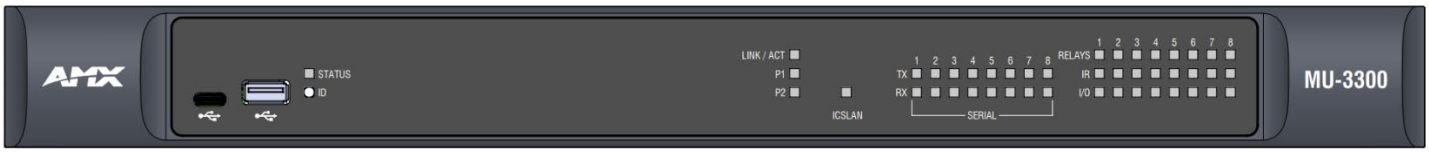
AMX
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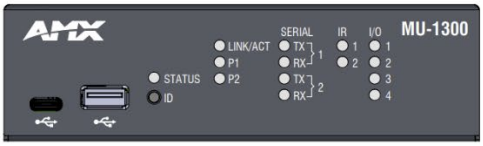
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ESD Warning

To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before touching any internal materials.

When working with any equipment manufactured with electronic devices, proper ESD grounding procedures must be followed to make sure people, products, and tools are as free of static charges as possible. Grounding straps, conductive smocks, and conductive work mats are specifically designed for this purpose. These items should not be manufactured locally, since they are generally composed of highly resistive conductive materials to safely drain static discharges, without increasing an electrocution risk in the event of an accident.

Anyone performing field maintenance should use an appropriate ESD field service kit complete with at least a dissipative work mat with a ground cord and a UL listed adjustable wrist strap with another ground cord.

IMPORTANT SAFETY INSTRUCTIONS

1. READ these instructions.
2. KEEP these instructions.
3. HEED all warnings.
4. FOLLOW all instructions.
5. DO NOT use this apparatus near water.
6. CLEAN ONLY with dry cloth.
7. DO NOT block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. DO NOT install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. DO NOT defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.
12. USE ONLY with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
14. REFER all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. DO NOT expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
16. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
17. Where the mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.
18. DO NOT overload wall outlets or extension cords beyond their rated capacity as this can cause electric shock or fire.

WATCH FOR THESE SYMBOLS:

The exclamation point, within an equilateral triangle, is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to persons.

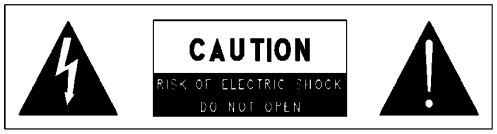
ESD Warning: The icon to the left indicates text regarding potential danger associated with the discharge of static electricity from an outside source (such as human hands) into an integrated circuit, often resulting in damage to the circuit.

WARNING: To reduce the risk of fire or electrical shock, do not expose this apparatus to rain or moisture.

WARNING: No naked flame sources – such as lighted candles – should be placed on the product.

CAUTION: To be installed by instructed, or skilled, persons only.

WARNING: This product is intended to be operated ONLY from the voltages listed on the back panel or the recommended, or included power supply of the product. Operation from other voltages other than those indicated may cause irreversible damage to the product and void the product's warranty. The use of AC Plug Adapters is cautioned because it can allow the product to be plugged into voltages in which the product was not designed to operate. If you are unsure of the correct operational voltage, please contact your local distributor and/or retailer. If the product is equipped with a detachable power cord, use only the type provided, or specified, by the manufacturer or your local distributor.



WARNING: Do Not Open! Risk of Electrical Shock. Voltages in this equipment are hazardous to life. No user-serviceable parts inside. Refer all servicing to qualified service personnel.

Place the equipment near a main power supply outlet and make sure that you can easily access the power breaker switch.

CAUTION*:* This product contains batteries that are covered under the 2006/66/EC European Directive, which cannot be disposed of with normal household waste. Please dispose of any used batteries properly, following any local regulations. Do not incinerate*.*

WARNING: 45°C (113 °F) is maximum ambient operating temperature. Avoid exposure to extreme heat or cold.

RACK MOUNTING:

A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips)."

FCC AND CANADA EMC COMPLIANCE INFORMATION:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAN ICES 003 (B)/NMB-3(B)

FCC SDOC SUPPLIER'S DECLARATION OF CONFORMITY:

HARMAN Professional, Inc. hereby declares that this equipment is in compliance with the FCC part 15 Subpart B.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Approved under the verification provision of FCC CFR Title 47 Part 15 Sub Part B.

Caution: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this device.

ENVIRONMENTAL:

该设备的设计和测试是在海拔 2000 米高度以下进行的, 它只适用在海拔2000 米以下的地区. 在海拔2000 米以上使用可能会导致潜在的安全隐患.

This device is designed and evaluated under the condition of altitude below 2000 meters above sea level; it can only be used in locations below 2000 meters above sea level. Using the device above 2000 meters could result in a potential safety hazard.

此标识适用于在中华人民共和国销售的电子信息产品. 标识中间的数字为环保实用期限的年数.

This logo applies to electronic information products sold in the People's Republic of China. The number in the middle of the logo is the number of years of environmental utility.

EU COMPLIANCE INFORMATION:

Hereby, Harman Professional, Inc. declares that the equipment type MU-1000/1300/2300/3300 is in compliance with the following: European Union Low Voltage Directive 2014/35/EU; European Union EMC Directive 2014/30/EU; European Union Restriction of Hazardous Substances Recast (RoHS2) Directive 2011/65/EU and as amended by 2015/863;

The full text of the EU declaration of conformity is available at the following internet address: https://www.amx.com/en/support_downloads/download_types/certification

WEEE NOTICE:

The WEEE Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), which entered into force as European law on 14/02/2014, resulted in a major change in the treatment of electrical equipment at end-of-life.

The purpose of this Directive is, as a first priority, the prevention of WEEE, and in addition, to promote the reuse, recycling and other forms of recovery of such wastes so as to reduce disposal. The WEEE logo on the product or on its box indicating collection for electrical and electronic equipment consists of the crossed-out wheeled bin, as shown below.

This product must not be disposed of or dumped with your other household waste. You are liable of dispose of all your electronic or electrical waste equipment by relocating over to the specified collection point for recycling of such hazardous waste. Isolated collection and proper recovery of your electronic and electrical waste equipment at the time of disposal will allow us to help conserving natural resources. Moreover, proper recycling of the electronic and electrical waste equipment will ensure safety of human health and environment. For more information about electronica and electrical waste equipment disposal, recovery, and collection points, please contact your local city center, household waste disposal service, shop from where you purchased the equipment, or manufacturer of the equipment.

Manufacturer Information:

HARMAN Professional, Inc.
Address: 8500 Balboa Blvd. Northridge, CA 91329 USA

EU Regulatory Contact:

Harman Professional Denmark ApS
Olof Palmes Allé 44, 8200 Aarhus N, Denmark

UK Regulatory Contact:

Harman Professional Solutions
2 Westside, London Road, Apsley, Hemel Hempstead, HP3 9TD, UK

Table of Contents

Contents

What's New?

Supports multiple Harman protocols natively

The MU-series controller speaks HControl, HiQnet, and ICSP right out of the box, allowing seamless integration with existing Harman gear. AMX touch panels, Crown DCi Amplifiers, BSS Contrio keypads and Soundweb London devices are all available to the controller from these communication buses. Future Harman gear that is HControl aware will all work with the MU-series controllers.

HControl

Harman HControl is a new protocol that provides self-describing devices that share their capabilities to HControl aware controllers. The readable and controllable parameters are furnished to the controller to allow dynamic updates of control possibilities.

Standard Language Scripting Support

Instead of using the proprietary NetLinx language for the business logic of a controlled space, the MU-series employs standard scripting languages. This currently includes:

- Python3
- JavaScript
- Java with Groovy

The use of standard languages opens the doors for the practically infinite resources available for learning and deploying these scripts. The programmer no longer has to go through AMX certification process to learn our specific language. They are free to take any course, read any book, or utilize any other resource they prefer to learn the available languages. Reaching out for questions is no longer limited to the AMX Forums or Tech Support. Industry favorite sites like Stack Overflow are there for reference and help.

Duet Module and Driver Design Module support

The MU-series platform still supports Duet and XDD modules. This gives you control of 1000s of devices from the AMX InConcert library. Complex devices like video conferencers and media servers will share the same uniform control set as they did in NetLinx, allowing you to integrate them without writing programs for their native API. Similar devices become interchangeable, so swapping out one display for another becomes a matter of pointing to a different XDD or Duet module. The controls the script sees are the same.

USB Host

The USB-A Host port is available for use with mass storage devices for convenient logging capabilities as well as to connect other devices such as the FLIRC IR receiver to add IR Hand Controls as an input to the system.

USB-C Program Port

The controller's CLI is available from the USB-C port allowing the programmer to connect directly to find and configure properties like the IP address, known devices, running programs, and many more. The symmetrical USB-C connector can be inserted in either orientation. Once plugged in, the MU Controller presents as a virtual COM port. Use your favorite terminal program to communicate to the MU directly.

ICSLan improvements

For models with ICSLan (MU-1000, MU-2300, MU-3300) the network address and subnet mask are now selectable, providing a more flexible control network. The ICSLan still provides an isolated network for controlled devices that never touches the LAN connection. IT departments only see the one LAN address for a complete system.

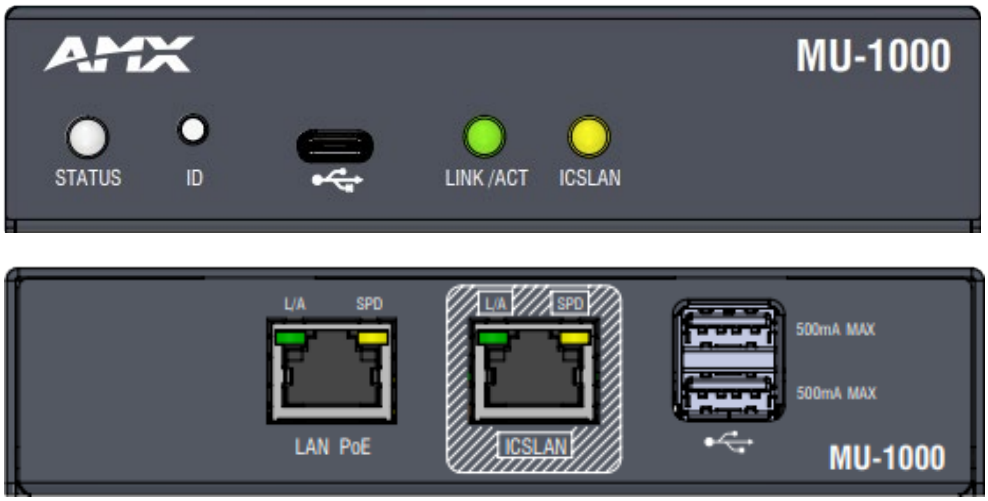
Features

MU-Series Controller Features

Name (SKU)	Features
MU-1000 (AMX-CCC000)	PoE Powered (802.3af – standard power) 1 LAN Ethernet port 1 ICSLan Control Network port Small form factor – 1” x 5” x 5” DIN Rail mountable with DIN Rail Clip (AMX-CAC0001) 4 GB DDR3 RAM 8 GB eMMC Storage 2x USB 2.0 Type A Host port 1x USB Type C program port
MU-1300 (AMX-CCC013)	1 LAN Ethernet port 1 RS-232 / RS-422 / RS-485 serial port 1 RS-232-only serial port 2 IR / Serial ports 4 Digital I/O ports Small form factor – 1 RU, 1/3 Rack Width 1 11/16” x 5 13/16” x 5 1/8” (42.16 mm x 147.32 mm x 130.81 mm) DIN Rail mountable with DIN Rail Clip (AMX-CAC0001) 4 GB DDR3 RAM 8 GB eMMC Storage 2x USB 2.0 Type A Host port 1x USB Type C program port
MU-2300 (AMX-CCC023)	1 LAN Ethernet port 1 RS-232 / RS-422 / RS-485 serial port 3 RS-232-only serial port 4 IR / Serial ports 4 Digital I/O ports 1 ICSLan Control Network Port Rack Mounted – 1 RU 4 GB DDR3 RAM 8 GB eMMC Storage 3x USB 2.0 Type A Host port 1x USB Type C program port
MU-3300 (AMX-CCC033)	1 LAN Ethernet port 2 RS-232 / RS-422 / RS-485 serial port 6 RS-232-only serial port 8 IR / Serial ports 8 Digital I/O ports 1 ICSLan Control Network Port Rack Mounted – 1 RU 4 GB DDR3 RAM 8 GB eMMC Storage 3x USB 2.0 Type A Host port 1x USB Type C program port

MU-1000

The MU-1000 (AMX-CCC000) has 4 GB of on-board DDR3 RAM, a commercial grade 8GB eMMC non-volatile memory storage chip and an ICSLan control network. It is PoE powered and has a small form factor for easy installation. It features the MUSE scripting engine which supports a variety of standard programming languages to create the business logic for the control system. A complete list of device specifications is listed below.



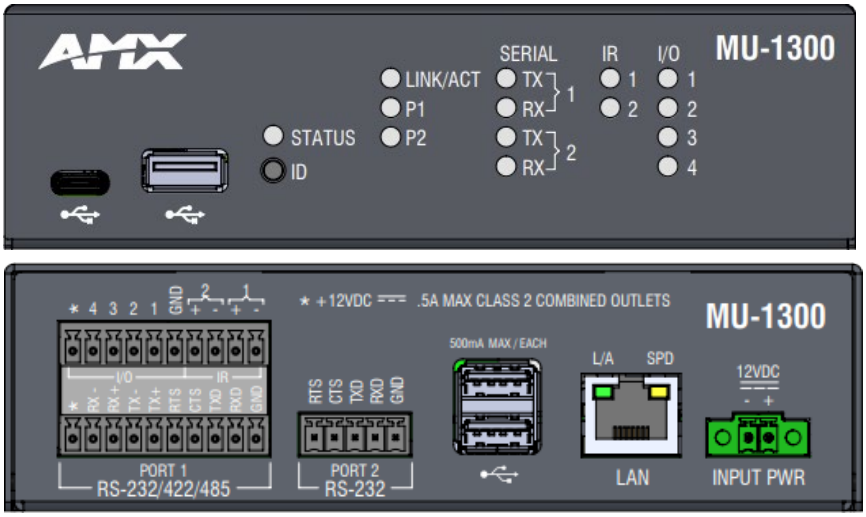
MU-1000 Specifications

Dimensions	5.14" x 5.04" x 1.18" (130.5 x 128 x 30 mm)
Power Requirements	PoE 36-57V @ 350mA Max
Power Consumption	15.4W Maximum - PoE 802.3af Class 0
Mean Time Between Failure (MTBF)	100000 hours
Memory	4 GB DDR3 RAM 8 GB eMMC
Weight	1.26 lbs (572g)
Enclosure	Powder Coated Steel – Gray Pantone 10393C
Certifications	• ICES 003 • CE EN 55032 • AUS/NZ CISPR 32 • CE EN 55035 • CE EN 62368-1 • IEC 62368-1 • UL 62368-1 • VCCI CISPR 32 • RoHS / WEEE compliant
Front Panel Components	
Status LED	RGB LED – see Status LED Detailed Description
ID button	ID pushbutton used during boot to revert to factory configuration or factory firmware
USB-C Program Port	Connection to PC for virtual terminal for MU configuration
LAN Link/Activity LED	Lit when connected to a network. Blinks upon network activity
ICSLan Link/Activity LED	Lit when connected to a network. Blinks upon network activity
Rear Panel Components	
LAN Port	RJ-45 10/100 BASE-T for Ethernet communication and PoE Auto MDI/MDI-X DHCP Client

…MU-1000 specifications continued	
ICSLan Port	RJ-45 10/100 BASE-T for Ethernet communication Auto MDI/MDI-X DHCP server Provides isolated control network
USB Host Port	2x Type-A USB host port • USB Mass Storage – for external logging • FLIRC – IR Receiver for IR hand control input
General Specifications:	
Operating Environment	• Operating Temperature: 32° F (0° C) to 122° F (50° C) • Storage Temperature: 14° F (-10° C) to 140° F (60° C) • Operating Humidity: 5% to 85% RH • Heat Dissipation (On): 10.2 BTU/hr
Included Accessories	None

MU-1300

The MU-1300 (AMX-CCC013) has 4 GB of on-board DDR3 RAM, a commercial grade 8GB eMMC non-volatile memory storage chip and an ICSLan control network. It is a small form factor for easy installation. It features the MUSE scripting engine which provides a variety of standard programming languages to create the business logic for the control system. A complete list of device specifications is listed below.



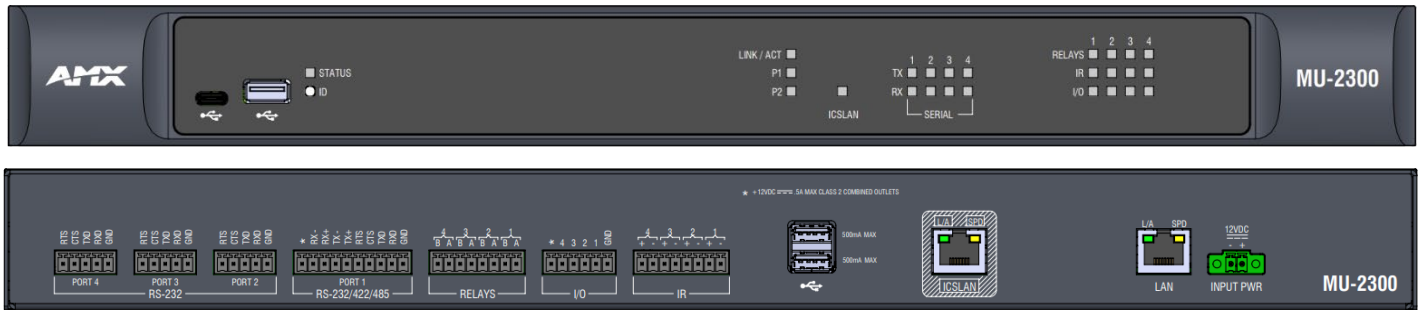
MU-1300 Specifications

Dimensions	5.8" x 5.16" x 1.66" (147.32mm x 131mm x 42.16 mm)
Power Requirements	• DC input voltage (typical): 12 VDC • DC current draw: 2.17A Max • DC range, voltage: 9-18 VDC
Power Consumption	26 Watts Max
Mean Time Between Failure (MTBF)	100000 hours
Memory	4 GB DDR3 RAM 8 GB eMMC
Weight	1.58 lb (718g)
Enclosure	Powder Coated Steel – Gray Pantone 10393C
Certifications	• ICES 003 • CE EN 55032 • AUS/NZ CISPR 32 • CE EN 55035 • CE EN 62368-1 • IEC 62368-1 • UL 62368-1 • VCCI CISPR 32 • RoHS / WEEE compliant
Front Panel Components	
Status LED	RGB LED – see Status LED Detailed Description
ID button	ID pushbutton used during boot to revert to factory configuration or factory firmware
USB-C Program Port	Connection to PC for virtual terminal for MU configuration
USB-A Host Port	Type-A USB host port • USB Mass Storage – for external logging • FLIRC – IR Receiver for IR hand control input
LAN Link/Activity LED	Lit when connected to a network. Blinks upon network activity

…MU-1300 specifications continued	
P1 / P2 LED	Programmable LEDs available to control scripts
Serial TX / RX LED	Activity LEDs for each port in each direction. Blinks on activity.
IR TX LED	Activity LEDs for the IR/Serial port. Blinks on transmission.
I/O LED	LED indication of I/O Status. On for digital input or output active
Rear Panel Components	
Power	3.5mm Phoenix 2-pin connector with retention screws for 12vdc input
LAN Port	RJ-45 10/100 BASE-T for Ethernet communication Auto MDI/MDI-X DHCP Client
Serial Port 2	3.5mm Phoenix 5-pin connector. RS232 with hardware handshaking
20 pin double stack Phoenix connector	All remaining device control connections: • Lower 10 pins – RS-232/422/485 plus hw handshaking + power • Upper Left 6 pins – 4 Input/Output plus Ground and Power • Upper Right 4 pins – 2x IR/Serial output ports
USB Host Port	2x Type-A USB host port • USB Mass Storage – for external logging • FLIRC – IR Receiver for IR hand control input
General Specifications:	
Operating Environment	• Operating Temperature: 32° F (0° C) to 122° F (50° C) • Storage Temperature: 14° F (-10° C) to 140° F (60° C) • Operating Humidity: 5% to 85% RH • Heat Dissipation (On): 10.2 BTU/hr
Included Accessories	• 1x 2-pin 3.5 mm mini-Phoenix PWR connector • 1x 6-pin 3.5 mm mini-Phoenix I/O connector • 1x 10-pin 3.5mm mini-Phoenix RS232/422/485 connector • 1x 5-pin 3.5mm mini-Phoenix RS232 connector • 1x CC-NIRC, IR Emitters (FG10-000-11)

MU-2300

The MU-2300 (AMX-CCC023) has 4 GB of on-board DDR3 RAM, a commercial grade 8GB eMMC non-volatile memory storage chip and an ICSLan control network. It is built for installing in an equipment rack. It features the MUSE scripting engine which provides a variety of standard programming languages to create the business logic for the control system. A complete list of device specifications is listed below.



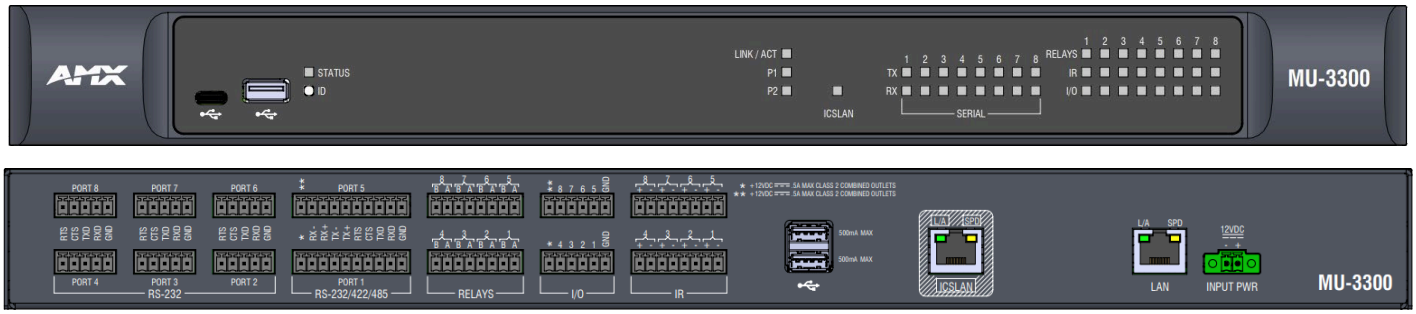
MU-2300 Specifications

Dimensions	1 RU - 17.32" x 9.14" x 1.7" (440mm x 232.16mm x 43.3 mm)
Power Requirements	• DC input voltage (typical): 12 VDC • DC current draw: 3A Max • DC range, voltage: 9-18 VDC
Power Consumption	36 Watts Max
Mean Time Between Failure (MTBF)	100000 hours
Memory	4 GB DDR3 RAM 8 GB eMMC
Weight	6.05 lb (2.75kg)
Enclosure	Powder Coated Steel – Gray Pantone 10393C
Certifications	• ICES 003 • CE EN 55032 • AUS/NZ CISPR 32 • CE EN 55035 • CE EN 62368-1 • IEC 62368-1 • UL 62368-1 • VCCI CISPR 32 • RoHS / WEEE compliant
Front Panel Components	
Status LED	RGB LED – see Status LED Detailed Description
ID button	ID pushbutton used during boot to revert to factory configuration or factory firmware
USB-C Program Port	Connection to PC for virtual terminal for MU configuration
USB-A Host Port	Type-A USB host port • USB Mass Storage – for external logging • FLIRC – IR Receiver for IR hand control input
LAN Link/Activity LED	Lit when connected to a network. Blinks upon network activity
P1 / P2 LED	Programmable LEDs available to control scripts
Serial TX / RX LED	Activity LEDs for each port in each direction. Blinks on activity.
IR TX LED	Activity LEDs for the IR/Serial port. Blinks on transmission.
I/O LED	LED indication of I/O Status: On for digital input or output active
Relay LED	LED indication of Relay state: On for engaged relay

…MU-2300 Specifications continued	
Rear Panel Components	
Power	3.5mm Phoenix 2-pin connector with retention screws for 12vdc input
LAN Port	RJ-45 10/100 BASE-T for Ethernet communication Auto MDI/MDI-X DHCP Client
ICSLan Port	RJ-45 10/100 BASE-T for Ethernet communication Auto MDI/MDI-X DHCP server Provides isolated control network
RS-232/422/485 Port 1	3.5mm Phoenix 10-pin connector • 12VDC @0.5A • RX- Balanced line input for RS-422/485 • RX+ Balanced line input for RS-422/485 • TX- Balanced line output for RS-422/485 • TX+ Balanced line output for RS-422/485 • RTS Ready to Send for Hardware Handshaking • CTS Clear to Send for Hardware Handshaking • TXD Unbalanced line output for RS-232 • RXD Unbalanced line input for RS-232 • GND – Signal ground for RS-232
RS-232 Ports 2-4	3.5mm Phoenix 5 pin connector • RTS Ready to Send for Hardware Handshaking • CTS Clear to Send for Hardware Handshaking • TXD Unbalanced line output for RS-232 • RXD Unbalanced line input for RS-232 • GND – Signal ground for RS-232
Relays 1-4	3.5mm Phoenix 8 pin connector 4 pairs – Contact Closure output for Normally Open contact
IR 1-4	3.5mm Phoenix 8 pin connector 4 pairs – IR/Serial output + ground
I/O 1-4	3.5mm Phoenix 6 pin connector • 12VDC @0.5A • 4x I/0 pins configurable as Analog In, Digital In, or Digital Out • Ground
USB Host Port	2x Type-A USB host port • USB Mass Storage – for external logging • FLIRC – IR Receiver for IR hand control input
General Specifications:	
Operating Environment	• Operating Temperature: 32° F (0° C) to 122° F (50° C) • Storage Temperature: 14° F (-10° C) to 140° F (60° C) • Operating Humidity: 5% to 85% RH • Heat Dissipation (On): 10.2 BTU/hr
Included Accessories	• 1x 2-pin 3.5 mm mini-Phoenix PWR connector • 1x 6-pin 3.5 mm mini-Phoenix I/O connector • 1x 10-pin 3.5mm mini-Phoenix RS232/422/485 connector • 3x 5-pin 3.5mm mini-Phoenix RS232 connectors • 2x CC-NIRC, IR Emitters (FG10-000-11) • 2x removable rack ears

MU-3300

The MU-3300 (AMX-CCC033) has 4 GB of on-board DDR3 RAM, a commercial grade 8GB eMMC non-volatile memory storage chip and an ICSLan control network. It is built for installation in an equipment rack. It features the MUSE scripting engine which provides a variety of standard programming languages to create the business logic for the control system. A complete list of device specifications is listed below.



MU-3300 Specifications

Dimensions	1 RU - 17.32" x 9.14" x 1.7" (440mm x 232.16mm x 43.3 mm)
Power Requirements	• DC input voltage (typical): 12 VDC • DC current draw: 3A • DC range, voltage: 9-18 VDC
Power Consumption	36 Watts Max
Mean Time Between Failure (MTBF)	100000 hours
Memory	4 GB DDR3 RAM 8 GB eMMC
Weight	6.26 lb (2.84kg)
Enclosure	Powder Coated Steel – Gray Pantone 10393C
Certifications	• ICES 003 • CE EN 55032 • AUS/NZ CISPR 32 • CE EN 55035 • CE EN 62368-1 • IEC 62368-1 • UL 62368-1 • VCCI CISPR 32 • RoHS / WEEE compliant
Front Panel Components	
Status LED	RGB LED – see Status LED Detailed Description
ID button	ID pushbutton used during boot to revert to factory configuration or factory firmware
USB-C Program Port	Connection to PC for virtual terminal for MU configuration
USB-A Host Port	Type-A USB host port • USB Mass Storage – for external logging • FLIRC – IR Receiver for IR hand control input
LAN Link/Activity LED	Lit when connected to a network. Blinks upon network activity
P1 / P2 LED	Programmable LEDs available to control scripts
Serial TX / RX LED	Activity LEDs for each port in each direction. Blinks on activity.
IR TX LED	Activity LEDs for the IR/Serial port. Blinks on transmission.
I/O LED	LED indication of I/O Status: On for digital input or output active
Relay LED	LED indication of Relay state: On for engaged relay

…MU-3300 Specifications continued	
Rear Panel Components	
Power	3.5mm Phoenix 2-pin connector with retention screws for 12vdc input
LAN Port	RJ-45 10/100 BASE-T for Ethernet communication Auto MDI/MDI-X DHCP Client
ICSLan Port	RJ-45 10/100 BASE-T for Ethernet communication Auto MDI/MDI-X DHCP server Provides isolated control network
RS-232/422/485 Port 1 & 5	3.5mm Phoenix 10-pin connector • 12VDC @0.5A • RX- Balanced line input for RS-422/485 • RX+ Balanced line input for RS-422/485 • TX- Balanced line output for RS-422/485 • TX+ Balanced line output for RS-422/485 • RTS Ready to Send for Hardware Handshaking • CTS Clear to Send for Hardware Handshaking • TXD Unbalanced line output for RS-232 • RXD Unbalanced line input for RS-232 • GND – Signal ground for RS-232
RS-232 Ports 2-4 & 6-8	3.5mm Phoenix 5 pin connector • RTS Ready to Send for Hardware Handshaking • CTS Clear to Send for Hardware Handshaking • TXD Unbalanced line output for RS-232 • RXD Unbalanced line input for RS-232 • GND – Signal ground for RS-232
Relays 1-8	3.5mm Phoenix 8 pin connector 4 pairs – Contact Closure output for Normally Open contact
IR 1-8	3.5mm Phoenix 8 pin connector 4 pairs – IR/Serial output + ground
I/O 1-8	3.5mm Phoenix 6 pin connector • 12VDC @0.5A • 4x I/0 pins configurable as Analog In, Digital In, or Digital Out • Ground
USB Host Port	2x Type-A USB host port • USB Mass Storage – for external logging • FLIRC – IR Receiver for IR hand control input
General Specifications:	
Operating Environment	• Operating Temperature: 32° F (0° C) to 122° F (50° C) • Storage Temperature: 14° F (-10° C) to 140° F (60° C) • Operating Humidity: 5% to 85% RH • Heat Dissipation (On): 10.2 BTU/hr

Included Accessories	• 1x 2-pin 3.5 mm mini-Phoenix PWR connector • 2x 6-pin 3.5 mm mini-Phoenix I/O connectors • 2x 8-pin 3.5 mm mini-Phoenix Relay connectors • 2x 10-pin 3.5mm mini-Phoenix RS232/422/485 connectors • 6x 5-pin 3.5mm mini-Phoenix RS232 connectors • 2x CC-NIRC, IR Emitters (FG10-000-11) • 2x removable rack ears

Mounting the controller

Mounting the MU-2300 and MU-3300

Use the rack-mounting brackets (supplied with the MU-2300/3300) for equipment rack installations. Remove the mounting brackets and apply the rubber feet to the bottom of the controller for flat surface installations.

Installing the Controller into an Equipment Rack

The MU-2300/3300 each ship with removable rack ears for installation into an equipment rack. The following instructions apply to the MU-2300/3300.

Rack Mount Safety Instructions

Be sure to follow these important safety instructions when installing your central controller:

- If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature 60°C (140°F).
- Installing the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mounting the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

NOTE: *To avoid repeating the installation, test the incoming wiring by connecting the Controller's connectors to their terminal locations and applying power. Verify that the unit is receiving power and functioning properly. Disconnect the terminal end of the power cable from the connected 12 VDC-compliant power supply.*

1. Use the supplied #8-32 screws to secure the rack ears to the sides of the controller. You can attach the rack ears toward the front or rear panel for either a front-facing or rear-facing installation.

2. Slide the unit into the rack until the attachment holes, along both sides, align to their corresponding locations on the mounting brackets

3. Thread the cables through the opening in the equipment rack. Allow for enough slack in the cables to accommodate for movement during the installation process.

4. Reconnect all cables to their appropriate source/terminal locations. Refer to the Wiring and Connections section on page XXX for more detailed wiring and connection information. Verify that the terminal end of the power cable is not connected to the power supply before plugging in the 2-pin power connector

5. Secure the controller to the rack by using the four #10-32 screws supplied in the kit.

6. Apply power to the unit to complete the installation.

Mounting the MU-1000 and MU-1300

Mounting options for the MU-1000 and MU-1300 are as follows:

- Rack mounting with an AVB-VSTYLE-RMK-1U, V Style Module Rack Mounting Tray (FG1010-720)
- Surface mounting with an AVB-VSTYLE-SURFACE-MNT, V Style Single Module Surface Mount (FG1010-722)
- DIN Rail mounting with a VSTYLE DIN Rail Clip (AMX-CAC0001)

Consult the Mounting Options for V Style Modules Quick Start Guide included with the respective mounting kit for instructions on mounting the MU-1000 and MU-1300. The MU-1000 and MU-1300 also have rubber feet which you can apply to the bottom of the unit for table-top mounting.

Front Panel Components

The following sections list the front panel components on the MU-series controllers. Each component is featured on all MU-series controllers except where noted.

Program Port

The front panel of all models features one USB-C port for connecting the controller to a PC via USB cable.

The Program port uses a standard Type-C-to-Type-A or Type-C-to-Type-C USB cable that supports USB 2.0/1.1 signals to connect to a PC. When connected, you can se your favorite terminal program to communicate to the MU directly.

FIG. 9 Program port

USB Port

The front panel of all models except the MU-1000 features one Type-A USB port you can use to connect a mass storage device.

NOTE: This USB port only supports a FAT32 f ile system.

This USB port (FIG. 10) uses standard USB cabling to connect to any mass storage or peripheral devices.

FIG. 10 USB port

NOTE: USB hubs are not supported on this port.

LEDs

This section details the various LEDs on the front panel of the MU-series controllers.

General Status LEDs

The General Status LEDs include the Link/Activity and Status LEDs. These LEDs appear on all models of MU-series controllers.

- Link/Act - Lights green when the link is up and toggles off when a data packet is sent or received.
- Status - The MU-series features one visible-light tri-color status LED. The following table lists the LED colors and patterns of the status LED.

Color	Rate	Status
Yellow	Solid	Booting

Green	Solid	Booted
Green	1Hz	Program running
Blue	3Hz	Firmware transfer
White	3Hz	Locate
White	3Hz	ID Button Held (no action)
Yellow	3Hz	ID Button Held (Config reset)
Red	3Hz	ID Button Held (Factory reset)

ICSLAN LEDs

The ICSLAN LEDs light green when there is an active link on the corresponding ICSLAN port. The light toggles off when a data packet is sent or received.

The MU-1000, MU-2300 and MU-3300 each have one ICSLAN LED

SERIAL LEDs

The SERIAL LEDs are two sets of LEDs which light to indicate that the RS-232 ports are transmitting or receiving RS-232, 422, or 485 data (red = TX, yellow = RX). The light toggles on when a data packet is sent or received.

The MU-3300 has two sets of eight SERIAL LEDs. The MU-2300 has two sets of four LEDs. TheMU-1300 has two sets of two LEDs

RELAYS LEDs

The RELAYS LEDs light red to indicate that the corresponding relay port is active. The light toggles off when the relay port is not engaged.

The MU-3300 has eight RELAY LEDs. The MU-2300 has four RELAY LEDs.

IR/SERIAL LEDs

The IR/SERIAL LEDs light red to indicate that the corresponding IR/Serial port is transmitting data.

The MU-3300 has eight IR/SERIAL LEDs. The MU-2300 has four IR/SERIAL LEDs. The MU-1300 has two IR LEDs.

I/O LEDs

The I/O LEDs light yellow to indicate that the corresponding I/O port is active.

The MU-3300 has eight I/O LEDs. The MU-1300 and MU-2300 have four I/O LEDs.

Wiring and Connections

Overview

This chapter provides details, specifications, wiring diagrams, and other important information for all port and connectors available on the MU-series controllers.

Serial Ports

The MU-series controllers each feature device control serial ports that support either RS-232 or RS-232, RS-422, and RS-485 communication protocols. Each port supports the following specifications:

- XON/XOFF (transmit on/transmit off)
- CTS/RTS (clear to send/ready to send)
- 300-115,200 baud rate

RS-232 Ports

The RS-232 ports (ports 2-4 and 5-8 on the MU-3300; ports 2-4 on the MU-2300; port 2 on the MU-1300) are 5-pin 3.5 mm Phoenix connectors used for connecting A/V sources and displays. These ports support most standard RS-232 communication protocols for data transmission.

The following table lists the pinouts for the RS-232 ports.

RS-232 Port Pinout	
Signal	Function
GND	Signal Ground
RXD	Receive Data
TXD	Transmit Data
CTS	Clear to Send

RS-232/422/485 Ports

The RS-232/422/485 ports (ports 1 and 5 on the MU-3300; port 1 on the MU-1300/2300) are 10-pin 3.5 mm Phoenix connectors used for connecting A/V sources and displays

These ports support most standard RS-232, RS-422, and RS-485 communication protocols for data transmission.

RS-232/422/485 Pinout						
		Port Configuration				
Signal	Function	RS-232	RS-422	RS-485		
GND	Signal Ground	X				
RXD	Receive Data	X				
TXD	Transmit Data	X				
CTS	Clear to Send	X				
RTS	Request to Send	X				
TX+	Transmit Data		X	X	strap to RX+	
TX-	Transmit Data		X	X	strap to RX-	
RX+	Receive Data		X	X	strap to TX+	
RX-	Receive Data		X	X	strap to TX-	
12VDC	Power					

Relay Ports

Relay Pinout			
Signal	Function	Signal	Function
1A	Relay 1 Common	1B	Relay 1 NO
2A	Relay 2 Common	2B	Relay 2 NO
3A	Relay 3 Common	3B	Relay 3 NO
4A	Relay 4 Common	4B	Relay 4 NO
5A	Relay 5 Common	5B	Relay 5 NO
6A	Relay 6 Common	6B	Relay 6 NO
7A	Relay 7 Common	7B	Relay 7 NO
8A	Relay 8 Common	0B	Relay 8 NO

- Connectors are labeled A and B
- These relays are independently controlled, isolated and normally open
- The relay contacts are rated for a maximum of 1 A @ 0-24 VAC or 0-28 VDC (resistive load)
- If desired, a metal connector strip is provided to distribute 'common' among multiple relays.

I/O Ports

Configurable as voltage sensing or digital output

I/O – Pinout	
Signal	Function
GND	Signal Ground
1-4	Individually configurable I/O
+12vdc	Vcc

- Each pin is individually configurable as a voltage sense input or a digital output
- Threshold settings are available to determine the high/low points for the digital input and the required voltage change to generate an update
- Digital Output can push or pull 100mA

IR/SERIAL Port

Configurable as IR control emulation or 1-way serial

IR/S Port Pinout – MU-2300 & MU-3300 lower port			
Signal	Function	Signal	Function
1-	IR 1 GND	3-	IR 3 GND
1+	IR 1 Signal	3+	IR 3 Signal
2-	IR 2 GND	4-	IR 4 GND
2+	IR 2 Signal	4+	IR 4 Signal

IR/S Port Pinout – MU-3300 upper port			
Signal	Function	Signal	Function
5-	IR 5 GND	7-	IR 7 GND
5+	IR 5 Signal	7+	IR 7 Signal
6-	IR 6 GND	8-	IR 8 GND
6+	IR 6 Signal	8+	IR 8 Signal

- Each pair is configurable as IR or 1-way RS-232
- Baud rates for RS-232 are limited. Maximum Baud is 19200 in DATA mode
- RS-232 voltages are 0-5v, not +-12v. This limits the maximum distance based on the cable resistance to <10 ft
- IR carrier frequency up to 1.142 MHz
- All ports can be used simultaneously
- These ports accept an IR Emitter (CC-NIRC) that mounts onto the device's IR receiver window

ICSLAN Ports

The MU-1000/2300/3300 controllers have two types of Ethernet ports: LAN and ICSLAN.
The LAN port is used to connect the controller to an external network, and the ICSLAN ports are used to connect to other AMX equipment or third-party A/V equipment. The ICSLAN ports on all models provide Ethernet Communication to connected AMX Ethernet Equipment in a way that is isolated from the primary LAN connection. The ICSLAN port is a 10/100 Port RJ-45 connector and Auto MDI/MDI-X enabled. The controller will listen on either port for Harman communication buses such as ICSP, HiQnet, and HControl.

Using the ICSLAN Network

ICSLan Network Settings

The default IP address for the ICSLAN network is 198.18.0.1 with a subnet mask of 255.255.0.0. You are able to set the subnet mask and network address for ICSLan on the MU controller's built in web server.

Note: It is important that the ICSLAN and LAN subnets do not overlap. If the LAN port is configured such that its address space overlaps with the ICSLAN network, the ICSLAN network will be DISABLED.

DHCP Server

The ICSLAN port has a built-in DHCP server. This DHCP server is enabled by default and will serve IP addresses to any connected devices set to DHCP mode. The DHCP server can be disabled from the MU controller's built in web server The DHCP address range is assigned to half the available IP addresses in the assign subnet.

Opening LAN and ICSLAN Sockets from Code

When opening sockets from any script there is no mechanism to indicate which network to use. The controller will open the socket on whichever network has an IP subnet that matches the address provided in the command to open the socket. There is no indication which network was used, only whether the socket was created successfully.

LAN 10/100 Port

All MU-series controllers feature a LAN 10/100 port to provide 10/100 Mbps communication via Category cable. This is an Auto MDI/MDI-X enabled port, which allows you to use either straight-through or crossover Ethernet cables. The port support IPv4 and IPv6 networks, as well as HTTP, HTTPS, Telnet, and FTP.
The LAN port automatically negotiates the connection speed (10 Mbps or 100 Mbps), and whether to use half duplex or full duplex mode.
The LAN port gets its IP address(es) in one or more of the following ways:

IPv4

- Static assignment by the user
- Dynamic assignment by an IPv4 DHCP server
- Link local as a fall back when configured for DHCP but unable to successfully obtain address

IPv6

- Link local address
- Prefix(es) assigned by a router

INPUT PWR Connector

The MU-1300, MU-2300 and MU-3300 controllers feature a 2-pin 3.5 mm Phoenix connector with screw retention for providing DC power to the controller. The suggested power supply for the MU-series controllers is a 13.5 VDC 6.6 A output, suitable for 50° C.

Preparing Captive Wires

You will need a wire stripper and flat-blade screwdriver to prepare and connect the captive wires.

NOTE: Never pre-tin wires for compression-type connections.

1. Strip 0.25 inch (6.35mm) of insulation off all wires.

2. Insert each wire into the appropriate opening on the connector (according to the wiring diagrams and connector types described in this section).

3. Tighten the screws to secure the wire in the connector. Do not tighten the screws excessively, as doing so may strip the threads and damage the connector.

ID Pushbutton

All MU-series controllers feature an ID pushbutton which you can use to reset the default settings on the controller or restore the controller to its factory firmware image.

The ID Pushbutton functionality is as follows:

- A Quick press will send out an HControl "Identify" message
- Press & hold for 10 seconds will perform a configuration factory reset
- Press & hold for 20 seconds will perform a configuration factory reset including return to factory firmware.

A factory reset performs the following operations:

- All user scripts (Python, Groovy, JavaScript) and libraries are deleted
- All manually installed extensions are uninstalled
- All manually configured repositories are removed
- All device instance files are removed
- All Plug-in configuration items are reset to their defaults
- All SMTP servers are removed
- ICSP authentication/encryption returns to "off"
- All bound NDP devices are unbound (TBD)
- All IRL files are removed
- All installed HiQnet AudioArchitect files are removed
- HiQnet node id returns to default
- All Duet module .jar files are removed
- Network configuration is returned to defaults
- LAN returns to DHCP client mode, hostname returns default value
- ICSLan returns to DHCP Server mode on octets 198.18.0.x
- 802.1x is disabled
- Network time is disabled
- NTP servers are cleared
- Time will coast using the real-time clock
- Time zone returns to default
- User accounts are deleted
- The default credentials of "admin" with default "password" are restored
- "support" user is disabled
- Any configured syslog server is disabled and cleared
- Any configured flash media logging is disabled
- Any manually installed certificates are removed
- Factory certificates for HControl, HTTPS and Secure ICSP are restored
- Device control ports return to default state
- IRL files are cleared
- Serial port comm parameters return to their default (9600, 8 data bits, 1 stop bit, No parity, 422/485 disabled)
- All I/O's return to digital input mode with default threshold values

LED Patterns

The MU-series features one visible-light tri-color status LED.

Color	Rate	Status
Yellow	Solid	Booting
Green	Solid	Booted
Green	1Hz	Program running
Blue	3Hz	Firmware transfer
White	3Hz	Locate
White	3Hz	ID Button Held (no action)
Yellow	3Hz	ID Button Held (Config reset)
Red	3Hz	ID Button Held (Factory reset)

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