Crestron MM-DS-12 MediaManifold® High-Definition CATV Distribution System

Operations & Installation Guide

CRESTRON®

Regulatory Compliance

As of the date of manufacture, the MM-DS-12 has been tested and found to comply with specifications for CE marking.

CE

Federal Communications Commission (FCC) Compliance Statement

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

CAUTION: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

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

Industry Canada (IC) Compliance Statement

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

Contents

MediaManifold CATV Distribution System: MM-DS-12

Introduction

The Crestron® MediaManifold® MM-DS-12 is a 12-zone bidirectional CATV distribution amplifier featuring individual gain and tilt adjustment on every output. The MM-DS-12 integrates all of the elements of a complete professional headend into a single compact module. High power and headroom combine with low noise and distortion to deliver exceptional performance for distributing both analog and digital cable TV signals.*

Features and Functions

- 12-zone CATV distribution system
- Expandable from 24 to 576 zones
- High-power, high-headroom, low-noise, and low-distortion
- Supports bidirectional cable runs up to 300 feet (91 meters) each
- Individual gain and tilt adjustments per zone
- Automatic setup using MM-HTDR Cable Analyzer
- Built-in cable modem output and modulator input
- Compact surface wall-mount design

Simplicity without Compromise

Designing and installing a high-performance residential or small commercial cable TV system is easy with the MM-DS-12. The MM-DS-12 eliminates the numerous splitters, combiners, amplifiers, and cables that make up an ordinary distribution system, replacing them all with a single, compact surface-mount module. Each of its 12 zone outputs supports up to 300 feet (91 meters) of homerun RG6 coaxial cable feeding a single television or set-top box. An additional output is provided for cable modem and digital phone, and an external modulator can also be connected to enable signals from security cameras and other video sources to be combined and distributed along with the main cable TV channels.

* Not compatible with systems utilizing a MoCA (Multimedia over Coax Alliance) based media service such as Verizon FiOS®.

Automatic Adjustment

Compared to conventional CATV distribution amps, MediaManifold offers much greater capability for proper adjustment, providing independent gain and tilt settings for every zone. Adjusting these settings is extremely easy with MediaManifold. Simply by entering the cable length for each zone, the MM-DS-12 sets the optimum gain and tilt settings automatically.

Determining the cable lengths is also very simple using the optional MM-HTDR Cable Analyzer.* The MM-HTDR employs state-of-the-art "time domain reflectometry" to determine the length and integrity of each RG6 cable run. At the press of a button, the MM-HTDR analyzes the cable and transfers the length measurement to the MM-DS-12, setting the appropriate gain and tilt values automatically.

Easy Expansion

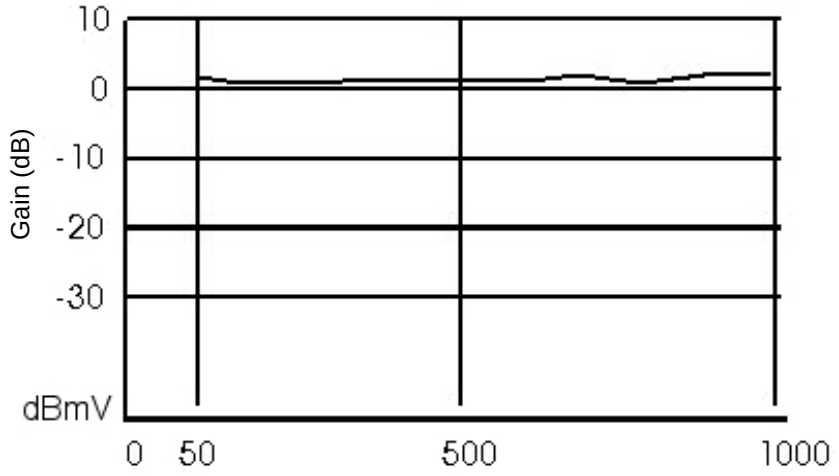
Adding the MM-DE-12 MediaManifold Expander* provides 12 additional output zones. Housed in an identical compact module, the MM-DE-12 connects to the MM-DS-12 using three “F” cables, supporting 24 zones total with automatic gain and tilt adjustment for every zone output. Additional zones can be achieved by cascading any zone connection to a second MediaManifold system, enabling complete systems of over 500 zones.

Theory

Original Signal

The originating signal from the local cable operator is a mostly flat signal at approximately 0 dBmV as shown in the following diagram.

Originating Cable Signal



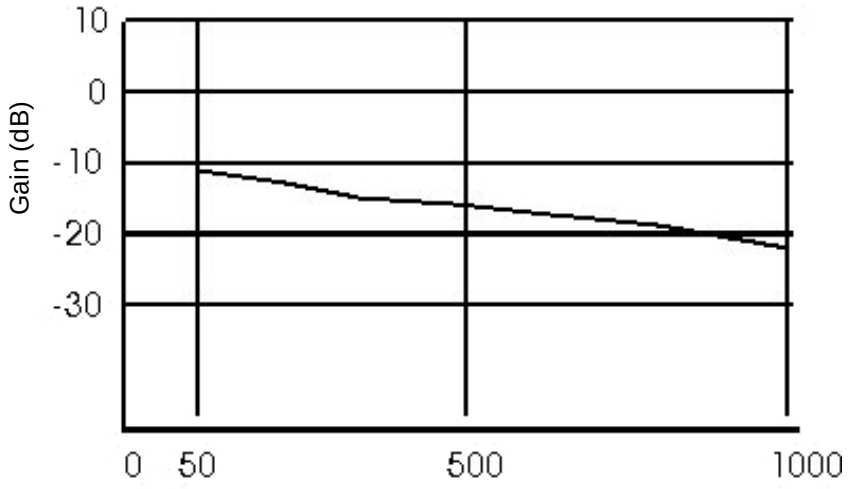
Freq. Response After 5 ft (1.5 m) of Cable

* Sold separately.

Cable Drop

When using longer length cable runs, the overall signal strength drops while the signal strength at the higher frequencies has a greater decrease as shown in the following diagram.

Frequency Response on 300 Feet of Cable without Gain or Tilt Compensation

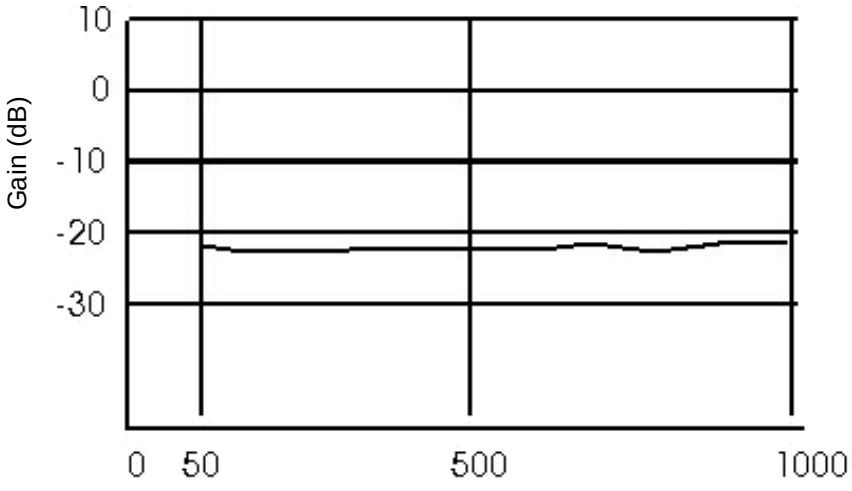


Cable Drop at 300 ft (91 m)

Setting the Cable Length

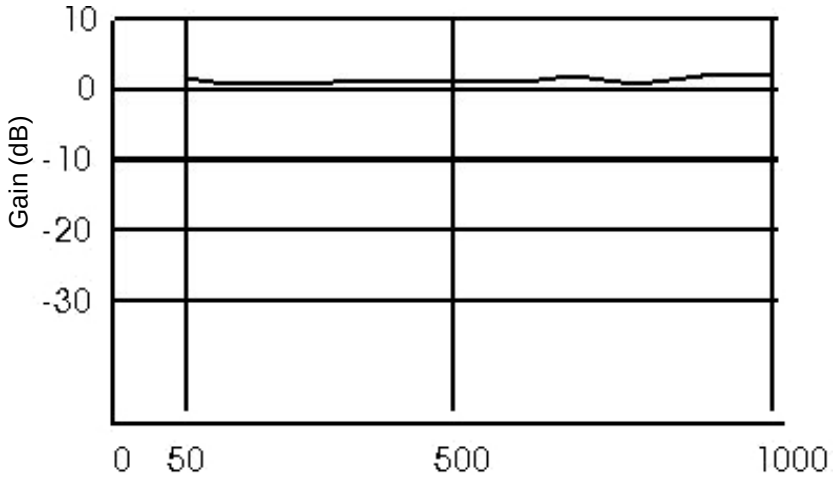
Setting the cable length on the MM-DS-12 lowers the signal strength of the low-end frequencies to the level of the high-end frequencies (tilt) and raises the signal strength (gain) to match the original input signal. Refer to the following diagrams.

Frequency Response on 300 Feet of Cable with Tilt Compensation (No Gain Adjustment)



Freq. Response After Tilt Correction - 13 dB

Frequency Response on 300 Feet of Cable with Tilt and Gain Compensation

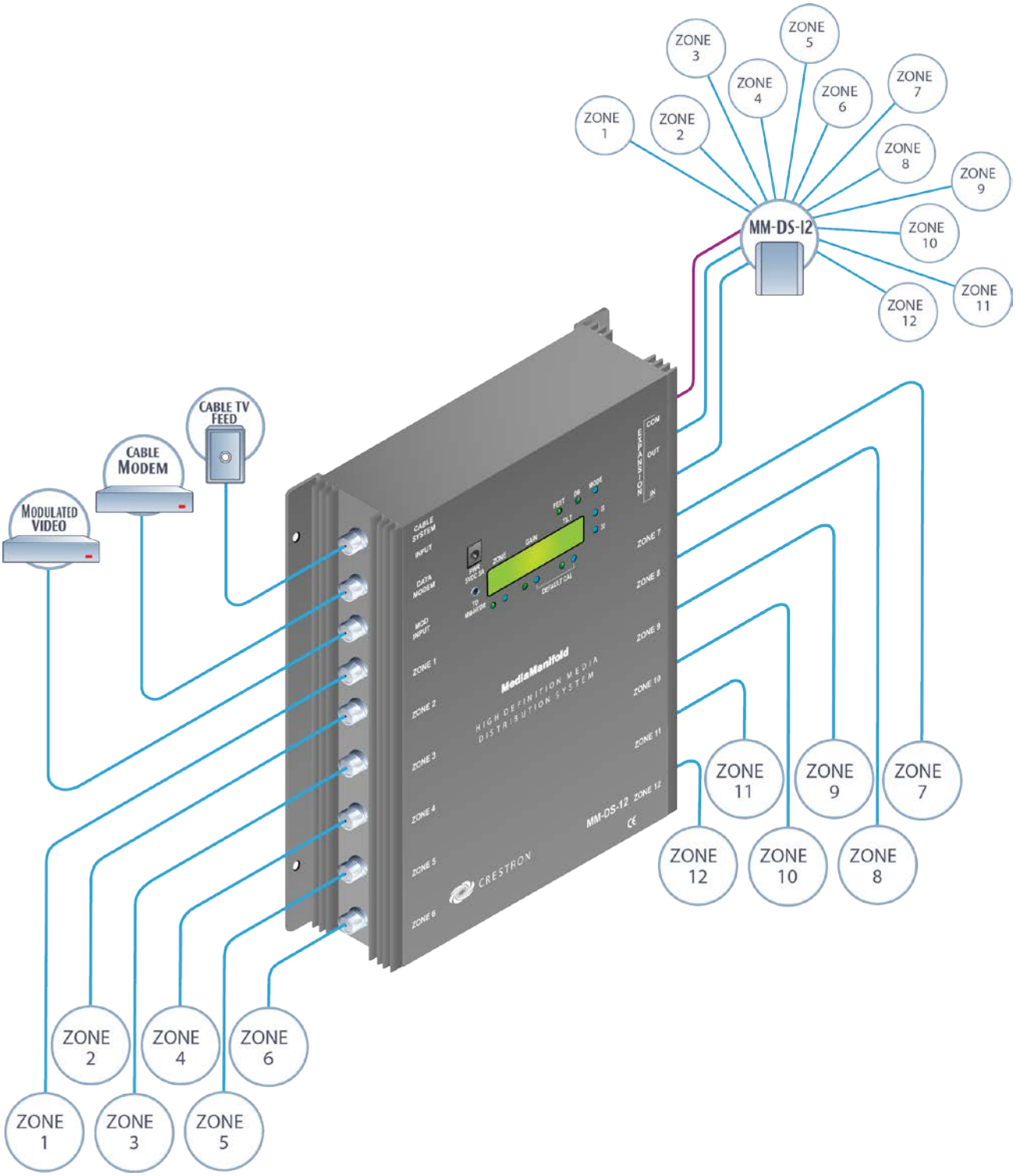


Freq. Response After 300 ft (91 m) Cable
and 23 dB Gain Compensation

Applications

The following diagram shows an MM-DS-12 in a residential application.

MM-DS-12 in a Residential Application



Specifications

Specifications for the MM-DS-12 are listed in the following table.

MM-DS-12 Specifications

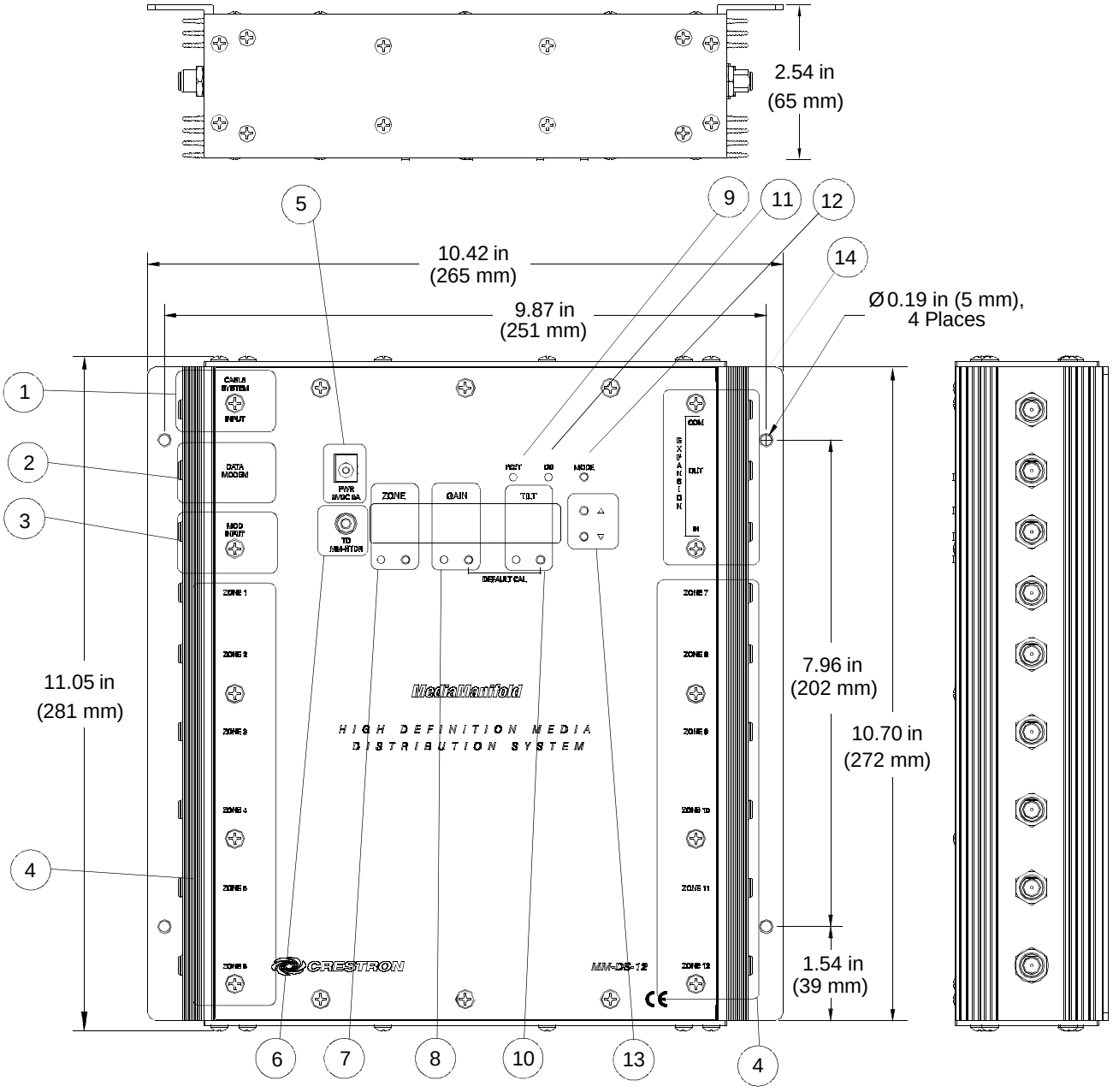
SPECIFICATION	DETAILS
RF	
Forward Bandwidth	54 MHz to 1 GHz
Reverse Bandwidth	5 MHz to 42 MHz
Minimum Output Cable Length	5 feet (1.5 meters)
Maximum Output Cable Length	300 feet (91 meters)
Gain	23 dB
Gain Adjust	-6 dB to 25 dB
Tilt Adjust	0 dB to 31 dB
Isolation	> 45 dB
Power Requirements	5 A @ 5 Vdc regulated
Power Supply (included)	120 Vac, 60 Hz
Enclosure	Chromium-plated aluminum with black powder-coated steel end panels and polycarbonate label overlay, surface-mount with integral heat-sinks and (2) mounting flanges
Environmental	
Temperature	41º to 104º F (5º to 40º C)
Humidity	10% to 90% RH (non-condensing)
Heat Dissipation	68 Btu/h
Dimensions	
Height	11.05 in (281 mm)
Width	10.42 in (265 mm)
Depth	2.54 in (65 mm)
Weight	5.9 lbs (2.7 kg)
Available Accessories	
CAEN	Automation Enclosure
CAEN-UMP	Universal Mounting Plates
MM-DE-12	MediaManifold Expander
MM-HTDR	MediaManifold Cable Analyzer

Physical Description

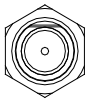
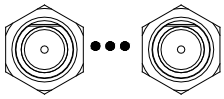
This section provides information on the connections, controls, and indicators available on the MM-DS-12.

MM-DS-12 Physical View

MM-DS-12 Overall Dimensions



Connectors, Controls, and Indicators

#	CONNECTORS, CONTROLS, AND INDICATORS	DESCRIPTION
1	CABLE SYSTEM INPUT 	(1) F-type coaxial, female; Impedance: 75 Ω nominal; Maximum Input Level: 20 dBmV; Nominal Input Level: 0 dBmV ±5 dB
2	DATA MODEM 	(1) F-type coaxial, female; Impedance: 75 Ω nominal
3	MOD INPUT 	(1) F-type coaxial, female; Impedance: 75 Ω nominal; Nominal Input Level: +30 dBmV
4	ZONE 1-12 	(12) F-type coaxial, female; Bidirectional CATV distribution outputs for use with RG6 only; Impedance: 75 Ω nominal
5	PWR 5VDC 5A 	(1) 3.0 mm barrel dc power jack; 5 Vdc power input (power supply included) **NOTE:** Only the included power supply should be used.
6	TO MM-HTDR 	(1) 3.5 mm TRS mini-phone jack For connection of the MM-HTDR (sold separately) during setup
7	ZONE (Display and Selector Button)	(1) Miniature push button with green LED indicator and 2-digit display, used to select a zone for adjustment
8	LENGTH/GAIN (Display and Selector Button)	(1) Miniature push button with green LED and 3-digit display, used to set the cable length or gain for the zone selected.
9	FEET LED	(1) green LED, indicates *Feet* mode is selected

(Continued on following page)

Connectors, Controls, and Indicators (Continued)

#	CONNECTORS, CONTROLS, AND INDICATORS	DESCRIPTION
10	LENGTH/TILT (Display and Selector Button)	(1) Miniature push button with green LED and 3-digit display, used to set the cable length or tilt for the zone selected.
11	DB LED	(1) Green LED, indicates *DB* mode is selected
12	MODE BUTTON	(1) Miniature push button, selects between *Feet* and *DB* modes
13	ADJUSTMENT BUTTONS ◎ △ ◎ ▽	(2) Miniature push buttons; manually adjust the cable length, gain, or tilt settings
14	EXPANSION 	(3) F-type coaxial, female Impedance: 75 Ω nominal; COM, OUT, and IN connections to MM-DE-12 MediaManifold Expander;* Maximum Cable Length: 10 feet (3 meters)

***** Sold separately.

Setup

Supplied Hardware

The hardware supplied with the MM-DS-12 is listed in the following table.

Supplied Hardware for the MM-DS-12

DESCRIPTION	PART NUMBER	QUANTITY
75 Ω Female Terminator	2017362	12

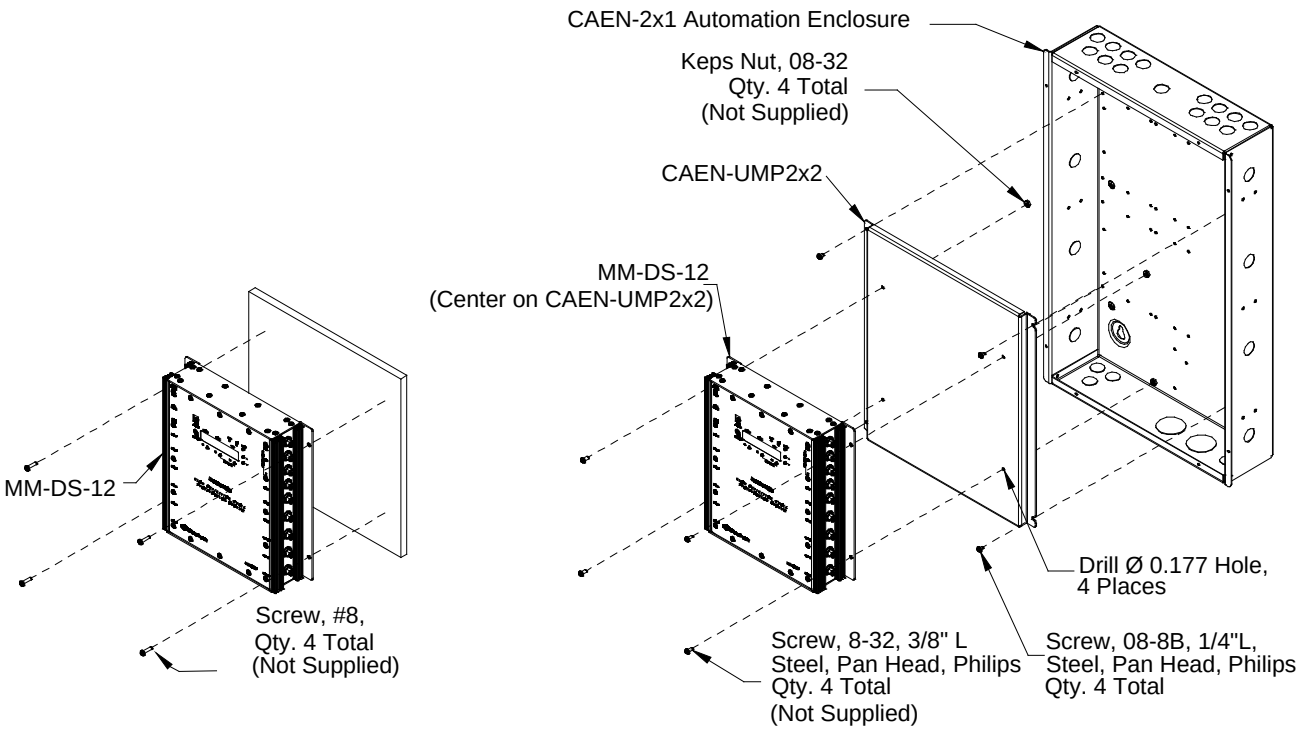
Installation

The MM-DS-12 can be mounted on a rack or on a board using the integral mounting flanges. Mounting hardware is not provided.

The MM-DS-12 can also be mounted in a CAEN Automation Enclosure with the use of a CAEN-UMP2x2 Universal Mounting Plate for CAEN Automation Enclosures. For more information, refer to the CAEN-UMP Installation Guide (Doc. 5981) at www.crestron.com/manuals.

The following diagram shows installation on a board and on a CAEN-UMP2x2.

Mounting Options for the MM-DS-12: Board Mount (Left) and CAEN-UMP2x2 (Right)



Hardware Hookup

Ventilation

The MM-DS-12 should be used in a well-ventilated area. The venting holes should not be obstructed under any circumstances.

To prevent overheating, do not operate this product in an area that exceeds the environmental temperature range listed in the table of specifications. Consideration must be given if installed in a closed or multi-unit rack assembly since the operating ambient temperature of the environment may be greater than the room ambient temperature. Contact with thermal insulating materials should be avoided on all sides of the unit.

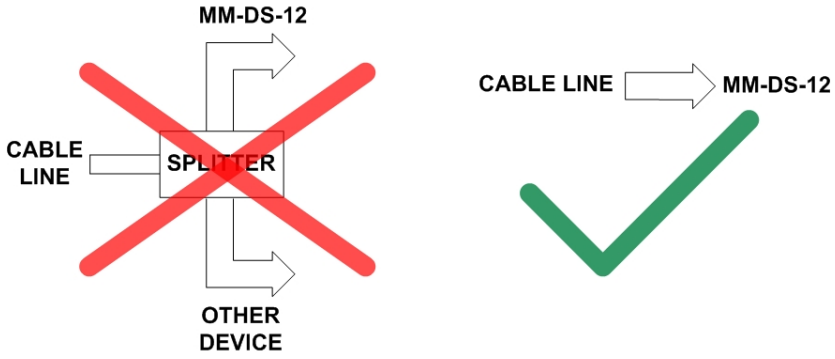
Connect the Device

Make the necessary connections as called out in the illustration that follows this paragraph. Apply power after all connections have been made.

When making connections to the MM-DS-12, consider the following:

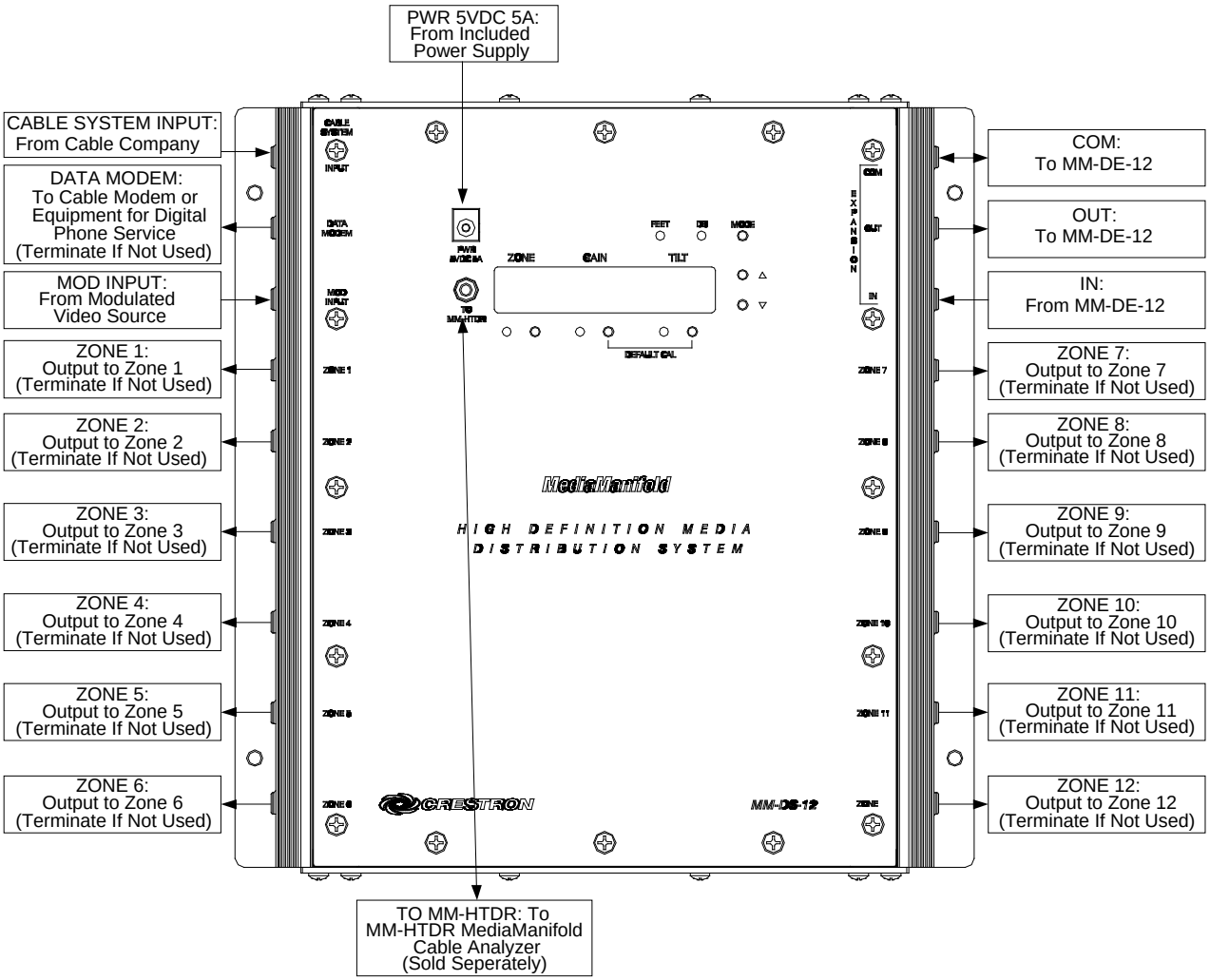
- Use Crestron power supplies for Crestron equipment.
- Do not use any splitters to connect the cable line to the **CABLE SYSTEM INPUT** port of the MM-DS-12.

NOTE: The MM-DS-12 incorporates a high quality, passive data-grade splitter designed for use in a calibrated system. The internal splitter maintains a flat, 0 db feed to the system to keep the signal pure, while providing a pass-through feed for a local cable modem. In order to deliver pure, calibrated signals through the MediaManifold distribution system, no splitters of any kind should be used before the MM-DS-12 system.



- Any **ZONE** outputs that are not used must be terminated using the included terminators.
- If the **DATA MODEM** output is not connected, it must be terminated using the included terminator.
- Each **ZONE** output is intended to feed a single television, cable box, or other receiver connected at the end of a homerun cable. The use of splitters or taps is not recommended. This product is for use with RG6 cable only.

Hardware Connections for the MM-DS-12



NOTE: The MM-DS-12 does not enhance or modify the signals to the **DATA MODEM** output.

Connect the MM-DE-12 (Optional)

If an MM-DE-12 MediaManifold Expander is to be used, make the following connections:

- Connect the **EXPANSION-OUT** port on the MM-DS-12 to the **EXPANSION-IN** port on the MM-DE-12. Use the 1 1/2 foot (0.5 m) cable included with the MM-DE-12 or a cable up to 10 feet in length (not included).
- Connect the **EXPANSION-IN** port on the MM-DS-12 to the **EXPANSION-OUT** port on the MM-DE-12. Use the 1 1/2 foot (0.5 m) cable included with the MM-DE-12 or a cable up to 10 feet in length (not included).
- Connect the **COM** port on the MM-DS-12 to the **COM** port on the MM-DE-12. Use the 1 1/2 foot (0.5 m) cable included with the MM-DE-12 or a cable up to 10 feet in length (not included).

For more information refer to the MM-DE-12 Operations & Installation Guide (Doc. 6601) at www.crestron.com/manuals.

Operation

The MM-DS-12 can optimize 12 zones. If a MM-DE-12 MediaManifold Expander is connected, an additional 12 zones can be optimized from the MM-DS-12 control panel.

Operating Modes

Each zone of the MM-DS-12 can be calibrated using the length of cable or gain and tilt settings. When a zone is calibrated using cable length, the display units are measured in feet. When a zone is calibrated using gain and tilt, the display units are measured in decibels (dB). The selected unit of measure is indicated on the display.

Feet Mode

When a zone is operating in *Feet* mode, the selected zone is configured with a specific length setting that is measured in feet. The selected zone's cable length setting is displayed and the cable length can be adjusted with the ▼ or ▲ buttons.

Zones that are set in *Feet* mode are indicated by the **FEET** LED. To switch a zone to *Feet* mode, press and release the buttons labeled **DEFAULT CAL** (the **LENGTH** and **TILT** buttons pressed together). The **FEET** LED illuminates when a zone is in *Feet* mode.

DB Mode

When a zone is operating in *DB* mode, the selected zone is configured with specific gain and tilt settings that are measured in decibels. The selected zone's gain and tilt settings are displayed and can be adjusted with the ▼ or ▲ buttons.

Zones that are set in *DB* mode are indicated by the **DB** LED. To switch a zone to *DB* mode, press and release the **DB** button. The **DB** LED illuminates when a zone is in *DB* mode.

Configure a Zone

When configuring a zone, perform the following steps:

1. Select the zone.
2. Set the cable length.
3. Set gain and tilt (to be used only if fine tuning is required).

Select the Zone

Before making any changes to the cable length, gain, or tilt, a zone must be selected. The selected zone is displayed on the left side of the display. Perform the following to select a zone:

1. Press the **ZONE** button.
2. Press the ▼ or ▲ buttons to change the zone number on the display. Each zone's settings for cable length or gain and tilt is displayed.

Set Cable Length

A zone's cable length can be set automatically with the MM-HTDR MediaManifold Cable Analyzer (sold separately) or manually with the front panel. For instructions on setting the cable length automatically, refer to the MM-HTDR Operations Guide (Doc. 6602) at www.crestron.com/manuals.

Perform the following to set the cable length manually:

1. Select the zone to be configured as described above.
2. Verify that the **FEET** LED is lit. If the zone is in *DB* mode (**DB** LED is lit), press the buttons labeled **DEFAULT CAL** (the **LENGTH** and **TILT** buttons pressed together) to return to *Feet* mode.
3. Press the **GAIN** or **TILT** button. The **GAIN** and **TILT** LEDs illuminate.

4. Press the ▼ or ▲ buttons to change the cable length shown on the display.

NOTE: Any zone that is not used must be set to 10 feet (3 meters). The zone connector must also be terminated using the included terminators.

After setting the cable length, the displayed value is saved approximately three seconds after the last button press.

Set the Gain and Tilt (Advanced Function)

Given a cable length, a zone's gain and tilt are set automatically. The gain and tilt settings can be adjusted further to optimize the signal.

NOTE: Gain and tilt should be adjusted with a cable box's diagnostic feature.

Perform the following to set the gain:

1. Select a zone as described on page 15.
2. Verify that the **DB** LED is lit. If it is not lit, select *DB* mode as described in "Operating Modes" on page 15.
3. Press the button located under the displayed **GAIN** value.
4. Press the ▼ or ▲ buttons to change the gain value shown on the display.

   After setting the gain, the displayed value is saved approximately three seconds after the last button press.

NOTE: To revert to the last specified cable length for this zone, press and release the buttons labeled **DEFAULT CAL**. The **FEET** LED lights.

Perform the following to set the tilt:

1. Select a zone as described on page 15.
2. Verify that the **DB** LED is lit. If it is not lit, select the *DB* mode as described in "Operating Modes" on page 15.
3. Press the button located under the displayed **TILT** value.
4. Press the ▼ or ▲ buttons to change the tilt value shown on the display.

   After setting the tilt, the displayed value is saved approximately three seconds after the last button press.

NOTE: To revert to the last specified cable length, press and release the buttons labeled **DEFAULT CAL** (the **LENGTH** and **TILT** buttons pressed together). The **FEET** LED lights. Changes made in *DB* mode are discarded.

Restore Factory Settings

To restore the factory settings, press and hold the **MODE** button and then press the **ZONE** button. The cable length value for every zone is set to 10 feet (3 meters). The corresponding gain and tilt values (0 dB and 0 dB, respectively) are also set.

Problem Solving

Troubleshooting

The following table provides corrective action for possible trouble situations. If further assistance is required, please contact a Crestron customer service representative.

MM-DS-12 Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Device does not function.	Device is not receiving power from a Crestron power source.	Use the provided Crestron power source. Verify connections.
The picture has poor quality.	Cables are not securely connected.	Properly connect all cables.
	Cable run is not properly calibrated.	Verify setting for cable length.
	Low signal strength.	Increase the gain setting to compensate for signal loss.
Certain TV channels have poor picture quality.	There is too much signal loss at low end of the frequency spectrum.	Raise the tilt setting to accommodate for signal loss.
Cable box or cable modem is not receiving signal.	There is a short or open in circuit path.	Verify cabling.
	The cable box or cable modem is not working.	Contact the local cable operator for repair.

Reference Documents

All documents mentioned in this guide are available at www.crestron.com/manuals.

List of Related Reference Documents

DOCUMENT TITLE
CAEN-UMP Universal Mounting Plates for CAEN Automation Enclosures
MM-DE-12 MediaManifold Expander
MM-HTDR MediaManifold Cable Analyzer

Further Inquiries

To locate specific information or resolve questions after reviewing this guide, contact Crestron's True Blue Support at 1-888-CRESTRON [1-888-273-7876] or, for assistance within a particular geographic region, refer to the listing of Crestron worldwide offices at www.crestron.com/offices.

To post a question about Crestron products, log onto Crestron's Online Help at www.crestron.com/onlinehelp. First-time users must establish a user account to fully benefit from all available features.

Future Updates

As Crestron improves functions, adds new features, and extends the capabilities of the MM-DS-12, additional information may be made available as manual updates. These updates are solely electronic and serve as intermediary supplements prior to the release of a complete technical documentation revision.

Check the Crestron website periodically for manual update availability and its relevance. Updates are identified as an “Addendum” in the Download column.

Return and Warranty Policies

Merchandise Returns / Repair Service

1. No merchandise may be returned for credit, exchange or service without prior authorization from Crestron. To obtain warranty service for Crestron products, contact an authorized Crestron dealer. Only authorized Crestron dealers may contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number and return address.
2. Products may be returned for credit, exchange or service with a Crestron Return Merchandise Authorization (RMA) number. Authorized returns must be shipped freight prepaid to Crestron, 6 Volvo Drive, Rockleigh, N.J. or its authorized subsidiaries, with RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. Crestron reserves the right in its sole and absolute discretion to charge a 15% restocking fee plus shipping costs on any products returned with an RMA.
3. Return freight charges following repair of items under warranty shall be paid by Crestron, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.

CRESTRON Limited Warranty

Crestron Electronics, Inc. warrants its products to be free from manufacturing defects in materials and workmanship under normal use for a period of three (3) years from the date of purchase from Crestron, with the following exceptions: disk drives and any other moving or rotating mechanical parts, pan/tilt heads and power supplies are covered for a period of one (1) year; touch screen display and overlay components are covered for 90 days; batteries and incandescent lamps are not covered.

This warranty extends to products purchased directly from Crestron or an authorized Crestron dealer. Purchasers should inquire of the dealer regarding the nature and extent of the dealer's warranty, if any.

Crestron shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended or if it has been subjected to misuse, accidental damage, modification or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced or removed.

This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall Crestron be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. Crestron is not liable for any claim made by a third party or made by the purchaser for a third party.

Crestron shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty.

Except as expressly set forth in this warranty, Crestron makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supersedes all previous warranties.

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