Crestron **MM-HTDR**
MediaManifold® Cable Analyzer
Operations Guide

CRESTRON®

Regulatory Compliance

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

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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 Cable Analyzer: MM-HTDR

Introduction

The Crestron® MM-HTDR MediaManifold® Cable Analyzer is a portable handheld device used to determine the length and integrity of RG6 cable runs. Using "time domain reflectometry," the MM-HTDR can measure cable lengths up to 1099 feet (335 meters). When used in conjunction with the MM-DS-12 MediaManifold High-Definition CATV Distribution System, the MM-HTDR can be used to set the optimum gain and tilt settings for each zone based on the length measured (up to 300 feet or 91 meters maximum). The MM-HTDR can also be used to determine if a cable is shorted. Single-button operation makes it simple to set up a complete MediaManifold system.

Features and Functions

- Handheld device measures RG6 cable length and checks for shorts and opens in RG6 cable runs
- Uses time domain reflectometry to determine the length and integrity of each RG6 cable run and set the optimum gain and tilt settings
- Single-button control allows for simple operation
- Connects with the MM-DS-12 MediaManifold High-Definition CATV Distribution System for quick input of measured lengths
- Battery operation allows for portable use

Specifications

Specifications for the MM-HTDR are listed in the following table.

MM-HTDR Specifications

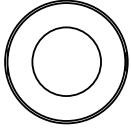| SPECIFICATION	DETAILS
Measurement	
Maximum Cable Length	1099 feet (335 meters)
Minimum Cable Length	0 feet for open, 5 feet (1.5 meters) for shorted
Resolution	0.1 foot (30 mm) from 00.0 to 99.9, 1 foot (305 mm) from 100 to 1099
Forward Bandwidth	54 MHz to 1 GHz
Cable Velocity Factor	0.60 to 1.00 (0.82 default)
Battery	
Type	9 volt disposable alkaline, 625 mAh (included)
Usage	~4 hours (>10,000 measurements)
Automatic Shutoff	~5 seconds
Enclosure	Black plastic handheld box installed in removable rubberized protective "boot"
Environmental	
Temperature	41º to 104º F (5º to 40º C)
Humidity	10% to 90% RH (non-condensing)
Dimensions (with case)	
Height	1.68 in (43 mm)
Width	3.95 in (101 mm)
Depth	6.12 in (156 mm)
Weight	0.83 lb (379 g)

Physical Description

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

MM-HTDR Physical View
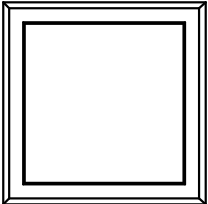
MM-HTDR Overall Dimensions
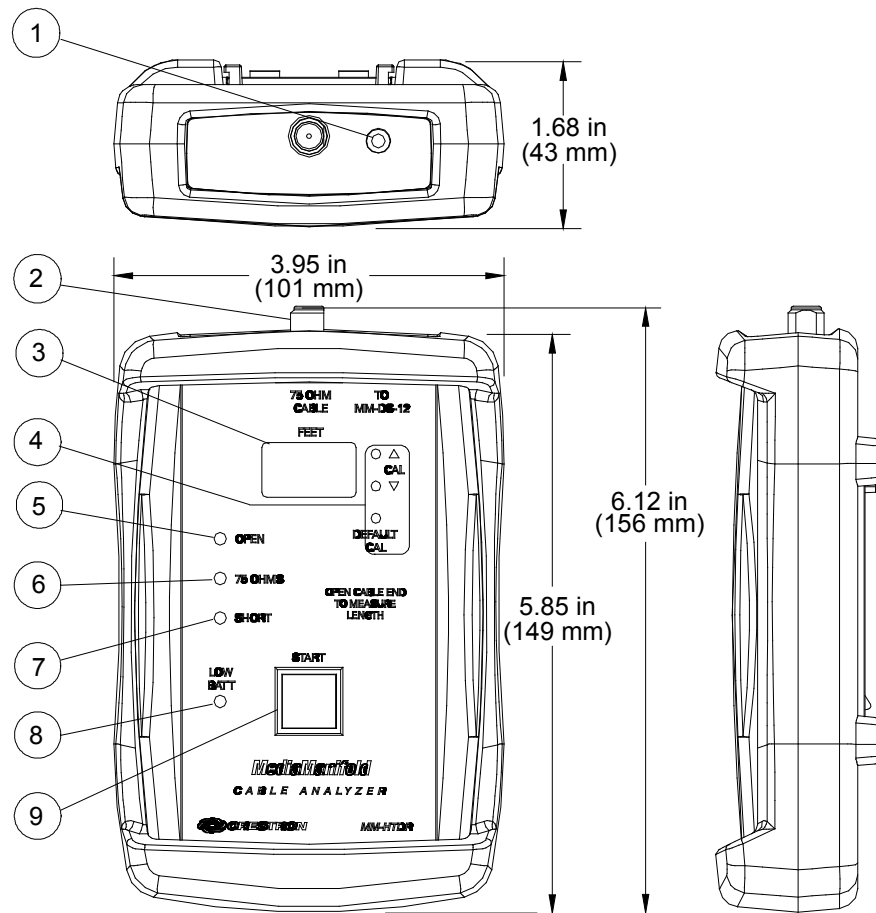
Connectors, Controls, and Indicators

#	CONNECTORS, CONTROLS, AND INDICATORS	DESCRIPTION
1	To MM-DS-12	(1) 3.5 mm TRS mini-phone jack; Connects to the MM-DS-12* during setup; 6 foot (1.83 meter) interface cable included
2	75 OHM CABLE	(1) F-type coaxial, female; Connects to RG6 cable under test; Impedance: 75 Ω nominal

(Continued on following page)

Connectors, Controls, and Indicators (Continued)

#	CONNECTORS, CONTROLS, AND INDICATORS	DESCRIPTION
3	FEET	(1) 3-digit green LED display, displays cable length in feet
4	CALIBRATION ○ △ CAL ○ ▽ ○ DEFAULT CAL	(2) Miniature recessed push buttons, used to calibrate the MM-HTDR to a known cable length or velocity factor; For more information, refer to "Calibration" on page 12
5	OPEN LED	(1) Green LED, indicates cable under test is unterminated (normal)
6	75 OHMS LED	(1) Yellow LED, indicates cable under test is terminated or connected to some device, measurement cannot be made
7	SHORT LED	(1) Red LED, indicates cable under test is shorted or connected to some device, measurement cannot be made
8	LOW BATT LED	(1) Red LED, indicates battery should be replaced
9	START BUTTON	(1) Square push button, initiates measurement process

*   Sold separately.

Setup

Getting Started

Before using the MM-HTDR, the battery must be installed. To install the battery, perform the following:

1. Remove the protective boot by pulling the top of the boot over the "F" connector on top of the unit. Once the top of the boot has been pulled off, the boot can be easily removed.

2. Turn the unit over to reveal the battery compartment cover.

3. Push down on the grated surface and slide the battery cover in the direction shown by the arrow as shown in the following diagram.

Insert Battery
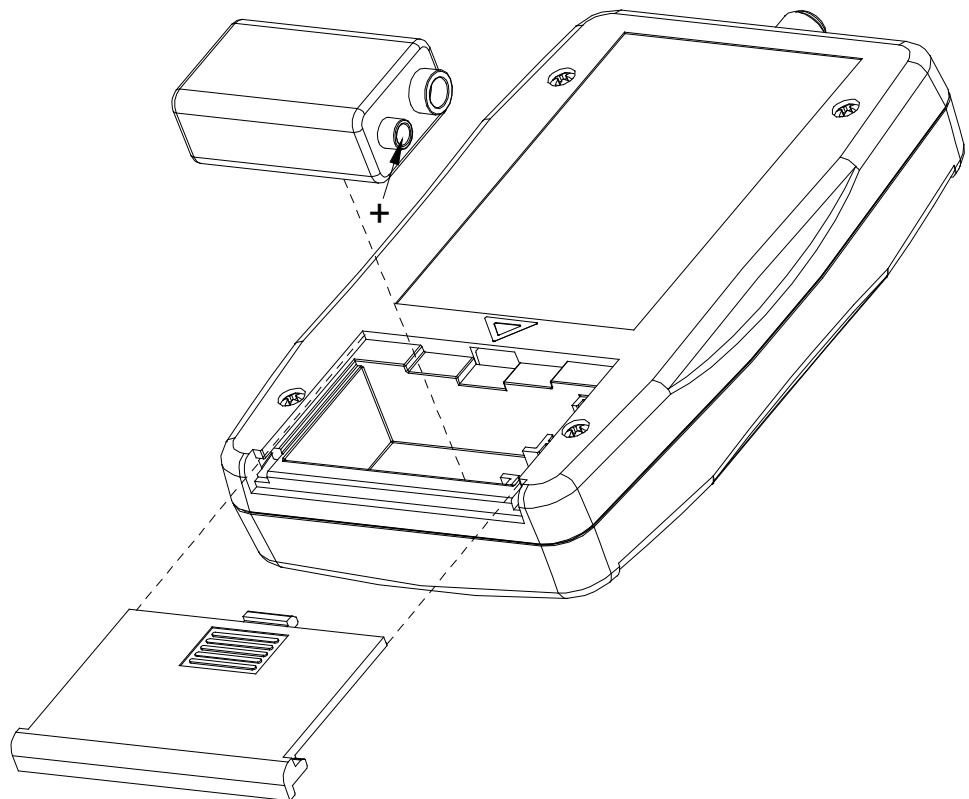
4. Insert the included battery as shown above. Observe polarity.

5. Replace the battery cover.

6. Replace the boot by putting the bottom part on the MM-HTDR then pulling the top of the boot over the top of the MM-HTDR.

Installation

The MM-HTDR can "stand up" using the tilt stand that is built into the protective boot as shown in the following diagram.

MM-HTDR on Integrated Tilt Stand
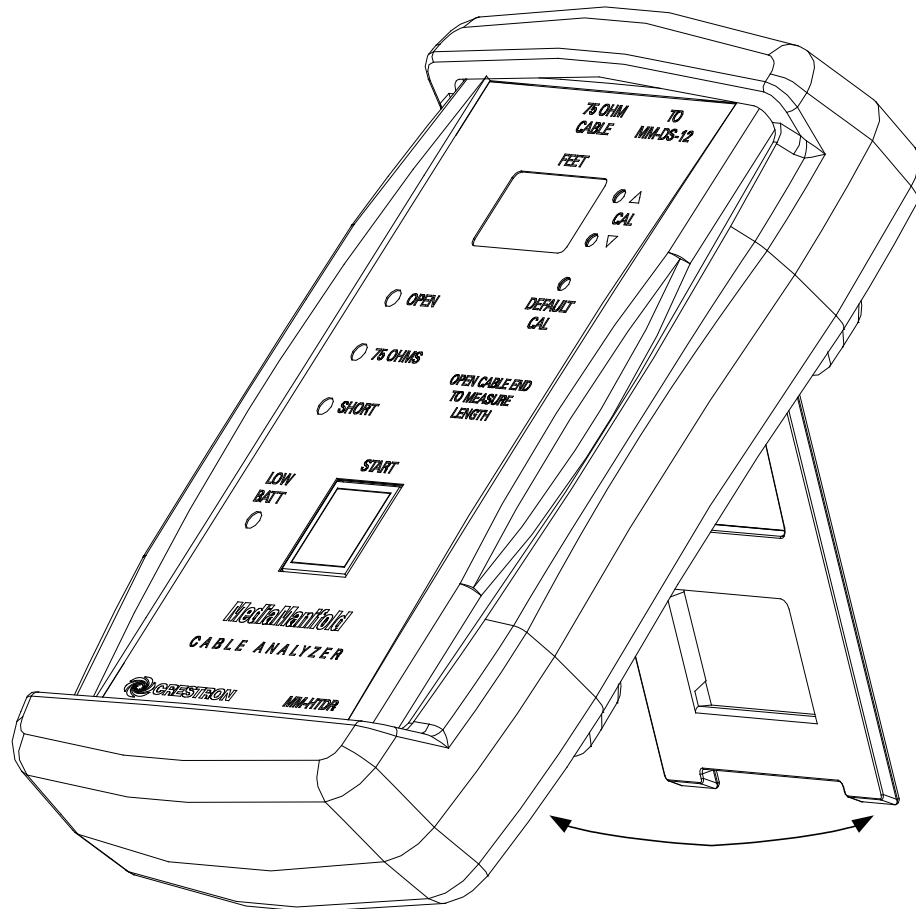
Hardware Hookup

Make the necessary connections as called out in the illustration that follows this paragraph.

When making connections to the MM-HTDR, consider the following:

- The MM-HTDR can only be used with RG6 cable.

- When connecting to the MM-DS-12, use the included interface cable.

Hardware Connections for the MM-HTDR

75 OHM CABLE:
Connect Cable to Be Analyzed

TO MM-DS-12:
MM-DS-12 MediaManifold
High Definition CATV
Distribution System
(Sold Separately)
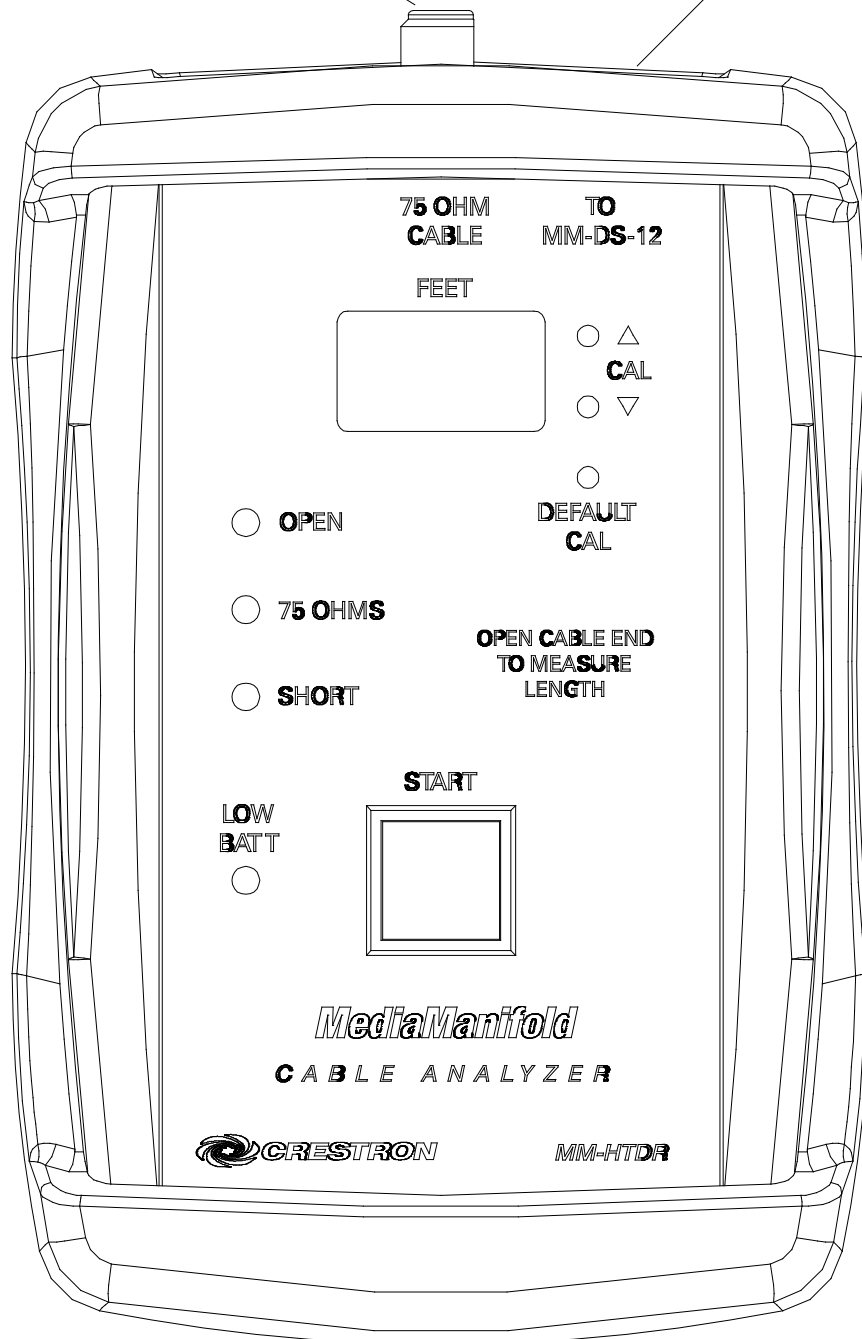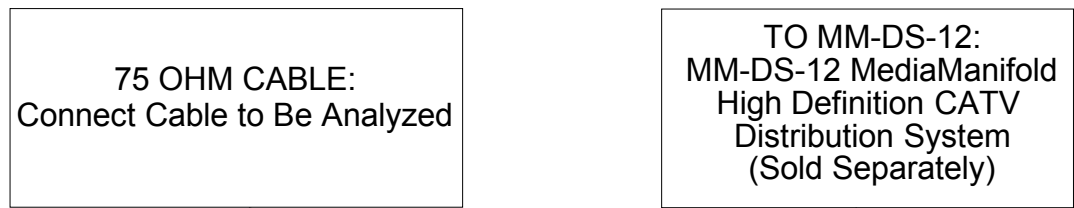
Operation

The MM-HTDR can be used with the MM-DS-12 to measure cable length and troubleshoot RG6 cable runs.

Measure Cable Length

When connected to an MM-DS-12 High-Definition CATV Distribution System, measurements up to 300 feet (91 meters) can be automatically sent to the MM-DS-12 for zone configuration.

Preparation   To prepare the MM-HTDR for measurement, perform the following:

1. On the MM-DS-12, select the zone to be measured. For more information, refer to the MM-DS-12 Operations & Installation Guide (Doc. 6600) at www.crestron.com/manuals.

2. Disconnect the cable to be measured from the selected MM-DS-12 zone and connect to the MM-HTDR, as shown in the following diagram. The cable to be measured should not be connected to any other device(s).

Connect MM-HTDR to Cable Length and MM-DS-12
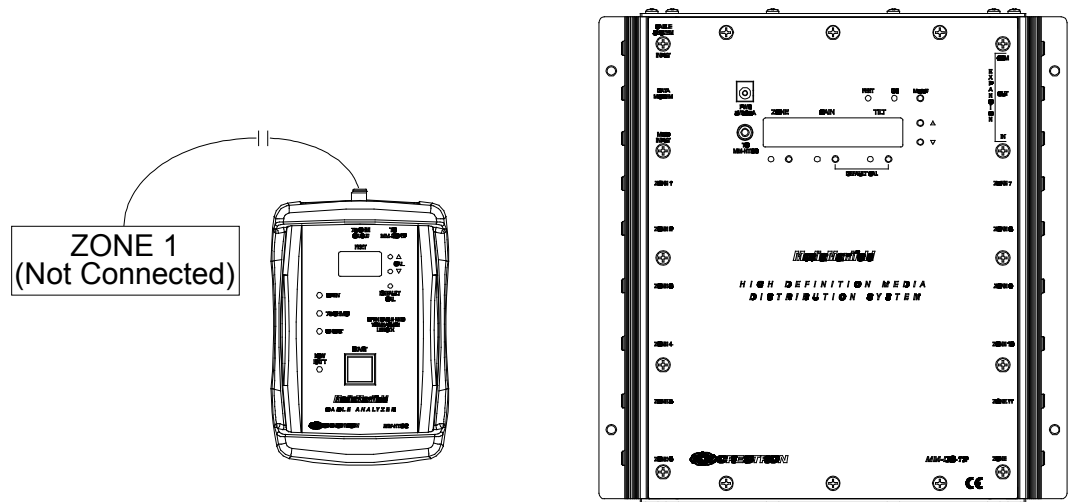
3. (OPTIONAL) Perform the following to have measurement data automatically transferred to the MM-DS-12:

   a. Connect the included interface cable to the MM-DS-12 as shown in the following diagram.

        b. Set the zone to be measured in the *Feet* mode. For more information, refer to the MM-DS-12 Operations & Installation Guide (Doc. 6600).

Connect MM-HTDR to Cable Length and MM-DS-12

Measure   To measure the cable length and transfer the measurement to the MM-DS-12, press the **START** button. The MM-HTDR displays the measured results.
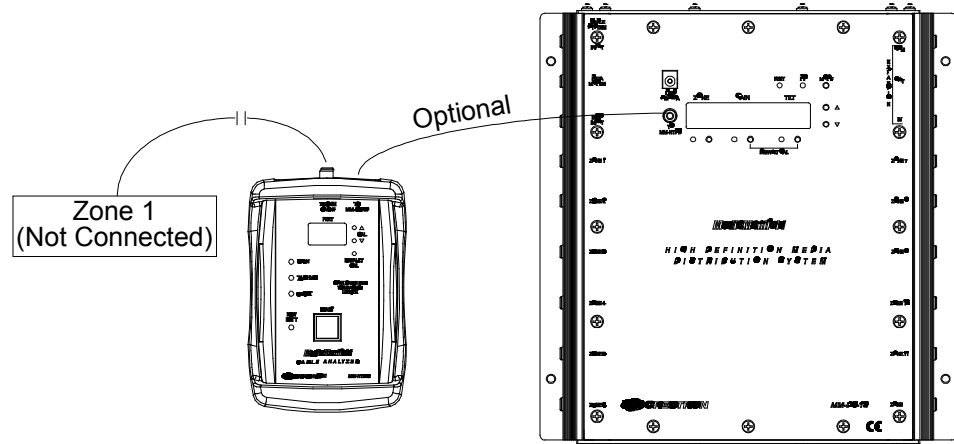
When the **OPEN** LED is lit, the cable's measured length is displayed in feet. If the MM-HTDR is connected to an MM-DS-12, the measured length (up to 300 feet or 91 meters) is automatically set for the zone displayed on the MM-DS-12. For more information, refer to the MM-DS-12 Operations & Installation Guide (Doc. 6600).

NOTE: If the measurement is greater than 300 feet, the measurement is not transferred.

NOTE: The settings transferred to the MM-DS-12 can be adjusted from the MM-DS-12's control panel. Refer to the MM-DS-12 Operations & Installation Guide for more information.

NOTE: Since the MM-HTDR can only display up to 999 feet (304.5 meters), lengths beyond this value are displayed with a "0" as the first digit, followed by the remaining distance beyond 1000 feet (304.8 meters) (up to 1099 feet or 335 meters total).

When the **75 OHMS** LED is lit, the end of the cable has been terminated in a way that a measurement cannot be made. Three dashes are displayed.

NOTE: If the MM-HTDR is connected to an MM-DS-12, the setting on the MM-DS-12 does not change.

When the **SHORT** LED is lit, the cable length displayed represents the distance from the MM-HTDR to the short in the cable line.

NOTE: If the MM-HTDR is connected to an MM-DS-12, the measured length is automatically set for the zone displayed on the MM-DS-12 (up to 300 feet or 91 meters).

Measure the Remainder on a Cable Spool

The MM-HTDR can also be used to measure remaining cable left on a spool of RG6 cable. The MM-HTDR can measure cable lengths up to 999 feet (304.5 meters).

To measure an unknown length of cable, perform the following:

1. Attach an "F" terminator to one end of the unknown cable.

2. Connect the MM-HTDR to the cable and press **START**. The measured length is displayed.

NOTE: Since the MM-HTDR can only display up to 999 feet (304.5 meters), lengths beyond this value are displayed with a "0" as the first digit, followed by the remaining distance beyond 1000 feet (304.8 meters) (up to 1099 feet or 335 meters total).

Other Functions

The MM-HTDR turns off approximately 5 seconds after the last button press.

Low Battery   If the **LOW BATT** LED is lit, the battery should be changed. Refer to "Getting Started" on page 6 for instructions on installing a battery.

Calibration   While the default factory calibration provides sufficient accuracy to properly adjust the MM-DS-12, calibration can be performed to improve the accuracy of cable length measurements. Calibration can be done by calibrating with a cable of a known length or entering the velocity factor (if known) of the cables to be measured.

Calibrate the MM-HTDR to a Known Length

If a cable run with a known length is not being measured correctly, the MM-HTDR can be calibrated using the known length of cable as a reference point.

NOTE: Although shorter cable lengths can be used, calibration with 10 feet (3 meters) or more of cable provides maximum accuracy.

To calibrate the MM-HTDR with a known cable length, perform the following:

1. Connect the measured cable to the MM-HTDR and press the **START** button. The measured length is displayed.
2. Hold the **START** button and press the ▼ or ▲ buttons until the correct cable length is displayed.
3. Release the buttons to store the calibration setting.
4. To reset the MM-HTDR to the factory calibration setting, press the **DEFAULT CAL** button.

Calibrate the MM-HTDR to the Cable's Velocity Factor

Velocity factor is a parameter that characterizes the speed at which an electrical signal passes through a medium. Expressed as a ratio, it is the ratio of a signal's transmission speed compared to the speed of light in vacuum.

If a cable's velocity factor is specified by the cable manufacturer, the MM-HTDR can be calibrated to the cable's specified velocity factor.

To calibrate the cable's specified velocity factor, press the ▼ or ▲ buttons until the velocity factor is displayed.

NOTE: To reset the MM-HTDR to the factory setting (0.82), press the **DEFAULT CAL** button.

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-HTDR Troubleshooting

TROUBLE	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Device does not function.	The battery is weak or there is no battery.	Install a fresh 9 volt battery.
	The battery is incorrectly installed.	Install a battery with the correct polarity.
No measurement is displayed.	The cable is terminated.	Leave end of cable open.
Inaccurate measurement is displayed.	The device is incorrectly calibrated.	Calibrate MM-HTDR as described on page 12.
	The cable is shorted.	Remove object causing the short.

Reference Documents

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

List of Related Reference Documents

DOCUMENT TITLE
MM-DS-12 Operations & Installation Guide

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-HTDR, 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.