



Multi-Room DVR Isolation Module Installation Guide

Overview

Purpose

This document provides instructions for installing the Multi-Room™ DVR (MR-DVR) Isolation Module (IM), as well as troubleshooting tips. This document is concerned only with RF information.

Audience

This guide is written for cable TV technicians who install the MR-DVR system.

Related Publications

For general information on MR-DVR System Installation, see *Multi-Room DVR System Installation Guide*, part number 4003868.

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MR-DVR IM Description

Overview

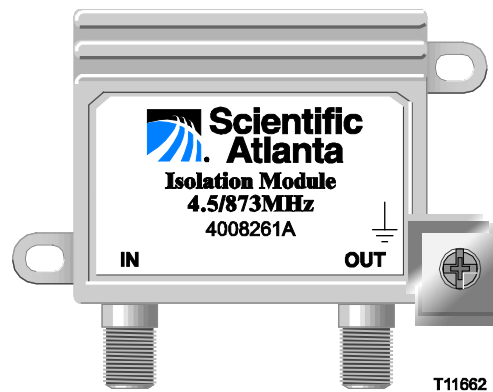
In the MR-DVR system, the client set-tops transmit a 4.5 MHz FSK signal to the server set-top to request programs and the server delivers the programs using a QAM signal at 873 MHz. The Isolation Module (IM) isolates the CATV plant from these signals. The IM is installed in series with the CATV drop cable, typically before the first splitter. The IM's passband is 6.5 to 858 MHz (Ch 134).

Description

The IM is a device with two F-ports in a weather-resistant enclosure. It contains two trap filters: 4.5 MHz and 873 MHz. The trap filters in the IM prevent the MR-DVR signals from leaking onto the CATV system. In addition, the IM reflects the FSK and QAM signals, which reduces the loss seen by these signals.

IM Illustration

The following illustration shows the IM.



MR-DVR IM Description, Continued

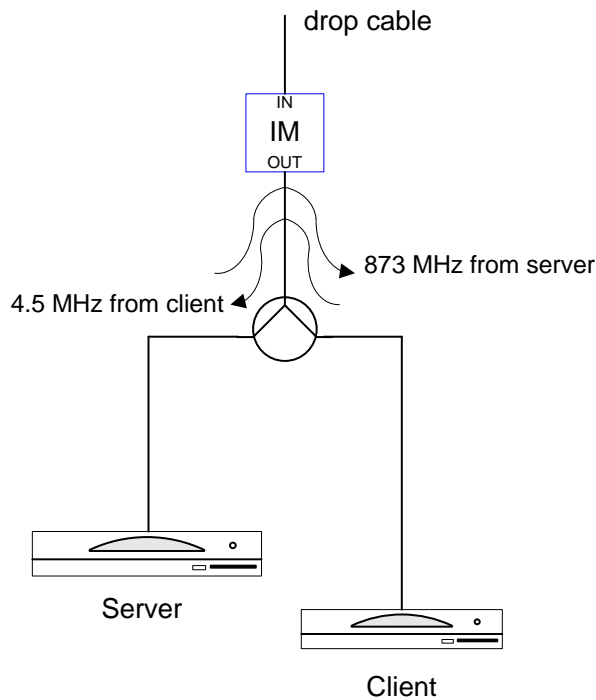
Electromagnetic Compatibility Regulatory Requirements

This equipment meets applicable electromagnetic compatibility (EMC) regulatory requirements. EMC performance is dependent upon the use of correctly shielded cables of good quality for all external connections when installing this equipment.

Ensure compliance with cable/connector specifications and associated guidelines where given elsewhere in this guide.

IM Reflects 4.5 MHz FSK and 873 MHz QAM Signals

In the following example, the signals pass through one side of the splitter, are reflected by the IM, and pass through the other side of the splitter. The signals experience a loss of approximately $3.5 + 3.5 = 7$ dB due to the splitter. Without the IM, the loss would be that of the splitter port-port isolation, which is at least 20 dB.



Installation

Installation Guidelines

The basic guidelines for installing the IM are as follows.

- Install the IM upstream of the splitter feeding the server and client(s).
- Install the IM as close as possible to the splitter feeding the server and client(s). Refer to Example 3 in **IM Installation Examples** later in this document. If both splitters are accessible, then Example 3b is preferable to Example 3a.
- Do not install a drop amplifier between the IM and the server.

Additional recommendations are as follows:

- Insertion loss due to cables and splitters: The loss at 873 MHz from the server to the IM plus the loss from the IM to the client should not exceed 33 dB. Refer to Example 1 in **IM Installation Examples** later in this document. The loss from the server to the IM is 7.5 dB for the cable plus 7 dB for the 4-way splitter. The loss from the IM to the client is also 7.5 dB + 7 dB. So total loss is $7 + 7.5 + 7 + 7.5 = 29$ dB.
- The IM port labeled **IN** should be connected to the cable from the CATV system, and the port labeled **OUT** should be connected to the splitter feeding server and client(s). This orientation results in slightly less loss of the 873 MHz signal.
- Both ports of the IM have a DC path to ground. Therefore, the IM does not support drop amps powered over the coaxial cable, unless a DC block is placed next to the IM.

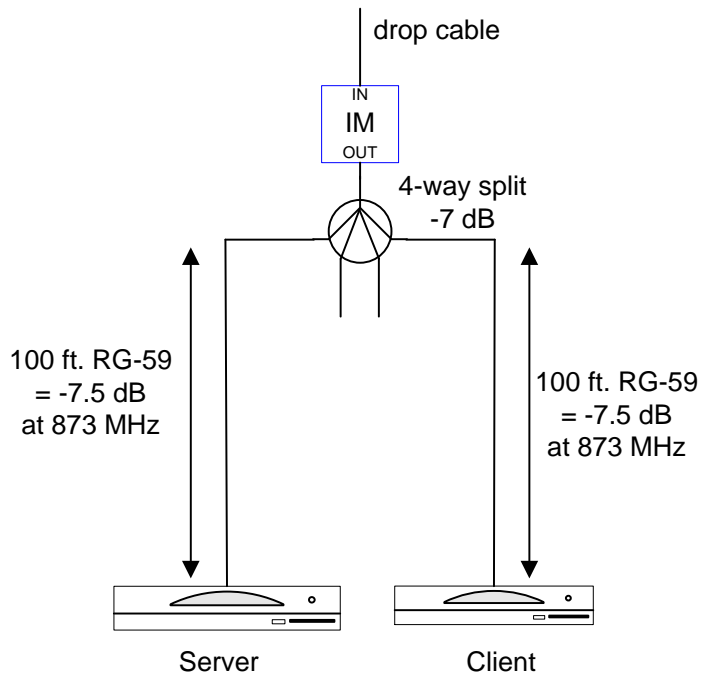
Installing the IM

Follow these steps to install the IM.

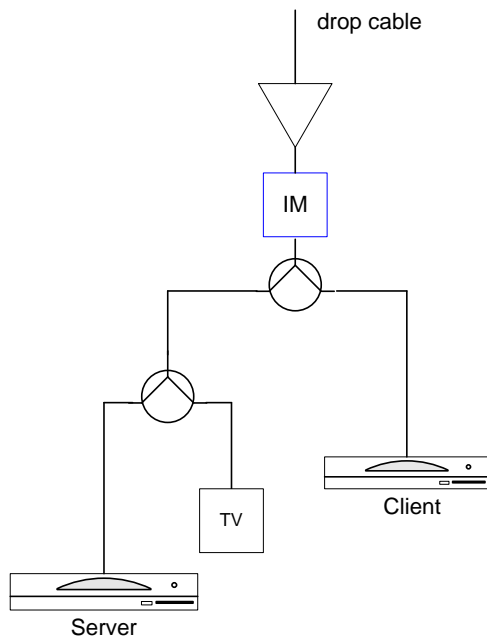
1. Find the optimal location for the IM. Refer to guidelines above and examples in **IM Installation Examples** later in this document
2. Mount the IM to a stud or wall using the appropriate screws (not included).
3. Connect the coaxial cables to the IM.
4. Tighten the cables per manufacturer's specifications.

IM Installation Examples

Example 1: Loss from server to client at 873 MHz = 7.5 + 7 + 7 + 7.5 = 29 dB



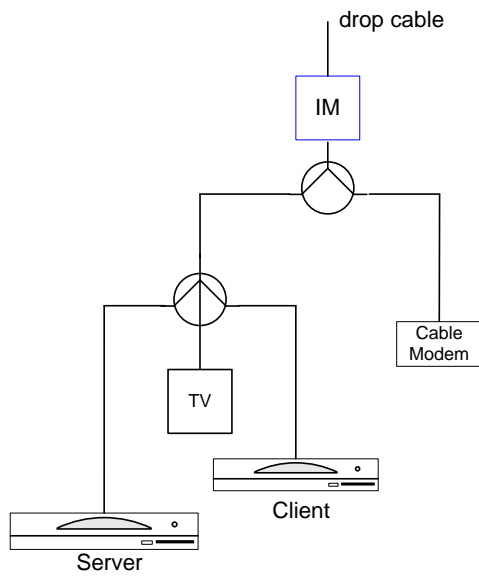
Example 2: Install the IM after a drop amplifier, if present.



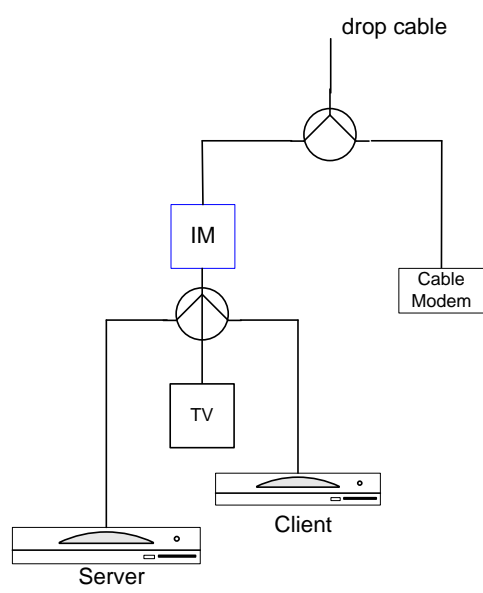
IM Installation Examples, Continued

Example 3: Home with Cable Modem. IM can be placed before or after the split to the cable modem.

Example 3a



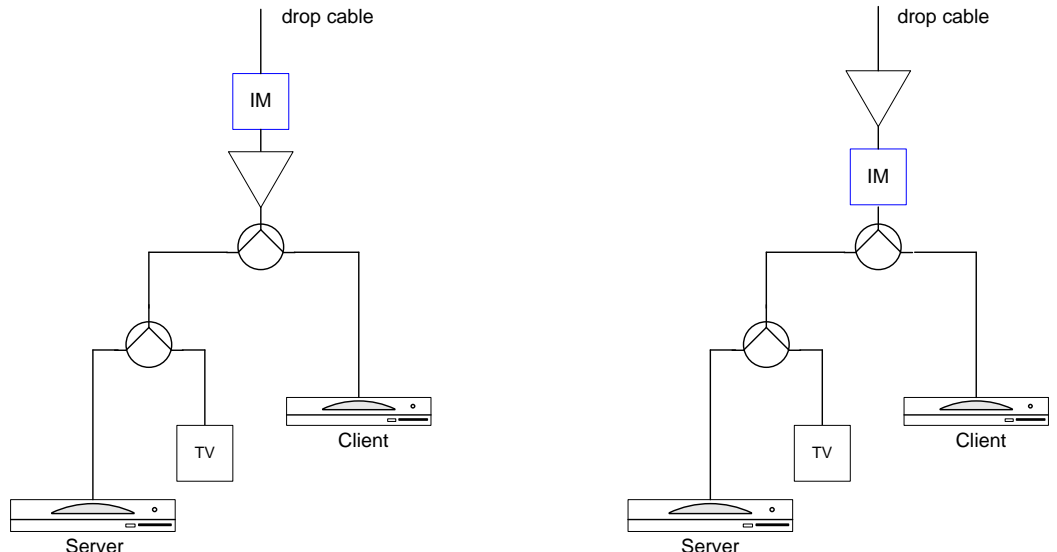
Example 3b



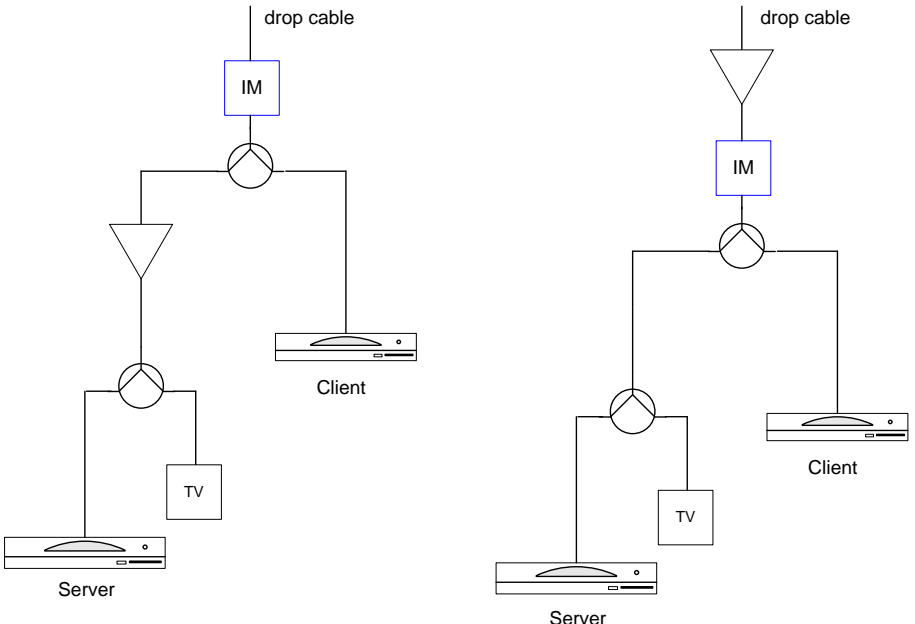
IM Installation Troubleshooting

Unable to Receive Programs or Have Poor Signal Quality

If the client set-top is unable to receive programs from the server, or if the signal quality is poor, the problem may be due to the home wiring and/or location of the IM. The examples below show several problematic installations and possible fixes.

Issue	Solution
Amplifier downstream of IM causes too much loss to Multi-room signals.	Place IM downstream of amplifier.
 <p>The diagrams illustrate two cable configurations for a Multi-Room (MR) system. In the left diagram, a 'drop cable' enters from the top and connects to an IM (In-Matrix) box. Below the IM is an amplifier (represented by a triangle). The signal then splits to a 'Server' and a 'Client'. The right diagram shows the same setup but with the IM box placed below the amplifier, meaning the signal passes through the amplifier before reaching the IM. This configuration is the recommended solution to prevent signal loss.</p>	

IM Installation Troubleshooting, Continued

Issue	Solution
Drop Amp feeding the server prevents the 873 MHz signal from reaching the client.	Move the drop amp upstream of the splitter feeding client and server.
 <p>The diagrams illustrate two cable TV signal distribution configurations. In the left diagram, a 'drop cable' enters from the top and connects to an 'IM' (In-Line Modulator) box. Below the IM box is a circular splitter. One output of this splitter goes to a 'Client' (represented by a computer monitor icon). The other output goes to a second circular splitter. This second splitter feeds a 'TV' and a 'Server' (represented by a server rack icon). In the right diagram, the 'drop cable' enters from the top and connects to a triangular drop amp. Below the drop amp is the 'IM' box. Below the IM box is a circular splitter. One output of this splitter goes to a 'Client'. The other output goes to a second circular splitter, which feeds a 'TV' and a 'Server'. The labels 'Server' and 'Client' are placed below their respective icons in both diagrams.</p>	

IM Installation Troubleshooting, Continued

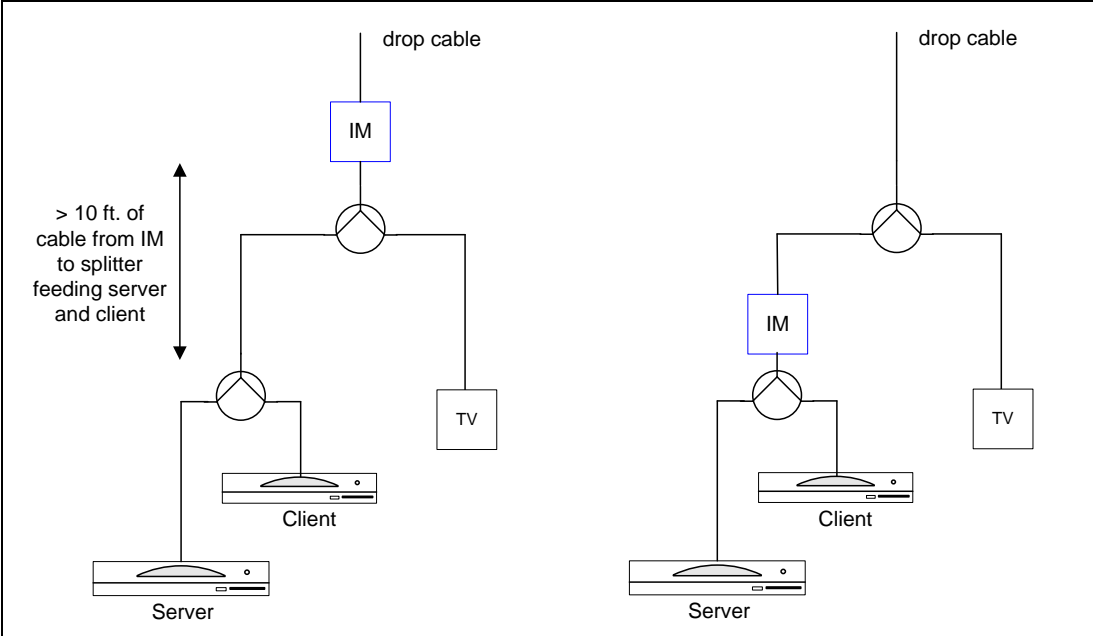
Issue	Solution
Two-way drop amp prevents installing the IM.	Replace the 2-way drop amp with a single-output drop amp, an IM, and a splitter.
No place to install IM	Modified for IM
<p>The diagram illustrates two network configurations. On the left, a '2-output drop amp' (represented by a triangle with two circles below it) is connected to a 'drop cable'. It splits the signal to a 'Server' and a 'Client'. A 'TV' is connected to the 'Server' via a splitter. On the right, the '2-output drop amp' is replaced by a 'single-output drop amp' (a triangle with one circle below it) connected to the 'drop cable'. This is followed by an 'IM' (In-Motion) device, then a 'splitter' (a circle with two lines extending from it). The 'splitter' then branches to the 'Server' and the 'Client'. A 'TV' is connected to the 'Server' via another splitter.</p>	

IM Installation Troubleshooting, Continued

Signal Degraded Due to Multi-path

Sometimes the 873 MHz QAM signal is degraded due to multi-path. Multi-path means that there are two signal paths between server and client that can cancel each other out.

For example in the following figure, there is a path across the isolation of the splitter feeding the client and server, and another path reflected from the IM. Degradation becomes more likely when there is a long cable between the IM and the splitter. In general, multi-path can be minimized by placing the IM as close as possible to the splitter feeding the client and server. Ideally, the IM should be less than 10 feet from the splitter.

Issue	Solution
Potential multi-path because the IM is greater than 10 ft. from the splitter.	Locate the IM near the splitter feeding server and client.
Potential multi-path problem	No multi-path
	

IM Installation Troubleshooting, Continued

Issue	Solution
Potential multi-path because the IM is greater than 10 ft. from the splitter.	Locate the IM near the splitter feeding server and client.
Potential multi-path problem	No multi-path
<p>The diagram illustrates two network configurations. In the left configuration, a drop cable connects an IM (Interference Mitigation) box to a splitter. A double-headed arrow indicates a distance of '> 10 ft. of cable from IM to splitter feeding server and client'. The splitter is connected to both a Server and a Client. In the right configuration, the IM box is positioned much closer to the splitter, and the same drop cable connects them. The Server and Client are also connected to the splitter in this configuration.</p>	

IM Installation Troubleshooting, Continued

Issue	Solution
Potential multi-path because the IM is greater than 10 ft. from the splitter.	By moving the client's cable to a non-adjacent splitter port, it may be possible to avoid moving the IM.
Potential multi-path problem	Try client on non-adjacent splitter port
<p>The diagram consists of two side-by-side network diagrams. Both diagrams show a central circular splitter connected to a 'Server' on the left and a 'Client' on the right. A 'drop cable' enters from the top and connects to an 'IM' (Intermediate Module) box. In the left diagram, the IM is positioned such that a vertical double-headed arrow indicates a distance of '> 10 ft. of cable from IM to splitter feeding server and client'. This creates a multi-path scenario where the signal from the IM to the client can take either a direct path or a path through the splitter. In the right diagram, the IM is moved to a different position, and the client's cable is connected to a non-adjacent port on the splitter, which eliminates the multi-path problem.</p>	

For Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.



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