

MC110 SERIES RF MULTI-COUPLER USER'S GUIDE



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SAFETY SUMMARY

System Weight and Handling Restrictions - Depending upon the specific system and configuration, each MC110 chassis weighs approximately 7 pounds. The MC110 is housed in a 1U rack-mount enclosure designed for installation in Telemetry Ground Station equipment racks.

Electrical – The MC110 is designed to operate on 115/230 VAC 50/60 Hz and complies with all U.S. and International safety codes and regulations required for safe operation and use of commercial equipment. Use standard and accepted safety practices with respect to operating commercial electrical equipment at all times to avoid the risk of personal injury or death.

EMI/EMC – The MC110 complies with all FCC and CE regulations regarding electromagnetic interference and compatibility. There are no personnel hazards or safety issues with respect to EMI/EMC when operating the system.

Exposure to Radio Frequency (RF) Signals – The MC110 is not an RF transmission device but does pass transmitted RF signals from 200 MHz to 2500 MHz at levels of between +10 dBm to noise threshold levels. These signal levels are well below the minimum safe exposure levels prescribed by both U.S. and International standards.



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1 - INTRODUCTION

1.1 Scope

This User's Guide provides the necessary information for the operation of all SEMCO MC110 RF Multi-Coupler configurations, which are used to receive and distribute RF signals from antennas operating in the 200 MHz to 2500 MHz frequency spectrum. The most common use of the MC110 RF Multi-Coupler is the distribution of these antenna RF signals to telemetry receivers installed in telemetry ground stations in support of aircraft, missile, and weapon system flight tests.

1.2 Purpose and Description

This User's Guide provides detailed information to allow for operation of all MC110 RF Multi-Coupler configurations (Figure 1-1).

Section 2, Getting Started briefly describes and lists the standard and optional hardware features of the rackmount MC110 RF Multi-Coupler and then describes how to install and apply power to the MC110.

Section 3, Hardware I/O describes system hardware and I/O interface. This standardized hardware I/O description facilitates MC110 RF Multi-Coupler operation in a typical Telemetry Ground Station environment.

Section 4, RF Multi-Coupler Operation provides instructions for MC110 operation.



Figure 1-1
MC110 Series RF Multi-Coupler

2 – GETTING STARTED

2.1 System Description

The MC110 RF Multi-Coupler is a 1U rack mount device designed for receiving antenna RF signals and distributing these signals to multiple telemetry receivers or other desired devices in a telemetry ground station. The RF Multi-Coupler is available in several configurations:

- A. 1 RF input and 8 RF outputs
- B. 2 RF inputs and 4 RF outputs per channel
- C. 2RF Inputs and 8 RF outputs per channel

All models of the MC110 provide a separate rear panel port that allows for the monitoring of the incoming RF spectrum. This monitoring port is provided using a directional coupler connected to the RF input and has some insertion loss compared to the RF input signal.

Each output port has an independent gain adjustment with a nominal range of 10 to 15dB. The MC110 is designed to operate from 200 MHz to 2500 MHz

The MC110 design includes selective wide band RF LNAs, precision power splitters and adjustable gain controls across the 200 MHz to 2500 MHz spectrum. Simple front panel adjustments provide for balancing the output of each output channel. Isolation between output ports is >50dB.

Table 2-1 provides the MC110 Specifications.

**Table 2-1
MC110 Specifications**

Features	Specifications
Electrical	
Input Ports	1 or 2 (N-type F or SMA-type F)
Output Ports	8 (N-type F) or 16 (SMA-type F)
Spectrum Monitoring Ports	1 or 2 (N-type F or SMA-type F)
Frequency Range	200 MHz to 2500 MHz
VSWR	<2.5:1
Noise Figure	<10 dB
Gain Controls	Nominal 10 to 15 dB gain per output channel
Linearity	+/-1 dB across each selected channel
P1 Compression Point	Begins compressing at 0 dBm input power
Isolation	>50 dB between RF output ports
Communications	
Local Control	Front Panel
Power Requirements	
Input Power	90 to 265 VAC; 50-60 Hz; Auto Ranging
Physical and Environmental	
Size and Weight	1U RM; 17" W x 1.75" H x 12" D; <7 lbs.
Operating Temperature	-20 to +50 degrees C
Storage Temperature	-20 to +70 degrees C
Humidity	Up to 95% non-condensing
Altitude	Up to 30,000 feet
EMI	Designed to meet MIL-STD 461

2.1.1 System Configurations and Options

As previously discussed, the MC110 is provided with 1 RF input and 8 RF outputs or 2 RF inputs and 4 or 8 RF outputs per channel. Custom configurations of the MC110 are also available. Contact the factory if a custom configuration is desired.

2.2 Initial System Hardware Set-up and Operation

The user should read this User's Guide and become familiar and comfortable with the overall features and configuration of the specific MC110 multi-coupler that will be used. Figure 2-1 depicts the MC110 power ON/OFF switch w/LED indicator, RF input ports, RF channel output ports, monitoring ports, power supply input connector and front panel controls.

The MC110 is operated using an external 115/230 VAC, 50/60 Hz power source. A simple ON/OFF power button (Figure 2-1) is provided.

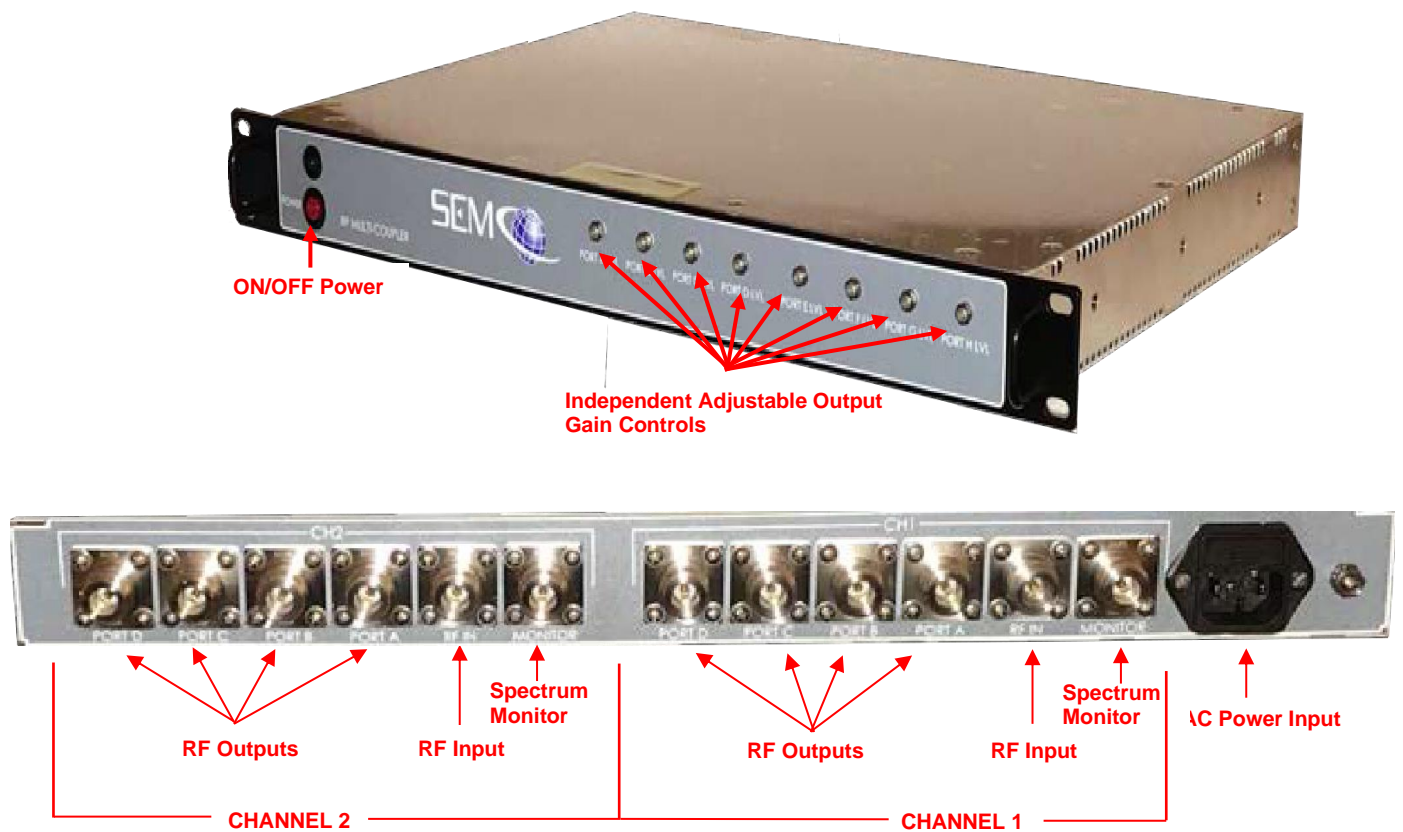


Figure 2-1
MC110 RF Multi-Coupler I/O and Operator Controls
(2 RF Inputs, 4 RF Outputs per CH is shown)

3 – RF MULTI-COUPLER OPERATION

3.1 Overview

This section describes all steps and features required for RF Multi-Coupler operation. The front panel controls described herein are applicable to all delivered MC110 Multi-Couplers. These controls and displays are described in subsequent paragraphs.

3.2 Front Panel Controls

Figure 3-1 depicts the MC110 front panel controls.

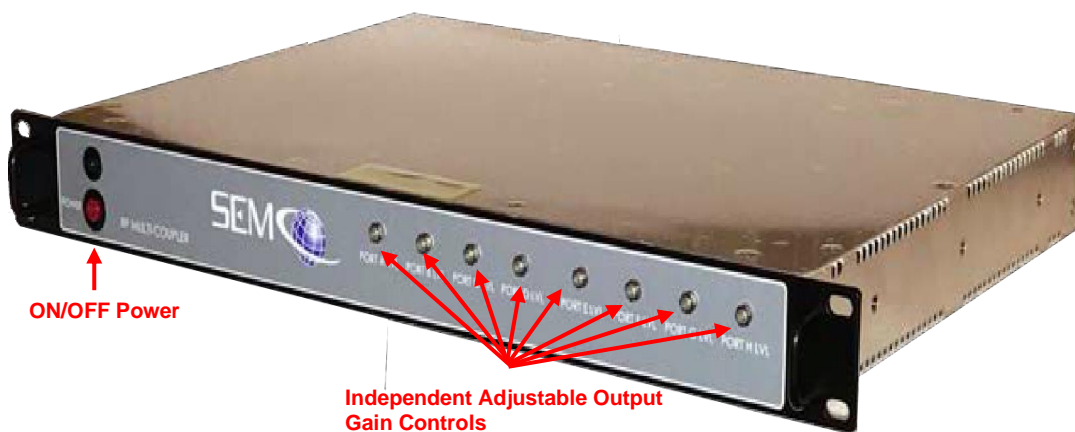


Figure 3-1
RF Multi-Coupler Front Panel Controls

As shown in Figure 3-1, the MC110 Front Panel is divided into two sub-panels:

- System Power
- Channel Gain Controls

Power ON/OFF – This push button applies 115/230 VAC power to the MC110.

Output CH Gain Controls – Each output channel has a front panel adjustment (nominal 10 to 15 dB gain).

3.2.1 RF Multi-Coupler Set-Up

Step 1 - Connect the RF Multi-Coupler AC power input to a 110-220 VAC source. Power the RF Multi-Coupler “ON” by depressing the front panel red Power ON/OFF button. The power “ON” indicator LED should illuminate when the systems is operational.

Step 2 - Connect the RF Input port to an appropriate signal source. Connect the RF output ports to the RF transmission systems or device.

Step 3 – It may be necessary to adjust the gain in each output channel to allow for termination or cable loss differences in the transmission system. Using a small blade screwdriver adjust the Gain control potentiometer for each port while monitoring the signal at the termination device and adjust as needed.

Step 4 - Connect a Spectrum Analyzer to the Spectrum Monitoring port(s) and verify the presence of the incoming RF spectrum.