



## INSTALLATION MANUAL

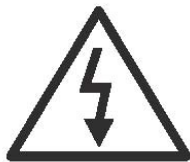
### CT-FMM

### Fixed Channel Audio/Video Micro Modulator

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#### ***IMPORTANT INFORMATION***

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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 electric shock to persons.



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 appliance.

**WARNING :** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. DO NOT OPEN THE CABINET, REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

## **PACKAGE CONTENTS**

This package contains:

- One CT-FMM Fixed Channel Audio/Video Micro Modulator
- One CT-FMM instruction manual

## **PRODUCT DESCRIPTION**

The CT-FMM is a professional grade fixed channel micro modulator providing an audio and video modulated RF carrier from 54 to 806MHz on any CATV channel from 2 to 125. Any standard video source can be used, including satellite receivers, demodulators, VCRs, DVD players, and TV/security cameras.

The CT-FMM employs highly stable synthesized frequency control. Setup and tuning is easy and straightforward taking advantage of the unit's front panel access to all level controls and indicators. Channel frequency information with FCC offsets is programmed into each unit at the factory. Non-volatile memory maintains channel selection in event of power loss.

The CT-FMM meets or exceeds government regulatory requirements, including FCC group delay pre-distortion for color transmission, and FCC Docket 21006 aeronautical offset requirements.

Note: The CT-FMM cannot be used as an audio only modulator. Video must accompany an audio input for the unit to function properly.

# SPECIFICATIONS

## CT-FMM

Fixed Channel Audio/Video Micro Modulator Specifications (Typical)

<b>RF</b>	
1. Output Frequency	54 – 806 MHz. CATV Channels 2 – 125
2. Output Level	+50 dBmV typical
3. Output Level Range	20 dB Adjustable
4. A/V Ratio	-12 dB to -18 dB ( $\pm$ 2dB) Adjustable
5. C/N Ratio	60 dB typical
6. Broadband Noise	-78 dBc
7. Spurious Output	>60 dB
8. Frequency Accuracy	$\pm$ 25 kHz
9. Output Impedance	75 Ohms
10. Output Return Loss	12 dB
<b>VIDEO</b>	
1. Video Input Level	0.7 Vp-p (Min.) @87.5% Modulation
2. Video Impedance	75 Ohms
3. Differential Gain	4.5% @87.5% modulator
4. Differential Phase	4.5° @87.5%Modulation
5. Video S/N Ratio	62 dB
6. Input Return Loss	20 dB
7. Flatness	$\pm$ 1 dB
8. Group Delay Response	Meets FCC group delay pre-distortion requirements for color transmission
<b>AUDIO</b>	
1. Input Level	0.35 V – 1 Vp-p for 50 kHz Deviation
2. Input Impedance	>10k Ohms
3. Flatness	$\pm$ 1dB, 50 Hz – 5 kHz
4. Harmonic Distortion	<1%, 50 Hz – 15 kHz
<b>GENERAL</b>	
1. DC Input Power	5V (400mA), 12V (150mA)
2. Operating Temperature	32 °F ~ 122 °F
<b>MECHANICAL</b>	
1. Dimensions	1"(W)" x 3.5 (H) x 7.5" (D)
2. Weight	14 oz.

# INSTALLATION AND OPERATION

## NOTE TO SYSTEM INSTALLER

System installer must adhere to Article 820-40 of the NEC that provides guidelines for proper grounding and specifies that the cable ground shall be connected to *the grounding system of the building*, as close to the point of cable entry as practical.

### 1. UNPACKING and HANDLING

Each unit is shipped assembled and factory tested.

Ensure that all accessories are removed from the container before discarding packing material

### 2. MECHANICAL INSPECTION

Inspect the front and rear of the equipment for shipping damage. Make sure the equipment is clean, and no connectors are broken, damaged, or loose. If equipment appears to be damaged or defective please contact your distributor or Cabletronix at 1-610-429-1511 for assistance.

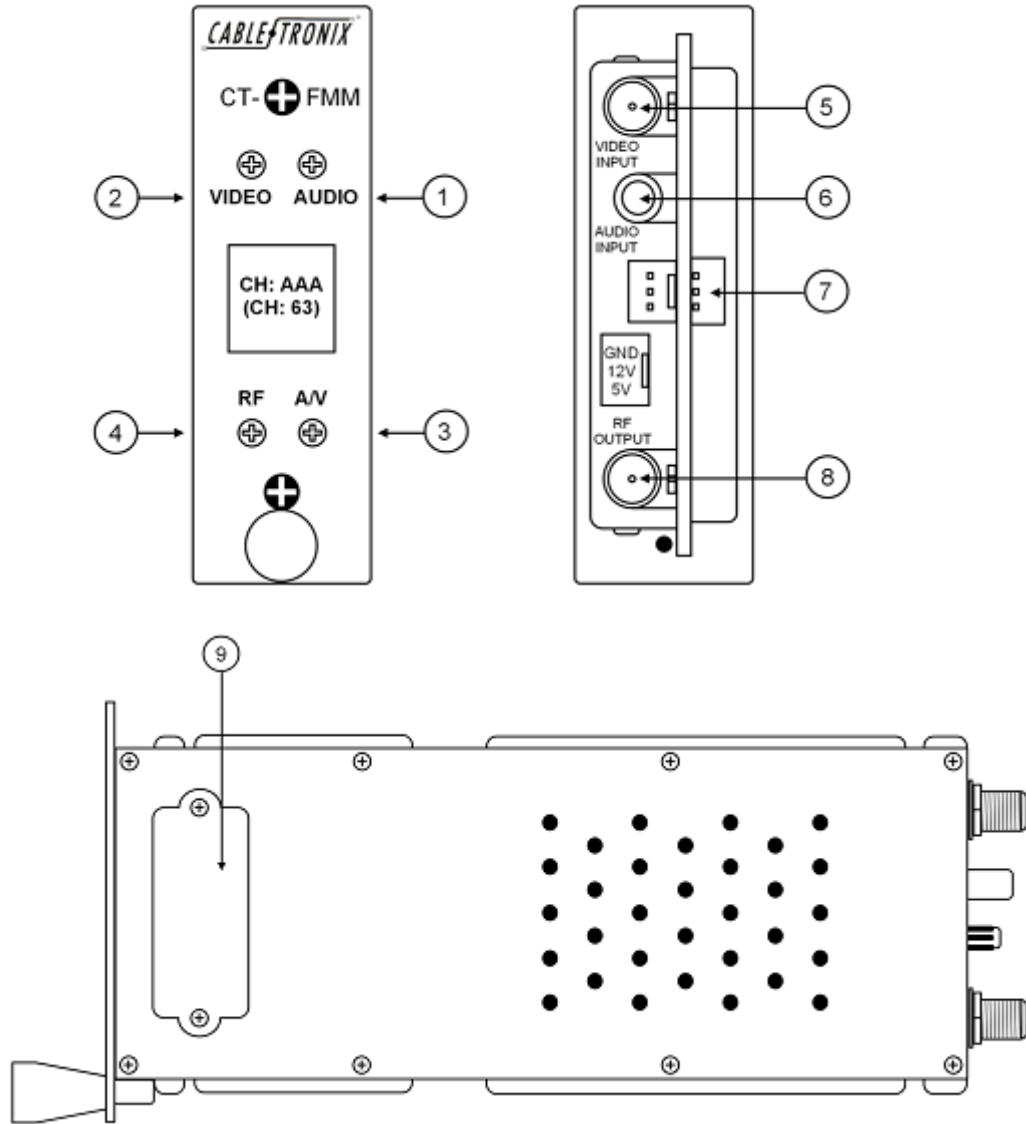
### 3. THE USE OF RACK MOUNTABLE CHASSES AND POWER SUPPLIES

The CT-FMM is designed to be mounted in a rack chassis designed for micro modulators, and powered by power supplies intended for micro modulators and designed to fit in the micro modulator rack chassis. The Cabletronix CTRC-12 12-unit rack chassis and Cabletronix CTPS-12 12-unit power supply should be used with the CT-FMM. Up to 12 CT-FMMs can be configured into a single CTRC-12/CTPS-12.

Some chassis and power supplies from other vendors and distributors may also be used, but actual configurations will vary by vendor. It is critical to note that (a) the power supply harness being used MUST come from the vendor providing the power supply, (b) the power supply must be designed for powering micro modulators and installation in a micro modulator rack chassis, and (c) power supply harnesses and power supplies are NOT always interchangeable among vendors. Using the wrong power supply harness and/or power supply can damage the CT-FMM. Contact your distributor for more information.

#### 4. PRODUCT DIAGRAM

##### FRONT, REAR, and SIDE PANELS



1	<b>Audio Modulation Deviation Level (Volume Control)</b>	Adjust for 25KHz deviation
2	<b>Video Modulation Index Level</b>	Adjust for 1 to 1.5 Vp-p @87.5% modulation
3	<b>A/V Adjustment</b>	Adjusts the picture carrier to audio sub-carrier ratio of the output signal
4	<b>RF Output Power Adjustment</b>	Adjusts individual modulator overall RF output
5	<b>Video Input</b>	F-connector
6	<b>Audio Input</b>	RCA Jack
7	<b>DC Power Input</b>	3 Pin Locking Header
8	<b>RF Output</b>	F-connector
9	<b>In-band Channel Adjustment Port</b>	Connector for adjusting CT-FMM channel within its specific band

## 5. HARDWARE CONNECTIONS

- a. The CT-FMM is designed for installation in a chassis designed for micro modulators. Micro modulator chasses such as the Cabletronix CTRC-12 can be mounted in standard 19" EIA racks.
- b. The Cabletronix CTRC-12 12-unit rack chassis and Cabletronix CTPS-12 12-unit power supply should be used with the CT-FMM. Up to 12 CT-FMMs can be configured into a single CTRC-12/CTPS-12. Some chasses and power supplies from other vendors and distributors may also be used, but actual configurations will vary by vendor. Contact your distributor for more information.
- c. The CTRC-12 rack chassis can hold up to 12 CT-FMMs and other micro modulators and demodulators of the same size. However, note that some other products such as the Cabletronix CT-AHP require two slots in a CTRC-12 resulting in the chassis supporting 6 units instead of 12.
- d. When configuring the CT-FMM in the chassis and power supply it is critical that the power harness being used is from the same vendor as the power supply, and is designed for that specific supply. Power supply harnesses among vendors are not interchangeable and can severely damage the CT-FMM.
- e. The use of a surge protector is highly recommended. Product warranty does not cover surge damages.
- f. Connect a 75ohm coaxial cable with proper connectors from the **source's Video Output port to the CT-FMM's Video Input port** (F-female connector).
- g. Connect a 75ohm coaxial cable with proper connectors from the **source's Audio Output port to the CT-FMM's Audio Input port** (RCA female connector).
- h. Connect a 75ohm coaxial cable with F-connectors from the **CT-FMM's RF Output port to the headend combiner**.

## 6. CHANNEL SELECTION

- a. The CT-FMM is a fixed channel modulator. Channel adjustment is possible, but only within the band for the specific CT-FMM purchased.
- b. The optional CT-FCP frequency control panel is required to adjust a CT-FMM's channel within its specific band.
- c. Remove the panel covering the CT-FMM's **In-band Channel Adjustment port**.
- d. Power up the CT-FMM.
- e. Attach the CT-FCP wiring harness to the CT-FCP, then attach the CT-FCP to the CT-FMM's **In-band Channel Adjustment port**.
- f. Push the respective **Up / Down Buttons** to set the desired channel. After about 15 seconds the channel will be automatically stored in the modulator's memory. In the event of a power outage the channel will be automatically recovered.
- g. Disconnect the CT-FCP from the CT-FMM and replace the **In-band Channel Adjustment port** panel.

## 7. ADJUSTMENT

- a. After installation and completing all hardware connections power the unit and wait 20 minutes before making the following adjustments.
- b. For testing purposes no more than 15dB from the **RF Output** should be going to a TV or RF input monitor. Use an attenuator to reduce the signal level if testing with an RF Input monitor. Individual CT-FMM setup and level settings can be tested from the **RF Output port**. However, system level testing should be done from the combiner.
- c. With a nominal 1 Vp-p video source connected, use the **Video Modulation Index Level control** to adjust the video modulation level for correct percentage of modulation (87.5%) if the video input is greater than 1.5 Vp-p. If test equipment is not available then adjust for proper picture contrast when viewed on a TV monitor and compare with known Off-Air broadcast picture quality. Turn the level control clockwise to increase the video modulation index, counter-clockwise to decrease the video modulation index.
- d. With audio source connected, adjust **Audio Modulation Deviation Level control** on the front panel for 25 kHz deviation. If you do not have an audio modulation meter and a precision demodulator, use a TV set or a signal level meter with an audio speaker and adjust for equal volume as compared to a known Off-Air broadcast. Monitor for a few minutes to assure the maximum volume does not over modulate, which can cause picture distortion. The audio modulation deviation can be increased by turning the level control clockwise, counter-clockwise to decrease the audio modulation deviation.
- e. To adjust the picture carrier to audio sub-carrier ratio of the output signal, rotate the **A/V Adjustment** on the front panel. Clockwise to increase the audio carrier level, counter-clockwise to decrease the audio carrier level.

- f. To adjust the output rotate the **RF Power Adjustment control** on the front panel. Clockwise to increase output, counter-clockwise to decrease output.

## 8. TROUBLESHOOTING

- a. Ensure you are using quality multiple shielded cables with quality radial or compression F-connectors. It is recommended Belden 9167 cable be used to prevent signal ingress and egress.
- b. Ensure the F-connector's center conductor is making solid contact with the CT-FMM's **Video Input, Audio Input, and RF Output ports**.
- c. If the CT-FMM is receiving power but no signal, check to be sure the video and/or audio input cables are securely connected with their respective Video Output and Audio Output ports on the video source and the Video Input and Audio Input ports on the CT-FMM. Also ensure the cable is securely connected at the CT-FMM's **RF Output port** and the combiner's input ports.
- d. When taking measurements it is always best to use a quality signal level meter. For initial individual CT-FMM setup measurements may be taken from the unit's **RF Output port**. System level measurements, however, should be taken from the combiner's output.
- e. It is highly recommended the **CT-FANRK** 3-unit rack mountable fan be used as significant heat reduction may double the CT-FMM's life span.
- f. Further troubleshooting assistance can be found on-line at [www.cabletronix.com](http://www.cabletronix.com) in addition to support from Cabletronix sales engineers at 1-610-429-1511.