

# MR-23VX

## 21.2-23.6 GHz VIDEO MICROWAVE SYSTEM

### MAIN FEATURES

- One or two-way transmission of video signals
- Up to two simplex or duplex subcarriers for audio or data applications
- RS-232 or RS-422 data subcarrier
- Choice of 1', 2', and 4' antennas
- Built-in diagnostics with front panel indicators for easy servicing
- Easy installation and alignment
- Full compliance with SIA warranty and service practices



*MR-23VX with 2' Antenna.*



*MR-23VX with 1' Antenna and Integral RF Unit.*

The MR-23VX is an economical solution for the short-range transmission of video signals. It features a variety of options that let you customize your system for surveillance, CCTV, teleconferencing, or studio-to-transmitter links.

Microwave is a less expensive alternative to cable, eliminating not only cable's prohibitive installation costs, but also the delays encountered in obtaining construction permits. It is also a good solution where cable is impractical: congested downtown areas, across highways or landscaped grounds, or locations where trenching and aerial lines are not permitted.

### FLEXIBLE DESIGN

The modular design of the MR-23VX allows you to create the exact system you need, with one or two-way transmission of selected subcarriers.

The simplex system carries video and subcarrier signals in one direction only, and is suitable for basic surveillance or STL use.

# MR-23VX VIDEO MICROWAVE SYSTEM

The duplex system carries the signal (video, subcarrier, or both) in two directions, and gives greater flexibility for security and teleconferencing applications. For example, a simple duplex system could carry video in one direction and camera controls in reverse; a more complex system could carry video, controls, and audio in both directions.

Up to two subcarriers can be used to carry audio, RS-422 or RS-232 data. These can be used for intercom, camera controls, telephone or facsimile channels.

The one-foot antenna is ideal for most "campus" style locations, where distances covered are 3 to 5 miles. A two-foot antenna can be substituted for coverage of 5 to 8 miles, and a four-foot antenna can be ordered for applications requiring distances from 8 to 12 miles.

## SYSTEM DESIGN

The MR-23VX consists of a weather-resistant RF unit with integral antenna and rack-mounted indoor interface unit. All video and subcarrier connections are conveniently located on the rear panel of the controller unit, which contains power supply and diagnostic circuitry. Status indicators on the front panel display system performance at a glance.

## INSTALLATION

You can rely on a worry free installation of your MR-23VX. We'll help you choose the configuration that's right for you, and provide complete and clear

instructions on installation.

Installation is easy: simply mount the radio, point, and turn it on. The interface unit can be rack-mounted as far as 250' from the antenna/RF unit. Only an adjustable wrench, screwdriver, and voltmeter are required to put in your own microwave link. Or, we can arrange to have the equipment installed for you—promptly and economically.

## SERVICE

The MR-23VX contains the same reliability that has been proven in thousands of installations worldwide, so you can count on your MRC microwave radio to deliver years of trouble-free service. However, if you should run into problems, we've made sure they won't last long.

Diagnosis and service of most malfunctions is simple. The front panel features a two-function meter for AGC voltage, and Gunn current. LEDs verify that carrier, Gunn current, and power are working. Fuses are mounted directly on the back panel, so they can be changed without removing the interface unit from the rack.

If you cannot find the problem, we'll back you up with our factory-based customer service staff. Call us, and we can probably talk you through the repair.

## FOR MORE INFORMATION

Please call your local MRC representative, or contact MRC directly, to learn more about the MR-23VX.

## CALCULATION OF TYPICAL MR-23VX ANNUAL OUTAGES DUE TO RAINFALL

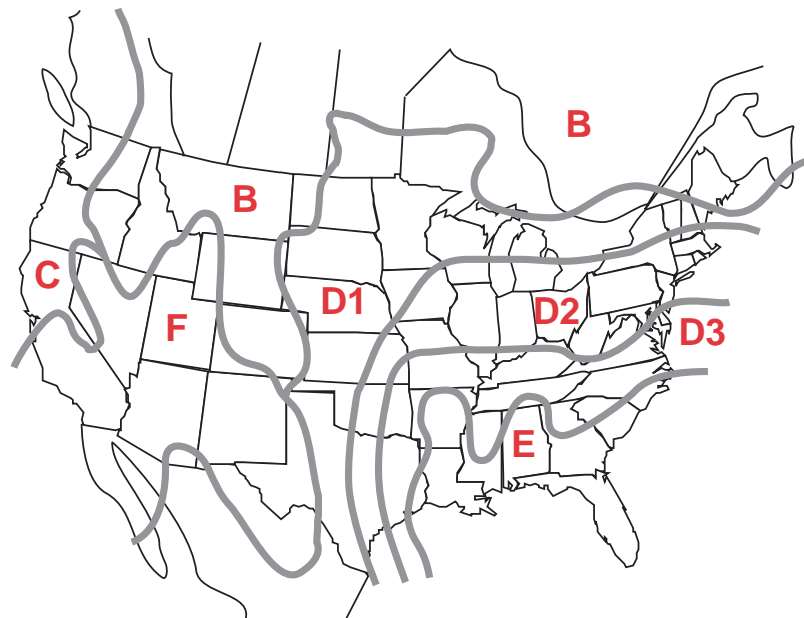
Typical outage per year (in minutes) caused by rainfall  
One-foot Antenna

Path Length (Miles)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0
Region								
B	5	5	5	5	9	16	21	43
C	5	5	8	13	24	42	47	84
D1	5	5	13	18	37	66	79	180
D2	5	8	18	37	66	116	142	300
D3	5	16	37	68	131	210	315	600
E	8	60	131	237	368	578	657	1077
F	5	5	5	8	16	29	37	63

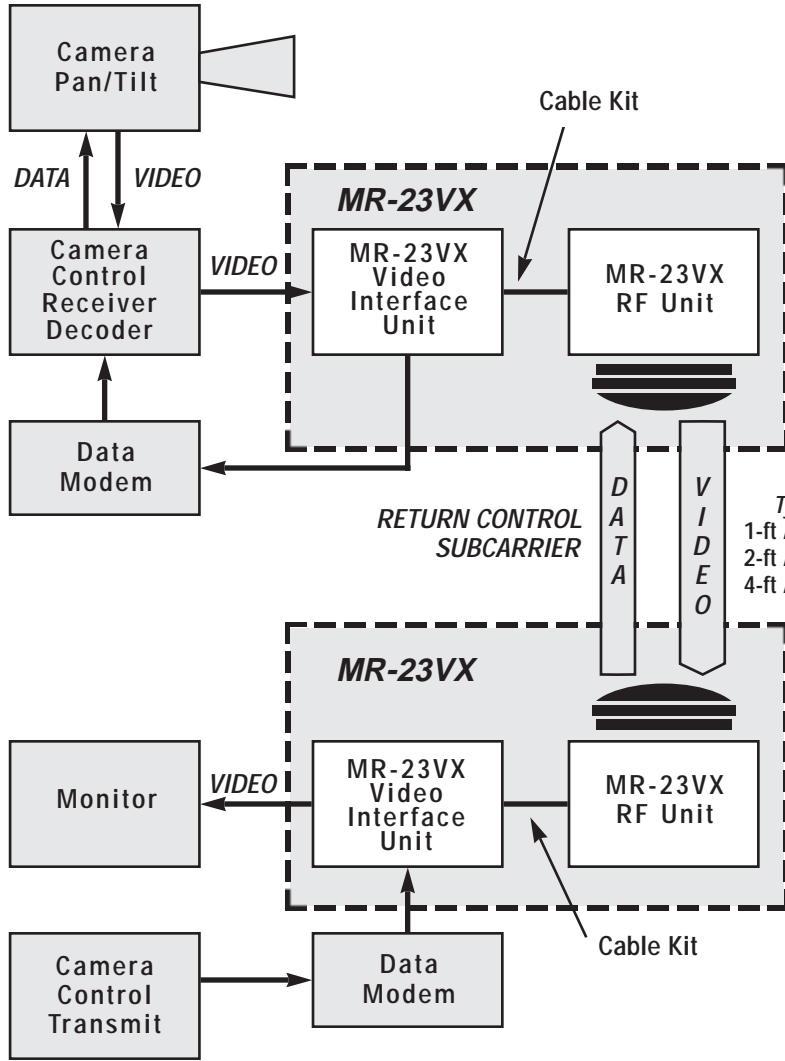
Typical outage per year (in minutes) caused by rainfall  
Two-foot Antenna

Path Length (Miles)	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
Region								
B	5	5	5	6	9	15	24	32
C	5	5	7	16	26	38	58	68
D1	5	5	9	21	42	66	105	137
D2	5	5	16	42	74	110	158	210
D3	5	9	32	79	131	210	368	468
E	5	32	116	263	394	578	736	893
F	5	5	5	11	17	26	39	53

Heavy rainfall affects the quality of the microwave signal as the distances covered increases. So a path suitable to an arid climate may be too great in areas where there are frequent downpours. The chart gives typical annual outages for one-foot and two-foot antennas for various path lengths and areas of the U.S. and Canada.



# MR-23VX VIDEO MICROWAVE SYSTEM



## Typical Configuration: Simplex Video With Full-Duplex Audio and Control Channels

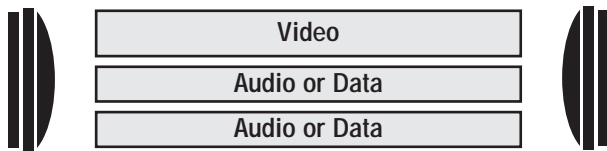
The versatility of the MR-23VX makes it perfect for a wide range of video transmission applications. This configuration drawing shows a typical system application involving simplex video and duplex audio and control channels. Simplex video with duplex audio and controls allow intercom, plus a data channel for camera controls with access controls on the return channel.

### Typical Path Lengths

- 1-ft Antenna: 3-5 Miles
- 2-ft Antenna: 5-8 Miles
- 4-ft Antenna: 8-12 Miles

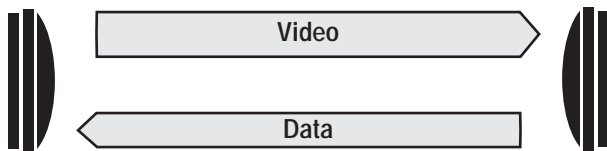
## Configuration Choices Range from Simplex Video to Full Duplex

The MR-23VX delivers enough bandwidth to carry the video signal and up to two subcarriers, in simplex (one-way) or duplex (two-way) mode.



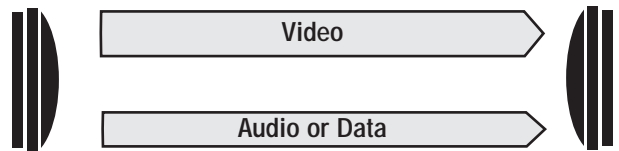
## Duplex Configuration with Video and Camera Control (Data) Channels

A common duplex installation with video from camera to monitor, and camera controls back from monitor to camera.



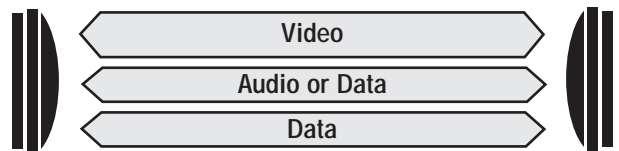
## Simplex Video Configuration with Audio or Data Channels

The simplex version allows both video and audio channels from camera/mic to a monitoring station.



## Sophisticated Configuration with Full Duplex Video, Audio and Data Channels

The most sophisticated MR-23VX configuration delivers full duplex performance on video, audio, and control channels, and is suitable for teleconferencing applications.



# MR-23VX SPECIFICATIONS

## GENERAL

Frequency Bands  
1' Antenna Systems: 21.8–22.0 GHz and 23.0–23.2 GHz  
2' Antenna Systems: 21.2 to 23.6 GHz  
Radio Capacity: 8 MHz bandwidth, 525/625 line video,  
plus up to two FM subcarriers for  
audio and/or data channels  
Modulation: FM  
Deviation:  $\pm 4$  MHz  
Video Signal-to-Noise Ratio (*with -35 dBm RCL*): 55 dB min.  
Subcarrier Bandwidth: 15 kHz  
RS232, RS422 Data Transmission  
with External Modems: 19.2 kbps

## TRANSMITTER

Power Output (*at source*), Minimum: 50 mW (+ 17 dBm)  
Typical: 66 mW (+ 18 dBm)  
Maximum: 100 mW (+ 20 dBm)  
Long-Term Frequency Stability:  $\pm 0.03\%$   
Spurious Response: Per FCC Part 94 and Part 21  
Video Input, Level: 1 Vp-p  
Impedance: 75  $\Omega$   
Return Loss: 20 dB minimum  
Audio and/or Data Input, Level: 0 dBm  
Impedance: 600  $\Omega$ , balanced  
Connector: Pluggable terminal strip  
Subcarrier Frequencies: 6.2, 6.8, or 7.5 MHz

## RECEIVER

Type: Dual conversion, superheterodyne  
Noise Figure: 12 dB nominal  
Local Oscillator: Solid-state, Gunn oscillator  
IF Bandwidth: 40 MHz  
First IF Frequency: 140 MHz  
Video Output, Level: 1 Vp-p  
Impedance: 75  $\Omega$   
Audio and/or Data Output, Level: + 8 dBm  
Impedance: 600  $\Omega$ , balanced  
Connector: Pluggable Terminal Strip  
Receiver Threshold (*37 dB weighted S/N*): - 71 dBm

## ANTENNA

Size:	1' diameter	2' diameter
Gain ( <i>including Radome Loss</i> ):	33 dBi	40 dBi
Beamwidth ( <i>3 dB</i> ):	3.5°	1.8°

## PRIMARY POWER

Source: 115 Vac (50 to 60 Hz); 220 Vac optional  
Power Consumption, Transceiver (*duplex systems*): 140 W  
Transmitter: 70 W  
Receiver: 70 W  
*RF Unit powered via interconnection cable by Video Interface Unit.*

## PHYSICAL

Size (*Transceiver, Transmitter, or Receiver*)  
RF Unit (*including 1' antenna*): 16" dia. x 10.75" d  
(40.5 x 27.5 cm)  
Video Interface Unit: 3.5" h x 19" w x 14.3" d  
(9.0 x 43.2 x 36.3 cm)  
Weight, RF Unit (*including 1' antenna*): 10 lbs. (4.5 kg)  
Video Interface Unit: 13.5 lbs. (6.1 kg)

## ENVIRONMENTAL

*RF Unit*  
Ambient Temperature, Operating: -30° to +50°C  
Optional, Operating: -30° to +55°C  
Storage: -40° to +60°C  
Relative Humidity: up to 100%  
Wind Load: 40 psi maximum  
*Video Interface Unit*  
Ambient Temperature, Operating: +10° to +40°C  
Storage: -30° to +50°C  
Relative Humidity: Up to 95%

## INTERCONNECTION

*Video Interface Unit to RF Assembly*  
Recommended Configuration  
DC Power: 50', 100', 250' standard kits; Up to  
1000' (300 meters) upon request  
IF/BB: 50', 100', 250' standard kits; Up to  
1000' (300 meters) upon request  
Technical Limits for Alternative Configuration  
DC Power: 2.9 V maximum dc drop at 1.9A or  
1.5  $\Omega$  total loop resistance

## FCC DATA

Type Accepted: Parts 94 and 21  
Emission Designator: 25M0F8W  
Recommended Frequencies  
1' Antenna Systems: 21.925, 23.125, 21.975, 23.175 GHz  
2' and 4' Antenna Systems: 21.225 GHz to 23.575 GHz  
FCC Identifier  
1' Antenna Systems: FC35DZMR23VX  
2' and 4' Antenna Systems: FC35DZMR23VX-2



MICROWAVE  
RADIO  
COMMUNICATIONS



Microwave Radio Communications  
20 Alpha Road  
Chelmsford, MA 01824-4168 USA

Tel, U.S. & Canada: (800) 490-5700  
Telephone: (978) 250-1110  
Facsimile: (978) 256-6225

E-mail: sales@cm-mrc.com  
Internet: <http://www.cm-mrc.com>

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