

Millennium PML

Portable Microwave Radio Links



Applications

- Fixed or Portable Microwave Links
- News or sporting event coverage

Features

- Transmitters and receivers from 1.7 to 15 GHz, in 500 MHz bands
- Convertible: Analog Video + 4 Audio Channels, or 34 Mbps Digital Datastream
- Separate RF Unit from control unit by up to 250 meters/800 feet (standard configuration)
- 70 MHz intermediate frequency
- Digital frequency synthesizers
- Integral LNA standard
- Alarms and indicators at RF unit and control unit
- Audible & visual panning aid for antenna alignment
- Linear AGC with direct read RCL in dBm on front panel
- Quick connect antenna feeds
- Up to 4 RF Heads can be placed on a single tripod and configured as either simplex or duplex links
- Built-in AC/DC power:
 - ◆ Universal AC Inputs, 105 to 260 Vac
 - ◆ Standard DC Input, 24 or 48 Vdc
 - ◆ Optional Automatic Switch, AC/DC
- Direct reading RCL in dBm

Overview

The Millennium PML two-box microwave radios are designed for international applications, in compliance with CCIR recommendations, requiring widely separated RF units and control units. In a standard configuration, the RF unit can be separated from the control unit by up to 250 meters (800 feet), with a standard 70 MHz IF signal feeding the RF unit through a single triax cable.

For outstanding flexibility, the Millennium PML can be reconfigured quickly from the standard analog video plus audios configuration to a digital radio featuring full 34 Mbps (E3) datastream. This optional PML-DR configuration can be setup quickly in the field by merely replacing modules in the control unit. The RF unit is the same for all configurations.

The Millennium PML radio series include both transmitters and receivers. Up to four RF Heads can be placed on a single heavy duty tripod, and configured for either simplex or duplex operation.

The Millennium PML features an internal AC/DC power supply, with universal AC inputs and DC inputs. The radio also offers up to four audio subcarriers.

The compact and lightweight design of the Millennium PML radios provides the mobility and quick-response required in outside broadcast and emergency restoration applications. Radios can be quickly and easily setup in the field, with no special tools required.



The Millenium PML units include weatherproof covers and pop-out rackmount hardware

Superior performance is achieved through the use of sophisticated, field-proven RF circuitry and a digital synthesizer for multi-channel flexibility. No elaborate tuning or adjustments are required.

The Millennium PML radios can operate easily from either AC or DC power sources without the need for modifications or external converters. They feature a universal built-in AC/DC power supply that allows operation from 105 to 260 Vac, or 20 to 60 Vdc.

The Millennium PML features ruggedized, weather-resistant cases, connectors, switches, and indicators to function reliably in the most adverse field conditions.

Proud History of Leadership

The Millennium PML is the latest in a long series of “two-box” radio systems from Microwave Radio Corporation. Dating from the “B” system of the early 1960s from MRC’s predecessor company, Microwave Associates, MRC has developed, manufactured, and supported tens of thousands of two-box radios in over 70 countries.

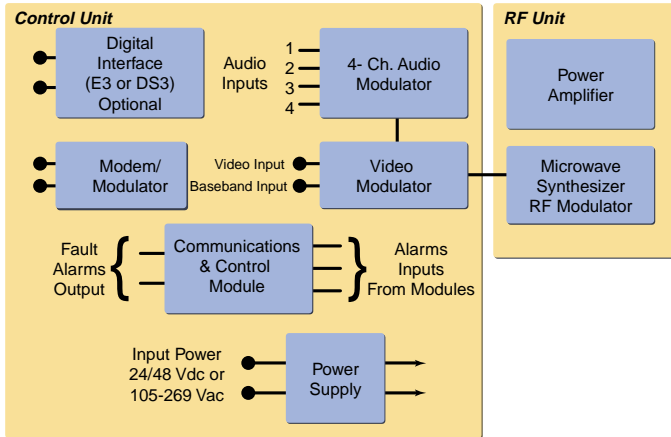


The Millennium PML

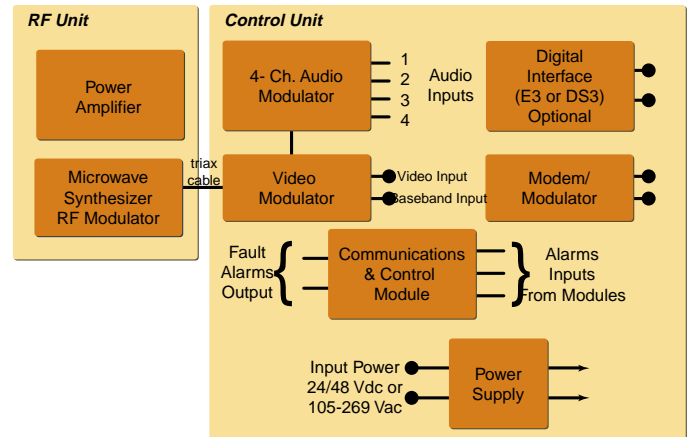
Building on a proud, proven, and continuous history of two-box radio development, the Millennium PML is the two box system for the 1990s and beyond. With an ease of use, ease of repair, and ease of configuration that makes it ideal for today’s demanding, changing times. The Millennium PML is designed from the ground up to be the radio system you need today for emergency restoration and temporary service provision. But it is also architected to meet the changes of the future as well. Each Millennium PML control unit is modular, ready to accept new voice channels, new data channels, new control channels—virtually any technology and service improvement that can be offered in the years ahead. Today, that capability even includes a 34 Mbps, E3 or 45 Mbps, DS3 datastream with the optional ‘DR’ configuration.

The Millennium PML: The New Two Box Standard

From the Microwave Associates of the early 1960s, to the Microwave Radio Communications of today, you’ll see an unbroken commitment to technology, customers, and customer satisfaction. You’ll also see a company that has grown into one of the largest broadband and digital radio providers in the world, and to be a significant part of California Microwave, a world leader in wireless communications.



The Millennium PML Transmitter can be equipped with the four standard audio modulators or the optional digital radio modem within the three-rack unit cabinet



The Millennium PML receiver can be equipped with the four standard audio demodulators or the optional digital radio modem within the three-rack unit cabinet



Bottom Left: The Millenium PML features removable modules that make it easy to switch between analog and digital configurations
Bottom Right: Up to four RF units can be place on the heavy-duty tripod (shown) and diplexed to the quick connect antenna, or a single RF Unit can be used with a twist lock antenna (**Top**)

SPECIFICATIONS

ANALOG SYSTEM PERFORMANCE

All measurements at -40 dBm RCL. Measurements are made in accordance with EIA RS250C or CCIR specifications, unless otherwise noted.

VIDEO

Video: 525 line or 625 line
Signal-to-Noise Ratio (weighted):
For RF Frequencies up to 8 GHz: 67 dB min
For RF Frequencies from 8 to 11 GHz: 65 dB min
For RF Frequencies above 11 GHz: 62 dB min
Signal-to-Hum (p-p/RMS): 55 dB min
Threshold (with LNA): ≤ -84 dBm typical
For RF Frequencies up to 8 GHz: ≤ -82 dBm min
(37 dB weighted S/N)
For RF Frequencies greater than 8 GHz: ≤ -80 dBm min
Periodic Noise: 10 kHz to 5 MHz, >60 dB
Frequency Response: 300 Hz to 6 MHz, <0.5 dB
Wideband Response to 15 MHz: <2 dB
Emphasis: Per CCIR Rec. 405, or flat; selectable
Return Loss: ≥ 26 dB min
Differential Phase: $\leq 1.0^\circ$ max
Differential Gain: $\leq 2.0\%$ max
Chroma/Luminance Gain Inequality: ± 2 IRE
Chroma/Luminance Delay Inequality: ± 20 ns
Video Input/Output: 1 Vp-p, 75 Ω unbalanced
Video Input/Output Connector: BNC
Video Level Adjustment Range: ± 3 dB, front panel adj

AUDIO

Audio Capacity: Up to 4 audio subcarriers
Signal-to-Noise Ratio: 65 dB min
Audio Response: 40 Hz to 12 kHz, ± 0.5 dB
12 kHz to 15 kHz, ± 1.0 dB
Harmonic Distortion: 0.5% max. @ 1 kHz
Input: 0 to +9 dBm,
600 Ω or bridging; selectable
Output: 600 Ω or low impedance; strap selectable
Factory set to +8 dBm in/out
+15 dBm capacity
Subcarrier Frequencies: Up to 4 channels,
standard CCIR frequencies
Audio Input/Output Connectors: XLR

STANDARD FEATURES

Video/Audio Test Generator
Continuity Pilot
Selectable Emphasis: 525, 625 line, or flat;
Video Invert on FMT & FMR
Audio I/O Switchable: 600 Ω or bridging input
600 Ω or low Z output

DIGITAL SYSTEM PERFORMANCE

All measurements at -40 dBm RCL.

System Gain
10-3 BER: 112 dB
10-6 BER: 109 dB
Capacity: E3, 34 Mbps
Modulation: 4FSK
Interface: G.703
Line Code: HDB3
Bit Error Rate (10-6), 34 Mbps: -75 dBm RCL
Jitter: per CCITT Rec. G.823 & G.824
Local Orderwire: Control Unit to RF Unit

TRANSMITTER

Type: Dual conversion, superheterodyne
Power Output (without branching)
2, 3 GHz Models, typical: 4 Watts
4, 5, 6, 7 & 8 GHz Models, typical: 2 Watts
10, 13 & 14 GHz Model, typical: 1 Watt
IF Input Level: 0.2 to 1.0 Vrms
Frequency Stability: $\pm 0.002\%$

RECEIVER

Type: Dual conversion, superheterodyne
Frequency Stability: $\pm 0.002\%$
Noise Figure: ≤ 4 dB min
Intermediate Frequency: 70 MHz
IF Output Level: 0.5 Vrms

INTERCONNECTION

Coax, Cable Length: Up to 250 meters/800 feet

OPERATING ENVIRONMENT

RF UNIT

Temperature: -30° to $+55^\circ\text{C}$
Relative Humidity: up to 100%

CONTROL UNIT

Temperature: 0° to $+45^\circ\text{C}$
Relative Humidity: up to 95%

PHYSICAL

RF UNIT

Size: 4.75" h x 8" w x 11" d
(12.1 x 20.3 x 27.9 cm)
Weight: 17 lbs (7.7 kg)

CONTROL UNIT

Size: 5.2" (h) x 17.25" (w) x 11.5" (d)
(13.2 x 43.8 x 29.2 cm)
Weight: Approx. 23 lbs (10.4 kg)

METERS AND INDICATIONS

RF Head Metering, Transmitter: Output Power
Receiver: Received Carrier Level (RCL)
Control Unit Metering: System Voltages
External Indicators: Summary Alarm LEDs
Internal Indicators: Subcarrier Alarms, AFC,
Local Oscillator Lock

CONFIGURATIONS

Preprogrammed Channels: Up to 100 are available
Modulation: FM
Video Deviation: 8 MHz
Power Supply: 20 to 60 Vdc & 105 to 260 Vac (50 to 60 Hz)
Optional Auto Switchover: From AC to DC on loss of AC
DC Power Consumption, TX or RX: 80 W, typical
Choice of Frequency Bands
1.99 to 2.5 or 2.3 to 2.7 GHz
3.25 to 3.75 GHz
4.4 to 4.9 GHz
5.8 to 6.4 GHz
6.4 to 7.0 or 6.5 to 7.1 GHz
7.1 to 7.7 GHz
7.7 to 8.2 or 8.2 to 8.5 GHz
10.25 to 10.75 GHz
12.7 to 13.2 GHz
14.0 to 14.5 or 14.7 to 15.2 GHz



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