

## Features

- Standard compliant system for 7-23GHz.
- Supports 34Mbps 4xETH Payload.
- Supports space and frequency diversity, unprotected (1+0) and protected (1+1).
- Auxiliary EOW voice.
- Adaptive Transmit Power Control (ATPC) and high sensitivity to improve link reliability and stability.
- Automatic Gain Control (AGC) function.
- Hot standby Tx protection switching and hitless Rx protection switching.
- Local management via CIT to facilitate commissioning.
- NMS for end-to-end link performance, monitoring and diagnosis with SNMP management.
- Loopback testing functions to facilitate commissioning and troubleshooting.
- Wide operating temperature ranges from -33°C to +55°C for ODU.
- Compact and light weight for easy installation and reliable performance.



## Product Description

Comba Digital Microwave System allows transmission links to be established rapidly and easily to meet a variety of transmission needs, brings cost savings and helps rapid network rollout. This solution comprises of: antenna, outdoor unit, indoor unit and NMS.

The IP radio system is an IP transmission solution designed to seamlessly incorporate radio links into wide range of infrastructures, working across a variety of frequencies from 7GHz to 23GHz and meeting carrier-grade standards for reliability, quality and environmental compliance.

ML-MI employs a design that does not distinguish between the type of data to be transported, and provides "native" support for both Ethernet and TDM data over the same radio link, without resulting degradation of either type of traffic.

The ML-MI is able to be configured for full-duplex connection capacities of 34Mbps of fast Ethernet interface, and is configurable from 4Mbit/s to 34Mbit/s via Craft Interface Terminal (CIT). ML-MI IDU can be easily upgraded from 1+0 mode to 1+1 mode by adding one more IF module which is hot swappable in operation.

Please consult us for exact and detailed product requirement for the territory(s) concerned, and to use the "Microwave Parabolic Antennas" datasheet to select the required antenna(s) for each link.

## Technical Specification

Electrical - System		7GHz	8GHz	11GHz	13GHz	15GHz	18GHz	23GHz	
Frequency Range	GHz	7.10-7.90	12.80-13.20	10.67-11.74	14.50-15.30	17.70-19.70	21.20-23.60	21.20-23.60	
ITU-R Compliance		F.385-7	F.386-6	F.387-9	F.497-6	F.636-3	F.595-3	F.637-3	
RF Tx/Rx Spacing	MHz	154 or 161	119 or 126	490, 500 or 530	266	420 or 490	1010	1008 or 1232	
RF Channel Bandwidth	MHz	28					27.5	28	
Modulation		QPSK							
Tx Power (±2dB tolerance)	dBm	27	25			23			
Rx Sensitivity @ 10 <sup>-6</sup> BER (Guaranteed: +2dB)	dBm	-83				-82	-81	-80	
RX AGC Control Range	dB	≥ 60							
Frequency Stability	ppm	10							
Residual BER		< 10 <sup>-13</sup>							
Supported RF Configurations		1+0, 1+1							
Radio Protection		Hot standby/ Space diversity / Frequency diversity							
IP Interfaces		IEEE 802.3, 10/100BaseT, RJ-45 Connector							
Throughput	Mbps	34							
AUX interface		Async (19.2kbit/s) / Sync (64kbit/s), RS-422 protocol, DB-9							
Voice EOW Interface		600Ω balanced, RJ-11							
Data EOW Interface	Kbit/s	No							
Monitoring Port Interface	CIT	F-interface, VT-100, via local CIT RS-232, DB-9							
	NMS	Q-interface, SNMP, Ethernet 10/100 Base-T, RJ-45							
Programmable User I/O Interface		4 Inputs 4 Outputs, DB-26							
Power Supply	VDC	-20 to -60							
Power Consumption (Per hop)	1+0	≤ 95							
	1+1	≤ 135							
IF Frequencies	MHz	350 (up-conversion), 140 (down-conversion)							
IF Connection on ODU		N-type connector, Belden 9913/RG-8, up to 300m							
RSSI Connection on ODU		BNC							
<b>Mechanical - Per Installation</b>									
Dimensions (H x W x D)	IDU	mm	44 x 438 x 280						
	ODU		279 x 240 x 92						
Weight	IDU	kg	5						
	ODU		4.2						
Operational Temperature	IDU	°C	-5 to +55						
	ODU		-33 to +55						
Operational Altitude Above Mean Sea Level (max.)		m	4500						
Operational Humidity (max.)	IDU	%	≤ 85						
	ODU		≤ 95						
Environmental Compliance			ETSI ETS 300 019						