

## CHAPTER 1

### GENERAL INFORMATION

#### 1-1 Introduction

This manual contains information pertaining to the specifications, installation, operation of MM-2500.

#### 1-2 Manual summary

This manual is divided into 4 chapters, each covering a particular topic for the operation of the Jung Jin Model MM-2500. The topics by chapter number are:

**Front matter:** Includes title page, read first for safety consideration, and table of contents.

**Chapter 1, Generation information:** Describes the manual format, brief function description, and specifications.

**Chapter 2, Installation :** Provides information concerning initial inspection, preparation for use, storage and shipment.

**Chapter 3, Operation :** Describes the front and rear panel controls, indicators, connectors, and instrument operation procedures.

**Chapter 4, Theory of operation:** Contains the technical note for installation with other equipments and operating theory.

### 1-3 General description

MM-2500 is used in testing RF Level, Modulation, Frequency simultaneously which has wide frequency range from 20MHz to 2.5GHz. The product provides high-speed measurement by adopting interpolator & OCXO, more stable measurement in RF level with frequency-temperature calibration technology and lower distortion in 2.0 ~ 2.5GHz with built in down converter specially designed to obtain better demodulation.

### 1-4 Features

#### 3GHz Frequency Counter

- High Resolution  
(100Hz resolution at 0.1sec gate time @2.5GHz)
- High Stability OCXO ( $5 \times 10^{-8}$ , 0.05ppm)
- Input sensitivity : -30dBm

#### RF Level Meter

- Level Accuracy : +/- 1dB (Typically 0.5dB)
- Relative Level function

#### FM/AM Modulation Meter

FM distortion : > 1% (typically 0.5%) at FM deviation  
7kHz @ 2.0 ~ 2.5GHz

## 1-5 Specifications

### 1-5.1 Input

- Connector : N-Type
- Impedance :  $50\Omega$
- Maximum : +20dBm (100mW)
- Frequency : 20MHz to 2500MHz

### 1-5.2 Modulation

	Carrier Frequency	Level Range
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FM	20MHz to 1500MHz	-30dBm ~ +20dBm
	1500MHz TO 2500MHz	-20dBm ~ +20dBm
AM	20MHz to 1000MHz	-30dBm ~ 0dBm

### 1-5.3 FM Measurement

- Modulation (bandwidth) : 25Hz to 50kHz
- Deviation Range : 100, 50, 30, 10, FM 3kHz  
(300Hz-3kHz : -3dB  $\pm$ 0.5dB at band limits)
- Measurement : peak+/peak- deviation,
- Accuracy : @1kHz AF  
 $\pm$ (2% of Fs + 2% of reading + residual FM)
- Residual FM :  
up to 100MHz : < 20Hz for carrier frequency  
above 100MHz : increases linearly with  
frequency (20Hz/100MHz).
- De-Emphasis : 50, 75, 750us or OFF  
Time constant Accuracy =  $\pm$ 5%
- Modulation Frequency Response : Referenced to 1kHz

## · Filter Response

- Stop band :
  - 25Hz, 50kHz : -3dB cut OFF
  - 300Hz, 3K, 15kHz : -0.5dB cut OFF
- Pass band :
  - 25Hz HPF + 3kHz LPF :  $\pm 0.5\text{dB}$ @40Hz~3kHz
  - 25Hz HPF + 15kHz LPF :  $\pm 0.5\text{dB}$  @40Hz~15kHz
  - 25Hz HPF + 50kHz LPF :  $\pm 0.5\text{dB}$ @40Hz~24.5kHz
  - 300Hz HPF + 3kHz LPF :  $\pm 0.5\text{dB}$ @300Hz~3kHz
  - 300Hz HPF+15kHz LPF :  $\pm 0.5\text{dB}$ @300Hz~15kHz
  - 300Hz HPF+50kHz LPF :  $\pm 0.5\text{dB}$ @300Hz~24.5kHz
  - 3kHzHPF + 15kHz LPF :  $\pm 0.5\text{dB}$ @3kHz~15kHz
  - 3kHzHPF + 50kHz LPF :  $\pm 0.5\text{dB}$ @3kHz~24.5kHz

## 1-5.4 AM Measurement

- RF Level range : 0dBm max
- Modulation (band width) : 25Hz to 50kHz
- AM Range : 10, 30, 50, 100% Measurement of peak, through or difference can be made
- Accuracy at 1kHz modulation rate ;  
(3% of Fs + 2% reading + residual AM)
- Residual AM ;  
<3% with 15kHz Bandwidth selected

## 1-5.5 AF Signal outputs

Connector : Front-panel BNC  
Level : 0.5Vrms at 1kHz Modulation Frequency  
          equals meter full scales on any Range  
Frequency Response : Controlled by selected filter  
Impedance : 600 $\Omega$

- Distortion
- FM :  
    <1.5% for 50kHz deviation @1kHz
- AM :  
    <3% for 30% AM @1kHz

#### 1-5.6 Frequency-Counter

- RF Counter

CARRIER FREQUENCY	LEVEL RANGE
20MHz to 2000MHz	: -30dBm to +20dBm
2000MHz to 2500MHz	: -25dBm to +20dBm
- \*At AM modulated Carrier minimum Sensitivity is depend on AM depth, not specified.
- Gate Time  
    Approx : 0.1sec to 1.0sec (4 step Selectable)
- Frequency Counter Displayed digits 7 Segment to 9 digits (controlled by selected Gate time)
- Time Base Generator

Frequency	: 10MHz
Frequency Stability	: 0.05PPM

## 1-5.7 RF Level mode

· RF Input	
CARRIER FREQUENCY	LEVEL RANGE
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20MHz to 2000MHz	: -30dBm to +20dBm
2000MHz to 2500MHz	: -25dBm to +20dBm
· Level Linearity	: $\pm 1$ dB of each range
· Frequency Response	: $\pm 1.0$ dB
· Display digit	: 4digits
· Display unit	: dBm, dBu, mW

## 1-5.8 Temperature

- Specification apply over the temperature range of from  
15°C to 30°C (operational from 0°C to 40°C)
- Storage temperature range : 0°C to +50°C
- Maximum relative humidity : 95% at 30°C

## 1-5.9 Others

- Power Requirements : Voltage Auto Select  
50/60Hz  
115 $\pm$ 10%  
230V –10% +8%(250V max)  
Approx 30VA
- Dimensions and Weight : 113(H) × 427(W) × 312(D)mm
- Weight : Approx 8.25Kg
- Standard Accessories  
: N Type Cable, Fuse, Manual, Power Cord