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USER OPERATION AND MAINTENANCE MANUAL

FREQUENSY METER FM-WG/70/220
Part No. FM-WG/70/220

1st edition, March 2013

Table of Contents.

1. INTRODUCTION.

This instruction manual contains information on operation of the Frequency meter WG/70/220, hereinafter called Frequency meter.

1.1 General Description.

Frequency meter is intended for measuring frequency in range 70-220GHz.
The   Frequency   Meter   is   based   on   sweepable   heterodyne   receiver.
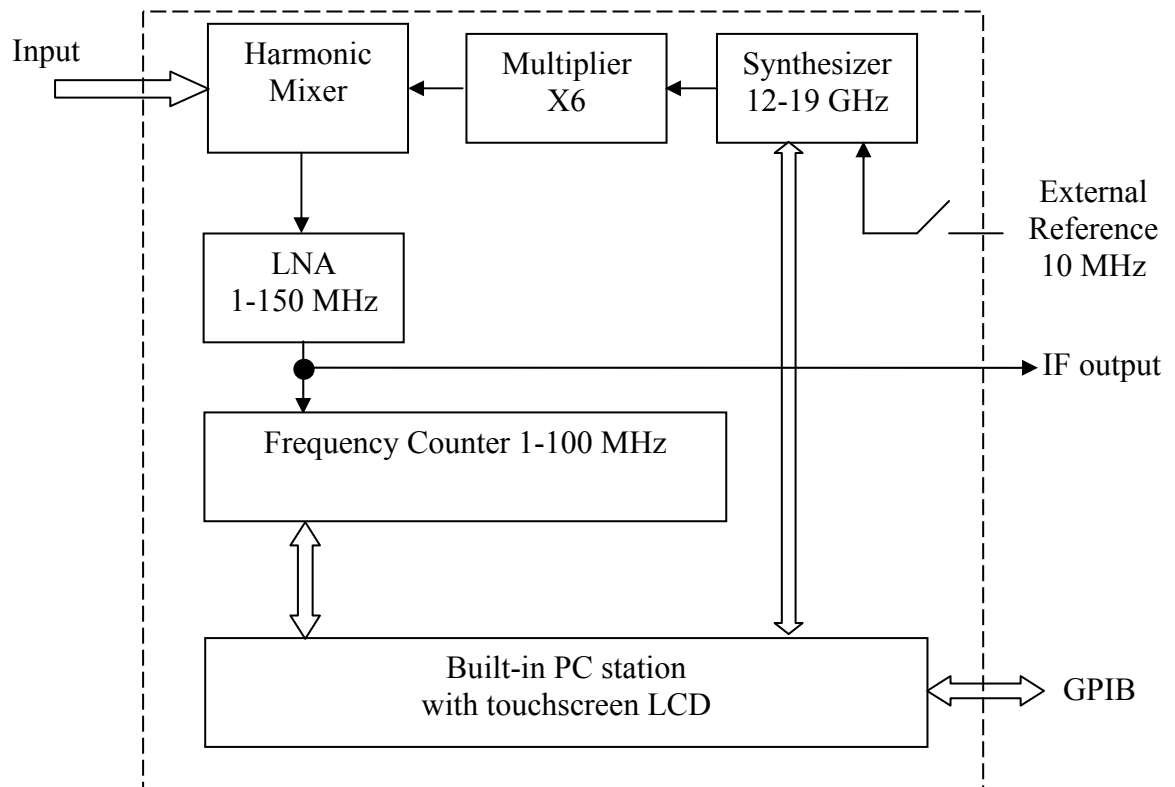
2. SPECIFICATIONS.

2.1 Common Specifications.

No.	Specifications	Range	Remarks
1	Input Frequency range	70 – 220 GHz	
2	Maximum input	+ 10 dBm	
3	Minimum input	-20 dBm	
4	Damage level	+13 dBm	
5	Dynamic range	30 dB	
6	Standard Input connectors	Flange UG-378/U-M	
7	Standard Input waveguide	WR-10	
8	Standard Output connector	SMA	
9	Modes of operation	Counter	
10	Accuracy	+/- 1 MHz	
11	Resolution	1 kHz	
12	IF Output	50-100 MHz	
13	Control Interface	GPIB	
14	Power Supply	230 V, +/- 10%, 50- 60 HZ,~200 VA	
15	Operating temperature range	+10°C…+ 50°C	

2.2 Mechanical Specifications.

1. Size   52 x 17 x 35 cm.
2. Weight   10,2 kg.

Frequency meter WG/70/220

2.3 Block-diagram of the Frequency Meter.

```
                    ┌──────────┐    ┌──────────┐    ┌──────────┐
 Input              │ Harmonic │◄───│Multiplier│◄───│Synthesizer│
 ════════►          │  Mixer   │    │   X6     │    │ 12-19 GHz │
                    └────┬─────┘    └──────────┘    └──────────┘
                         │                                         External
                         ▼                                         Reference
                    ┌──────────┐                                   10 MHz
                    │   LNA    │
                    │ 1-150 MHz│
                    └────┬─────┘
                         ●──────────────────────────────────►  IF output
                         ▼
              ┌─────────────────────────┐
              │ Frequency Counter 1-100 MHz │
              └───────────┬─────────────┘
                          ↕
              ┌─────────────────────────┐
              │    Built-in PC station  │  ◄═══►  GPIB
              │   with touchscreen LCD  │
              └─────────────────────────┘
```
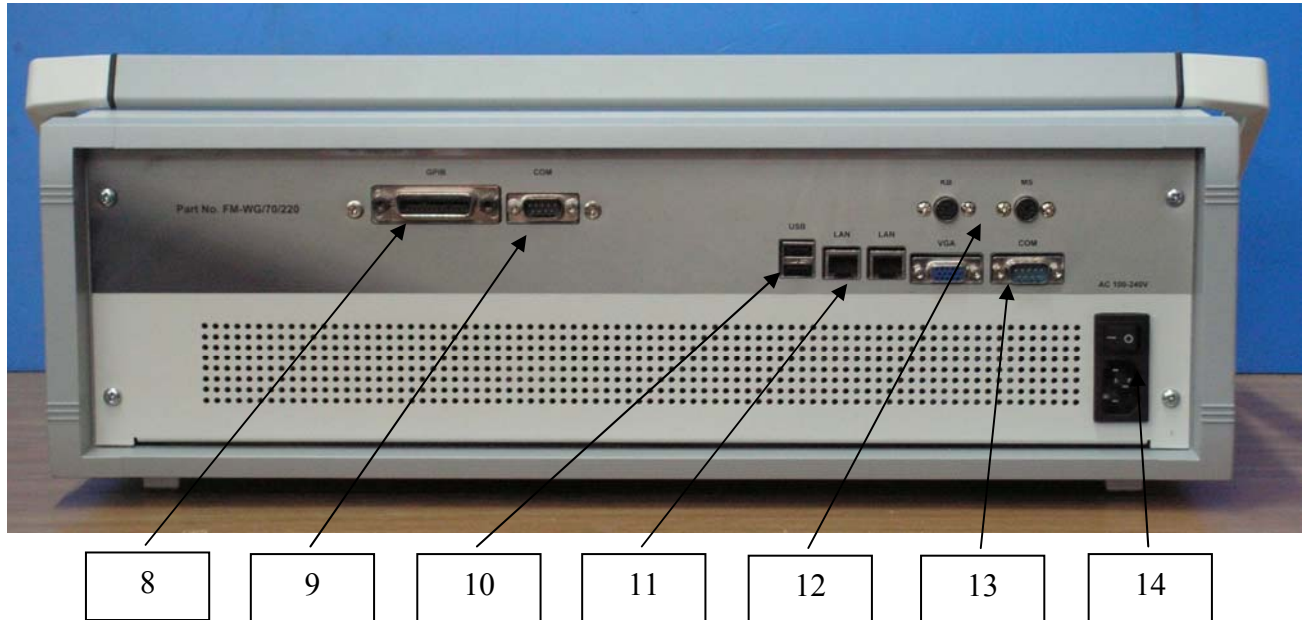
2.4 Front panel.

Disposition of the plugs and knobs on the front panel of the Radiometer are the following:
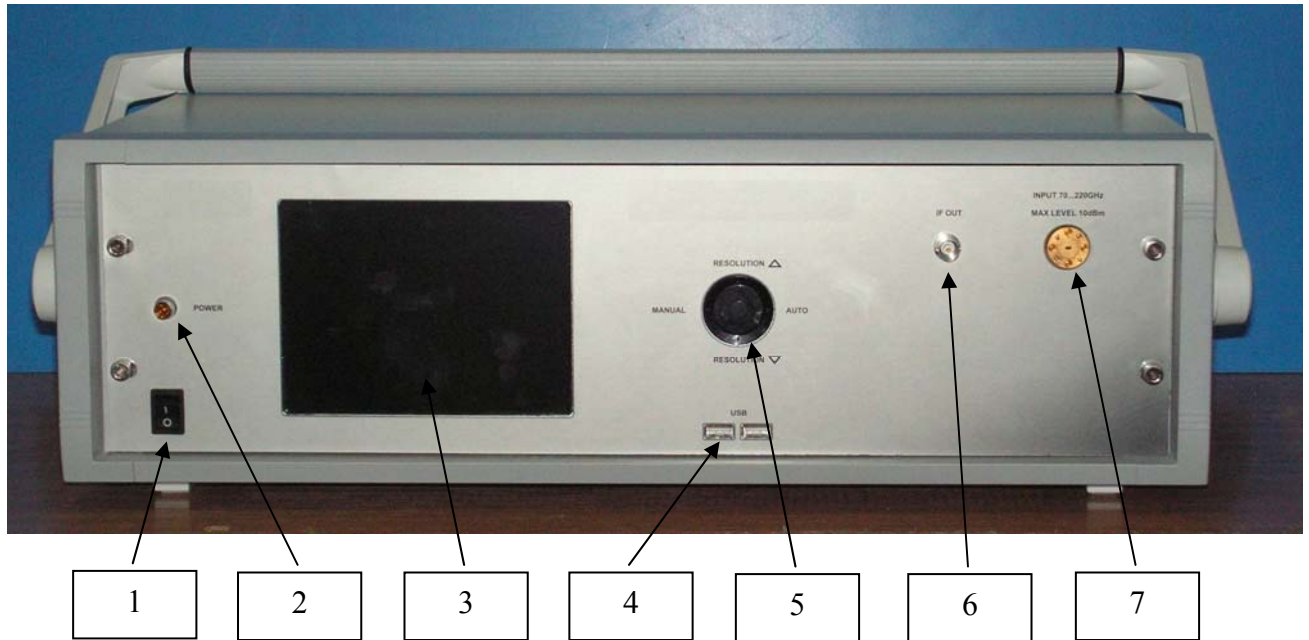
1. Power switch.
2. Power indicator.
3. Touchscreen display.
4. USB ports.
5. Tuning knob.
6. IF connector, BNC.
7. Waveguide input, UG-387/U-M, WR10.

2.5 Rear panel.

Disposition of the plugs on the rear panel of the Radiometer are the following:

8. GPIB connector.
9. COM port (don't used).
10. USB ports.
11. LAN ports
12. Keyboard and mouse connectors, PS/2.
13. Display connector.
14. Power plug 90-230V AC with power switch

3. INSTALLATION.

3.1 Assembly procedure.

The Frequency Meter is fully completed device and don't require any special components.

3.2 Put into operation.

- Switch off power switch (14) on the rear panel.
- Connect power cable to socket (14)
- Connect power cable to primary line 90-230V AC
- Switch ON power switch (14) on the rear panel.
- If needed install WR-10 extension waveguide, bend
- For measure frequency higher > 120GHz install waveguide adapter WR-10 to WR-05

4. OPERATION.

4.1 Measuring procedure.

- Connect DUT to input of Frequency meter. To be sure, that output power of DUT < 20mW
- Switch ON power switch (1) on the front panel.
- Wait for while start up procedure of built-in PC is finished.
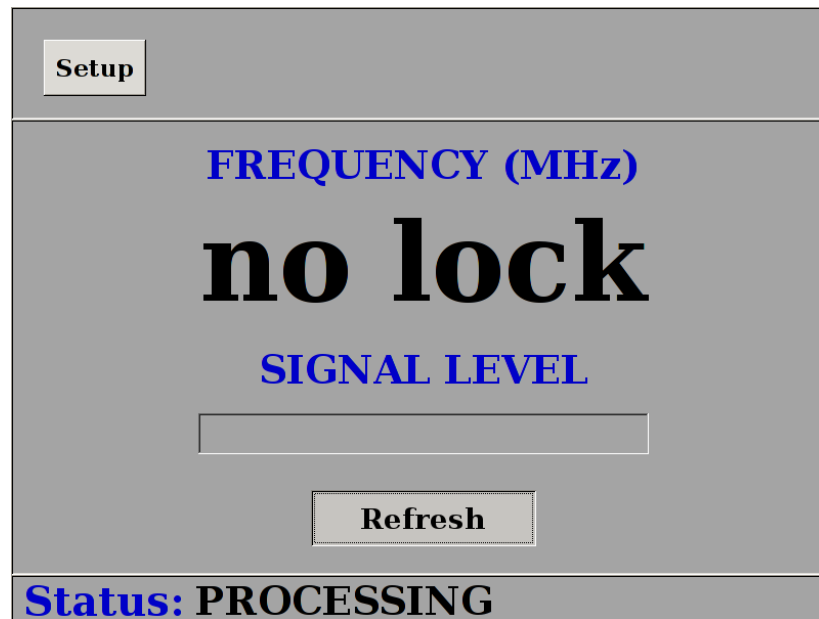- When start up procedure is done the following menu is appeared.

- Touch knob 'Refresh' and Frequency meter starts measuring procedure or press central button of knob (5) on front panel1
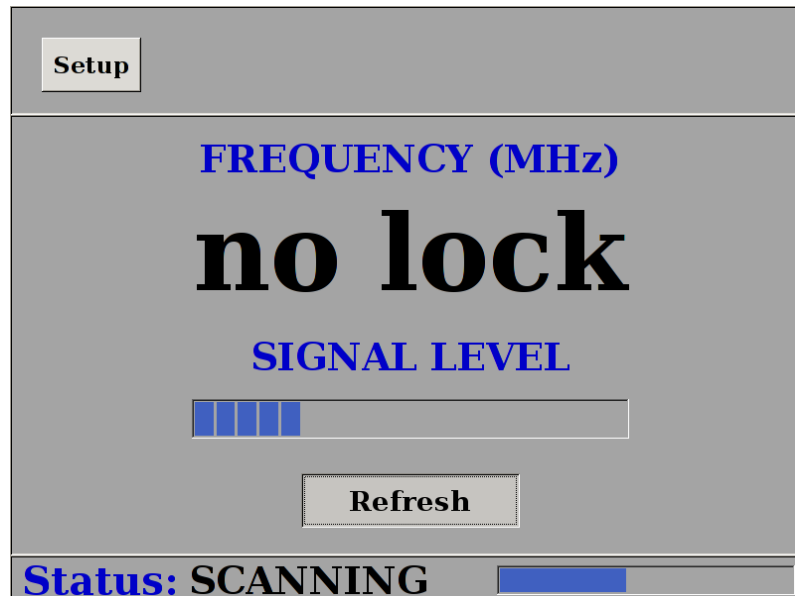
- When input frequency is measured, result is displayed. Signal level indicator line shows input power.
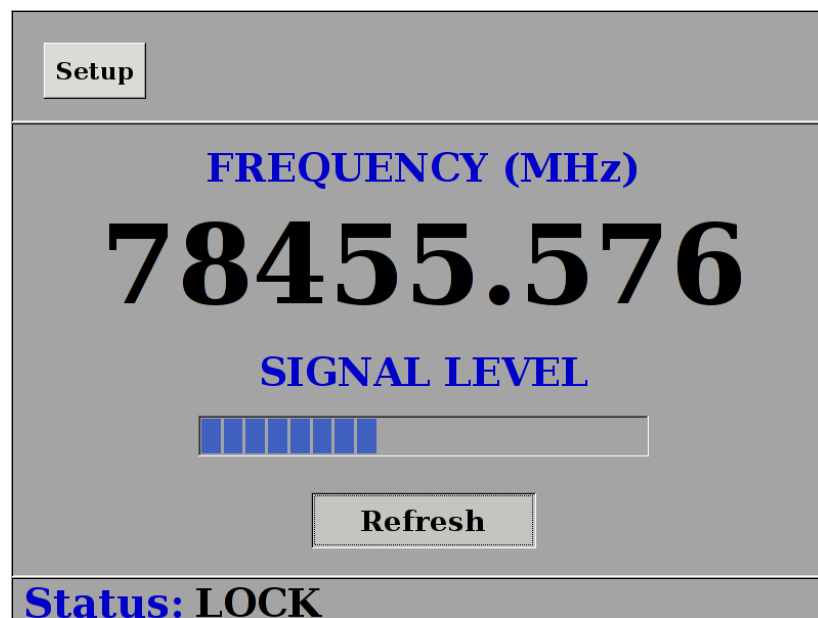
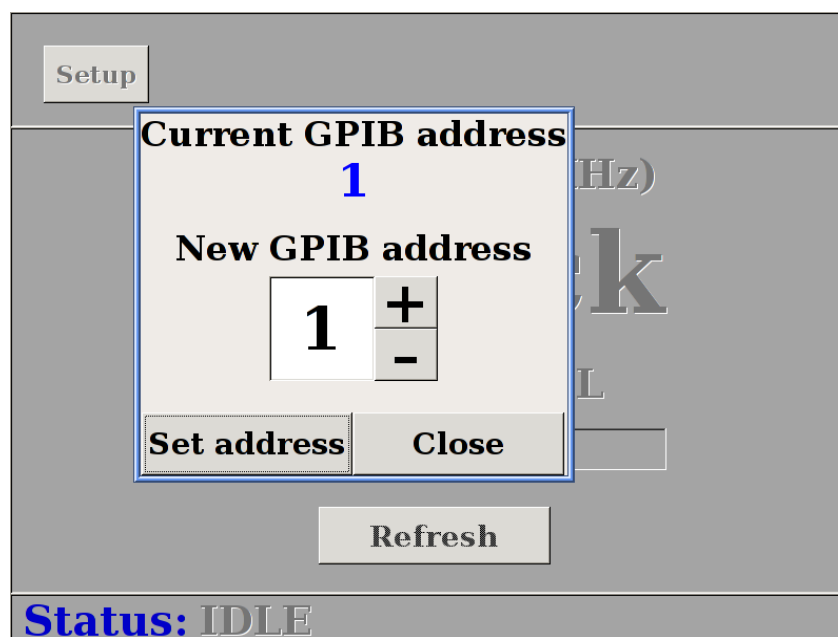- If any signals not found, Frequency meter scan continuously

- To update measuring frequency touch knob 'Refresh'.

5. GPIB interface.

5.1 Set GPIB address.

- Touch knob 'SETUP'. Window with current set address is appeared or press right button Manual of knob (5) on front panel.

5.2 GPIB commands.

- GPIB commands are presented in table below

COMMAND	NAME	DESCRIPTION
*IDN?	Identification Query	Returns its identification code as four fields separated by commas. These fields are: manufacturer, model, six-digit serial number and version of firmware - e.g. ELVA-1 Frequency meter Part No. FM-WG 70-220
*RST	Reset	The Frequency meter restores its power-up state except that the state of IEEE-488 interface is unchanged, including: 1) instrument address, 2) Status Byte and, 3) Event Status Register.
:STRF!	Start refresh	{SUCC} or {FAIL}
:SPRF!	Stop refresh	{SUCC} or {FAIL}
:SCRS?	Get scanning result	{RF<value>P<value>%} or {NULL}

- To get measured result command :SCRS? should be sent
- Frequency meter send 18b string

Parameter		Frequency, MHz										Pin				
R	F	x	x	x	x	x	x	.	x	x	x	P	x	x	.	x	%

Example of response:
'RF078455.576P43.1%' , that means, measured frequency 78455.576MHz, Pin = 43% from max or 'NULL', that means, Frequency meter couldn't measure frequency.

Frequency meter WG/70/220