

Generation and Measurement of signals using Function Generator and Programmable Counter

Step-By-Step Application Guide

Products:

- | R&S® HMF2550
- | R&S® HM8123

The purpose of this document is to allow participant to practice and navigate some of the key features of R&S®HM8123 Programmable Counter and R&S®HMF2550 Function Generator. By completing the exercise, user should learn how to demo some of the key feature of both the equipment and explains some of the concepts and settings. The document is separated into two part, with the first part explaining the main controls of each instrument. The second part of the document contains the lab exercise with the R&S®HMF2550 generating a signal and R&S®HM8123 programmable counter measuring the generated signal.

History

History		
01.06.2016	Heng Wee Boo	first version

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1 Introduction of Operating Elements

R&S®HM8123 Programmable Counter

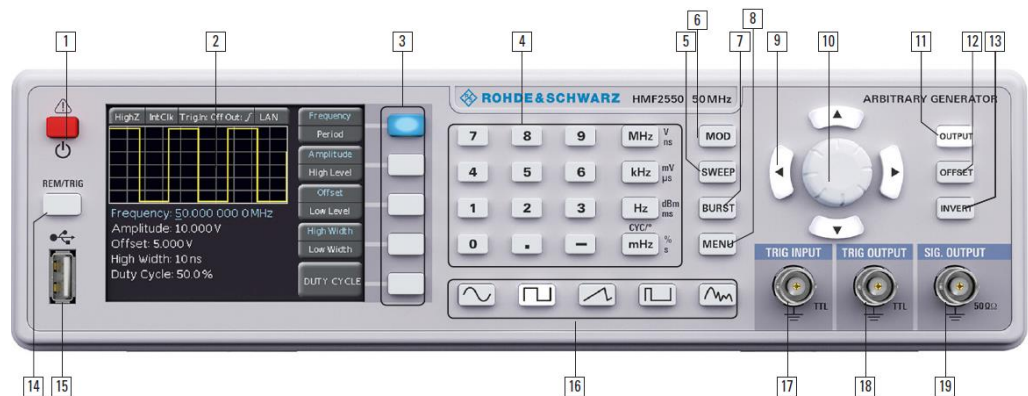
Front panel of R&S®HM8123

1. POWER (Pushbutton)	15. Slope (pushbutton)
2. GATE (LED)	16. 1 : 10 pushbutton Input attenuator, total attenuation 100 times.
3. REMOTE (LED and pushbutton)	17. 50 Ω (pushbutton)
4. Display (LCD)	18. LP 50 kHz (pushbutton)
5. Display (LCD)	19. TRIG (LED)
6. ENTER (pushbutton)	20. INPUT A (BNC connectors)
7. SELECT (pushbutton)	21. AUTO TRIG (pushbutton)
8. \blacktriangle \blacktriangledown \blacktriangleleft \blacktriangleright pushbuttons	22. INPUT B (BNC connectors)
9. Rotating knob	23. TRIG (LED)
Knob for entering parameters	24. INPUT C (SMA connector)
10. GATE TIME (pushbutton)	25. RESET / V (pushbutton)
11. LEVEL B (pushbutton)	26. TRIG / GHz/s (pushbutton)
12. LEVEL A (pushbutton)	27. HOLD / mV (pushbutton)
13. 1 : 10 pushbutton Input attenuator, total attenuation 100 times.	
14. DC (pushbutton) Selects the coupling of the corresponding channel. Button DC lit = DC coupling Button DC dark = AC coupling	



R&S®HMF2550 Arbitrary Generator

<ol style="list-style-type: none"> 1. POWER - Power switch turns the instrument on/off 2. Display (TFT) - All parameters including the current waveform are shown concurrently 3. Interactive Softkeys - Direct access of all relevant functions 4. Numerical keyboard - Setting of all operating parameters with respective units 5. SWEEP - Selection of the parameters for sweep mode 6. MOD - Modulation modes 7. BURST - Add user defined period to the waveform depending on internal or external trigger signal 8. MENU - Open the menu options 	<ol style="list-style-type: none"> 9. Arrow buttons - Cursor keys for shifting the cursor to the position to be changed, increase/decrease value of the selected parameter 10. Rotary knob - Knob to adjust the values / confirm settings by pushing the knob 11. OUTPUT - Turn on/off the output 12. OFFSET - Add a user defined DC voltage to the signal output 13. INVERT - Inverses the pulse signal output 14. REM/TRIG - Toggling between front panel and remote operation or force trigger 15. USB stick port - USB stick port for storing parameters and load waveforms 16. Signal functions - Selection of the signal: sine wave, square wave, triangle, pulse, arbitrary
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2 Exercise

Creating a Sine Signal using R&S®HMF2550 Arbitrary Generator. (CW Signal)

Equipment Needed:

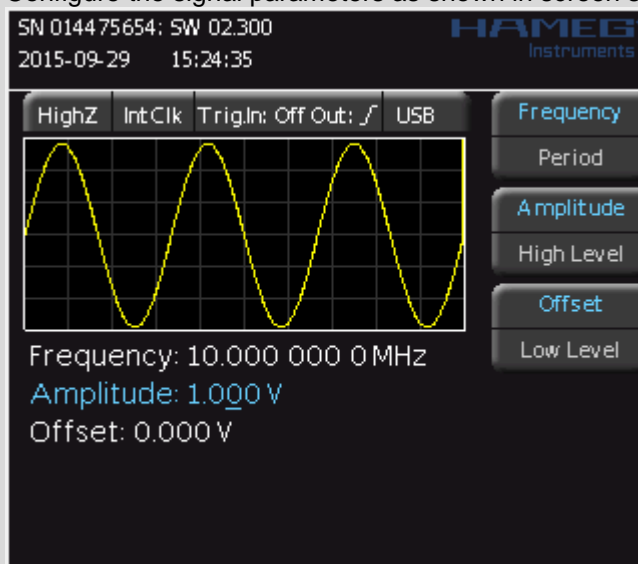
- R&S®HM2550

Instrument Settings:

1. Power on the R&S®HM2550
2. Select the signal to be a Sine signal by pressing on the Panel keys



3. Configure the signal parameters as shown in screen shot below



Measuring the given signal using R&S®HMF2550 Programmable Counter

Equipment Needed:

- R&S®HM8123 Programmable Counter
- 2x BNC – BNC RF Cables

Instrument Settings:

1. Power on the R&S®HM8123 Programmable Counter
2. Connect the signal output of R&S®HMF2550 to Input A of R&S®HM8123
3. Click on the OUTPUT key of R&S®HMF2550



4. Press Reset on R&S®HM8123

Question 1

What is the measured frequency of the signal? Is it at 10 MHz? If not, why?

5. Connect 10 MHz Reference Out (R&S®HMF2550) to 10 MHz Reference In (R&S®HM8123)
6. Press SELECT (Menu) -> Select Reference->Reference->External (Using arrows and ENTER (menu))

Question 2

What is the measured frequency of the signal now? Can you explain the reason why change in measured values.

7. Please feel free to try changing the Frequency output of R&S®HMF2550 and observe the measurement result on R&S®HM8123
8. Explore on other features of both R&S®HMF2550 and R&S®HM8123

Summary

This short exercise show how two instruments can be used to demo the functionary of both the instruments. It also illustrate the importance of setting references between source and measuring instruments will improve on the measurement result.

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