UDB11xx(S) series
Direct Digital Synthesis (DDS)
Signal Generator

Users Manual

Rev2.1
2011-5-20

Introduction of the instrument

UDB11xx(UDB11xxS) series direct digital synthesis signal generator use DDS technology and FPGA design with the characters of high stability and low distortion ect., with the function of TTL output and 60MHz frequency meter, SG100xS series have sweep function, the start and end frequency and sweep time can be set at will. It's the ideal equipment of electronic engineer, laboratory, production lines, the teaching and scientific research.

Main technology data

◆ **Signal Output function**

Output waveforms	Sine wave, Square wave, Triangle wave and saw tooth wave
Output amplitude	≥9Vp-p (signal output, no load)（MAX） ≤10mVp-p (MIN)
Output impedance	50Ω ±10%(signal output)
DC offset	±2.5V(no load)
Display	LCD1602
Frequency range	0.01Hz ~ 2MHz(UDB1102 or UDB1102S) 0.01Hz ~ 3MHz(UDB1103 or UDB1103S) 0.01Hz ~ 5MHz(UDB1105 or UDB1105S)
Resolution	0.01Hz(10mHz)
Frequency Stability	$\pm 1\times 10^{-6}$
Frequency accuracy	$\pm 5\times 10^{-6}$
Sine wave distortion	≤0.8% (reference frequency is 1kHz)
Triangle linearity	≥98%　(0.01Hz~10kHz)
Rise and fall time of square wave	≤100ns
Square Wave Duty range	1%~99%(digital control mode)

◆ **TTL Output　function**

Frequency range	0.01Hz ~ 2MHz(UDB1102 or UDB1102S) 0.01Hz ~ 3MHz(UDB1103 or UDB1103S) 0.01Hz ~ 5MHz(UDB1105 or UDB1105S)
Amplitude	>3Vp-p
Fan Out	>20 TTL loads

◆ **COUNTER　function**

Counter Range	0-4294967295
Frequency Meter Range	1Hz~60MHz
Input Voltage Range	0.5Vp-p~20Vp-p

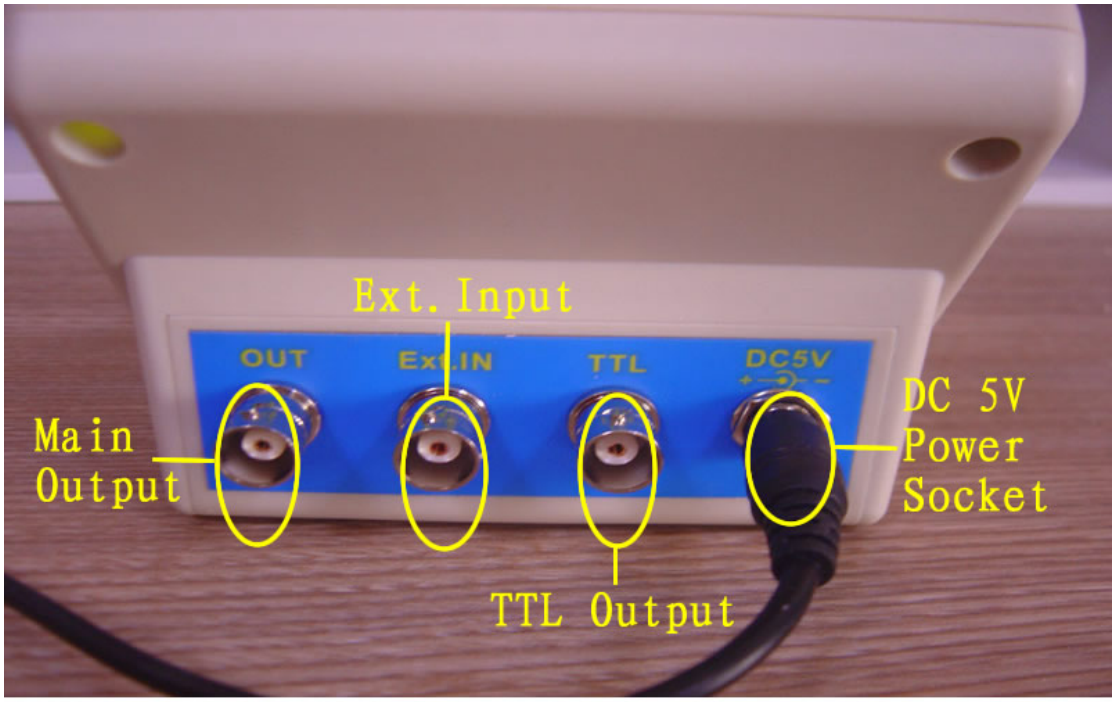
◆ **SWEEP　function (as for SG100xS series)**

Frequency range	**f_{M1}　to　f_{M2}**
Sweep time	1s~99s
Input voltage range	0.5Vp-p~20Vp-p

◆ **Others　function**

Save and Load Parameter	M0-M9(M0: default load)

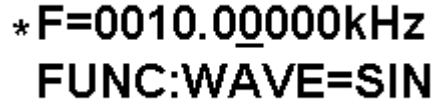
Introduction of function



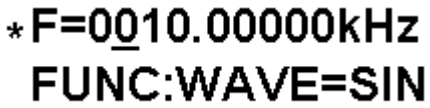
Operating Guide

1. **Pressing Sel which can switch from frequency adjusting to function adjusting, and the detailed condition (frequency adjusting or function adjusting) displayed after "*".**

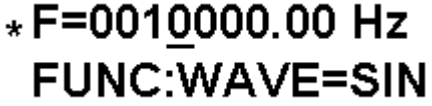
2. **As frequency adjusting, pressing the button of ◀ and ▶ can adjust position, and the OK button can switch units(Hz，kHz and MHz) and then adjust the code switch and the corresponding value of frequency appear.**



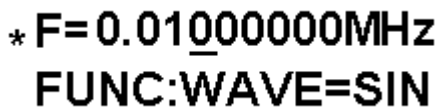
step frequency：0.01kHz



step frequency：100kHz etc.



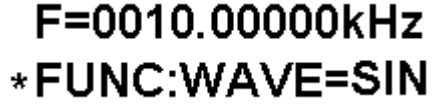
The frequency unit is 'Hz'



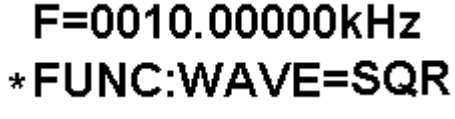
The frequency unit is 'MHz'

3. **As function adjusting, pressing the button of ◀ and ▶ can switch "WAVE，"DUTY"， "COUNTER"， "EXT.FREQ"， "SAVE" , "LOAD", "TIME" and "SWEEP".**

4. **As WAVE adjusting, pressing OK which can change waves of SIN, TRI and SQR.**



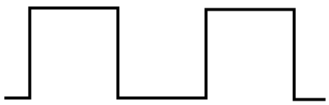
main output waveform is sine.

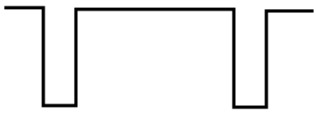


main output waveform is square.

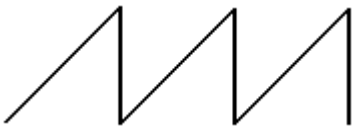
F=0010.00000kHz
*FUNC:WAVE=TRI **main output waveform is triangle.**

5. **The "DUTY" means duty cycle, SQR adjusted from 1% to 99%, while TRI adjusted from 50% (standard TRI), above 50% to below 50% (both are different saw tooth waves, SIN is disable).**

F=0010.00000kHz
*FUNC:DUTY=50% :  **(WAVE=SQR)**

F=0010.00000kHz
*FUNC:DUTY=80% :  **(WAVE=SQR)**

F=0010.00000kHz
*FUNC:DUTY=50% :  **(WAVE=TRI)**

F=0010.00000kHz
*FUNC:DUTY=51% :  **(WAVE=TRI)**

F=0010.00000kHz
*FUNC:DUTY=49% :  **(WAVE=TRI)**

6. **COUNTER is counter function, and the counter values displayed on the screen, impulse inputted from Ext.Input, reset to "0"as**  **pressed and counting again.**

CNTR=1246
*FUNC:COUNTER

7. **EXT.FREQ is exterior frequency measuring function, which can measure the frequency of input signal.**

ExtF=9.998kHz
*FUNC:EXT.FREQ

8. **SAVE can save the value of the current frequency, wave and duty, and there are 10 storage position from M0 to M9, which adjusted by code switch, as setting finished, then press**  **, when "OK" appeared on the screen, storage is over. If the current value is saved to "M0", and the changed value will be called in next time, to UDB11xxS series, the start frequency of sweep function is defined at M1, the end frequency is defined at M2. If the sweep function**

need to be run, the start and end frequency must to be set correctly, and $f_{M2}>f_{M1}$.

F=0012.32000kHz
*FUNC:SAVE=0 **（set position）**

F=0012.32000kHz
*FUNC:SAVE=0 OK **(Save to "0 position" is OK)**

9. **LOAD is function of calling in the parameters of memory, operation is similar to SAVE.**
10. **TIME is the function of set sweep time from 1 second to 99 seconds.**

F=0010.00000kHz
*FUNC:TIME=10s

11. **SWEEP is the function of sweep, the default setting is stop, it can be run as pressing OK, the sweep time and frequency range (f_{M1} to f_{M2}) need to be set in advance.**

F=0010.00000kHz
*FUNC:SWEEP=STOP

F=0010.00000kHz
*FUNC:SWEEP=RUN

12. **TTL output the synchronized TTL wave of the same frequency**
13. **The two right potentiometers adjust output amplitude and DC offset respectively.**
14. **Pressing Wave which can change output waveforms conveniently.**
15. **Pressing the button of -32dB attenuator and the output amplitude can attenuate -32dB (abt. 40x), otherwise, which can output the small signal (amplitude below 10mV)**

Appendix

Complete set of instrument and auxiliary

DDS function generator / counter----------1 set
DC 5V Power Supply----------1 pc
Signal output cable----------1 pc
User's manual----------1 book