

**UDB100x(S) series
Direct Digital Synthesis (DDS)
Signal Generator**

Users Manual

**Rev2.1
2011-3-10**

Introduction of the instrument

UDB100x(UDB100xS) 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, UDB100xS 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 and Triangle wave
Output amplitude	$\geq 9V_{p-p}$ (signal output, no load) (MAX) About $0.1V_{p-p}$ (MIN)
Output impedance	$50\Omega \pm 10\%$ (signal output)
DC offset	$\pm 2.5V$ (no load)
Display	LCD1602
Frequency range	0.01Hz ~ 2MHz(UDB1002) 0.01Hz ~ 3MHz(UDB1003) 0.01Hz ~ 5MHz(UDB1005)
Resolution	0.01Hz(10mHz)
Frequency Stability	$\pm 1 \times 10^{-6}$
Frequency accuracy	$\pm 5 \times 10^{-6}$
Sine wave distortion	$\leq 0.8\%$ (reference frequency is 1kHz)
Trinagle linearity	$\geq 98\%$ (0.01Hz~10kHz)
Rise and fall time of square wave	$\leq 100ns$
Square Wave Duty range	1%~99%(digital control mode)

- **TTL Output function**

Frequency range	0.01Hz ~ 2MHz(UDB1002 or UDB1002S) 0.01Hz ~ 3MHz(UDB1003 or UDB1003S) 0.01Hz ~ 5MHz(UDB1005 or UDB1005S)
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Amplitude	$> 3V_{p-p}$
Fan Out	> 20 TTL loads

- **COUNTER function**

Counter Range	0-4294967295
Frequency Meter Range	1Hz~60MHz
Input Voltage Range	$0.5V_{p-p} \sim 20V_{p-p}$

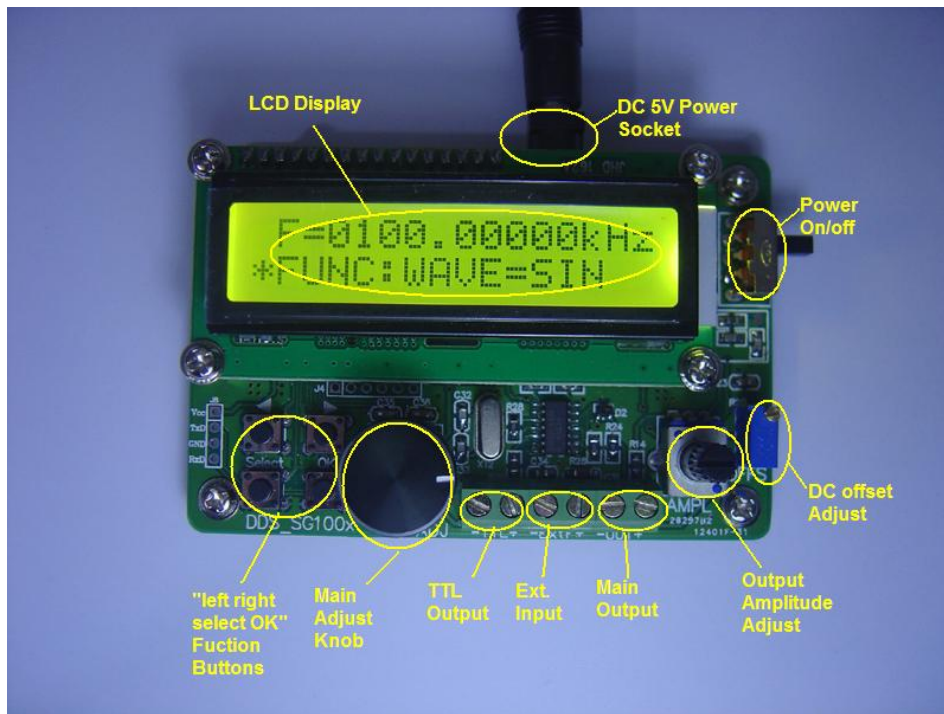
- **SWEEP function (as for UDB100xS series)**

Frequency range	f_{M1} to f_{M2}
Sweep time	1s~99s

- **Others function**

Save and Load Parameter	M0-M9(M0: default load)
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The function introduction of front panel



Operating Guide

1. Pressing the “select” button which can switch from frequency adjusting to function adjusting, and the detailed condition (frequency adjusting or function adjusting) displayed after “*”.

* **F=0010.00000kHz** **F=0010.00000kHz**
FUNC:WAVE=SIN * **FUNC:WAVE=SIN**

2. As frequency adjusting, pressing the button of “left” and “right” 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.

* **F=0010.00000kHz**
FUNC:WAVE=SIN step frequency : 0.01kHz

* **F=00010.00000kHz**
FUNC:WAVE=SIN step frequency : 100kHz etc.

* **F=0010000.00 Hz**
FUNC:WAVE=SIN The frequency unit is ‘Hz’

* **F=0.01000000MHz**
FUNC:WAVE=SIN The frequency unit is ‘MHz’

- As function adjusting, pressing the button of “left” and “right” can switch “WAVE”, “DUTY”, “COUNTER”, “EXT.FREQ”, “SAVE”, “LOAD”, “TIME” and “SWEEP”.
- As WAVE adjusting, pressing “OK” which can change waves of SIN, TRI and SQR.

F=0010.00000kHz

***FUNC:WAVE=SIN** main output waveform is sine.

F=0010.00000kHz

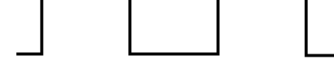
***FUNC:WAVE=SQR** main output waveform is square.

F=0010.00000kHz


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

- 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 sawtooth waves, SIN is disable).


F=0010.00000kHz

***FUNC:DUTY=50%** :  (WAVE=SQR)


F=0010.00000kHz

***FUNC:DUTY=80%** :  (WAVE=SQR)

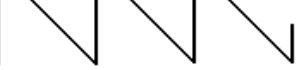
F=0010.00000kHz

***FUNC:DUTY=50%** :  (WAVE=TRI)

F=0010.00000kHz

***FUNC:DUTY=51%** :  (WAVE=TRI)

F=0010.00000kHz

***FUNC:DUTY=49%** :  (WAVE=TRI)

- COUNTER is counter function, and the counter values displayed on the screen, impulse inputted from ExtInput, reset to “0”as “OK” pressed and counting again.

CNTR=1246

***FUNC:COUNTER**

- 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 “OK” button, 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 UDB100xS 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 posion)

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 the button of 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.

Appendix

complete set of instrument and auxiliary

DDS function generator / counter-----1

DC 5V Power Supply-----1

User's manual-----1