UDB100xS seriers
DDS Signal Generator

User Manual

Rev4.0

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Instrument introduction

UDB100xS series are signal generators based on direct digital synthesis (DDS) technology, are deigned by adopting FPGA,it has the characters of high stability and low distortion ect,one channel output,one channel TTL output, external frequency measurement, counter, etc.,and output signals are capable of regulating amplitude and DC bias. UDB100xS series have a sweep function and can freely set sweep range and scanning time. UDB100xS series are applicable to laboratories and are used by engineering technicians and enthusiasts.

Basic technology data

◆ Signal output function

Output waveforms	Sine wave,Square wave, Triangle wave
Output amplitude	$\geqslant 9V_{p-p}$(signal output ,no load)
Output impedance	$50\Omega \pm 10\%$
DC offset	$\pm 2.5V$(no load)
Display	LCD1602
Frequency range	0.01Hz~2MHz(UDB1002S)
	0.01Hz~5MHz(UDB1005S)
	0.01Hz~8MHz(UDB1008S)
Frequency resolution	0.01Hz(10mHz)
Frequency Stability	$\pm 1 \times 10^{-6}$
Frequency accuracy	$\pm 5 \times 10^{-6}$
Sine wave distortion	$\leqslant 0.8\%$ (reference frequency is 1kHz)
Trinagle wave linearity	$\geqslant 98\%$ (0.01Hz~10kHz)
Rise and fall time of square wave	$\leqslant 100$ns
Square wave duty range	1%~99%

◆ TTL output function

Frequency range	0.01Hz~2MHz(UDB1002S)
	0.01Hz ~5MHz(UDB1005S)
	0.01Hz ~8MHz(UDB1008S)
Amplitude	$>3V_{p-p}$
Fan out coefficient	>20 TTL Load

◆ COUNTER function

Counter range	0~4294967295
Frequency measurement range	1Hz~60MHz
Input voltage range	$0.5V_{p-p}$~$20V_{p-p}$

◆ SWEEP function

Frequency range	f_{M1}~f_{M2}(frequency can be freely set)
Input voltage range	$0.5V_{p-p}$~$20V_{p-p}$

◆ Other functions

Save and load parameter	M0~M9(M0:default load)

Function description
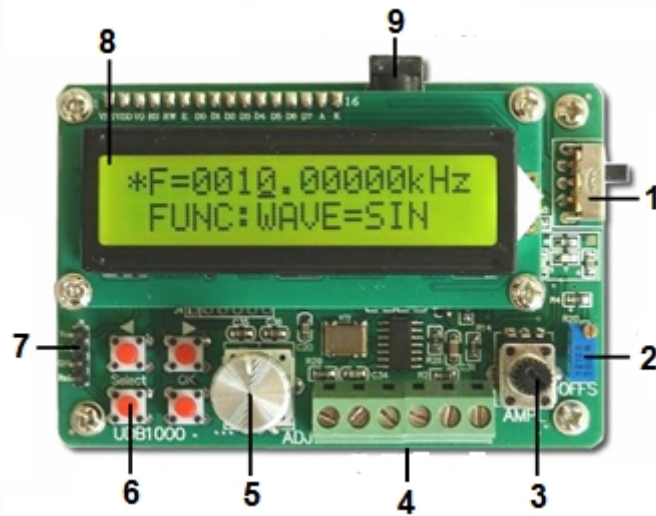
1. Power switch
2. Offset regulation
3. Amplitude regulation
4. Signal output terminal
5. Encoder adjusting
6. User key
7. Communication interface
8. LCD display
9. DC5V Power input

Operating instructions:

1. Select key can select between regulating frequency and regulating function, "*" on the left of screen can indicate whether in regulating frequency or regulating function in current.

2. During regulating frequency ,press the ◀ and ▶ key can move regulation positions leftwards and rightwards, and press the "OK" key can switch the frequency units(HzkHz and MHz).At the moment, rotary coding switch can regulating frequency.

step frequency:0.01kHz

*F=0010.00000kHz
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"

3. During regulating function, press the ◀ and ▶ key can select projects needing being regulated, mainly including "WAVE" , "DUTY" , "COUNTER" , "EXT.FREQ", "SAVE","LOAD","SWEEP".
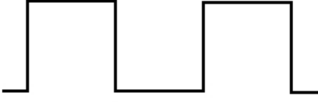
4. WAVE represents waveform regulation, press OK key can change the current waveform , SIN represents sine wave, TRI represents triangular wave, and SQR represents square wave.
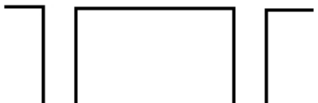
F=0010.00000kHz
*FUNC:WAVE=SIN   main output waveform is sine.

F=0010.00000kHz
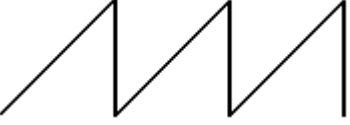***FUNC:WAVE=SQR**   main output waveform is square.

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

5. DUTY represents duty ratio regulation, now regulate the encoder can regulate duty ratio, SQR can be regulated between 0.1% and 99.9%; TRI have three situations, namely, standard triangular wave in 50.0%, rise sawtooth wave in above 50.0%, and fall sawtooth wave in below 50.0%; and SIN is invalid.

F = 0010.00000KHz
*FUNC:DUTY=50.0% :   (WAVE=SQR)

F = 0010.00000KHz
*FUNC:DUTY=80.0% :   (WAVE=SQR)

F = 0010.00000KHz
*FUNC:DUTY=50.0% :   (WAVE=TRI)

F = 0010.00000KHz
*FUNC:DUTY=51.0% (WAVE=TRI)

F = 0010.00000KHz
*FUNC:DUTY=49.0% (WAVE=TRI)

6. COUNTER represents counter function, which starts to count after ExtInput input pulse, the screen displays count value, press the OK key to clear 0 and re-count.

CNTR=1246
*FUNC:COUNTER

7.EXT.FREQ represents external frequency measurement function, which can measure frequency of the ExtInput input signal.

ExtF=9.998kHz
*FUNC:EXT.FREQ

8. SAVE represents storage function, which can store current frequency value, current waveform and duty ratio data in internal memory so as to be called out in next time, there is 10 storage positions of 0-9, which can be regulated through encoder, press the OK to save after selecting the storage position, now OK appearing in the lower-right corner of the screen indicate successful storage, if you save current data in the position 0, the value is called in in default when next-time startup. M1 and M2 have special meanings, M1 is start frequency, M2 is stop frequency, and if sweep function is needed to be used, values of M1 and M2 are needed to be set, and f_{M2}>f_{M1} is ensured.

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

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

9. LOAD represents parameters called in storage, specific operations are similar to SAVE, so the same will not be repeated here.

10. TIME is the function of set sweep time, with set range of 1s~99s.

F=0010.00000kHz
*FUNC:TIME=10s

11.SWEEP represents sweep function, default setting is STOP, press the OK key to

start to scan, and at this moment output signal frequency continuously changes from f_{M1} to f_{M2}, wherein frequencies of M1 and M2 need to be set by using SAVE function, and scanning time needs to be set by using TIME function.

F=0010.00000kHz
*FUNC:SWEEP=STOP

F=0010.00000kHz
*FUNC:SWEEP=RUN

12. TTL output the synchronized TTL wave of the same frequency.

13. OFFSET on the right is DC bias regulating knob, and AMPLITUDE is amplitude regulating knob.