

**FY2200S Series
Dual Channel DDS Signal Generator**

User's Manual

**Rev2.1
2014-5-8**

Thank you for purchasing our products, please read the manual carefully before using the various content, to ensure the normal use of the instrument.

● **FY2200S series Introduction of the instrument**

This manual applies to FY2200S series Dual Channel DDS Signal Generator.

FY2200S instrument model two digits after the XX said the model instrument frequency limit (MHz). (For example: FY2205S, 05 indicates the type of sine wave output frequency up to 5MHz.)

This instrument adopts large scale CMOS integrated circuit, high speed microprocessor, The internal circuit adopts active crystal as the reference, the signal of high stability. Using surface patch process, greatly improving the anti-interference performance and service life of the instrument. Instrument has dual DDS signal output, can generate sine wave, square wave, triangle wave, sawtooth wave, the output signal's amplitude, offset, phase of implementation process control. Both TTL output, frequency measurement and counter, and other functions, FY2200S series with linear sweep and logarithmic frequency sweep function, can set arbitrary scanning frequency range and scanning time. Is the electronic engineers, laboratory, production line and the ideal equipment of teaching, scientific research, at the same time can also be used as industrial equipment form a complete set of modules.

It has excellent technical indexes and function features:

- ◆ High frequency precision, frequency precision can reach 10^{-6} orders of magnitude
- ◆ High frequency resolution: full range of 10 MHz frequency resolution
- ◆ Main wave of adjustable duty ratio (1% ~ 99%)
- ◆ No range limit: full range of frequency step, direct digital Settings
- ◆ High precision waveform: value calculated by the function, of output waveform synthesis, waveform of high precision, small distortion
- ◆ A variety of waveform: sine, square wave, triangle wave, sawtooth wave
- ◆ Scanning features: frequency linear and logarithmic function, scan scanning load-point any Settings
- ◆ Storage features: can store 20 groups of users to set the state of instrument parameters, can be called up again
- ◆ Operation mode: all keystrokes, LCD1602 LCD English display, direct digital continuous adjusting Settings or knob
- ◆ High reliability, large scale integrated circuit and SMT technology, high reliability, long service life
- ◆ Frequency measurement: with 60MHz frequency meter functions, the internal/external signal frequency measurement

● Main technology indexes

Output channel	CH1 channel and CH2 channel signals of high speed output.
Output waveforms	Sine wave, Square wave (Duty cycle adjustable) and Triangle wave (include sawtooth wave)
Output amplitude	$\geq 20V_{p-p}$ (signal output, no load)
Output impedance	$51\Omega \pm 10\%$ (signal output)
DC offset	$\pm 10V$ (no load)
Sine wave frequency range	0.01Hz ~ 5MHz (FY2205S) 0.01Hz ~ 8MHz (FY2208S) 0.01Hz ~ 10MHz (FY2210S) 0.01Hz ~ 12MHz (FY2212S)
Square wave frequency range	0.01Hz ~ 5MHz (FY2200S Series)
Resolution	0.01Hz (10mHz)
Frequency accuracy	$\pm 5 \times 10^{-6}$
Frequency Stability	$\pm 2 \times 10^{-6}$ / 3hours
Sine wave distortion	$\leq 0.8\%$ (reference frequency is 1kHz)
Triangle 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/5MHz/8MHz/10MHz
Amplitude	$> 3V_{p-p}$
Fan Out	> 20 TTL loads
◆ COUNTER function	
Counter Range	0-4294967295
Frequency Meter Range	1Hz~60MHz
Input Voltage Range	1V _{p-p} ~20V _{p-p}
◆ SWEEP function (该功能只有主波具有)	
Sweep mode	Linear sweep, Logarithmic sweep
Sweep range	FM1 to FM2
Sweep time	1s~99s
◆ Others	
Display	LCD1602
Save and Load Parameter	M00-M19(M00: default load)
Size	200mm(Length)×190mm(Width)×90mm(Height)
Buzzer warning tone	Can be turned On/Off by setting
Production technology	Surface mount technology, large scale integrated circuit, high reliability, long service life
Operation feature	Button-controlled, Knob-adjusted continuously
Conditions requirement	Temp: 0~40℃ Humidity: < 80%

• The function introduction of front panel



1. Power switch
2. LCD display
3. Parameter adjustment
 - (1). [◀] The cursor moves left button
 - (2). [▶] The cursor moves to the right buttons
 - (3). [OK] The knob press down is confirm
4. Function keys
 - (1). [MENU] Function selection
 - (2). [PARM] Parameter switching
 - (3). [WAVE] Waveform selection
 - (4). [COUNT] Frequency meter and counter function
 - (5). [SWEEP] Sweep function
5. Measuring the input port
6. Waveform output channel
 - (1). [CH1] CH1 channel switching and the CH1 channel output /stop
 - (2). [CH2] CH2 channel switching and the CH2 channel output /stop

● Operating Guide:

1. Channel selection

Open host power supply, the upper left corner of the screen "MF" or "SF" represents the currently selected channel state. "MF" indicates that the CH1 channel. "SF" indicates that the CH2 channel.

- "MF" as the main wave, selected "SF" for selected deputy wave, can be used to switch CH1 and CH2.
- When the CH1 channel is selected, again press the [CH1] key, the CH1 channel is closed, [CH1] key the left side of the LED indicator light goes out.
- Press the [CH1] key again, the CH1 channel waveform output, [CH1] key to the left LED indicating lamp is bright.
- CH2 channel and CH1 channel operation method of the same.

MF=0010.00000kHz SF=0010.00000kHz
AMPL=05.00V SINE AMPL=05.00V SQR

2. Adjust the frequency

Select the CH1 channel or the CH2 channel function interface, adjusting the frequency of the cursor pointing frequency information, if the cursor in other functions, can use the [PARM] button to switch.

- Use the parameters adjustment knob to change the cursor position frequency value, the clockwise rotation can improve the frequency, counterclockwise to lower frequency.

MF=0020.00000kHz
AMPL=05.00V SINE

- If you need to quickly set the frequency value, through the [left] key and [right] key move around the cursor position indication.

MF=0021.00000kHz
AMPL=05.00V SINE

- Press down the parameter adjusting knob can switch frequency display units (Hz, kHz and MHz). The rotation parameters adjustment knob can change the cursor indicator bit numbers, so as to change the output frequency.

MF=0021.00000 Hz
AMPL=05.00V SINE

The frequency unit is **Hz**

MF=0.02100000MHz
AMPL=05.00V SINE

The frequency unit is **MHz**

3. Change waveforms

In the selected CH1 channel and CH2 channel function interface, press the [WAVE] button in the waveform can be "sine wave", "square wave", "Triangular wave" to switch between.

MF=0021.00000kHz
AMPL=05.00V SINE CH1 channel output waveform is sine.

SF=0021.00000kHz
AMPL=05.00V SQUR CH2 channel output waveform is square.

SF=0021.00000kHz
AMPL=05.00V TRGL CH2 channel output waveform is triangle.

4. Amplitude adjustment

In the selected CH1 channel and CH2 channel function interface, press the [PARM] button makes the cursor in the corresponding position amplitude value (AMPL=), amplitude value of signal peak to peak (Vpp), can use [left] key and [right] key match with the rotary encoder output signal amplitude rotation around the modified value, as shown below:

MF=0021.00000kHz
AMPL=05.00V TRGL

5. Offset adjustment

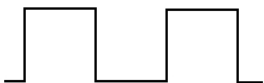
In the selected CH1 channel and CH2 channel function interface, press the [PARM] button makes the cursor in the corresponding position offset value (Offset=), can use [left] key and [right] key fit knob rotation around the change of output signal with a DC bias value, as shown below:

MF=0021.00000kHz
Offset=1.0V TRGL

6. Duty cycle adjustment

In the selected CH1 channel and CH2 channel function interface, press the [PARM] button makes the cursor in the duty cycle adjustment interface (DUTY=), can use [left] key and [right] key fit knob to change the output signal duty ratio (duty cycle adjustment of sine wave is invalid), as shown below:

- The square wave duty cycle can be adjusted within the range of 1%~99%

MF=0021.00000kHz
DUTY=50%  (WAVE=SQUR)

MF=0021.00000kHz
DUTY=80%  (WAVE=SQUR)

- The triangular wave is of three kinds: 50% is the standard triangular wave, is greater than 50% and less than 50% corresponding to two kinds of sawtooth wave with different.

MF=0021.00000kHz
DUTY=50%



(WAVE=TRGL)

MF=0021.00000kHz
DUTY=51%



(WAVE=TRGL)

MF=0021.00000kHz
DUTY=49%



(WAVE=TRGL)

7. Phase adjustment

In the selected CH2 channel function interface, press the [PARM] button makes the cursor position in the corresponding phase value (Phase=), can use [left] key [right] and key fit knob adjust output signal phase difference, phase CH1 channel and CH2 channel difference between $0^\circ \sim 359^\circ$ adjustment, as follows as shown in:

MF=0021.00000kHz
Phase=000° TRGL

8. Measurement functions

In any interface press [COUNT] button to enter the measurement function, this instrument provides frequency meter and counter two measurement functions. From the panel EXT.IN input measurement, press the [PARM] button in the measurement of frequency and pulse measurement function switch.

ExtF=21.000kHz
***FUNC:EXT.TREQ**

(COUNT=FREQ)

- Press the parameter adjusting knob to count to 0, count again.
- Rotate counterclockwise rotary encoder can suspend display (does not affect counting).
- Clockwise rotation encoder can terminate pause display function.

CNTR=0
***FUNC:COUNGTER**

(COUNT=COUNT)

9. Frequency sweep function

In any interface press [SWEEP] button to enter the sweep function, the machine sweep function is divided into LIN-SWEEP (linear sweep) and LOG-SWEEP (logarithmic sweep) two sweep frequency mode, frequency sweep signal output by the CH1 channel.

- The default is LIN-SWEEP mode, before the start of the rotation parameter adjusting knob can switch frequency sweep mode in scanning.
- Press the parameter adjustment knob can start / stop frequency sweep, sweep the frequency of the output signal from the fM1 to fM2 change (please refer to the function of 10). The M1 and M2 frequency need to use the SAVE function setting, scan time need to use the TIME function set.

F=0021. 00000kHz
***LIN-SWEEP:STOP**
F=0021. 00000kHz
***LOG-SWEEP:STOP**

F=0021. 00000kHz
***LIN-SWEEP:RUN**
F=0021. 00000kHz
***LOG-SWEEP:RUN**

- In the sweep frequency interface press [PARM] button in the sweep frequency start and sweep time adjustment interface switching. Sweep time is from the sweep frequency start frequency fM1 to sweep over the length of time the frequency of fM2 variation. Sweep time can be adjusted between 1S~99S.

F=0021. 00000kHz
***FUNC:TIME=10S**

10. Storage function

In the selected CH1 channel and CH2 channel function interface, press the [MENU] button to enter the storage function, can save the CH1 channel and CH2 channel of the current channel frequency, amplitude, offset value, duty cycle, wave type, phase information. This instrument provides 20 groups of storage space (M0~M19). Boot parameters information automatically load storage position 0.

- Storage location rotation parameters adjustment knob can select the parameters (M0~M19). Press the parameter adjusting knob, the lower right corner of the screen shows "M" short that save the machine all current parameters to this location. As shown below:

MF=0021. 00000kHz
***SAVE P_ON FREQ**

- The storage location of 1 (M1) default frequency sweep function starting frequency by frequency sweep function, automatic loading. The interface is as follows:

MF=0021. 00000kHz
***SAVE BEGIN FREQ**

- The storage location of 2 (M2) default frequency sweep the end frequency by frequency sweep function, automatic loading. The interface is as follows:

MF=0021. 00000kHz
***SAVE END FREQ**

- Storage location 03 ~ 19 (M3 ~ M19) for user defined storage area, Users can decide for themselves. The interface is as follows:

MF=0021. 00000kHz
***SAVE ADDR=03**

11. Load function

In the loading function interface, press the [MENU] button to enter the loading function, the function can be stored by the user information (M0~M19) loaded

in the main and auxiliary wave frequency, amplitude, the offset value, accounting for information space ratio, wave type, phase etc..

- The rotation parameters adjustment knob can choose a location to store the need to load parameters (M0~M19). Press the parameter adjusting knob, the lower right corner of the screen shows "OK" short that loaded the correct information.

MF=0021.00000kHz

***FUNC:LOAD=00 OK**

- Such as brief show "Non", said the location is not stored information effectively, fail to load.

MF=0021.00000kHz

***FUNC:LOAD=00 Non**

● Other functions

1. Press the [MENU] button several times in various functional interface switches the machine.
2. Dual TTL output is synchronous TTL waveform of the CH1 channel and CH2 channel.
3. Buzzer sound function: each time the button, or rotary coding switch generates a pulse, ring tones. Invalid operation will be issued when the sound of a long tone. If no sound, can be in shutdown mode, press the parameter adjusting knob, then turn on the power switch, the sound can be turned off. Such as the need to open the sound, again to repeat the above operation can be.

●Safety Notes

1. Before using this instrument, please check if the power supply is normal, to ensure the normal use and personal safety.
2. This instrument must be used in the technical index range.
3. Please do not change the instrument circuit arbitrarily, so as to avoid damaging equipment or endangering the safety.

●Warning and personal injury

Do not apply the product in the safety protection device or emergency stop device, or any other applications that the product failure could result in personal injury, unless there is special purpose or use authorization. Before the installation and use, each parameter of the technical indexes in this manual should be referred to. If this suggestion is not obeyed, death or serious personal injury could be caused. In this condition the company will not be responsible for any compensation of personal injury or death, and all the company managers and employees and auxiliary agents, distributors, other personnel concerned will be released from any claim (including all the costs, expenses, attorney fees etc.) that may result in.

Appendix**Complete set of instrument and accessories**

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|--|-------------------|
| 1. FY2200S DDS function signal generator / Counter | 1 pcs |
| 2. The host power line | 1 pcs |
| 3. User's manual | 1 book (pdf file) |