FY8300 Series Function Waveform Generator

Host Computer Communication Protocol Specification

Rev1.2

Overview

The overall structure of control command using the command line, the baud rate of fixed value 115200bps, the command issued by PC, the execution machine analysis, each command marks the end to newline (sixteen hexadecimal representations for "0x0a"). The execution machine will reply 0x0a after command executed. The following is a detailed description of the different orders.

Communication Protocol Summary

	Writing Command	Command Line			Return		Description of reading function	Command Line		Return	
		Code	Data entity	End Mark				Code	End Mark	Value	End Mark
Output	Set the CH1 waveform	WMW	xxxxxxxx	0x0a	0x0a		Read the CH1 waveform	RMW	0x0a	xxxxxxxx	0x0a
	Set the CH1 Frequency	WMF	xxxxxxxx	0x0a	0x0a		Read CH1 Frequency	RMF	0x0a	xxxxxxxx	0x0a
	Set the CH1 Amplitude	WMA	xxxxxxxx	0x0a	0x0a		Read CH1 Amplitude	RMA	0x0a	xxxxxxxx	0x0a
	Set the CH1 Offset	WMO	xxxxxxxx	0x0a	0x0a		Read CH1 Offset	RMO	0x0a	xxxxxxxx	0x0a
	Set the CH1 Duty	WMD	xxxxxxxx	0x0a	0x0a		Read CH1 Duty	RMD	0x0a	xxxxxxxx	0x0a
	Set the CH1 Phase	WMP	xxxxxxxx	0x0a	0x0a		Read CH1 Phase	RMP	0x0a	xxxxxxxx	0x0a
	Set the CH1 On/Off of output	WMN	xxxxxxxx	0x0a	0x0a		Read CH1 on/off output	RMN	0x0a	xxxxxxxx	0x0a
	Set the CH2 waveform	WFW	xxxxxxxx	0x0a	0x0a		Read CH2 waveform	RFW	0x0a	xxxxxxxx	0x0a
	Set the CH2 Frequency	WFF	xxxxxxxx	0x0a	0x0a		Read CH2 Frequency	RFF	0x0a	xxxxxxxx	0x0a
	Set the CH2 Amplitude	WFA	xxxxxxxx	0x0a	0x0a		Read CH2 Amplitude	RFA	0x0a	xxxxxxxx	0x0a
	Set the CH2 offset	WFO	xxxxxxxx	0x0a	0x0a		Read CH2 Offset	RFO	0x0a	xxxxxxxx	0x0a
	Set the CH2 Duty	WFD	xxxxxxxx	0x0a	0x0a		Read CH2 Duty	RFD	0x0a	xxxxxxxx	0x0a
	Set the CH2 Phase	WFP	xxxxxxxx	0x0a	0x0a		Read CH2 Phase	RFP	0x0a	xxxxxxxx	0x0a
	Set the CH2 on/off output	WFN	xxxxxxxx	0x0a	0x0a		Read CH2 off/on output	RFN	0x0a	xxxxxxxx	0x0a
	Set the CH3 waveform	TFW	xxxxxxxx	0x0a	0x0a		Read CH3 waveform	RTW	0x0a	xxxxxxxx	0x0a
	Set the CH3 Frequency	TFF	xxxxxxxx	0x0a	0x0a		Read CH3 Frequency	RTF	0x0a	xxxxxxxx	0x0a
	Set the CH3 Amplitude	TFA	xxxxxxxx	0x0a	0x0a		Read CH3 Amplitude	RTA	0x0a	xxxxxxxx	0x0a
	Set the CH3 Offset	TFO	xxxxxxxx	0x0a	0x0a		Read CH3 Offset	RTO	0x0a	xxxxxxxx	0x0a
	Set the CH3 Duty	TFD	xxxxxxxx	0x0a	0x0a		Read CH3 Duty	RTD	0x0a	xxxxxxxx	0x0a

	Set the CH3 Phase	TFP	xxxxxxxx	0x0a	0x0a	Read CH3 Phase	RTP	0x0a	xxxxxxxx	0x0a
	Set the CH3 on/off output	TFN	xxxxxxxx	0x0a	0x0a	Read CH3 Output on/off	RTN	0x0a	xxxxxxxx	0x0a
Modulation	Set the CH1 Modulation function	WPF	xxxxxxxx	0x0a	0x0a	Read CH1 trigger function	RPF	0x0a	xxxxxxxx	0x0a
	Set the CH1 Modulation function	WPM	xxxxxxxx	0x0a	0x0a	Read CH1 trigger function	RPM	0x0a	xxxxxxxx	0x0a
	Set CH1 FSK second frequency	WFK	xxxxxxxx	0x0a	0x0a	Read FSK secondary frequency	RFK	0x0a	xxxxxxxx	0x0a
	Set the number of CH1 trigger pulses	WPN	xxxxxxxx	0x0a	0x0a	Read CH1 pulse amount triggered	RPN	0x0a	xxxxxxxx	0x0a
	Generate manual trigger source	WPO	xxxxxxxx	0x0a	0x0a					
	Set CH1AM modulation rate	WPR	xxxxxxxx	0x0a	0x0a	Read the Modulation Rate of CH1 AM	RPR	0x0a	xxxxxxxx	0x0a
	Set the CH1FM Modulation frequency offset	WFM	xxxxxxxx	0x0a	0x0a	Read FM Modulation Frequency Offset of CH1	RFM	0x0a	xxxxxxxx	0x0a
	Set the CH1PM Modulation phase offset	WPP	xxxxxxxx	0x0a	0x0a	Read PM Modulation Phase Offset of CH1 PM	RPP	0x0a	xxxxxxxx	0x0a
Measurement	Set measurement input coupling mode	WCC	xxxxxxxx	0x0a	0x0a					
	Set count clear	WCZ	xxxxxxxx	0x0a	0x0a					
	Set measurement pause	WCP	xxxxxxxx	0x0a	0x0a					
	Set measurement gate time	WCG	xxxxxxxx	0x0a	0x0a	Read measuring gate time	RCG	0x0a	xxxxxxxx	0x0a
						Read frequency of external measurement	RCF	0x0a	xxxxxxxx	0x0a
						Read external	RCC	0x0a	xxxxxxxx	0x0a

						counting value				
						Read external counting period	RCT	0x0a	xxxxxxxx	0x0a
						Read positive pulse width of external measurement	RC+	0x0a	xxxxxxxx	0x0a
						Read negative pulse width of external measurement	RC-	0x0a	xxxxxxxx	0x0a
						Read duty cycle of external measurement	RCD	0x0a	xxxxxxxx	0x0a
Sweep	Set sweep object	SOB	xxxxxxxx	0x0a	0x0a					
	Set sweep start data	SST	xxxxxxxx	0x0a	0x0a					
	Set sweep end data	SEN	xxxxxxxx	0x0a	0x0a					
	Set sweep time	STI	xxxxxxxx	0x0a	0x0a					
	Set sweep mode	SMO	xxxxxxxx	0x0a	0x0a					
	Set start-stop of sweep	SBE	xxxxxxxx	0x0a	0x0a					
	Set signal source of sweep	SXY	xxxxxxxx	0x0a	0x0a					
System Setting	Save parameters of current two channels	USN	xxxxxxxx	0x0a	0x0a					
	Load parameters from storage position	ULN	xxxxxxxx	0x0a	0x0a					
	Add synchronization mode	USA	xxxxxxxx	0x0a	0x0a	Read synchronization information	RSA	0x0a	xxxxxxxx	0x0a
	Cancel synchronization mode	USD	xxxxxxxx	0x0a	0x0a					
	Set buzzer on/off	UBZ	xxxxxxxx	0x0a	0x0a	Read buzzer status	RBZ	0x0a	xxxxxxxx	0x0a
	Set uplink mode	UMS	xxxxxxxx		0x0a	Read uplink	RMS	0x0a	xxxxxxxx	0x0a

				0x0a	
	Set local uplink status	UUL	xxxxxxxx	0x0a	0x0a

mode				
Read native uplink status	RUL	0x0a	xxxxxxxx	0x0a
Read native ID	UID	0x0a	xxxxxxxx	0x0a
Read native Model	UMO	0x0a	xxxxxxxx	0x0a

	Button Name	Command code	Data entity	End Mark	Return
Button simulation	WAVE	KEY	1	0x0a	0x0a
	MEAS	KEY	2	0x0a	0x0a
	SWEEP	KEY	3	0x0a	0x0a
	MOD	KEY	4	0x0a	0x0a
	SYNC	KEY	5	0x0a	0x0a
	SYS	KEY	6	0x0a	0x0a
	MORE	KEY	7	0x0a	0x0a
	CH1	KEY	8	0x0a	0x0a
	CH2	KEY	9	0x0a	0x0a
	F1	KEY	10	0x0a	0x0a
	F2	KEY	11	0x0a	0x0a
	F3	KEY	12	0x0a	0x0a
	F4	KEY	13	0x0a	0x0a
	F5	KEY	14	0x0a	0x0a
	LEFT	KEY	15	0x0a	0x0a
	RIGH	KEY	16	0x0a	0x0a
	OK	KEY	17	0x0a	0x0a
	UP	KEY	18	0x0a	0x0a
	DOWN	KEY	19	0x0a	0x0a

• Detailed description of each command

1. CH1 parameter command

Set the CH1 parameter：

(1)WMW：Set the CH1 waveform

Format：WMW xx+ 0x0a

Where "XX" refers to the waveform represented by 2 numbers, for example:

WMW0	Expressed as SINE waveform
WMW1	Expressed as Square waveform
WMW2	Expressed as Rectangle waveform
WMW3	Expressed as Trapezoid waveform
WMW4	Expressed as CMOS waveform
WMW5	Expressed as Adjustable Pulse waveform
WMW6	Expressed as DC waveform
WMW7	Expressed as Triangle waveform
WMW8	Expressed as Positive Sawtooth waveform
WMW9	Expressed as Negative Sawtooth waveform
WMW10	Expressed as Stepped triangular waveform
WMW11	Expressed as step waveform
WMW12	Expressed as Reverse step waveform
WMW13	Expressed as Exponential waveform
WMW14	Expressed as Anti exponential waveform

WMW15 Expressed as Positive descent index

WMW16 Expressed as Inverse descent index

WMW17 Expressed as logarithmic waveform

WMW18 Expressed as Anti-logarithm waveform

WMW19 Expressed as Logarithm of positive descent waveform

WMW20 Expressed as Inverse logarithm of descent waveform

WMW21 Expressed as Full waveform

WMW22 Expressed as Negative full waveform

WMW23 Expressed as Positive half- waveform

WMW24 Expressed as Negative half-waveform

WMW25 Expressed as Lorentz pulse

WMW26 Expressed as multi-tone

WMW27 Expressed as Random noise

WMW28 Expressed as ECG

WMW29 Expressed as Trapezoidal pulse

WMW30 Expressed as Sinc-Pulse

WMW31 Expressed as Narrow pulse

WMW32 Expressed as AWGN

WMW33 Expressed as AM

WMW34 Expressed as FM

WMW35 Expressed as Chirp

……

WMW99 Expressed as Arbitrary64

(2)WMF：Set the CH1 Frequency

Format：WMFxxxxxxxxxxxxx + 0x0a

Where "XXXXXXXXXXX" represents the frequency value represented by 14 numbers, and the frequency value is fixed in the unit of UHZ, for example:

WMF100000000 means the set frequency is 100Hz

WMF000123456 means the set frequency is 0.123456Hz

WMF000000001 means the set frequency is 1uHz

(3)WMA：Set the CH1 amplitude

Format：WMAxx.xxx+ 0x0a

Where "XX. XXX" is the amplitude value to be set, for example:

WMA12.351 means the set frequency is 12.351V

WMA0.352 means the set frequency 0.352V

(4)WMO：Set the CH1 offset

Format：WMO xx.xxx+ 0x0a

Where "XX. XXX" is the offset value to be set, for example:

WMO 2.351 means the set frequency is 2.351V

WMO -2.352 means the set frequency is -2.352V

(5)WMD：Set CH1 Duty

Format：WMD xx.x+ 0x0a

Where "xx. X" represents the duty cycle represented by three numbers, and the

last bit is floating-point bit, for example：

WMD50.1 Indicates the set duty cycle is 50.1%

(6)WMP：Set the CH1 phase

Format：WMPxxxx+ 0x0a

Where "xxx. X" is the offset value to be set, for example：

WMP123.4 indicates that the CH1 phase lag is 123.4 degrees.

WMP4.5 indicates that the CH1 phase lag is 4.5 degrees.

(7)WMN：To set the On/Off status of main wave output of CH1.

Format：WMNx+ 0x0a

Above “x” shows On/Off status. Fox example:

WMN0 means the CH1 output is set to Off.

WMN1 means the CH1 output is set to On.

(8) WMS：Set the pulse duration of CH1 pulse wave

Format：WMS xxxx+ 0x0a

Where "xxxx" is the duration of the set pulse, in nanoseconds (nS), for example：

WMN10000 means pulse period is 10000 nS.

Read CH1 information：

(1)RMW：Read the CH1 waveform

PC sends RMW + 0x0a ，

If the machine returns 0000000001, it means the current waveform is Square waveform.

Details as follows:

0 SINE

1 Square

2 Rectangle

3 Trapezoid

4 CMOS

5 Adj-Pulse

6 DC

7 TRGL

8 Ramp

9 NegRamp

10 Stair TRGL

11 Stairstep

12 NegStair

13 PosExponen

14 NegExponen

15 P-Fall-Exp

16 N-Fall-Exp

17 PosLogarit

18 NegLogarit

19 P-Fall-Log

20 N-Fall-Log

21 P-Full-Wav

22 N-Full-Wav

23 P-Half-Wav

24 N-Half-Wav

25 Lorentz-Pu

26 Multitone

27 Random-Noi

28 ECG

29 Trapezoid

30 Sinc-Pulse

31 Impulse

32 AWGN

33 AM

34 FM

35 Chirp

36 Arbitrary Waveform 1

37 Arbitrary Waveform 2

……

99 Arbitrary Waveform 64

(2)RMF：Read frequency of CH1

PC sends RMF + 0x0a ，

If the machine returns 00010000.000000, it means the current frequency is 10KHz.

The unit of frequency is Hz.

(3)RMA：Read the amplitude of CH1

PC sends RMA + 0x0a ，

If the instrument returns “00000010000”, it means the current amplitude is 10.000V

(4)RMO：To read the offset of CH1

PC sends RMO + 0x0a ，

If the instrument returns “611”, it means the current offset is -0.389V.

If the instrument returns “16782”, it means the current offset is 6.782V.

Note: when the offset value returned by the machine is less than 10000, it means the offset is negative pressure, and when it is equal to 10000, it means 0.

When it is bigger than 10000 indicates a positive bias. If it is bigger than 10000, take the return value minus 10000, which is the positive pressure offset of the actual output; if it is less than 10000, take 10000 minus the return value.。

(5)RMD：To read the duty cycle of CH1

PC sends RMD + 0x0a ，

If the instrument returns 0000000689, it means the current duty cycle is 68.9%.

(6)RMP：To read the phase of CH1

PC sends RMP + 0x0a ，

If the instrument returns 2189, it means the current phase is 218.9°.

(7)RMN：To read the output status: enabled or disabled

PC sends RMN + 0x0a ，

If this instrument returns 0000000000, it means that the current CH1 output is disabled.

If this instrument returns 0000000255, it means the current CH1 output is enabled.

(8) RSS：To read the pulse period of CH1

Format 0x0a

If the instrument returns 10000, it means the pulse period is 10000 nS.

2. **Parameter command of CH2**

To set parameter of CH2：

(1)WFW：To set the type of CH2

Format：WFW xx+ 0x0a

Where "XX" means the waveform represented by 2 numbers, for example：

WFW0	Expressed as	SINE
WFW1	Expressed as	Square
WFW2	Expressed as	Rectangle
WFW3	Expressed as	Trapezoid

WFW4	Expressed as	CMOS
WFW5	Expressed as	DC
WFW6	Expressed as	TRGL
WFW7	Expressed as	Ramp
WFW8	Expressed as	NegRamp
WFW9	Expressed as	Stair TRGL
WFW10	Expressed as	Stairstep
WFW11	Expressed as	NegStair
WFW12	Expressed as	PosExponen
WFW13	Expressed as	NegExponen
WFW14	Expressed as	P-Fall-Exp
WFW15	Expressed as	N-Fall-Exp
WFW16	Expressed as	PosLogarit
WFW17	Expressed as	NegLogarit
WFW18	Expressed as	P-Fall-Log
WFW19	Expressed as	N-Fall-Log
WFW20	Expressed as	P-Full-Wav
WFW21	Expressed as	N-Full-Wav
WFW22	Expressed as	P-Half-Wav
WFW23	Expressed as	N-Half-Wav
WFW24	Expressed as	Lorentz-Pu
WFW25	Expressed as	Multitone
WFW26	Expressed as	Random-Noi

WFW27 Expressed as ECG

WFW28 Expressed as Trapezoid

WFW29 Expressed as Sinc-Pulse

WFW30 Expressed as Impulse

WFW31 Expressed as AWGN

WFW32 Expressed as AM

WFW33 Expressed as FM

WFW34 Expressed as Chirp

WFW35 Expressed as Arbitrary1

WMW36 Expressed as Arbitrary2

……

WMW98 Expressed as Arbitrary64

(2)WFF：To set the Frequency of CH2

Format：WFFxxxxxxxxxxxxx + 0x0a

Where "XXXXXXXXXXX" represents the frequency value represented by 14 numbers, and the frequency value is fixed in the unit of uHz, for example:

WFF100000000 means the set frequency is 100Hz

WFF000123456 means the set frequency is 0.123456Hz

WFF000000001 means the set frequency is 1uHz

(3)WFA：To set the Amplitude of CH2

Format：WFAxx.xxx+ 0x0a

Where "XX. XXX" is the amplitude value to be set, for example：

WFA12.351 means the setting amplitude is 12.351V

WFA0.352 means the setting amplitude is 0.352V

(4)WFO：To set the Offset of CH2

Format：WFO xx.xxx+ 0x0a

Where "XX. XXX" is the offset value to be set, for example：

WFO 2.351 means the setting amplitude is 2.351V

WFO -2.352 means the setting amplitude is -2.352V

(5)WFD：To set the Duty Cycle of CH2

Format：WFD xx.x+ 0x0a

Where "xx. X" represents the duty cycle represented by three numbers, and the last bit is floating-point bit, for example：

WFD50.1 indicates the set duty cycle is 50.1%

(6)WFP：To set the Phase of CH2

Format：WFPxxx.x+ 0x0a

Where "xxx. X" is the offset value to be set, for example:

WFP142.3 indicates setting CH2 phase lag of 142.3 degrees.

WFP4.5 **means set CH2 phase lag of 4.5 degrees**

(8)WFN：Set CH2 output on/off

Format：WFNx+ 0x0a

Where "X" is the opening and closing to be set, for example：

WFN0 indicates setting CH2 output off

WFN1 indicates setting CH2 output on

Read the information of CH2：

(1)RFW：To read the type of CH2

PC sends RFW + 0x0a ，

If the instrument returns 000000000 1, it means that the current set waveform is rectangular wave.

Details as follows：

0	SINE
1	Square
2	Rectangle
3	Trapezoid
4	CMOS
5	DC
6	TRGL
7	Ramp
8	NegRamp
9	Stair TRGL
10	Stairstep
11	NegStair

12	PosExponen
13	NegExponen
14	P-Fall-Exp
15	N-Fall-Exp
16	PosLogarit
17	NegLogarit
18	P-Fall-Log
19	N-Fall-Log
20	P-Full-Wav
21	N-Full-Wav
22	P-Half-Wav
23	N-Half-Wav
24	Lorentz-Pu
25	Multitone
26	Random-Noi
27	ECG
28	Trapezoid
29	Sinc-Pulse
30	Impulse
31	AWGN
32	AM
33	FM
34	Chirp

35 Arbitrary Waveform 1

36 Arbitrary Waveform 2

……

98 Arbitrary Waveform 64

(2)RFF：To read the frequency of CH2

PC sends RFF + 0x0a.

If the instrument returns 00010000.000000, it means the current set frequency is 10kHz.

The unit of frequency value is Hz which is fixed.

(3)RFA：To read the amplitude of CH2

PC sends RFA + 0x0a ，

If the instrument returns 10000, it means the current set amplitude is 10.000v.

(4)RFO：To read the offset of CH2

PC sends RFO + 0x0a.

If the instrument returns 611, it means the current set offset is -0.389V.

If the instrument returns 16782, the current set offset is 6.782V.

Note: When the offset value returned by the unit is less than 10000, it means that the offset is negative pressure, when it is equal to 10000, it is 0. When it is greater than 10000, the offset is positive pressure. When it is greater than 10000, it is necessary to take the return value minus 1000, which is the positive pressure

offset of the actual output. When it is less than 10000, take 10000 minus the return value.

(5)RFD：To read the duty cycle of CH2

PC sends RFD + 0x0a ，

If the machine returns 689, the current set duty cycle is 68.9%.

(6)RFP：To read the phase of CH2

PC sends RFP + 0x0a ，

If the instrument returns 1289, the current set phase offset is 128.9 °

(7)RFN：To read the CH2 output status: enabled or disabled.

PC sends RFN + 0x0a ，

If the instrument returns 0000000000, it means the subsidiary waveform output is disabled.

If the instrument returns 0000000255, it means the subsidiary waveform output is enabled.

3. Modulation correlation

Setting up the parameter of CH3：

(1)TFW：set the waveform of CH3

Format：TFW xx+ 0x0a

Where "XX" means the waveform represented by 2 numbers, for example：

TFW0 Expressed as SINE

TFW1	Expressed as	Square
TFW2	Expressed as	Rectangle
TFW3	Expressed as	Trapezoid
TFW4	Expressed as	CMOS
TFW5	Expressed as	DC
TFW6	Expressed as	TRGL
TFW7	Expressed as	Ramp
TFW8	Expressed as	NegRamp
TFW9	Expressed as	Stair TRGL
TFW10	Expressed as	Stairstep
TFW11	Expressed as	NegStair
TFW12	Expressed as	PosExponen
TFW13	Expressed as	NegExponen
TFW14	Expressed as	P-Fall-Exp
TFW15	Expressed as	N-Fall-Exp
TFW16	Expressed as	PosLogarit
TFW17	Expressed as	NegLogarit
TFW18	Expressed as	P-Fall-Log
TFW19	Expressed as	N-Fall-Log
TFW20	Expressed as	P-Full-Wav
TFW21	Expressed as	N-Full-Wav
TFW22	Expressed as	P-Half-Wav
TFW23	Expressed as	N-Half-Wav

TFW24 Expressed as Lorentz-Pu

TFW25 Expressed as Multitone

TFW26 Expressed as Random-Noi

TFW27 Expressed as ECG

TFW28 Expressed as Trapezoid

TFW29 Expressed as Sinc-Pulse

TFW30 Expressed as Impulse

TFW31 Expressed as AWGN

TFW32 Expressed as AM

TFW33 Expressed as FM

TFW34 Expressed as Chirp

TFW35 Expressed as Arbitrary1

TMW36 Expressed as Arbitrary2

……

TFW98 Expressed as Arbitrary64

(2)TFF：Set the Frequency of CH3

Format：TFFxxxxxxxxxxxxx + 0x0a

Where "XXXXXXXXXXX" represents the frequency value represented by 14 numbers, and the frequency value is fixed in the unit of UHZ, for example:

TFF100000000 means the set frequency is 100Hz

TFF000123456 means the set frequency is 0.123456Hz

TFF000000001 means the set frequency is 1uHz

(3)TFA：Set the amplitude of CH3

Format：TFAxx.xxx+ 0x0a

Where "XX. XXX" is the amplitude value to be set, for example：

TFA12.351 means the setting amplitude is 12.351V

TFA0.352 means the setting amplitude is 0.352V

(4)TFO：Set the offset of CH3

Format：TFO xx.xxx+ 0x0a

Where "XX. XXX" is the offset value to be set, for example：

TFO 2.351 means the setting amplitude is 2.351V

TFO -2.352 means the setting amplitude is -2.352V

(5)TFD：Set the duty cycle of CH3

Format：TFD xx.x+ 0x0a

Where "xx. X" represents the duty cycle represented by three numbers, and the last bit is floating-point bit, for example：

TFD50.1 indicates that the set duty cycle is 50.1%

(6)TFP：Set the phase of CH3

Format：TFPxxx.x+ 0x0a

Where "xxx. X" is the offset value to be set, for example：

TFP142.3 indicates that the set CH3 phase lag is 142.3 degrees.

TFP4.5 means set CH3 phase lag of 4.5 degrees

(8)TFN：Set CH3 output on/off

Format：TFNx+ 0x0a

Where "X" is the opening and closing to be set, for example:

TFN0 indicates setting CH3 output off

TFN1 indicates setting CH3 output on

Read the information of CH3：

(1)RTW：read the waveform of CH3

PC sends RTW + 0x0a ，

If the unit returns 0000000001, the currently set waveform is a rectangular wave.

Details as follows：

0	SINE
1	Square
2	Rectangle
3	Trapezoid
4	CMOS
5	DC
6	TRGL
7	Ramp
8	NegRamp
9	Stair TRGL
10	Stairstep

11	NegStair
12	PosExponen
13	NegExponen
14	P-Fall-Exp
15	N-Fall-Exp
16	PosLogarit
17	NegLogarit
18	P-Fall-Log
19	N-Fall-Log
20	P-Full-Wav
21	N-Full-Wav
22	P-Half-Wav
23	N-Half-Wav
24	Lorentz-Pu
25	Multitone
26	Random-Noi
27	ECG
28	Trapezoid
29	Sinc-Pulse
30	Impulse
31	AWGN
32	AM
33	FM

34 Chirp

35 Arbitrary Waveform 1

36 Arbitrary Waveform 2

……

98 Arbitrary Waveform 64

(2)RTF：Read the frequency of CH3

PC sends RTF + 0x0a ，

If the unit returns 00010000.000000, it means that the currently set frequency is 10KHz.

The unit of frequency value is Hz which is fixed.

(3)RTA：Read the amplitude of CH3.

PC sends RTA + 0x0a ，

If the unit returns 10000, it means that the current setting is 10.000V.

(4)RTO：Read the offset of CH3

PC sends RTO + 0x0a ，

If the instrument returns 611, it means the current set offset is -0.389v。

If the instrument returns 16782, the current set offset is 6.782v.

Note: when the offset value returned by the machine is less than 10000, it means the offset is negative pressure, when it is equal to 10000, it means 0, when it is greater than 10000, it means the offset is positive pressure. If it is greater than

10000, take the return value minus 1000, which is the positive pressure offset of the actual output; if it is less than 10000, take 10000 minus the return value.

(5)RTD：Read the duty cycle of CH3

PC sends RTD + 0x0a ，

If the instrument returns 689, the current set duty cycle is 68.9%.

(6)RTP：Read the phase of CH3

PC sends RTP + 0x0a ，

If the instrument returns 1289, the current set phase offset is 128.9 °.

(8)RTN：To set the On/Off status of CH3

PC sends RTN + 0x0a ，

If the local machine returns 0000000000, it means that the current CH3 output is off.

If the machine returns 0000000255, it means the current CH3 output is on.

4. Modulation correlation

(1)WPF：Set the modulation mode of CH1

Format：WPFx+ 0x0a

Where "X" is the modulation mode to be set, for example:

WPF0 indicates setting the CH1 modulation mode to ASK

WPF1 indicates setting the CH1 modulation mode to FSK

WPF2 indicates setting the CH1 modulation mode to PSK

WPF3 indicates setting the CH1 modulation mode is trigger.

WPF4 indicates setting the CH1 modulation mode to AM

WPF5 indicates setting the CH1 modulation mode to FM

WPF6 indicates setting the CH1 modulation mode to PM

(2) RPF：Read the modulation mode of CH1

PC sends RPF + 0x0a, signal generator replies

0 indicates setting the CH1 modulation mode to ASK

1 indicates setting the CH1 modulation mode to FSK

2 indicates setting the CH1 modulation mode to PSK

3 indicates setting the CH1 modulation mode is trigger.

4 indicates setting the CH1 modulation mode to AM

5 indicates setting the CH1 modulation mode to FM

6 indicates setting the CH1 modulation mode to PM

(3)WPM：Setting up the CH1 modulation source

Format：WPMx+ 0x0a

Where "x" is the modulation source to be set, for example：

WPM0 indicates setting the modulation source of CH2

WPM1 indicates setting the modulation source as an external AC coupling channel

WPM2 indicates setting the modulation source to manual

WPM3 indicates setting the modulation source as an external DC coupling

channel

(4)RPM：Read CH1 modulation source CH1

PC sends RPM + 0x0a, signal generator replies

0 indicates setting the modulation source of CH2

1 means setting the modulation source as an external AC coupling channel

2 means set the modulation source to manual

3 indicates that the modulation source is set as an external DC coupling channel

(5)WPN：Setting the CH1 trigger pulses number

Format：WPNxxxxxxx+ 0x0a

The maximum value of "xxxxxxx" is 1048575, for example：

WPN10 indicates that 10 cycles of waveform will be output after triggering

(6)RPN：Read CH1 trigger pulse number

PC sends RPN + 0x0a ，

If the instrument returns to 0000000068, the number of trigger pulses currently set is 68.

(7) WFK：Set the second frequency of FSK modulation

Format：WFK xxxxxxx.x+ 0x0a

Where "xxxxxxx.x" is the second frequency of the FSK to be set, for example:

WFK123.4 indicates that the second frequency of setting FSK

modulation is 123.4Hz

(8) RFK：Read the second frequency of the FSK modulation

PC sends RFK + 0x0a, signal generator replies

123.4 indicates that the second frequency of the set FSK modulation is 123.4Hz

(9) WPO：Generate manual source

Format：WPO + 0x0a

Each time the signal generator receives the instruction, it generates a manual source.

(10) WPR：Setting AM modulation rate

Format：WPR xxx.x+ 0x0a

Where "xxx.x" is the modulation rate that needs to be set, for example WFK50.1 indicates that the AM modulation rate set is 50.1%.

(11)RPR：Read AM Modulation Rate

PC sends RPR + 0x0a, signal generator replies

23.4 indicates that the modulation rate of AM modulation is 23.4%

(12) WFM：Setting frequency offset of FM modulation

Format：WFM xxxxxxx.x+ 0x0a

Where "xxxxxxx.x" is the frequency offset of FM that needs to be set, for example：

WFM 123.4 indicates that the frequency offset of setting FM modulation is 123.4Hz.

(13) RFM: Frequency offset for reading FM modulation

PC sends RFM + 0x0a ， such as signal generator replies

6623.567 indicates that the frequency offset of the FM modulation set is 6623.567Hz.

(14) WPP：WPP: Set PM modulation phase offset

Format：WPPxxx.xx+ 0x0a

Where "xxx.xx" is the required phase offset, for example：

WPP150.12 indicates that the set PM phase offset is 150.12 degrees.

(15) RPP: Read FM modulation frequency offset

PC sends RPP + 0x0a, such as signal generator replies

66.56 indicates that the set PM phase offset is 66.56 degrees

5. Measure the relevant parameters command

(1)RCF：Read the frequency of the external measurement

PC sends RCF + 0x0a ，

If the machine returns 0000000668 ,

When the gate time is 1s, the frequency result is 668Hz.

When the gate time is 10s, the frequency result is 66.8Hz.

When the gate time is 100s, the frequency result is 6.68Hz.

Note: Please read the gate time first before do this command to confirm the magnitude.

(2)RCC：Read external counting value.

PC sends RCC + 0x0a ，

If the machine returns 0000000668 , it means the value counted is 668.

(3)WCZ：Reset the counter

Format：WCZx+ 0x0a

Where "X" is the zeroing object to be set, for example:：

WCZ0 means reset the counter.

(4)WCP：Pause the measurement

Format：WCPx+ 0x0a

Where "X" is the pause object to be set, for example：

WCP0 means pause the counter.

(5)RCT：Read the external counting period.

PC sends RCT + 0x0a ，

If the machine returns 0000060668, it means the width of positive pulse is

60668ns.

(6)RC+：Read width of positive pulse of external measurement.

PC sends RC+ + 0x0a ，

If the instrument returns 0000060668, it means the width of positive pulse is 60668ns.

(7)RC-：Read width of negative pulse of external measured

PC sends RC- + 0x0a ，

If the instrument returns 0000060668, it means the width of negative pulse is 60668ns.

(8)RCD：Read the duty cycle of external measurement.

PC sends RCD + 0x0a

If the machine returns 0000000668, it means the duty cycle of external measurement is 66.8%.

(9)WCG：Set the gate time of measurement.

Format：WCG x+ 0x0a

Where "X" is the gate time to be set, for example：

WCG0 Means gate time is set to 1s

WCG1 Means gate time is set to 10s

WCG2 Means gate time is set to 100s

(10)RCG：Red the gate time of measurement.

PC sends RCT + 0x0a ，

If the machine returns 0000000000, It means the gate time is 1s.

Details as:

0 Means the gate time current is 1s.

1 Means the gate time current is 10s.

2 Means the gate time current is 10s.

(11)WCC：Set the coupling mode of measurement.

Format：WCC x+ 0x0a

Where "X" is the coupling mode to be set, for example：

WCC0 means set the coupling mode is set to DC coupling.

WCC1 means set the coupling mode is set to AC coupling.

6. Sweep command

(1)SOB：Set the object of sweep.

Format：SOBx+ 0x0a

Where "X" is the scanning object to be set, for example：

SOB0 means set the frequency to be object.

SOB1 means set the amplitude to be object.

SOB2 means set the offset to be object.

SOB3 means set the duty cycle to be object.

(2)SST：Set the start position of sweep.

1. When the sweep object is frequency, the unit is Hz.

Form as：SSTxxxxxxx.x+ 0x0a

For example:

SST1000.0 means the start frequency is 1000.0Hz

2. When the sweep object is amplitude, the unit is V.

Format：SSTxx.xxx+ 0x0a

For example:

SST10.001 means the start amplitude is 10.001V

3. When the sweep object is offset, the unit is V.

Format：SSTxx.xxx+ 0x0a

SST-6.000 means the start offset is -6.000V.

4. When the sweep object is duty cycle, the unit is %.

Format：SSTxx.x+ 0x0a

For example:

SST68.9 means the start duty cycle is 68.9%.

When the value input is higher than max value, the machine will keep the max value.

(3)SEN：Set the sweep end position.

1. When the sweep object is frequency, the unit is Hz.

Format：SENxxxxxxx.x+ 0x0a

For example:

SEN1000.0 means the end frequency is 1000.0Hz.

2. When the sweep object is amplitude, the unit is V.

Format：SSNxx.xxx+ 0x0a

For example:

SSN10.000 means the end amplitude is 10.000V.

3. When the sweep object is offset, the unit is V.

Format：SSNxx.xxx+ 0x0a

For example

SEN-6.000 means the end offset is -6.000V

4. When the sweep object is duty cycle, the unit is %.

Format：SSNTxx.x+ 0x0a

For example:

SSN68.9 means the end duty cycle is 68.9%

Note: When the value input is higher than max value, the machine will keep the max value.

(4) STI：Set the sweep time

Format：STIxxx.xx+ 0x0a

Above “xxx.xx” means the sweep time needed. For example:

STI68.9 means the sweep time is set to 68.9s

(6)SMO：Set the sweep mode

Format：SMO x+ 0x0a

Above “x” is the sweep mode needed. For example:

SMO0 means the sweep mode is linear sweep.

SMO1 means the sweep mode is log sweep.

(7)SBE：Set the sweep on/off.

Format：SBEx+ 0x0a

Above “x” means the on/off status of sweep. For example:

SBE0 Set the sweep turned off.

SBE1 Set the sweep turned on.

(8) SXY：Set the control source of sweep

Format：SXY x+ 0x0a

Above “x” means the control source of sweep. For example：

SBE0 means the control source is time.

SBE1 means the control source is analog signal input from VCO IN terminal.

7. System Setting command

(1)USN: Save the parameters of current two channels (Frequency, amplitude, offset, duty cycle, waveform and so on) to a certain position.

Format：USNxx+ 0x0a

Above “xx” means the saving position. For example:

USN06 means save current parameters to position 6.

USN01 means save current parameters to position 1.

Note: If the position 1 has data saved, the machine will load these data when start-up.

(2) ULN: Load the parameters of current two channels (Frequency, amplitude, offset, duty cycle, waveform and so on) from a certain position.

Format：ULNxx+ 0x0a

Above “xx” means the position needed to load. For example:

ULN06 means load parameters from position 6.

ULN01 means load parameters from position 1.

Note: If the position 1 has data saved, the machine will load these data when start-up. If the position needed to load doesn’t have data saved, the machine will not load. It will maintain current parameters.

(3) USA: Add synchronization mode.

Format：USAx+ 0x0a

Above “x” means the synchronization object. For example：

USA0 means to set waveform synchronization between other channels and the first channel

USA1 means to set the frequency synchronization between other channels and the first channel

USA2 means to set the amplitude synchronization between other channels and the first channel

USA3 indicates setting the offset synchronization of other channels and the first

channel

USA4 indicates setting duty cycle synchronization of other channels and the first channel

USA5 means to set the rise time synchronization of rectangular wave between other channels and the first channel

USA6 means to set the rectangular wave falling time synchronization between other channels and the first channel

USA7 means to set the switch synchronization of other channels and the first channel

Note: synchronization is not supported in sweep state.

(4)USD: Cancel synchronization mode

Format：USDx+ 0x0a

Above “x” means the synchronization object. For example：

USD0 means to cancel the waveform synchronization between the second channel and the first channel

USD1 means to cancel the frequency synchronization between the second channel and the first channel

USD2 means to cancel the amplitude synchronization between the second channel and the first channel

USD3 means to cancel the offset synchronization between the second channel and the first channel

USD4 means to cancel the duty cycle synchronization between the second

channel and the first channel

USD5 means to cancel the rectangular wave rise time synchronization between other channels and the first channel

USD6 means to cancel the synchronization of rectangular wave descent time of other channels and the first channel

USD7 means to cancel the switch synchronization of other channels and the first channel

(5)RSA: Read synchronization information.

Format：RSAx+ 0x0a

Where "X" is the synchronization option to read information, for example:

RSA0 means read the waveform synchronization information.

RSA1 means reading frequency synchronization information.

RSA2 indicates reading amplitude synchronization information

RSA3 indicates reading offset synchronization information

RSA4 means reading duty cycle synchronization information.

RSA5 indicates synchronization information for reading the rise time of a rectangular wave

RSA6 indicates reading the synchronous information of rectangular wave falling time

RSA7 indicates the synchronization information of the read channel switch

If the machine returns 0, it means the object synchronization is disabled.

If the machine returns 255, it means the object synchronization is enabled.

For example：PC sends RSA2+ 0x0a

If the machine returns 0, it means the amplitude synchronization is disabled.

If the machine returns 255, it means the amplitude synchronization is disabled.

(6)UBZ：Set the buzzer on/off

Format：UBZx+ 0x0a

Above “x” means the on/off status of buzzer. For example:

UBZ0 means turn off the buzzer.

UBZ1 means turn on the buzzer.

(7)RBZ：Read the buzzer on/off status.

Format：RBZ+ 0x0a

For example：PC sends RBZ+ 0x0a

If the machine returns 0, it means the buzzer is disabled.

If the machine returns 255, it means the buzzer is enabled.

(8)UMS：To set the uplink mode.

Format：UMSx+ 0x0a

Above “x” represents the uplink mode. For example:

UMS0 means setting the instrument as master machine.

UMS1 means setting the instrument as slave machine.

(9)RMS：To read the uplink mode.

Format：RMS+ 0x0a

For example：PC sends RMS+ 0x0a

If the instrument returns 0, it means it is master machine in uplink.

If the instrument returns 255, it means it is slave machine in uplink.

(10) UUL：To turn on/off unlink function.

Format：UMLx+ 0x0a

Above “x” represents the on/off status of uplink. For example:

UML0 means turning off the uplink function.

UML1 means turning on the uplink function.

(11)RUL：To read the uplink on/off status.

Format：RUL+ 0x0a

Format：PC sends RUL+ 0x0a ，

If the instrument returns 0, it means the uplink function is in off status.

If the instrument returns 255, it means the uplink function is in on status.

(12)UID：To read the ID number of the instrument.

PC sends UID + 0x0a.

The instrument returns its ID number.

(13)UMO：To read the model of the instrument.

PC sends UMO + 0x0a.

The instrument returns its model.

8. Button simulation：

KEY：Analog button

Format：KEYxx+ 0x0a

Where "xx" represents the key value represented by 2 digits, for example:

KEY01	Analog key value	WAVE (switch waveform button)
KEY02	Analog key value	MEAS (measurement function button)
KEY03	Analog key value	SWEEP (Sweep function button)
KEY04	Analog key value	MOD (Modulation function button)
KEY05	Analog key value	SYNC (Sync function button)
KEY06	Analog key value	SYS (System function button)
KEY07	Analog key value	MORE (More Settings function buttons)
KEY08	Analog key value	CH1 (Channel one button)
KEY09	Analog key value	CH2 (Channel two button)
KEY10	Analog key value	F1 (Shortcuts F1)
KEY11	Analog key value	F2 (Shortcuts F2)
KEY12	Analog key value	F3 (Shortcuts F3)
KEY13	Analog key value	F4 (Shortcuts F4)
KEY14	Analog key value	F5 (Shortcuts F5)
KEY15	Analog key value	LEFT (Left arrow key)
KEY16	Analog key value	RIGH (Right arrow key)
KEY17	Analog key value	OK (Confirm key)

KEY18	Analog key value	UP (Knob left-handed)
KEY19	Analog key value	DOWN (Knob right)

NOTE: Feeltech reserves the right to modify all protocol without notice

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