

# **FY6600 Series Function Waveform Generator**

## **Host Computer Communication Protocol Specification**

**Rev 1.5**

## 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 |  | Reading Command                      | Command Line |          | Return   |          |
|--------|-------------------------------------|--------------|----------|----------|--------|--|--------------------------------------|--------------|----------|----------|----------|
|        |                                     | Code         | Value    | End Mark |        |  |                                      | Code         | End Mark | Value    | End Mark |
| Output | Set waveform of main wave           | WMW          | xxxxxxxx | 0x0a     | 0x0a   |  | Read waveform of main wave           | RMW          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set frequency of main wave          | WMF          | xxxxxxxx | 0x0a     | 0x0a   |  | Read frequency of main wave          | RMF          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set amplitude of main wave          | WMA          | xxxxxxxx | 0x0a     | 0x0a   |  | Read amplitude of main wave          | RMA          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set offset of main wave             | WMO          | xxxxxxxx | 0x0a     | 0x0a   |  | Read offset of main wave             | RMO          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set duty cycle of main wave         | WMD          | xxxxxxxx | 0x0a     | 0x0a   |  | Read duty cycle of main wave         | RMD          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set phase of main wave              | WMP          | xxxxxxxx | 0x0a     | 0x0a   |  | Read phase of main wave              | RMP          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set On/Off of main wave output      | WMN          | xxxxxxxx | 0x0a     | 0x0a   |  | Read On/Off of main wave output      | RMN          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set waveform of auxiliary wave      | WFW          | xxxxxxxx | 0x0a     | 0x0a   |  | Read waveform of auxiliary wave      | RFW          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set frequency of auxiliary wave     | WFF          | xxxxxxxx | 0x0a     | 0x0a   |  | Read frequency of auxiliary wave     | RFF          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set amplitude of auxiliary wave     | WFA          | xxxxxxxx | 0x0a     | 0x0a   |  | Read amplitude of auxiliary wave     | RFA          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set offset of auxiliary wave        | WFO          | xxxxxxxx | 0x0a     | 0x0a   |  | Read offset of auxiliary wave        | RFO          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set duty cycle of auxiliary wave    | WFD          | xxxxxxxx | 0x0a     | 0x0a   |  | Read duty cycle of auxiliary wave    | RFD          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set phase of auxiliary wave         | WFP          | xxxxxxxx | 0x0a     | 0x0a   |  | Read phase of auxiliary wave         | RFP          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set On/Off of auxiliary wave output | WFN          | xxxxxxxx | 0x0a     | 0x0a   |  | Read On/Off of auxiliary wave output | RFN          | 0x0a     | xxxxxxxx | 0x0a     |
|        | Set trigger                         | WPM          | xxxxxxxx | 0x0a     | 0x0a   |  | Read trigger                         | RPM          | 0x0a     | xxxxxxxx | 0x0a     |

|  |     |          |      |      |
|--|-----|----------|------|------|
| mode of main wave                        |     |          |      |      |
| Set pulse amount triggered by main wave  | WPN | xxxxxxxx | 0x0a | 0x0a |
| Set ASK mode of main wave                | WTA | xxxxxxxx | 0x0a | 0x0a |
| Set FSK mode of main wave                | WTF | xxxxxxxx | 0x0a | 0x0a |
| Set FSK secondary frequency of main wave | WFK | xxxxxxxx | 0x0a | 0x0a |
| Set PSK mode of main wave                | WTP | xxxxxxxx | 0x0a | 0x0a |

|   |     |      |          |      |
|---|-----|------|----------|------|
| mode of main wave                         |     |      |          |      |
| Read pulse amount triggered by main wave  | RPN | 0x0a | xxxxxxxx | 0x0a |
| Read ASK mode of main wave                | RTA | 0x0a | xxxxxxxx | 0x0a |
| Read FSK mode of main wave                | RTF | 0x0a | xxxxxxxx | 0x0a |
| Read FSK secondary frequency of main wave | RFK | 0x0a | xxxxxxxx | 0x0a |
| Read PSK mode of main wave                | RTP | 0x0a | xxxxxxxx | 0x0a |

## Measurement

|                              |     |          |      |      |
|------------------------------|-----|----------|------|------|
| Set coupling mode            | WCC | xxxxxxxx | 0x0a | 0x0a |
| Reset Counter                | WCZ | xxxxxxxx | 0x0a | 0x0a |
| Pause the measurement        | WCP | xxxxxxxx | 0x0a | 0x0a |
| Set gate time of measurement | WCG | xxxxxxxx | 0x0a | 0x0a |
|                              |     |          |      |      |
|                              |     |          |      |      |
|                              |     |          |      |      |
|                              |     |          |      |      |
|                              |     |          |      |      |
|                              |     |          |      |      |

|   |     |      |          |      |
|---|-----|------|----------|------|
|   |     |      |          |      |
|   |     |      |          |      |
|   |     |      |          |      |
| Read gate time of measurement                     | RCG | 0x0a | xxxxxxxx | 0x0a |
| Read frequency of external measurement            | RCF | 0x0a | xxxxxxxx | 0x0a |
| Read external counting value                      | RCC | 0x0a | xxxxxxxx | 0x0a |
| 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                                | RCD | 0x0a | xxxxxxxx | 0x0a |

|                |   |     |         |      |      |                                  |     |      |         |      |
|----------------|---|-----|---------|------|------|----------------------------------|-----|------|---------|------|
|                |   |     |         |      |      | external measurement             |     |      |         |      |
|                |   |     |         |      |      |                                  |     |      |         |      |
| Sweep          | Set sweep object                        | SOB | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Set start data of sweep                 | SST | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Set end data of sweep                   | SEN | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Set sweep time                          | STI | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Set sweep mode                          | SMO | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Set start-stop of sweep                 | SBE | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Set signal source of sweep              | SXY | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                |   |     |         |      |      |                                  |     |      |         |      |
| System Setting | Save parameters of current two channels | USN | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Load parameters from storage position   | ULN | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Add synchronization mode                | USA | xxxxxxx | 0x0a | 0x0a | Read synchronization information | RSA | 0x0a | xxxxxxx | 0x0a |
|                | Cancel synchronization mode             | USD | xxxxxxx | 0x0a | 0x0a |                                  |     |      |         |      |
|                | Set buzzer on/off                       | UBZ | xxxxxxx | 0x0a | 0x0a | Read buzzer status               | RBZ | 0x0a | xxxxxxx | 0x0a |
|                | Set uplink mode                         | UMS | xxxxxxx | 0x0a | 0x0a | Read uplink mode                 | RMS | 0x0a | xxxxxxx | 0x0a |
|                | Set local uplink status                 | UUL | xxxxxxx | 0x0a | 0x0a | Read local uplink status         | RUL | 0x0a | xxxxxxx | 0x0a |
|                |   |     |         |      |      | Read local ID                    | UID | 0x0a | xxxxxxx | 0x0a |
|                |   |     |         |      |      | Read local Model                 | UMO | 0x0a | xxxxxxx | 0x0a |

## ● Detailed description of each command

### 1、 Main waveform Parameter command

#### Set Main waveform Parameter :

##### 1) WMW:set up main waveform form

Format: **WMW**xx+0x0a

Which "XX" represents the waveform of the 2 figures ,among:

WMW00 expressed as sine

WMW01 expressed as Rectangular

WMW02 expressed as Triangle/Square

WMW03 expressed as Rise Sawtooth

WMW04 expressed as Fall Sawtooth

WMW05 expressed as Step Triangle

WMW06 expressed as Positive Step

WMW07 expressed as Inverse Step

WMW08 expressed as Positive Exponent

WMW09 expressed as Inverse Exponent

WMW10 expressed as Positive Falling Exponent

WMW11 expressed as Inverse Falling Exponent

WMW12 expressed as Positive Logarithm

WMW13 expressed as Inverse Logarithm

WMW14 expressed as Positive Falling Logarithm

WMW15 expressed as Inverse Falling Logarithm

WMW16 expressed as Positive Half Wave

|       |                                      |               |
|-------|--------------------------------------|---------------|
| WMW17 | expressed as Negative Half Wave      |               |
| WMW18 | expressed as Positive Half Wave      | Rectification |
| WMW19 | expressed as Negative Half Wave      | Rectification |
| WMW20 | expressed as Lorenz Pulse            |               |
| WMW21 | expressed as Multitone               |               |
| WMW22 | expressed as Noise                   |               |
| WMW23 | expressed as Electrocardiogram (ECG) |               |
| WMW24 | expressed as Trapezoidal Pulse       |               |
| WMW25 | expressed as Sinc Pulse              |               |
| WMW26 | expressed as Narrow Pulse            |               |
| WMW27 | expressed as Gauss White Noise       |               |
| WMW28 | expressed as AM                      |               |
| WMW29 | expressed as FM                      |               |
| WMW30 | expressed as Linear FM               |               |
| WMW31 | expressed as Arbitrary1              |               |
| WMW32 | expressed as Arbitrary2              |               |
| ..... |                                      |               |
| WMW94 | expressed as Arbitrary64             |               |

2) **WMF**: Set main waveform frequency

Format: **WMF**xxxxxxxxxxxxxx+0x0a

Which "xxxxxxxxxxxxxx" represents the frequency value of the 14 digits, the frequency value is fixed to uHz as a unit, for example

- ❖ **WMF**1000000000 indicates that the setting frequency is 100Hz
- ❖ **WMF**000123456 indicates that the setting frequency is 123.456mHz

❖ **WMF000000001** indicates that the setting frequency is 1uHz.

### 3)WMA: To set the Amplitude of main waveform

Form as: **WMA<sub>xx.xx</sub>+ 0x0a**

Above “xx.xx” shows the amplitude value needed. For example:

**WMA12.35** means the amplitude is set to 12.35V.

**WMA0.35** means the amplitude is set to 0.35V.

### 4)WMO: To set the Offset of main waveform

Form as: **WMO<sub>xx.xx</sub>+ 0x0a**

Above “xx.xx” shows the offset value needed. For example:

**WMO2.35** means the offset is set to 2.35V

**WMO-2.35** means the offset is set to -2.35V

### 5)WMD: To set the Duty Cycle of main waveform

Form as: **WMD<sub>xx.x</sub>+ 0x0a**

Above “xx.x” shows the duty cycle value represented by 3 digits. For example:

**WMD50.1** means the duty cycle is set to 50.1%.

### 6)WMP: To set the Phase of main waveform

Form as: **WMP<sub>xxx</sub>+ 0x0a**

Above “xxx” shows the phase value needed. For example:

**WMP123.4** means the phase is set to 123.4.

**WMP4.5** means the phase is set to 4.5°.



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

Form as: WMNx+ 0x0a

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

WMN0 means main wave output is set to Off.

WMN1 means main wave output is set to On.

8) WMS: To set pulse period of main wave pulse

Form as: WMS xxxx+ 0x0a

Above “xxxx” shows pulse period. Unit is nS. For example:

WMN10000 means pulse period is 10000 nS.

## Read Main Wave information

1)RMW: Read waveform of main wave.

PC sends RMW + 0x0a ,

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

Details as follows:

|   |                    |
|---|--------------------|
| 0 | Sine Wave          |
| 1 | Square Wave        |
| 2 | Triangle/Ramp Wave |
| 3 | Rise Sawtooth Wave |
| 4 | Fall Sawtooth Wave |
| 5 | Step Triangle Wave |

|    |                                  |
|----|----------------------------------|
| 6  | Positive Step Wave               |
| 7  | Inverse Step Wave                |
| 8  | Positive Exponent Wave           |
| 9  | Inverse Exponent Wave            |
| 10 | Positive Falling Exponent Wave   |
| 11 | Inverse Falling Exponent Wave    |
| 12 | Positive Logarithm Wave          |
| 13 | Inverse Logarithm Wave           |
| 14 | Positive Falling Logarithm Wave  |
| 15 | Inverse Falling Logarithm Wave   |
| 16 | Positive Half Wave               |
| 17 | Negative Half Wave               |
| 18 | Positive Half Wave Rectification |
| 19 | Negative Half Wave Rectification |
| 20 | Lorenz Pulse Wave                |
| 21 | Multitone Wave                   |
| 22 | Random Noise Wave                |
| 23 | Electrocardiogram (ECG) Wave     |
| 24 | Trapezoidal Pulse Wave           |
| 25 | Sinc Pulse Wave                  |
| 26 | Narrow Pulse Wave                |
| 27 | Gauss White Noise Wave           |
| 28 | AM Wave                          |

|       |                       |
|-------|-----------------------|
| 29    | FM Wave               |
| 30    | Linear FM Wave        |
| 31    | Arbitrary Waveform 1  |
| 32    | Arbitrary Waveform 2  |
| ..... |                       |
| 94    | Arbitrary Waveform 64 |

## 2)RMF: Read frequency of main wave

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 main wave

PC sends RMA + 0x0a

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

## 4)RMO: To read the offset of main waveform.

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.

(Calculating method instruction: If the return value is smaller than 10000, deduct 10000 from the return value. When the return value is bigger than 10000, deduct

10000 from the return value.)

5)RMD: To read the duty cycle of main waveform.

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 main waveform.

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 the instrument returns 0, it means the main waveform output is disabled.

If the instrument returns 255, it means the main waveform output is enabled.

8)RSS: To read the pulse period of main wave pulse.

Format as: RSS + 0x0a

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

## 2、Parameter command of subsidiary waveform

To set parameter of subsidiary waveform

(1)WFW: To set the type of subsidiary waveform

Form as : WFW xx+ 0x0a

Above “xx” represents the waveform type by 2 digits. i.e.:

|       |  |
|-------|--|
| WFW00 | Set to be Sine Wave                        |
| WFW01 | Set to be Square Wave                      |
| WFW02 | Set to be Triangle/Ramp Wave               |
| WFW03 | Set to be Rise Sawtooth Wave               |
| WFW04 | Set to be Fall Sawtooth Wave               |
| WFW05 | Set to be Step Triangle Wave               |
| WFW06 | Set to be Positive Step Wave               |
| WFW07 | Set to be Inverse Step Wave                |
| WFW08 | Set to be Positive Exponent Wave           |
| WFW09 | Set to be Inverse Exponent Wave            |
| WFW10 | Set to be Positive Falling Exponent Wave   |
| WFW11 | Set to be Inverse Falling Exponent Wave    |
| WFW12 | Set to be Positive Logarithm Wave          |
| WFW13 | Set to be Inverse Logarithm Wave           |
| WFW14 | Set to be Positive Falling Logarithm Wave  |
| WFW15 | Set to be Inverse Falling Logarithm Wave   |
| WFW16 | Set to be Positive Half Wave               |
| WFW17 | Set to be Negative Half Wave               |
| WFW18 | Set to be Positive Half Wave Rectification |
| WFW19 | Set to be Negative Half Wave Rectification |
| WFW20 | Set to be Lorenz Pulse Wave                |
| WFW21 | Set to be Multitone Wave                   |
| WFW22 | Set to be Random Noise Wave                |

|       |  |
|-------|--|
| WFW23 | Set to be Electrocardiogram (ECG) Wave |
| WFW24 | Set to be Trapezoidal Pulse Wave       |
| WFW25 | Set to be Sinc Pulse Wave              |
| WFW26 | Set to be Narrow Pulse Wave            |
| WFW27 | Set to be Gauss White Noise Wave       |
| WFW28 | Set to be AM Wave                      |
| WFW29 | Set to be FM Wave                      |
| WFW30 | Set to be Linear FM Wave               |
| WFW31 | Set to be Arbitrary Waveform 1         |
| WFW32 | Set to be Arbitrary Waveform 2         |
| WFW33 | Set to be Arbitrary Waveform 3         |
| WFW34 | Set to be Arbitrary Waveform 4         |
| WFW35 | Set to be Arbitrary Waveform 5         |
| WFW36 | Set to be Arbitrary Waveform 6         |
| WFW37 | Set to be Arbitrary Waveform 7         |
| WFW38 | Set to be Arbitrary Waveform 8         |
| WFW39 | Set to be Arbitrary Waveform 9         |
| WFW40 | Set to be Arbitrary Waveform 10        |
| WFW41 | Set to be Arbitrary Waveform 11        |
| WFW42 | Set to be Arbitrary Waveform 12        |
| WFW43 | Set to be Arbitrary Waveform 13        |
| WFW44 | Set to be Arbitrary Waveform 14        |
| WFW45 | Set to be Arbitrary Waveform 15        |

WFW46      Set to be Arbitrary Waveform 16

(2)WFF: To set the Frequency of subsidiary waveform

Form as: WFFxxxxxxxxxxxxxx + 0x0a

Above “xxxxxxxxxxxxxx” shows the frequency value represented by 14 digits.

The unit of frequency is fixed as uHz. For example:

WFF100000000 Means setting the frequency to 100Hz.

WFF000123456 Means setting the frequency to 0.123456Hz

WFF000000001 Means setting the frequency to 1uHz

(3)WFA: To set the Amplitude of subsidiary waveform

Form as: WFAxx.xx+ 0x0a

Above “xx.xx” shows the amplitude value needed. For example:

WFA12.351 means the amplitude is set to 12.351V.

WFA0.352 means the amplitude is set to 0.352V.

(4)WFO: To set the Offset of subsidiary waveform

Form as: WFO xx.xx+ 0x0a

Above “xx.xx” shows the offset value needed. For example:

WFO 2.351 means the offset is set to 2.351V

WFO -2.352 means the offset is set to -2.352V

(5)WFD: To set the Duty Cycle of subsidiary waveform

Form as: WFD<sub>xx.x</sub>+ 0x0a

Above “xx.x” shows the duty cycle value represented by 3 digits. For example:

WFD50.1 means the duty cycle is set to 50.1%.

(6)WFP: To set the Phase of subsidiary waveform

Form as: WFP<sub>xxx</sub>+ 0x0a

Above “xxx” shows the phase value needed. For example:

WFP142.3 means the phase is set to 142.3°.

WFP4.5 means the phase is set to 4.5°.

(8)WFN: To enable/disable subsidiary waveform output.

Form as: WFN<sub>x</sub>+ 0x0a

Above “x” represents the status of enable/disable. For example:

WFN0 means the subsidiary waveform output is disabled.

WFN1 means the subsidiary waveform output is enabled.

Read the information of subsidiary waveform:

(1)RFW: To read the type of subsidiary waveform.

PC sends RFW + 0x0a ,

If the instrument returns “1”, it means the current waveform is Square Wave.

Details as follows:

|   |             |
|---|-------------|
| 0 | Sine Wave   |
| 1 | Square Wave |



|    |                                  |
|----|----------------------------------|
| 2  | Triangle/Ramp Wave               |
| 3  | Rise Sawtooth Wave               |
| 4  | Fall Sawtooth Wave               |
| 5  | Step Triangle Wave               |
| 6  | Positive Step Wave               |
| 7  | Inverse Step Wave                |
| 8  | Positive Exponent Wave           |
| 9  | Inverse Exponent Wave            |
| 10 | Positive Falling Exponent Wave   |
| 11 | Inverse Falling Exponent Wave    |
| 12 | Positive Logarithm Wave          |
| 13 | Inverse Logarithm Wave           |
| 14 | Positive Falling Logarithm Wave  |
| 15 | Inverse Falling Logarithm Wave   |
| 16 | Positive Half Wave               |
| 17 | Negative Half Wave               |
| 18 | Positive Half Wave Rectification |
| 19 | Negative Half Wave Rectification |
| 20 | Lorenz Pulse Wave                |
| 21 | Multitone Wave                   |
| 22 | Random Noise Wave                |
| 23 | Electrocardiogram (ECG) Wave     |
| 24 | Trapezoidal Pulse Wave           |

|    |                        |
|----|------------------------|
| 25 | Sinc Pulse Wave        |
| 26 | Narrow Pulse Wave      |
| 27 | Gauss White Noise Wave |
| 28 | AM Wave                |
| 29 | FM Wave                |
| 30 | Linear FM Wave         |
| 31 | Arbitrary Waveform 1   |
| 32 | Arbitrary Waveform 2   |
| 33 | Arbitrary Waveform 3   |
| 34 | Arbitrary Waveform 4   |
| 35 | Arbitrary Waveform 5   |
| 36 | Arbitrary Waveform 6   |
| 37 | Arbitrary Waveform 7   |
| 38 | Arbitrary Waveform 8   |
| 39 | Arbitrary Waveform 9   |
| 40 | Arbitrary Waveform 10  |
| 41 | Arbitrary Waveform 11  |
| 42 | Arbitrary Waveform 12  |
| 43 | Arbitrary Waveform 13  |
| 44 | Arbitrary Waveform 14  |
| 45 | Arbitrary Waveform 15  |
| 46 | Arbitrary Waveform 16  |

(2)RFF: To read the frequency of subsidiary waveform.

PC sends RFF + 0x0a ,

If the instrument returns “00010000.000000” , it means the current frequency is 10KHz.

The unit of frequency value is Hz which is fixed.

(3)RFA: To read the amplitude of subsidiary waveform.

PC sends RFA + 0x0a ,

If the instrument returns “10000”, it means the current amplitude is 10.000V

(4)RFO: To read the offset of subsidiary waveform.

PC sends RFO + 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.

(Calculating method instruction: If the return value is smaller than 10000, deduct 10000 from the return value. When the return value is bigger than 10000, deduct 10000 from the return value.)

(5)RFD: To read the duty cycle of subsidiary waveform.

PC sends RFD + 0x0a ,

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

(6)RFP: To read the phase of subsidiary waveform

PC sends RFP + 0x0a ,

If the instrument returns 1289, it means the current phase is 128.9°.

(8)RFN: To read the subsidiary 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 and Trigger

(1) WPM: To set the Trigger Mode of main waveform

Form as: WPMx+ 0x0a

Above “x” presents the trigger mode needed. For example:

WPM0 means trigger is disabled.

WPM1 means the main waveform is triggered by subsidiary (CH2) waveform.

WPM2 means the main waveform is triggered by external signal inputted from Ext.In connector.

WPM3 means the main waveform is triggered manually. The main waveform is triggered one time each time the command is sent.

(2) WPN: To set the pulse numbers of main waveform when triggered.

Form as: WPNxxxxxxx+ 0x0a

Above “xxxxxxx” shows the pulse numbers and can be set from 1 to 1048575. For example:

WPN10 means the main channel will output waveform with 10 cycles when triggered.

### (3) WTA: Set ASK modulation mode of main wave

Form as: WTA x+ 0x0a

Above “x” shows the trigger mode needed. For example:

WPM0 means normal output without trigger.

WPM1 means modulation mode of external signal input.

WPM2 means manual modulation mode

### (4) WTF: Set FSK modulation mode of main wave

Form as: WTF x+ 0x0a

Above “x” shows the trigger mode needed. For example:

WTF0 means normal output without trigger.

WTF1 means modulation mode of external signal input.

WTF2 means manual modulation mode

### (5) WFK: Set secondary frequency of main wave FSK

Form as: WFK xxxxxxx.x+ 0x0a

Above “xxxxxxx.x” shows secondary frequency needed. For example:

WFK123.4 means the secondary frequency for FSK modulation is

123.4Hz.

(6) WTP: Set PSK modulation of main wave.

From as: WTP x+ 0x0a

Above “x” shows the trigger mode needed. For example:

WTP0 means normal output without trigger.

WTP1 means modulation mode of external signal input.

WTP2 means manual modulation mode

(7) RPM: Read trigger mode of main wave.

PC sends RPM + 0x0a ,

If the machine returns 0000000002 , it means the current trigger mode is by external signa.

Details as below :

- 0 No trigger
- 1 Triggered by subsidiary wave.
- 2 Triggered by external signal and signals input from Ext. terminal.
- 3 Triggered by manual. Triggered one time by the command

(8) RPN: Read pulse No. triggered of main wave.

PC sends RPN + 0x0a ,

If the machine returns 0000000068, it means the pulse No. is 68.

**(9) RTA: Read ASK mode**

PC sends RTA + 0x0a ,

If the machine returns 0000000002 , it means the current modulation mode is manual.

Details as :

- 0 No trigger
- 1 Modulation mode of external signal.
- 2 Manual modulation mode

**(10) RTF: Read FSK mode**

PC sends RTF+ 0x0a ,

If the machine returns 0000000002 , it means the current modulation mode is manual.

Details as:

- 0 No trigger
- 1 Modulation mode of external signal.
- 2 Manual modulation mode

**(11) RFK: Read FSK secondary frequency.**

PC sends RFK + 0x0a ,

If the machine returns 0000002345 , it means the current secondary frequency is 234.5Hz.

**(12) RTP: Read PSK mode**

PC sends RTP + 0x0a ,

If the machine returns 0000000002 , it means the current modulation mode is manual.

Details as:

- 0 No trigger
- 1 Modulation mode of external signal.
- 2 Manual modulation mode

#### 4、Measurement command

##### (1)RCF: Read frequency of 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.

Form as: WCZ<sub>x</sub>+ 0x0a

Above “x” means the object of reset. For example:



WCZ0 means reset the counter.

(4)WCP: Pause the measurement.

Form as: WCP<sub>x</sub>+ 0x0a

Above “x” means the object of pause. 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 counting period is 60668ns.

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

PC sends RC+ + 0x0a ,

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

(7)RC-: Read width of positive pulse of external measurement.

PC sends RC- + 0x0a ,

If the machine 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.**

Form as: WCG x+ 0x0a

Above “x” means the gate time needed. 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 100s.

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

Form as: WCC x+ 0x0a

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

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

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

## 5、Sweep command

### (1)SOB: Set the object of sweep.

Form as: SOB<sub>x</sub>+ 0x0a

Above “x” is the object needed of sweep. 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: SSTxxxxxx.x+ 0x0a

For example:

SST1000.0 means the start frequency is 1000.0Hz

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

Form as: 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.

Form as: SSTxx.xxx+ 0x0a

For example:

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

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

Form as: SST<sub>xx.x</sub>+ 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.

Form as: SEN<sub>xxxxxxx.x</sub>+ 0x0a

For example:

SEN1000.0 means the end frequency is 1000.0Hz.

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

Form as: SEN<sub>xx.xxx</sub>+ 0x0a

For example:

SEN10.000 means the end amplitude is 10.000V.

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

Form as: SEN<sub>xx.xxx</sub>+ 0x0a

For example

SEN-6.000 means the end offset is -6.000V

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

Form as: SEN<sub>xx.x</sub>+ 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

Form as: 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

Form as: 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.

Form as: SBE<sub>x</sub>+ 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.

Form as: SXY x+ 0x0a

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

SXY0 means the control source is time.

SXY1 means the control source is analog signal input from VCO IN terminal.

## 5、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.

Form as: USN<sub>xx</sub>+ 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.

Form as: ULN<sub>xx</sub>+ 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.

Form as: USA<sub>x</sub>+ 0x0a

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

USA0 means set the waveform of second channel synchronized with first channel.

USA1 means set the frequency of second channel synchronized with first channel.

USA2 means set the Amplitude of second channel synchronized with first channel.

USA3 means set the offset of second channel synchronized with first channel.

USA4 means set the duty cycle of second channel synchronized with first channel.

Note: Synchronization function is not available in sweep status.

### (4)USD: Cancel synchronization mode

Form as: USD<sub>x</sub>+ 0x0a

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

USD0 means cancel the waveform of second channel synchronized with first channel.

USD1 means cancel the frequency of second channel synchronized with first channel.

USD2 means cancel the amplitude of second channel synchronized with first

channel.

USD3 means cancel the offset of second channel synchronized with first channel.

USD4 means cancel the duty cycle of second channel synchronized with first channel.

#### (5)RSA: Read synchronization information.

Form as: RSA<sub>x</sub>+ 0x0a

Above “x” means the synchronization object needs to read.

RSA0 means read the waveform synchronization information.

RSA1 means read the frequency synchronization information.

RSA2 means read the amplitude synchronization information.

RSA3 means read the offset synchronization information.

RSA4 means read the duty synchronization information.

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.

#### (5)UBZ: Set the buzzer on/off

Form as: UBZ<sub>x</sub>+ 0x0a

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



UBZ0 means turn off the buzzer.

UBZ1 means turn on the buzzer.

(5)RBZ: Read the buzzer on/off status.

Form as: 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.

(6) UMS: To set the uplink mode.

Form as: UMS<sub>x</sub>+ 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.

(6) RMS: To read the uplink mode.

Form as: 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.

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

Form as: UML<sub>x</sub>+ 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.

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

Form as: RUL+ 0x0a

For example: 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.

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

PC sends UID + 0x0a ,

The instrument returns its ID number.

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

PC sends UMO + 0x0a ,

The instrument returns its model.

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

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