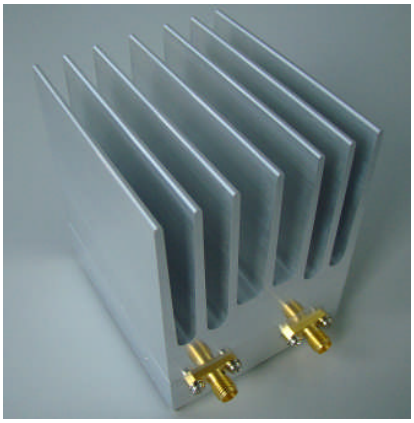
User's Manual

Frequency Synthesizer

DPL-18GF

DPL-18GFH(with Heat Sink)



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Contents

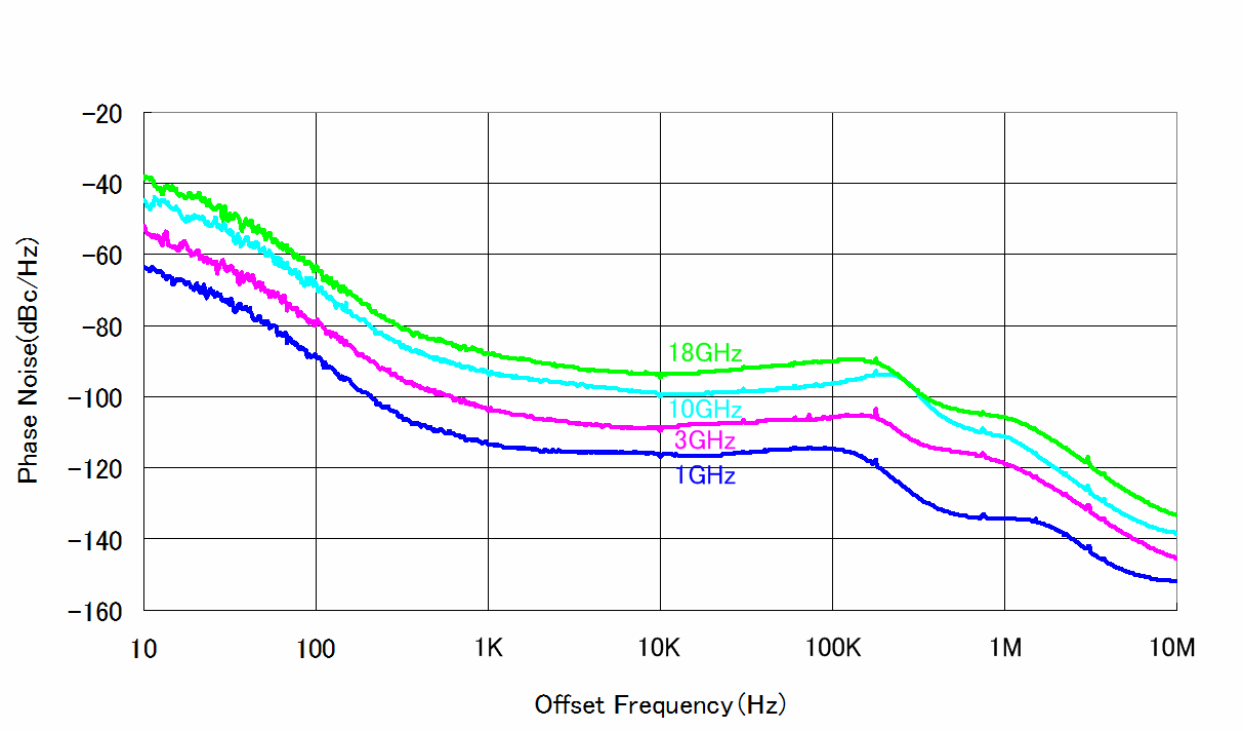
1. General Description

DPL-18GF/GFH is a frequency synthesizer which can generate any frequency from 1GHz to 18GHz in 10KHz step. It can be used as a clock source or local oscillator for communication and test/measurement equipment because of its excellent phase noise and compact size. The frequency is set not only with asynchronous serial data but by SPI serial data. Once the frequency is successfully set, it is automatically memorized into EEPROM. So the next time it is powered, the last entered frequency is retrieved.

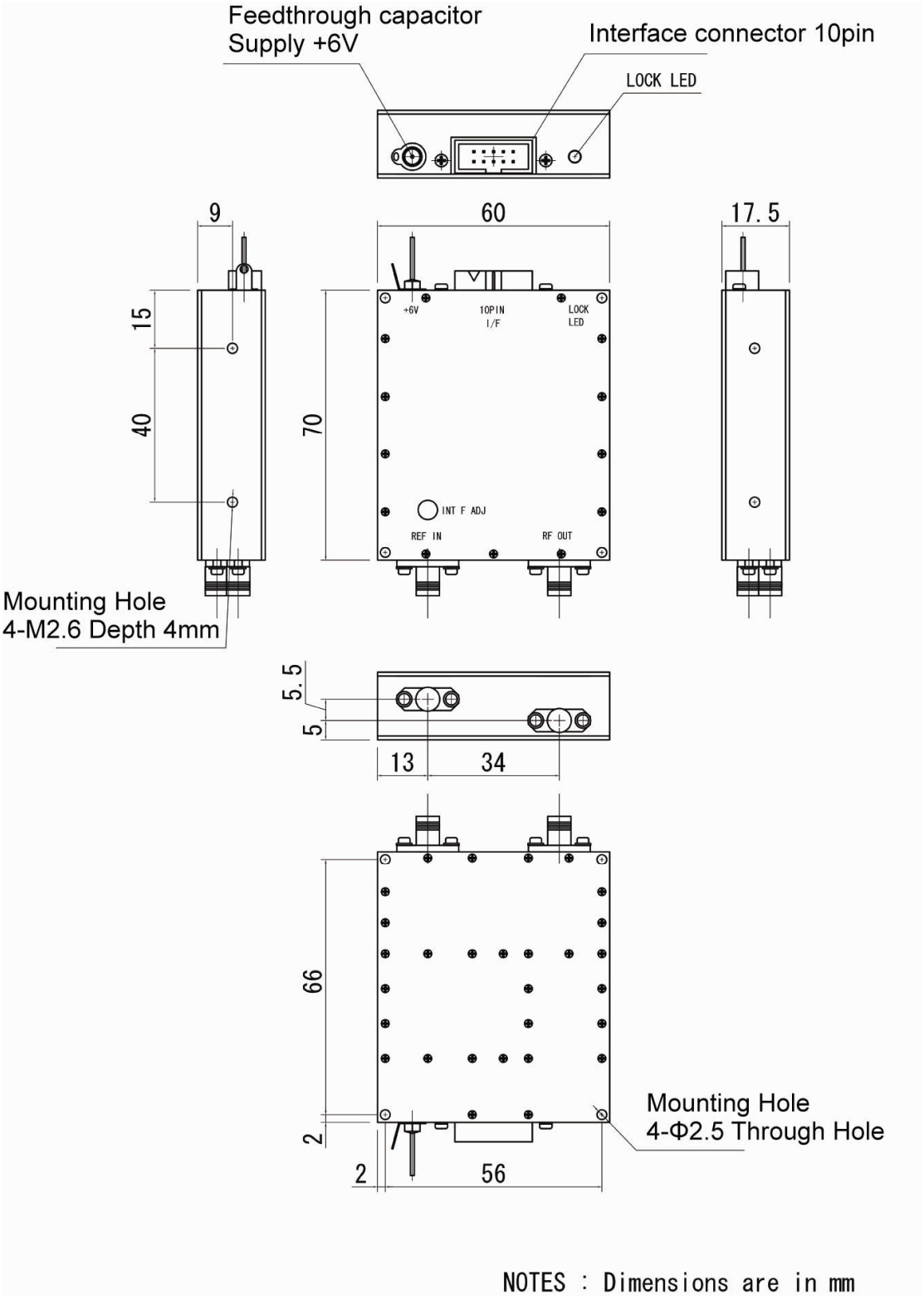
2. Electrical Specification

Power Supply／Current	＋6V+/-5%、<2A
Frequency Range	1GHz - 18GHz
Frequency Resolution	10kHz step
Output level	>＋10dBm
Output Impedance	50 ohm
Spurious	<－60dBc
Harmonics	<－8dBc
Phase Noise 10GHz（typical）	－72dBc／Hz @100Hz －93dBc／Hz @1kHz －97dBc／Hz @10kHz －94dBc／Hz @100kHz －113dBc／Hz @1MHz
Internal Ref Clock Accuracy	<+/-2ppm 0 – 50 degree C
External Ref Clock and Level	10MHz -6dBm - +6dBm
Lock Time	max 10msec
Operating temperature Range	0 - ＋50 degree C （In case of being installed with thermal resistance 6.5(degree C/W) heat sink）
Outer Dimensions	60mm×70mm×17.5mm 60mm X 70mm X77.5mm(with Heat Sink)
Interface	(1) Asynchronous Serial Communication 9600bps、8 bits、1 stop bit、non-parity 3.3V CMOS level (2)SPI serial communication 3.3V CMOS level

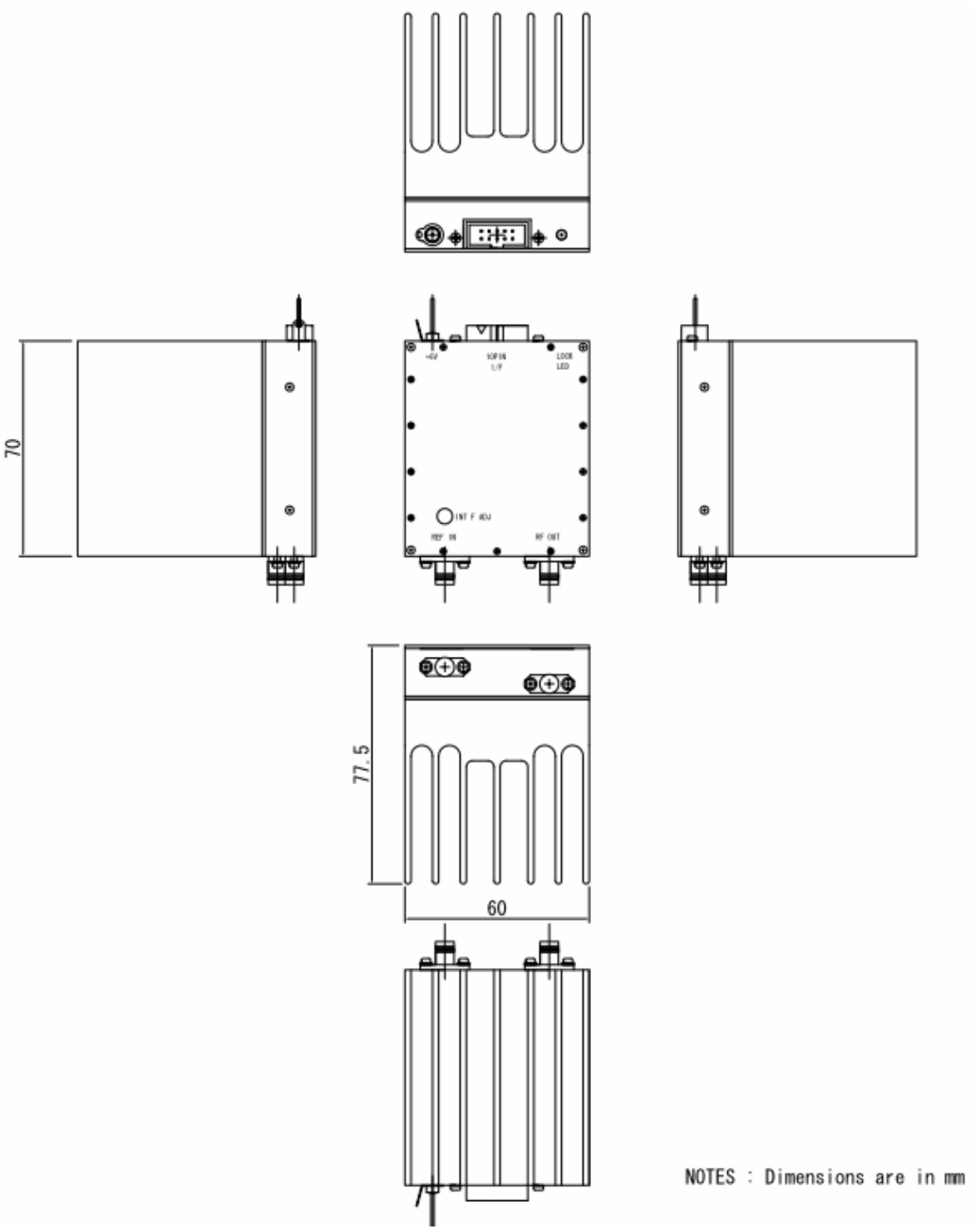
3. Phase Noise



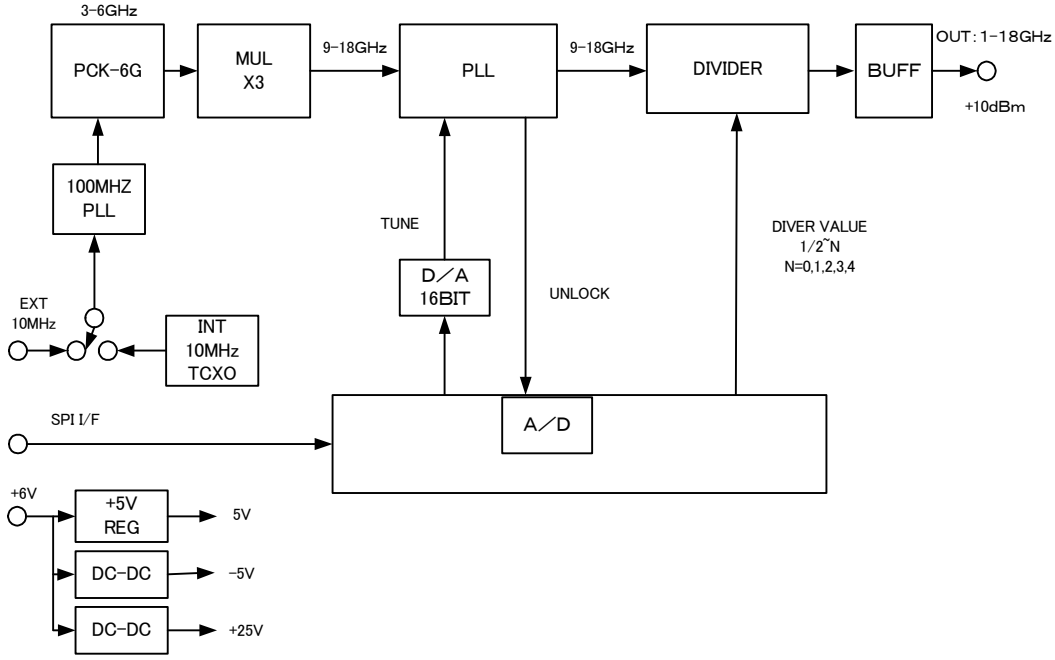
4. Outer Dimensions
(1)DPL-18GF



(2)DPL-18GFH



5. Circuit Configuration



6. Connector, Interface

(1) External 10MHz input	SMA－J	50 ohm
(2) Output Connector	SMA－J	50 ohm
(3) Power Supply Pin	Feedthrough capacior	Supply +6V
(4) I／F Connector	2.54mm 5x2 10 pin	
	Connector for flat Cable	
	Part No. : HIROSE HIF3FC－10PA－2.54DSA	

Pin Assignment

Pin No.	Name	Description
1	GND	Signal GND
2	GND	Signal GND
3	NC	None
4	INT/EXT	Mode selection pin external or internal Ref clock High: Internal Low: External Internally pulled up
5	LOCK	PLL lock status output High: lock Low: unlock 3.3V CMOS
6	/CS	Chip select under SPI mode Input low active 3.3V CMOS Internally pulled up
7	RXD	Asynchronous serial RX data 3.3V CMOS Internally pulled up
8	SDI	Serial data input under SPI mode 3.3V CMOS
9	TXD	Asynchronous serial TX data 3.3V CMOS
10	CLK	Serial input under SPI mode 3.3V CMOS

7. Thermal Consideration

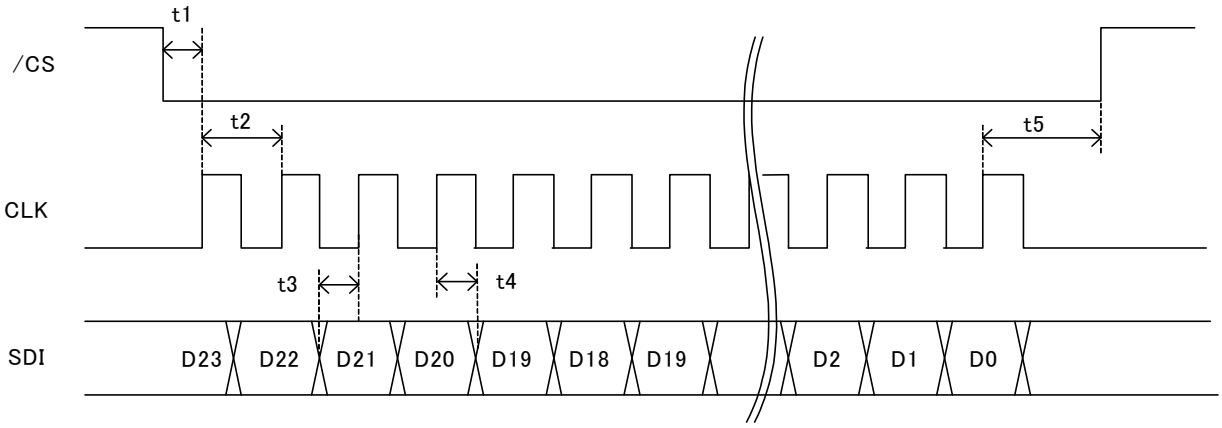
Mount this module on chassis firmly in order to flow heat as power dissipation of this module is about 3 watts. Or installing heat sink of heat resistance less than 6.5(degree C/W) is recommended. Refer to Page 3 Outer dimensions about mounting holes. It will be more effective if silicon compound is put on the surface of the mounting section of the module.

8. Control by SPI serial data

（1）SPI specification

Max. clock speed	500KHz
Data bits width	24bits (22bits frequency data bits, 2bits reserved)
Logic level	3.3V CMOS

（2）Timing characteristic



Timing characteristic

Parameter	Condition	Min.	Unit
t1	CLK setup time to /CS	50	ns
t2	CLK period	2	us
t3	SDI setup time to CLK rise edge	100	ns
t4	SDI hold time to CLK rise edge	100	ns
t5	/CS setup time to CLK rise edge	50	ns

（3） Command definitions

24 bits frequency data is transferred by serial data.
Actual frequency data bits are 22 bits among 24 bits, the remaining 2 bits are not used. Bit definition is as follows.

Bits	Name	Width	Description
bit[23:22]	Reserved	2 bits	Not used, do not care
bit[21:0]	Frequency	22 bits	Frequency data in 10KHz resolution in binary

For example, if you set 18GHz, the frequency data of 10KHz unit must be converted to binary data. 18GHz is converted to 1B7740（hex） in 22 bits binary data.

** Please note that even if the frequency of beyond 1GHz to 18GHz was set, the quality of the signal would not be guaranteed.

9. Control by Asynchronous serial data

How to set from a PC serial port(RS-232C) is explained below.

9-1. Communication specification

Speed	9600bps
Data bits	8 bits
Stop bits	1 bit
Parity	None
Flow control	None
Logic level	3.3V CMOS level

9-2. RS-232C connection

The logic level of DPL-18GF serial communication is 3.3V CMOS, which cannot be directly connected to RS-232C level like PC serial port. Level converter (LVC-232C) between RS-232C and 3.3V CMOS is needed. LVC-232C is available from our products line-up. Refer to our Web site.

http://www.dst.co.jp/en/manuals/lvc232c.pdf

9-3. Command definitions

Character strings marked as double quotation marks “” means ASCII code, and CR and LF, which are control codes, means 0D(hex) and 0A(hex). If any invalid command is entered, “INVALID DATA”CR LR”*” is returned. All characters used for input should be uppercase. If a normal command is entered, “*” is returned. Also, the entered data is echoed back.

9-3-1. Frequency setting command

For frequency setting, input can be made in GHz, MHz and KHz unit.

(1) Setting in GHz

For setting 18GHz, input the following data.

“18G”CR

In this case, all the data below 100MHz is set to “0”.

(2) Setting in MHz

For setting 2400MHz, input the following data.

“2400M”CR

In this case, all the data below 100KHz is set to “0”.

(3) Setting in KHz

For setting 2400020KHz, input the following data.

“2400020K”CR

or

“240002”CR

** Please note that even if the frequency of beyond 1GHz to 18GHz was set, the quality of the signal would not be guaranteed.

9-3-2. READ command

By entering “READ”CR, the currently set frequency is output,

The response is as shown below.

“ffffffffKHz”CR LF

"fffffff" is the frequency of correctly outputting in KHz unit.

9-3-3. SAVE command

By entering "SAVE"CR, the current frequency can be memorized into EEPROM. When it is powered next time, the stored data can be output.

10. Shipping inspection

100% inspection shall be performed for the electrical specification in 2-1.

11. Warranty

If any defect is found due to the manufacturer's improper production or design within one year after delivery, repair or replacement shall be performed under the manufacturer's responsibility. DS Technology, Inc. assumes no liability for damages that may occur as a result of handling by users even though the warranty period.

12. Others

11-1. This product, which employs a CMOS device may be easily damaged by static electricity. DS Technology, Inc. assumes no liability for damages that may occur as the result of handling by users even though the above warranty period.

11-2. Do not supply over voltage power supply, module may be damaged. DS Technology, Inc assumes no liability for damages that may occur as the result of handling by users even though the above warranty period.