

Customer Code:

DATASHEET

DAPU P/N: **CM66K-D129-10.00MHz-GB**

Customer P/N: _____

DAPU			Customer Approval
Drew	Audited	Approved	Stamp, please! Thanks!
Date: 2024.10.23			

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1. General Description

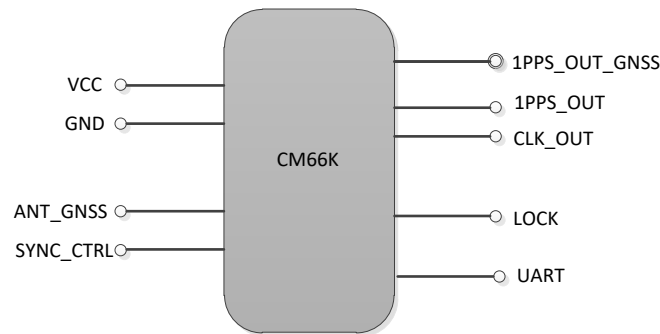


Figure 1 CM66K

Figure 1 is the basic diagram of CM66K. CM66K is a high-performance clock module designed to provide precise frequency and phase synchronizing with internal time reference for telecom and other applications.

Key features:

- **Reference:** GNSS receiver
- **Temperature Stability:** $\pm 0.2\text{ppb}$;
- **Holdover:** $\pm 1.0\mu\text{s}/12\text{h}$ @ $\Delta T = \pm 5^\circ\text{C}$;
- **Clocks Output:** 2*1PPS output and 1*10MHz output;
- **Serial Interface:** 1*UART for TOD and management;
- **Mechanical Size:** 60mm*60mm*13mm.



2. Pin Definition

Table 1 Pin Definition

Pin group	Pin#	Pin Name	Type	Description
Supply Voltage	4, 9, 11, 13	GND	GND	Ground
	12	VCC	PWR	Power Supply
Control and Status Pins	8	SYNC_CT RL	I	Synchronizing Procedure Control
	5	LOCK	O	Lock Status
UART	6	RXD0	I	Asynchronous Serial Data Output/Input. 9600-N-8-1
	7	TXD0	O	
GNSS	10	1PPS_OUT	O	1PPSOutput from the internal GNSS receiver.
	SMA-KE	ANT	I	GNSS ANT signal input
Output Clocks	3	1PPS_OUT	O	1PPSOutput
	2	CLK_OUT	O	10.00MHz Output
Reserve	1, 14	NC		Not connected.

3. Electrical Parameters

Table 2 Electrical Parameters

Parameter	Symbol	Minimum	Typical	Maximum	Units
LVC MOS Input					
High Level Input Voltage	V _{IH}	2.7			V
Low Level Input Voltage	V _{IL}			0.4	V
LVC MOS Output					
High Level Output Voltage	V _{OH}	2.7			V
Low Level Output Voltage	V _{OL}			0.4	V



4. Performance

Table 3 Performance

Item	Parameter	Minimum	Typical	Maximum	Units	Test Condition
Internal Receiver Characteristics	Number of Channels			50		
	Frequency Band	BD2 B1/ GPS L1/ Galileo E1/ GLONASS L1				The module can be configured to Beidou/GPS/GLONASS/Galileo mode through commands, default Beidou+GPS.
	Tracking Code					C/A Code
	Tracking Capability			12		12 Satellites
	Sensitivity			-159		dBm
			-144		dBm	Acquisition
Clock Output	Nominal Frequency	10.00			MHz	Synchronizing with GNSS1PPS output.
	Duty Cycle	45	50	55	%	Load 15pF
	Frequency vs. Temperature	-0.2		+0.2	$\times 10^{-9}$	V _{cc} =5.0V; O _{load} =15pF; T _A varies from -40°C to 85°C, temperature slope less than °C per minute.
	Accuracy	-1		+1	$\times 10^{-12}$	24 hours average value when locked to 1PPS.
	Short-term Stability	-0.02		+0.02	$\times 10^{-9}$	V _{cc} =5.0V; T _A =25°C; 1s; no EMI\EMC or other interference.
	Daily Aging	-0.2		+0.2	$\times 10^{-9}$	V _{cc} =5.0V; T _A =25°C. FREE RUN condition and after 30 days of operation.
	Yearly Aging	-0.01		+0.01	$\times 10^{-6}$	
	Phase Noise			-118	-113	dBc/Hz
			-138	-133	100Hz	
			-148	-143	1KHz	
			-150	-145	10KHz	



			-150	-145		100KHz
			-150	-150		1MHz
1 PPS Output	Pulse Width		100		ms	
	Accuracy	-20		+20	ns	Synchronizing with 1PPS reference. Mean is 0, and standard deviation is 20ns. After locking, monitor 24 hours.
	12 hours holdover	-1.0		+1.0	μs	Δ T=±5℃, 12 hours holdover after turn on 7days and GPS lock 3days. Temperature variable speed less than 1℃ per minute
Supply Voltage	Supply Voltage	4.75	5.0	5.25	V	
	Warm Up Current			2000	mA	During Warm-up
	Steady Current			1000	mA	During steady state operation @25℃
	AC Ripple			50	mVpk-pk	10Hz to 1MHz

5. UART

UART interfaces are used for management and TOD, which has a fixed baud rate (9600) using 1 stop bit and no parity. It is a LVTTTL-compatible port and needs an external translator to work with other signal types (such as RS-232C or RS-485).

TOD default output GGA+RMC+PDP statements, GGA and RMC statements following NMEA standards. PDP statement following DAPU enterprise standards. PDP can output Satellite positioning mode and other information;

for example:

\$PDP, 06, 0, F, 1, (BEIDOU Satellite positioning mode)

\$PDP, 07, 0, F, 1, (GLONASS Satellite positioning mode)

And others positioning mode:

00: GPS; 01: GPS+BEIDOU; 02: Galileo; 03: GALILEO+GPS; 04: GLONASS+GPS+QZSS; 06:BEIDOU; 07:GLONASS
08: GLONASS+GPS



6. Control and Status Pins

CM66K is a clock module which synchronizes the local clock to reference such as 1 PPS retrieving from GNSS. CM66K will work normally performing synchronizing algorithm when the SYNC_CTRL pin is driven high. It also could be force to work in free-run or holdover status when the SYNC_CTRL pin is driven low.

The LOCK pin indicates the lock status of CM66K. High level indicates the module is locked to GNSS reference. When the module never is locked to reference after power up, the status of module is free-run, the LOCK pin outputs low. When the GNSS signal is lost, the status of module is holdover, the LOCK pin also output low.

串口指令（9600 波特率）

序号	串口指令	版本	说明
采用 HEX 格式测试发送。24 表示 16 进制 0x24 占用 1 个字节。			
1	24 50 AA 00 5A 00 07		配置为单 GPS 模式
2	24 50 AA 00 5A 01 07		配置为 GPS+北斗模式
3	24 50 AA 00 5A 02 07		配置为单 Galileo 模式
4	24 50 AA 00 5A 03 07		配置为 GPS+ Galileo 模式
5	24 50 AA 00 5A 04 07		恢复接收机出厂模式
6	24 50 AA 00 5A 06 07		配置为单北斗模式
7	24 50 AA 00 5A 07 07		配置为 GLONASS 模式
8	24 50 AA 00 5A 08 07		配置为 GLONASS+GPS 模式
9	24 50 AA XX 5A 01 14		输出大普消息(XX: 00 表示锁定内部接收机的, 01 表示锁定外部 PPS), 掉电保存
10	24 50 AA XX 5A 03 14		输出 NMEA 消息, 掉电保存; XX 字段同上。
11	24 50 AA XX 5A 04 14		输出 NMEA+PDP 消息, 掉电保存; XX 字段同上。
12	24 50 AA 00 5A XX 03		XX : 00 暂停输出; XX: 01 输出 PDP; XX: 03 输出 NMEA, XX: 04 输出 NMEA+PDP,掉电不保存。
13	24 50 AA XX 5A YY D7		配置 NMEA 输出字段: XX: 00:GGA,01:GLL,02:GSA,03:GSV, 04:RMC, 05:VTG, 08: ZDA, A0: ANTSTAT(天线检测语句) YY: 00: close , 01:open



7. Environmental Conditions

Table 4 Environmental Conditions

Parameter	Conditions	
Operating Temperature	-40°C to 85°C	
Storage Temperature	-55°C to 105°C	
Storage Humidity	30%~80%	
ESD Level	Human Body Model, class2: 2000V to 4000V; ANSI/ESDA/JEDEC JS-001-2010.	
	Machine Model, class B: 200V to 400V; JEDEC JESD22-A115C.	
Moisture Sensitivity Level	Not Humidity Sensitive.	
Vibration	Test Condition: 0.75mm ;acceleration:10g;10Hz~500Hz, one cycle per 30 min, test 2 hour. (3 times for each 3 directions X ,Y , Z), IEC 68-2-06 Test Fc.	
Shock	50g; 11ms; half sine wave (3 times for each 3 directions X,Y,Z),IEC 68-2-27 Test Ea/Severity 50A.	
Relative Humidity	20%~70%	Full Package Storage
Temperature	-10°C~35°C	

8. Typical Application

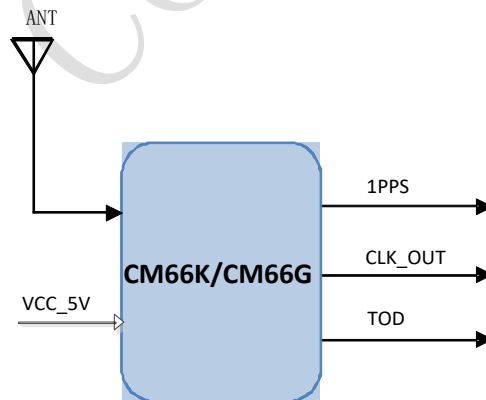


Figure 2 Typical application

GNSS Receiver is embedded in CM66K.



9. Mechanical Structure (mm)

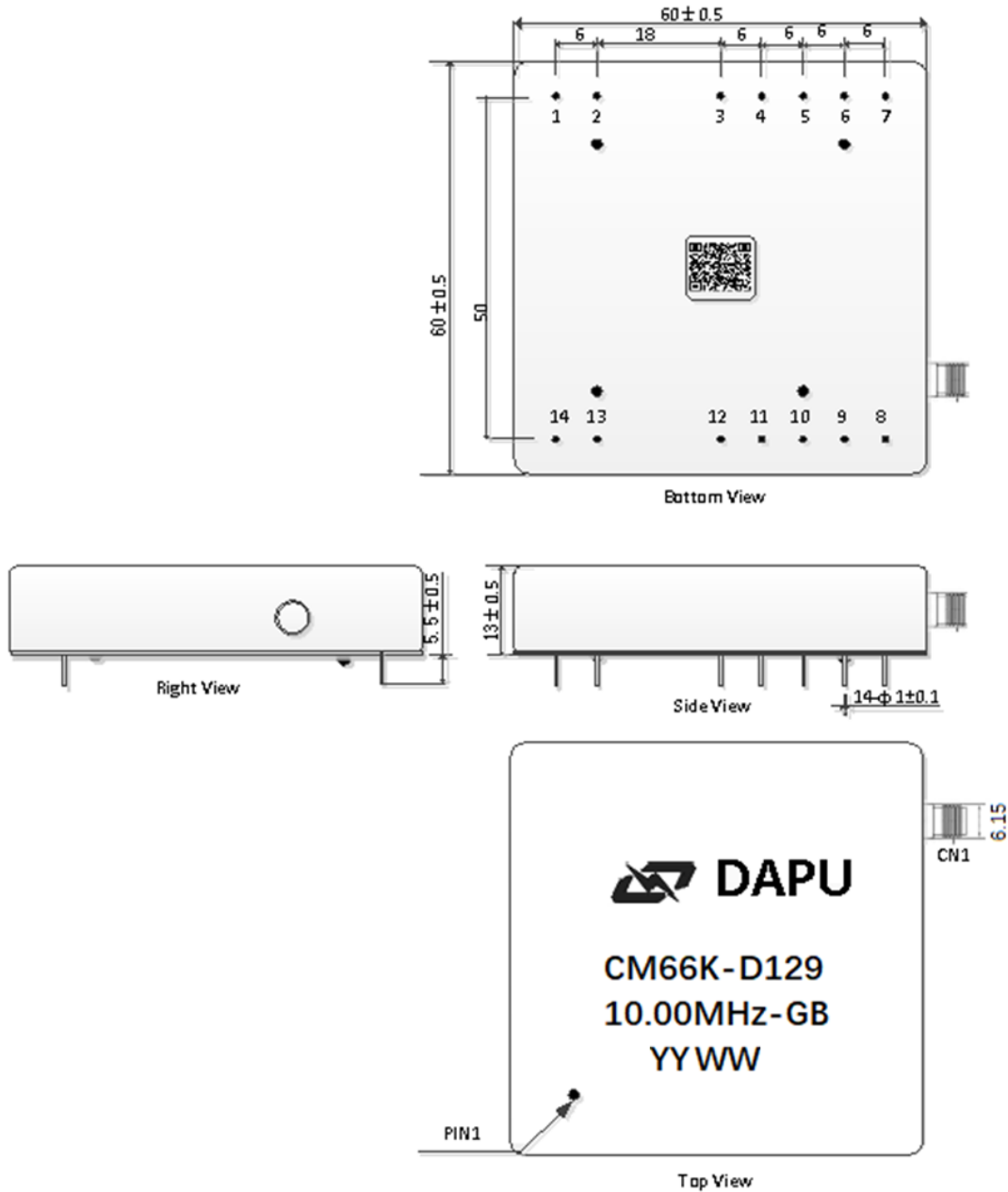


Figure 3 Mechanical structure

Note1: Tolerance±0.2mm without mark.

Note2: YY represents Year.

WW represents Week.

Note3: Referential Weight 82±10g



10. Wave Soldering Curve(RoHS)

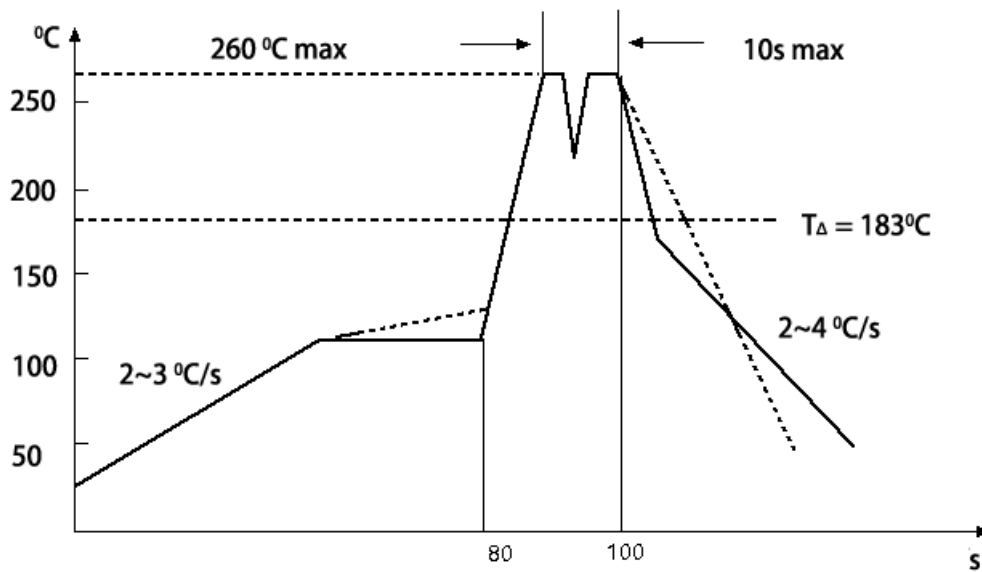


Figure 4 Wave soldering curve

11. Package (mm)

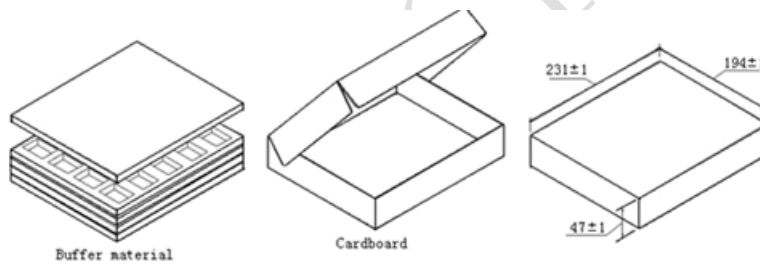


Figure 5 Package