Customer Code:

DATASHEET

DAPU   P/N: **CM22B-G328-10.00MHz-F**

Customer P/N:

DAPU			Customer Approval
Drew	Audited	Approved	
Date: 2024.12.23			Stamp, please! Thanks!

Guangdong Dapu Telecom TechnologyCo.,Ltd

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Table of Amendment

Version	Revision contents	Prepared by	Revised date
1.0	The first issued	Amway	2024.12.23

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1. General Description
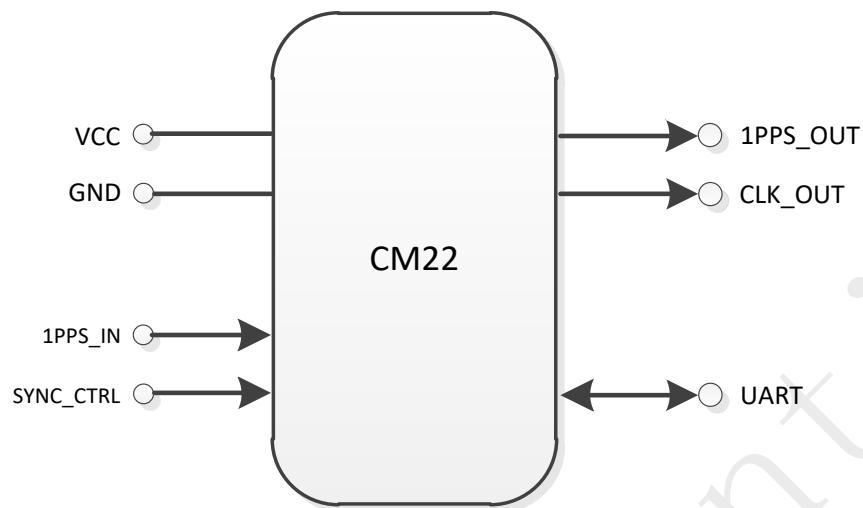
Figure 1 CM22

Figure 1 is the basic diagram of CM22. CM22 is a high-performance clock module designed to provide precise frequency and phase synchronizing with external time reference for telecom and other applications.

Key features:

➢ **Reference:** 1PPS and TOD from GNSS receiver, IEEE1588 etc.;
➢ **Temperature Stability:** ±0.3ppb;
➢ **Holdover:** ±1μs/1hour @△T=±5℃ after power up 0.5 hour, and lock 1 hours;
➢ **Clocks Input and Output:**1*1PPS input, 1*1PPS output and 1*10MHz output;
➢ **Serial Interface:**1*UART for management and ToD information;
➢ **Mechanical Size:** 20.2mm*20.2mm*13.0mm.

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2. Pin Definition

Table 1 Pin Definition

Pin group	Pin#	Pin Name	Type	Description
Supply Voltage	2	VCC	PWR	Power Supply
	3	GND	GND	Ground
Control and Status Pins	1	SYNC_CTRL	I	Synchronizing Procedure Control
UART	5	RXD	I	Asynchronous Serial Data Output/Input
	6	TXD	O	
Input Clock	4	1PPS_IN	I	1PPS Reference Input.
Output Clocks	7	1PPS_OUT	O	1PPSOutput
	8	CLK_OUT	O	10.00MHz Output

3. Electrical Parameters

Table 2 Electrical Parameters

Parameter	Symbol	Minimum	Typical	Maximum	Units
LVCMOS Input					
High Level Input Voltage	V_{IH}	2.0			V
Low Level Input Voltage	V_{IL}			0.8	V
LVCMOS Output					
High Level Output Voltage	V_{OH}	2.4			V
Low Level Output Voltage	V_{OL}			0.4	V

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4. Performance

Table 3 Performance

Item	Parameter	Minimum	Typical	Maximum	Units	Test Condition
Clock Output	Waveform		LVCMOS			
	Nominal Frequency		10.00		MHz	Synchronizing with 1PPS reference.
	Duty Cycle	45	50	55	%	Load 15pF
	Frequency vs. Temperature	-0.3		+0.3	$\times10^{-9}$	Vcc=3.3V; O_{load}=15pF;T_A varies from-40℃ to 85℃, temperature slope less than 2℃ per minute.
	Accuracy	-5		+5	$\times10^{-12}$	24 hours average value when locked to 1PPS.
	Short-term Stability	-0.01		+0.01	$\times10^{-9}$	Vcc=3.3V;T_A=25℃; 1s;no EMI\EMC or other interference.
	Daily Aging	-0.5		+0.5	$\times10^{-9}$	Vcc=3.3V;T_A=25°C.
	Yearly Aging	-0.03		+0.03	$\times10^{-6}$	
	Phase Noise		-110	-100	dBc/Hz	10Hz
			-143	-138		100Hz
			-155	-150		1KHz
			-155	-150		10KHz
			-155	-150		100KHz
			-160	-155		1MHz
1 PPS Intput	Waveform		LVCMOS			
	Pulse Width	0.001	100	500	ms	
1 PPS Output	Waveform		LVCMOS			
	Pulse Width		100		ms	
	Accuracy	-50		+50	ns	Synchronizing with 1PPS reference.
	1 hour holdover	-1		+1	μs	△T=±5℃,1 hour holdover after power up 0.5 hour, and lock 1hours; temperature slope less than 2℃ per minute.
Supply Voltage	Supply Voltage	3.135	3.3	3.465	V	

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Warm Up Current			750	mA	
Steady Current			350	mA	@25℃
AC Ripple			50	mVpk-pk	10Hz to 1MHz

5. UART

UART interface is used for management, which has a fixed baud rate (115200) using 1 stop bit and no parity. It is a LVTTL-compatible port and needs an external translator to work with other signal types (such as RS-232C or RS-485).

a）TOD input sentence format

$GPZDA, <1>,<2>,<3>,<4>,<5>,<6>*HH<CR><LF>

Parameter Number	Parameter Name	Format	Description
<1>	UTC time	hhmmss.ss	Hour,minute,second,9 characters
<2>	day	dd	Range: 01~31, 2 characters
<3>	month	mm	Range: 01~12, 2 characters
<4>	year	yyyy	4 characters
<5>	NA	00	Filled with 00
<6>	NA	00	Filled with 00
Note：All sentences begin with "$"，end with<CR><LF> 　　　* HH represents the bitwise XOR result of all characters between "$" and "*" 　　　<CR><LF>: Carriage Return and Line Feed. 　　　Example：$GPZDA,010516.00,26,11,2008,00,00*6B			

a) b）TOD output sentence format

$DPZDA, <1>,<2>,<3>,<4>,<5>,<6>,<7>,<8>,<9>,<10>,<11>,<12>,<13>,<14>*HH<CR><LF>

Parameter Number	Parameter Name	Format	Description
<1>	UTCtime	hhmmss	Hour,minute,second, 6 characters
<2>	Day	dd	Range: 01~31, 2 characters
<3>	Month	mm	Range: 01~12, 2 characters
<4>	Year	yyyy	4 characters
<5>	System state	xx	00-Freerun，01-fast track，10-lock，11-holdover
<6>	Lock indicator	x	0-unlock，1-locked
<7>	temperature	xxx	Unit：0.1℃。e.g.234means23.4℃
<8>	Input identifier	x	1-1PPS Input，0-no1PPS Input.
<9>	GPZDA input identifier	x	1 means GPZDA Input，0 means no GPZDA Input.
<10>	reserve	0	--
<11>	T1	xxxxx	Test parameter1: range

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			+8192~-8192, 5 parameters
<12>	T2	xxxxxxxxxx	Test parameter2: range 65535.0000~00000.0000, 10 parameters
<13>	T3	xxxxxxxxxx	Test parameter3: 10 parameters
<14>	reserve	xxxxxxx	7 characters
Note：All sentences begin with "＄", end with<CR><LF>			
* HH represents the bitwise XOR result of all characters between "＄" and "＊"			
<CR><LF>: Carriage Return and Line Feed.			
Example：			
$DPZDA,010517,26,11,2008,10,1,315,1,1,0,-0000,31945.0000,-0000.1146,0000000*78			

Control Pins

CM22 is a clock module which synchronizes the local clock to reference such as 1 PPS retrieving from GPS. CM22 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.
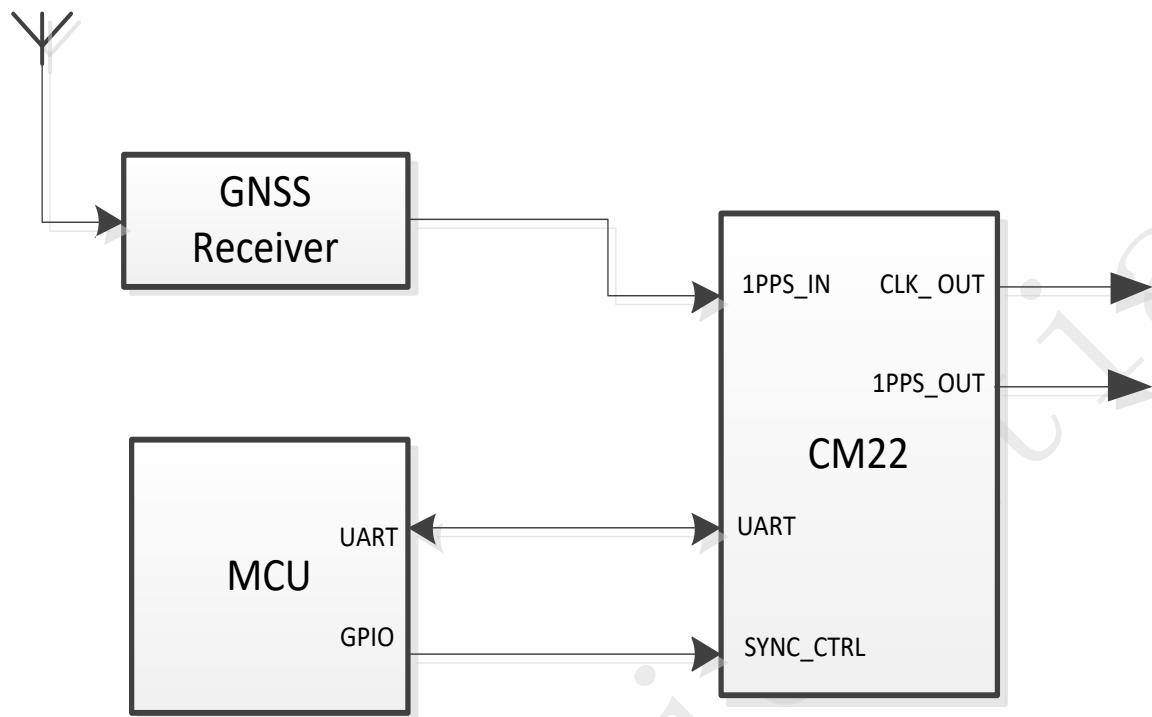
6. Environmental Conditions

Table 5 Environmental Conditions

| Parameter	Conditions	
Operating Temperature	-40℃ to 85℃	
Storage Temperature	-55℃ to 105℃	
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	

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7. Typical Application
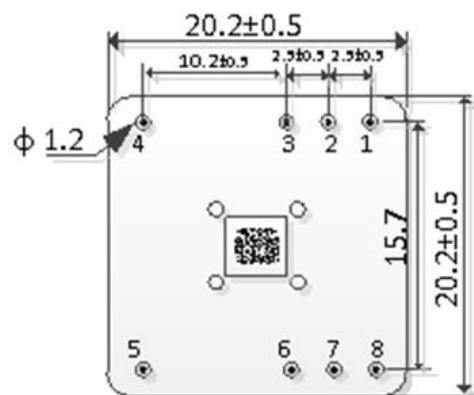
GNSS Receive offers 1PPS signal to CM22.
The MCU monitors the work state of CM22.

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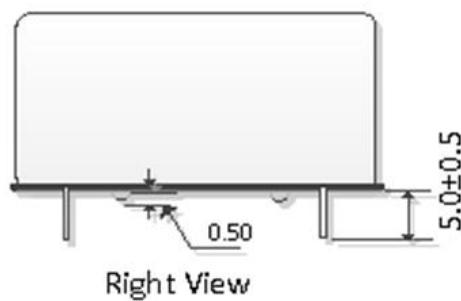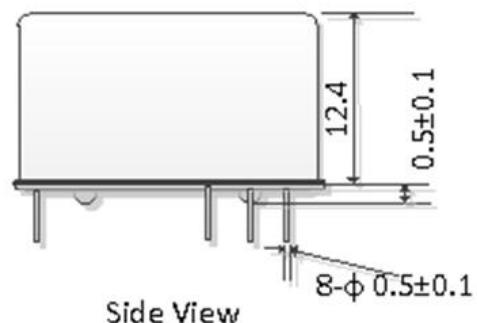
8. Mechanical Structure (mm)
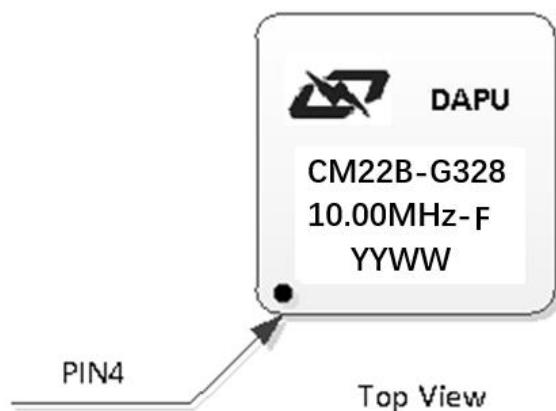
Bottom View

Right View

Side View

CM22B-G328
10.00MHz-F
YYWW

PIN4

Top View

Note1: Tolerance ± 0.3mm without mark.

Note2: YY represents Year.

WW represents Week.
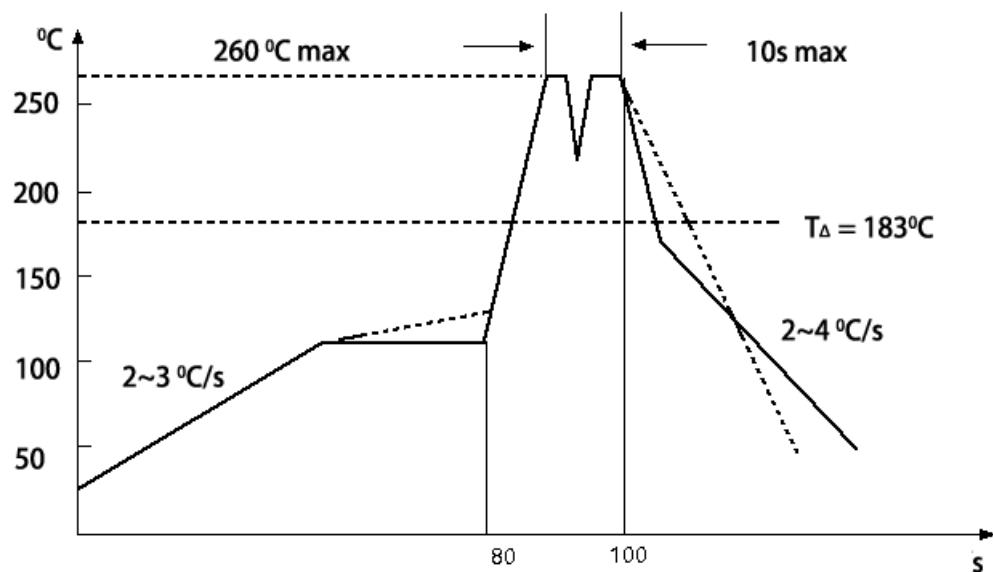
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9. Wave Soldering Curve(RoHS)

10.Package（mm）

Buffer material

Cardboard
Max 20pcs, circulator