

Customer Code :

# DATASHEET

DAPU P/N: CM30B-M328-10.00MHz

Customer P/N: \_\_\_\_\_

DAPU			Customer Approval
Drew	Audited	Approved	Stamp, please! Thanks!
Date: 2019.05.06			

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PRELIMINARY



## 1. General Description

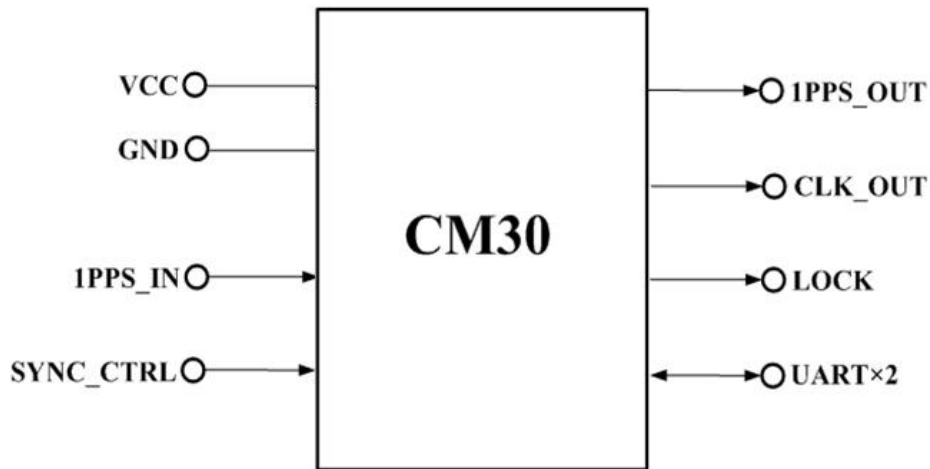


Figure 1 CM30

Figure 1 is the basic diagram of CM30. CM30 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:**  $\pm 0.2$ ppb;
- **Holdover:**  $\pm 100\mu\text{s}/24\text{h}$  @  $\Delta T = \pm 10^\circ\text{C}$ , 24 hours holdover after power up 7 days and lock 5 days;
- **Clocks Input and Output:** 1\*1PPS input, 1\*1PPS output and 1\*10MHz output;
- **Serial Interface:** 1\*UART for TOD, 1\*UART for management;
- **Mechanical Size:** 30mm\*25mm\*15mm.



## 2. Pin Definition

**Table 1 Pin Definition**

Pin group	Pin#	Pin Name	Type	Description
Supply Voltage	3	GND	GND	Ground
	7	VCC	PWR	Power Supply
Control and Status Pins	1	SYNC_CTRL	I	Synchronizing Procedure Control
	12	LOCK	O	Lock Status
UART	8	RXD0	I	Asynchronous Serial Data Output/Input RXD1, TXD1 are reserved for future usage
	9	TXD0	O	
	10	RXD1	I	
	11	TXD1	O	
Input Clock	2	1PPS_IN	I	1PPS Reference Input.
Output Clocks	5	1PPS_OUT	O	1PPS Output
	6	CLK_OUT	O	10.00MHz Output
Reserve	4	NC		Reserved

## 3. Electrical Parameters

**Table 2 Electrical Parameters**

Parameter	Symbol	Minimum	Typical	Maximum	Units
<b>LVC MOS Input</b>					
High Level Input Voltage	$V_{IH}$	2.4			V
Low Level Input Voltage	$V_{IL}$			0.4	V
<b>LVC MOS Output</b>					
High Level Output Voltage	$V_{OH}$	2.4			V
Low Level Output Voltage	$V_{OL}$			0.4	V



## 4. Performance

**Table 3 Performance**

Item	Parameter	Minimum	Typical	Maximum	Units	Test Condition	
Clock Output	Nominal Frequency	10.00			MHz	Synchronizing with 1PPS reference.	
	Duty Cycle	45	50	55	%	Load 15pF	
	Frequency vs. Temperature	-0.2		+0.2	$\times 10^{-9}$	V <sub>cc</sub> =3.3V; O <sub>load</sub> =15pF;T <sub>A</sub> varies from -40°C to 85°C, temperature slope less than 2°C per minute.	
	Accuracy	-5		+5	$\times 10^{-12}$	24 hours average value when locked to 1PPS.	
	Short-term Stability			+0.01	$\times 10^{-9}$	V <sub>cc</sub> =3.3V;T <sub>A</sub> =25°C; 1s; using PN9000; no EMI/EMC or other interference.	
	Daily Aging	-0.5		+0.5	$\times 10^{-9}$	V <sub>cc</sub> =3.3V;T <sub>A</sub> =25°C.	
	Yearly Aging	-0.03		+0.03	$\times 10^{-6}$		
	Phase Noise			-110	-100		dBc/Hz
				-143	-138	100Hz	
				-155	-152	1KHz	
			-160	-158	10KHz		
			-160	-158	100KHz		
			-160	-158	1MHz		
1 PPS Output	Pulse Width		100		ms		
	Accuracy	-50		+50	ns	Synchronizing with 1PPS reference.	
	24 hours holdover	-100		+100	μs	ΔT=±10°C,24 hours holdover after power up 7 days and lock 5 days; temperature slope less than 2°C per minute.	
Supply Voltage	Supply Voltage	3.135	3.3	3.465	V		
	Warm Up			750	mA		



	Current					
	Steady Current			350	mA	@25°C
	AC Ripple			50	mVpk-pk	10Hz to 1MHz

## 5. UART

UART interfaces are used for management and TOD, which has a fixed baud rate (115200) 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).

### Time of Day

A TOD message format can be a GPRMC message or one of a group of other GPS messages or proprietary messages to suit specific causes. Such as a GPRMC message has the format \$GPRMC,122356,A,0000.0000,N,00000.0000,W,0.0,0.0,120508,,A,\*F6 in which the commas are separators. The message is 62 characters in length (i.e. 62 bytes). No parity bit is used, but each byte has a stop bit. The architecture of the message is shown in Table 4.

**Table 4 Architecture of GPRMC message**

Elements	Description
\$GPRMC	Message header.
122356	UTC value.
A	Status (A = active, V = void).
0000.0000,N	Latitude, north (fixed to zero).
00000.0000,W	Longitude, west (fixed to zero).
0.0	Speed over ground (fixed to zero).
0.0	Track angle (fixed to zero).
120508	Date (ddmmyy).
A	A = autonomous, D = differential, E = estimated, S = simulation, N = not valid.
*F6	Checksum.

## 6. Control and Status Pins

When the SYNC\_CTRL pin is driven high, CM30 will work normally and perform synchronizing algorithm. When the SYNC\_CTRL pin is driven low, CM30 will be forced to work in free-run or holdover status.

The LOCK pin indicates the lock status of CM30. High level means the module is locked to external 1PPS reference. When the module isn't locked to the reference after power up, the module is in free-run status, the LOCK pin output is low. When the reference is lost, the module runs into holdover status, the LOCK pin output is low as well.



## 7. Environmental Conditions

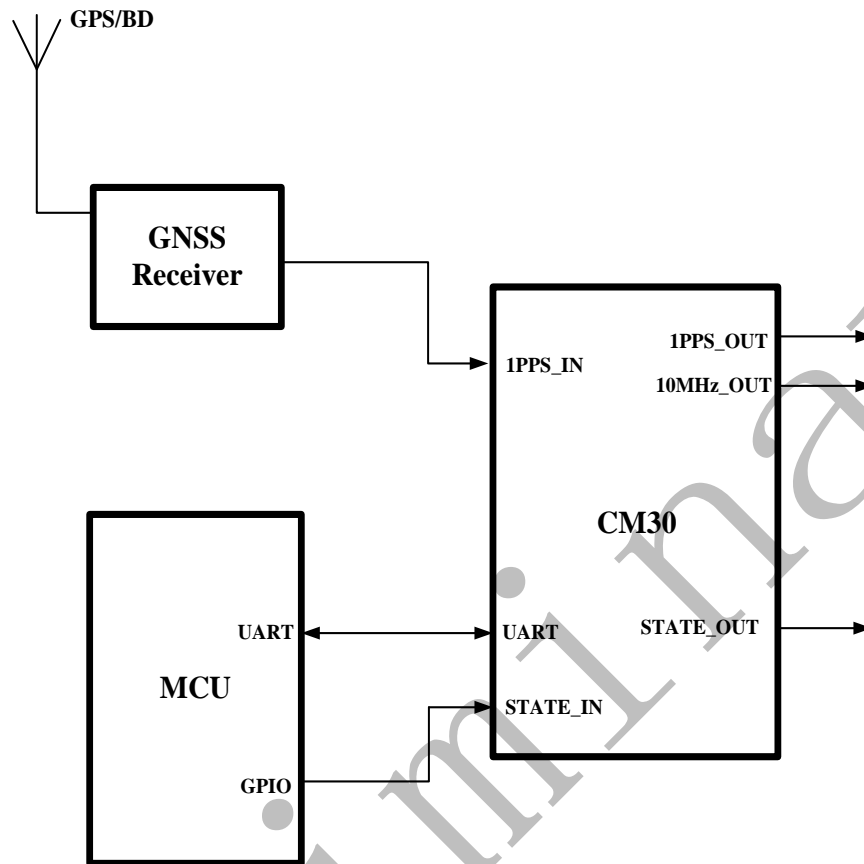
**Table 5 Environmental Conditions**

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; ANSI/ESDA/JEDEC JS-001-2010.	
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**

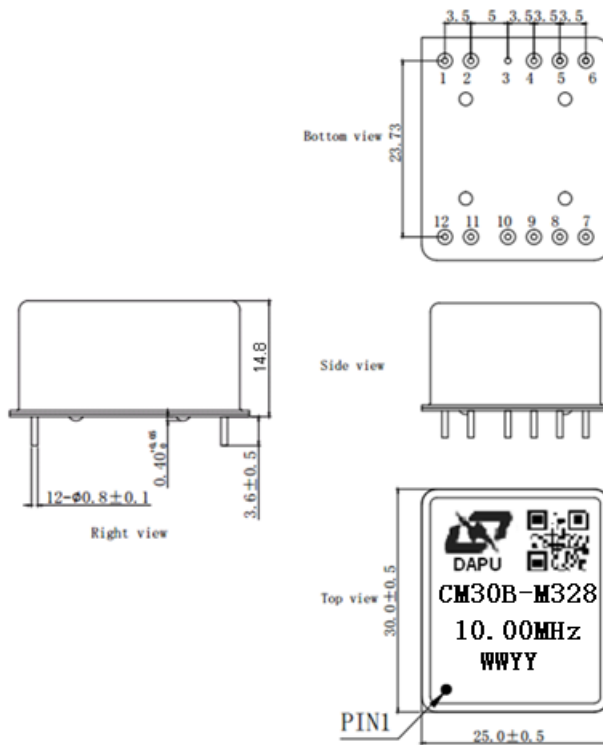
GNSS Receiver offers 1PPS signal to CM30.

The MCU monitors the work state of CM30.

CM30 is a clock module which synchronizes the local clock to the reference such as 1 PPS retrieving from GPS.



## 9. Mechanical Structure (mm)



**Figure 3 Mechanical structure**

**Note1:** Tolerance  $\pm 0.3\text{mm}$  without mark.

**Note2:** WW represents Week.

YY represents Year.



## 10. Package (mm)

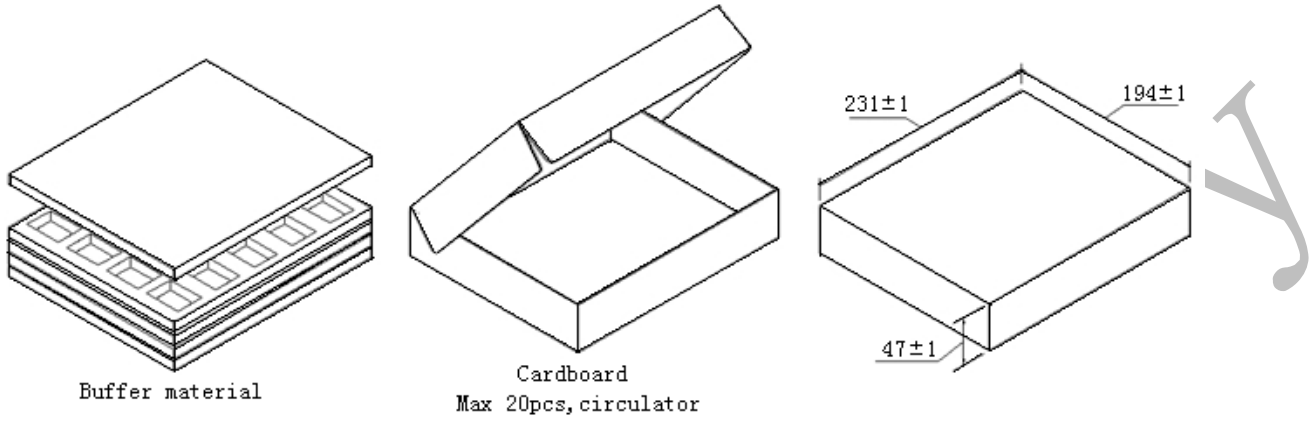


Figure 5 Package

Preliminary