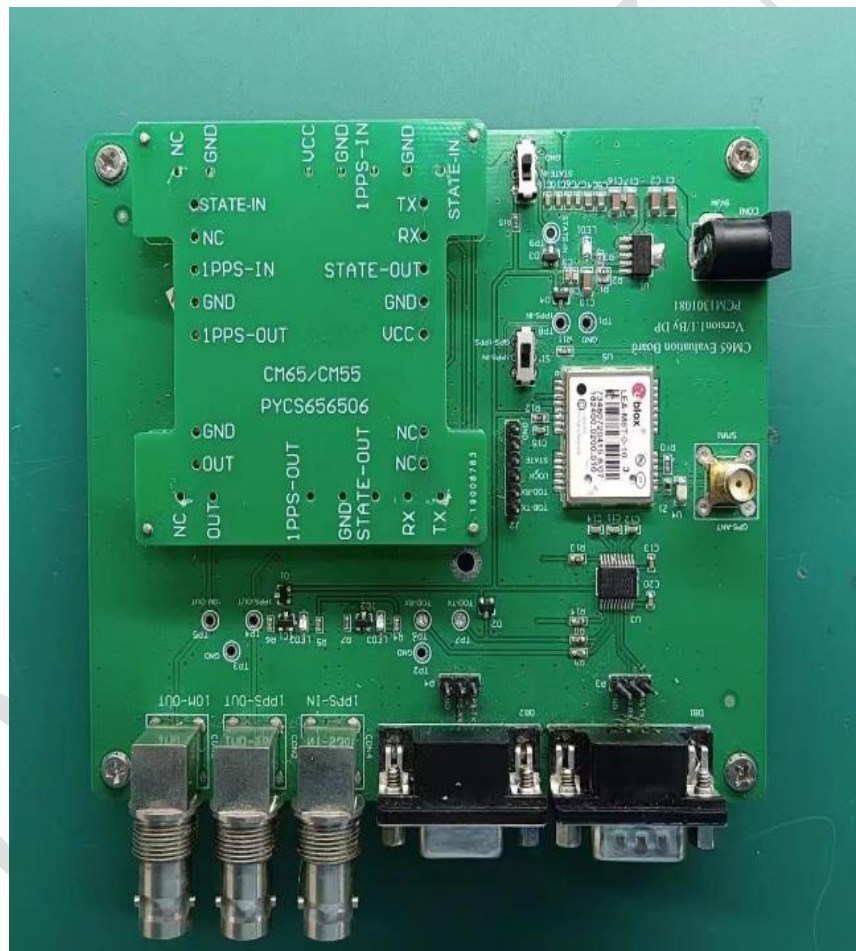




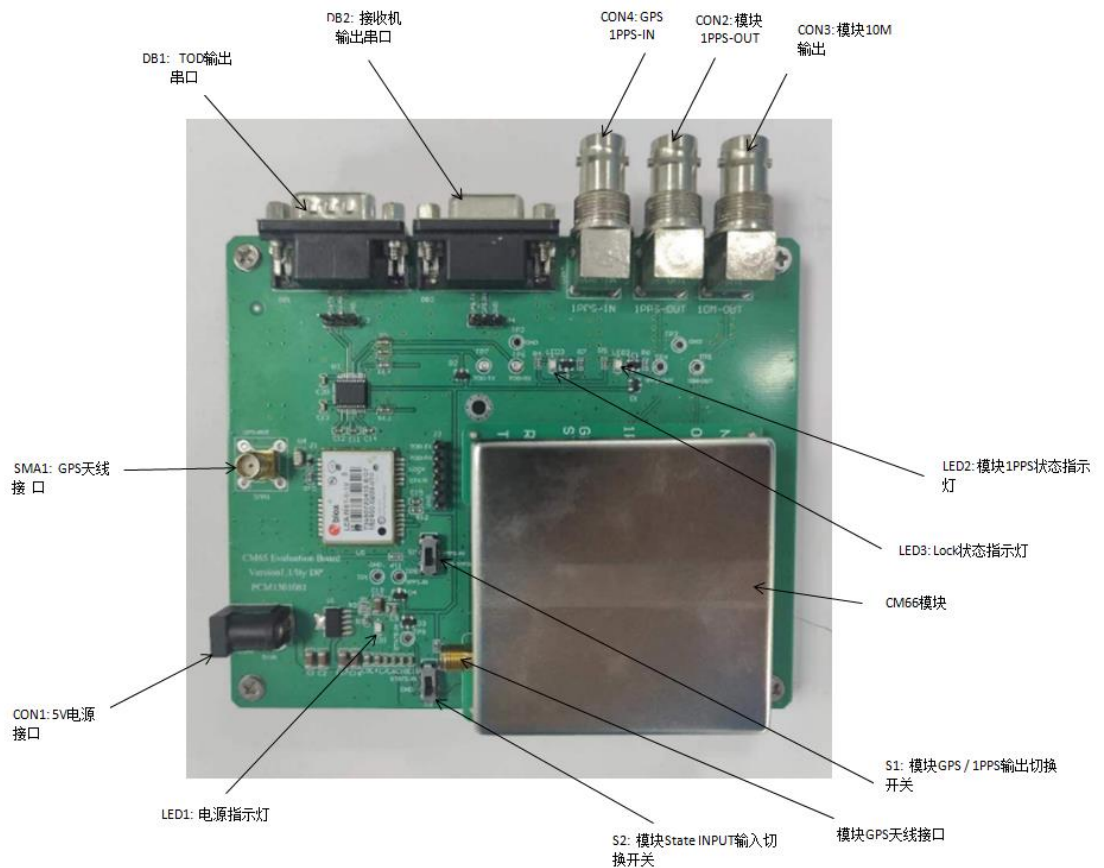
# Clock module CM series product evaluation board direction for use





## 1. Hardware description

Clock module CM series product evaluation board is used for the test and evaluation of DAPU CM series (CM65, CM66, etc.) clock products. The functions are described as follows:



### 1.1 Power supply part: CON1, LED1

The board is powered by 5.0VDC@4A power adapter. LED1 is the power indicator. If the indicator is on, the board is powered on normally.

### 1.2 Serial port:

The DB1 serial port is connected to the PC through the serial port line, and the PC can receive the TOD message output from the TX pin of the clock module (CM65, CM66, etc.) through the special software SSCOM, and can also send the command to the RX pin, so that the module can perform the corresponding operation, the baud rate is generally 9600 or 115200. Support code online upgrade.



### 1.3 Signal output parts: CON2, CON3, CON4

- (1) CON2:1PPS output, obtained by local clock frequency division;
- (2) CON3:10M output, local clock signal output;
- (3) CON4:1PPS input; (If the on-board receiver is not used, it can be used as a 1PPS input, and the S1 toggle switch is toggle in the direction of J2; If the on-board receiver is used, the S1 toggle switch toggles in the direction of TP8.)

### 1.4 Indicator description: LED1, LED2, and LED3

- (1) LED1: Power indicator

LED1 status	Power status
Light on	Power on
light off	Power off

- (2) LED2:1PPS Signal Indicator (CON2)

When the indicator turns on and off for about 1s, it indicates that the clock module (CM66) 1PPS OUTPUT pin has 1PPS output to CON2.

If the indicator is off for a long time, the module has no 1PPS signal output.

LED2 status	1 PPS Output status
Alternating brightening	Active output
Light off for a long time	No output

- (3) LED3: LOCK status indicator

When the clock module (CM66) is connected to the GPS antenna, the local clock inside the module will track the GPS 1PPS signal and reach the LOCK State for 6-10min. After the lock, the State OUTPUT pin of the module will output a high level and light up LED3.



LED3 status	Lock status
Light on	Locked
light off	Unlocked

1.5 Test point description: TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9

- (1) TP1: GND;
- (2) TP2: GND;
- (3) TP3: GND;
- (4) TP4: Clock module 1PPS output;
- (5) TP5: Clock module 10M output;
- (6) TP6: Clock module RX input;
- (7) TP7: Clock module TX output;
- (8) TP8: Clock module GPS 1PPS output;
- (9) TP9: Clock module State INPUT input;

1.6 Toggle switch description

- (1) Switch S1

The switch has three terminals, any connection of two terminals can achieve the corresponding function, for the module CM66, the three terminals are: External receiver GPS 1PPS input (toggle the switch to the TP8 test point, switch to the on-board receiver GPS antenna input 1PPS), clock module GPS 1PPS output, internally connected to CON4;

Switch S1	Function	Instruction
Toggle the switch in the direction of the J2 terminal	Internal connection to COM4	For the CM66, the toggle switch is toggle in the direction of the J2 terminal, and CON4 is
	Clock module GPS 1PPS output	



		output as the module GPS 1PPS
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## (2) Switch S2

When there is 1PPS input, toggle the switch in the direction of TP9 test point, and the module starts to lock; After the module is locked, toggle the switch in the reverse direction (S2 direction on PCBA) to force the module into the holdover status.

## 2. Software description

### 2.1 Connect to a PC

The evaluation board can be connected to the serial port of PC through DB1 serial port and USB-to-serial cable to realize communication with PC, and can receive TOD messages output by GPS with SSCOM serial port output software.

Note: If no serial port is available on the PC, a serial port to USB cable and the corresponding USB-to-serial port driver are required.

### 2.2 SSCOM Software Settings

To ensure that the SSCOM software correctly receives TOD messages from the clock module, the following Settings are required:

- Baud rate: 9600bps;
- Data bits: 8 bits;
- Stop bit: 1 bit;
- Check bit: None;

The above Settings are generally the default Settings. If they are inconsistent, change them according to the above Settings. Then select the correct COM number, click the button to open the serial port, you can receive



the GPS TOD message output by the module. Here is an example of an output GPS TOD message:



### 3. Teat description

#### 3.1 Electrical performance test

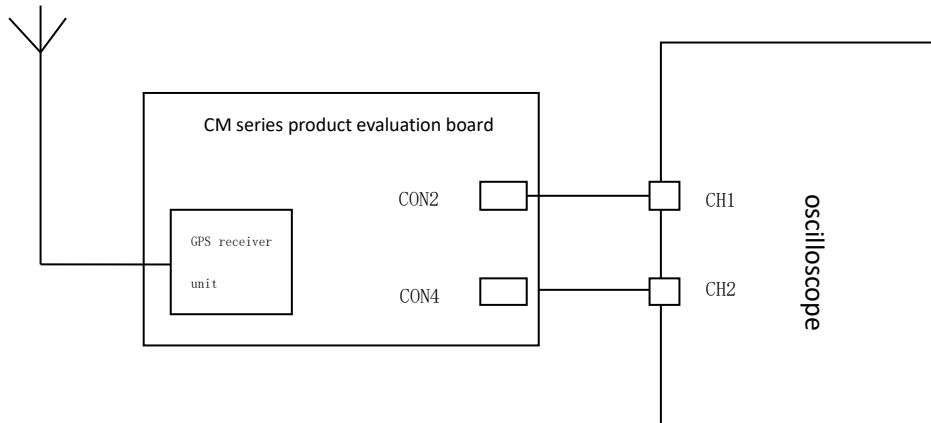
Electrical performance test refers to the test of the basic output function of the module, as detailed in the CM66 module specification.

#### 3.2 Holdover test

The keeping test refers to the timekeeping ability of the clock module, that is, the holdover ability, when the signal of the GPS or the upper clock is lost or interrupted after the clock module has tracked and locked the GPS or the upper clock for a period of time. Generally, the following tests are available according to different requirements:  $\pm 1.5\mu\text{s}/24\text{h}$ ,  $\pm 3\mu\text{s}/24\text{h}$ ,  $\pm 8\mu\text{s}/24\text{h}$ ,  $\pm 1.5\mu\text{s}/8\text{h}$ ,  $\pm 1.5\mu\text{s}/12\text{h}$ , etc.

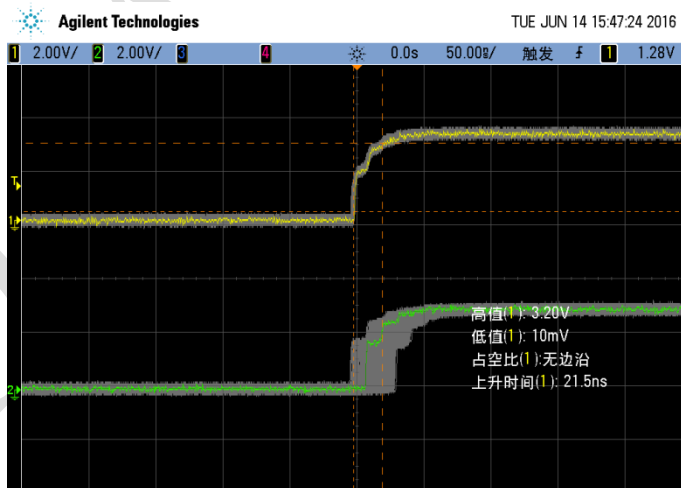


The test block diagram is as follows:



- Test method

According to the above block diagram, the S1 toggle switch is toggle in the direction of J2 terminal (S2 toggle switch is toggle in the direction of TP9 test point) to make CON4 output as GPS 1PPS; CON2 and CON4 are connected to oscilloscope CH1 and CH2 channels by coaxial cable, and two waveforms are obtained as shown in the following figure:



In the figure: CH1 is the 1PPS signal given by the built-in GPS receiver of the CM66 module, and CH2 is the 1PPS obtained by the frequency division of the local clock of the CM66 module. After the module is stably locked, evaluation board LED3 lights lit up.



b. After 7 days of power, lock for 3 days, oscilloscope adopts wireless afterglow function for continuous test, you can observe the module tracking lock situation;

c. After 3 days of locking, flip the S2 toggle switch in the opposite direction (S2 direction on PCBA), the module State INPUT pin is grounded, LED3 is off, and the module will be forced into the holdover status. After 24h, the holdover data can be obtained by comparing the phase difference between the two signals.

#### 4. Typical application block diagram

