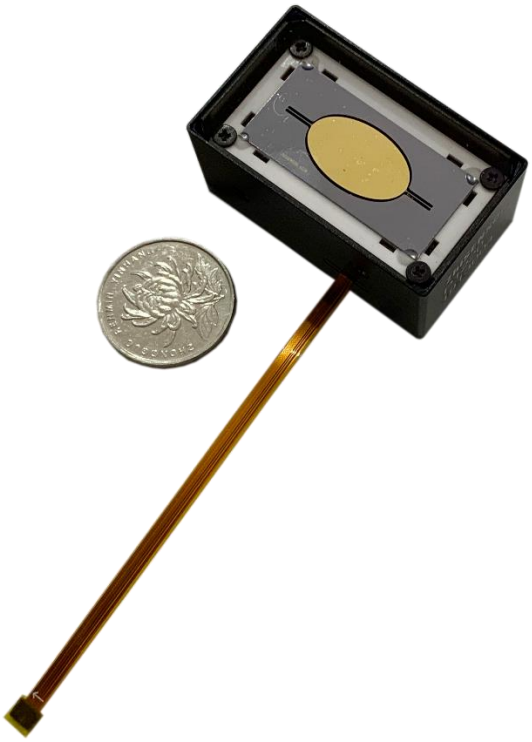
Xi'an ZhiSENSOR Technologies Co., Ltd.



Test Board for MEMS Mirror Module

User Manual

V1.1

User Manual

1. Introduction

The test board is a tool to interact with the MEMS mirror module P1220. There are LCD display for output and physical buttons for input on the test board. The functions of the test board are mainly divided into three parts: module detection, module setting and working state query.

2. Connector

Since the test board is for MEMS mirror module, the connector is suitable for P1220. As shown in figure 1, there is a connector, which model is DF37NB-10DS-04V.

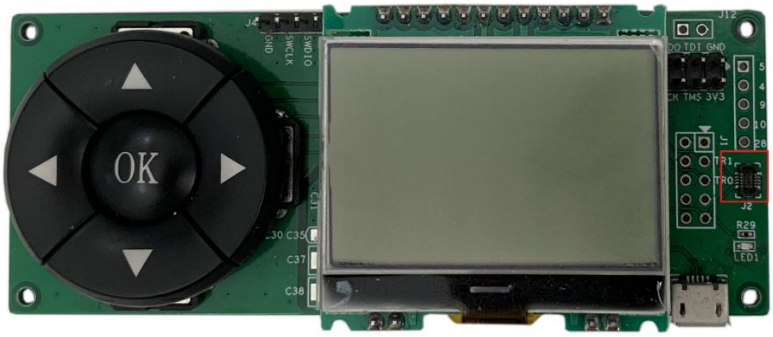


Figure 1 Test board for MEMS mirror module

The connection to the MEMS mirror module is shown in figure 2.

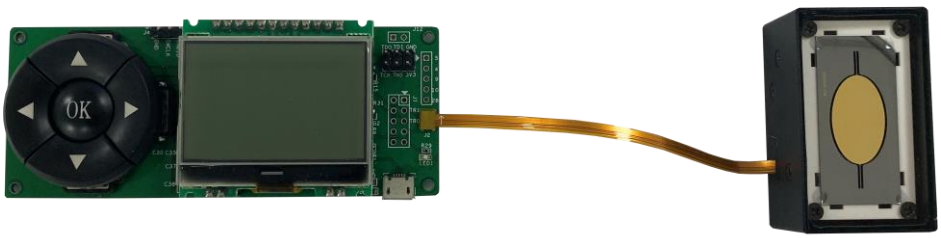


Figure 2 Connection between MEMS mirror module and test board

There is a backup connector for external test, which shown in figure 3. The pins number are shown in figure 4 and the function of pins are list in table 1.

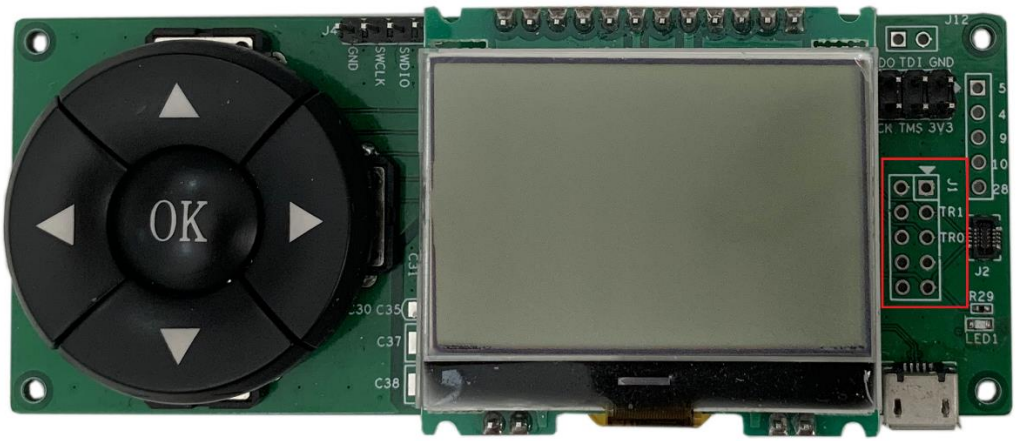


Figure 3 Backup connector

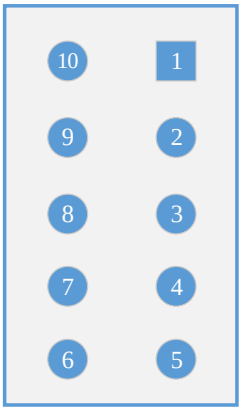


Figure 4 Pins number

Table 1 Function of pins

Pin	Function	Input/Output	Description	Condition
1	GND	-	GND	0V
2	TX	Output	UART output	LVTTL3.3
3	RX	Input	UART intput	LVTTL3.3
4	GND	-	GND	0V
5	VCC	-	Power	5V
6	GND	-		0V

7	TRIG0	Output	The zero marking pulse signals of MEMS mirror module can be monitor through this pin.	LVTTL3.3
8	GND	-		0V
9	TRIG1	Output	The angle marking pulse signals of MEMS mirror module can be monitor through this pin.	LVTTL3.3
10	GND	-		0V

Note: TRIG0 and TRIG1 can be used to connect to the oscilloscope to monitor the marking signal output from the MEMS mirror module, when the MEMS mirror module is connect to the test board and working normally.

By the way，the test board is powered by the micro USB, as shown in figure 5.

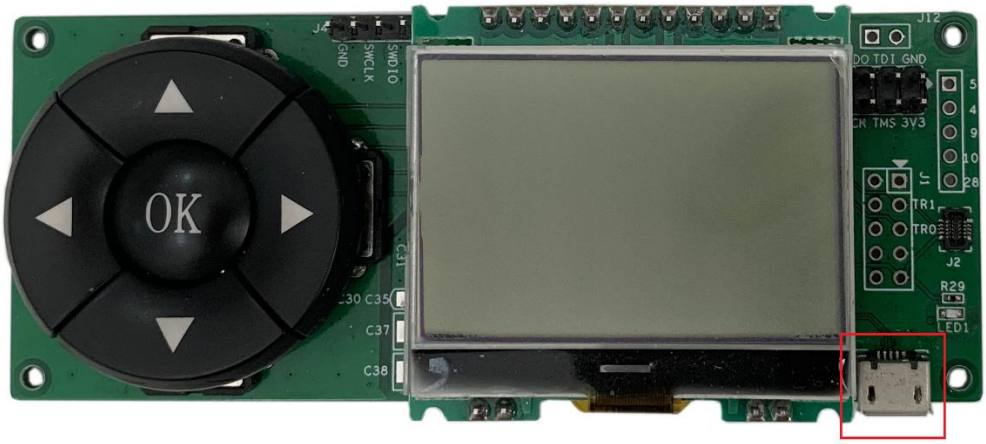


Figure 5 Power port micro USB

3. Function instruction

After power on, the initial interface appears on the LCD, there are two options: '**Manual**' and '**Automatic**'. The '**Manual**' is used for setting and querying parameters of the MEMS mirror module. '**Automatic**' is used for automatic detection MEMS mirror modules.

Users can use the "OK" button to select the function and use the "left" and "right" buttons to switch selections. The operate buttons are shown in figure 6.

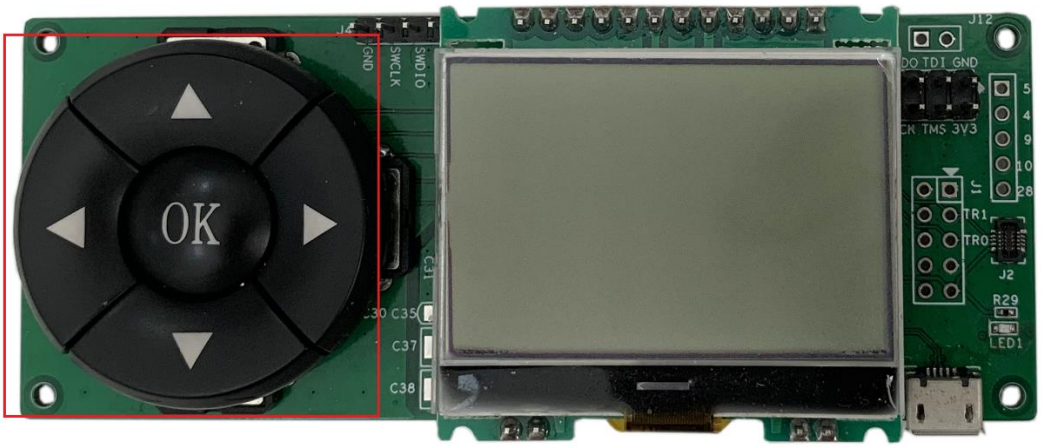


Figure 6 Operate buttons

3.1 Module detection

The development board will automatically detects MEMS mirror modules when select the '**Automatic**'. The test board test the connection between test board and MEMS mirror board. The operating state and marking signals of MEMS mirror module are also be tested. The whole test will spend 2 minutes. After the test, if the module is normal, the screen will display '**Module normal – Marking signal normal**', otherwise, the screen will display '**System exception**' with correspond reasons. In addition, after the test, the connection between the test board and the module will stop. Long press "OK" for 2 seconds to return to the initial interface.

3.2 Module setting and working state query

3.2.1 Manual option

The development board will turn to the main menu interface of '**Setting**' and '**Query**' when select the '**Manual**' in initial interface. Users can use the "left" and "right" buttons to switch selection between '**Settings**' and '**Query**', and press "OK" button to select one.

3.2.2 Setting parameters

After selecting the '**Setting**' function, the test board will enter the '**Angle**' and '**Phase**' setting interface. Users also can use the "left" and "right" button to switch

selection and then use the "OK" button to select functions.

After selecting the '**Angle**' function, the test board enters the angle setting interface, which displays the current value of the MEMS mirror module' parameters. In this angle setting interface, users can set the value of scan angle and marking angle. Operating methods are list in table 2.

Table 2 Operation of setting parameters

Items	Operation	Note
Setting scan angle	Press 'left' or 'right' buttons to select the bit of scan angle, press 'up' and 'down' button to adjust value.	The value should not be greater than 60 °. After setting, press "OK" to confirm the order.
Setting marking angel	The operation is the same as setting scan angle	The value should no more than half of the scan angle. After setting, press 'OK' to confirm the order.

After setting, the interface remains in the angle setting interface, and operations of set scan angle and marking angle are repeatable. Long press 'OK' button for 2 seconds to exit and enter the setting interface of '**Angle**' and '**Phase**'.

It is worth noting that the angle of marking signals is set with setting the scan angle. If the value of scan angle is lower than the minimum(see the data sheet of the MEMS mirror module), the scan angle will not change, the angle of marking signals is equal to the setting value.

Select the '**Phase**', the test board enters the phase setting interface.

Press 'Left' or 'right' button to select the bit that adjust the phase, press 'up' and 'down' button to adjust the phase value. The phase value must among -512~511. After setting the phase value, press 'OK' to confirm the order. Whether the setting is successful can be detected through the signal which outputs from TRIG0 or through other methods.

3.2.3 Query parameters

Users can use the test board to query the information of MEMS mirror module. Select '**Query**', the interface turn into Queryable parameters interface. Queryable parameters and operations are shown in table 3.

Table 3 Queryable parameters and operations

Parameters	Operation	Description
Working state	Press 'up' or 'down' button to switch selection then press 'OK' button to select the function.	If the state of module is normal, the screen will display '**Detecting pulse**'; otherwise, the reasons of abnormal will be displayed. The reasongs includes '**Voltage abnormal**', '**Feedback abnormal**', '**Signal abnormal**', '**communication error**'.
Working voltage	Press 'up' or 'down' button to switch selection then press 'OK' button to select the function.	The driving voltage of the MEMS mirror can be displayed in real time.
Resonant frequency	Press 'up' or 'down' button to switch selection then press 'OK' button to select the function.	The resonance frequency of the MEMS mirror will be displayed in real time.
Software version	Press 'up' or 'down' button to switch selection then press 'OK' button to select the function.	The development board displays the code version of the MEMS mirror module.

Note: Each of the interface which shown above can be returned to the superior interface by long-pressing 'OK' for 2 seconds.

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Revision History

Date	REV	Description
2019-2-18	V1.0	The first edition
2019-9-8	V1.1	Modify some errors