

# CAMERA MODULE

## 產品規格承認書

### PRODUCTION SPECIFICATION FOR APPROVAL

**Model No. : EV5020C1-S1-3M1**

<b>Customer</b> 客戶名稱	
<b>Date Sumitted</b> 送樣日期	

**Approve**

確認回簽

**Fangtec Corporation**



## Revision History

Date	Rev.	Contents
2010/07/05	V1.0	First release
2013/07/01	V1.1	Add Power Consumption
2014/06/11	V1.11	Modify the Pin5 GPIO Pin To GND Pin



## Table of Contents

1. Preface .....	3
2. Features .....	4
3. Applications .....	4
4. Key Specification .....	5
5. Digital MIC specification.....	6
6. Max Frame Rates.....	6
7. Pin Description .....	7
8. Outline Specification .....	8
9. Reliability Test .....	9

## 1. Preface

This document defines the product specification, interfaces and functionality of the module for use on Notebook; it combines the sensor (OV2655) and platform (Empia 2775) for high quality PC camera products.

The OV2655 image sensor is a low voltage CMOS device that provides the full functionality of a single-chip UXGA camera and image processor in a small footprint package. The OV2655 provides full-frame, sub-sampled or windowed 8-bit images in a wide range of formats, controlled through the Serial Camera Control Bus interface.

EM2775 is a multi-function USB device that supports PC camera and audio input (Digital Microphone) functions. These chips have CMOS sensor interface, Digital Microphone interface, command serial bus interface, and general I/O ports. Many ports and buffers are multi-purpose and must be configured at power up before entering normal operation.

Digital-Output Microphone which is ideal for use in microphone array applications where a high degree of noise immunity is required. The Microphone integrates an acoustic transducer, analog output amplifier, and a 4th\_order sigma-delta modulator on a single chip. The output of the microphone is pulse density modulation (PDM); a single-bit digital output stream that can be decimated by a digital filter in downstream electronics such as an audio CODEC, DSP, or base band processor for a high degree of design flexibility and freedom.

## 2. Features

- Compliant to USB2.0 and USB Video Class
- Support still image capture and Video Streaming.
- Convert Bayer RGB to YUV color space
- Video Resolution: 2.0M pixel.
- Black Clamping-Gamma Correction
- Gain and offset adjustment in RGB space
- Window image statistics collection for AE and AWB
- Gain and offset adjustment in YUV space
- Sharpness enhancement
- Compliant to USB audio class
- Support stereo and mono audio
- Audio input (Digital Microphone) functions
- Input Voltage: standard 5V

## 3. Applications

- Notebook PC
- LCD PC
- LCD Monitor
- Industrial PC

#### 4. Key Specification

ITEM		SPECIFICATION
Image Sensor	Optical format	1/5 inch 2.0M pixel
	Effective resolution	1600(H)×1200(H)
	Unit Pixel size	1.75um x 1.75um
	Max video frame	30fps @ VGA
	ADC accuracy	10-bit
LENs	Element	3P+IR
	F/No.	2.8±5%
	Max. image diameter	4.05mm
	Diagonal field of View	62°
Image Processor	Type	Controller IC : EM 2775
	Compatibility	USB 2.0 Video/Audio class Compliant, Microsoft WHQL Certified
	OS Supported	XP, Vista, Win7

Power Consumption			
	Min	Type	Max
Input Supply Voltage		5 DC	
Un-configured Current	–	30 mA	–
Operating Current	120 mA	135 mA±5%	150 mA

## 5. Digital MIC Specification

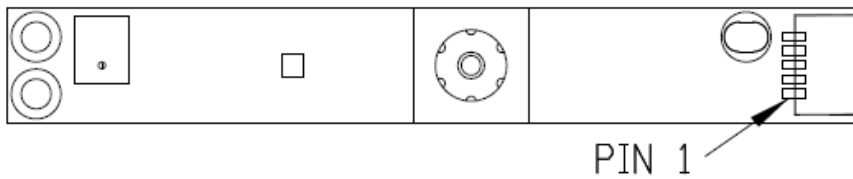
1	<b>Sensitivity</b>	-26±3dBFS	V <sub>DD</sub> =3.3V, CLK=2.4MHz 1KHz@1Pa
2	<b>Directivity</b>	Omni-directivity	
3	<b>Frequency</b>	50-12000 Hz	
4	<b>Current Consumption</b>		
	4.1 Working mode	<1000uA	CLK>1MHz
	4.2 Standby mode	<50uA	CLK<1KHz or CLK OFF
5	<b>Operation Voltage</b>	3.3V	
6	<b>Clock frequency range</b>	1MHz-4MHz	
7	<b>Typical clock frequency</b>	2.4MHz	
8	<b>Max. Sound Pressure Level</b>	120dB SPL	
9	<b>S/N Ratio</b>	More than 58dB	
10	<b>Sensitivity change after reflow</b>	Within ±1.5dB	
11	<b>Total Harmonic Distortion</b>	≤3% (at 115dB SPL)	
12	<b>Power Supply Noise Rejection</b>	Less than -70 dB	Measured within full audio bandwidth. Measured with 217Hz, 100mV <sub>pp</sub> square wave and 100mV <sub>pp</sub> noise
13	<b>Track</b>	Stereo (can be choosed by L/R)	
14	<b>Mode</b>	Working	
		Standby	

## 6. Max Frame Rates (fps)

QQVGA	QCIF	QVGA	CIF	VGA	SXGA	UXGA
160×120	176×144	320×240	352×288	640×480	1280×1024	1600×1200
25 ~ 30	25 ~ 30	25 ~ 30	25 ~ 30	25 ~ 30	7 ~ 9	4 ~ 6

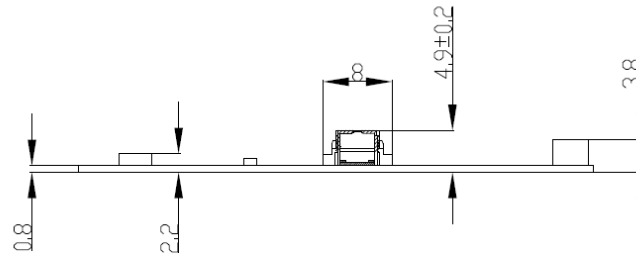
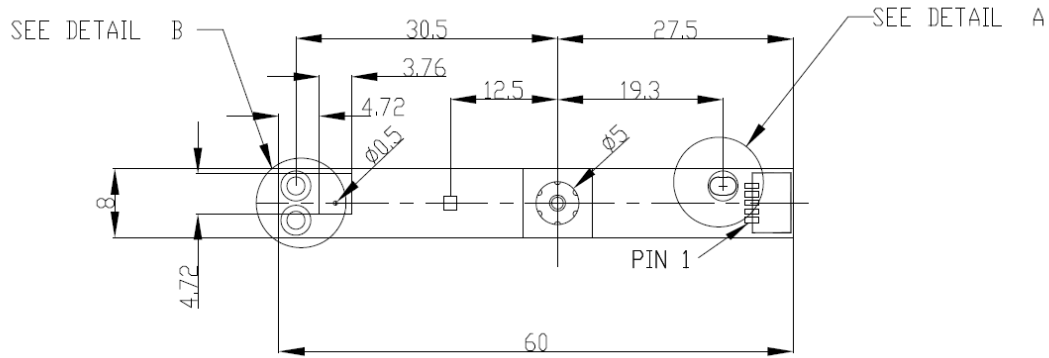
## 7. Pin Description

Pin Number	Name	Pin Type	Function Description
1	VCC	Power	5V DC
2	D-	Data Transmission	USB Data Write
3	D+	Data Transmission	USB Data Read
4	GND	GND	System Ground
5	GND	GND	System Ground

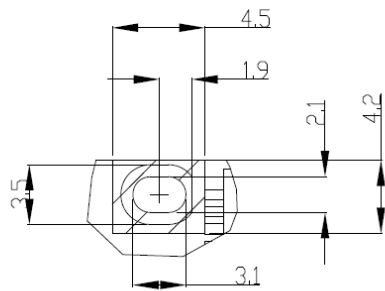
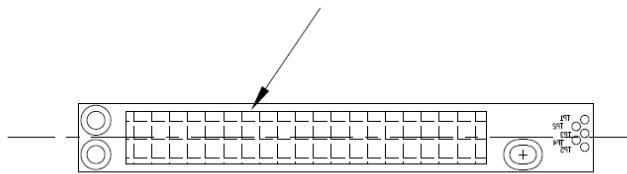




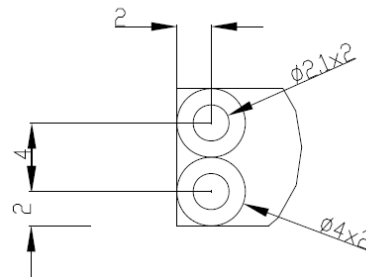
## 8. Outline Specification



Adhesive Area  
42mm x 6mm



DETAIL A  
SCALE 2.000



DETAIL B  
SCALE 2.000

## 10. Reliability Test

No	ITEM	Test condition
1	High Temp. storage	65±2°C, 72Hrs
2	Low Temp. storage	-20±2°C, 72Hrs
3	High Temp. & High Humidity	60±2°C, 90%RH, 120Hrs
4	Thermal Shock	1. Temp. : -10±3°C, +65±3°C 2. Soak Time : 30min The cycles is repeated 100 times
5	ESD	HBM : 2.0KV MM : 150V
6	Vibration Test	Sinusoidal vibration, Frequency 10~2000Hz Max. Acceleration : 1.5mm, 2G X, Y, Z time : 20min/ each (45hrs)
7	Drop Test	150cm Height free fall Surface : concrete or steel Number of drop : 3 times
8	Vibration Test (packing)	Air Frequency 2~300Hz, Max. Acceleration : 1.48G Truck Frequency 1~200Hz, Max. Acceleration : 0.73G X, Y, Z time : 1 Hr/ each
9	Drop Test (packing)	100cm Height free fall Surface : concrete or steel Number of drop : 10 times
10	Connector Mating	(1). Mating/Un-mating male & female connector (2). Duration : 25 cycles (3). Function test every 5 cycles