LinkSprite JPEG Color Camera
Serial UART Interface

User Manual

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LinkSprite Technologies, Inc

www.linksprite.com

Doc Title	LinkSprite JPEG Color Camera Serial UART Interface User Manual	**Number**	LS-Y201-2MP
		Version	1.2

Version	Date	Description	Author
1.0	31/03/2012	The first edition	Nancy
1.1	04/07/2012	The second edition	Nancy
1.2	16/07/2013	The third edition	Nancy

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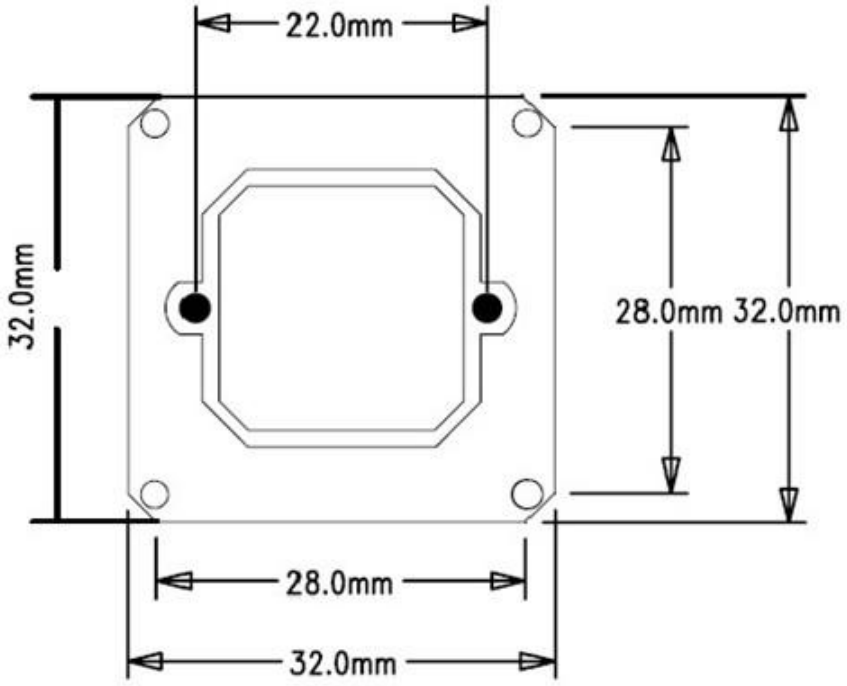
1. Introduction

LS-Y201-2MP is LinkSprite's new generation serial port camera module. It can capture high resolution pictures using the serial port. LS-Y201-2MP is a modular design that outputs JPEG images through UART, and can be easily integrated into existing design.

2. Specification

- VGA/QVGA/160*120 resolution
- Support capture JPEG from serial port
- Default baud rate of serial port is 115200
- DC 5V power supply
- Size 32mm X 32mm
- Current consumption: 80-100mA
- Near the C03 pin is AV output, this is a analog output pin.



Footprint

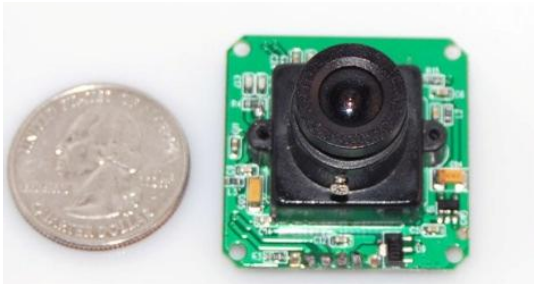
3. Application

- Different image capture systems
- Environmental monitoring
- Industry monitoring
- Medical equipment
- Video phone
- Security
- Vehicle based GPS

4. Getting Started - TTL

4.1 Hardware part

- LS - Y201 – TTL camera



- 5V DC power

- UART-232 module

4.2 Hardware connection

- LS - Y201 - TTL (TXD) to UART-232 (RXD).
- LS - Y201 - TTL (RXD) to UART-232 (TXD).
- LS - Y201 - TTL (GND) to UART-232 (GND). At the same time it also need to connect to GND in power.
- LS - Y201 - TTL (VCC) to +5V DC power.
- UART-USB module and DB9 needle connected to each, and DB9 hole connected to PC。

5. Getting Started——RS232

5.1 Hardware part

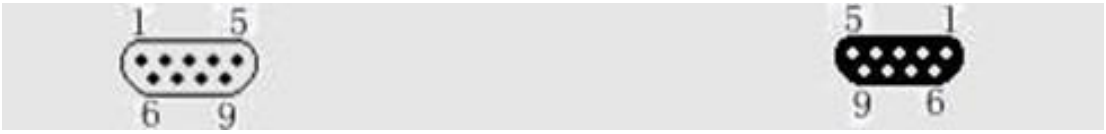
- LS - Y201 - RS232 camera
- 5V DC power
- RS-232 serial cable（DB9 MALE/FEMALE）

5.2 Hardware connection

- LS - Y201 - RS232 (TXD) to DB-9 MALE pin 2(RXD).
- LS - Y201 - RS232 (RXD) to DB-9 MALE pin 3(TXD).
- LS - Y201 - RS232 (GND) to DB-9 MALE pin 5(GND). At the same time it also needs to connect to GND in power.
- LS - Y201 - RS232 (VCC) to +5V DC power.

Note: If you are using DB-9(FEMALE), the 2 pin is TXD, the 3 pin is RXD.

DB-9 Pin definition



DB-9 MALE(Needle) DB-9 FEMALE(Hole)

- RS-232 (DB-9 FEMALE / Hole) Pin definition

Pin number:	2	3	5	1. 4. 6	7. 8
Signal definition:	TXD	RXD	GND	Internal connected	Internal connected

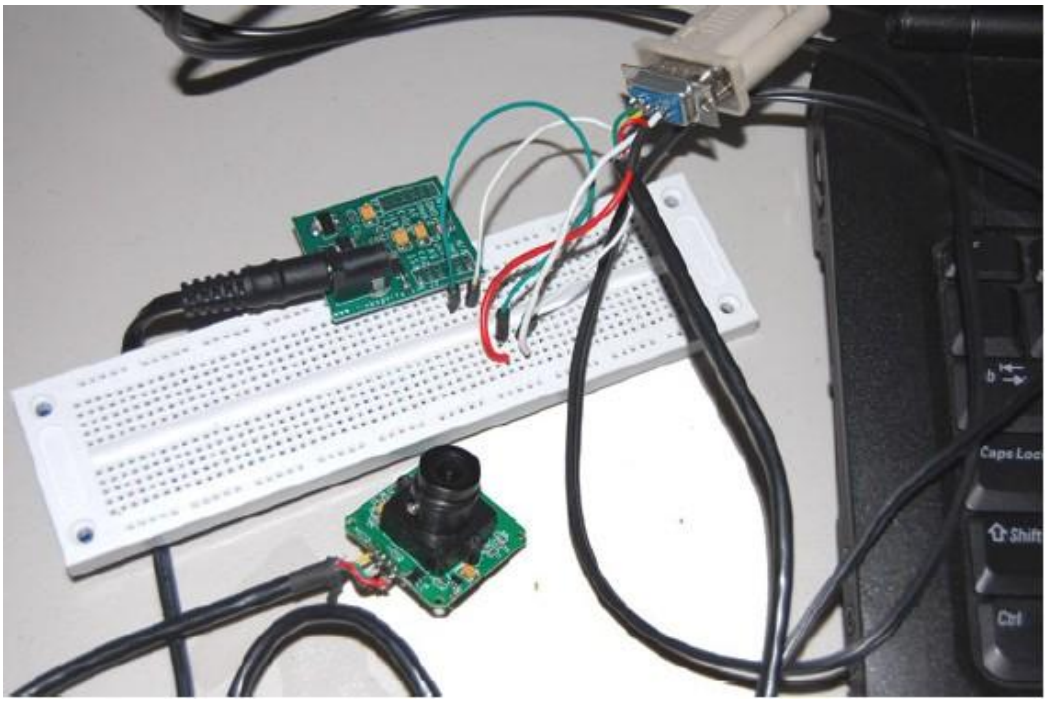
Directly connect the COM port of PC

- RS-232 (DB-9 MALE/ Needle) Pin definition

Pin number:	2	3	5	1. 4. 6	7. 8
Signal definition:	RXD	TXD	GND	Internal connected	Internal connected

Directly connect the COM port of PC

5.3 Hardware connection



5.4 Software

- X-CTU Download Link：www.digi.com (test software)
- Software：

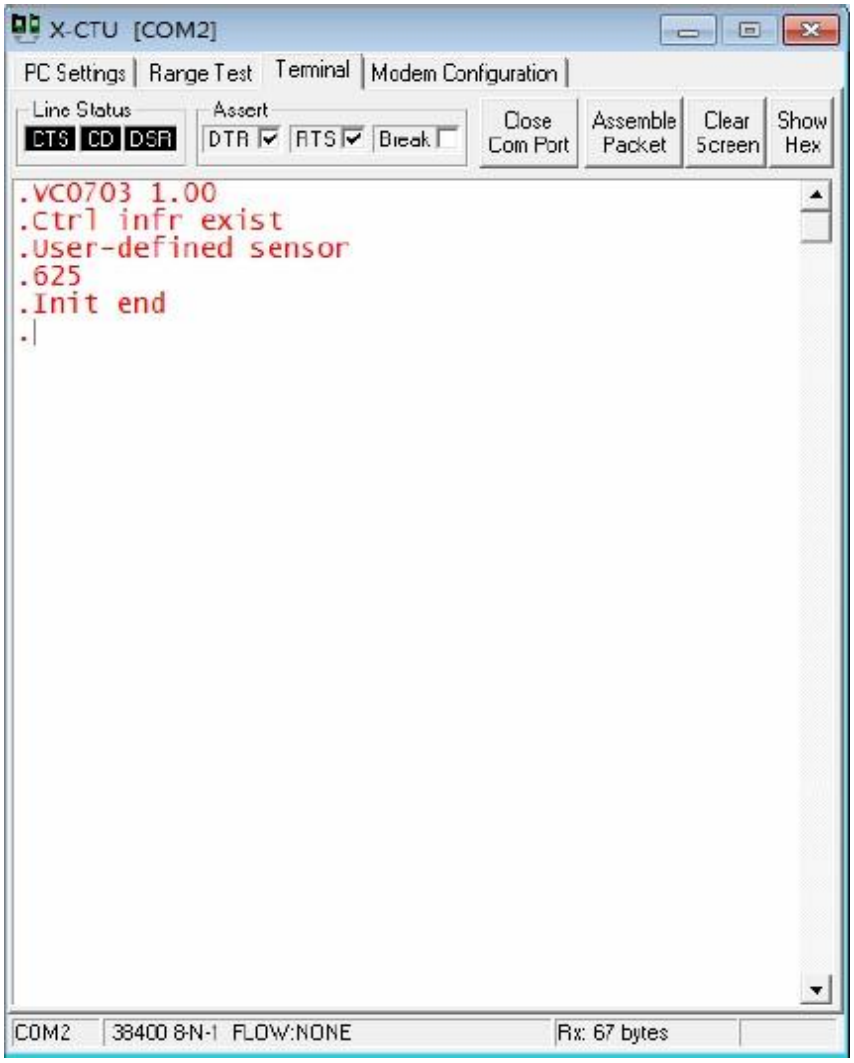
  http://www.linksprite.com/download/showdownload.php?id=36&lang=en

6. Test

6.1 Regular test

Power up information in X-CTU as the following ASCII：

Please note that the baud rate should be 115200.

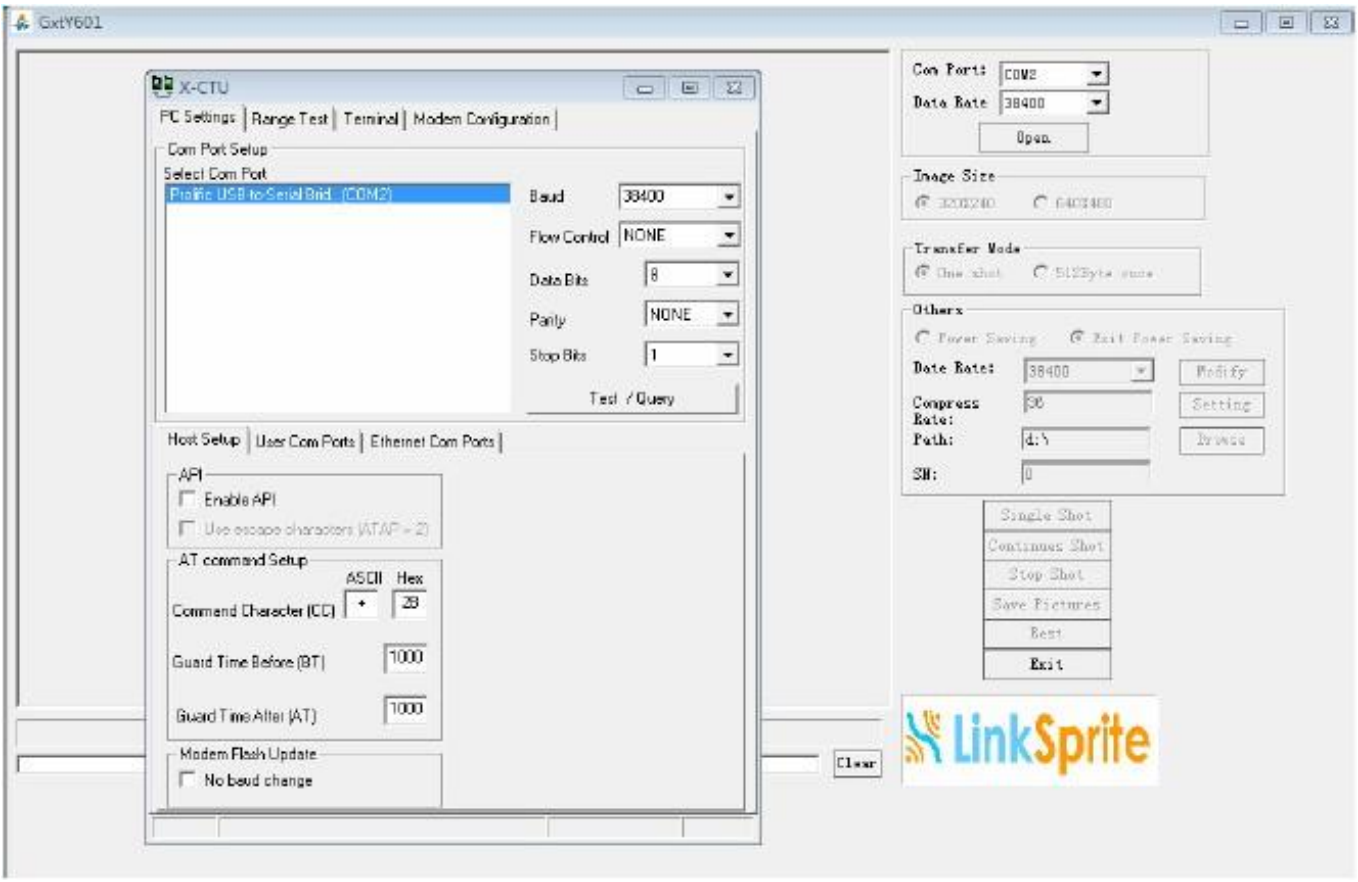


6.2 Software

Com Port：Choose the right Com Port。

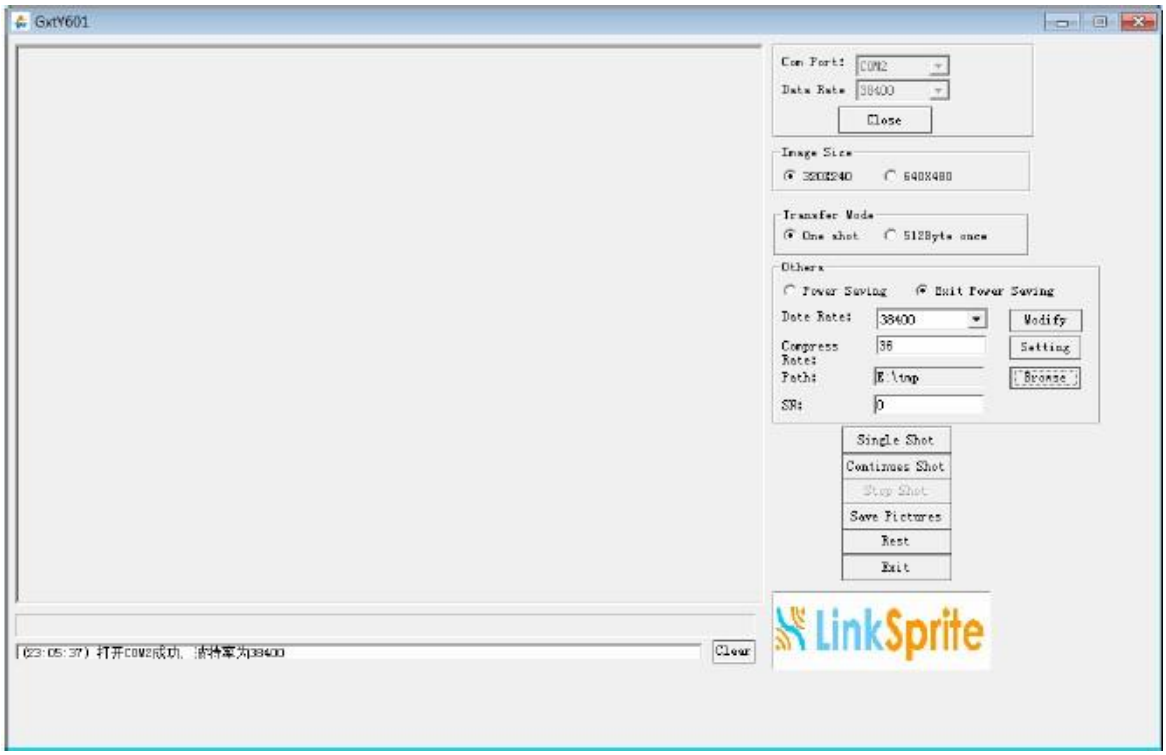
Data Port：Baud Rate settings, here it is 115200。

Click “Open” to open Com connection

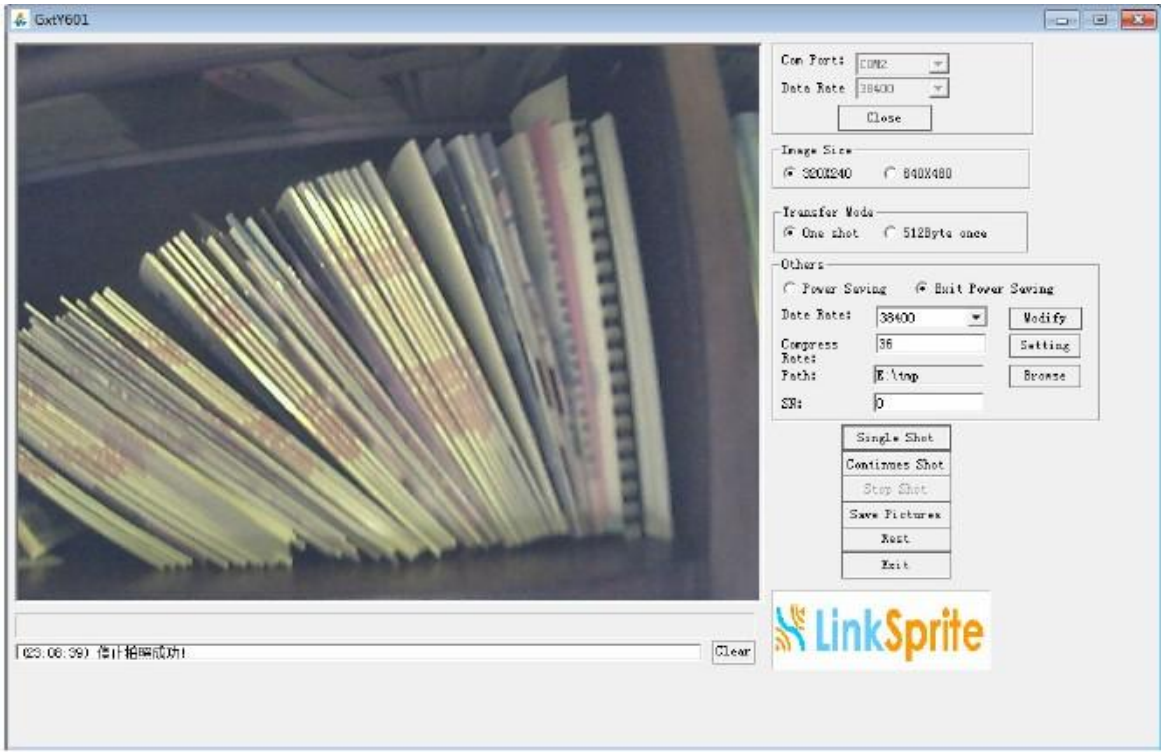


Path：Set the path for captured images. Please note that it is necessary to set the path, if it is a wrong path or not exist, then the picture may not be saved.

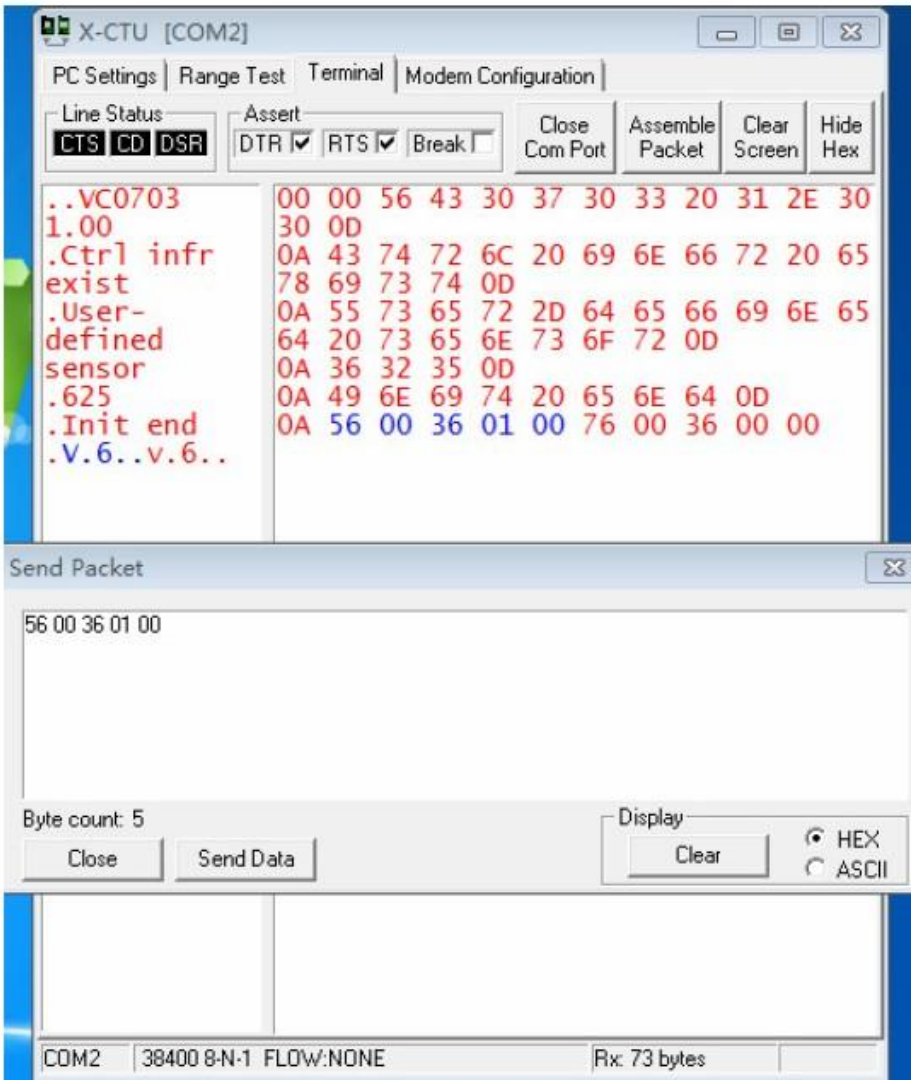
6.3 Test with software



Click “Single Shot”:



6.4 Test with X-CTU



Input HEX command in “Send Packet” and click “Send Data”, X-CTU will show the input command and return the information sent back by the camera.

7. Communication Protocol

7.1 Reset

Send：56 00 26 00

Return：76 00 26 00

7.2 Take picture

Send：56 00 36 01 00

Return：76 00 36 00 00

7.3 Read JPEG file size

Read length：56 00 34 01 00

Return ： 76 00 34 00 04 00 2C B4 DC (example)

2C B4 DC is the length of the picture file, MSB in the front and LSB in the end.

7.4 Read JPEG file content

Read：56 00 32 0C 00 0A 00 MM MM MM 00 KK KK KK XX XX

Return ：76 00 32 00 00 （Spacing Interval）FF D8 。。。。。。。。。。（Spacing Interval）

76 00 32 00 00

（spacing interval）= XX XX*0.01ms

00 00 MM MM MM Init address

00 00 KK KK KK data length

MSB first, then LSB

Note：（Spacing Interval）= XX XX*0.01ms，it is better to be smaller，such as：00 0A

JPEG file start from FF D8 end by FF D9.

To read Jpeg file, the start is always 0000, and read data block in integer multiple of 8 till it show FF D9 at the end.

7.5 Stop taking pictures

Stop ： 56 00 36 01 03

Return ： 76 00 36 00 00

7.6 Compression Ratio

Send：56 00 31 05　01 01 12 04　XX

Return：76 00 31 00 00

XX is usually 1-9.

7.7 Image size

Send	Resolution	Return
56 00 54 01 22	160*120	76 00 54 00 00
56 00 54 01 11	320*240	76 00 54 00 00
56 00 54 01 00	640*480	76 00 54 00 00
56 00 54 01 1D	800*600	76 00 54 00 00
56 00 54 01 1C	1024*768	76 00 54 00 00
56 00 54 01 1B	1280*960	76 00 54 00 00
56 00 54 01 21	1600*1200	76 00 54 00 00

Do not disconnect or reset after sending the command, or it will turn back.

7.8 Power Saving

Send：　56 00 3E 03 00 01 01　　Return ： 76 00 3E 00 00

Quit Saving：56 00 3E 03 00 01 00　Return：76 00 3E 00 00

7.9 Changing Baud Rate

Send ： 56 00 24 03 01 XX

Return ： 76 00 24 00 00

XX　　baud rate

0Xae	9600
0X2A	38400
0X1C	57600
0X0D	115200
0X7E	128000
0X56	256000

Please Note：

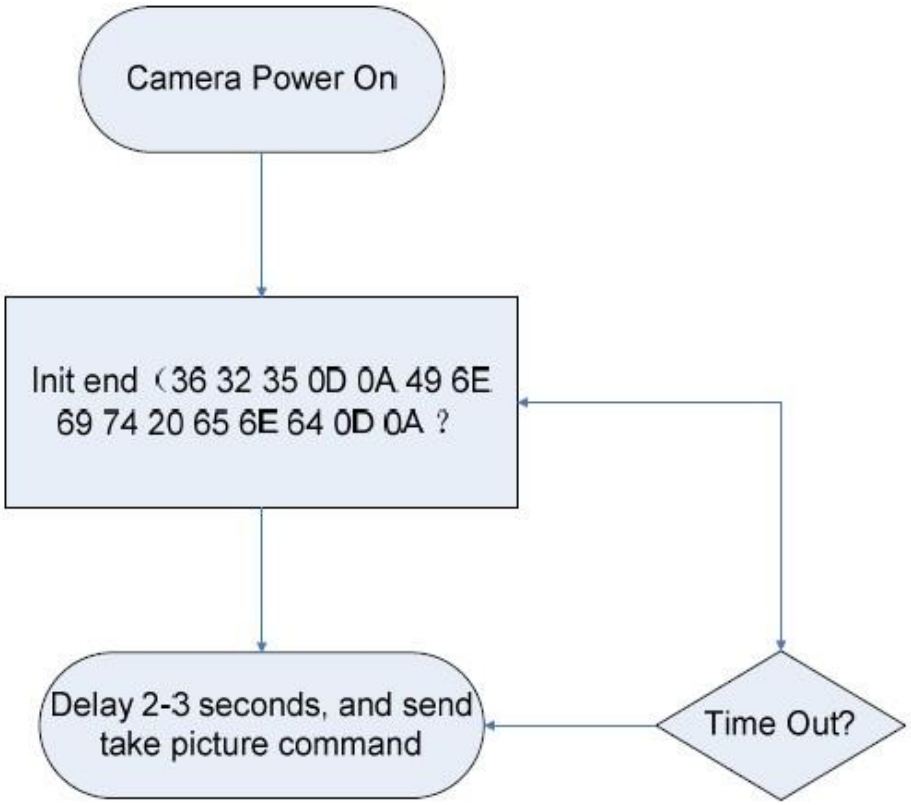
- **The starting read address must be the 8 integer multiples**
- **For multiple cameras 56 XX 36 01 00，XX is the Device Number(Default is 00)**
- **UART is in RS232 level. If connect to the MCU, please add a level converter or remove the MAX3232 ic. RS232 level are used in the modules，UART communication distance can not be longer than 1m.**
- **The serial port will show the below info when connect with power：**

  Init end

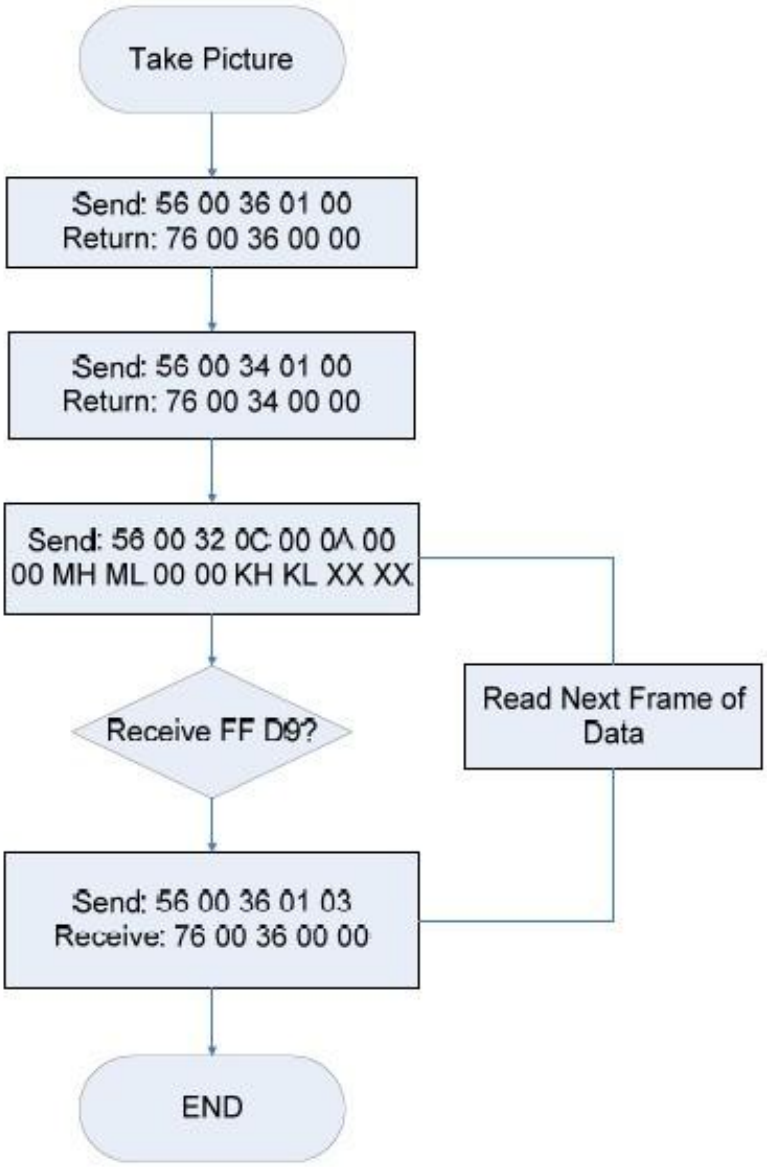
- **The host only have to make sure when to receive "Init end"（36 32 35 0D 0A 49 6E 69 74 20 65 6E 64 0D 0A），then take the capture command in 2-3s.**

8. Program flow chart

8.1 Initialize



8.2 Take JPEG picture：



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