

SPECIFICATIONS

DMD32240T035-01WN

3.5, 320X240, M100 Kernel, 65K COLOR LCD TFT HMI

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AMP DISPLAY PART NO.	DMD32240T035-01WN	000			
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DMD32240T035_01WN:





DWIN TFT HMI MODULE



THE FULL RANGE OF PRODUCTS: BASIC TYPE, STANDARD TYPE, ENHANCED TYPE

To satisfy the widely applications of different industry.

Basic Type: Simple in external, inexpensive, a substitution for TN, STN without the function of GUI. Available for most of the working environments.

Standard Type: 100% preburning, temperature testing and dead pixels rejection before delivery based on Basic Type, the price is 30%—50% higher in bulk price.

Enhanced Type: Based on Standard Type, it was manufactured with high-standard screen and special disposals for adapting the rigours environment (eg. Intrinsic Safety Anti-explosion).

Integrated standard fonts & Extensible user fonts

Intelligent LCD terminal was assembled with 5 fonts before delivery, which include 8*8 ASCII, 16*16 GBK, 32*32 GB2312, 12*12 GBK, and 24*24 GB 2312.

Moreover, extensible fonts are also available according to the requirement of users such as GBK, BIG5, SJIS, HANGUL, and UNICODE. Fonts designing function is supported in same time.

Optional operation modes

The module can be operated by Keyboard or Touch Screen.

The coordinate numerical values of the touched screen could be obtained directly, as well as key assignments. With PC-settings and touching/keyboard-control configuration files downloading, operation effects will be visual.

Visual display

Wide in viewing angle, various in color; the brightness of screen can be adjusted in 64 levels (CCFL and OLED are not included), which could provide an easier operation and monitoring environment for users.

Graphical User Interface(GUI) operation

All the Intelligent LCD terminals are operated under the GUI environment; the development of GUI and software/hardware could be carried out in the sometime, which saves the manufacturing cost and circle.

Multi-controller option

Connecting to the controllers (including PC, SCM, PLC, DSP, and ARM) with Serial port. The terminal could be driven with the level of TTL / CMOS and RS232 mostly. Moreover, USB download function is available for specific terminals, which could provide the baud rates up to 921600bps.



CONTENTS





Technical Specification

Terminal Characteristics					
Terminal Type		DMD32240	T035_01WN	N	
		Basic type			
TF1-ID Display Color		0x00	TUMI		
		3.5"			
Size (Inch)	`	0.0	.4.		
Resolution (WXRGBXH, pixel)	320xRGBx2	240 (')		
Backlight		LED			
Brightness		Typical Brig	htness 250ni	t;Brightness o	of the screen can be adjusted to 64 levels
	with softwar	e.			
Contrast Ratio	300	25			
Reaction Time (ms)		25			
Viewing Angle (L/R/U/D)		60/60/45/45	5		
Screen Mode		Digital			
Note [1]: 1. Modules can wor	k in the 90° pattern	rotation after s	oftware mod	ification. (240	x320)
2. Viewing angle is	haracteristics	o clock of 12	o clock positi	ion. (Pre-orde	required before purchase).
Direct Current Electrical C	naracteristics	32-58			
Input Power Voltage (V)		0.2 0.0	Deal-light On		Deal-light Off
Electric Current (mA, Typic	al value)				Backlight Off
(Input ⁽²⁾ : VCC=5V)			170		110
Note [2] : The input voltage an	d current are measu	red at the pin	socket of the	terminal in the	e DC Electrical Characteristics Test
Customer Interface ⁽³⁾					
	Pin Name	Number	Type		Illustration
	VCC	123	P	Power input	t
880	1/00	1,2,0	1 T		
20000 × 1000	PVD	4	-	Baud rate selection(9216000ps)	
T S O S O	TYD	5	1	Serial input ⁽³⁾	
0.2		6	0	Serial outpu	it ⁽³⁾
	BUSY	7	Ο	Full signal of	of serial buffer ⁽³⁾
	GND	8.9.10	Р	Public grou	nd
I:INPUT, O:OUTPUT, P:POWER, Note [3]: 1 FCC10_1.0mm socket; Socket type, connect user system with 10PIN 1.0mm flat cable. 2. Direction of the signal was defined with HMI; 'I' refers to the signal from the user's system transmitted to the HMI. 3. Pins with the same definition in the modules are connected together internally. 4. This terminal serial port is 3.3V TTL/CMOS.				lat cable. Iser's system transmitted to the HMI.	
		L'Iniversal A	synchronous	Receiver/Tr	ansmitter (UART) 8N1 mode(1 start hit
Serial Mode ⁽⁴⁾		Universal Asynchronous Receiver/Transmitter (UART), 8N1 mode(1 start bit, 1 stop bit, 8 data bit, no parity bit), Baud rate: 4800-115200bps. Different baud rate settings available by software.			
USB Interface ⁽⁴⁾		No			
Touch panel		No			
Key-board Interface		No			
Video Interface		No			
Bool Time Clock(DTC) (Bool		No			
Real-Time Clock(RTC) (Back	up battery)	No			



	1. I/O0=VCC or N	IC, Baud rat	e available	for Seria	ıl	1		0		
	(bps)	4800	4800	4800	9600	19200	38600	57600	115200 (Default)	
	Baud Set	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	
 1/O0=0V: 921600bps; Use 0vE0 configured the seriel part hand rate (see Command Set), not loss when power off. 										
	5. Use 0xE0 configured the seriar port datid rate (see Confinand Set), not lose when power off.									
Mem	Memory Space									
Snaaa	of Font (5)			4MB,	6 fonts: 5	standard t	fonts with	one reser	ved fonts. Support GBK,	, BIG5,
Space of Font (5)			SJIS,	SJIS, HANGUL, UNICODE and user design their own fonts.						
Space	of Image			12MB	(Up to 15	53 full-scr	een image	s storage :	space)	
		(,	Up to	32MB and	d overlapp	ing with t	he image	memory space.	
Serial	Access Memory Spa	ace (RMA)							
Note [5]: 1. Pre-loaded with	h 5 fonts bef	ore deliver	y, located	1 at 0x00(ASCII), 0	x20(12 lat	tice GBK), 0x21(16 lattice GBK),	, 0x22(24
	lattice GB2312)	, 0x23(32 la	ttice GB23	12).						
	2. Reserved font lo	ocated at 0x2	24, keep for	users(e.	g. Pinyin	input font)			
Dime	nsion									
Viewir	ng Area Size			70.1 (W)×52.6 ((H) mm				
Dimen	sions			78.0 (W)×65.2 ((H) ×6.6 (Γ) mm			
Net W	eight			,	, ,		,			
				50g (50g (DMD32240T035_01WN)					
Envir	onment Conditio	on (limited	by the tem	perature	range of l	LCD scree	en)			
Worki	ng Temperature			-20°C	-20°C — +70°C					
Storag	e Temperature			-30°C	-30°C — +80°C					
Com	mand Set									
Command Set				Using the Command Set "DMD32240T035_01WN Command Set"						
Mode	Model Selection									
Model	Models DMD32240T035_01WN, no peripherals functions									
P	Pb RoHs CE									



Command List

Categories	Com	Command Parameter	Illustration	Sup
	mand			port
Handshake	0x00	No	Check the configuration and version	\checkmark
	0x40	Fcolor+Bcolor	Palette setting	\checkmark
	0x41	D_X (0x00-0x7F) +D_Y (0x00-0x7F)	Character space setting	\checkmark
Parameter	0x42	X+Y	Move the appointed color to background color palette	\checkmark
Configuration	0x43	X+Y	Move the appointed color to foreground color palette.	\checkmark
	0x44	Mode+X+Y+Wide (0x01-0x1F) +Height (0x01-0x1F)	Cursor display mode setting	\checkmark
	0x53		8X8 lattice ASCII character	\checkmark
	0x54		16×16lattice GBK	\checkmark
	0x55	X+Y+String	32×32 GB2312	\checkmark
Text Display	0x6E		12×12 GBK	\checkmark
	0x6F		24×24 GB2312	\checkmark
	0x98	X+Y+Lib_ID+C_mode+C_dot+Fcolor+Bcolor+String	Display any lattice, any encoded string.	\checkmark
	0x50		More points setting in the background color.(delete point)	\checkmark
	0x51	(x,y) $_{0}$ + (x,y) $_{1}$ ++ (x,y) $_{n}$	More points in the foreground color.	\checkmark
Points Setting	0x74	$X{+}Y_s{+}Y_e$ +Bcolor+ (y, Fcolor) $_1{+}$ + (y, Fcolor) $_n$	Dynamic curve display.	\checkmark
	0x72	Address(H:M:L)+Data_word_0++ Data_word_n	Operation to the buffer of video card.	\checkmark
Lines &	0x56		Polygon display: Line the points with foreground colored segment.	\checkmark
Polygon	0x5D	$(x,y)_0+(x,y)_1+\ldots+(x,y)_n$	Polygon delete: Line the points with background colored segment	\checkmark
Arcs	0x57	$(Type,x,y,r)_0+(Type,x,y,r)_1+\ldots+(Type,x,y,r)_n$	Arcs display	\checkmark
	0x59		Show rectangles: display rectangles by foreground color)	\checkmark
Rectangles	0x69	$(x_{s}, y_{z}, x_{e}, y_{e})_{0} + (x_{s}, y_{z}, x_{e}, y_{e})_{1} + \dots + (x_{s}, y_{z}, x_{e}, y_{e})_{n}$	Delete rectangles: display rectangles by background color	\checkmark
	0x64	X+Y+Color	Fill in the appointed area	\checkmark
	0x52	No	Clear screen	\checkmark
	0x5A		Areas deleting	\checkmark
4 1000	0x5B	$(x_{s},y_{z},x_{e},y_{e})_{0}+(x_{s},y_{z},x_{e},y_{e})_{1}+\ldots +(x_{s},y_{z},x_{e},y_{e})_{n}$	Fill in more than one appointed areas.	
Operation	0x5C		Areas color changing	V
operation	0x60		Appointed areas ring-shifting to the left	V
	0x61	$(\mathbf{x} \mathbf{y} \mathbf{x} \mathbf{y} \mathbf{n})_{\mathbf{x}+(\mathbf{x} \mathbf{y} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{n})_{\mathbf{x}+(\mathbf{x} \mathbf{y} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{n})_{\mathbf{x}+(\mathbf{x} \mathbf{y} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{n})_{\mathbf{x}+(\mathbf{x} \mathbf{x} \mathbf{x} \mathbf{n})_{\mathbf{x}+(\mathbf$	Appointed areas ring-shifting to the right	V
	0x62	(**\$5, J 25, **65, J 65, **)0 * (**\$5, J 25, **65, J 65, **)1 * · · · · · · * (**\$5, J 25, **65, J 65, **)11	Appointed areas shifting to the left	V
	0x63		Appointed areas shifting to the right	\checkmark
	0x70	Picture_ID (0x00-0x98,up to 153 pictures)	Display a full screen image	V
	0x73	RAM_POS(0x00-0x01)	Display a full screen image from internal flash	V
	0x71	Picture_ID+Xs+Ys+Xe+Ye+X+Y	Display part of a picture in the memory (background display)	\checkmark
Pictures & Cursor	0x9C	Picture_ID+Xs+Ys+Xe+Ye+X+Y	Display a part from an image which stored in the module (background not shown), automatically restore the current image background.	√
	0x9D	Picture_ID+Xs+Ys+Xe+Ye+X+Y	Display part of a picture in the memory (background does not display)	\checkmark
	0xE2	Picture_ID	Save the current picture in the internal flash	\checkmark
	0xE8	RAM_POS(0x00-0x01)	Save the current picture in the specified position of internal flash	\checkmark
	0xC0	Address(H:L)+ Data_word ₀ ++ Data_word _n	Writing data to the 64KMB RAM data storage	\checkmark
User data storage	0xC2	<address>+<data_length></data_length></address>	Read back data from the internal 64KMB RAM data storage	\checkmark
Pinyin input method	0xB0	0X40+PY_code	Pinyin input query based on GKB	\checkmark
		0xF2+0xF2+0x5A+0xA5+Lib_ID	Modify font library	V
		Lib_ID=0x00 128KB,ASCII		\checkmark
Download font	0xF2	Lib_ID=0x20 576KB,12*12 GBK		\checkmark
library		Lib_ID=0x21 752KB,16*16 GBK		
		Lib_ID=0x22 624KB,24*24 GB2312		\checkmark
		Lib ID=0x23 1024KB,32*32GB2312		



A Brighter Solution

		Lib_ID=0x24 992KB,ASCII, Reserved font for users(e.g. Pinyin input font)		
Backlight	0x5E	Non	Turn off the backlight	\checkmark
Control	0x5F	Non or PWM_T(0x00-0x3F)	Turn the backlight on or adjusting the brightness by PWM.	\checkmark
Parameter Configuration	0xE0	0x55+0xAA+0x5A+0xA5+Panel_Set+Bode_Set+Para1 Note: the lowest baud rate is 4800bps(bote_set=00,01,02) Para11.2=0 level (320*240) display mode Para11.2=1 vertical(240*320) display mode	Configuring the user's serial port speed and the display mode	V

Note $: \sqrt{\text{Command available in this module}}$

DMD32240T035 01WN color setting mode is 16bit, but download images must select 256 colors mode 0x73,0xE8 are DMD32240T035_01WN unique Command, used for images saved and restores 0xC0,0xC2 is according byte operation, different from other HMI 0xb004 Command need download GBK Pinyin font library to 0x24 position

Please refer to the DWIN HMI Command Set for details.

Beijing DWIM Technology



Reliability Test

Temperature and humidity test

Test Item	Test Method
High temperature-working	70°C , 240H
High temperature-storage	80°C , 240H
High temperature high humidity-working	60°C , 90%RH , 240H
Low temperature-working	-20°C , 240H
Low temperature-storage	-30°C , 240H
Cold and hot impact	-20°C (1Hr) ~ 70°C(1Hr) , 200 cycles



Test Item	Test Method
Impact test (without power)	1 .Vibration level: 294m / s 2 (equivalent to 30G.)
	2. Waveform: half sine, 11ms
	3. Vibration frequency : total three vibration inputs (each direction of three
	mutually perpendicular axis has a vibration input)
Vibration test (with power)	1.Frequency range: 8-55 Hz
	2. Stoke: 1.5mm
	3. Vibration: half-wave, vertical axis (X, Y, Z axis : 2 hours)
	4.Scan: 10G, 55-400 Hz
	5.Period: 15 minutes



Precautions

1. Applied for LCD terminals:

LCD terminals are precise instrument. For preventing LCD terminals from damage, please read the following precautions carefully before using:

1) Please use the mounting hole on the module's corners for installation and avoid bending or wrenching during assembling process. Do not drop, bend or twist the TFT-LCD module during handling;

2) The protective film(Laminator) applied on the screen should be peeled off in the course of using, otherwise, it may affects the sensitivity or leads to malfunction ;

3) Modules are fragile products that any drops, beats and strong vibrations may cause damages ;

4) The visual effectiveness of the terminal changes along with the viewing angles. So, users should take a full account of the viewing position

5) Caution with the polarizing film from being scratched by hard objects.

6) Avoid touching the power inverter, which may cause unnecessary damages.

7) Using and saving the modules in its temperature range to avoid damages. LCD crystallization occurs if working below lowest temperature requirements, resulting in permanent damages.

8) Disassembling the module might cause permanent damages, which should be strictly avoided;

9) Do not wipe the terminals with gasoline, alcohol and other chemicals. Cottons and soft cloths are available.

10) To continuously improve the performance of HMI module, the terminals and data sheet will do continuously upgrade and revision, the information is subject to change without prior notice!

2. Storage:

If you need to storage the modules for a long time, we recommend you of the following ways:

- 1) Keep in dark and avoid exposure of bright light;
- 2) Do not put anything on the screen;
- 3) Store the module at a room temperature place.

Documen



Assembly Dimension Chart





Appendix 1 Naming Rules

Naming Rules

	DM	DWIN HMI		
	Т	T=65K color HMI G=16.7M color D=256 color		
	48	48: resolution in width. 48=480, 64=640		
Illustration 270 270: resolution in height				
K K=advanced type, T=basic type, S=standard type (1) 043 Dimension,056=5.6 inch,035=3.5 inch _0 0=with shell,1=no shell		K=advanced type, T=basic type, S=standard type (1)		
		Dimension,056=5.6 inch,035=3.5 inch		
		0=with shell,1=no shell		
	1	Series number of different hardware		
	W	W=wide temperature range N=normal temperature		
	Ν	N=no TP,T=with TP, K=with keyboard, Z=ODM ⁽²⁾		
 S=Standard, compare with the basic, 100% aging, high and low temperature testing, bad point eliminate in the factory. Batch price higher than the same type of basic about 30%-50% K=Enhanced, compare with the standard, the main difference is the choice, special protective of screen, etc, in order to satisfy a few demanding application requirements(such as explosion proof) Note [2]: Peripherals explanation TP(Touch Panel): touch screen(4 line resistance screen) KB (Keyboard): matrix keyboard interface, according to different type configuration 4*4, 6*6 and 8*8 matrix keyboard interface. RTC(Real Time Clock): real time clock, 2000-2099 years in the Gregorian calendar and the lunar clock, can be display on the screen.(0x9B Command) 				
K=E Note [2]: Per TP(Touch I KB (Keybo RTC(Real 7 screen.(0x9B	andard, compare with the basic, 100% a price higher than the same type of basic inhanced, compare with the standard, the satisfy a few demanding application re- ipherals explanation Panel): touch screen(4 line resistance scr ard): matrix keyboard interface, accordi Fime Clock): real time clock, 2000-2099 Command)	aging, high and low temperature testing, bad point eliminate in the factory. Batc c about 30%-50% e main difference is the choice, special protective of screen, etc, in order to equirements(such as explosion proof) reen) ing to different type configuration 4*4, 6*6 and 8*8 matrix keyboard interface. 9 years in the Gregorian calendar and the lunar clock, can be display on the		



Appendix 2 Accessories

Accessories

Configuratio n Method	Name	Model	Illumination	Picture		
Standard Parts	10PIN 1.0mm flat cable		10PIN - 10PIN 15cm straight attachment			
Optional	FCC10_1.0mm Socket		10PIN 1.0mm space	ant and a second		
Optional	USB to TTL downloading board	HDL662				
Optional	Iron Frame	TK035001				
Notes: More in	Notes: More information about the accessories please check the DWIN Accessory Book.					

e check the DW



The Instruction of High-speed Downloading Board

Num	Name	Instruction	
1	DWI N HMI	Model : DMD48270T043_01WN	
2	Terminal USB Baud Rate Setting	Pad jumping to 921600bps. (ON=921600bps, OFF=User Set, defaulted OFF.)	
3	HDL662 Downloading Board	Top-speed downloading board.	
4	Double 10PIN connections	15cm straight attachment	
5	USB port	Connecting PC to USB port with double USB connection line	
6	Connector	FCC10_1.0mm Socket	
Instruct 1. Pad ju 2,3; 2. Conn board. (3. Conn 5) ;	ions : umper to 921600bps. See number necting the module to Downloading (See number 1、3、4、6) ; necting board with PC (See number	<image/>	
₽ ⁶	ing DWIN Tect	molos	



Assembly Sketch Map









Iron Frame Dimension Chart





Appendix 3 Testing Summary:

There are 4 classes of the LCD panel quality defined by ISO in 2001: Class 1 is the highest rating and does not allowed any dead pixels. The last rating is Class 4, allowed 10N dead pixels. Under normal circumstances, we are using the panels of Class 2 in serial T which allows three dead pixels, but if there are two dead pixels appeared within 5 * 5 pixels are also not allowed.

1) Dead pixels.

The pixels appears pure black under the totally black background or pure black under white and in the color switching of red, green and blue, it also displays in black or white in the same position that can be assumed to be a dead pixel.

2) Bright pixels

Pixels that showing the color of red, green and blue when the background color is black are < echi called bright pixels which are also un-normal.

3) Dark pixels

red, g. .-normal. Com Retimo Pixels that showing the color of non-pure red, green and blue when the background color is

Revise Date: 2011.05-11



Appendix 4 FAQ:

Q1. When the terminal and the MCU are connected, it displays normally on the single-step implementation of the control procedure. But when the terminal is powered directly, it doesn't response.

A: Please check whether the input power to the MCU are delayed or the shakehand acknowledgment are reset; you may connecting the MCU to the PC, using the Terminalassistant Software to check the baud rate or the instructions sent by MCU. If both the MCU and terminal can communicate with PC rather than communicate with each other, then measure whether the output signal of MCU are standard RS232 signal by using an oscilloscope.

Q2. Do we need to clear the screen before showing up texts?

A: We don't need to clear the screen except when displaying the transparent Command (0x98).

Q3. Why the terminal didn't response to the instructions sent by MCU?

A: Dropping Frames maybe the reason for the unimplementation of instructions, check with the BUSY signal or add delay before the lost instructions.

Q4. About power voltage;

A: Make sure the voltage in the terminal interface is corresponding to the basic requirement.

Q5. Terminal cannot display normally after received the configuration Command of 0xE0.

A: Reset the TFT ID (Command of 0xE0).

Q6. Some terminals cannot display normally after updating the standard M600 procedure.

A: Some terminals are not using the standard procedure.

Q7. Could the module simulate the instrument Mode?

A: AA 71 Command is available.

Q8. How to extend the terminal font?

A: Use the fonts generating software to make a new font and then download the new font to the terminal by Terminalassistant (Do not overlap with other fonts).

Q9. How to connect the module with PC and SCM?

A: The MCU to PC and terminal to PC are all connected with TXD/RXD of the RS232. Cross connect the 2 and 3 pin foot when connecting the SCM to HMI terminal.

Q10. Steps of making a touch interface.

A: 1) Design interfaces;

2) Using the Sysdef.exe software to configuration the logical relationships between interfaces, then, generating the configuration file;

- 3) download the file to the terminal;
- 4) Texting and modification.



Appendix 5 Typical applications

1, An Illustration of C51 and ASM51.

1, ASM51 Program:





2, C51 Program :

//	
//SICI2C2052 22.1184/mHz //EKTC52A	
//	
// Includes //	
#include <reg52.h></reg52.h>	
//	
<pre>sbit LED=P1^0;</pre>	
Global CONSTANTS	
#define SYSCLK 22118400 #define BAUD_RATE 115200 #define uchar unsigned #define uint unsigned	// SYSCLK frequency(Hz) // baud rate
//	
void Uart0_transmit(unsigned char i); void send_str(unsigned char *p,unsigned char s);	<pre>//statement Serial subfunction //Statement of sending a string subfunction</pre>
void delay_ms(unsigned char n); void SysInīt (void);	//statement of delay subfunction //statement of initialization systerm subfunction
void WenbenChangel(void);	// The statement to send the text subfunction
//	
// Uart0_transmit,one byte send to the serial //	
void Uart0_transmit(unsigned char i) {	//one byte send to the serial
ES=0; TT=0	
SBUF=i;	// send data to uartO
	// clear suspending
E3=1; }	
void send_str(unsigned char *p,unsigned char s) {	//send a data string to the serial
unsigned char m; for(m=0;m <s;m++)< td=""><td></td></s;m++)<>	
{ Uart0 transmit(*p):	
p++;	
} .	
//	
// usiay //	
yoid delay_ms(unsigned char n)	
<pre>{ int i, j; for (i=1000;i>0;i) { for (j=25*n;j>0;j) {:} }</pre>	
}	
//// SysInit	
//	



void SysInit(void)
{ PCON =0x80; SCON=0x50; TMOD=0x21; TH1=255; TL1=255; TP1=1; TR1=1; ES=0: ES=0; TH0=0xB8; TL0=0x00; TR0=1; ET0=1; TextChange 11 void WenbenChangel(void) uchar wenben1[30]={0xAA,0x55,0x00,0x00,0x00,0x00,0xB1,0xB1,0xBE,0xA9, 0xB5,0xCF,0xCE,0xC4,0xBF,0xC6,0xBC,0xBC,0xBC,0xD3,0xD0, 0xCF,0xDE,0xB9,0xAB,0xCB,0xBE,0xCC,0x33,0xC3,0x3C}; //display the text as: 北京迪文科技公司 send_str(wenben1, 30);
delay_ms(100); 3 main() Routine int main (void) { //main function EA=0; SysInit(); EA=1; //CLEAR EA //EA=1 $delay_ms(40);$ //delay 400ms while (1) { delay delay_ms(100); WenbenChange1(); //send text 3 return 0; Beijing DWIM Technolow



2. Typical Application Schematic

