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北京迪文科技有限公司

Beijing DWIN Technology Co., Ltd

Beijing DWIN Technology Co., Ltd Instruction Manual

Professional, Creditable, Successful

DWIN's High Quality HMI, The Best Solution for Industrial Field Applications!

Index

1.0 Overview	3
1.1 Feature	3
1.2 Typical Application	3
2.0 Interface Connection	4
2.1 Terminal Interface:	4
2.1.1 8PIN×2.54mm spacing socket	4
2.1.2 USB Interface	4
2.1.3 10PIN×1.0mm spacing socket (Suitable for C Series and DMD Series).....	4
2.1.4 5PIN×3.81mm spacing socket (Suitable for some models).....	5
2.1.5 5PIN×5.08mm spacing socket (for DMT64480S057-12WT / DMT80600S104-12WT).....	5
2.1.6 Key-board Interface	5
2.2 Connection Cables Interface.....	6
2.2.1 DB9-8PIN cable (8PIN interface)	6
2.2.2 USB cable.....	6
2.2.3 Down-loading board HDL661 (8PIN interface).	7
2.2.4 Double 8 PIN connecting line	7
2.2.5 10PIN cable	8
2.2.6 Down-loading board HDL663 (10PIN interface)	8
3.0 Accessories	9
3.1 Accessories (Suitable for 10PIN interface)	9
3.2 Accessories (Suitable for 8PIN interface)	9
3.3 Optional Frames.....	9
4.0 Command list	11
4.1 DWIN HMI Command Set H600	11
4.2 DWIN HMI Command Set D100	14
4.3 DWIN HMI Command Set M100, M600, K600)	16
5.0 Preferred Installation and Precautions.....	19
5.1 LCD terminals Application.....	19
5.2 Storage	19

6.0 Testing Summary	19
6.1 Dead pixels.....	19
6.2 Bright pixels.....	20
6.3 Dark pixels.....	20
7.0 Package Specification.....	20
8.0 International Standards	21
9.0 Definition of Labels and Naming Rules.....	22
10.0 Product Maintenance	23
10.1 Technical Support	23
10.2 Product Upgrade	23
10.3 Product Maintenance	23
Appendix 1: Typical application principle diagram.....	24
1.1 An illustration of C51 and ASM51.	24
1.2 Typical Application Schematic	27
Contact Information.....	28

1.0 Overview

1.1 Products Feature

- Standard industrial LCD screen, unified Command Set, touch screen shift compensation technology, EMI Proof capability and experienced in quantity production supply;
- Unified hardware interface: RS232/TTL, easy to update;
- Easy to use, module can be worked with 3 wires (power cable, ground cable and serial port input cable) at minimum;
- Multi fonts and Multilingual Support (32MB font library space and 5 font libraries pre-installed before delivery. In addition, fonts designing function (User customized fonts) are also supported);
- Full screen display and regional display(default 128MB memory for picture storage that can be upgraded to 3GB);
- Integration of touch screen, keyboard, clock and audio play, support touch screen (keyboard) interface auto-shift and clock auto-composition display; Support touchscreen / Keyboard auto-switch and Clock Overlap Display
- Specially designed for industrial applications and Extensible command set
- Stable and mature drivers technologies to avoid clients' risk of new products development, staff turnovers and products update. It will support clients to exploit new market rapidly.

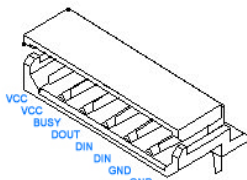
1.2 Typical Application

- Cooperation with LCM manufacturer
DWIN provides systematic industrial LCM solution based on DWIN driving kernel for other LCM manufacturers
- Medical and Cosmetology Application
Typical products: anesthesia machine, respirator, microware bistouries, laser hairdressing equipment
- Power Industry Application
Typical products: relay protection machine, power monitoring, power-supply device, earthed system
- Engineering Machinery Application
Typical products: moment limiter, Integrated digital dashboard
- Transportation Industry
Typical products: diagnostic unit, engine electronic control monitoring display, digital dashboard
- Elevator Industry
Typical products: lift display, outbound displayer
- Environment Protection Machinery
Typical products: environmental monitoring equipments, water analysis equipments

2.0 Interface Connection


2.1 Terminal Interface:

2.1.1 8PIN x2.54mm spacing socket

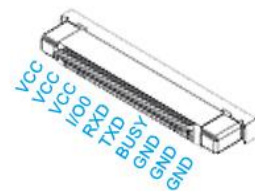
Serial Mode				
	Pin Name	Number	Type	Illustration
	VCC	1,2	P	Power input
	BUSY	3	O	Full signal of serial buffer
	DOUT	4	O	Serial output ⁽¹⁾
	DIN	5,6	I	Serial input ⁽¹⁾
	GND	7,8	P	Public ground

I: INPUT, O: OUTPUT, P: POWER
 Note (1):
 1. Adopting an 8 Pin 2.54mm spacing socket and 5 Pin 3.81mm spacing socket. Socket type: Molex 0022057085;
 2. Direction of the signal was defined based on UART LCM; 'I' refers to the signal from the user's system transmitted to the UART LCM.
 3. Pins of same functions are connected inside UART LCM

2.1.2 USB Interface

USB Interface	
	Default baud rate is 921600bps
Note: DMG80600S080_02WT supports video display functions with mini USB port.	

2.1.3 10PINx1.0mm spacing socket (Suitable for C Series and DMD Series)

Serial Mode				
	Pin Name	Number	Type	Illustration
	VCC	1,2,3	P	Power input
	I/O0	4	I	Baud rate selection(921600bps) ⁽²⁾
	RXD	5	I	Serial input ⁽¹⁾
	TXD	6	O	Serial output ⁽¹⁾
	BUSY	7	O	Full signal of serial buffer ⁽¹⁾
	GND	8,9,10	P	Public ground

I: INPUT, O: OUTPUT, P: POWER
 Note (1):
 1. FCC10_1.0mm socket; connect user system with 10PIN 1.0mm flat cable.
 2. Direction of the signal was defined with UART LCM; 'I' refers to the signal from the user's system transmitted to the UART LCM.
 3. Pins with the same definition in the modules are connected together internally.
 4. This terminal serial port is 3.3V TTL/CMOS

Note (2):

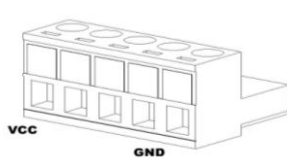
1. Baud rate available for Serial or USB connection.

(bps)	4800	4800	4800	9600	19200	38600	57600	115200 (Default)
Bode_Set	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07

2. I/O0=0V: 921600bps;

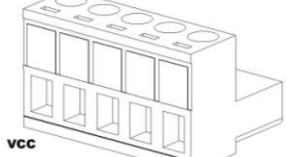
3. Use 0xE0 configure the serial port baud rate (see: Command Set), Reset when power off.

2.1.4 5PIN×3.81mm spacing socket (Suitable for certain models)

Serial Mode				
	Pin Name	Number	Type	Illustration
	VCC	1	P	Power input
	BUSY	2	O	Full signal of serial buffer
	TXD	3	O	Serial output
	RXD	4	I	Serial input
	GND	5	P	Public ground wire





I: INPUT, O: OUTPUT, P: POWER

2.1.5 5PIN×5.08mm spacing socket (for DMT64480S057-12WT / DMT80600S104-12WT)

Serial Mode				
	Pin Name	Number	Type	Illustration
	VCC	1	P	Power input
	BUSY	2	O	Full signal of serial buffer
	TXD	3	O	Serial output
	RXD	4	I	Serial input
	GND	5	P	Public place

I: INPUT, O: OUTPUT, P: POWER

2.1.6 Key-board Interface

Key-board Interface			
			
Support 4*4 matrix keyboard interface	Support 4*4 matrix keyboard interface	Support 4*4; 6*6 matrix keyboard interface	Support 4*4; 6*6; 8*8 matrix keyboard interface

2.2 Connection Cables Interface

2.2.1 You can use DB9-8PIN cable when you need to execute parameter settings or download pictures to DWIN terminal. (to connect COM port and 8Pin port on DWIN UART LCM)

(20cm/50cm/100cm DB9-8PIN cable available for select)



Attention: The left end of DB9-8PIN cable is 8PIN port to connect DWIN terminal; the right end is DB9 port and power port. DB9 port is to connect COM port to PC. The max baud rate of COM port is 115200bps.



2.2.2 You can also use male to male USB cable to achieve faster downloading when you need to download massive data.



Attention: Not all of DWIN products have USB port; please refer to datasheet and products manual before use. Additional power supply is needed when downloading pictures by using USB port.



2.2.3 You can also use high-speed download board “HDL661” if you need to download data to two or multiple DWIN terminals.



Attention: Please use male to male USB cable to connect PC and high-speed download board, and then use 8PIN-8PIN cable to connect DWIN terminal and download board. Baud rate can be set at 921600bps by jumping the wire jumper (connect the Jumper pads) on PCB when using high-speed download board. (Remarked on PCB: ON=921600bps, OFF=User Set, defaulted OFF (User Set). Please connect appropriate power supply to any one or two of the two black rounded power sockets. The port with red mark in the picture above must be connected to DWIN terminal or the download board will fail to work normally. The picture below illustrates the detailed connecting method as an example

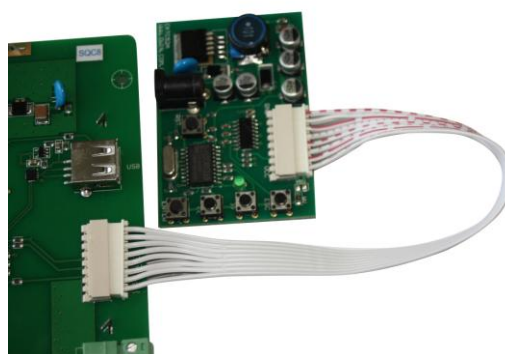


2.2.4 Use Double 8 PIN cable connect DWIN terminal and Single-chip Microcontroller or other devices

(20cm 8PIN-8PIN cable is intrinsic and optional 50cm/100cm 8PIN-8PIN cable available. Consult products manual to get detailed information)



Attention: Use symmetrical-male 8PIN cable to connect single-chip microcontroller (ETKC52 debugging board as example) and DWIN terminal whose power supplied by customer devices.



2.2.5 10PIN cable is needed to connect PC and USB adapter plate when using DWIN C-series products, 8-bit color products and some other products.

(10PIN cables of 5cm/15cm/40cm available; consult products catalogue to get more information)

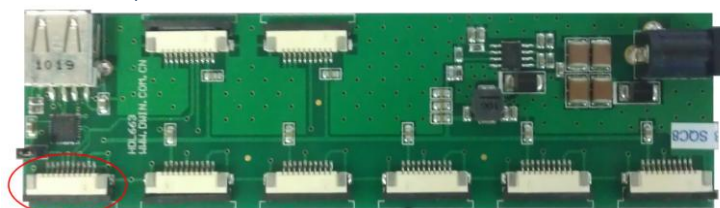


Attention: Connect USB adapter (HDL662) and DWIN terminal with 10PIN cable. Set baud rates by using the wire jumper on HDL662. Users can connect it directly to PC without additional power supply. The picture below shows the detailed connecting method.



*: HDL662 is not bundled in (sold separately); please purchase it separately with DWIN terminal.




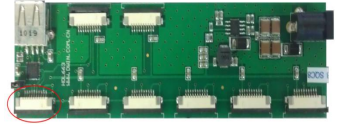
2.2.6 High-speed download board HDL663 is available if customers need to download data to multiple DWIN terminals. (10PIN interface)



Attention: Please use male to male USB cable to connect PC and high-speed download board and then use 10PIN-10PIN cable to connect DWIN terminal and download board. Baud rate can be as high as 921600bps or 6.25Mbps by using high-speed download board. Please connect matching power supply to any one of the two black rounded power ports. The port with red mark in the picture above must be connected to DWIN terminal or the download board will fail to work normally.

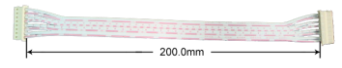
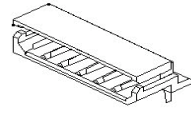

3.0 Accessories

3.1 Accessories (Suitable for 10PIN interface)

Configuration Method	Name	Model	Illumination	Picture
Optional	10PIN 1.0mm flat cable		10PIN—10PIN 15cm straight attachment	
Optional	FCC10_1.0mm Socket		10PIN 1.0mm space	
Optional	Adapter plate	HDL662	One-way USB to 10PIN_1.0 FCC UART LCM debugging interface	
Optional	Down-loading board	HDL663	8-port USB to 10PIN_1.0 FCC UART LCM debugging interface with power modulation	

Notes: To get more information about the accessories, please check the DWIN Accessory Book or contact with sales manager.

3.2 Accessories (Suitable for 8PIN interface)

Configuration Method	Name	Model	Illumination	Picture
Optional	Double 8 PIN connecting line	HDL65020	8PIN—8PIN 20cm plug: Molex 0050375083	
Optional	900 8PIN_2.54 mm Socket	Socket: Molex 0022057085	8PIN 2.54mm space	
Optional	Down-loading board	HDL661	12-port interfaces USB to 8PIN UART LCM downloading board	

Notes: To get more information about the accessories please check the DWIN Accessory Book or contact with sales manager.

3.3 Optional Frames

Size	Scale	LCD Size (mm)	Resolution	Compatible Model	Compatible Frame
3.5	4:3	70.1x51.6	320x240	DMD32240T035_01WN DMT32240C035_01WN	

	4:3	70.1×51.6	320×240	DMT32240C035_02W* DMT32240T035_01WN DMT32240S035_01W* DMG32240C035_01W* DMG32240S035_01W*	
	4:3	71.5×53.6	240×320	DMG32240S035_02W* DMG32240K035_02W*	
4.3	16:9	95.0×53.9	480×272	DMT48270C043_01W* DMT48270C043_02W* DMT48270T043_01W* DMT48270K043_01W* DMG48270C043_01W* DMG48270S043_01W* DMG48270K043_01W*	DS043001
	16:9	95.0×53.9	480×272	DMT48270S043_02W*	
4.7	16:9	103.7×58.8	480×272	DMD48270T047_01WN DMT48270C047_01W*	
5.0	16:9	108.0×64.8	800×480	DMT80480C050_01W* DMG80480T050_01W* DMG80480S050_01W*	
	4:3	101.6×76.2	640×480	DMT64480T050_01WN DMG64480T050_01W* DMG64480S050_01W*	
5.6	4:3	112.9×84.7	640×480	DMT64480T056_01W* DMT64480T056_02WN DMG64480C056_01W* DMG64480S056_01W*	DS056001
5.7	4:3	115.2×86.4	640×480	DMT64480S057_03W* DMG64480K057_01W*	
	4:3	115.2×86.4	640×480	DMT64480S057_12W*	Plastic Frame Integrated
7.0	16:9	152.4×91.4	800×480	DMT80480T070_02W* DMT80480S070_03W* DMT80480S070_05W* DMG80480T070_01W* DMG80480S070_01W* DMG80480K070_01W*	DS070001
	16:9	154.1×85.9	800×480	DMT80480C070_01W* DMT80480T070_05W* DMG80480C070_01W* DMG80480T070_02W* DMG80480S070_02W* DMG80480C070_02W*	
	4:3	141.0×105.8	800×600	DMG80600T070_01W*	
	4:3	141.3×106.0	1024×768	DMG10768S070_01W*	

8.0	4:3	162.0x121.5	800x600	DMT80600C080_01W* DMT80600T080_02W* DMT80600S080_05W* DMG80600C080_01W* DMG80600T080_01W* DMG80600S080_01W* DMG80600S080_02W* DMG80600S080_03W* DMG80600K080_01W*	DS080001
	4:3	162.0x121.5	1024x768	DMG10768S080_01W*	DS080001
8.4	4:3	170.5x127.9	1024x768	DMG10768K084_01W*	DS084001
10.2	16:9	220.4x129.2	1024x600	DMG10600S102_01W* DMG10600T102_01W*	
10.4	4:3	211.2x158.4	800x600	DMG80600C104_01W* DMG80600S104_02W* DMG80600K104_01W*	
	4:3	210.4x157.8	1024x768	DMG10768K104_01W*	DS104001
	4:3	211.2x158.4	800x600	DMG80600S104_12W*	Plastic Frame Integrated
12.1	16:9	261.1x163.2	1280x800	DMG12800S121_01W*	
	4:3	245.8x184.3	1024x768	DMG10768S121_01W* DMG10768K121_01W*	DS121001
	4:3	245.8x184.3	1024x768	DMG10768S121_02W*	
15.0	4:3	304.1x228.1	1024x768	DMT10768T150_01W* DMG10768S150_01W*	
	4:3	304.1x228.1	1024x768	DMG10768K150_01W*	DS150001
15.6	16:9	344.2x193.5	1365x768	DMG13768T156_01W*	
18.5	16:9	409.8x230.4	1365x768	DMG13768T185_01W*	

4.0 Command list

4.1 DWIN HMI Command Set H600 (Suitable for some of 65K colors and 16.7M colors)

Categories	Command	Command Parameter	Illustration
Hand shake	0x00	None	Check the configuration and version
Parameter configuration	0x40	Fcolor+Bcolor	Palette setting
	0x41	D_X (0x00-0x7F)+D_Y (0x00-0x7F)	Character space setting
	0x42	X+Y	Move the appointed color to background color palette
	0x43	X+Y	Move the appointed color to foreground color palette.
	0x44	Mode+X+Y+Wide (0x01-0x1F)+Height	Cursor display mode setting

		(0x01-0x1F)	
Text display	0x53	X+Y+String	8X8 lattice ASCII character
	0x54		16x16lattice GBK
	0x55		32x32 GB2312
	0x6E		12x12 GBK
	0x6F		24x24 GB2312
	0x98	X+Y+Lib_ID+C_mode+C_dot+F color+Bcolor+String	Display any lattice, any encoded string.
	0x45	(Xs,Ys,Xe,Ye)/0x00	Turn on/off textbox limit
Points Setting	0x50	(x,y) ₀ + (x,y) ₁ ++ (x,y) _n	More points setting in the background color. (delete point)
	0x51		More points in the foreground color.
	0x74	X+Y _s +Y _e +Bcolor+ (y, Fcolor) ₁ ++ (y, Fcolor) _n	Dynamic curve display.
	0x72	Address (H:M:L)+Data_word ₀ ++ Data_word _n	Oeration to the buffer of video card.
Lines & polygon	0x56	(x,y) ₀ + (x,y) ₁ ++ (x,y) _n	Polygon display: Line the points with foreground colored segment.
	0x6D		Polygon delete: Line the points with background colored segment
	0x75	X+Y+Height_max+Height ₀ + Height ₁ ++ Height _n	Spectrum display: display a continuous vertical line with the same end in a fast rhythm.
	0x76	X+X_dis (0x00-0xFF)+Y ₀ + Y ₁ ++ Y _n	Line chat display (Xi=X+i*X_dis,Yi=Yi)
	0x78	X+Y + (D_X0, D_Y0)+.....+ (D_Xi, D_Yi)	Connect curve by offset
Arcs	0x57	(Type,x,y,r) ₀ + (Type,x,y,r) ₁ +.....+ (Type,x,y,r) _n	Arcs display
Rectangles	0x59	(Xs,Yz,Xe,Ye) ₀ + (Xs,Yz,Xe,Ye) ₁ ++ (Xs,Yz,Xe,Ye) _n	Show rectangles: display rectangles by foreground color)
	0x69		Delete rectangles: display rectangles by background color
Areas Operation	0x73	Color0+Color1+ (Xs,Ys,Xe,Ye)+ (X,Y)+Data	Bi-color bitmap fill specified area
	0x64	X+Y+Color	Fill in the appointed area
	0x52	No	Clear screen
	0x5A	(Xs,Yz,Xe,Ye) ₀ + (Xs,Yz,Xe,Ye) ₁ ++ (Xs,Yz,Xe,Ye) _n	Areas deleting
	0x5B		Fill in more than one appointed areas.
	0x5C		Areas color changing
	0x60		Appointed areas ring-shifting to the left
	0x61	(Xs,Yz,Xe,Ye,n) ₀ + (Xs,Yz,Xe,Ye,n) ₁ +.....+ (Xs,Yz,Xe,Ye,n) _n	Appointed areas ring-shifting to the right
	0x62		Appointed areas shifting to the left
0x63		Appointed areas shifting to the right	
Pictures & Icons	0x70	Picture_ID	Picture showing
	0x7B	Picture_ID	Display a full screen picture and calculate CRC. Check..
	0x71	Picture_ID+X _s +Y _s +X _e +Y _e +X+Y	Display part of a picture in the memory (background display)
	0x9C	Picture_ID+X _s +Y _s +X _e +Y _e +X+Y	Display part of a picture in the memory (background does not display)
	0x9D	Picture_ID+X _s +Y _s +X _e +Y _e +X+Y	Display part of a picture in the memory (background does not display)
	0x9E	Mode+Pic_ID+X _s +Y _s +X _e +Y _e +Xc+Y	Display part of a picture in the memory, paste to the

		c+AL+Xc1+Yc1	current screen after rotating a specific angle
	0xE2	Picture_ID	Picture saving
	0x99	(x,y,lcon_ID) ₀ + (x,y,lcon_ID) ₁ +.....+ (x,y,lcon_ID) _n /No	User-defined icons display
	0xD0	No	Refresh
Animation	0x9A	0xFF/Pack_ID	Turn off/on the automatic implementation of the user's pre-setting instruction set
Temporay buffer operation	0xC0	Address (H:L)+ Data_word ₀ ++ Data_word _n	Writing data to the temporary buffer
	0xC1	0x01+Address+Pixel_Number (H:L)	Display the pre-set date points in the temporary buffer
		0x02+Address+Line_Number (H:L)	Display the pre-set date lines in the temporary buffer
		0x03+Address+X+Y+ Line_Number+D_x+Dis_x+K_y+Color	Dynamic curve scaling: connecting the data points in the temporary buffer zone
		0x04+Addr1+X+Y+Line_Number+0x01+Dis_x+Color1+ Addr0+ Color0	Oscillometer: connecting the data points in temporary buffer in a flicker-free high-speed
		0x05+Address+X+Y+Line_Number+ D_x+Dis_x+M_y+D_y+ Color	Use datas in temporary buffer to display line charts.
		0x06+Address+X+Y+Line_Number+ D_x+Dis_x+M_y+D_y+ Color+Ymin+Ymax	Use dates in temporary buffer zoom to display a window-constrained bi-directional line chart
		0x0700+Address+Xlen+Ylen+Xs+Ys	Clear placed dots in buffer
		0x0701+Address+Xlen+Ylen+Xs+Ys +Color+Mode+ (Xi,Yi)	Place a dot in buffer
		0x0702+Address+Xlen+Ylen+Xs+Ys +Color	Display buffer to current screen
		0x10+Address+Frame_Number	Using the command in the temporary buffer to perform a synchronize display
	0x08+Address+<Parameter_N>	Multi-parameter display in buffer	
	0xC2	Address> +<Data_Length>	Read data in buffer
Database Operation	0xF2	0xF2+0xF2+0x5A+0xA5+Lib_ID	Font modification
	0x90	0x55+0xAA+0x5A+0xA5+Address (H:MH:ML:L)+Data	Write dates to the user's database (32MB)
	0x91	Address+Read_Length (H:L)	Read datas from the database (32MB)
Key board Operation	0x71	K_code	Key code uploading
	0xE5	0x55+0xAA+0x5A+0xA5+K_Code ₀ ++K_Code _n	Key code port modification
Touch pad Operation	0x72	Touch_X+Touch_Y	Uploading the last data after the touch-screen is released, (which can turn off by 0xE0 instruction)
	0x73		Uploading datas when pressing the touch screen (uploading once only by setting the command of 0xE0)
	0xE4	0x55+0xAA+0x5A+0xA5	Touch screen adjusting
	0x78	Touch_Code	Uploading the defaulted key code when switching the touch interface
	0x79		
	0x7C	01 R_ID VP_ID X Y Str_Max_Num Str_Scale Str_Color	Input ASCII string by touch screen
	02 R_ID VP_ID X Y Str_Max_Num Str_Scale Str_Color T_Color Tx Ty	Input English and Chinese combined string by touch screen	
Buzzer Operation	0x79	BZ_time	Buzzing once only (10xBz_time mS)
Video Mode Switching	0x7A	Work_Mode+Video_mode+Video_C H	HMI and Video mode switching (support CVBS / S-VIDEO signal input and NTSC / PAL format).

Backlight Control	0x5E	Non or 0x55+0xAA+0x5A+0xA + V_ON+V_OFF+ON_TIME	Turn off the backlight or control the backlight mode by touching or keying.
	0x5F	Non or PWM_T (0x00-0x3F)	Turn the backlight on or adjusting the brightness by PWM.
Clock Operation	0x9B	0x5A 、 0x5B (read)/0x00 (off)/0xFF+M+TM+Color+X+Y (ON)	Clock on/off ; read the clock
	0xE7	0x55+0xAA+0x5A+0xA5 + YY:MM:DD:HH:MM:SS	Clock adjusting
Parameter Configuration	0xE0	0x55+0xAA+0x5A+0xA5 + Panel_Set+Bode_Set+Para1 + 0x55+0xAA+0x5A+0xA5 + Panel_Set+Bode_Set+Para1 + Para2	Configure users serial interface rate, touch screen data uploading format, Backlight-control mode and display mode. Parameter will not be saved if powered off after V6.0
Algorithm	0xB0	Download:0x01+PY_Code answer: 0x01+HZ_num+String	Pinyin typewriting based on elementary font library
		Download :0x02+A+B+C+D answer: 0x02+E+F	Calculating (A × B + C) / D, E is 4 bytes quotient, F is 2 bytes remainder
		Downslide :0x03+Data_Pack0 answer: 0x03+ Data_Pack1	Array listing of unsigned integers (2 bytes)
		Downslide0x04+PY_Code answer:0x04+HZ_num+String	Pinyin typewriting based on GBK font library
Volume Operation	0x30	Start_Seg+Play_number+Play_time	Play the music in the appointed zoom
	0x32	Volume_L+Volume_R+0x00	Volume adjusting
	0x33	0x55+0xAA+0x5A	Stop playing
	0x3F	'OK'	Sound-op response
Configuration file Operation	Pic_Now+ (x _s ,y _z ,x _e ,y _e)+P_next+P_cut+Touch_Code		Touch interface automatically switching (0x1E font files)
	Pic_Now+0x00:K_Code+Pnext+P_cut+Touch_Code		Touch interface automatically switching (0x1B font files)
	Delay+Length+ Command		Play auto-instructions (0x1C font files)
	Pic_ID+ (x _s ,y _z ,x _e ,y _e)		Icon Character Definition (0x1D font files)
	Command_Length+Command+String		Uploading the instructions pre-stetted by users (0x1A font file)
Upgrading	DWIN_M600_BOOT!		Upgrading the core software on line through Serial

Notes: 0x9E and 0x7C commands should be applied in products of V6.1 and higher kernel version.

4.2 DWIN HMI Command Set D100 (Suitable for DMD32240T035_01WN and DMD48270T047_01WN)

Categories	Command	Command Parameter	Illustration
Handshake	0x00	No	Check the configuration and version
Parameter Configuration	0x40	Fcolor+Bcolor	Palette setting
	0x41	D_X (0x00-0x7F) +D_Y (0x00-0x7F)	Character space setting
	0x42	X+Y	Move the appointed color to background color palette
	0x43	X+Y	Move the appointed color to foreground color palette.
	0x44	Mode+X+Y+Wide (0x01-0x1F) +Height (0x01-0x1F)	Cursor display mode setting
Text	0x53	X+Y+String	8X8 lattice ASCII character

Display	0x54		16x16lattice GBK
	0x55		32x32 GB2312
	0x6E		12x12 GBK
	0x6F		24x24 GB2312
	0x98	X+Y+Lib_ID+C_mode+C_dot+Fcolor+Bcolor+String	Display any lattice, any encoded string.
Points Setting	0x50	$(x,y)_0 + (x,y)_1 + \dots + (x,y)_n$	More points setting in the background color.(delete point)
	0x51		More points in the foreground color.
	0x74	X+Y _s +Y _e +Bcolor+ (y, Fcolor) ₁ ++ (y, Fcolor) _n	Dynamic curve display.
	0x72	Address(H:M:L)+Data_word ₀ ++ Data_word _n	Operation to the buffer of video card.
Lines & Polygon	0x56	$(x,y)_0 + (x,y)_1 + \dots + (x,y)_n$	Polygon display: Line the points with foreground colored segment.
	0x5D		Polygon delete: Line the points with background colored segment
Arcs	0x57	$(Type,x,y,r)_0 + (Type,x,y,r)_1 + \dots + (Type,x,y,r)_n$	Arcs display
Rectangles	0x59	$(X_s,Y_z,X_e,Y_e)_0 + (X_s,Y_z,X_e,Y_e)_1 + \dots + (X_s,Y_z,X_e,Y_e)_n$	Show rectangles: display rectangles by foreground color)
	0x69		Delete rectangles: display rectangles by background color
Areas Operation	0x64	X+Y+Color	Fill in the appointed area
	0x52	No	Clear screen
	0x5A	$(X_s,Y_z,X_e,Y_e)_0 + (X_s,Y_z,X_e,Y_e)_1 + \dots + (X_s,Y_z,X_e,Y_e)_n$	Areas deleting
	0x5B		Fill in more than one appointed areas.
	0x5C		Areas color changing
	0x60		Appointed areas ring-shifting to the left
	0x61	$(X_s,Y_z,X_e,Y_e,n)_0 + (X_s,Y_z,X_e,Y_e,n)_1 + \dots$	Appointed areas ring-shifting to the right
	0x62	...+ $(X_s,Y_z,X_e,Y_e,n)_n$	Appointed areas shifting to the left
0x63		Appointed areas shifting to the right	
Pictures & Cursor	0x70	Picture_ID (0x00-0x98,up to 153 pictures)	Display a full screen image
	0x73	RAM_POS(0x00-0x01)	Display a full screen image from internal flash
	0x71	Picture_ID+X _s +Y _s +X _e +Y _e +X+Y	Display part of a picture in the memory (background display)
	0x9C	Picture_ID+X _s +Y _s +X _e +Y _e +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+X _s +Y _s +X _e +Y _e +X+Y	Display part of a picture in the memory (background does not display)
	0xE2	Picture_ID	Save the current picture in the internal flash
	0xE8	RAM_POS(0x00-0x01)	Save the current picture in the specified position of internal flash
User data storage	0xC0	Address(H:L)+ Data_word ₀ ++ Data_word _n	Writing data to the 64KMB RAM data storage
	0xC2	<Address>+<Data_length>	Read back data from the internal 64KMB RAM data storage
Pinyin input method	0xB0	0X40+PY_code	Pinyin input query based on GKB
Download font library	0xF2	0xF2+0xF2+0x5A+0xA5+Lib_ID Lib_ID=0x00 128KB,ASCII Lib_ID=0x20 576KB,12*12 GBK Lib_ID=0x21 752KB,16*16 GBK Lib_ID=0x22 624KB,24*24 GB2312	Modify font library

		Lib_ID=0x23 1024KB,32*32GB2312 Lib_ID=0x24 992KB,ASCII, Reserved font for users(e.g. Pinyin input font)	
Backlight Control	0x5E	Non	Turn off the backlight
	0x5F	Non or PWM_T(0x00-0x3F)	Turn the backlight on or adjusting the brightness by PWM.
Parameter Configuration	0xE0	0x55+0xAA+0x5A+0xA5+Panel_Set+Bode_Set+Para1 Note: the lowest baud rate is 4800bps(bote_set=00,01,02) Para1.2=0 level (320*240) display mode Para1.2=1 vertical(240*320) display mode	Configuring the user's serial port speed and the display mode
<p>Note :</p> <p>DMD32240T035_01WN and DMD48270T047_01WN color setting mode are 16bit, but download images must select 256 colors mode</p> <p>0x73,0xE8 are DMD32240T035_01WN and DMD48270T047_01WN unique Command, used for images saved and restores</p> <p>0xC0,0xC2 is according byte operation, different from other UART LCM.</p> <p>0xb004 Command need download GBK Pinyin font library to 0x24 position</p> <p>Please refer to the DWIN HMI Command Set for details.</p>			

4.3 DWIN HMI Command Set M100, M600, K600 (Suitable for some of 65K colors and 16.7M colors)

Categories	Command	Command Parameter	Illustration
Hand shake	0x00	No	Check the configuration and version
Parameter Configuration	0x40	Fcolor+Bcolor	Palette setting
	0x41	D_X (0x00-0x7F) +D_Y (0x00-0x7F)	Character space setting
	0x42	X+Y	Move the appointed color to background color palette
	0x43	X+Y	Move the appointed color to foreground color palette.
	0x44	Mode+X+Y+Wide (0x01-0x1F) +Height (0x01-0x1F)	Cursor display mode setting
Text Display	0x53	X+Y+String	8X8 lattice ASCII character
	0x54		16x16lattice GBK
	0x55		32x32 GB2312
	0x6E		12x12 GBK
	0x6F		24x24 GB2312
	0x98	X+Y+Lib_ID+C_mode+C_dot+F color+Bcolor+String	Display any lattice, any encoded string.
Points Setting	0x50	(x,y) ₀ + (x,y) ₁ ++ (x,y) _n	More points setting in the background color.(delete point)
	0x51		More points in the foreground color.
	0x74	X+Y _s +Y _e +Bcolor+ (y, Fcolor) ₁ ++ (y, Fcolor) _n	Dynamic curve display.
	0x72	Address(H:M:L)+Data_word ₀ ++ Data_word _n	Operation to the buffer of video card.
Lines	0x56	(x,y) ₀ + (x,y) ₁ ++ (x,y) _n	Polygon display: Line the points with foreground

&Polygon			colored segment.
	0x5D		Polygon delete: Line the points with background colored segment
	0x75	$X+Y+Height_max+Height_0+Height_1+ \dots + Height_n$	Spectrum display: display a continuous vertical line with the same end in a fast rhythm.
	0x76	$X+X_dis(0x00-0xFF)+Y_0+Y_1+ \dots + Y_n$	Line chat display ($X_i=X+i*X_dis, Y_i=Y_i$)
Arcs	0x57	$(Type,x,y,r)_0+(Type,x,y,r)_1+ \dots + (Type,x,y,r)_n$	Arcs display
Rectangles	0x59	$(X_s,y_z,x_e,y_e)_0+(X_s,y_z,x_e,y_e)_1+ \dots + (X_s,y_z,x_e,y_e)_n$	Show rectangles: display rectangles by foreground color)
	0x69		Delete rectangles: display rectangles by background color
Areas Operation	0x64	$X+Y+Color$	Fill in the appointed area
	0x52	无	Clear screen
	0x5A		Areas deleting
	0x5B	$(X_s,y_z,x_e,y_e)_0+(X_s,y_z,x_e,y_e)_1+ \dots + (X_s,y_z,x_e,y_e)_n$	Fill in more than one appointed areas.
	0x5C		Areas color changing
	0x60		Appointed areas ring-shifting to the left
	0x61	$(X_s,y_z,x_e,y_e,n)_0+(X_s,y_z,x_e,y_e,n)_1+ \dots + (X_s,y_z,x_e,y_e,n)_n$	Appointed areas ring-shifting to the right
	0x62		Appointed areas shifting to the left
	0x63		Appointed areas shifting to the right
Pictures & Icons	0x70	Picture_ID	Display a full screen image
	0x7B	Picture_ID	Display a full screen image and calculate the cumulative sum.
	0x71	Picture_ID+X _s +Y _s +X _e +Y _e +X+Y	Display part of a picture in the memory (background display)
	0x9C	Picture_ID+X _s +Y _s +X _e +Y _e +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+X _s +Y _s +X _e +Y _e +X+Y	Display part of a picture in the memory (background does not display)
	0xE2	Picture_ID	Picture saving
	0x99	$(x,y,Icon_ID)_0+(x,y,Icon_ID)_1+ \dots + (x,y,Icon_ID)_n/无$	User-defined icons display
Animation	0x9A	0xFF/Pack_ID	Turn off/on the automatic implementation of the user's pre-setting command set
Temporary Buffer operation	0xC0	Address(H:L)+Data_word ₀ + ... + Data_word _n	Writing data to the temporary buffer
		0x01+Address+Pixel_Number(H:L)	Display the pre-set date points in the temporary buffer
	0xC1	0x02+Address+Line_Number(H:L)	Display the pre-set date lines in the temporary buffer
		0x03+Address+X+Y+Line_Number+D_x+Dis_x+K_y+Color	dynamic curve scaling: connecting the data points in the temporary buffer zone
Temporary Buffer operation	0xC1	0x04+Addr1+X+Y+Line_Number+0x01+Dis_x+Color1+Addr0+Color0	Oscillometer: connecting the data points in temporary buffer in a flicker-free high-speed
		0x05+Address+X+Y+Line_Number+D_x+Dis_x+M_y+D_y+Color	Using the data in the temporary buffer to display line charts.
	0xC1	0x06+Address+X+Y+Line_Number+D_x+Dis_x+M_y+D_y+Color+Ymin+Ymax	Using the data in the temporary buffer zoom to display a window-constrained bi-directional line chart
		0x10+Address+Frame_Number	Using the command in the temporary buffer to perform

			a synchronize display
	0XC2	<Address>+<Data_length>	Read back data from the temporary buffer.
Database Operation	0xF2	0xF2+0xF2+0x5A+0xA5+Lib_ID	Font modification
	0x90	0x55+0xAA+0x5A+0xA5+Address (H:MH:ML:L) +Data	Write data to the user's database (32MB)
	0x91	Address+Read_Length(H:L)	Read data from the database (32MB)
Key board Operation	0x71	K_code	Key code uploading
	0xE5	0x55+0xAA+0x5A+0xA5+K_Code ₀ ++K_Code _n	Key code port modification
Touch pad Operation	0x72	Touch_X+Touch_Y	Uploading the last data after the touch-screen is released, (which can turn off by 0xE0 command)
	0x73		Uploading data when pressing the touch panel(uploading once only by setting the command of 0xE0)
	0xE4	0x55+0xAA+0x5A+0xA5	Touch panel adjusting
	0x78	Touch_Code	Uploading the defaulted key code when switching the touch interface.
	0x79		
Buzzer Operation	0x79	BZ_time	Buzzing once only (10xBz_time mS)
Video Operation	0x7A	Work_Mode+Video_mode+Video_CH	Switching HMI and video mode (support CVBS/S-Video signal input, NTSC/PAL formats)
Backlight Control	0x5E	Non or 0x55+0xAA+0x5A+0xA + V_ON+V_OFF+ON_TIME	Turn off the backlight or control the backlight mode by touching or keying.
	0x5F	Non or PWM_T(0x00-0x3F)	Turn the backlight on or adjusting the brightness by PWM.
Clock Operation	0x9B	0x5A、0x5B(read)/0x00(off)/0xFF+M+T M+Color+X+Y(ON)	Clock on/off ; read the clock
	0xE7	0x55+0xAA+0x5A+0xA5 + YY:MM:DD:HH:MM:SS	Clock adjusting
Parameter Configuration	0xE0	0x55+0xAA+0x5A+0xA5+Panel_Set+Bode_Set+Para1	Configuring the user's serial port speed and the touch-screen data uploading.
Algorithm	0xB0	Download:0x01+PY_Code answer: 0x01+HZ_num+String	
		Download :0x02+A+B+C+D answer: 0x02+E+F	Calculating(A × B + C) / D, E is 4 bytes quotient, F is 2 bytes remainder
		Download :0x03+Data_Pack0 answer: 0x03+ Data_Pack1	Array listing of unsigned integers(2 bytes)
		Download:0x04+PY_Code answer: 0x04+HZ_num+String	PINYIN input based on GBK
Volume Operation	0x30	Start_Seg+Play_number+Play_time	Play the music in the appointed zoom
	0x32	Volume_L+Volume_R+0x00	Volume adjusting
	0x33	0x55+0xAA+0x5A	Stop playing
	0x3F	'OK'	Sound-op response
Configuration file Operation		Pic_Now+(x _s ,y _z ,x _e ,y _e)+P_next+P_cut+Touch_Code	Touch interface automatically switching (0x1E font files)
		Pic_Now+0x00:K_Code+Pnext+P_cut+Touch_Code	Keyboard interface automatically switching (0x1B font files)
		Delay+Length+ Command	Play auto-instruction(0x1C font files)
		Pic_ID+(x _s ,y _z ,x _e ,y _e)	Icon Character Definition (0x1D font files)
		Command_Length+Command+String	Uploading the commands pre-settled by users(0x1A font file)
Upgrading		DWIN_M600_BOOT!	Upgrading the core software on line through Serial
Note:			

5.0 Precautions

5.1 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 affect the sensitivity or leads to malfunction;
- 3) Modules are fragile products, so 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 DWIN UART LCM module, the terminals and data sheet will do continuously upgrade and revision, the information is subject to change without prior notice!

5.2 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.

6.0 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.

6.1 Dead pixels.

The pixels appears black under the totally black background or 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.

6.2 Bright pixels

Pixels that showing the color of red, green and blue when the background color is black are called bright pixels which are also unnormal.

6.3 Dark pixels

Pixels that showing the color of non-pure red, green and blue when the background color is black are called dark pixels which are also unnormal.

7.0 Package Specification

Packaging Boxes: No.1: 220mm (L)×160mm (W)×50mm (H)
 No.2: 250mm (L)×200mm (W)×80mm (H)
 No.3: 320mm (L)×270mm (W)×80mm (H)
 No.4: 450mm (L)×350mm (W)×300mm (H)
 No.5: 600mm (L)×450mm (W)×300mm (H)

Chart1: Packaging Illustration for Carton 1

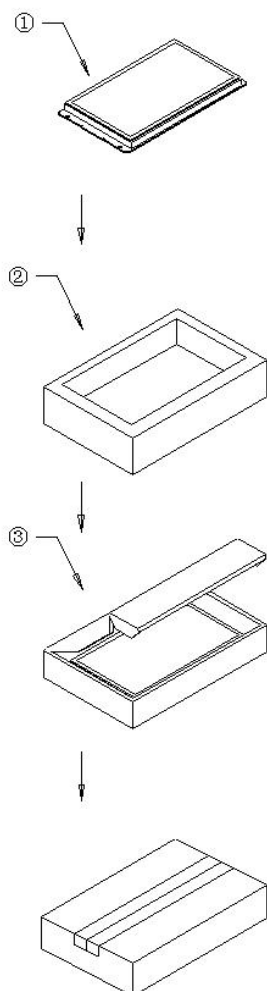
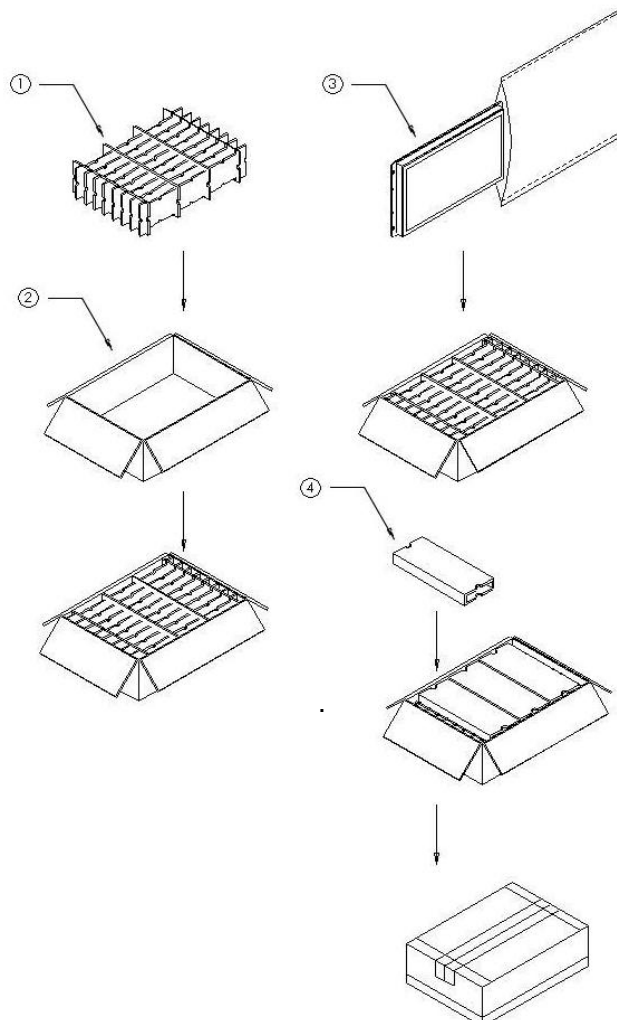


Chart2: Packaging Illustration for Carton 5



Note(1): ① Static Proof Cover
② Cushioning Material
③ Paper Boxes

Note (2): ① Cushioning Material
② Paper Boxes
③ Intelligent Display Terminal
④ Static Proof Cover
⑤ Cushioning Material

8.0 International Standards



ISO9001:2008 Certificate



TÜV Authentication



CE Authentication

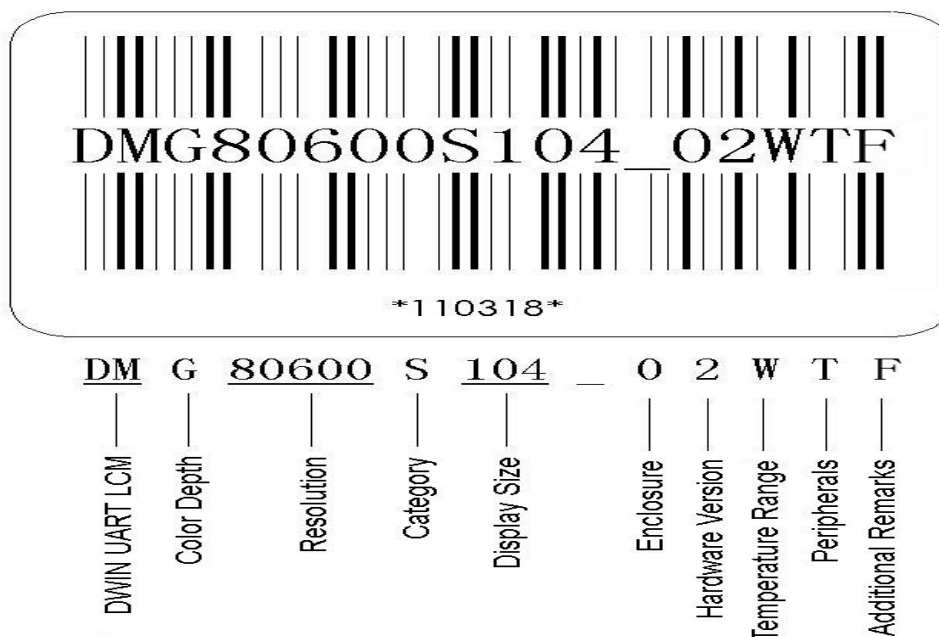


ROHS Authentication



Pb Free

9.0 Definition of Labels and Naming Rules



①DWIN UART LCM

②T=65K colors UART LCM G=16.7M colors D=256 colors

③H. Resolution: 32=320; 48=480; 64=640; 80=800; 10=1024; 12=1280; 13=1365.

V. Resolution: 240=240; 270=272; 480=480; 600=600; 768=768; 800=800.

④Category: C=Consumer type; T=Basic type; S=Standard type; K=Enhanced type; Q=Vehicle Class ⁽¹⁾

⑤Display Size: 080 is 8.0" in diagonal distance.

⑥0=No enclosure; 1=Have enclosure.

⑦Hardware version: 1-9 to distinguish different hardware specification.

⑧Temperature range: N: Within -20/+70°C; W: Beyond -20/+70°C.

⑨Peripherals: N=No peripherals; K=Keyboard; T=Touch panel; T+=Tempered Glass; Z: ODM products; J=Compatible design for deprecation. ⁽²⁾

⑩ Additional remark: Blank=Standard product; Z=ODM products; J=Backward compatible design; F=Extended memory (128MB to 1GB, 384MB to 3GB)

Note [1]:

C-series: Touch panel and LCD display are supplied by Chinese (Hong Kong and Taiwan included) first class manufacturers, and produced in massive production line, without pressure test, optimized for cost sensitive and high reliability requirements' high-end consumer applications.

T-series: Designing and manufacturing under industrial standards, and being supplied for years. Except for Man-Made physical damages, such as LCD panel broken, the rannual return rate is lower than 1%.

S-series: Based on the T series, extra working processes are applied, such as Proof Painting, High-Temperature, Pre-burning test and Dead Pixels rejection. The annual return rate is lower than 0.5%, except for man-made physical damages.

K-series: Based on the S series, with top-of-the-line LCD display, special proof-treatment and higher standard production are adopted to satisfy client's special need or for the most rugged environment, such as Blast-safe.

Q series: Specially optimized for vehicle and marine purpose. Wide input voltage level, high ESD protection, Super Temperature/Humidity range, High brightness and contrast, Shock and Vibration proof. Applied for ODM.

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)

10.0 Product Maintenance

10.1 Technical Support

DWIN can provide you with technical support if you meet any technical problems in the process of using our products. Both online communication and technical consultation hotline are available.

10.2 Product Upgrade

When you need product upgrade, we can offer the latest upgrade software for free. You can contact our technique experts who can provide you with operation instruction on software and hardware.

10.3 Product Maintenance

DWIN promises: free return in 7 days, free exchange in 15 days, free warranty in 1 year and lifelong service.

DWIN grantees free warranty in 1 year for DWIN manufactured & produced TFT driving kernel, LCD module and LED backlight board for the exception of factitious damage (circuit damage, bonding pad damage, appearance damage and shield cover damage if clients separate LCD and PCB; LCD break down because of drop-down; other damage caused by artificial mistake). DWIN will not be responsible for LCD damage (glass broken etc.) occurs 7 days after products received.

You can to connect our sales engineers to have your products repaired or exchanged. DWIN will pay one-way postage.

Appendix 1: Typical application principle diagram

1.1 An illustration of C51 and ASM51.

1.1.1 ASM51 Program:

```

;STC12C2052 22.1184MHz
;EKC52A

        $INCLUDE (MOD52)

        DL10MS EQU 32H ; defination delay 10ms register

        ORG 0000H
        LJMP MAIN

        ORG 000BH
        LJMP SYSCLK ; 10mS timer INTERRUPT

MAIN:   ORG 0100H
        CLR EA ; initializing MCU,CLEAR EA
        MOV SP,#60H ; SP=60H
        ORL PCON,#80H ; serial initialization
        MOV SCON,#50H
        MOV TMOD,#21H
        MOV TH1,#255 ; 115200bps :115200/(256-TH1)
        MOV TL1,#255
        SETB TR1
        CLR ES
        MOV TH0,#0B8H ; 10mS timer0
        MOV TLO,#00H
        SETB TR0
        SETB ETO
        SETB EA ; EA=1
        MOV DL10MS,#100 ; power on 1 sencond delay
        LCALL DELAY ; waiting HMI for initializing
        MOV DPTR,#CMDTTL ; send stop bit
        LCALL TXROMS

;*****text display*****
START:  MOV DL10MS,100 ; delay 1 second
        LCALL DELAY
        MOV DPTR,#MENUTAB
        LCALL TXROMS ; call the output function
        SJMP START
        NOP

;*****sent text*****
MENUTAB: DB 0AAH,55H ; sent text:"北京迪文科技有限公"
         DW 00H,00H
         DB '北京迪文科技有限公司'
         DB 0CCH,33H,0C3H,3CH,0FEH

;*****timer interception *****
SYSCLK: PUSH ACC
        PUSH PSW
        CLR TFO ; reset the timer and register
        MOV TH0,#0B8H
        MOV TLO,#00H
        DEC DL10MS ; delay the declination of register
SYSCKE: POP PSW
        POP ACC
        RETI

;*****DELAY subroutine*****
DELAY:  MOV A,DL10MS ; delay 10MS*DL10MS
        JNZ DELAY
        RET

;*****show subroutine*****
TXROMS: CLR A
        MOVC A,@A+DPTR
        INC DPTR
        CJNE A,#0FEH,TXROMS1 ; End of the table?
        RET
TXROMS1: MOV SBUF,A
         JNB TI,$
         CLR TI
         SJMP TXROMS
         NOP

CMDTTL: DB 0CCH,33H,0C3H,3CH,0FEH ; ended with 0XCC,0X33,0XC3,0X3C.
        END ; program ending
    
```

1.1.2 C51 program:

```

//-----
//STC12C2052 22.1184MHz
//EKT52A

//-----
// Includes
//-----

#include<reg52.h>

//-----
// sbit Definitions
//-----

sbit LED=P1^0;

//-----
// Global CONSTANTS
//-----

#define SYSCLK      22118400           // SYSCLK frequency(Hz)
#define BAUD_RATE   115200           // baud rate
#define uchar       unsigned char
#define uint        unsigned int

//-----
// Function PROTOTYPES
//-----

void Uart0_transmit(unsigned char i);           //statement Serial subfunction
void send_str(unsigned char *p,unsigned char s); //Statement of sending a string subfunction

void delay_ms(unsigned char n);               //statement of delay subfunction
void SysInit(void);                           //statement of initialization system subfunction

void WenbenChange1(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;
    TI=0;
    SBUF=i;                                   // send data to uart0
    while (!TI);                             // clear suspending
    TI=0 ;
    ES=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++)
    {
        Uart0_transmit(*p);
        p++;
    }
}

//-----
// delay
//-----

void delay_ms(unsigned char n)
{
    int i,j;
    for(i=1000;i>0;i--) {
        for(j=25*n;j>0;j--) {};
    }
}

//-----
// SysInit
//-----

void SysInit(void)
{
    PCON |=0x80;
    SCON=0x50;
    TMOD=0x21;
    TH1=255;
    TL1=255;
    TR1=1;
    ES=0;
    TH0=0xB8;
    TL0=0x00;
    TR0=1;
    ET0=1;
}

```

```

//-----
// TextChange
//-----
void WenbenChange1(void)
{
    uchar wenben1[30]={0xAA, 0x55, 0x00, 0x00, 0x00, 0x00, 0xB1, 0xB1, 0xBE, 0xA9,
                      0xB5, 0xCF, 0xCE, 0xC4, 0xBF, 0xC6, 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);
}

//-----
// main() Routine
//-----
int main (void) //main function
{
    EA=0; //CLEAR EA
    SysInit(); //EA=1
    EA=1; //EA=1
    delay_ms(40); //delay 400ms

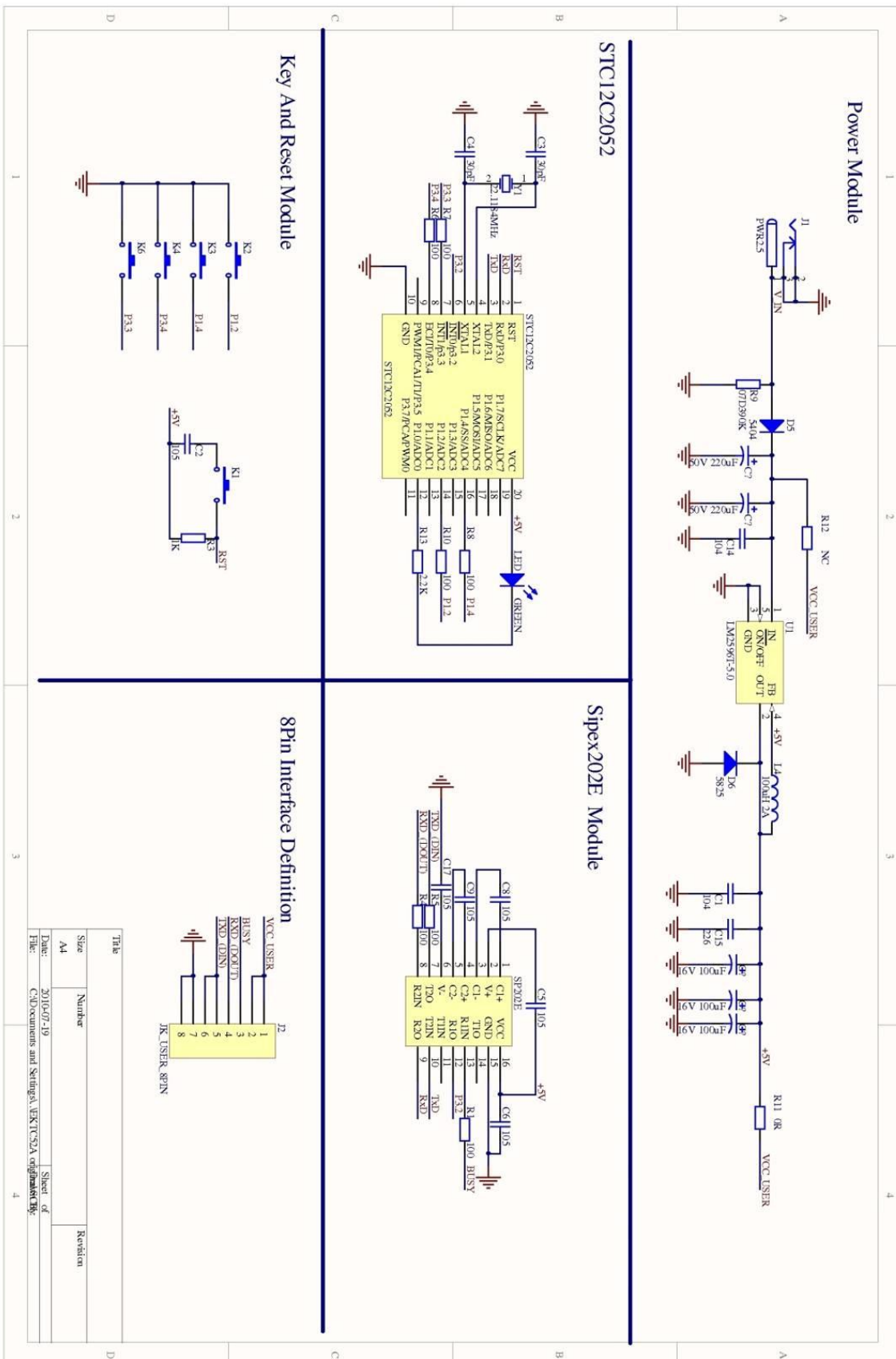
    while (1)
    {
        delay_ms(100);

        WenbenChange1(); //send text
    }
    return 0;
}

//-----
// End Of File
//-----

```

1.2 Typical Application Schematic



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