LCD Module

RSI24064****-01

Application Notes

-Support UART

Ver:1.0
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Subject to change without notice.

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Update History

Version	Date	Description
1.0	2016-07-27	Preliminary Version

Directory

1. Features....4
2. Structure....4
2.1 Mechanical characteristics....4
2.2 Mechanical Drawings....5
3 Interface Definition....6
4. Maximum Absolute Limit....6
4.1 Maximum DC Characteristic....6
4.2 Maximum Ambient Temperature....6
5. Operating Electrical Characteristic....7
5.1 DC Characteristic....7
5.2 Communicate....7
6. Key-Scan....7
7 Applications....8
8 API library....8
8.1 API Functions table....8
8.2 API Functions Description....9
9 Product Selection....15

1. Features

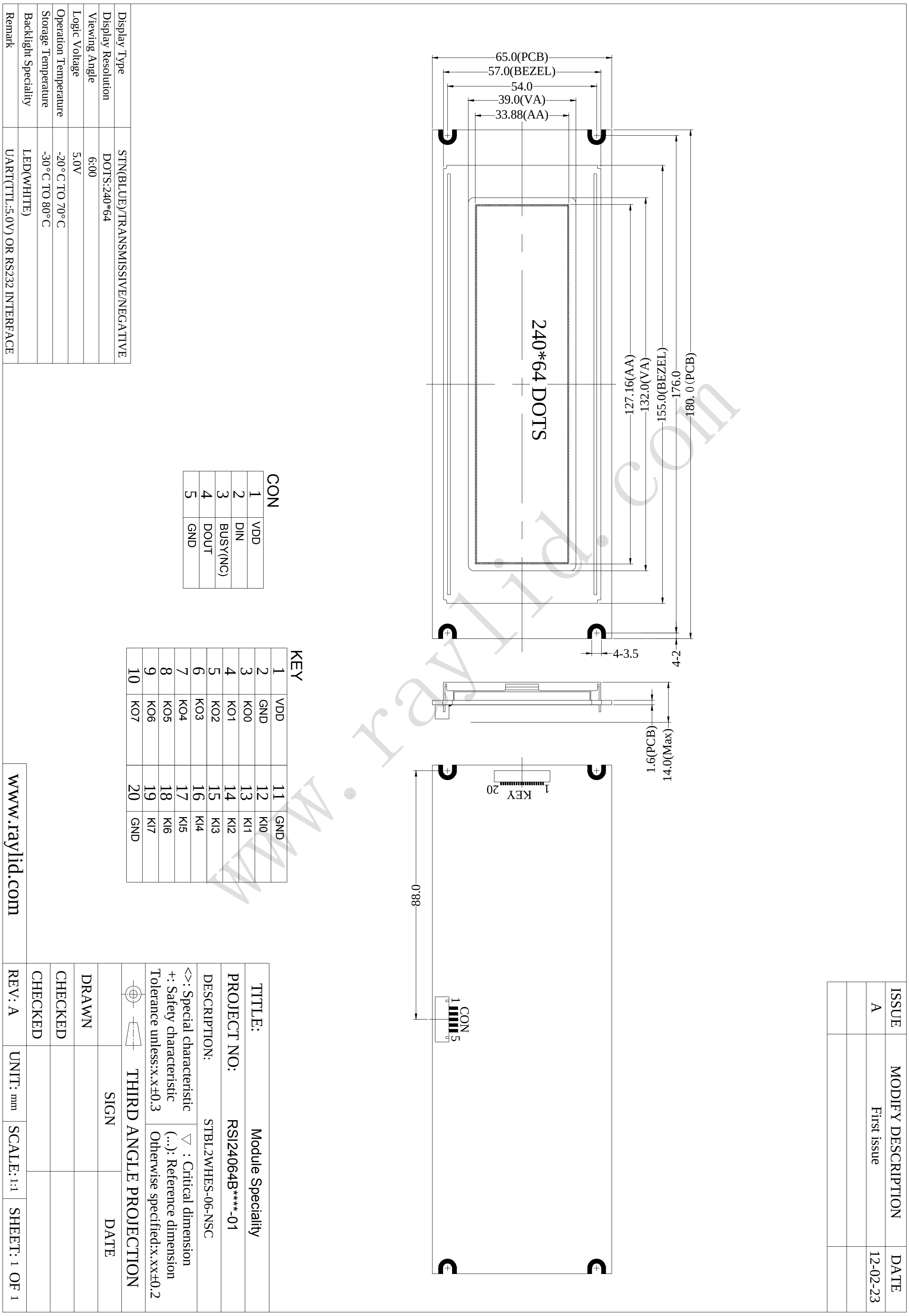
●240*64 STN Blue/STN YG/STN Grey
●Viewing angle：6：00
●Built-In Simplified/Traditional Chinese,Japanese,Korean and ASCII font ROM.
●Font size：
Half-width:5*7/8*16
Full-width:16*16
●2D graphics (point, line, circle, rectangle) drawing function
●Support 8x8 key-scan
●Backlight：WhiteLED（STN Blue/STN Grey），Yellow-green LED（STN YG）
●Operating Voltage：5.0±0.1V
●Operating temperature:-20~70℃
●Storage temperature:-30~80℃
●Support interface:UART(TTL:5.0V/RS232)

2. Structure

2.1 Mechanical characteristics

Parameter	Specification	Unit
Dimensions	180.0(L)*65.0(W)*14.0(H)	mm
Visible area（VA）	132.0*39.0	mm
Active area（AA）	127.16*33.88	mm
Resolution	240*64	dots
Pixel size	0.49*0.49	mm
Pixel spacing	0.04	mm
Weight	TBD	Grams

2.2 Mechanical Drawings



3. Interface Definiton

3.1 Contrl and Power Interface

Pin No.	Symbol	I/O	function
1	VDD	P	Power supply（+5.0V）
2	RXD	I	UART RXD input
3	BUSY	O	UART busy output,high is busy
4	TXD	O	UART TXD output
5	GND	P	Ground

3.2 Key-Scan interface（Supports only key scan models）

Pin No.	Symbo	I/O	function
1	VDD	P	5V power output
2	GND	P	Ground
3	KO0	O	Key scan signal
4	KO1	O	
5	KO2	O	
6	KO3	O	
7	KO4	O	
8	KO5	O	
9	KO6	O	
10	KO7	O	
11	GND	P	Ground
12	KI0	I	Key scan signal
13	KI1	I	
14	KI2	I	
15	KI3	I	
16	KI4	I	
17	KI5	I	
18	KI6	I	
19	KI7	I	
20	GND	P	Ground

4. Maximum Absolute Limit

4.1 Maximum DC Characteristi（Ta=25℃）

Parameter	Symbo	Min.	Max.	Unit
Supply Voltage Range	VDD	-0.3	6.5	V
Input Voltage Range	VIN	-0.3	VDD+0.3	V

Notes：1. Voltage conditions exceed the limits will damage the product.

2.All supply voltages are referenced to Gnd = 0V.。

4.2 Maximum Ambient Temperature

Parameter	Symbo	Min.	Max.
Operating temperature	-20	70	℃
Storage temperature	-30	80	℃

Note: Ambient temperature outside the limits will result in the product not working or damaged.

5. Operating Electrical Characteristic

5.1 DC Characteristic（Ta = 25 °C, VDD = 5.0V±0.2V, GND=0V）

Parameter	Symbo	Min.	Typ.	Max.	Unit
Operating Voltage	VDD	4.8	5.0	5.2	V
Input Voltage	VIH	0.8*VDD	-	VDD	V
	VIL	GND	-	0.2*VDD	V
Ouyput Voltage	VOH	VDD-0.4	-	VDD	V
	VOL	GND	-	GND+0.4	V
Backlight off	IDD1	-	90	-	mA
Backlight on	IDD2	-	210	-	mA

NOTE:RS232 interface signals electrical parameters as the standard RS232 signal.

5.2 Communication(UART)

Band rate：9600b/s（Default）

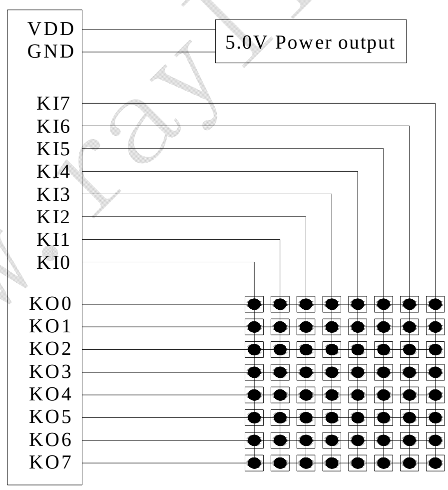
Data bits：8bit

Parity bit：None

Stop bit：1bit

6.Key-Scan

Support 4 * 8 keyboard scanning function can help system developers to implement keyboard control solution



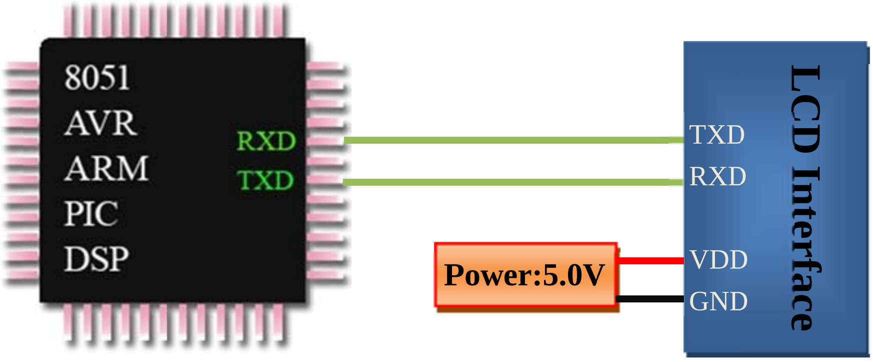
8-1 Keyboard reference design schematics

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7
KO0	00H	01H	02H	03H	04H	05H	06H	07H
KO1	10H	11H	12H	13H	14H	15H	16H	17H
KO2	20H	21H	22H	23H	24H	25H	26H	27H
KO3	30H	31H	32H	33H	34H	35H	36H	37H
KO4	40H	41H	42H	43H	44H	45H	46H	47H
KO5	50H	51H	52H	53H	54H	55H	56H	57H
KO6	60H	61H	62H	63H	64H	65H	66H	67H
KO7	70H	71H	72H	73H	74H	75H	76H	77H

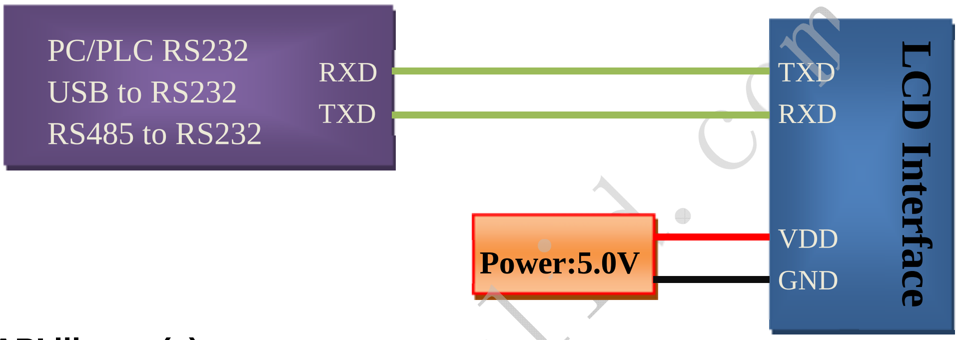
8-2 Keycode table

7. Applications

●UART interface products, directly with the MCU UART (TTL: 5.0V) connection



● RS232 interface products, directly with the PC, PLC RS232 connectionRS232



8. API library (c)

8.1 API Functions table

Type	Functions	Description
System	void reset()	Reset
	void clear_display()	Clear display
	void display_on()	Display on
	void display_off()	Display off
	void brightness(U8 n)	Backlight brightness adjustment
	void contrast(U8 n)	LCD contrast adjustment
Text	void cusor_xy(U8 x,U8 y)	Character display start position
	void inversely_on()	Inverse mode on
	void inversely_off()	Inverse mode off
	void font_spacing(U8 n)	Row and column spacing
	void print_string_5x7(U8 *ptr)	Display 5*7 ASCII string at current position
	void print_string_xy_5x7 (U8 x,U8 y,U8 *ptr)	Display 5*7ASCII string at the specified position
	void print_string_8x16(U8 *ptr)	Display8*16 ASCII string at current position
	void print_string_xy_8x16 (U8 x,U8 y,U8 *ptr)	Display 8*16ASCII string at the specified position
	void print_string_hf(U8 *ptr)	Display Full-width or half-width string at current position
	void print_string_xy_hf (U8 x,U8 y,U8 *ptr)	Display Full-width or half-width string at the specified position
	void print_U32_5x7(U32 n)	Long integer variable to display at current position t,font size 5*7
	void print_U32_xy _5x7(U8 x,U8 y,U32 n)	Long integer variable to display at he specified position,font size 5*7
	void print_U32_8x16(U32 n)	Long integer variable to display at current position t,font size8*16

	void print_U32_xy _8x16(U8 x,U8 y,U32 n)	Long integer variable to display at he specified position,font size 8*16
Graphic	void draw_pixel(U8 x,U8 y)	Draw a pixel
	void delete_pixel(U8 x,U8 y)	Delete a pixel
	void draw_line(U8 x1,U8 y1,U8 x2,U8 y2)	Draw a line
	void delete_line(U8 x1,U8 y1,U8 x2,U8 y2)	Delete a line
	void draw_rectangle(U8 x1,U8 y1,U8 x2,U8 y2)	Draw a non-filled rectangle.
	void delete_rectangle(U8 x1,U8 y1,U8 x2,U8 y2)	Delete a non-filled rectangle.
	void draw_rectangle_fill(U8 x1,U8 y1,U8 x2,U8 y2)	Draw a filled rectangle.
	void delete_rectangle_fill(U8 x1,U8 y1,U8 x2,U8 y2)	Delete a filled rectangle.
	void draw_circle(U8 x,U8 y,U8 r)	Draw a non-filled circle
	void delete_circle(U8 x,U8 y,U8 r)	Delete a non-filled circle
	void draw_circle_fill(U8 x,U8 y,U8 r)	Draw a filled circle
	void delete_circle_fill(U8 x,U8 y,U8 r)	Delete a filled circle
	void inversely_area(U8 x1,U8 y1,U8 x2,U8 y2)	Designated area inversely
Key-scan	void key_enable()	Key scan enable
	void key_disable()	Key scan disable
	Key code output	**Output Format：0XAA n d1,d2,d3**

NOTE: All API functions call the "void send (U8 d)" So before calling the API function, you first need to initialize the master (MCU or PC) UART, and according to the master MCU to "void send (U8 d)" function body make a statement.

8.2 API Functions Description

8.2.1 void reset()

Reset LCD module

8.2.2 void clear_display()

Clear display, Return to the starting position 0,0

8.2.3 void display_on()

Display on, the power-on default

8.2.4 void display_off()

Display off, Turn off LCD and backlight

8.2.5void brightness(U8 n)

Backlight brightness adjustment

Parameter

n:0~0xff, Default 0XFF

8.2.6 void contrast(U8 n)

LCD contrast adjustment

Parameter

n: If bit7 = 1 means that the contrast increases，otherwise decrease the contrast.

bit[6:0] is increased or decreased specific value

8.2.7 void cusor_xy(U8 x,U8 y)

Character display start position

Parameter

x:0~239

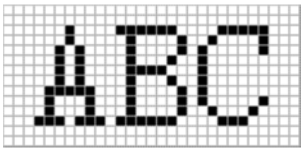
y:0~63

8.2.8 void inversely_on()

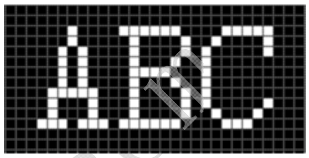
Inverse mode on

8.2.9 void inversely_off()

Inverse mode off



Inverse mode off



Inverse mode on

8.2.10 void font_spacing(U8 n)

Row and column spacing

Parameter

bit[7:4] is column spacing

bit[3:0] is Row spacing

8.2.11 void print_string_5x7(U8 *ptr)

*Display 5*7 ASCII string at current position*

Parameter

**ptr: ASCII strings*

Example

void print_string_5x7(“abcdABCD”);

8.2.12 void print_string_xy_5x7 (U8 x,U8 y,U8 *ptr)

*Display 5*7ASCII string at the specified position*

Parameter

**ptr:ASCII strings*

x:0~239

y:0~63

Example

void print_string_xy_5x7(5,5,“abcd123”);   // Displays the string "abcd123" at 5,5

8.2.13 void print_string_8x16(U8 *ptr)

*Display 8*16ASCII string at current position*

Parameter

**ptr: ASCII strings*

Example

void print_string_8x16("abcdABCD");

8.2.14 void print_string_xy_8x16 (U8 x,U8 y,U8 *ptr)

*Display 8*16 ASCII string at the specified position*

Parameter

**ptr:ASCII strings*

x:0~239

y:0~63

Example

void print_string_xy_8x16(5,5,"abcd123");   // Displays the string "abcd123" at 5,5

8.2.15 void print_string_hf(U8 *ptr)

Display Full-width or half-width string at current position, Automatically identify full-width or half-width.

Parameter

**ptr: strings*

Example

void print_string_hf("中文LCD");   //Display "中文LCD"

8.2.16 void print_string_xy_hf(U8 x,U8 y,U8 *ptr)

Display Full-width or half-width string at the specified position, Automatically identify full-width or half-width.

Parameter

**ptr: strings*

x:0~239

y:0~63

Example

void print_string_hf(3,3"中文LCD");   //Display "中文LCD"at 3,3

8.2.17 void print_U32_5x7(U32 n)

*Long integer variable to display at current position t,font size 5*7*

Parameter

n: 0~4294967295(Decimal)

Example

void print_U32_5x7(898,3);   //display 898

8.2.18 void print_U32_xy_5x7(U8 x,U8 y,U32 n)

*Long integer variable to display at the specified positiont,font size 5*7*

Parameter

x:0~239

y:0~63

n: 0~4294967295(Decimal)

Example

void print_U32_5x7(8,8,898,3);   // Display 898 at coordinates 8,8

8.2.19 void print_U32_8x16(U32 n)

*Long integer variable to display at current position t,font size 8*16*

Parameter

n: 0~4294967295(Decimal)

Example

void print_U32_8x16(898);   //display 898

8.2.20 void print_U32_xy_8x16(U8 x,U8 y,U32 n)

*Long integer variable to display at the specified positiont,font size 8*16*

Parameter

x:0~239

y:0~63

n: 0~4294967295(Decimal)

Example

void print_U32_8x16(8,8,898);   // Display 898 at coordinates 8,8

8.2.21 void draw_pixel(U8 x,U8 y)

Draw a pixel

Parameter

x:0~239

y:0~63

8.2.22 void delete_pixel(U8 x,U8 y)

Delete a pixel

Parameter

x:0~239

y:0~63

8.2.23 void draw_line(U8 x1,U8 y1,U8 x2,U8 y2)

Draw a line

Parameter

x1:0~239

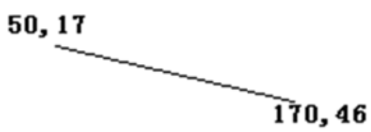
y1:0~63

x2:0~239

y2:0~63

Example

draw_line(50,17,170,46);



8.2.24 void delete _line(U8 x1,U8 y1,U8 x2,U8 y2)

Delete a line

Parameter
x1:0~239
y1:0~63
x2:0~239
y2:0~63

8.2.25 void draw_ rectangle (U8 x1,U8 y1,U8 x2,U8 y2)
Draw a non-filled rectangle
Parameter
x1:0~239
y1:0~63
x2:0~239
y2:0~63

8.2.26 void delete _ rectangle(U8 x1,U8 y1,U8 x2,U8 y2)
Delete a non-filled rectangle
Parameter
x1:0~239
y1:0~63
x2:0~239
y2:0~63

8.2.27 void draw_ rectangle_fill (U8 x1,U8 y1,U8 x2,U8 y2)
Draw a filled rectangle
Parameter
x1:0~239
y1:0~63
x2:0~239
y2:0~63

8.2.28 void delete _ rectangle_fill(U8 x1,U8 y1,U8 x2,U8 y2)
Delete a filled rectangle
Parameter
x1:0~239
y1:0~63
x2:0~239
y2:0~63

8.2.29 void draw_circle(U8 x,U8 y,U8 r)
Draw a non-filled circle
Parameter
x:0~239
y:0~63
r: Radius, x+r≤239,x-r≥0, y+r≤63,y-r≥0

8.2.30 void delete_circle(U8 x,U8 y,U8 r)

Delete a non-filled circle

Parameter

x:0~239

y:0~63

r: Radius, x+r≤239,x-r≥0, y+r≤63,y-r≥0

8.2.31 void draw_circle_fill(U8 x,U8 y,U8 r)

Draw a filled circle

Parameter

x:0~239

y:0~63

r: Radius, x+r≤239,x-r≥0, y+r≤63,y-r≥0

8.2.32 void delete_circle_fill(U8 x,U8 y,U8 r)

Delete a filled circle

Parameter

x:0~239

y:0~63

r: Radius, x+r≤239,x-r≥0, y+r≤63,y-r≥0

8.2.33 void inversely_area(U8 x1,U8 y1,U8 x2,U8 y2)

Designated area inversely

Parameter

x1:0~239

y1:0~63

x2:0~239

y2:0~63

8.2.34 void key_enable();

Key scan enable, Only support key scanning products

8.2.35 void key_ disable();

Key scan disable, Only support key scanning products

8.2.36 0XAA 0X55 n

This instruction module TXD output command, This instruction module TXD output command, For host computer processing. Only support key scanning products.

Parameter

n: Reference8-2 Keycode table

9. Product Selection

RSI24064 X X X X—01

- Product number
- Signal Standard:
  U:TTL:5.0V
  R:RS232
- Key-scan:
  K:Support
  N:Not support
- Font:
  A:ASCII
  S:Simplified Chinese(GB2312)+ASCII
  T:Traditional Chinese(BIG5)+ASCII
  H:Korean(HANGUL)+ASCII
  J:Japanese(S-JIS)+ASCII
  NOTE: If need other fonts, can provide customized services.
- Display Mode
  Y:STN YG
  G:FSTN Grey
  B:STN Blue
- Series Name

Note: If have special needs, hardware and software and fonts can provide customized services.