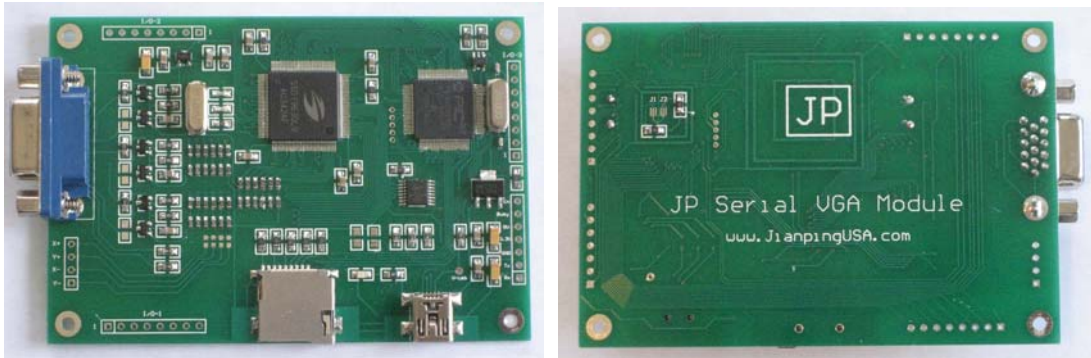


JP Serial Color VGA Display Module

(Version 2.2.0.0)



Description:

JP Serial Color VGA Display Module is a simple and cost effective interface controller unit. An extensive range of hardware and software peripherals have been integrated into the design, to give the user freedom to adapt the module to suit their application. Features include; micro-SD card connector, USB connector, an expansion port along with a series of GPIO and serial comm.

The JP color VGA Display Module serves as the perfect solution to be deployed at the forefront of any product design, requiring a brilliance of color, animation or images on a 640x480 displays.

Features:

Low-cost 640x480 VGA display graphics user interface solution.

The simplest, the easiest way build your touch screen project.

Four Wire Resistive Touch Panel.

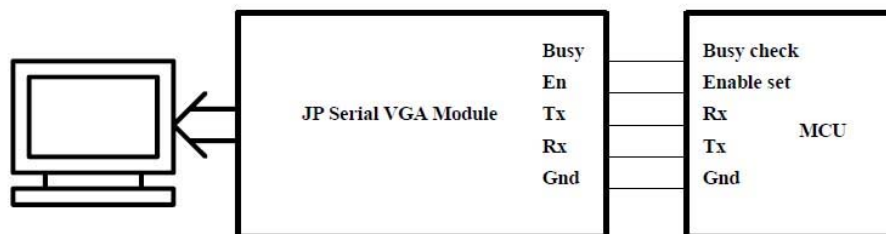
On-board micro-SD memory card adaptor and USB connector for user data logger

HC memory card support is also available for cards larger than 2GB (FAT32 format).

Load image to VGA screen from MMC card.

Save screen image to MMC card.

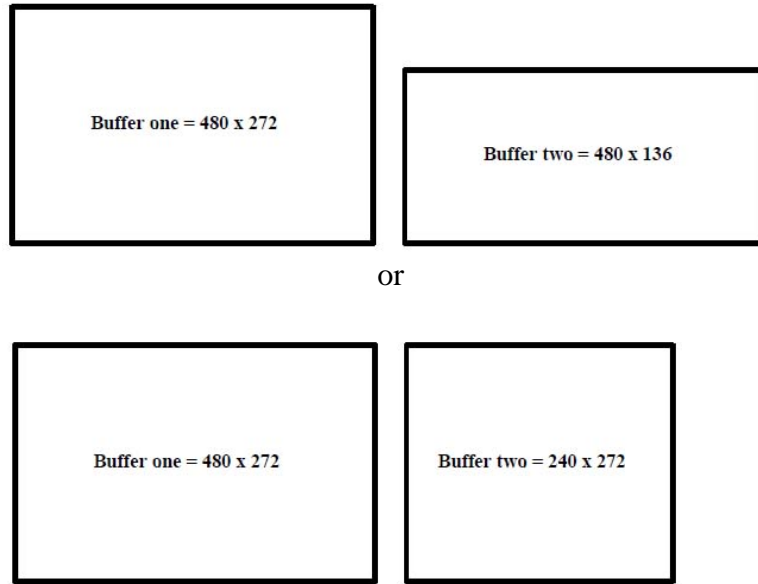
The module supports any MCU.



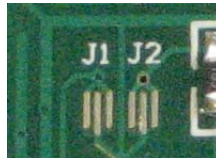
JP Serial VGA Module connect to MCU

JP Serial VGA Display Module Buffer structure:

The module has two buffers for display or others. Buffer one is 65280kb, it fit 480x272 resolution display with 4bit/pix. Buffer two is 32640kb; it is 480x136 or 240x272 with 4bit/pix. (see fig)



JP serial VGA module has two jumps for selecting serial communication baud. (see fig.)



baud	J1	J2
9600	-	-
19200	x	-
38400	-	x
115200	x	x

x = connected
- = unconnected

JP serial VGA display module command:

1. Buffer function
2. Geometry on screen or buffer

3. Buffer shift commands
4. Data Chart Function
5. Write a character or string to buffer or VGA Display screen
6. VGA Display screen function
7. Meter Function
8. Touch panel function
9. MMC/SD Card function
10. Port input/output function
11. Module control function
12. Font size

1. Buffer function

A+,x,y

Prototype	A+,x,y
Description	This function is copy first buffer (Buffer one) to VGA Screen.
Parameters	<ul style="list-style-type: none"> • x: x coordinate of the screen location. • y: y coordinate of the screen location.
Returns	None
Requires	None.
Example	A+,0,0
Notes	Buffer one size is 480x272. Each Pix is 4 bits in buffer memory.

A@,Color value

Prototype	A@,Color value
Description	The function is to fill first buffer.
Parameters	Color value = 0 - 15
Returns	None
Requires	None.
Example	A@,3 (3 = green)
Notes	Pix is 4 bits in buffer memory.

A?,Color value

Prototype	A?,Color value
Description	The function is to fill second buffer.
Parameters	Color value = 0 - 15
Returns	None
Requires	None.

Example	A?,3 (3 = green)
Notes	Second buffer is 480x136 or 240x272. Pix is 4 bits in buffer memory.

A!,x_Left,y_bottom,x_Right,y_Top

Prototype	A@,x_left,y_down,x_right,y_top
Description	Copy a partial area of the first buffer on a desired location to same place on VGA display.
Parameters	x_left: x coordinate of the first buffer location. y_bottom: y coordinate of the first buffer location. x_right: x coordinate of the first buffer location. Y_top: y coordinate of the first buffer location..
Returns	None
Requires	None.
Example	A!,10,10,310,230
Notes	Pix is 4 bits in buffer memory.

A*,x_left,y_bottom,x_width,y_height,X_left,Y_bottom

Prototype	A*,x_left,y_bottom,x_width,y_height,X_left,Y_bottom
Description	Copy a partial area of the first buffer on a desired location to different place on VGA display.
Parameters	x_left: x coordinate of the first buffer location. y_bottom: y coordinate of the first buffer location. x_width: x coordinate of the first buffer width. Y_height: y coordinate of the first buffer height. X_left: X coordinate of VGA display location. Y_bottom: Y coordinate of VGA display location.
Returns	None
Requires	None.
Example	A*,50,50,150,100,10,10
Notes	Pix is 4 bits in buffer memory.

A\$, data_length

Prototype	A1,data_Length
Description	The function is load data from MUC to First buffer
Parameters	
Returns	None
Requires	None.
Example	A\$,65280
Notes	Pix color is 4 bits in buffer memory.

A[,File_Name

Prototype	A[, File_Name
Description	This function save a file from MMC card to first buffer
Parameters	
Returns	None
Requires	None.
Example	A[,my_buffer_data
Notes	

A],File_Name

Prototype	A], File_Name
Description	This function load a file from MMC card to first buffer
Parameters	
Returns	None
Requires	None.
Example	A],My_MMC_File
Notes	

A^, data_length

Prototype	A^,data_Length
Description	The function is load data from MUC to second buffer
Parameters	
Returns	None
Requires	None.
Example	A^,33600
Notes	

A(,File_Name

Prototype	A(, File_Name
Description	This function save a file from MMC card to second buffer
Parameters	
Returns	None
Requires	None.
Example	A(,my_buffer_data

Notes	
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A),File_Name

Prototype	A), File_Name
Description	This function load a file from MMC card to second buffer
Parameters	
Returns	None
Requires	None.
Example	A),My_MMC_File
Notes	

2. Geometry on screen or buffer

G1,n,x_position,y_position,color write a pix to screen or buffer

Prototype	G1,n,x_position,y_position,color
Description	Write a pix to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • x_position: x coordinate of screen or buffer • y_position: y coordinate of screen or buffer • color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G1,8,200,100,31 (write a blue color pix to screen)
Notes	color volume: 4 bits for buffer, 16 bits for screen

G2,n,x1_position,x2_position,y_position,line_size,line_color

Prototype	G2,n,x1_position,x2_position,y_position,line_size,line_color
Description	Draw a Horizontal line to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X1_position: x coordinate of screen or buffer • X2_position: x coordinate of screen or buffer • Y_position: y coordinate of screen or buffer • line_size: line width. • line_color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G2,8,10,300,100,3,31 (draw a blue line to screen)

Notes	Line color is 4 bits in buffer memory.
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G3,n,x1_position,x2_position,y_position,line_size,line_color

Prototype	G3,n,x1_position,x2_position,y_position,line_size,line_color
Description	Draw a Horizontal dash line to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X1_position: x coordinate of screen or buffer • X2_position: x coordinate of screen or buffer • y_position: y coordinate of screen or buffer • line_size: line width. • line_color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G3,8,10,300,100,3,31 (draw a blue line to screen)
Notes	Line color is 4 bits in buffer memory.

G4,n,x_position,y1_position,y2_position,line_size,line_color

Prototype	G4,n,x1_position,x2_position,y_position,line_size,line_color
Description	Draw a Vertical line to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X_position: x coordinate of screen or buffer • Y1_position: x coordinate of screen or buffer • Y2_position: y coordinate of screen or buffer • line_size: line width. • line_color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G4,8,100,10,200,3,31 (draw a blue dash line to screen)
Notes	Line color is 4 bits in buffer memory.

G5,n,x_position,y1_position,y2_position,line_size,line_color

Prototype	G5,n,x1_position,x2_position,y_position,line_size,line_color
Description	Draw a Vertical dash line to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X_position: x coordinate of screen or buffer • Y1_position: y coordinate of screen or buffer • Y2_position: y coordinate of screen or buffer • line_size: line width. • line_color: color volume: 4 bits for buffer, 16 bits for screen

Returns	None
Requires	None.
Example	G5,8,100,10,200,3,31 (draw a blue dash line to screen)
Notes	Line color is 4 bits in buffer memory.

G6,n,x1_position, x2_position,y1_position,y2_position,line_color

Prototype	G6,n,x1_position,x2_position,y1_position,y2_position,line_color
Description	Draw a line to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X1_position: x coordinate of screen or buffer • X2_position: x coordinate of screen or buffer • Y1_position: y coordinate of screen or buffer • Y2_position: y coordinate of screen or buffer • line_size: line width. • line_color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G6,8,0,0,479,271,31 (draw a blue line to screen)
Notes	Line color is 4 bits in buffer memory.

G7,n,x_center,y_center,x_axis,y_axis, fill,color

Prototype	G7,n,x_center,y_center,x_axis,y_axis, fill,color
Description	Draw an ellipse to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X_center: x coordinate of screen or buffer • y_center: y coordinate of screen or buffer • x_axis: x axis length of screen or buffer • Y_axis: y axis length of screen or buffer • Fill: fill > 0 Draws a filled ellipse. • color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G7,8,240,136,200,130,8,31
Notes	

G8,n,x1_position,x2_posaition,y1_position,y2_position,color

Prototype	G8,n,x1_position,x2_posaition,y1_position,y2_position,color
Description	Draw an rectangle to screen or buffer

Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X1_position: x coordinate of screen or buffer • X2_position: x coordinate of screen or buffer • Y1_position: x coordinate of screen or buffer • Y2_position: y coordinate of screen or buffer • color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G8,8,20,40,100,100,31 (draw a blue color rectangle on screen)
Notes	Color is 4 bits in buffer memory.

G9,n,x_position,y_position,side_length,color

Prototype	G9,n,x1_position,y1_position,side_length,color
Description	Draw an square to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X_position: x coordinate of screen or buffer • Y_position: x coordinate of screen or buffer • Side_length: square side length • color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	G8,8,20,40,100,100,31 (draw a blue color rectangle on screen)
Notes	Color is 4 bits in buffer memory.

GA,n,x1_position,x2_posaition,y1_position,y2_position,color

Prototype	GA,n,x1_position,x2_posaition,y1_position,y2_position,color
Description	Draw a fill box to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • X1_position: x coordinate of screen or buffer • X2_position: x coordinate of screen or buffer • Y1_position: x coordinate of screen or buffer • Y2_position: y coordinate of screen or buffer • color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	GA,8,20,40,100,100,31 (draw a blue color fill box on screen)
Notes	Color is 4 bits in buffer memory.

GB,n,Xc,Yc, Radius,Fill,color

Prototype	GB,n,Xc,Yc, Radius,Fill,color
Description	Draw a circle on first buffer
Parameters	<ul style="list-style-type: none">• n: n = 0 write pix to buffer, n > 0 write pix to screen.• Xc: x coordinate of the first buffer location• Yc: y coordinate of the first buffer location• Radius: circles radius size.• Fill: > 0 Draws filled circle, = 0 not fill.• Color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	GB,8,160,120,80,8,31 (draw a filled circle on screen)
Notes	color is 4 bits in buffer memory.

GC,n,x_position,y_position, dot_size,color

Prototype	GC,n,x_position,y_position, dot_size,color
Description	Draw a customer size pix on screen or buffer
Parameters	<ul style="list-style-type: none">• n: n = 0 write pix to buffer, n > 0 write pix to screen.• X_position: x coordinate of the first buffer location• Y_position: y coordinate of the first buffer location• Dot_size: a dot size.• Color: color volume: 4 bits for buffer, 16 bits for screen
Returns	None
Requires	None.
Example	GC,8,100,150,5,31 (draw a 5x5 blue dot on screen)
Notes	color is 4 bits in buffer memory.

3. Buffer shift commands

JU,move_distance,back_color

Prototype	JU,move_distance,back_color
Description	Move buffer position from bottom to up
Parameters	<ul style="list-style-type: none">• Move_distance: move distance• back_color: font background color = 0 - 15
Returns	None
Requires	None.

Example	JU,10,0 (move buffer from bottom to up 10 pix size, back color is black)
Notes	color is 4 bits in buffer memory.

JD,move_distance,back_color

Prototype	JD,move_distance,back_color
Description	Move buffer position from up to bottom
Parameters	<ul style="list-style-type: none"> • Move_distance: move distance • back_color: font background color = 0 - 15
Returns	None
Requires	None.
Example	JD,10,0 (move buffer from up to bottom 10 pix size, back color is black)
Notes	color is 4 bits in buffer memory.

JR,move_distance,back_color

Prototype	JR,move_distance,back_color
Description	Move buffer position from left to right
Parameters	<ul style="list-style-type: none"> • Move_distance: move distance • back_color: font background color = 0 - 15
Returns	None
Requires	None.
Example	JR,10,0 (move buffer from left to right 10 pix size, back color is black)
Notes	color is 4 bits in buffer memory.

JL,move_distance,back_color

Prototype	JL,move_distance,back_color
Description	Move buffer position from right to left
Parameters	<ul style="list-style-type: none"> • Move_distance: move distance • back_color: font background color = 0 - 15
Returns	None
Requires	None.
Example	JL,10,0 (move buffer from right to left 10 pix size, back color is black)
Notes	color is 4 bits in buffer memory.

4. Data Chart Function

JC,x_start,y_start,x_end,y_end,x_axie,step,ratio,compress,dimension,file_name

Prototype	JC,x_start,y_start,x_end,y_end,x_axie,step,ratio,compress,dimension,file_name
Description	Draw a data chart.
Parameters	<ul style="list-style-type: none"> • x_start: data chart area x start position • y_start: data chart area y start position • x_end: data chart area x end position • y_end: data chart area y end position • x_axis: x axial position • data_step: two data points distance (pix) • data_ratio: user can change data ratio (100 = 1:1) • data_compress: data can be compressed (ex:200 can be compressed at one pix) • data_dimension: the function can display 10 dimensions data • data_file_name: record data file name
Returns	None
Requires	None.
Example	JC,13,465,30,1,200,5,20,1,testdat1.csv
Notes	None

5. Write a character or string to buffer or Screen**FA,n,font_type,x_position,y_position,space,font_color,back_color,text_string**

Prototype	FA,n,x_position,y_position,space,font_color,back_color,text_string
Description	Write a text string to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • Font_type: font size and font type • x_position: x coordinate of screen or buffer location • y_position: y coordinate of screen or buffer location • space: adjust characters space • font_color: 4 bits for buffer, 16 bits for screen • back_color: 4 bits for buffer, 16 bits for screen • text_string: text string
Returns	None
Requires	None.
Example	FA,8,5,10,10,1,0,65535>Hello,world!
Notes	color is 4 bits in buffer memory.

FB,n,font_type,x_position,y_position,space,font_color,back_color,text_char

Prototype	FA,n,x_position,y_position,space,font_color,back_color,text_string
Description	Write a single character to screen or buffer
Parameters	<ul style="list-style-type: none"> • n: n = 0 write pix to buffer, n > 0 write pix to screen. • Font_type: font size and font type • x_position: x coordinate of screen or buffer location • y_position: y coordinate of screen or buffer location • font_color: 4 bits for buffer, 16 bits for screen • back_color: 4 bits for buffer, 16 bits for screen • text_char text character
Returns	None
Requires	None.
Example	FB,8,5,100,100,0,65535,J
Notes	color is 4 bits for buffer memory, 16 bits for screen.

6. VGA screen function

L@,color

Prototype	L@,color
Description	screen fill
Parameters	<ul style="list-style-type: none"> • color screen color, 16bits from 0 to 65535
Returns	None
Requires	None.
Example	L@,65535 (fill white color on screen)
Notes	

L&,x0,y0,x1,y1,color

Prototype	AK,x_position,y_position,font_color,back_color,char
Description	screen partially fill
Parameters	<ul style="list-style-type: none"> • x0_position: x coordinate of the screen location • y0_position: y coordinate of the screen location • x1_position: x coordinate of the screen location • y1_position: y coordinate of the screen location • color: screen color, 16bits from 0 to 65535
Returns	None
Requires	None.
Example	L&,20,40,200,100,31

Notes	color is 4 bits in buffer memory.
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LU,x,y,Length,width, color

Prototype	LU,x0,y0,x1,y1, color
Description	Draw a up text board.
Parameters	<ul style="list-style-type: none"> • x_position: x coordinate of the screen location • y_position: y coordinate of the screen location • Length: length of the board • width: width of the board • color: screen color, 16bits from 0 to 65535
Returns	None
Requires	None.
Example	LU,50,60,300,100,65535
Notes	

LD,x,y,Length,width, color

Prototype	LD,x0,y0,x1,y1, color
Description	Draw a down text board.
Parameters	<ul style="list-style-type: none"> • x_position: x coordinate of the screen location • y_position: y coordinate of the screen location • Length: length of the board • width: width of the board • color: screen color, 16bits from 0 to 65535
Returns	None
Requires	None.
Example	LD,50,60,300,100,65535
Notes	

LH,x,y,Length,width,bar_v,bar_color,back_color

Prototype	LH,x,y,Length,width,bar_v,bar_color,back_color
Description	Draw a horizontal meter bar
Parameters	<ul style="list-style-type: none"> • x_position: x coordinate of the screen location • y_position: y coordinate of the screen location • Length: length of the bar • width: width of the bar • bar_volume bar volume • bar_color bar volume color, 16bits from 0 to 65535

	<ul style="list-style-type: none"> back color bar back color, 16bits from 0 to 65535
Returns	None
Requires	None.
Example	LH,10,10,470,50,200,31,65535
Notes	

LV,x,y,Length,width,bar_v,bar_color,back_color

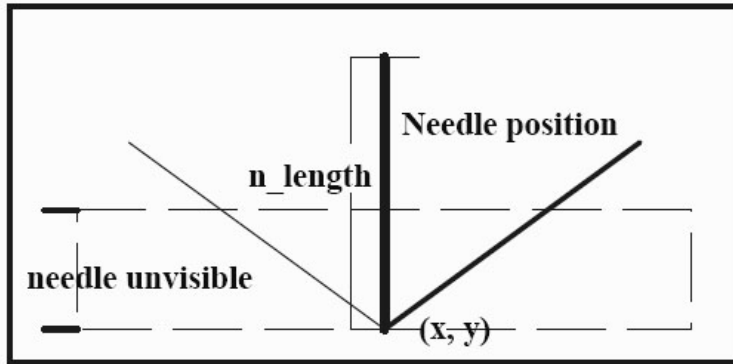
Prototype	LV,x,y,Length,width,bar_v,bar_color,back_color
Description	Draw a vertical meter bar
Parameters	<ul style="list-style-type: none"> x_position: x coordinate of the screen location y_position: y coordinate of the screen location Length: length of the bar width: width of the bar bar_volume bar volume bar color bar volume color, 16bits from 0 to 65535 back color bar back color, 16bits from 0 to 65535
Returns	None
Requires	None.
Example	LV,100,10,50,250,200,31,65535
Notes	

7. Meter Function

S1,x,y,y1,n_length,n_width,n_position,n_color

Prototype	S1,x,y,y1,n_length,n_width,n_position,n_color
Description	Draw an analog meter needle
Parameters	<ul style="list-style-type: none"> x_position: x coordinate of the first buffer location y_position: y coordinate of the first buffer location y1: y coordinate of needle visible n_length needle length n_width needle size needle position: meter volume(position) from 0 to 900 needle_color: needle color is 4 bits color = 0 - 15
Returns	None
Requires	None.

Example	S1,240,0,100,205,2,500,3
Notes	color is 4 bits in buffer memory.



S2,n_position ,y,y1,n_width,n_color

Prototype	S2,b_position ,y,y1,n_width,n_color
Description	Draw a bar meter needle
Parameters	<ul style="list-style-type: none"> • n_position: meter volume(position) • x_position: x coordinate of the first buffer location • y_position: y coordinate of the first buffer location • n_width: needle size • needle_color: needle color is 4 bits color = 0 - 15
Returns	None
Requires	None.
Example	S2,240,0,100,205,2,500,3
Notes	color is 4 bits in buffer memory.

S3,x0,x1,y0,y1,size,space,color

Prototype	S3,x0,x1,y0,y1,size,space,color
Description	Draw a bar meter scale
Parameters	<ul style="list-style-type: none"> • x0_position: x coordinate of the first buffer location • x1_position: x coordinate of the first buffer location • y0_position: y coordinate of the first buffer location • y1_position: y coordinate of the first buffer location • bar size: scale bar size (width) • bar soace: between two bars space • scale bar color: scale color is 4 bits = 0 - 15

Returns	None
Requires	None.
Example	s3,222,290,200,150,7,12,2
Notes	color is 4 bits in buffer memory.

S4,start,end,p1,p2,color

Prototype	S4,start,end,p1,p2,color
Description	Draw an arc for meter scale
Parameters	<ul style="list-style-type: none"> • start: the arc start position • end: the arc end position • p1: arc top position • p2: arc bottom position • arc color: arc color is 4 bits = 0 - 15
Returns	None
Requires	None.
Example	S4,0, 900, 205, 200, 0
Notes	color is 4 bits in buffer memory.

S5,start,end,p1,p2,color

Prototype	S4,start,end,p1,p2,color
Description	Draw an arc for meter scale
Parameters	<ul style="list-style-type: none"> • start: the arc start position • end: the arc end position • p1: the arc top position • y2: the arc bottom position • arc color: scale color is 4 bits = 0 - 15
Returns	None
Requires	None.
Example	s5,0, 900, 190, 185, 1
Notes	color is 4 bits in buffer memory.

S6,start,end,space,size,p1,p2,color

Prototype	S6,start,end,space,size,p1,p2,color
Description	Draw an arc meter scale
Parameters	<ul style="list-style-type: none"> • start: the arc start position • end: the arc end position • space: scale line space • line size: scale line size

	<ul style="list-style-type: none"> • p1: scale top position • p2: scale bottom position • scale color: scale color is 4 bits = 0 - 15
Returns	None
Requires	None.
Example	S6,0, 900, 150, 2, 185, 175, 1
Notes	color is 4 bits in buffer memory.

8. Touch panel function

T1,num,x,y,width,high,text_c, tx,ty,t_type,text

Prototype	T1,num,x,y,width,high,text_c, tx,ty,t_type,text
Description	Create a user button.
Parameters	<ul style="list-style-type: none"> • num: button ID number • x_position: x coordinate of button location • y_position: y coordinate of button location • width: button width • high: button high • f_color: button up text font color (16 bits color) • fd_color: button down text font color (16 bits color) • f_size: button text font size • fx: button text x position • fy: button text y position • text: button text string
Returns	Button ID number
Requires	None.
Example	T1,1,120,30,100,40,0,48631,12,140,33,Erase
Notes	

T2,num,x,y,tw,th,image_up,image_down

Prototype	T2,num,x,y,tw,th,image_up,image_down
Description	Create image button
Parameters	<ul style="list-style-type: none"> • num: image button ID number • x_position: x coordinate of button location • y_position: y coordinate of button location • tw: touch area width • th: touch area high • image_up: image button up image name • image_down: image button down image name

Returns	127 + ID number
Requires	None.
Example	T2,1,336,80,46,46,keyup1,keydn1
Notes	Button image have to save in T_Image folder (directionz)

T3,active

Prototype	T3,active
Description	Active user button function
Parameters	<ul style="list-style-type: none"> active: volume = 0 disable, volume > 0 enable
Returns	None
Requires	None.
Example	T3,10
Notes	.

T4,active

Prototype	T4,active
Description	Active Image button function
Parameters	<ul style="list-style-type: none"> active: volume = 0 disable, volume > 0 enable
Returns	None
Requires	None.
Example	T4,10
Notes	.

TC

Prototype	TC
Description	clean Touch panel parameter in eeprom
Parameters	<ul style="list-style-type: none"> none
Returns	None
Requires	None.
Example	TC
Notes	

TD

Prototype	TD
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Description	Reload default Touch panel parameter to eeprom
Parameters	<ul style="list-style-type: none"> • none
Returns	None
Requires	None.
Example	TD
Notes	

TF

Prototype	TF
Description	Touch panel point check. (It is dead loop.)
Parameters	<ul style="list-style-type: none"> • none
Returns	None
Requires	None.
Example	TF
Notes	

TL

Prototype	TL
Description	Reload Touch panel default parameters.
Parameters	<ul style="list-style-type: none"> • none
Returns	None
Requires	None.
Example	TL
Notes	

TP,x,y,x1,y1,pen_size,pen_color

Prototype	TP,x,y,x1,y1,pen_size,pen_color
Description	Customer paint set.
Parameters	<ul style="list-style-type: none"> • x: paint area start of position. • y: paint area start of position • x1: paint area end of position • y1: paint area end of position • pen_size: paint pen size. • pen_color: paint pen color.

Returns	None
Requires	None.
Example	TL
Notes	TL, 50,50,280,200,5,63488 (pen_color = red)

TE,x

Prototype	TE,x
Description	Enable customer paint function
Parameters	<ul style="list-style-type: none"> x: x = 0 disable, x > 0 enable.
Returns	None
Requires	None.
Example	TE,8 (function is enable.)
Notes	

TT,x

Prototype	TT,x
Description	This function will send x, y parameters from Uart when TP touched.
Parameters	<ul style="list-style-type: none"> x: x = 0 disable, x > 0 enable.
Returns	None
Requires	None.
Example	TT,8 (Function is enable.)
Notes	The function will be disenabled when Button or Image button function enabled.

9. MMC/SD Card function

M1

Prototype	M1
Description	Go to parent direction
Parameters	<ul style="list-style-type: none"> none
Returns	None
Requires	None.
Example	M1

Notes	
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M2

Prototype	M2
Description	Go to root direction
Parameters	<ul style="list-style-type: none"> • none
Returns	None
Requires	None.
Example	M2
Notes	

M3

Prototype	M3
Description	Show folder information
Parameters	<ul style="list-style-type: none"> • none
Returns	None
Requires	None.
Example	M3
Notes	

M4,direction_name

Prototype	M4,direction_name
Description	Change direction
Parameters	<ul style="list-style-type: none"> • direction_name: a direction name
Returns	None
Requires	None.
Example	M4,t_image
Notes	

M5,direction_name

Prototype	M5,direction_name
Description	Create a new direction
Parameters	<ul style="list-style-type: none"> • direction_name: a direction name

Returns	None
Requires	None.
Example	M5,t_image
Notes	

M6,direction_name

Prototype	M6,direction_name
Description	Delete direction
Parameters	<ul style="list-style-type: none"> direction_name: a direction name
Returns	None
Requires	None.
Example	M6,t_image
Notes	

MT,year,month,day,hour,min,sec

Prototype	MT,year,month,day,hour,min,sec
Description	Change MMC date and time
Parameters	<ul style="list-style-type: none"> Year, month, day Hour, min, second
Returns	None
Requires	None.
Example	MT,2014,2,15,18,38,58
Notes	

MC,file_name,file_string

Prototype	MC,file_name,file_string
Description	Change MMC file and write string to this file
Parameters	<ul style="list-style-type: none"> File name (ex. My_file.txt, my_data_csv) File data string (ex. Hello, world!, 12345.00,65432.23)
Returns	None
Requires	None.
Example	MC,your_file_name.txt,hello,world!
Notes	

MA,file_name,file_string

Prototype	MA,file_name,file_string
Description	append data or string to a file
Parameters	<ul style="list-style-type: none"> File name (ex. My_file.txt, my_data_csv) File data string (ex. Hello, world!, 12345.00,65432.23)
Returns	None
Requires	None.
Example	MA,your_file_name.txt,hello,world!
Notes	

MR,file_name

Prototype	MR,file_name
Description	Read a file
Parameters	<ul style="list-style-type: none"> File name (ex. My_file.txt, my_data_csv)
Returns	None
Requires	None.
Example	MR,your_file_name.txt,
Notes	

MD,file_name

Prototype	MD,file_name
Description	delect a file
Parameters	<ul style="list-style-type: none"> File name (ex. My_file.txt, my_data_csv)
Returns	None
Requires	None.
Example	MD,your_file_name.txt,
Notes	

MF,label

Prototype	MF,Label
Description	Format MMC/SD card
Parameters	<ul style="list-style-type: none"> Label: create new label after format
Returns	None
Requires	None.

Example	MR,your_label
Notes	Warning: this function will erase ALL data on this card!

MI,x,y,image_name

Prototype	MI,x,y,image_name
Description	Display an image from MMC card
Parameters	<ul style="list-style-type: none"> • x_position: x coordinate of screen location • y_position: y coordinate of screen location • image name: image file name
Returns	None
Requires	None.
Example	MI,0,0,my_image
Notes	Image file must be 16 bits, 565 format JPG file

MS,x,y,x1,y,image_name

Prototype	MS,x,y,x1,y,image_name
Description	Save screen picture to MMC card
Parameters	<ul style="list-style-type: none"> • x_position: x coordinate of screen location • y_position: y coordinate of screen location • x1_position: x coordinate of screen location • y1_position: y coordinate of screen location • image name: image file name
Returns	None
Requires	None.
Example	MS,0,0,400,250,my_image
Notes	Image file is 16 bits, 565 format JPG file

10. Port input/output function

P1,w_volume

Prototype	P1,w_volume
Description	Write data to port one (Low 8 bits) and port two (high 8 bits)
Parameters	<ul style="list-style-type: none"> • w_volume: write data to port one or port two volume
Returns	None
Requires	None.
Example	P1,1 (1 = 0000000000000001) , low 8 bits is for port one, high is for port two.

Notes	This command is for port one and port two.
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P2,w_volume

Prototype	P2,w_volume
Description	Write data to port three
Parameters	<ul style="list-style-type: none"> w_volume: write data to port three volume
Returns	None
Requires	None.
Example	P2,1 (1 = 00000001)
Notes	Port three is 8 bits

P3

Prototype	P3
Description	read data from port one and port two.
Parameters	<ul style="list-style-type: none"> none
Returns	low 8bits numbers
Requires	None.
Example	P3
Notes	Only read Port one 8 bits.

P4

Prototype	P4
Description	read data from port two
Parameters	<ul style="list-style-type: none"> none
Returns	8 bits volume
Requires	None.
Example	P4
Notes	Port two is 8 bits

P5,volume

Prototype	P5
Description	Set port one and port two is input or output
Parameters	<ul style="list-style-type: none"> volume: volume = 0 is output, = 1 is input
Returns	none

Requires	None.
Example	P4
Notes	Port one is 16 bits for output, 8 bits for input.

P6,volume

Prototype	P6
Description	Set port three is input or output
Parameters	<ul style="list-style-type: none"> • volume: volume = 0 is output, = 1 is input
Returns	none
Requires	None.
Example	P6
Notes	Port three is 8 bits

11. Module control function

ZC

Prototype	ZC
Description	Calibrate touch panel
Parameters	<ul style="list-style-type: none"> • none
Returns	none
Requires	none.
Example	ZC
Notes	

ZD, volume

Prototype	ZD, volume
Description	Set a delay for read command from MMC
Parameters	<ul style="list-style-type: none"> • 1 = 100ms, 2 = 200ms, 3 = 300ms, 4 = 400ms, 5 = 500ms, 6 = 1000ms • 7 = 1500ms, 8 = 2000ms 9 = 2500ms, 10 = 3000ms, 11 = 5000ms • 12 = 6000ms, 13 = 7000ms, 14 = 8000ms, 15 = 9000ms, 16 = 10000ms • 17 = 15000ms, 18 = 20000ms
Returns	none
Requires	none.
Example	ZC
Notes	

ZL,loop_number

Prototype	ZL,loop_number
Description	Set a loop for read command from MMC
Parameters	<ul style="list-style-type: none">• Loop_number: 0 - 255
Returns	none
Requires	none.
Example	ZL,10
Notes	

ZO,File_Name

Prototype	ZO,File_Name
Description	Execute a command file from MMC
Parameters	<ul style="list-style-type: none">• File_Name: an executable command file from MMC
Returns	none
Requires	none.
Example	ZO,my_file
Notes	This file must be text file. (example: my_file.txt)

12. Font size

Arial Narrow Font:

- 1 = Arial_Narrow_8x11
- 2 = Arial_Narrow_12x15
- 3 = Arial_Narrow_18x20
- 4 = Arial_Narrow_22x25
- 5 = Arial_Narrow_26x30
- 6 = Arial_Narrow_30x37
- 7 = Arial_Narrow_38x47
- 8 = Arial_Narrow_50x64
- 9 = Arial_Narrow_77x95

Bold Arial Narrow Font:

- 11 = Bold_Arial_Narrow_17x20
- 12 = Bold_Arial_Narrow_23x29
- 13 = Bold_Arial_Narrow_30x35
- 14 = Bold_Arial_Narrow_38x46
- 15 = Bold_Arial_Narrow_51x63
- 16 = Bold_Arial_Narrow_76x94

Italic Font:

21 = Arial_Narrow16x19_Italic
22 = Arial_Narrow22x26_Italic
23 = Arial_Narrow31x36_Italic
24 = Arial_Narrow40x47_Italic
25 = Arial_Narrow53x63_Italic

Times New Roman Font:

41 = Times_New_Roman20x20
42 = Times_New_Roman28x25
43 = Times_New_Roman37x34
44 = Times_New_Roman46x44
45 = Times_New_Roman63x58

Numbers Font:

51 = Num_15x23	normal number
52 = Dot_15x23	Dots number
53 = Seg_15x23	Seven segment number
61 = Num_36x53	normal number
62 = Dot_36x53	Dots number
63 = Seg_36x53	Seven segment number
71 = Num_50x76	normal number
72 = Dot_50x76	Dots number
73 = Seg_50x76	Seven segment number

Customer's Font:

77 = Second buffer font data
88 = First buffer font data

LIABILITY WARNING

This device should be used only for experimental purposes. It has NOT gone through extensive testing and it could erase or corrupt some or all data on media cards that are inside the device. You assume to take your own risk when you purchase this device, and release the responsibility and liability from the manufacturer with no harm.

REGULATORY WARNING

This device is intended solely for experimental purposes; it is not in finished product form and is NOT FCC approved. If you wish to install these modules into non-experimental final finished products, you will be responsible to have the modules approved by the FCC at your own cost.

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