



## RA8806 vs. RA8803 – H/W

	RA8806	RA8803
Pin3	<b>NC</b>	<b>SYS_FQ:</b> System Clock Select This pin is used to select clock source. Pull Low (0) : X'tal/PLL Mode. Pull High(1) : External Clock.
Pin4	<b>NC</b>	<b>SYS_NM:</b> Test Pin This is a test pin. Normally it connects to high.
Pin29	<b>PWM_OUT:</b> PWM Output Signal This output signal is used to control back-light module or booster circuit.	<b>IOUT:</b> DAC Current Output DAC current source output used to contrast voltage control. This pin is tri-state when DAC disable.
Pin45	<b>NC</b>	<b>LPF:</b> Low Pass Filter Input This is a low pass filter input. Please refer the circuit of application note.
Pin46	<b>XD:</b> X'tal Output This pin connects to external X'tal(4M ~ 12MHz). In external clock mode, it keeps floating. 	<b>XB:</b> X'tal Output This pin connects to external X'tal(32768Hz). 
pin47	<b>XG:</b> X'tal Input In internal clock mode, this pin connects to external X'tal(4M ~ 12MHz). In external clock mode, it connects to external clock.	<b>XA:</b> X'tal Input In internal clock mode, this pin connects to external X'tal(32768Hz). In external clock mode, this is an input of external clock.
Pin49 Pin50	<b>TESTMD、TESTI :</b> Test Pins This pin is used for test only. It has internal pull-low and need to keep floating.	<b>OPM0、OPM1:</b> Operation Status of Current Command These two pins are the feedback from RA8803/8822 while MPU release a Read or Write command to RA8803/8822. The MPU could know the status of RA8803/8822.
Pin82 ~Pin89	<b>KIN[7:0] :</b> Key Pad Input These pins are keypad inputs with pull-up resistors. For un-used input, please keep floating.	<b>KC[7:0] :</b> Key Pad Output These pins are keypad outputs.
Pin90 ~Pin97	<b>KOUT[7:0] :</b> Key Pad Output These pins are keypad outputs. For un-used pin, please keep floating.	<b>KR[7:0] :</b> Key Pad Input These pins are keypad inputs.

## RA8806 vs. RA8803 – S/W

	<b>RA8806</b>	<b>RA8803</b>
<b>Register Write</b>	LCD_CmdWrite(Addr); // RS = 1 LCD_DataWrite(Data); // RS = 0	LCD_CmdWrite(Addr); // RS = 0 LCD_CmdWrite (Data); // RS = 0
<b>Register Read</b>	LCD_CmdWrite(Addr); // RS = 1 LCD_DataRead(); // RS = 0	LCD_CmdWrite(Addr); // RS = 0 LCD_CmdRead(); // RS = 0
<b>Status Register Read</b>	LCD_StatusRead(); // RS = 1	None
<b>Memory Write</b>	LCD_CmdWrite(0XB0); // RS = 1 LCD_DataWrite(Data); // RS = 0 LCD_DataWrite(Data); // RS = 0 ...	LCD_DataWrite(Data); // RS = 1 ... ...
<b>Memory Read</b>	LCD_CmdWrite(0XB1); // RS = 1 LCD_DataRead(); // RS = 0 LCD_DataRead(); // RS = 0 ...	LCD_DataRead(); //RS = 1 ... ...
<b>REG[00H]</b>	Bit 7 : 1 → Normal Mode 0 → Sleep Mode Bit 6 : 1 → User define ROM Mapping Rule 0 → BIG5/GB ROM Mapping Rule	Bit 7-6 : 1 1 → Normal Mode 00 → Sleep Mode
<b>REG[01H]</b>	Bit 7 : 1 → Eliminating flicker mode 0 → Normal Mode Bit 5 : 1 → Busy Polarity is Hi active 0 → Busy Polarity is Low active Bit 3-2 : Driver Clock Selection 00 → XCK=CLK/8 01 → XCK=CLK/4 10 → XCK=CLK/2 11 → XCK=CLK Bit 1 : 0 → SEG Scan Direction is 0~319 1 → SEG Scan Direction is 319~0 Bit 0 : 0 → COM Scan Direction is 0~239 1 → COM Scan Direction is 239~0	Bit 7 : Reserved Bit 5 : Reserved Bit 3-2 : Reserved Bit 1-0 : System Clock Select 00 → 3MHz 01 → 4MHz 10 → 8MHz 11 → 12MHz
<b>REG[10H]</b>	Bit 3 : 1 → Font rotates 90 degree. 0 → Normal Bit 0 : Reserved	Bit 3 : 1 → Enable "Auto Increase Cursor Position" 0 → Disbale "Auto Increase Cursor Position" Bit 0 : 1 → Cursor width is auto adjust 0 → Cursor width is fixed at one byte width(8 Pixel)
<b>REG[90H]</b>	Idle Time Setting, in count of system clock. The value can determine the scan time of each COM of the LCD. ( See Data Sheet for detail )	SCCR : Set Shift Clock Cycle ( See Data Sheet for detail )
<b>REG[F0H]</b>	Bit 7 : 1 → Enable ISO8859 Mode 0 → Disable SO8859 Mode Bit 6-4 : Reserved	Bit 7 : 1 → Enable Font ROM Transfer 0 → Disable Font ROM Transfer Bit 6 : 1 → Select lower 256KB Font 0 → Select Upper 256KB Font Bit 5-4 : 00 → GB-code ( 256KB, Mode0 ) 01 → BIG5-code ( 512KB, Mode1 ) 10 → GB-code ( 512KB, Mode2 )

## RA8806 General Description

RAiO Technology has developed a 4 gray scale LCD controller RA8806 for small and mid-size LCD panel that suits a wide variety of commercial, industrial and medical appliances, such as Multifunction Printer, Human-Machine Interface, Ticket Vending Machine, Test and Measuring Instruments.

RA8806 is a LCD controller for QVGA Dot-Matrix type STN-LCD which supports both character and graphic mode display, integrating two Display Data RAM(DDRAM) for two layers display. It has an embedded font ROM that contains 4x256 embedded half-size (8x16 pixels) characters that can display ISO8859-1 ~ 4 (or called Latin-1 ~ 4) alphabets that using in most of English speaking and European countries, also capable of displaying the full-size(16x16 pixels) traditional Chinese font (BIG5, 13973 characters) or simplified Chinese font(GB, 9216 characters). The interface of RA8806 supports the 8080/6800 series MPU protocol interface, which is capable of switching the interface with 4-bits or 8-bits data bus. For LCD driver interface, it can be set to 4-bits/8-bits data bus.



The device inherits all the features of RA8803 and RA8822, two of the RAiO LCD controller ICs include embedded font ROM, but RA8806 offers more functions to give customers a more advanced LCD display solution. The RA8806 gives system engineers the flexibility to develop better suited panel size on their applications. The device supports resolution from 128x64 up to 320x240 pixels in normal mode, and 640x240 or 320x480 pixels in extension mode. Additionally, using the 90, 180, 270 degree font rotation function, the LCD screen could be applied either vertical or horizontal-way usage.

RAiO Technology is well known for providing highly integrated LCD controller and helping customers of LCD module cost improvement. The new released RA8806 is highly integrated high-performance device but consistent with low cost as RA8803 and RA8822. The LCD controller includes the embedded intelligence touch panel controller that provides the 4-wires resistance-type Touch Panel interface, and the PWM output provides an easy contrast or back-light control method for LCD panel. RA8806 also provides a 4x8(32 keys) or 8x8(64 keys) powerful and smart Key-Scan interface includes long-key function. The flexible interrupt and polling mechanism can make it easy to control touch panel, key-scan and power mode functions.

The embedded 512Byte character generation RAM (CGRAM) allows user to build maximum 16 full-size or 32 half-size fonts. Even with the single layer display, the other unused layer can be used as CGRAM too. In this setting, the amazing 300 full-size and 600 half-size user created fonts or symbols are supported, also it can dramatically reduce the MPU loading. Additionally, RA8806 supports 4 gray scale display in FRC mode. The bit-arrangement is compatible for most gray level picture and easy to program. RA8806 also includes many useful functions for area scrolling, font blinks/bold/enlargement, memory clear function and so on. Especially the innovative mechanism of “no-flicker” mode is also included. It's effective for removing the “flicker” in frequently display data R/W, by this function the display quality can be easily enhanced. Other advantages of RA8806 included the wide operating temperature range of -30°C ~ + 90°C, ESD sensitivity pass ±8000V and RoHS compliant.

RA8806 is easy to integrate to LCD modules or embedded system design. It provides a fully integrated solution for variety small or middle-size STN LCD display and helps engineers to simplify the complex programming, can dramatically save developing time and the cost of hardware system. The RA8806 is available of die, as well as the LQFP and TQFP packages. More information about RA8806 and other RAiO LCD controller & driver ICs can be found at [www.raio.com.tw](http://www.raio.com.tw) . The sample of RA8806 is available from RAiO Technology and its authorized distributors at USA, Europe and Asia.

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