EVE MIGRATION GUIDE

EVE Migration Guide

Rev.1.0
2022-01-19

1. REVISION RECORDS

REVNO.	REVDATE	CONTENTS	REMARKS
1.0	2022-01-19	Initial Release	

2. CONTENTS

3. INTRODUCTION

The EVE family combines display, audio and touch into a single chip, providing an optimized solution with high quality graphics that output to 1/16th pixel resolution for WVGA, VGA, SVGA, WQVGA, WSVGA, WXGA TFT display panels. There are 4 versions of EVE:

1. EVE1 – FT800/1,
2. EVE2 – FT810/1; FT812/3,
3. EVE3 – BT815/6,
4. EVE4 – BT817/8.

Depending on the version EVE microcontrollers differ in their specifications. The below information relates to the IC.

PARAMETER	FT800/1	FT810/1	FT812/3	BT815/6	BT817/8
Target Display Resolution*	QVGA WQVGA HVGA	HVGA VGA WVGA SVGA	HVGA VGA WVGA SVGA	HVGA VGA WVGA SVGA	WVGA SVGA WSVGA WXGA
Max Pixels Per Line	512	2048	2048	2048	2048
Display Interface	RGB666	RGB666	RGB666, RGB888	RGB666, RGB888	RGB666, RGB888
Touch Function	800-Resistive 801-Capacitive	810-Resistive 811-Capacitive	812-Resistive 813-Capacitive	816-Resistive 815-Capacitive	818-Resistive 817-Capacitive
Audio Output	PWM	PWM	PWM	Sigma-Delta	Sigma-Delta
Host Interface	SPI/I2C	SPI/I2C	SPI/QSPI	SPI/QSPI	SPI/QSPI
90° Screen Rotation	No	Yes	Yes	Yes	Yes
Object Memory Size	256 kB	1 MB	1 MB	1 MB	1 MB
External Memory Support	No	No	No	Up to 256 MB	Up to 256 MB
Adaptive Framerate	No	No	No	Yes	Yes
Adaptive HSYNC	No	No	No	No	Yes
Dedicated PCLK PLL	No	No	No	No	Yes
2X Pixel Mode	No	No	No	No	Yes
Non Square Pixel	No	No	No	No	Yes
Co-Processor	32-bit RISC 48MHz	32-bit RISC 60MHz	32-bit RISC 60MHz	32-bit RISC 72MHz	32-bit RISC 72MHz
Image Decoder	DXT1, JPEG	DXT1, JPEG, PNG	DXT1, JPEG, PNG	DXT1, JPEG, PNG, ASTC	DXT1, JPEG, PNG, ASTC
Hardware Acceleration	No	JPEG	JPEG	JPEG, ASTC	JPEG, ASTC
Video Playback	No	Motion JPEG	Motion JPEG	Motion JPEG	Motion JPEG
Animation Playback	No	No	No	Yes	Yes
GPIOs	3	3	5	5	5
Package	QFN48	QFN48	QFN56	QFN64	QFN64

* QVGA – 320*240; WQVGA – 480*272; HVGA – 480*320; VGA – 640*480; WVGA – 800*480; SVGA – 800*600; WSYGA – 1024*600; WXGA – 1280*800

Compared to the previous generation FT81X series (EVE2), the BT81X (EVE 3/4) series introduces several enhanced features:

- QSPI NOR flash interface,
- Adaptive Scalable Texture Compression (ASTC) format bitmap,
- unicode text display,
- animation support.

Compared to BT815/6, BT817/8 has a 1.5x graphics engine performance improvement. In addition, it introduces many enhancements including:

- programmable timing to adjust HSYNC and VSYNC timing, enabling interface to numerous displays,
- add Horizontal Scan out Filter to support non-square pixel LCD display,
- Adaptive Hsync modes,
- Supports Animation in RAM_G,
- enable constructing command list in RAM_G,
- new font cache mechanism for custom fonts whose glyph is in flash.

If you want to read more about displays using EVE4 and their possibilities, please visit Riverdi's website.

4. DESIGN DIFFERENCES

When switching to the newer generation of EVE, some differences between the EVE versions should be taken into account.

4.1 Oscillator

- EVE1, EVE3 use internal oscillator,
- EVE2 use external oscillator,
- EVE4 use internal or external oscillator.

4.2 Register addresses

The register addresses used in EVE1, EVE2, EVE3 and EVE4 are different, so:

a) if you use Riverdi's library – https://github.com/riverdi/riverdi-eve/, all you have to do is change the definition in the module.h file to **#define EVE_4** and the definitions that define the display you are using,
b) if you have your own defined code, you have to change register addresses using datasheets of IC:

- EVE1 (version 1.4, chapter 5, page 30),
- EVE2 (version 1.4, chapter 5, page 41),
- EVE3 (version 1.0, chapter 5, page 42),
- EVE4 (version 1.1, chapter 5, page 40).

REGISTER NAME	ADDRESS			
	FT800/1 (EVE1)	FT810/1 FT812/3 (EVE2)	BT815/6 (EVE3)	BT817/8 (EVE4)
REG_ID	102400h	302000h	302000h	302000 h
REG_FRAMES	102404h	302004h	302004h	302004h
REG_CLOCK	102408h	302008h	302008h	302008h
REG_FREQUENCY	10240Ch	30200Ch	30200Ch	30200Ch
REG_RENDERMODE	102410h	302010h	302010h	302010h
REG_SNAPY	102414h	302014h	302014h	302014h
REG_SNAPSHOT	102418h	302018h	302018h	302018h
REG_SNAPFORMAT	-	30201Ch	30201Ch	30201Ch
REG_CPURESET	10241Ch	302020h	302020h	302020h
REG_TAP_CRC	102420h	302024h	302024h	302024h
REG_TAP_MASK	102424h	302028h	302028h	302028h
REG_HCYCLE	102428h	30202Ch	30202Ch	30202Ch
REG_HOFFSET	10242Ch	302030h	302030h	302030h
REG_HSIZE	102430h	302034h	302034h	302034h
REG_HSYNC0	102434h	302038h	302038h	302038h
REG_HSYNC1	102438h	30203Ch	30203Ch	30203Ch
REG_VCYCLE	10243Ch	302040h	302040h	302040h
REG_VOFFSET	102440h	302044h	302044h	302044h
REG_VSIZE	102444h	302048h	302048h	302048h
REG_VSYNC0	102448h	30204Ch	30204Ch	30204Ch
REG_VSYNC1	10244Ch	302050h	302050h	302050h
REG_DLSWAP	102450h	302054h	302054h	302054h
REG_ROTATE	102454h	302058h	302058h	302058h
REG_OUTBITS	102458h	30205Ch	30205Ch	30205Ch
REG_DITHER	10245Ch	302060h	302060h	302060h
REG_SWIZZLE	102460h	302064h	302064h	302064h
REG_CSPREA-D	102464h	302068h	302068h	302068h
REG_PCLK_POL	102468h	30206Ch	30206Ch	30206Ch
REG_PCLK	10246Ch	302070h	302070h	302070h
REG_TAG_X	102470h	302074h	302074h	302074h
REG_TAG_Y	102474h	302078h	302078h	302078h
REG_TAG	102478h	30207Ch	30207Ch	30207Ch
REG_VOL_PB	10247Ch	302080h	302080h	302080h
REG_VOL_SOUND	102480h	302084h	302084h	302084h
REG_SOUND	102484h	302088h	302088h	302088h
REG_PLAY	102488h	30208Ch	30208Ch	30208Ch
REG_GPIO_DIR	10248Ch	302090h	302090h	302090h
REG_GPIO	102490h	302094h	302094h	302094h
REG_GPIOX_DIR	-	302098h	302098h	302098h
REG_GPIOX	-	30209Ch	30209Ch	30209Ch
Reserved	102494h	3020A0h – 3020A4h	3020A0h - 3020A4h	3020A0h - 3020A4h
REG_INT_FLAGS	102498h	3020A8h	3020A8h	3020A8h

REG_INT_EN	10249Ch	3020Ach	3020Ach	3020Ach
REG_INT_MASK	1024A0h	3020B0h	3020B0h	3020B0h
REG_PLAYBACK_START	1024A4h	3020B4h	3020B4h	3020B4h
REG_PLAYBACK_LENGTH	1024A8h	3020B8h	3020B8h	3020B8h
REG_PLAYBACK_READPTR	1024ACh	3020BCh	3020BCh	3020BCh
REG_PLAYBACK_FREQ	1024B0h	3020C0h	3020C0h	3020C0h
REG_PLAYBACK_FORMAT	1024B4h	3020C4h	3020C4h	3020C4h
REG_PLAYBACK_LOOP	1024B8h	3020C8h	3020C8h	3020C8h
REG_PLAYBACK_PLAY	1024BCh	3020CCh	3020CCh	3020CCh
REG_PWM_HZ	1024C0h	3020D0h	3020D0h	3020D0h
REG_PWM_DUTY	1024C4h	3020D4h	3020D4h	3020D4h
REG_MACRO_0	1024C8h	3020D8h	3020D8h	3020D8h
REG_MACRO_1	1024CCh	3020DCh	3020DCh	3020DCh
Reserved	1024D0h – 1024E0h	3020E0h – 3020F4h	3020E0h – 3020F4h	3020E0h – 3020F4h
REG_CMD_READ	1024E4h	3020F8h	3020F8h	3020F8h
REG_CMD_WRITE	1024E8h	3020FCh	3020FCh	3020FCh
REG_CMD_DL	1024ECh	302100h	302100h	302100h
REG_TOUCH_MODE	1024F0h	302104h	302104h	302104h
REG_TOUCH_ADC_MODE REG_CTOUCH_EXTENDED	1024F4h	302108h	302108h	302108h
REG_TOUCH_CHARGE REG_EHOST_TOUCH_X	1024F8h	30210Ch	30210Ch	30210Ch
REG_TOUCH_SETTLE	1024FCh	302110h	302110h	302110h
REG_TOUCH_OVERSAMPLE REG_EHOST_TOUCH_ID	102500h	302114h	302114h	302114h
REG_TOUCH_RZTHRESH REG_EHOST_TOUCH_Y	102504h	302118h	302118h	302118h
REG_TOUCH_ RAW_XY REG_CTOUCH_TOUCH1_X Y	102508h	30211Ch	30211Ch	30211Ch
REG_TOUCH_RZ REG_CTOUCH_TOUCH4_Y	10250Ch	302120h	302120h	302120h
REG_TOUCH_ SCREEN_XY REG_CTOUCH_TOUCH0_X Y	102510h	302124h	302124h	302124h
REG_TOUCH_ TAG_XY	102514h	302128h	302128h	302128h
REG_TOUCH_TAG	102518h	30212Ch	30212Ch	30212Ch
REG_TOUCH_ TAG1_XY	-	302130h	302130h	302130h
REG_TOUCH_TAG1	-	302134h	302134h	302134h
REG_TOUCH_ TAG2_XY	-	302138h	302138h	302138h
REG_TOUCH_TAG2	-	30213Ch	30213Ch	30213Ch
REG_TOUCH_ TAG3_XY	-	302140h	302140h	302140h
REG_TOUCH_TAG3	-	302144h	302144h	302144h
REG_TOUCH_ TAG4_XY	-	302148h	302148h	302148h
REG_TOUCH_TAG4	-	30214Ch	30214Ch	30214Ch
REG_TOUCH_TRANSFORM_A	10251Ch	302150h	302150h	302150h
REG_TOUCH_TRANSFORM_B	102520h	302154h	302154h	302154h

REG_TOUCH_TRANSFORM_C	102524h	302158h	302158h	302158h
REG_TOUCH_TRANSFORM_D	102528h	30215Ch	30215Ch	30215Ch
REG_TOUCH_TRANSFORM_E	10252Ch	302160h	302160h	302160h
REG_TOUCH_TRANSFORM_F	102530h	302164h	302164h	302164h
REG_TOUCH_CONFIG	-	302168h	302168h	302168h
REG_CTOUCH_TOUCH4_X	-	30216Ch	30216Ch	30216Ch
Reserved	102534h – 102470h	302170h	-	-
REG_EHOST_TOUCH_ACK	-	-	302170h	302170h
REG_BIST_EN	-	302174h	302174h	302174h
Reserved	-	302178h – 30217Ch	302178h - 302187Ch	302178h - 302187C h
REG_TRIM	-	302180h	302180h	-
REG_ANA_COMP	-	302184h	302184h	302184h
REG_SPI_WIDTH	-	302188h	302188h	302188h
REG_TOUCH_DIRECT_XY REG_CTOUCH_TOUCH2_X Y	102574h	30218Ch	30218Ch	30218Ch
REG_TOUCH_DIRECT_Z1Z 2 REG_CTOUCH_TOUCH3_X Y	102578h	302190h	302190h	302190h
Reserved	-	302194h – 302560h	302194h - 302560h	302194h - 302560h
REG_DATESTAMP	-	302564h	302564h	302564h
REG_CMDB_SPACE	-	302574h	302574h	302574h
REG_CMDB_WRITE	-	302578h	302578h	302578h
REG_ADAPTIVE_FRAMERATE	-	-	30257Ch	30257Ch
REG_PLAYBACK_PAUSE	-	-	3025ECh	3025ECh
REG_FLASH_STATUS	-	-	3025F0h	3025F0h
Reserved	-	-	-	3025F4h - 302608h
REG_UNDERRUN	-	-	-	30260Ch
REG_AH_HCYCLE_MAX	-	-	-	302610h
REG_PCLK_FREQ	-	-	-	302614h
REG_PCLK_2X	-	-	-	302618h
REG_TRACKER	109000h	-	-	309000h
REG_TRACKER_1	-	-	-	309004h
REG_TRACKER_2	-	-	-	309008h
REG_TRACKER_3	-	-	-	30900Ch
REG_TRACKER_4	-	-	-	309010h
REG_MEDIAFIFO_READ	-	-	-	309014h
REG_MEDIAFIFO_WRITE	-	-	-	309018h
REG_FLASH_SIZE	-	-	-	309024h
REG_ANIM_ACTIVE	-	-	-	30902Ch
REG_PLAY_CONTROL	-	-	-	30914Eh

SWITCH TO RIVERDI!

In Riverdi we focus on solutions. Modifying our products to support the requirements of customers is our specialty.

Both our custom and off-the-shelf displays are designed and manufactured in our headquarters in Europe, from components sourced from across the world — including the latest glass technologies only available in Asian markets. By keeping a large inventory of components, we are able to offer short lead times and flexible minimum order quantities.

Whether you are developing a prototype you need to show to a client or investor, or preparing to manufacture at scale for retail, hospitality, healthcare or any other industry — Riverdi can provide you with the right display solutions.

We offer the best technologies, competitive prices, and exceptional customer service, accompanied by a free sample designed by your requirements.

As top display solution experts on the market, we will create the best solution in every aspect, including price and service, not to mention quality.

With us, you don't have to worry about hidden costs. We will design, develop, and manufacture your sample.

The only thing you need to do is send us information about your current project. We'll handle the rest.
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