RSK+RZA1H

RSK TFT APPLICATION BOARD

R30AN0202EG0200
Rev.2.00
Feb 10, 2020

Introduction

This application note describes details of the RSK+RZA1H's TFT application board.

Please refer to the RSK TFT Application Board schematics (R20UT2905EG0400) for more details.
Please refer to the RSK+RZA1H User's Manual (R20UT3007EG0300) for more details of the RSK+RZA1H board.
Please refer to the RZ/A1H Group User's Manual: Hardware (R01UH0403EJ0200) for more details of the RZ/A1H MCU.

Target Device

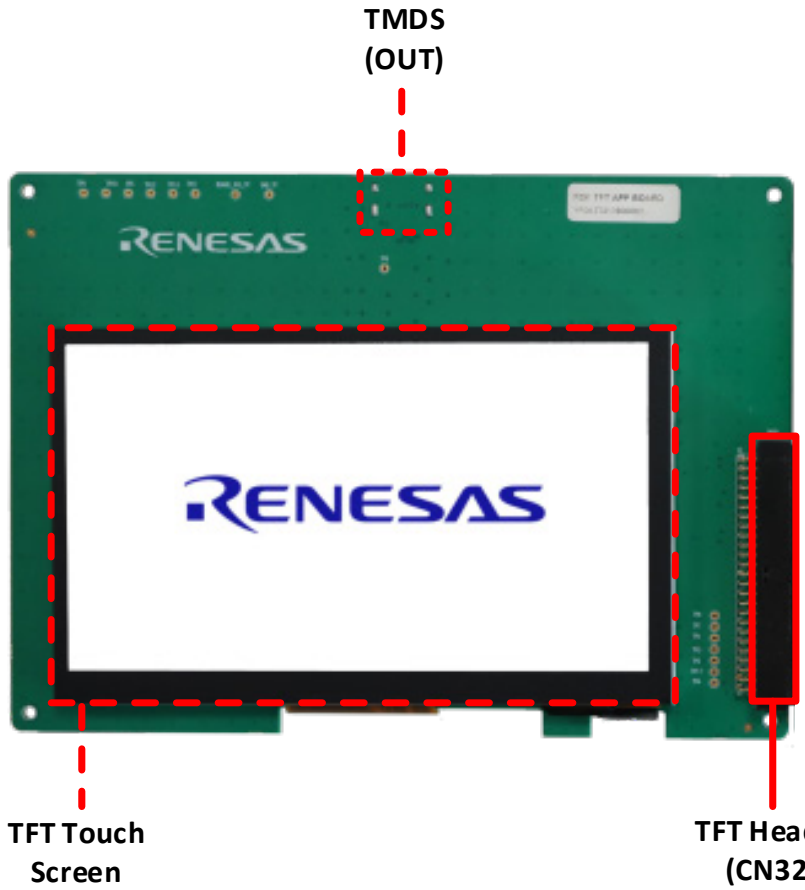
RZ/A1H

Contents

1. Overview

The TFT Application Board is included as an add-on board for the RSK+RZA1H for demonstrating the RZ/A1H's TFT Video Display Controller (VDC5) capabilities.

Figure 1 below details component placement on the RSK TFT Application Board.



1. The TMDS (Transition-Minimised Differential Signaling) connector is found on the bottom side of the board.

Figure 1 RSK TFT Application Board's component placement

1.1 TFT Specifications

The RSK TFT Application Board uses a 7 inch EastRising TFT LCD (ER-TFT070-2) with an 800x480 resolution. The panel accepts data in the RGB888 format. The LCD is also fitted with a capacitive multi touch-screen panel (ER-TPC070-6). A maximum of five touch-points can be detected by the touch-screen panel. This board is designed to be connected to the RSK+RZA1H board, although it can be connected to other target boards with capabilities of driving a TFT-LCD.

1.2 Touch Screen Controller Specifications

The capacitive multi touch-screen panel is controlled by the FocalTech FT5216 controller. It features a maximum of five detectable touch-points. The board is designed to be connected to the RSK+RZA1H board, although it can be connected to other target boards with capabilities of driving a TFT-LCD. Please use the RSK+RZA1H's schematics for reference if planning to use the RSK TFT Application Board with other target boards.

1.3 RGB to TMDS Converter

A parallel to serial converter is provided on the board to support TMDS output. IC5 (TF410PAP) handles the conversion from RGB to TMDS. IC5 is also configurable via IIC and has an IIC device ID 0x78. This device is also connected to IIC channel 0 of the RSK+RZA1H.

Software for driving the TFT LCD is included in the RSK+RZA1H's list of sample code. The RZ_A1H_Display_Board_RSK and RZ_A1H_VDC5_RSK samples use the RSK TFT Application Board. Users are encouraged to run these two samples and use them as reference for rapid development work when evaluating the RZ/A1H MCU.

1.4 Interface to the RSK+RZA1H

The connection between the TFT Application board and the RSK+RZA1H is made by connecting CN32 (TFT board) and CN44 (RSK+RZA1H).

Figure 2 below shows the RSK TFT Application Board connected to the RSK+RZA1H.

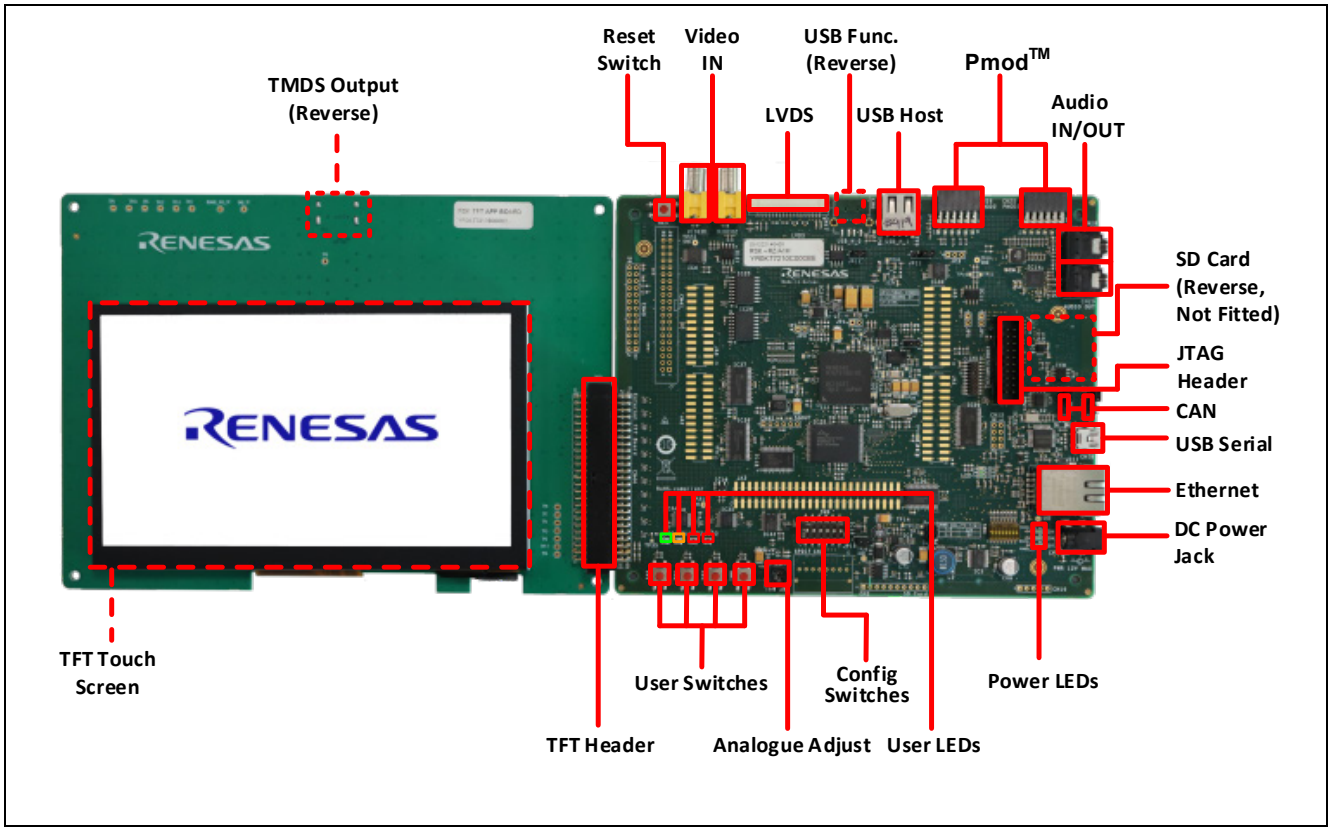


Figure 2 RSK TFT Application Board connection to RSK+RZA1H

Table 1 Corresponding Signals between RSK TFT Application Board and the RSK+RA1H.

RSK TFT Application Board (CN32)	Connector Number (Common)	RSK+RZA1H (CN44)	Notes
RGB_B0	1	P11_7_LCD0DATA0	
RGB_B1	2	P11_6_LCD0DATA1	
RGB_B2	3	P11_5_LCD0DATA2	
RGB_B3	4	P11_4_LCD0DATA3	
RGB_B4	5	P11_3_LCD0DATA4	
RGB_B5	6	P11_2_LCD0DATA5	
RGB_B6	7	P11_1_LCD0DATA6	
RGB_B7	8	P11_0_LCD0DATA7	
RGB_G0	9	P10_15_LCD0DATA8	
RGB_G1	10	P10_14_LCD0DATA9	
RGB_G2	11	P10_13_LCD0DATA10	
RGB_G3	12	P10_12_LCD0DATA11	
RGB_G4	13	P10_11_LCD0DATA12	
RGB_G5	14	P10_10_LCD0DATA13	
RGB_G6	15	P10_9_LCD0DATA14	
RGB_G7	16	P10_8_LCD0DATA15	
RGB_R0	17	P10_7_LCD0DATA16	
RGB_R1	18	P10_6_LCD0DATA17	
RGB_R2	19	P10_5_LCD0DATA18	
RGB_R3	20	P10_4_LCD0DATA19	
RGB_R4	21	P10_3_LCD0DATA20	
RGB_R5	22	P10_2_LCD0DATA21	
RGB_R6	23	P10_1_LCD0DATA22	
RGB_R7	24	P10_0_LCD0DATA23	
RESET_N	25	RESET2_N	
RGB_CLK	26	P11_15_LCD0CLK	
RGB_EN	27	P11_12_LCD0TCON2	
RGB_HSYNC	28	P11_11_LCD0TCON3	
RGB_VSYNC	29	P11_10_LCD0TCON4	
DITHB	30	P11_13_LCD0TCON1	
MODE	31	P11_14_LCD0TCON0	
LR_INV	32	P11_9_LCD0TCON5	
UD_INV	33	P11_8_LCD0TCON6	
BL_PWM_CTRL	34	BL_PWM_CTRL	
IO0 (TP7 only)	35	N.C	
IO1 (TP8 only)	36	N.C	
IIC_SDA	37	SDA0	MCU Port 1 Pin 1
IIC_SCL	38	SCL0	MCU Port 1 Pin 0
TP_INT	39	TP_INT	MCU Port 4 Pin 9 (IRQ1)
RSPCK (TP1 only)	40	P11_12_RSPCK1	
MOSI (TP2 only)	41	P11_14_MOSI1	
MISO (TP3 only)	42	P11_15_MISO1	
CS (TP4 only)	43	TFT_CS	Port Expander 2 (Pin 6)
IO2 (TP17 only)	44	N.C	
BOARD_3V3 (3.3V)	45	BOARD_VCC (3.3V)	
BOARD_3V3 (3.3V)	46	BOARD_VCC (3.3V)	
GROUND	47	GROUND	
GROUND	48	GROUND	
BOARD_5V (5.0V)	49	BOARD_5V	
BOARD_5V (5.0V)	50	BOARD_5V	

(N.C. Not Connected)

2. Additional Information

The part number for CN32 on the TFT Application board is: SBH11-PBPC-D25-RA-BK.
The mating connector's part number, CN44 on the RSK+ is: SFH11-PBPC-D25-RA-BK.

Renesas will not be accountable for damages to the RSK TFT Application Board should the customer attempt to connect it to a target board other than the RSK+RZA1H.

3. Website and Support

Renesas Electronics Website
http://www.renesas.com/

Inquiries
http://www.renesas.com/contact/

Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
1.00	Oct 06, 2014	All	Original release.
2.00	Feb 10, 2020	All	Revised for updated TFT App Board

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.
2. Processing at power-on

   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.
3. Input of signal during power-off state

   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.
4. Handling of unused pins

   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.
5. Clock signals

   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.
6. Voltage application waveform at input pin

   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).
7. Prohibition of access to reserved addresses

   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.
8. Differences between products

   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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