AT_JMOAB03(SBUS OUT custom FW) user's guide

v0.7

2021.08.05

This firmware disables the ESC2 output and PWM3, and uses the PWM3 pin as the SBUS output.

SBUS output is the content of CARTIF_SBUS_CHx as it is.

The I2C register assignments for ESC steering and throttle have been changed.

I2C Address1(7bit):0x70

I2C address for relay control(same as RELAY-BOARD02)

Reg address	Reg Name	Description
0x00	RY1 control	0x00=OFF 0x01=ON
0x01	RY2 control	0x00=OFF 0x01=ON

I2C Address2(7bit):0x71

I2C address for ADC read ,PWM output and SBUS I/F

Reg address	Reg Name	Description
0x00	ADC_A0	ADC result value 0x00=0V 0xFF = 40.96V
0x01	ADC_A1	
0x02	ADC_A2	
0x03	ADC_A3	
0x04	ADC_A4	
0x05	ADC_A5	
0x06	PWM1_H	PWM2 output width in μsec (Upper 8bit)
0x07	PWM1_L	PWM2 output width in μsec (Lower 8bit)
0x08	PWM2_H	PWM3 output width in μsec (Upper 8bit)
0x09	PWM2_L	PWM3 output width in μsec (Lower 8bit)
0x0A	PWM3_H	PWM4 output width in μsec (Upper 8bit)
0x0B	PWM3_L	PWM4 output width in μsec (Lower 8bit)
0x0C	IN_SBUS_CH1_H	input SBUS CH1 value(Upper 3bit)
0x0D	IN_SBUS_CH1_L	input SBUS CH1 value(Lower 8bit)
0x0E	IN_SBUS_CH2_H	input SBUS CH2 value(Upper 3bit)
0x0F	IN_SBUS_CH2_L	input SBUS CH2 value(Lower 8bit)
0x10	IN_SBUS_CH3_H	input SBUS CH3 value(Upper 3bit)
0x11	IN_SBUS_CH3_L	input SBUS CH3 value(Lower 8bit)
0x12	IN_SBUS_CH4_H	input SBUS CH4 value(Upper 3bit)
0x13	IN_SBUS_CH4_L	input SBUS CH4 value(Lower 8bit)
0x14	IN_SBUS_CH5_H	input SBUS CH5 value(Upper 3bit)
0x15	IN_SBUS_CH5_L	input SBUS CH5 value(Lower 8bit)
0x16	IN_SBUS_CH6_H	input SBUS CH6 value(Upper 3bit)
0x17	IN_SBUS_CH6_L	input SBUS CH6 value(Lower 8bit)
0x18	IN_SBUS_CH7_H	input SBUS CH7 value(Upper 3bit)
0x19	IN_SBUS_CH7_L	input SBUS CH7 value(Lower 8bit)
0x1A	IN_SBUS_CH8_H	input SBUS CH8 value(Upper 3bit)
0x1B	IN_SBUS_CH8_L	input SBUS CH8 value(Lower 8bit)
0x1C	IN_SBUS_CH9_H	input SBUS CH9 value(Upper 3bit)
0x1D	IN_SBUS_CH9_L	input SBUS CH9 value(Lower 8bit)
0x1E	IN_SBUS_CH10_H	input SBUS CH10 value(Upper 3bit)
0x1F	IN_SBUS_CH10_L	input SBUS CH10 value(Lower 8bit)
0x20	IN_SBUS_CH11_H	input SBUS CH11 value(Upper 3bit)
0x21	IN_SBUS_CH11_L	input SBUS CH11 value(Lower 8bit)

0x22	IN_SBUS_CH12_H	input SBUS CH12 value(Upper 3bit)	
0x23	IN_SBUS_CH12_L	input SBUS CH12 value(Lower 8bit)	
0x24	IN_SBUS_CH13_H	input SBUS CH13 value(Upper 3bit)	
0x25	IN_SBUS_CH13_L	input SBUS CH13 value(Lower 8bit)	
0x26	IN_SBUS_CH14_H	input SBUS CH14 value(Upper 3bit)	
0x27	IN_SBUS_CH14_L	input SBUS CH14 value(Lower 8bit)	
0x28	IN_SBUS_CH15_H	input SBUS CH15 value(Upper 3bit)	
0x29	IN_SBUS_CH15_L	input SBUS CH15 value(Lower 8bit)	
0x2A	IN_SBUS_CH16_H	input SBUS CH16 value(Upper 3bit)	
0x2B	IN_SBUS_CH16_L	input SBUS CH16 value(Lower 8bit)	
0x2C	IN_SBUS_DG1	input SBUS DG1 bit	
0x2D	IN_SBUS_DG2	input SBUS DG2 bit	
0x2E	IN_SBUS_BLK	input SBUS BLK bit	
0x2F	IN_SBUS_ERD	input SBUS ERD bit	
0x30	CARTIF_SBUS_CH1_H	SBUS ch1 output value to CARTIF-ESC(Upper 3bit)	reserved
0x31	CARTIF_SBUS_CH1_L	SBUS ch1 output value to CARTIF-ESC(Lower 8bit)	
0x32	CARTIF_SBUS_CH2_H	SBUS ch2 output value to CARTIF-ESC(Upper 3bit)	reserved
0x33	CARTIF_SBUS_CH2_L	SBUS ch2 output value to CARTIF-ESC(Lower 8bit)	
0x34	CARTIF_SBUS_CH3_H	SBUS ch3 output value to CARTIF-ESC(Upper 3bit)	reserved
0x35	CARTIF_SBUS_CH3_L	SBUS ch3 output value to CARTIF-ESC(Lower 8bit)	
0x36	CARTIF_SBUS_CH4_H	SBUS ch4 output value to CARTIF-ESC(Upper 3bit)	reserved
0x37	CARTIF_SBUS_CH4_L	SBUS ch4 output value to CARTIF-ESC(Lower 8bit)	
0x38	CARTIF_SBUS_CH5_H	SBUS ch5 output value to CARTIF-ESC(Upper 3bit)	reserved
0x39	CARTIF_SBUS_CH5_L	SBUS ch5 output value to CARTIF-ESC(Lower 8bit)	
0x3A	CARTIF_SBUS_CH6_H	SBUS ch6 output value to CARTIF-ESC(Upper 3bit)	reserved
0x3B	CARTIF_SBUS_CH6_L	SBUS ch6 output value to CARTIF-ESC(Lower 8bit)	
0x3C	CARTIF_SBUS_CH7_H	SBUS ch7 output value to CARTIF-ESC(Upper 3bit)	reserved
0x3D	CARTIF_SBUS_CH7_L	SBUS ch7 output value to CARTIF-ESC(Lower 8bit)	
0x3E	CARTIF_SBUS_CH8_H	SBUS ch8 output value to CARTIF-ESC(Upper 3bit)	reserved
0x3F	CARTIF_SBUS_CH8_L	SBUS ch8 output value to CARTIF-ESC(Lower 8bit)	
0x40	CARTIF_SBUS_CH9_H	SBUS ch9 output value to CARTIF-ESC(Upper 3bit)	Steering
0x41	CARTIF_SBUS_CH9_L	SBUS ch9 output value to CARTIF-ESC(Lower 8bit)	
0x42	CARTIF_SBUS_CH10_H	SBUS ch10 output value to CARTIF-ESC(Upper 3bit)	Throttle
0x43	CARTIF_SBUS_CH10_L	SBUS ch10 output value to CARTIF-ESC(Lower 8bit)	
0x44	CARTIF_SBUS_CH11_H	SBUS ch11 output value to CARTIF-ESC(Upper 3bit)	reserved
0x45	CARTIF_SBUS_CH11_L	SBUS ch11 output value to CARTIF-ESC(Lower 8bit)	
0x46	CARTIF_SBUS_CH12_H	SBUS ch12 output value to CARTIF-ESC(Upper 3bit)	reserved
0x47	CARTIF_SBUS_CH12_L	SBUS ch12 output value to CARTIF-ESC(Lower 8bit)	
0x48	CARTIF_SBUS_CH13_H	SBUS ch13 output value to CARTIF-ESC(Upper 3bit)	reserved
0x49	CARTIF_SBUS_CH13_L	SBUS ch13 output value to CARTIF-ESC(Lower 8bit)	
0x4A	CARTIF_SBUS_CH14_H	SBUS ch14 output value to CARTIF-ESC(Upper 3bit)	reserved
0x4B	CARTIF_SBUS_CH14_L	SBUS ch14 output value to CARTIF-ESC(Lower 8bit)	
0x4C	CARTIF_SBUS_CH15_H	SBUS ch15 output value to CARTIF-ESC(Upper 3bit)	reserved
0x4D	CARTIF_SBUS_CH15_L	SBUS ch15 output value to CARTIF-ESC(Lower 8bit)	
0x4E	CARTIF_SBUS_CH16_H	SBUS ch16 output value to CARTIF-ESC(Upper 3bit)	reserved
0x4F	CARTIF_SBUS_CH16_L	SBUS ch16 output value to CARTIF-ESC(Lower 8bit)	
0x50	CARTIF_SBUS_DG1	SBUS DG1 output value to CARTIF-ESC	reserved
0x51	CARTIF_SBUS_DG2	SBUS DG2 output value to CARTIF-ESC	reserved

0x52	CARTIF_INPUT_SELECT	Switches the input source of CARTIF-ESC 0 = Hold 1 = Manual (manual driving) 2 = CARTIF_SBUS (auto driving)
0x53	FW_version	7=v0.7(this FW version)
0x54	AUX_LED1	0 = OFF 1 = ON
0x55	AUX_LED2	
0x56	AUX_LED3	
0x57	DISABLE_SBUS_FAILSAFE	0=Enable Failsafe, 1=Disable Failsafe

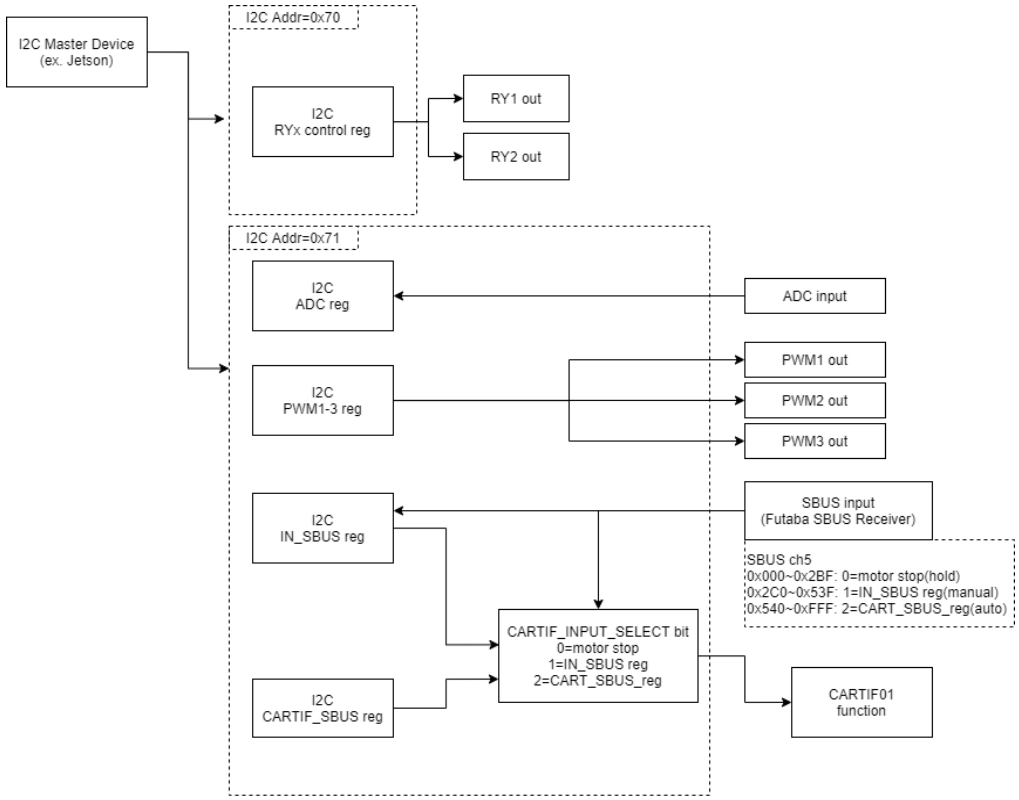
About CH1 (steering) and CH2 (throttle) of CARTIF_SBUS

A timeout function is added as a countermeasure when Jetson freezes.

If there is no write to the I2C address = 0x71 for 5 seconds, CH1 and CH2 will be forced to overwrite neutral (SBUS value = 0x400).

When controlling from Jetson with CARTIF_INPUT_SELECT (I2C register address 0x52) = 2, make sure to write I2C periodically.

Block diagram



Example of using on Jetson Xavier NX

#RY1 turn on

i2cset -y 8 0x70 0x00 0x01

#RY1 turn off

i2cset -y 8 0x70 0x00 0x00

#ADC0 read

i2cget -y 8 0x71 0x00

#PWM2 set 1920us

i2cset -y 8 0x71 0x06 0x07 0x80 i