

APPROVAL SHEET

Customer: _____

Part No.: WDTS-C302TSM 【2*ISDB-T+2*BS/CS】

Issue Date: 2014-1-11

Version: V1.0

Approved Date: _____

APPROVED SIGNATURES		
APPROVED	REVIEWED BY	CHECKED BY

1. Description

The module is suitable for the Japanese market three Band (ISDB-T+BS+CS) TV and DVB With PVR function, Two ISDB-T signals and BS and CS total of four independent signal input, the perfect realization of T-T, T-S, S-S channels while playing with each other while recording function.

It is full compliant with ISDB-T + B S + C S Japan market standard.

2. Features

The ISDB-T and Satellite 2*2 diversity antennas, the receiving ISDB-T and BS and CS three band signal;

High Sensitivity : Average : ISDB-T ≤-84dB; ISDB-S≤-70dB;

Support 2*ISDB-T and 2*BS/CS three band, four way signal received;

Support T-T, T-S, S-S signals while playing with each other while recording;

Support HDMI, YPbPr, CVBS, SPDIF Interface;

Support USB recording and playback is optional by USB or HDD;

Support SATA HDD 1PCS and maximum of 3 USB hard disk, Each hard disk capacity up to 2TB (FAT32, exFAT);

Support EPG, time-shift;

Support Video Resolutions: 480P, 576i, 576P, 720P, 1080i and 1080P;

Support UART/ Infrared Remote Control;

Software update from USB;

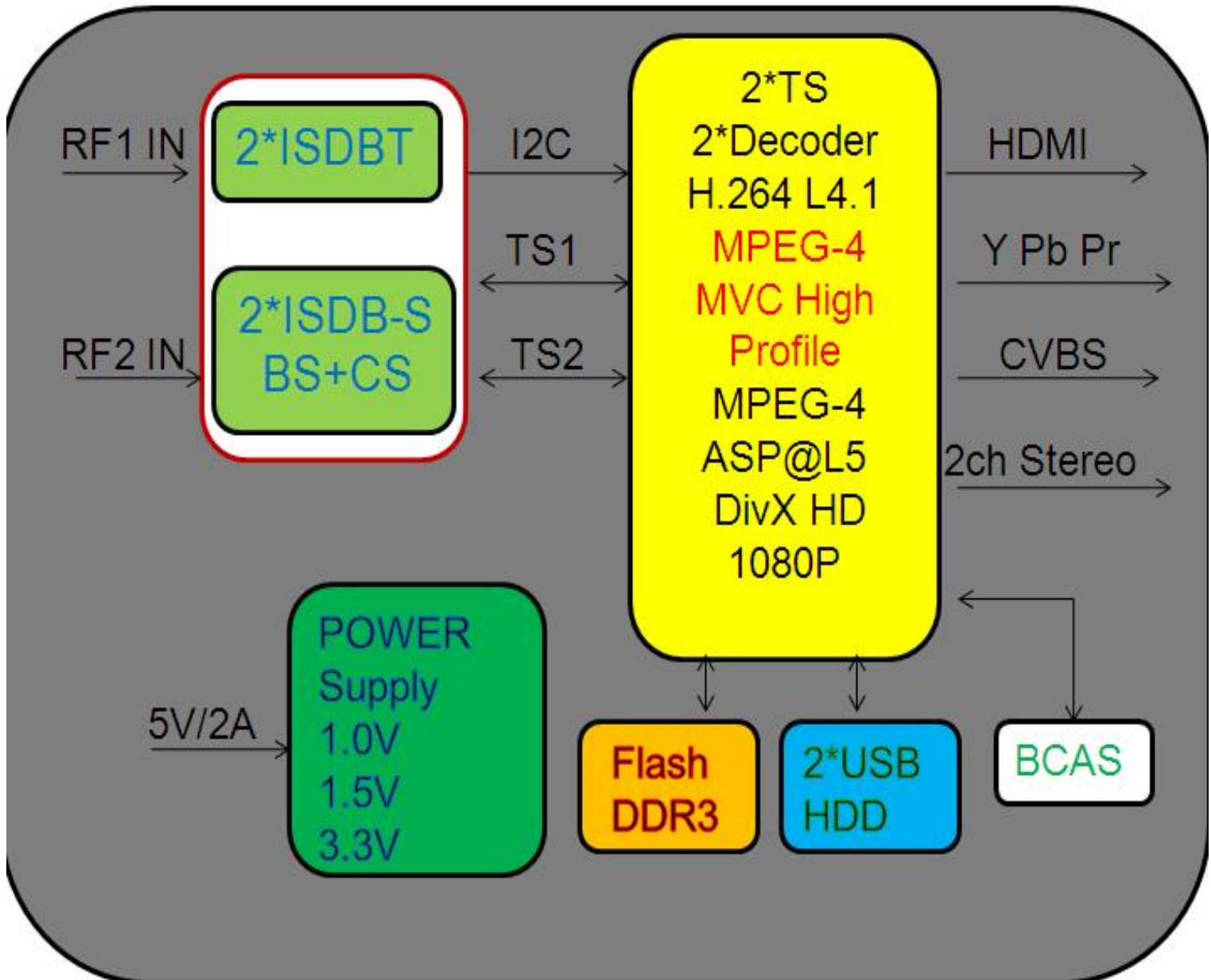
Single Power Input: 12V/2A;

Suitable for DTV, PMP, GPS, Portable TV, STB, Home TV Box products or mobile application;

3. Specifications

- * Frequency range: ISDB-T: 93.143 ~ 767.143MHz (AIR 1 ~ 62ch, CATV C13 ~ C63ch) ;
ISDB-S: 1032MHz ~ 2150MHz
- * Input level per channel: ISDB-T 10dBm ~ -82dBm; ISDB-S -70dBm ~ -20dBm;
- * Input impedance: Double antennas, 2 * 75 ohms
- * Video Decoder: MKV, AVI, MP4 (MPEG-4 ASP@L5 DivX HD 1080P);
MPEG-2: MP@HL, MPEG-4: ASP@L5 with QMC, GMC (1 warp-point only);
H.264 / MPEG-4 AVC: HP@L4.2 , H.264 / MPEG-4 MVC: Stereo HP@L4.1;
VC-1: AP@L3, MP@HL, SP@ML ; AVS JP@L2.0, L4.0, 6.0;
DivX3, 4, 5, 6, 7 , WMV9: AP@L3, MP@HL, SP@ML ;
H.264, MPEG2 dual HD decoding support; VP6, Sorenson Spark, JPEG;
Supports 3D Video decoding (Side by Side (half));
- * Audio Processor: Dedicated DSP for decoding and signal processing;
MPEG-1 and -2, layer 1 and 2, MP3;
MPEG-2 AAC, MPEG-4 AAC, MPEG-4 HE-AAC V1 L2/L4, V2 L2/L4 ;
Dolby Digital / Dolby Digital Plus;
Support for downmixing Dolby Digital / Dolby Digital Plus to 2 ch PCM;
Dolby Digital Plus to Dolby Digital transcode;
Supports MS10, DRA , WMA9 , DTS ;
Supports DTS transcoding, PCM L+R audio output;
- * Command Interface: UART/IR;
- * Operating voltage: DC 4.5V ~ 5.5V; Power Consumption: Typ. <2W;
- * Temperature: Operation: -10 °C ~ 50°C; Storage -20 °C ~ 60°C
- * Humidity: Operating: Less than 80%; Storage Less than 90%;
- * Size(W*L*H): 88mm*105.7mm*20mm;

4. Block Diagram



5. Communication Protocol (UART Protocol)

Communication between ISDB-T module with external MCU by the UART port or I²C port, the UART protocol detailed as below: (B P S = 1 1 5 2 0 0)

The MCU controller just need send 3 bytes to the module:

CMD: 0xAA + Key Code Byte + 0x55

Byte0 = 0xAA

Byte1= Key Code Byte

Byte2 = 0x55

Start CMD (0xAA)	Key Code Byte	End CMD (0x55)*
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Key Code Byte List Below:

Key name	Value
0	0x1e
1	0x59
2	0x45
3	0x44
4	0x55
5	0x49
6	0x48
7	0x51
8	0x4d
9	0x4c
10	0x1f
Mute	0x40
MENU	0x10
UP	0x11
DOWN	0x09
RIGHT	0x0e
LEFT	0x0c
VOLUMDN	0x0f
VOLUM UP	0x13
OK	0x0d
EXIT	0x12
PGUP	0x06
PGDN	0x07
SCAN	0x03
REC	0x1c
EPG	0x1b
INFO/DISPLAY	0x15
SUBTITLE	0x1a
PLAY/PAUSE	0x04
STOP	0x29
RETURN	0x24
F.B.	0x26
F.F.	0x25
RED	0x08
GREEN	0x20
YELLOW	0x21
BLUE	0x22
PREV	0x2d

NEXT	0x2e
PVR	0x2a
POWER	0x05
TV/RADIO	0x4e

MCU receive ISDB-T module command

Start CMD (0xAB)	Key Code Byte	End CMD (0x55)*
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Key Code Byte List Below:

Key name	Value
WAKE WAKEWUP	0x1b+0x31+0x31(key code byte)+0X7e Answer: 0xaa+0xfe+0x55
SLEEP	0x1b+0x31+0x32(key code byte)+0X7e Answer: 0xaa+0xff+0x55
REC START	0x1b+0x31+0x33(key code byte)+0X7e; no Answer
REC STOP	0x1b+0x31+0x34(key code byte)+0X7e; no Answer

*** If any side of both communication started want target confirm response signal,the end cmd should be Equal 0x56 and response 0x55aa signal back.**

6. IR Protocol

```
typedef enum _IrCommandType
{
    IRKEY_POWER                = 0x14,
    IRKEY_MUTE                  = 0x10,

    IRKEY_NUM_1                 = 0x48,
    IRKEY_NUM_2                 = 0x49,
    IRKEY_NUM_3                 = 0x4b,
    IRKEY_CHANNEL_RETURN       = 0x4a,

    IRKEY_NUM_4                 = 0x9,
    IRKEY_NUM_5                 = 0x1d,
    IRKEY_NUM_6                 = 0x1f,
    IRKEY_CHANNEL_FAV_LIST     = 0xd,

    IRKEY_NUM_7                 = 0x19,
    IRKEY_NUM_8                 = 0x1b,
    IRKEY_NUM_9                 = 0x15,
    IRKEY_PAGE_UP               = 0x17,

    IRKEY_ASPECT                = 0x12,
    IRKEY_NUM_0                 = 0x11,
    IRKEY_EPG                   = 0x59,
    IRKEY_PAGE_DOWN            = 0x8,

    IRKEY_MENU                  = 0x50,
    IRKEY_UP                    = 0x6,
```

```
IRKEY_EXIT                = 0x5,

IRKEY_LEFT                = 0x47,
IRKEY_SELECT              = 0x7,
IRKEY_RIGHT               = 0x40,

IRKEY_INFO                = 0x2,
IRKEY_DOWN                = 0x44,
IRKEY_PVR                 = 0x3,

IRKEY_PLAY                = 0x51,
IRKEY_PAUSE               = 0x13,
IRKEY_PLAYPAUSE           = IRKEY_DUMY,

IRKEY_BACKWARD            = 0xf,
IRKEY_RECORD              = 0x53,
IRKEY_STOP                = 0x52,
IRKEY_PREVIOUS            = 0x55,

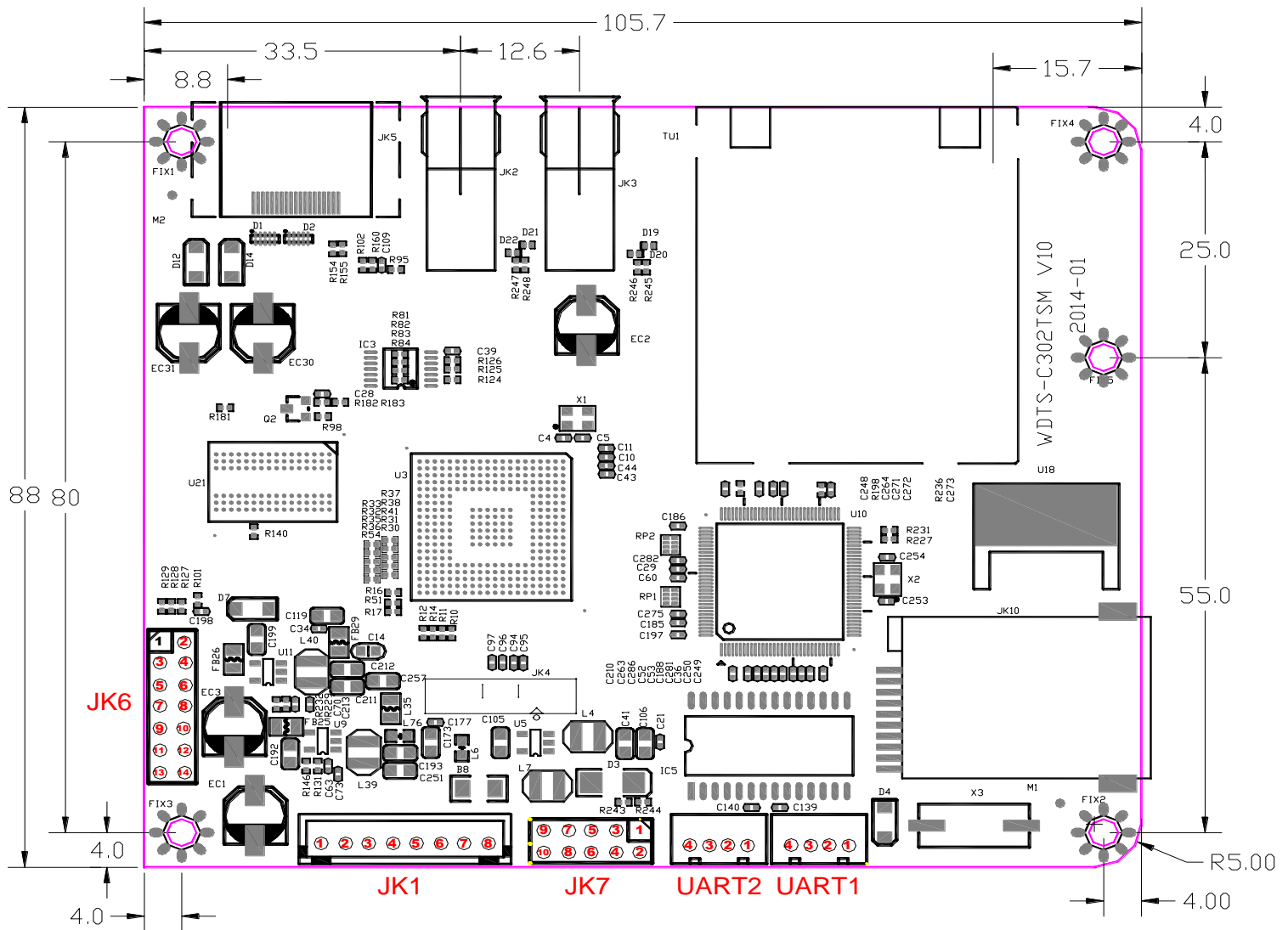
IRKEY_FORWARD             = 0x42,
IRKEY_SHIFT               = 0x1e,
IRKEY_GOTO                = 0xa,
IRKEY_NEXT                = 0x56,

IRKEY_RED                 = 0xe,      //IRKEY_SAT
IRKEY_GREEN               = 0x57,    //IRKEY_ZOOM
IRKEY_YELLOW              = 0x41,    //IRKEY_PAUSE
IRKEY_BLUE                 = 0x46,    //IRKEY_TV_RADIO

IRKEY_MULTIMEDIA          = 0x1a,
IRKEY_TTX                 = 0x18,
IRKEY_SUBT                = 0x5f,
IRKEY_AUDIO               = 0x45,

IRKEY_TIMER               = 0x00,
IRKEY_SLEEP               = 0x01,
IRKEY_LANGUAGE            = 0x43,
IRKEY_V_FORMAT            = 0x5e,
}IrCommandType;
```

7. Dimensions and Pin Description



JK6

PIN: 2.54*2.54mm	
1	CVBS
2	PRO
3	AOUR
4	YO
5	AOUL
6	PBO
7	GND
8	SPDIP
9	IR_INO
10	PPORT53
11	GND
12	GND
13	5VSTB
14	5VSTB

JK1

PIN: 2.54mm	
1	IR_INO
2	GND
3	5VSTB
4	5VIN
5	FP_STB
6	FP_SDA
7	FP_SCL
8	POWER

JK7

PIN: 2.54*2.54mm	
1	JTCK
2	GND
3	JTDO_O
4	D3.3V
5	JTMS
6	NC
7	JTRST
8	NC
9	JTD1
10	GND

UART2

PIN: 2.0mm	
1	5V
2	TXD0
3	RXD0
4	GND

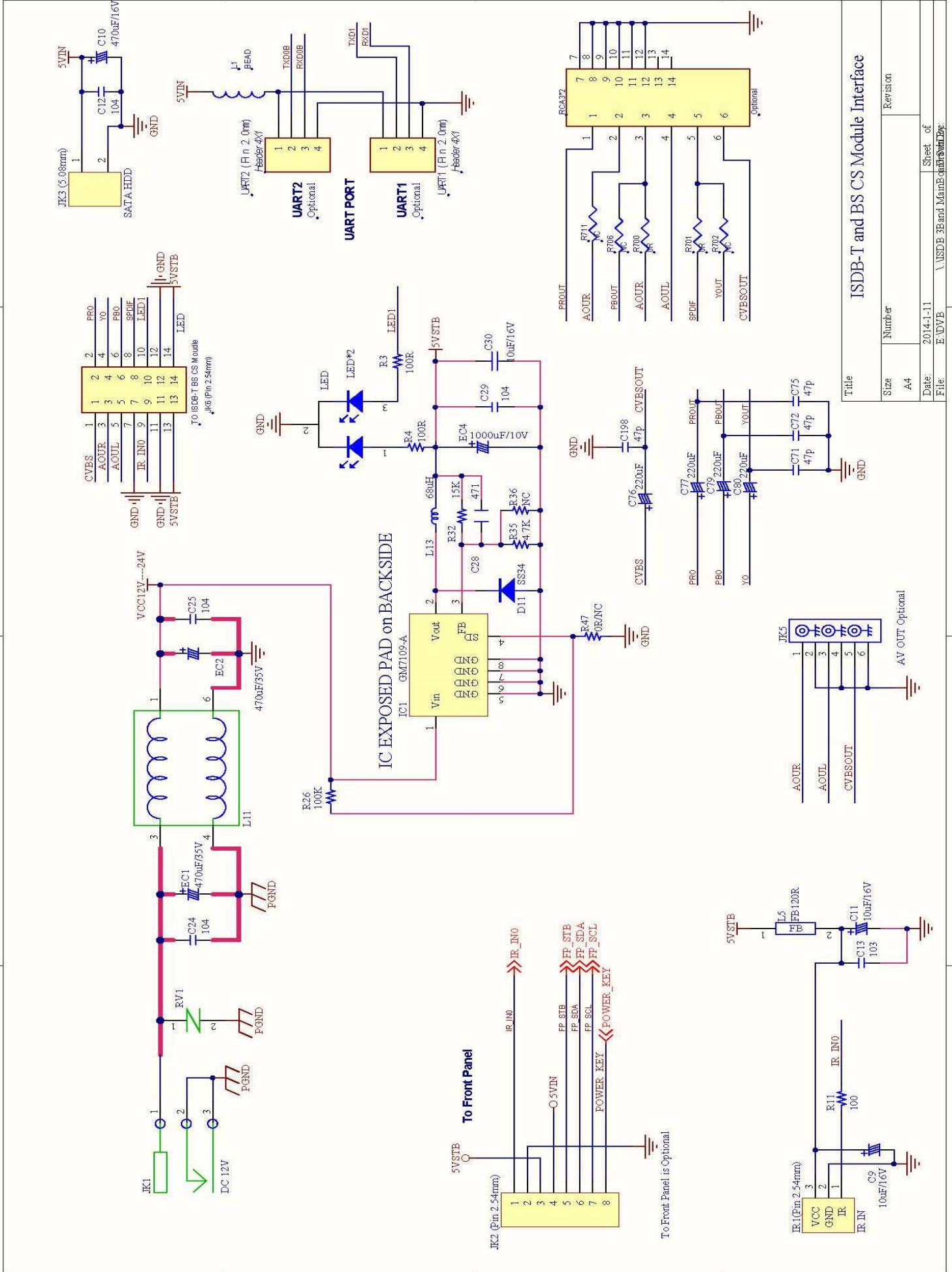
UART1

PIN: 2.0mm	
1	5V
2	TXD1
3	RXD1
4	GND

Remark:

- JK1: Front Control Panel is optional;
- JK7: Debug Reserved
- JK6: 5VSTB ----PCBA Input Power, $5V \pm 0.5V / 2A$;
SPDIP----Digital Audio output (SPDIF);
AV Output: CVBS, AOUR,AOUL,PRO/YO/PBO is optional;
PPort53----I/O optional;

8. Module Recommended Interface Application Circuit



Title		ISDB-T and BS CS Module Interface	
Size	Number	Revision	
A4	A4		
Date:	2014-1-11	Sheet of	
File:	E_VDVB	\USDB_3Band_MainExp\shw\shw.Dwg	

9. Reliability Test

No.	ITEM	TEST CONDITIONS	SPECIFICATIONS
1	High temperature with load test	+60°C, 48 hours Power on	Gain Variation: < \pm 3dB
2	Low temperature test	-20°C, 48 hours Power on	
3	Humidity & temperature with load test	+40° C ,95%RH, 48 hours power on	
4	Life Test	work about 240 hours, with standard power supply, measurements in standard test condition.	
5	ESD protection	<ol style="list-style-type: none">1) Observe ESD protection measures.2) Ground yourself before handling the module.3) Do not touch the module connector pins without ESD protection	