



SPECIFICATION

DIGITAL TV

Revision:1.0

1.SCOPE

This specification establishes the high performance of the consumer Digital Terrestrial Receiver.

- * Fully DVB Compliant
- * Multiple Switch types supported-NTSC/PAL monitors
- * EPG
- * Dynamic FFT positioning for portable and mobile environments
- * MPEG Transport Demux and A/V Decoder
- * 32 programmable PID filters
 - One video PID
 - One audio PID
 - 30 general purpose PIDs for generic section or private PES data
- * Video Decoder
 - Real time MPEG-2 MP@ML decoding
 - Real time MPEG-4 ASP D1 resolution decoding
 - Real time MPEG-1 D1 (720 x 480 x 30 / 720 x 567 x 25) decoding
 - Advanced decoding and display control
- * Audio Decoder
 - Flexible Programmable DSP Architecture
 - Support LPCM and PCM playback
 - Support WMA™¹ playback
 - Support MPEGI/II layer 1/2/3
- * OSD
 - Multiple OSD regions with different formats
 - Support 2/4/16/256 indexed color with de-flickering
 - Support 16/24-bit direct color
- * Embedded TV encoder
 - Support 480i/576i format

2 Features

- * Installation and Set Up
 - Software upgrades via terrestrial broadcast, through USB port and Receiver to receiver
- * Display
 - 256 Color On-Screen display
 - Automatic PAL-NTSC conversion

2.1 Front End

- * Frequency range VHF 177.5 ~ 226.5MHz
 - UHF 473 ~ 858 MHz
- * Demodulation 2k / 8k COFDM
- * Compliant with ETS 300 744 (DVB-T)
- * Carrier modulation QPSK, 16-QAM, 64-QAM
- * Bandwidth 6,7,8MHz
- * Guard interval 1/32,1/16,1/8,1/4
- * FEC code rate 1/2,2/3,3/4,5/6,7/8



SPECIFICATION

DIGITAL TV

Revision:1.0

2.2 Audio

- * Mode Stereo,Dual,Joint Stereo and Mono
- * Audio Format MPEG-2 Layer 1 and Layer 2 , Dolby Digital,MP3,and Linear PCM (LPCM)
- Volume Control Stepping Adjustment

2.3 Video

- * Video Format MPEG-2 MP@ML ISO 13818-2
- * Frame rate NTSC : 30 PAL : 25
- * Display Pixel NTSC 720 * 480 PAL 720 * 576
- * Aspect Ratio 16 : 9 or 4:3

2.4 Interface

- * Support USB2.0 DISK FAT format only

SPECIFICATION

DIGITAL TV

Revision:1.0

Tuner General Specifications

Typical condition applies to using on-chip analog regulators with typical conditions defined in Recommended Operation Conditions, measured across RF frequency range.

(IF = 4.57MHz)

Parameter	Symbol	Min	Typical	Max	Units	
System						
Input Return Loss 75ohm system	S_{11}		7		dB	
RF frequency range	f_{RF}	177		860	MHz	
Channel bandwidth			6, 7, 8		MHz	
Maximum Voltage Gain (appendix 1)	G_{max}	91	94		dB	
Gain Control Range	AGC	105	115		dB	
Noise Figure	NF		5	8	dB	
Output 1dB Compression			114		dBuVrms	
3 rd -order In-band Intermod Intercept (gain=50 dB)		-32.0	-27.0		dBm	
IF LO Feedthrough Rejection (appendix2)	gain =0-70 dB, DCOS	-50	-60		dBc	
I/Q Imbalance(gain = 50dB)	QI	-60	-63		dBc	
Loophrough						
Gain		-2	0	2	dB	
Noise Figure			6.5		dB	
Channel Select Filter						
Channel Select Filter Band Edge Frequency Definition (measured at offset from center of band)	BW=6MHz	FBE	NA	2.8	NA	MHz
	BW=7MHz		NA	3.3	NA	MHz
	BW=8MHz		NA	3.8	NA	MHz
Group Delay Across +/- Band Edge	BW=6MHz	GD		500	600	ns
	BW=7MHz			500	600	ns
	BW=8MHz			500	600	ns
In-Band Amplitude variation	BW=6MHz			2	4	dB
	BW=7MHz			2	4	dB
	BW=8MHz			2	4	dB
Attenuation of adjacent analog channel (measured at offset from center of band)	BW= 6 MHz	Picture (4.25MHz)		70		dB
		Sound (3.25MHz)		35	40	dB
	BW=7 MHz	Picture (4.75MHz)		70		dB
		Sound (3.75MHz)		34	40	dB
	BW=8 MHz	Picture (5.25MHz)		70		dB
		Sound (4.75MHz)		48	56	dB
Synthesizer						
Phase Noise	at 1 kHz Offset			-85	-75	dBc/Hz
	at 10 kHz Offset			-95	-85	dBc/Hz
	at 100 kHz Offset			-100	-90	dBc/Hz
Channel Switching Time			20	25	ms	
Others						
Current DAC	IDAC	3.5	4.0		mA	

SPECIFICATION

DIGITAL TV

Revision:1.0

5. Video Electrical Characteristics

Signal Performance at CVBS output

	Condition	Min.	Typ.	Max.	Unit
Bar level(NTSC)		90	100	110	IRE
Bar level(PAL)		630	700	770	mV
Sync level(NTSC)		38	40	42	IRE
Sync level(PAL)		280	300	315	mV
Burst amplitude(NTSC)		38	40	42	IRE
Burst amplitude(PAL)		280	300	315	mV
Picture Sync ratio		95	100	105	%
Line time distortion				1	%
C/L gain		80		120	%
C/L delay		-40		40	ns
K-2T				2.5	%
D.G.			2.8	5	%
D.P.			2.5	5	Deg
S/N ratio		55	56		dB
S/N ratio(Unweighted)			61		dB
Impedance			75		ohm
Output voltage	DC coupled	0.8	0.9	1.0	Vp-p

NOTE: video 75 ohm load

5.1 Audio Electrical Characteristics

2 separate audio outputs, left and right channels, are supported

	Condition	Min.	Typ.	Max.	Unit
S/N ratio L		70			dB
S/N ratio R		70			dB
THD L				1	%
THD R				1	%
Amplitude freq. response				2	dB
L-R level difference				1	dB
Output level		0.9	1	1.1	Vp-p
Output impedance(unbalanced)			600		ohm
Audio Separation	Vin=0.5RMS	70			dB
R & L of TV output	R=1kohm,gain=0dB	70			dB

SPECIFICATION

DIGITAL TV

Revision:1.0

5.2 Environmental requirement

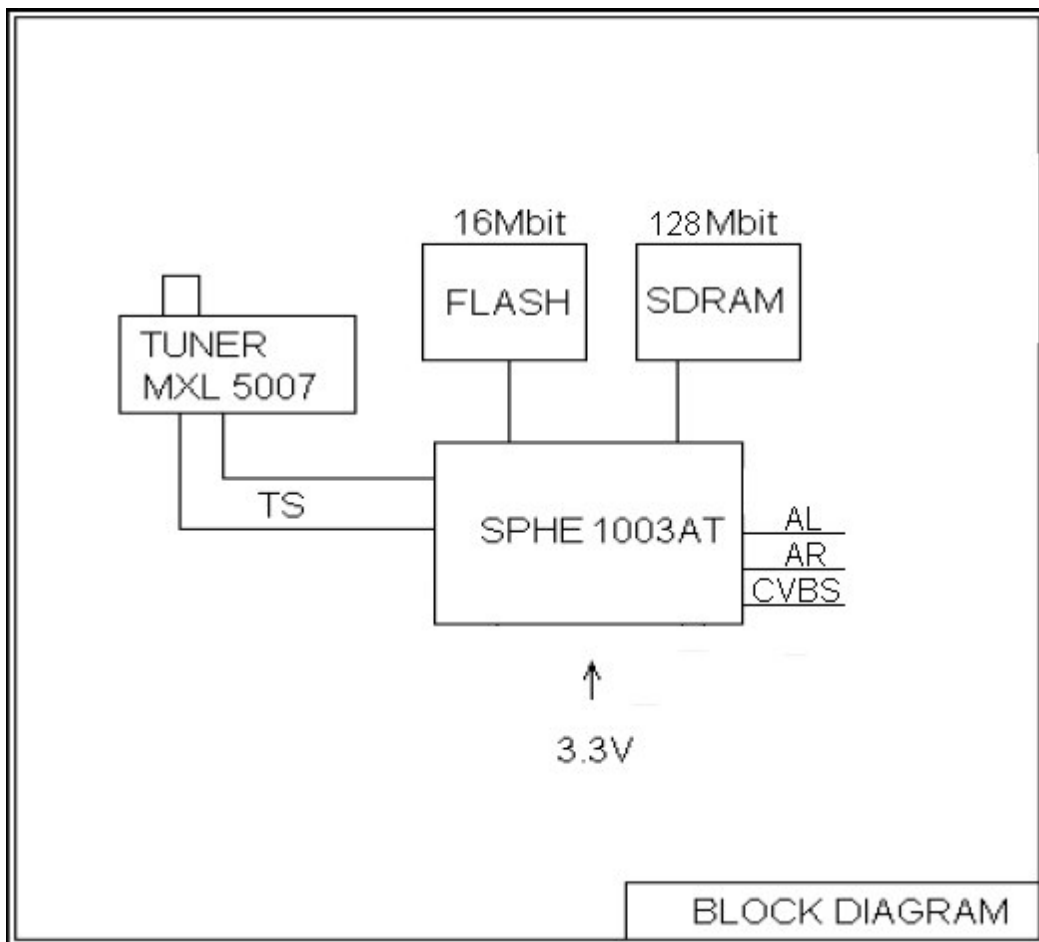
Operating temperature 0°C to 50°C
 Storage temperature -40°C to 85°C

5.3 Power

DC input
 DC voltages input 3.3VDC
 Power consumption 1.6W

5.4 Microprocessor

Microprocessor SUNPLUS SPHE1003A
 Clock 147.456MHz
 SDRAM 128Mbit
 Flash memory 16Mbit





SPECIFICATION

DIGITAL TV

Revision:1.0

6. **Electrostatic discharge**

6.1 **Test**

Each front-end must be capable of normal performance following its subjection to the following tests:

MIL STD 883C HBM

Test is performed with a voltage discharge from a 100 **PF** capacitor over a 1500 **OHM** series resistance in the discharge path. There is a direct contact between the test probe head and the unit under test, using the test points and conditions detailed below:

IEC 1000-4-2

Test is performed with a voltage discharge from a 150 **PF** capacitor over a 330 **OHM** series resistance in the discharge path. There is a direct contact between the test probe head and the unit under test, using the test points and conditions detailed below:

- o Test for antenna input socket +/-8 **KVDC**

SPECIFICATION**DIGITAL TV**

Revision:1.0

7 Reliability test procedure & conditions

Note:Room temperature = 25°C +/- 2°C

7.1 Heat load test

- o Measure the DUTs at room temperature
- o Load the DUTs into chamber of the following conditions:

Temperature = 60 °C
Period = 500 hrs
Cycle = 1.5 hrs on; 0.5 hrs off
Quantity = 10 pcs

- o Cool-down 0,5 hr at room temperature, then measured the DUTs within 1 hr
- o The test shall be continued to 1000 cycles for information only

7.2 Humidity load test

- o Measure the DUTs at room temperature
- o Load the DUTs into chamber of the following conditions:

Temperature = 40 +/- 5 °C
Period = 24 hrs
Cycle = constantly on
Quantity = 24 pcs

- o Cool-down 0.5 hr at room temperature, then measured the DUTs within 1 hr
- o Load the DUTs again into chamber of following conditions:

Temperature = 40+/-5°C
Humidity = 90 to 95%
Period = 500 hrs
Cycle = 1.5 hrs on; 0.5 hrs off
Quantity = 20 pcs

- o Cool down 0.5hr at room temperature, then measured the DUTs within 1 hr

SPECIFICATION**DIGITAL TV**

Revision:1.0

7.3 Cold test

- o Measure the DUTs at room temperature
- o Load the DUTs into chamber of the following conditions:

Temperature = -2 +/-5 °C
Period = 500 hrs
Cycle = constantly on
Quantity = 10 pcs

- o Warm up for 2 hrs at room temperature, then measured the DUTs within 1 hr

7.4 Thermal shock

- o Measure the DUTs at room temperature
- o Load the DUTs into chamber of the following conditions:

Temperature = -25°C for 60 min
 ↓ ↑
 80°C for 60 min
Period = 200 cycles
Power = power off
Quantity = 10 pcs

- o Cool-down 0.5 hr at room temperature then measured the DUTs within 1 hr

7.5 Temperature cycle test

- o Measure the DUTs at room temperature
- o Load the DUTs into chamber of the following conditions:

Temperature = -5°C for 16 hrs then 60°C for 8 hrs
Period = 500 hrs
Cycle = constantly on
Quantity = 10pcs

- o Cool down 0.5 hr at room temperature, then measured the DUTs within 1 hr
- o Load the DUTs again into chamber of the following conditions:

Temperature = 40 +/- 5°C
Humidity = 90 to 95%
Period = 500 hrs
Cycle = 1.5 hrs on; 0.5 hrs off
Quantity = 10 pcs

- o Cool down 0.5 hr at room temperature, then measured the DUTs within 1hr

SPECIFICATION**DIGITAL TV**

Revision:1.0

7.6 Vibration test

- o Frequency: 3.5 Hz
- o Vertical amplitude: 15 to 25 mm
- o Duration: 1 hr
- o Quantity: 1 carton

7.7 Drop test

- o Packaged apparatus: <or = 50 kg
- o Height: depend on weight
- o 1 corner + 3 edger + 6 faces

Drop on the weakest corner (point G)

Drop on the shortest edge on contact with point G

Drop on average edge in contact with point G

Drop on the longest edge in contact with point G

Drop flat wise on the side of minimum surface

Drop flat wise on the side of opposite minimum surface

Drop flat wise on the side of average surface

Drop flat wise on the side of opposite average surface

Drop flat wise on the side of maximum surface

Drop flat wise on the side of opposite maximum surface

- o Quantity :1 carton

7.8 Life test

- o Measure the DUTs at room temperature
- o Load the DUTs into chamber of the following conditions:

Temperature = 60 °C

Period = 500 hrs

Cycle = constantly on

Quantity = 20 pcs

- o Cool down 0.5 hr at room temperature, then measured the DUTs within 1hr

