

404X SERIES RF TUNER MODULES

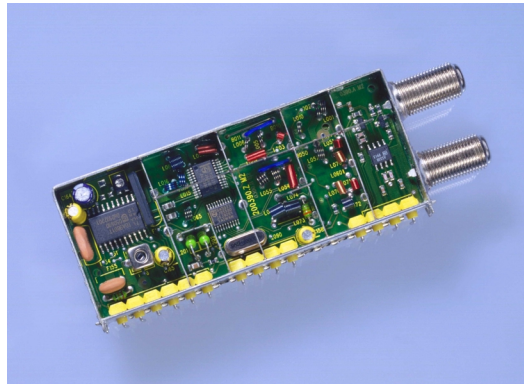
MIXED DIGITAL AND
ANALOG TV APPLICATIONS

APPLICATIONS

- Set-top boxes
- TV Sets
- PC TV Boards

FEATURES

- Frequency range:
50 MHz to 860 MHz
- NTSC and ATSC compatible
- Integrated IF demodulator for
analog video and audio
- Baseband outputs for analog
video and audio
- Balanced IF output for digital
applications
- Improved adjacent channel
performance for ATSC
reception
- All functions controlled by I²C
bus
- TTL-Controlled switchable
antenna inputs
- Low noise figure
- AFC byte readable through I²C
bus
- Single 5V supply



Modules can be implemented with different sockets, filters, interfaces, connectors, and other customizable options within the same pinouts.

The 404x Series RF Tuner Module is specifically designed for mixed digital and analog TV reception. This device combines the functions of both an analog multimedia front end and a digital tuner in a single unit.

For reception of digitally modulated signals, a balanced IF output has a center frequency of 44 MHz. The IF outputs connect directly with an applicable external SAW filter. An AGC control input allows for external control of the output signal amplitude. This tuner covers a frequency range of 50 MHz to 860 MHz with a channel bandwidth of 6 MHz.

The module's hyperband tuner for analog TV reception covers the frequency range of 50 MHz to 860 MHz and contains an IF part with SAW filter, IF amplifier,

and video and sound demodulators. The AF and CVBS signals are available at the audio and video output pins. A video buffer is built in for direct connection to a 75Ω input.

For both digital and analog applications, the reception frequency range is divided into VHF low, VHF high, and UHF. Band selection and tuning are done completely via the I²C-bus. In addition, the AFC voltage generated by the IF demodulator is fed to an integrated A/D converter in the PLL IC and is readable via the I²C bus. A digital AFC function can be implemented.

A DC/DC converter for 33V generation is built in, so that only a single supply voltage of 5V is required.



FUNCTIONAL CHARACTERISTICS

PARAMETER	MEASUREMENT	UNIT
Frequency range for digital reception		
VHF Low	57 to 160	MHz
VHF High	165 to 454	MHz
UHF	459 to 858	MHz
Frequency range for analog reception		
VHF Low (ch 02 to G)	55.25 to 157.25	MHz
VHF High (ch H to W+26)	163.25 to 451.25	MHz
UHF (ch W+27 to 69)	457.25 to 801.25	MHz
Recommended take-over frequency		
VHF Low / VHF High	162	MHz
UHF	457	MHz
IF Frequency		
Digital modulation (center)	44	MHz
Picture carrier	45.75	MHz
Sound carrier	41.25	MHz
Input impedance		
VHF/UHF Common	75	Ω , Unbalanced
IF Output	75	Ω , Balanced
Operating temperature	0 to +60	$^{\circ}\text{C}$
Storage temperature	-25 to +60	$^{\circ}\text{C}$
Supply voltage	5	V

VIDEO OUTPUT

PARAMETER	MIN	TYP	MAX	UNIT
CVBS Output level	0.8	1	1.2	V _{p-p}
Load impedance		75		Ω
Video S/N:		46		dB
UHF		45		dB
Noise limiting sensitivity for video S/N	45		3	dB μ V
Frequency response				
1 MHz	-1.5		1.5	dB
2 MHz	-2		2	dB
3 MHz	-4		2	dB
3.58 MHz	-8		-1	dB
Differential gain			10	%p-p
Differential phase			5	$^{\circ}$ p-p
C/L Gain	-50	-15	20	%
C/L Delay	-100	-25	50	ns

AUDIO OUTPUT

PARAMETER	MIN	TYP	MAX	UNIT
Output level:				
AC		1.3		V _{p-p}
DC	2.1	2.5	2.9	V
Output resistance		200		Ω
Load impedance	2.2			k Ω
AF Level	370	460	550	mV rms
THD+N			0.5	%
S/N		49		dB
Frequency response				
40 Hz to 15 kHz	-1		1	dB

2ND IF OUTPUT

PARAMETER	MIN	TYP	MAX	UNIT
AC Level of 4.5 MHz	50	120		mV _{p-p}
Load impedance	0.5			Ω



4040 FI5



4041 FI5



4042 FI5

404x Series Tuner Modules

TUNER MODULE DATA

PARAMETER	MIN	TYP	MAX	UNIT
Voltage gain (80 MHz to 862 MHz)				
Ch 02 to ch W+26	38	43		dB
1 kHz Distance from carrier	36	40		dB
Noise figure		7	9	dB
Phase noise				
1 kHz Distance from carrier				
VHF Low		-68	-60	dBc/Hz
VHF High		-60	-55	dBc/Hz
UHF		-57	-55	dBc/Hz
10 kHz Distance from carrier				
VHF Low		-95	-80	dBc/Hz
VHF High		-85	-80	dBc/Hz
UHF		-85	-80	dBc/Hz
100 kHz Distance from carrier				
VHF Low		-110	-100	dBc/Hz
VHF High		-106	-100	dBc/Hz
UHF		-103	-100	dBc/Hz
VSWR (Antenna input)		2	4	
AGC Range				
VHF Low	45	60		dB
VHF High	40	50		dB
UHF	35	50		dB
IF Rejection				
VHF Low	50			dB
VHF High	60			dB
UHF	60			dB
Image rejection				
VHF Low	60			dB
VHF High (ch H to ch 13)	60			dB
VHF High (ch J to ch W+29)	50			dB
UHF	45			dB
RF Tilt			2.5	dB
RF Input level	45		110	dB μ V
1 dB Compression point				
VHF Low	80	85		dB μ V
VHF High	80	82		dB μ V
UHF	80	84		dB μ V
CSO / CTB / IP3		2		
Composite triple beat			>60	dB
Composite second order beat			>60	dB
IP3 (Two tone)			>85	dB μ V

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