

49XX SERIES RF TUNER MODULES

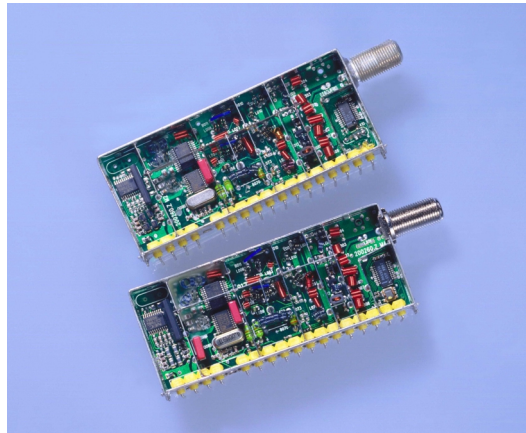
CABLE MODEM AND
DIGITAL APPLICATIONS

APPLICATIONS

- Cable modems (CM)
- Cable telephony
- Digital cable systems

FEATURES

- Input frequency ranges:
 - 50 MHz to 860 MHz (US)
 - 70 MHz to 862 MHz (EU)
- DOCSIS, EuroDOCSIS, and DVB compliant
- Contains an IF SAW filter, IF amplifier, and optional second downconversion to near baseband IF
- Contains a diplex filter and digitally-programmable-gain amplifier in the upstream path
- Downstream tuner functions controlled by I²C bus
- Single 5V supply
- Antenna input: F-connector
- Horizontal mounting
- Dimensions (l x h x d):
66 x 39 x 14 mm



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

The 49xx Series RF Tuner Modules are specifically designed for subscriber-side cable modem applications. Downstream signal frequencies range from 50 MHz to 860 MHz (US) and 70 MHz to 862 MHz (EU). Upstream signal frequencies range from 5 MHz to 42 MHz (US) and 5 MHz to 65 MHz (EU).

The receivers use a three-band single-conversion approach, with a 43.75 MHz (US) or 36.125 MHz (EU) output frequency. A second conversion to 5.75 MHz (US) or 7.125 MHz (EU) is available for QAM demodulators requiring a lower IF center frequency.

Downstream band selection and tuning is done via I²C bus while a separate, three-wire bus and transmit enable control the upstream amplifier.

Two gain-control inputs (RF+IF) are available to adjust the output signal level. The tuner IF output is designed to drive a low-pass image-reject filter prior to the QAM demodulator IC.

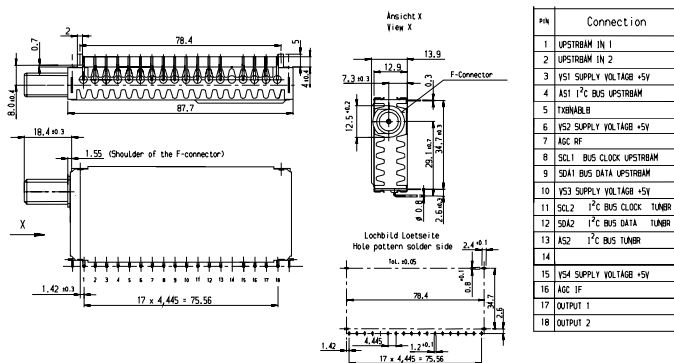
A DC/DC converter for 33V generation is built in, so that only a single supply voltage of 5V is required.

The common antenna input/output is realized by an F-connector (75Ω) per [IPS-sp-406].



FUNCTIONAL CHARACTERISTICS

PARAMETER	EURO DOCSIS	DOCSIS	UNIT
Downstream frequency range	70 to 862	50 to 860	MHz
Tuning resolution	62.5/50.0/ 31.25	62.5/50.0/ 31.25	kHz
IF Center frequency	36.125	43.75 or 44	MHz
Output frequency			
Model 3x8620	36.125		MHz
Model 3x8173	7.125		MHz
Model 3x7901		43.75	MHz
Model 3x7702		5.75	MHz
Upstream frequency range	5 to 65	5 to 42	MHz
Input impedance (VHF/UHF Common)	75	75	Ω
RF AGC Voltage for maximum gain	+4	+4	V
IF AGC Voltage for maximum gain	+4	+4	V
Supply voltage	+5	+5	V
Supply current requirements:			
Vs1 (pin 3)	150	150	mA
Vs2 and Vs3 (pins 6 and 10)	200	200	mA
Vs4 (pin 15)	100	100	mA
Operating temperature	0 to +60	0 to +60	°C
Storage temperature	-30 to +70	-30 to +70	°C



49xx Series RF Tuner Module Typical Layout

TUNER MODULE DATA (EURODOCSIS)

PARAMETER	MIN	TYP	MAX	UNIT
Downstream Data				
Input signal level	40		80	dBμV
Voltage gain	68	80		dB
Noise figure		8	10	dB
RF Tilt		2	3	dB
Image rejection:				
80-160 MHz	60	70		dB
152-467 MHz	55	65		dB
459-866 MHz	50	60		dB
Phase noise at 10 kHz:				
80-160 MHz		-95	-80	dBc/Hz
152-467 MHz		-85	-80	dBc/Hz
459-866 MHz		-85	-80	dBc/Hz
Intermodulation:				
Composite triple beat			-50	dBc
Composite second order beat			-50	dBc
Upstream Data				
Output level:				
Maximum	58	60		dBmV
Minimum		6	8	dBmV
Gain steps	0.7	1	1.3	dB
Gain range			52	dB
Harmonic distortion:				
5 MHz to 65 MHz (2 nd level)	-53			dBc
5 MHz to 65 MHz (3 rd level)	-54			dBc
88 MHz to 96 MHz			-43	dBmV
96 MHz to 180 MHz			-40	dBmV
180 MHz to 862 MHz			-40	dBmV

TUNER MODULE DATA (DOCSIS)

PARAMETER	MIN	TYP	MAX	UNIT
Downstream Data				
Input signal level	40		80	dBμV
Voltage gain	60	80		dB
Noise figure:		8	10	dB
RF Tilt			2.5	dB
Image rejection:				
55-162 MHz	60	70		dB
156-469 MHz	55	65		dB
463-860 MHz	55	60		dB
Phase noise at 10 kHz:				
55-162 MHz		-95	-80	dBc/Hz
156-469 MHz		-85	-80	dBc/Hz
463-860 MHz		-85	-80	dBc/Hz
Intermodulation:				
Composite triple beat			-50	dBc
Composite second order beat			-50	dBc
Upstream Data				
Output level:				
Maximum	58	60		dBmV
Minimum		6	8	dBmV
Gain steps	0.7	1	1.3	dB
Gain range			52	dB
Harmonic distortion:				
5 MHz to 42 MHz (2 nd level)	-53			dBc
5 MHz to 42 MHz (3 rd level)	-54			dBc
54 MHz to 60 MHz			-40	dBmV
60 MHz to 88 MHz			-50	dBmV
88 MHz to 860 MHz			-50	dBmV

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