



M I C R O T U N E ®

RF SILICON AND SUBSYSTEMS SOLUTIONS  
FOR BROADBAND COMMUNICATIONS AND AUTOMOTIVE ELECTRONICS

## MT2022 SINGLE-CHIP MoCA™-COMPATIBLE BROADBAND TUNER PRODUCT BRIEF

The MT2022 is a single-chip broadband tuner designed for superior performance with MoCA systems.



MT2022 Single-Chip Broadband Tuner

PRELIMINARY

The MicroTuner MT2022 is an advanced single-chip broadband tuner that has been optimized for high-performance analog and digital cable set-top boxes that require low composite distortion and noise under fully loaded (174 channels) cable environments. It is capable of receiving frequencies in the 48 MHz to 1.1 GHz range and of converting a selected channel to an intermediate frequency (IF).

The MT2022's low close-in phase noise allows it to be used for both digital and analog video signals. Its dual-conversion architecture, with no requirement for tracking filters, yields the desirable characteristics of traditional cable television tuners: controlled input impedance across the input band, low in-band emissions, and good selectivity.

The device is highly integrated, with on-chip components including a low noise amplifier (LNA), a first mixer that up-converts the input spectrum to a first IF of 1690 MHz, an image-reject mixer that downconverts the filtered first IF spectrum to a standard second IF, a buffer amplifier for the IF output, an IF variable gain amplifier, and a serial interface to program the device as well as read back its status.

On-chip phase-locked loops (PLLs) and voltage-controlled oscillators (VCOs) create a fully integrated frequency synthesis system, which runs off a single external crystal. The use of high First Intermediate Frequency (FIF) allows unhindered transmission of Multimedia over Coax Alliance (MoCA) band signals. The image-reject mixer provides excellent image rejection and eases the requirements of the first IF filter.

## APPLICATIONS

- DSG in cable STBs
- All-digital cable STBs

## FEATURES

- The MT2022 features many advantages including:
- On-chip amplifier for Forward Data Channel (FDC), which reduces bill of materials (BOM) cost while improving performance vs. solutions using a directional coupler.
- 1.1 GHz bandwidth
- Ease of multi-tuner front-end implementations
- Proven performance in dual-function digital STB designs
- Eliminates the need for the 28V to 33V supplies typically required by traditional tuners
- 3.3V and 5V serial bus compatible
- Minimal external components
- No manually tuned parts required
- Simple interface to external filters
- Software shutdown mode
- Intermediate frequency (IF) output fully compatible with demodulators for DSG, DAVIC, DVB-C, DOCSIS™, EuroDOCSIS™, and other standards
- Can be used in conjunction with MicroTune's upstream amplifiers to create a complete RF front end for bi-directional STB applications

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# MT2022 SINGLE-CHIP BROADBAND TUNER

## PRODUCT BRIEF

### RECOMMENDED OPERATING CONDITIONS

PARAMETER	MIN	TYP	MAX	UNIT
Input frequency range	48		1100	MHz
Second intermediate center frequency (programmable)	30		57	MHz
Supply voltage, +3.3V	3.15	3.3	3.45	V
Supply voltage, +5V	4.75	5.0	5.25	V
Supply voltage ripple			15	mVp-p
Operating junction temperature			100	°C
VGA differential output load impedance	300			Ω
Serial control clock			400	kHz
DNC differential load impedance	800			Ω

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	MIN	MAX	UNIT
Supply voltage, +3.3V		3.6	V
Supply voltage, +5V		6	V
Storage temperature range	-50	+150	°C
Lead solder temperature (4 seconds)		+245	°C
Lead Free solder temperature (5 seconds)		+260	°C
Junction temperature		+125	°C

### TUNER ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT
<b>Power Supply</b>				
Active current, 3.3V		82		mA
Active current, 5V		270		mA
<b>RF Signal Path (See figure 2)</b>				
Input frequency range	48		1100	MHz
Noise figure (DNC Out)		9		dB
Terminal voltage gain (DNC Out)		39		dB
RF AGC range		30		dB
Image rejection		73		dBc
LO phase noise (1 kHz)		-75		dBc/Hz
LO phase noise (10 kHz)		-82		dBc/Hz
LO phase noise (100 kHz)		-104		dBc/Hz
LO1 step size		250		kHz
LO2 step size		2		kHz
<b>IF VGA</b>				
Frequency range	30		57	MHz
Output voltage swing		1.0		Vp-p
Terminal voltage gain, VGACTRL = 0.7 to 3.3V	<12.5		>51.5	dB
IF AGC range		39		dB

PRELIMINARY

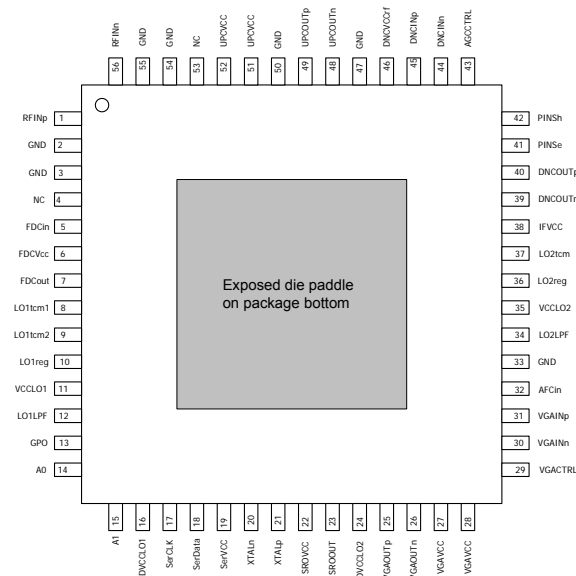


Figure 1 MT2022 Pin Diagram

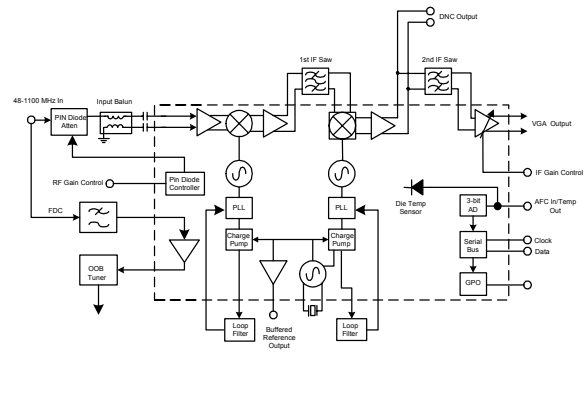


Figure 2 MT2022 Block Diagram



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