

## MT1560 UPSTREAM AMPLIFIER

### PRODUCT BRIEF

The MT1560 is a 3.3V programmable gain upstream amplifier.



*MT1560 Upstream Amplifier*

The Microtune® MT1560 is a low-cost programmable-gain power amplifier IC for use in CATV upstream applications. The MT1560 is a 3.3 volt part optimized for the DOCSIS 2.0 upstream standard.

The device's specified frequency range is from 5MHz to 65MHz, and can output 67dBmV through a 1:1 impedance-ratio transformer. A 3-wire digital serial bus controls the variable gain, with gain control available in 1dB steps and a nominal 59dB gain range.

The MT1560 may be disabled via an external control pin. The transmit-disable mode not only minimizes output noise by shutting off the output stage, but also maintains its output impedance at nominal levels. Output transients are nominally less than 16mVp-p at 61dBmV output level during transmit enable/disable switching.

Operating from a single +3.3V supply, the amplifier's typical current draw at maximum gain, or minimum attenuation, is 212mA. Additional internal circuitry reduces the amplifier's power consumption depending on gain setting. Transmit-disable mode power supply current is reduced to a nominal of 18mA. A shutdown mode further reduces current to a nominal of 80µA.

The MT1560 is available in a 20-pin MicroLeadFrame™ package with an exposed pad for the extended industrial temperature range of -40°C to +85°C.

## MT1560 APPLICATIONS

- Cable modems
- Telephony over cable
- Set-top box CATV

## FEATURES

- Maximum output level of 67dBmV
- Low power-up/down transients of 16mV<sub>p-p</sub> typical at 61dBmV output
- Ultra low third harmonic distortion
- Single +3.3V supply
- 59dB gain range
- Gain programmable in 1dB steps
- Low transmit output noise floor: -51dBmV in 160kHz
- Low transmit-disable output noise: -68dBmV
- Two power-down modes
- DOCSIS 2.0 compatible

### DC ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT
Supply voltage	3.15		3.45	V
Supply current, shutdown mode		80	125	$\mu$ A

#### SUPPLY CURRENT, TRANSMIT MODE

Gain code = 52 to 63		212		mA
----------------------	--	-----	--	----

#### DIGITAL INPUT

High voltage	2.0			V
Low voltage			0.7	V
Current		0		$\mu$ A

### AC ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT
Output 1dB compression point		70		dBmV
Output step size		1		dB
Gain accuracy		59		dB

#### VOLTAGE GAIN

Gain code = 4		-29.5		dB
Gain code = 63		29.5		dB

#### GAIN RESPONSE

Fin = 42MHz		0.0		dB
Fin = 65MHz		0.1		dB

#### TXEN

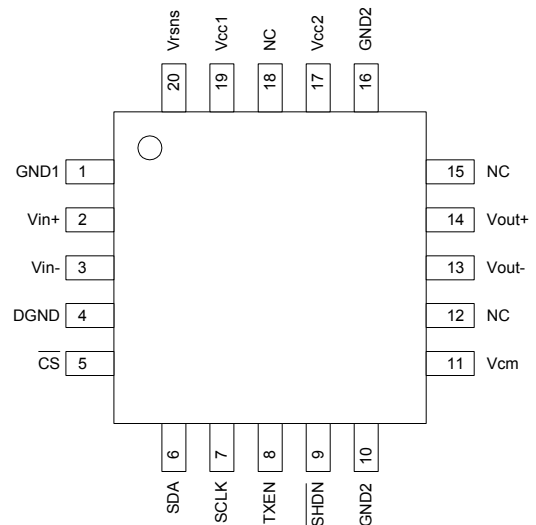
TXEN enable/disable time			5	$\mu$ s
TXEN transient duration		1.5		$\mu$ s
TXEN transient step size, $V_{OUT} = 61$ dBmV		16	64	mVp-p
TXEN transient step size, min gain			7	mVp-p

#### INPUT/OUTPUT

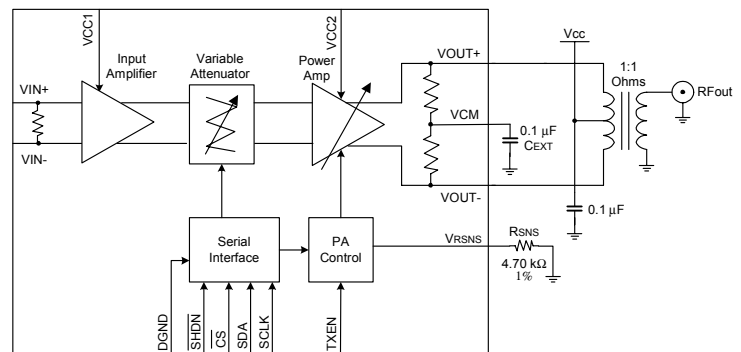
Input impedance		1.55		k $\Omega$
Output return loss, $Z_0 = 75\Omega$		16		dB

### STRESS RATINGS

PARAMETER	MIN	MAX	UNIT
$V_{CC}$ ( $V_{CC1}$ , $V_{CC2}$ )	-0.7	5	V
$V_{OUT+}$ , $V_{OUT-}$	-0.7	5.5	V
Input voltage levels (all inputs), VCM	-0.7	$V_{CC} + 0.7$	V
Junction temperature		+125	$^{\circ}$ C
Storage temperature range	-40	+150	$^{\circ}$ C
Lead temperature (soldering, 4 seconds)		+245	$^{\circ}$ C



MT1560 Pin Diagram



MT1560 Block Diagram



Microtune, Inc., 2201 Tenth Street, Plano, TX 75074, USA

Tel: +1-972-673-1600, Fax: +1-972-673-1602, E-mail: [sales@microtune.com](mailto:sales@microtune.com), Web site: [www.microtune.com](http://www.microtune.com)

For a detailed list of design centers, sales offices, and sales representatives, visit our Web site at [www.microtune.com](http://www.microtune.com).

The information in this document is believed to be accurate and reliable. Microtune assumes no responsibility for any consequences arising from the use of this information, nor from any infringement of patents or the rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or other rights of Microtune. The information in this publication replaces and supersedes all information previously supplied, and is subject to change without notice. The customer is responsible for assuring that proper design and operating safeguards are observed to minimize inherent and procedural hazards. Microtune assumes no responsibility for applications assistance or customer product design.

The devices described in this document are not authorized for use in medical, life-support equipment, or any other application involving a potential risk of severe property or environmental damage, personal injury, or death without prior express written approval of Microtune. Any such use is understood to be entirely at the user's risk.

Microtune is a registered trademark of Microtune, Inc. MicroTuner, MicroStreamer, VideoCaster, and the Microtune logo are trademarks of Microtune, Inc. Bluetooth is a trademark owned by Bluetooth SIG, Inc. and is used by Microtune under license. All other trademarks belong to their respective companies.

Microtune's products are protected by one or more of the following U.S. patents: 5,625,325; 5,648,744; 5,717,730; 5,737,035; 5,739,730; 5,805,988; 5,847,612; 6,100,761; 6,104,242; 6,144,402; 6,163,684; 6,169,569; 6,172,378; 6,177,964; 6,211,745; 6,218,899; 6,268,778; 6,310,387; 6,323,736; 6,355,537; 6,429,502; 6,462,327; D469,742 and additional patents pending or filed.

Entire contents Copyright © 1996 - 2003 Microtune, Inc.