

## MT3141 World-Standard Receiver

The MT3141, based on the MicroCeiver™ architecture, is a single chip receiver that integrates all the functions of the RF tuner, analog demodulator, IF filters, and amplifiers in a single IC.

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### Description

The MT3141 receiver is a world-standard solution designed to ease implementation of high-performance terrestrial and Tru2Way™ television receivers. It also supports advanced analog/digital set-top boxes (STB) and home gateway applications.

The MT3141 was designed to deliver the best performance both in off air terrestrial and cable reception. The IC needs only a relatively simple bill of materials to make the required small PCB footprint for slimmer flat panel TVs. No balun or SAW filters are required.

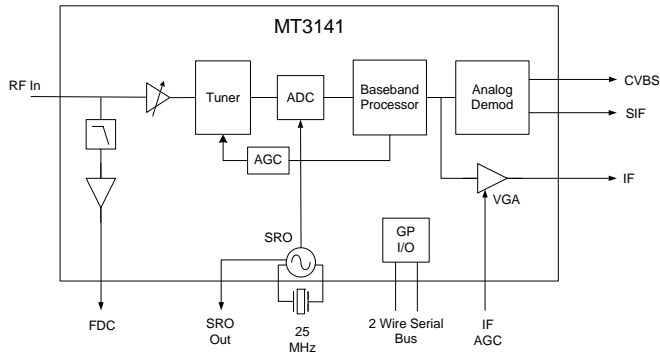
### Applications

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|---|---|
| <ul style="list-style-type: none"> <li>▪ Integrated Digital TV sets for terrestrial and cable reception</li> <li>▪ Tru2Way iDTVs</li> <li>▪ Hybrid (analog/digital) STBs and DVRs/PVRs</li> </ul> | <ul style="list-style-type: none"> <li>▪ Hybrid (analog/digital) home gateway applications</li> <li>▪ Hybrid (analog/digital) PCTV applications</li> <li>▪ Analog/Digital terrestrial or Tru2way cable DVR</li> <li>▪ Analog/Digital ½ NIM, ¾ NIM or full NIMs</li> </ul> |
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### Features

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|---|--|
| <ul style="list-style-type: none"> <li>▪ NTSC/PAL/SECAM synchronous demodulation with active carrier regeneration with composite video (CVBS) and sound intermediate frequency (SIF) outputs</li> <li>▪ Flexible standard or low IF output that supports nearly all digital demodulators available</li> <li>▪ Low external bill of materials: No balun, SAW filters or active components required.</li> <li>▪ Single-ended RF input</li> <li>▪ Integrated ClearTune™ RF filtering</li> <li>▪ Fully integrated RF automatic gain control (AGC) simplifying digital demodulator interfaces</li> <li>▪ 44 to 1002 MHz input frequency tuning range</li> <li>▪ Integrated LNA for best-in-class terrestrial reception</li> <li>▪ 3.3V (analog) and 1.8V (digital) power supply operation</li> </ul> | <ul style="list-style-type: none"> <li>▪ Exceeds requirements of ATSC, CTTB/DTMB, DVB-T, DVB-T2 and ISDB-T digital terrestrial broadcast standards</li> <li>▪ Exceeds extended DVB-C requirements of China cable operators</li> <li>▪ Fully complies with GB20600 China terrestrial DTV requirements</li> <li>▪ On-chip amplifier for Forward Data Channel (FDC) with integrated low-pass filter</li> <li>▪ ATSC A/74 Receiver Performance Guideline compliant</li> <li>▪ NORDIG Unified and DTG version 6 compliant</li> <li>▪ ARIB STD – B21 compliant</li> <li>▪ Tru2Way OpenCable Host 2.0 and SCTE 40 compliant</li> <li>▪ Co-exists with MoCA® in the same STB</li> <li>▪ Low-noise VGA</li> </ul> |
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## Block Diagram



## Recommended Operating Conditions

| Parameter  | Min | Typ  | Max | Unit     |
|--|-----|------|-----|----------|
| Supply voltage ( $V_{CC}$ ), 3.3 V               |     | 3.3  |     | V        |
| Supply voltage ( $V_{DD}$ ), 1.8 V               |     | 1.8  |     | V        |
| Power, Standby Mode                              |     |      | 36  | mW       |
| Supply voltage ripple                            |     |      | 15  | mV       |
| Guaranteed performance die operating temperature |     |      | 100 | °C       |
| VGA differential output load impedance           |     | 1000 |     | $\Omega$ |
| FDC single-ended output load impedance           | 120 |      |     | $\Omega$ |
| CVBS output load impedance                       |     | 75   |     | $\Omega$ |
| CVBS output source impedance                     |     | 75   |     | $\Omega$ |
| SIF output load impedance                        |     | 1000 |     | $\Omega$ |
| Serial control clock                             |     |      | 400 | kHz      |

## Tuner Electrical Characteristics

| Parameter                         | Min | Typ | Max  | Unit   |
|-----------------------------------|-----|-----|------|--------|
| <b>Power Supply</b>               |     |     |      |        |
| Active current ( $I_{CC}$ ) 3.3 V |     | 400 |      | mA     |
| Active current ( $I_{CC}$ ) 1.8 V |     | 200 |      | mA     |
| <b>RF Signal Path</b>             |     |     |      |        |
| Input frequency range             | 44  |     | 1002 | MHz    |
| Noise figure (Off Air Mode)       |     | 3   |      | dB     |
| Noise figure (CATV Mode)          |     | 9   |      | dB     |
| Gain range                        |     | 55  |      | dB     |
| Image rejection                   |     | 80  |      | dBc    |
| Phase noise (10 kHz)              |     | 92  |      | dBc/Hz |
| Phase noise (100 kHz)             |     | 108 |      | dBc/Hz |
| LO step size                      |     | 50  |      | kHz    |

| Parameter                          | Min | Typ | Max | Unit  |
|------------------------------------|-----|-----|-----|-------|
| <b>IF VGA</b>                      |     |     |     |       |
| Frequency range (programmable)     | 1   |     | 60  | MHz   |
| Output voltage                     |     |     | 2   | Vp-p  |
| Gain Range                         |     | 20  |     | dB    |
| <b>Out-of Band Amplifier (FDC)</b> |     |     |     |       |
| Frequency range                    | 50  |     | 130 | MHz   |
| Voltage gain                       |     | 5.5 |     | dB    |
| <b>Analog TV Demodulation</b>      |     |     |     |       |
| CVBS output level                  |     | 1.0 |     | Vp-p  |
| Sound IF input range               | -25 |     | -6  | dBc   |
| Sound IF output voltage range      |     | 540 |     | mVp-p |
| Sound IF output center frequency   | 4.5 |     | 6.5 | MHz   |

## Related Documents

- PB-00161 – MT3141 Product Brief (This document)
- DS-00101 – MT3141 Data Sheet
- UG-00406 – MT3141 EV Board User Guide
- Reference Group 406 – EV Board references including Schematic, Gerbers, PCB Layout, etc.

## Contact and Ordering Information

Copyright © 1996 - 2009 Microtune, Inc.  
 Microtune, Inc., 2201 10th 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)

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