

Keywords: MAX2165, direct-conversion tuner, DMB-TH, USB

REFERENCE DESIGN 4174 INCLUDES: ✓Tested Circuit ✓Board Available ✓Description ✓Test Data

## MAX2165 DMB-TH USB Dongle Reference Design

May 07, 2008

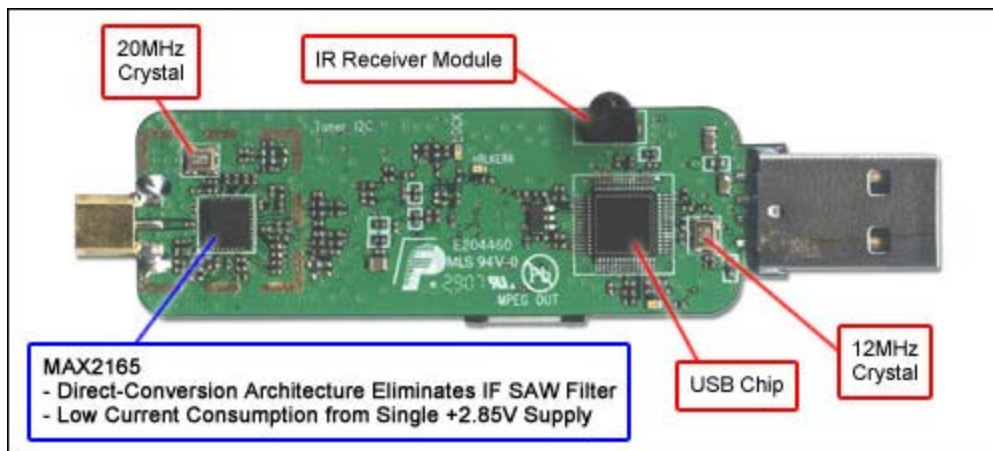
*Abstract: This compact USB dongle design combines a [MAX2165](#) direct-conversion tuner and a DMB-TH demodulator. The design converts a UHF signal (470MHz to 858MHz) to a MPEG-2 transport stream. Then the USB interface enables video viewing on a laptop or desktop computer.*

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**MAX2165**  
- Direct-Conversion Architecture Eliminates IF SAW Filter  
- Low Current Consumption from Single +2.85V Supply

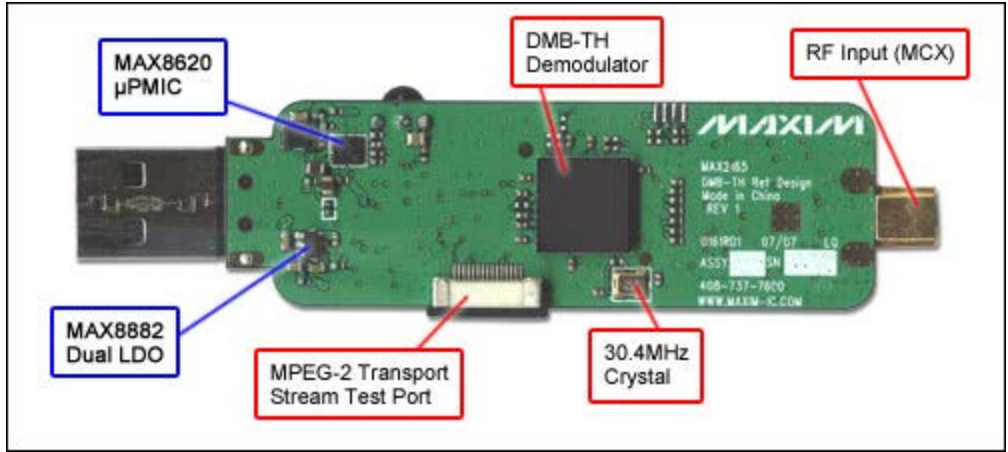
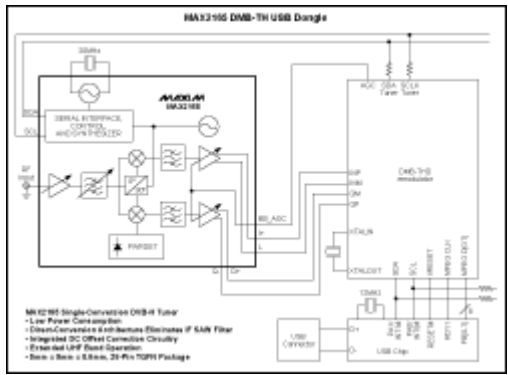


Figure 1. The reference design for the compact DMB-TH USB dongle features the MAX2165.



[More detailed image \(PDF, 232kB\)](#)  
 Figure 2. System block diagram.

Lab Measurements

MAX2165 Noise Figure and Maximum Gain

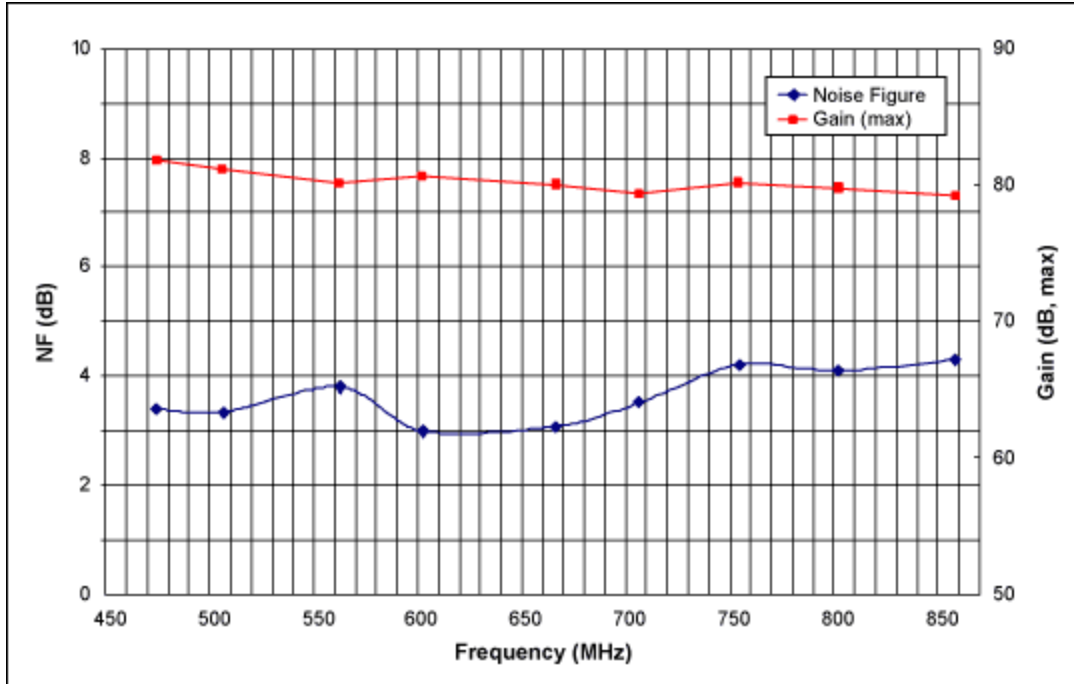


Figure 3. The noise figure ranges from 3.0dB to 4.3dB, with maximum gain ranging from 79.2dB to 81.8dB over 474MHz to 858MHz.

#### MAX2165 Phase Noise at 474MHz

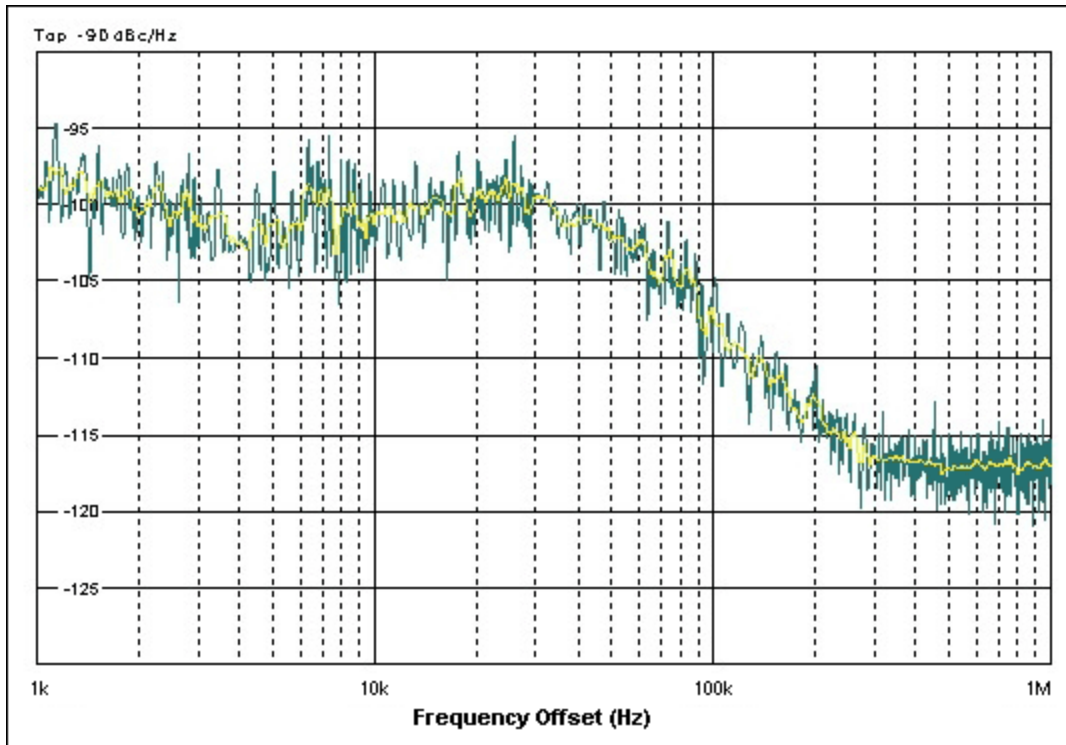


Figure 4. Phase noise at 1.0kHz offset is -99dBc/Hz when the LO frequency is 474MHz.

## RF Input Return Loss

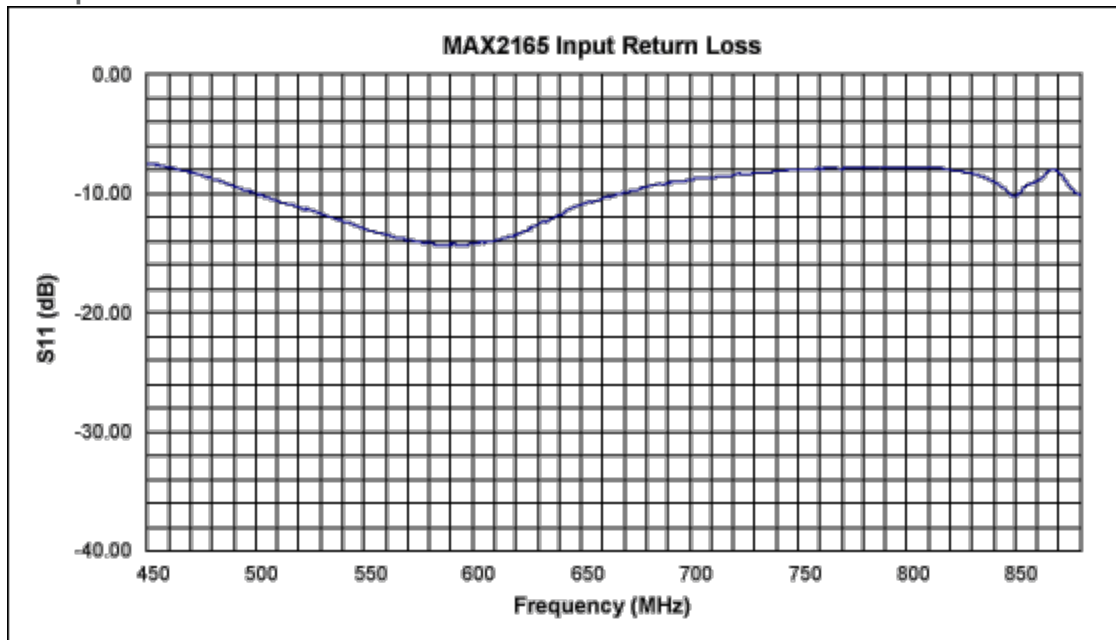


Figure 5. The input return loss is better than -7.7dB from 474MHz to 858MHz when the LO frequency is 858MHz.

### Detailed Description

This DMB-TH receiver reference design includes the MAX2165 direct-conversion tuner, a DMB-TH demodulator, and USB interface circuitry. This solution is intended for handheld or laptop computer-based digital video broadcast applications in the Chinese market. The design covers the 470MHz to 858MHz UHF band.

The MAX2165 direct-conversion architecture eliminates the need for an IF-SAW filter. Programmable baseband channel-selection filters allow for operation with 7MHz and 8MHz channels. The fractional-N synthesizer reduces VCO lock time and minimizes close-in phase noise, thus eliminating the need for power-hungry, phase-noise reduction algorithms.

The DMB-TH demodulator accepts I/Q inputs from the tuner and supplies a MPEG-2 transport stream to the USB chip. The USB chip enables interfacing with a laptop or desktop computer for viewing broadcast video and for lab analysis.

### Related Parts

[MAX2165](#)

Single-Conversion DVB-H Tuner

[Free Samples](#)

### More Information

For Technical Support: <http://www.maximintegrated.com/support>

For Samples: <http://www.maximintegrated.com/samples>

Other Questions and Comments: <http://www.maximintegrated.com/contact>

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Application Note 4174: <http://www.maximintegrated.com/an4174>

REFERENCE DESIGN 4174, AN4174, AN 4174, APP4174, Appnote4174, Appnote 4174

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