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Keywords: MAX3580, DVB-T, digital televisions, digital terrestrial set-tops, laptop televisions, automotive televisions, USB peripherals

REFERENCE DESIGN 4278 INCLUDES: [✓Tested Circuit](#) [✓Board Available](#) [✓Description](#) [✓Test Data](#)

# DVB-T Receiver Reference Design with the MAX3580

Sep 23, 2008

*Abstract: The MAX3580 DVB-T reference design meets NorDig 1.0.3 and MBRAI requirements. This NIM design includes the MAX3580 direct-conversion tuner and a DVB-T demodulator/decoder. A discrete, active loop-through with low power consumption and low cost is included. Target applications include digital televisions, digital terrestrial set-tops, laptop televisions, automotive televisions, and USB peripherals.*

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Click here for an overview of the wireless components used in a typical radio transceiver.

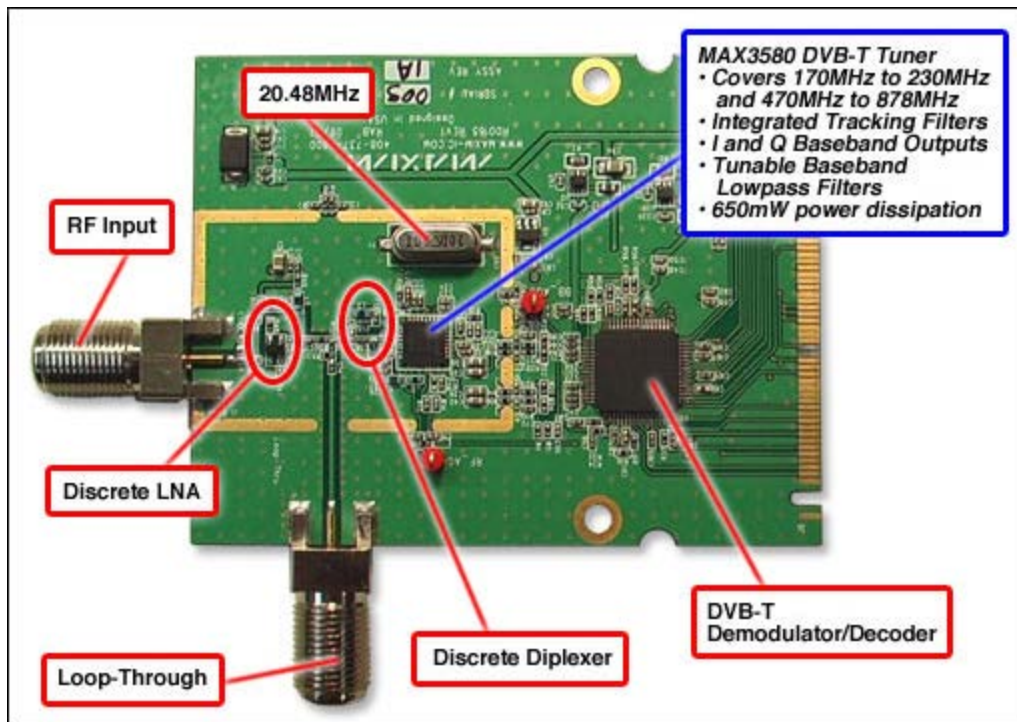


Figure 1. DVB-T receiver reference design features the MAX3580.

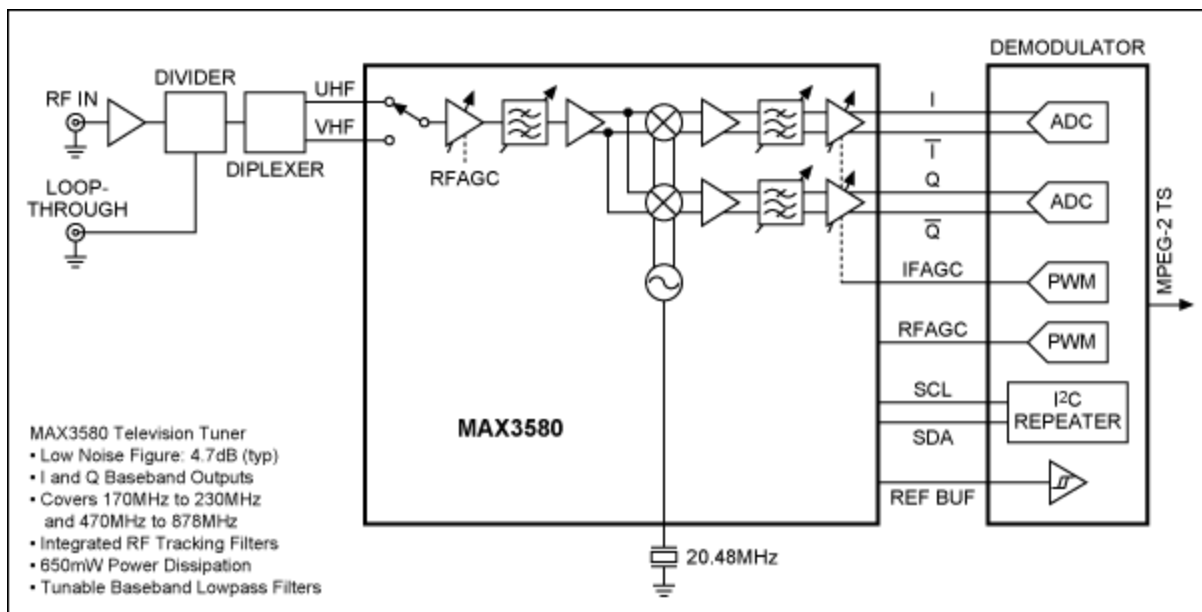


Figure 2. System block diagram.

## Lab Measurements

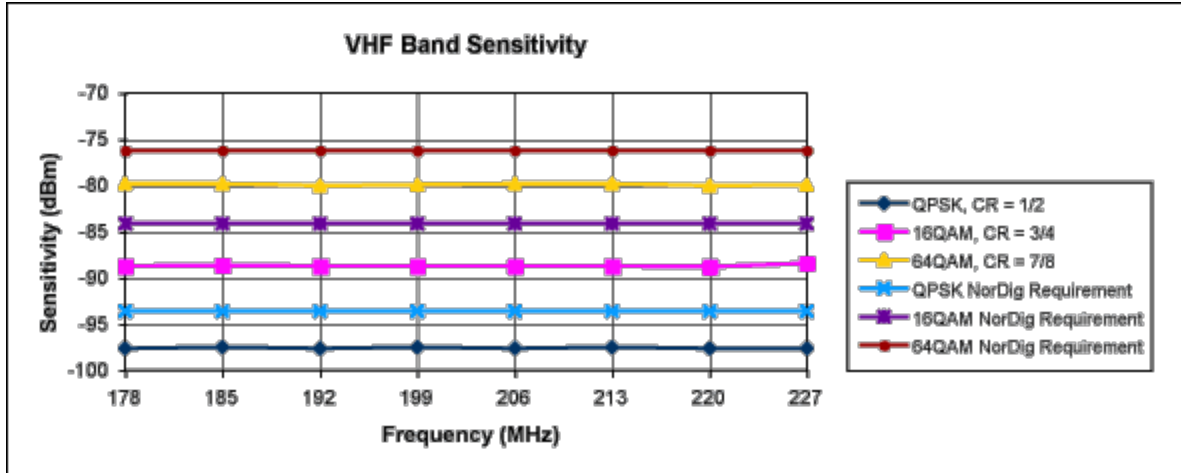


Figure 3. VHF sensitivity measures better than -97dBm for QPSK modulation with Code Rate 1/2.

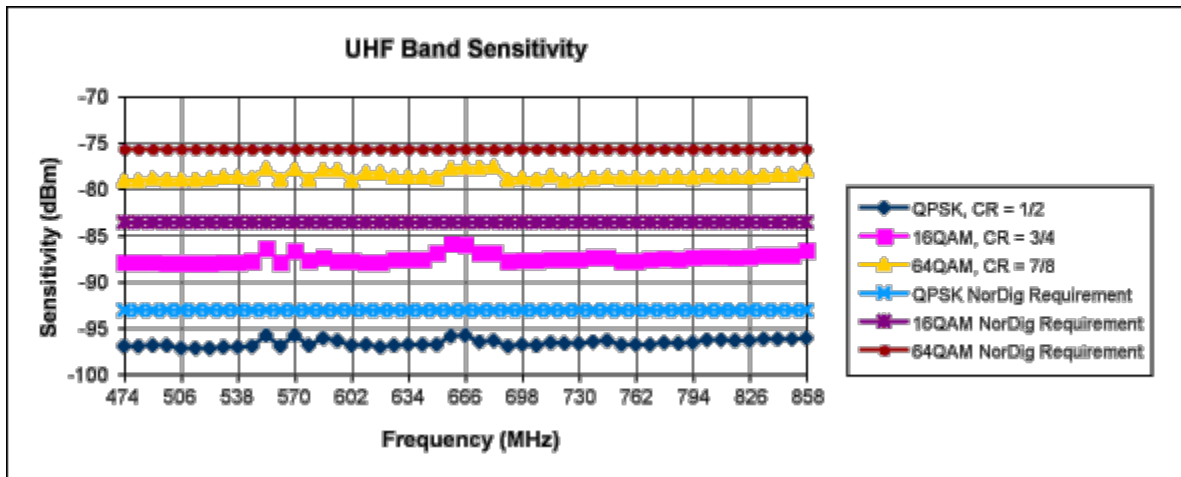


Figure 4. UHF sensitivity measures better than -96dBm for QPSK modulation and Code Rate 1/2.

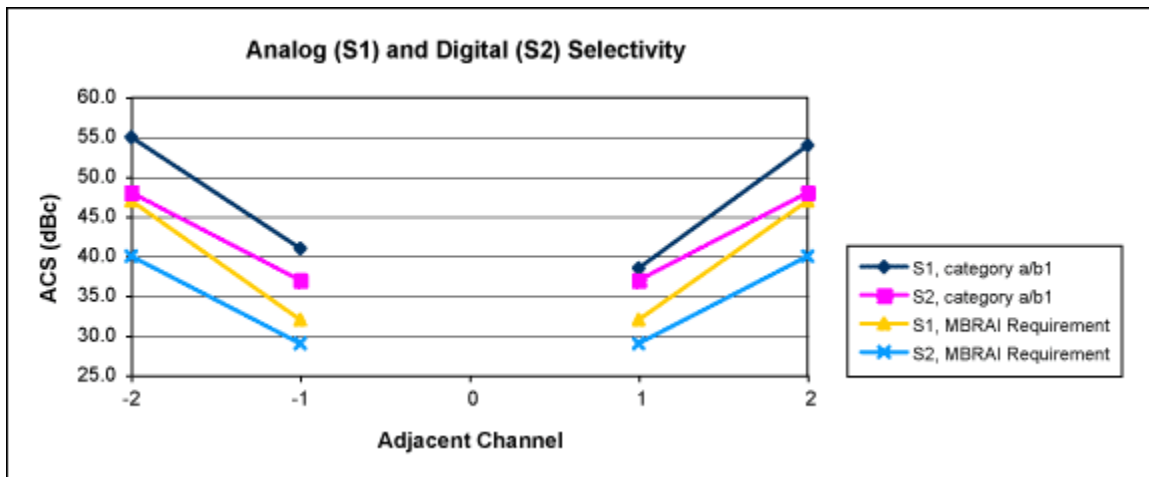


Figure 5. The adjacent channel selectivity (ACS) is better than 32dBc for  $N \pm 1$  digital adjacents and better than 38.5dBc for  $N \pm 1$  analog adjacents. These measurements show MBRAI compliance for

category a/b1 requirements.

## Loop-Through Performance

Parameter	Conditions	Measured			Units
		Min.	Typ.	Max.	
Frequency Range		47		862	MHz
Return Loss at Loop-Through Out	Antenna input terminated with 75Ω	10			dB
Power Gain to Loop-Through Out		-1.2		2.7	dB
Noise Figure to Loop-Through Out			4.5	5.0	dB
Loop-Through Out to RF In Isolation		31			dB
Loop-Through Out to Tuner In Isolation		15			dB

## DVB-T Terrestrial Frequency Plan in Europe

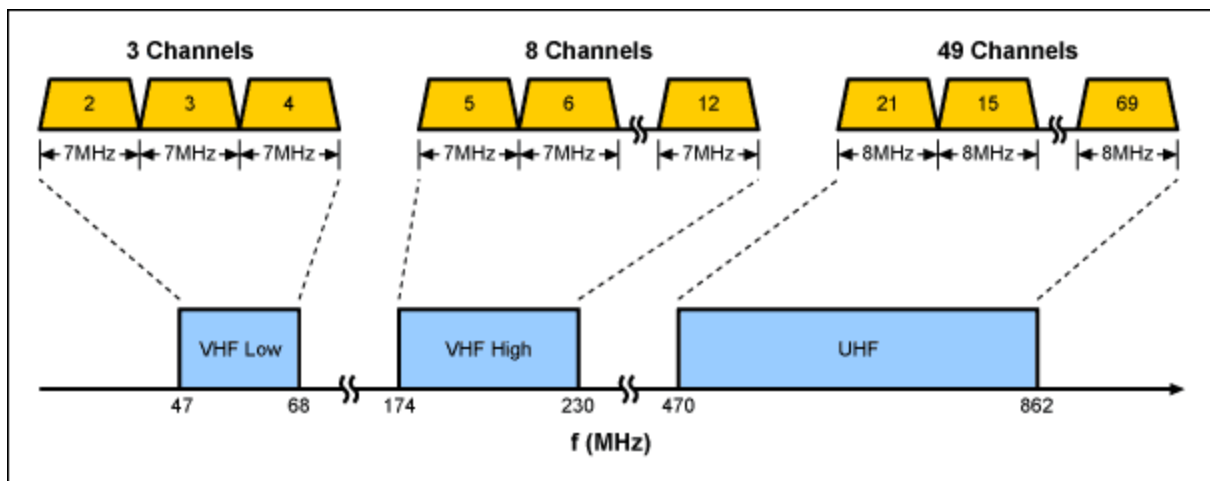


Figure 6. The DVB-T/PAL signal is broadcast in the VHF Low, VHF High, and UHF bands as shown above. Channel spacing is 7MHz in the VHF band and 8MHz in the UHF band.

## Detailed Description

The MAX3580 fully integrated, direct-conversion TV tuner is designed for digital video broadcasting-terrestrial (DVB-T) applications. The integrated tuner covers a 170MHz to 230MHz input frequency range for the VHF-III band and 470MHz to 878MHz for the UHF band.

The MAX3580 integrates an RF input switch and a multiband tracking filter, allowing low-power tuner-on-board applications without the cost and power-dissipation issues of dual-conversion tuner solutions. The zero-IF architecture eliminates the need for SAW filters by providing baseband I and Q outputs directly to the demodulator. In addition, DC-offset cancellation is implemented on-chip using a mixed-signal architecture to improve the second-order distortion performance and the dynamic range of the

downstream digitizer and demodulator.

The MAX3580 communicates using a 2-wire serial bus. The device typically operates from a +3.3V power supply, dissipating 650mV. The MAX3580 is available in a small 32-pin thin QFN package (5mm x 5mm) with an exposed paddle. Electrical performance is guaranteed over extended -40°C to +85°C temperature range.

## References

IEC62002-IEN

NorDig-Unified ver 1.0.3

Application note 3700, "[Front-End Diplex Filter for MAX3580](#)"

Application note 4258, "[Application Considerations for the MAX3580 DVB-T Tuner](#)"

## Related Parts

[MAX3580](#)

Direct-Conversion TV Tuner

[Free Samples](#)

## More Information

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

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

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Application Note 4278: <http://www.maximintegrated.com/an4278>

REFERENCE DESIGN 4278, AN4278, AN 4278, APP4278, Appnote4278, Appnote 4278

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