



**datasheet**

PRELIMINARY SPECIFICATION

Bluetooth® 2.0 + EDR stereo audio processor

OVC3860

## Copyright © 2011 OmniVision Technologies, Inc. All rights reserved.

This document is provided “as is” with no warranties whatsoever, including any warranty of merchantability, non-infringement, fitness for any particular purpose, or any warranty otherwise arising out of any proposal, specification, or sample.

OmniVision Technologies, Inc. and all its affiliates disclaim all liability, including liability for infringement of any proprietary rights, relating to the use of information in this document. No license, expressed or implied, by estoppel or otherwise, to any intellectual property rights is granted herein.

The information contained in this document is considered proprietary to OmniVision Technologies, Inc. and all its affiliates. This information may be distributed to individuals or organizations authorized by OmniVision Technologies, Inc. to receive said information. Individuals and/or organizations are not allowed to re-distribute said information.

### Trademark Information

OmniVision and the OmniVision logo are registered trademarks of OmniVision Technologies, Inc. The Bluetooth word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by OmniVision Technologies, Inc. is under license. Other trademarks and trade names are those of their respective owners.

#### **Bluetooth® 2.0 + EDR stereo audio processor**

datasheet  
PRELIMINARY SPECIFICATION

version 1.2  
april 2011

To learn more about OmniVision Technologies, visit [www.ovt.com](http://www.ovt.com).  
OmniVision Technologies is publicly traded on NASDAQ under the symbol OVTI.

## applications

- Bluetooth stereo headsets
- Bluetooth stereo speakers
- automotive stereo audio
- Bluetooth mini stereo soundboxes

## ordering information

- **OVC3860-Q56G** (lead-free)  
56-pin QFN

## features

- highly integrated single chip Bluetooth stereo audio solution
- low power consumption
- Bluetooth V2.0 + EDR specification compliant
- Bluetooth radio with +2 dBm transmit power and -82 dBm receive sensitivity
- supports the mandatory Bluetooth compression coding/decoding scheme - Sub Band Coding (SBC) which is license-free
- integrated hi-fi stereo audio CODEC with -90 dB SNR DAC
- integrated 150 mA Lithium battery charger
- integrated switch voltage regulator
- integrated low Iq linear regulators
- supports A2DP V1.2 and AVRCP V1.4
- supports HSP V1.2 and HFP V1.5
- UART and SCCB interfaces
- low power 1.8V operation
- small footprint 56-pin QFN 7 x 7 x 0.9mm package
- RoHS compliant

## key specifications

- **power supply:**  
VDD: 1.7~1.9V (1.8V typical)  
V<sub>IO</sub>: 1.7~3.3V  
V<sub>REG</sub>: 2.2~4.2V
- **power requirements:**  
active: 26 mA  
sleep: 400  $\mu$ A  
shutdown: 12  $\mu$ A
- **temperature range:**  
operating: -10°C to 80°C (see [table 5-2](#))  
storage: -45°C to 125°C (see [table 5-2](#))
- **Bluetooth specification:** version 2.0 with EDR
- **operating range:** up to 10 meters
- **modulation:** n/4 DQPSK / 8DQPSK
- **transmission frequency:** 2402~2480 MHz
- **receive sensitivity:** -82 dBm @ 1% BER (typical)
- **maximum RF transmit power:**  
0 ~ +4 dBm (+2 dBm typical)
- **antenna impedance:** 50 ohms
- **input clock:** 12 MHz
- **package dimensions:** 7 mm x 7 mm x 0.9mm



### note

Values shown are preliminary and are subject to change after further testing.

# 1 signal descriptions

**table 1-1** lists the signal descriptions and their corresponding pin numbers for the OVC3860. The package information is shown in **section 6**.

**table 1-1** signal description (sheet 1 of 3)

pin number	signal name	I/O type	description	power domain
01	GPIO_A1	digital	programmable input/output terminal, LED control	IO
02	GPIO_A0	digital	programmable input/output terminal, LED control	IO
03	VPP	power	positive power supply of OTP ROM	OTP
04	VDD_ANA	power	positive power supply for analog circuit	core
05	VDD_RF	power	positive power supply for RF circuit	RF
06	RFA	RF	radio transmitter terminal	
07	RFB	RF	radio transmitter terminal	
08	VDD_RF	power	positive power supply for RF circuit	RF
09	VDD_LO	power	positive power supply for local oscillator circuit	
10	VDDA_RFPCP	power	positive power supply for RF circuit	
11	LDO_OUT	power	linear voltage regulator output	
12	LDO_IN	power	linear voltage regulator input	
13	XTALO	analog	crystal resonator output (negative)	
14	XTALI	analog	crystal resonator output (positive)	
15	VDD_SYN	power	positive power supply for analog circuit	
16	AOM	analog	headphone common pin	
17	AOL	analog	headphone left channel output terminal	
18	VDD_AO	power	positive power supply for headphone power amplifier	
19	AOR	analog	headphone right channel output terminal	
20	VMID	analog	audio CODEC reference voltage input terminal	
21	VDDA	power	positive power supply for audio CODEC	
22	DNC	analog	do not connect	
23	AUDIOENABLE	analog	audio CODEC active indicate	

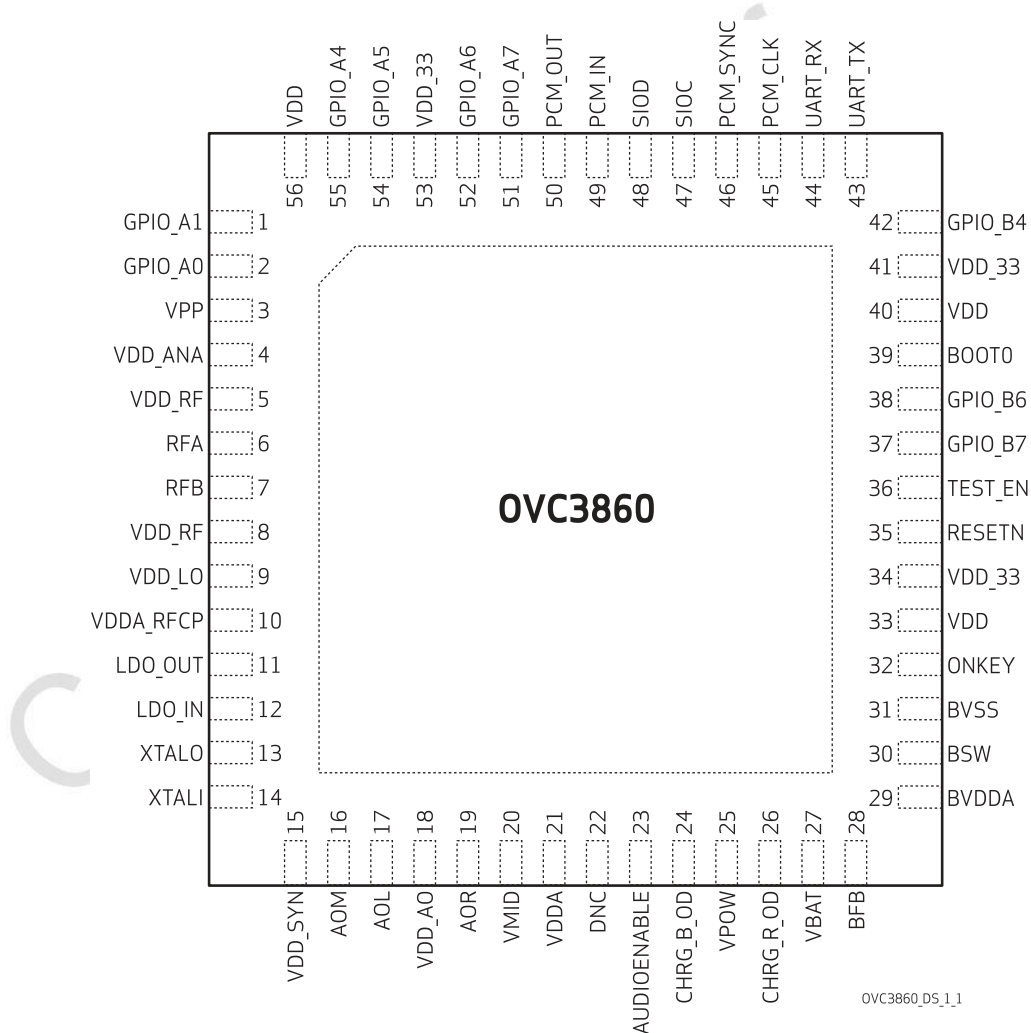
table 1-1 signal description (sheet 2 of 3)

pin number	signal name	I/O type	description	power domain
24	CHRG_B_OD	analog	charger status indicator output	
25	VPOW	power	positive power supply for charger	
26	CHRG_R_OD	power	charger status indicator output	
27	VBAT	power	charger output to battery terminal	
28	BFB	power	switch regulator feedback input terminal	
29	BVDDA	power	positive power supply for Buck	
30	BSW	power	switch regulator output terminal	
31	BVSS	power	exposed pad as ground	
32	ONKEY	digital	soft power ON/OFF control terminal	
33	VDD	power	positive power supply for digital core	
34	VDD_33	power	positive power supply for digital I/O	
35	RESETN	digital	chip reset enable (active low)	
36	TEST_EN	digital	enable test mode (connect to ground)	
37	GPIO_B7	digital	programmable I/O terminal	
38	GPIO_B6	digital	programmable I/O terminal	
39	BOOT0	digital	select boot position	
40	VDD	power	positive power supply for digital core	
41	VDD_33	power	positive power supply for digital I/O	
42	GPIO_B4	digital	programmable I/O terminal	
43	UART_TX	digital	UART interface data output terminal	
44	UART_RX	digital	UART interface data input terminal	
45	PCM_CLK	digital	PCM interface clock	
46	PCM_SYNC	digital	PCM interface sync	
47	SIOC	digital	SCCB interface clock output terminal	
48	SIOD	digital	SCCB interface data terminal	
49	PCM_IN	digital	PCM interface data in	
50	PCM_OUT	digital	PCM interface data out	
51	GPIO_A7	digital	programmable I/O terminal	
52	GPIO_A6	digital	programmable I/O terminal	
53	VDD_33	power	positive power supply for digital I/O	

table 1-1 signal description (sheet 3 of 3)

pin number	signal name	I/O type	description	power domain
54	GPIO_A5	digital	programmable I/O terminal	
55	GPIO_A4	digital	programmable I/O terminal	
56	VDD	power	positive power supply for digital core	

figure 1-1 pin diagram



## 2 system level description

### 2.1 overview

The OVC3860 is a highly integrated, low power single-chip Bluetooth® RF transceiver and baseband processor for ultra low cost Bluetooth stereo audio solutions.

The OVC3860 features a 2.4GHz ISM RF transceiver, Bluetooth V2.0+EDR baseband, high-quality 20-bit stereo audio CODEC and a complete on-chip power management unit including switch regulator, Lithium ion/polymer battery charger, and low Iq linear regulators.

A configurable Bluetooth stack is integrated with profiles and applications including A2DP V1.2, AVRCP V1.4, HSP V1.2 and HFP V1.5. Incorporated with an on-chip SBC decoder, the OVC3860 is fully compliant with the Bluetooth 2.0+EDR specification. It fulfills all Bluetooth stereo audio and voice communication functions.

### 2.2 key features

#### 2.2.1 general

- cost effective, low power consumption, single-chip solution for Bluetooth stereo audio applications
- Bluetooth V2.0 + EDR specification compliant fully integrated RF and baseband processor

#### 2.2.2 radio

- Bluetooth V2.0 + EDR specification compliant system in 2.4GHz ISM band
- typical +2 dbm transmit power
- typical -82 dBm receive sensitivity
- supports Class 2 and Class 3 without the need of an external power amplifier
- up to 10 meters communication range

#### 2.2.3 baseband processor

- on-chip low power, high performance, 32-bit RISC processor
- 2Mb internal ROM and 48kB internal RAM
- fully integrated Bluetooth baseband logic for FEC, HEC, access code correlation, CRC, demodulation, encryption bit stream generation, whitening
- fully supports Bluetooth V2.0 + EDR features including AFH and enhanced data rate up to 3 Mbps

#### 2.2.4 synthesizer

- fully integrated synthesizer
- 12MHz crystal compatible

#### 2.2.5 digital interfaces

- integrated high speed UART interface for system debugging
- SCCB interface for external EEPROM to store device configuration data

### 2.2.6 stereo audio CODEC

- integrated high fidelity audio CODEC with SNR > 90dB playback
- on-chip 20-bit stereo audio digital-to-analog converter (DAC)
- integrated headphone amplifier in 40mW @ 32Ω supporting capacitor-less output

### 2.2.7 power

- low power 1.8V core operation and 1.8V to 3.3V I/O
- on-chip high efficiency switched mode regulator up to 96%, from 2.7V to 4.5V input and adjustable 1.8/2.1/2.3V output
- on-chip, fully-functional, single-cell Lithium ion/polymer battery charger with programmable charging current between 10 to 150mA with ±7% accuracy
- power-on reset programmable battery low voltage detection
- supports standard sniff/hold power save mode and OmniVision extended modes

### 2.2.8 Bluetooth stack

- on-chip Bluetooth stack allows full-speed data transfer and Piconet support
- on-chip A2DP V1.2 and AVRCP V1.4 profiles with hardware SBC decoder enables audio stream over Bluetooth and remote control
- on-chip HFP V1.5 and HSP V1.2 profiles

### 2.2.9 package

- small footprint 56-pin QFN 7 x 7 x 0.9mm, 0.4mm pitch



## 2.3 architecture

figure 2-1 functional block diagram

