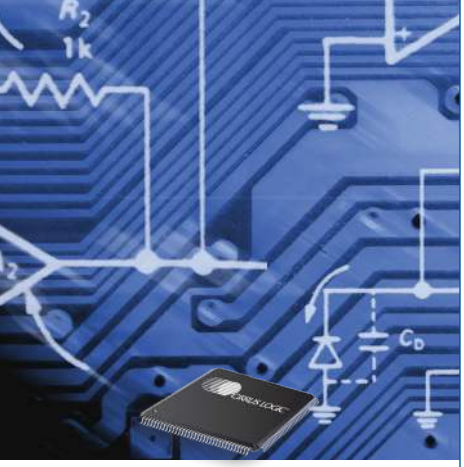

COMPLETE REFERENCE DESIGN & TURN-KEY MANUFACTURING DESIGN KIT INCLUDES THE FOLLOWING & MORE:

Cirrus Logic IC Data Sheets:
CS8416, CS4525, CS4353, CS485xx Family DSP, CS48AU2B, CS48DV2B

Cirrus Logic Application Notes:
AN277 - Creating DSP Composer Primitives, a Tutorial
AN298 - CS485xx Family Firrmware User's Manual
AN298xxxx - Appendices to AN298 covering sepecific algorithms

Cirrus Logic Hardware User's Manual:
CS485xx Family (covers CS48520, CS48AU2B and CS48DV2B devices)

CS485xx Family Evaluation Kit Installer:
DSP Composer with example.cpa files featuring: Cirrus Virtualizer Technology, Cirrus Bass Enhancement, Cirrus Band XpandeR, Cirrus Dynamic Volume Leveler (Cirrus Logic Royalty-Free Algorithm Installers) & Primitives to help you get started right away with the evaluation; Opal Kelly USB Driver Installer for CDB-USBMASTER; DSP Composer User's Manual; DSP Micro Condenser Installer & Example

Schematics, PCB Layout Files & BOMs:
Main Audio Board
User Interface Push-Button Board
LED Indicator / IR Remote Control Input Board

8051 Family Microcontroller Source Code
Designed to work seemlessly with flash image output generated from Micro-Condenser and supplied USB Interface Microcontroller Debug Adapter

CDB-USBMASTER Daughter Card
Enables the designer to perform real-time adjustments to audio algorithm parameters (like speaker tuning) in the DSP firmware in addition to upgrading of the SPI Flash

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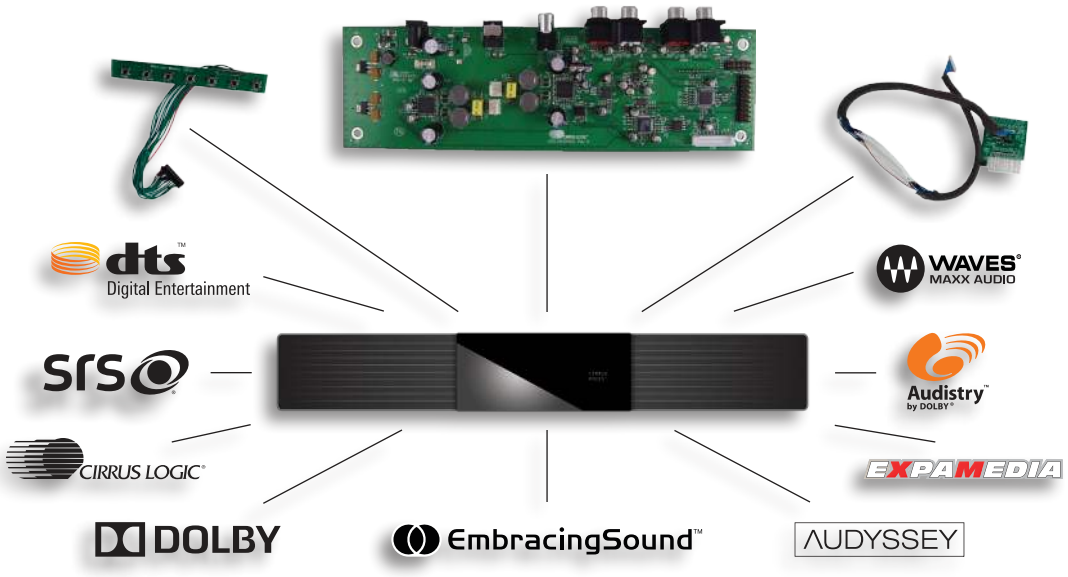
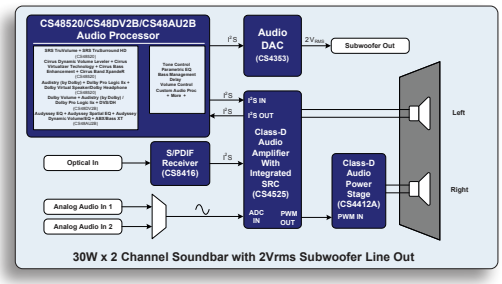
CRD-SB30Wx2 Soundbar

30W X 2 CHANNEL SOUND BAR WITH 2 VRMS SUB LINE OUT



JUST ADD SPEAKER ENCLOSURE, DRIVERS & POWER...

The CRD-SB30Wx2 Soundbar Reference Design / Turn-Key Manufacturing Kit includes all necessary design files (hardware, software, firmware, documentation) to enable from the beginner speaker driver / enclosure manufacturer who has almost no electronics design experience to be able to customize and manufacture a complete state-of-the-art 30W x 2 Channel Soundbar in the shortest time to market window ever before possible.



CRD-SB30Wx2 Evaluation Board Audio Path Block Diagram ▲

Feature-rich processing and customized signal flows can be easily developed using the Cirrus Logic Audio Software Library, which includes both 3rd party certified application programs and a modular plug-in environment for easy customization using the DSP Composer GUI development tool. The framework includes certified state-of-the-art matrix audio decoders, virtualizers, speaker equalization capabilities, & a wide variety of audio enhancement algorithms.

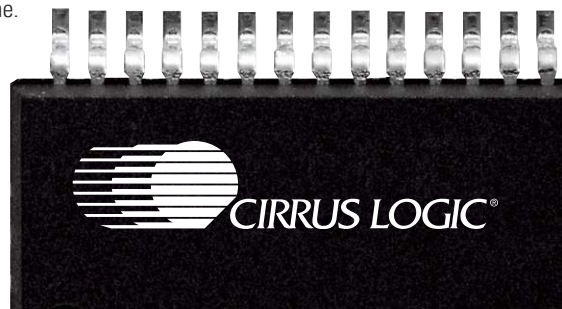
The CRD-SB30Wx2 is based around the CS48520/CS48AU2B/CS48DV2B Family of DSPs, all of which feature a 32-bit fixed-point DSP engine that offers dual MACs, making 300 million multiply-accumulates at the disposal of the designer. Each of these DSPs is capable of supporting both standard processing and an array of 3rd party algorithms.

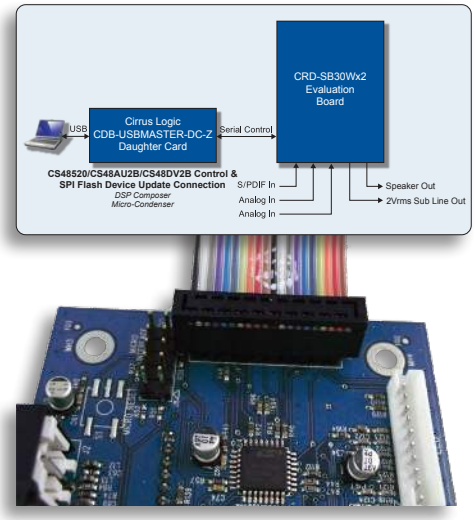
A complete list of all of the available algorithms supported by these 3 pin-compatible DSP part numbers is listed on the back of this document.

The CRD-SB30Wx2 has already been cost-optimized for manufacturability, undergone strict design for manufacturability rules, is RoHS compliant and has already passed EN55022 / CISPR 22 / FCC Class B, Part 15 EMI Testing so there should be no delay when you are ready to go to mass production.

AN INTUITIVE DSP GUI PROGRAMMING ENVIRONMENT

Every algorithm can be placed completely customizable signal flow and then compiled, downloaded, and then optimized in real-time. The speaker cabinet and drivers can also benefit from multiband Parametric EQ to assist in flattening the frequency response as well as notch out resonation frequencies or peak passive frequencies that have been impacted by a passive crossover - again in realtime.



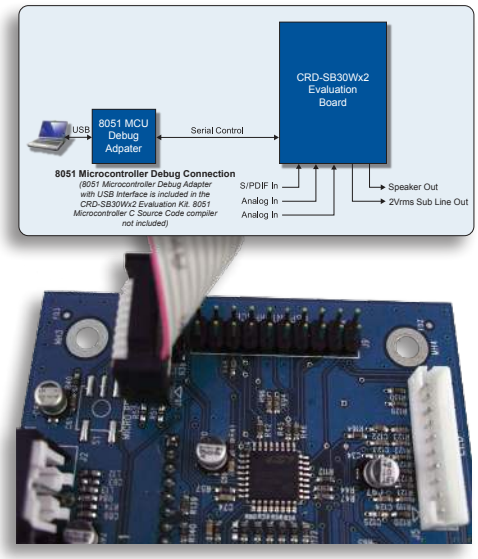


▲ DSP Interface Header connected to CRD-USBMASTER-DC-Z daugter card connected via JP1 ribbon cable enables real-time control of the DSP parameters shown in the DSP Composer .CPA signal flow file

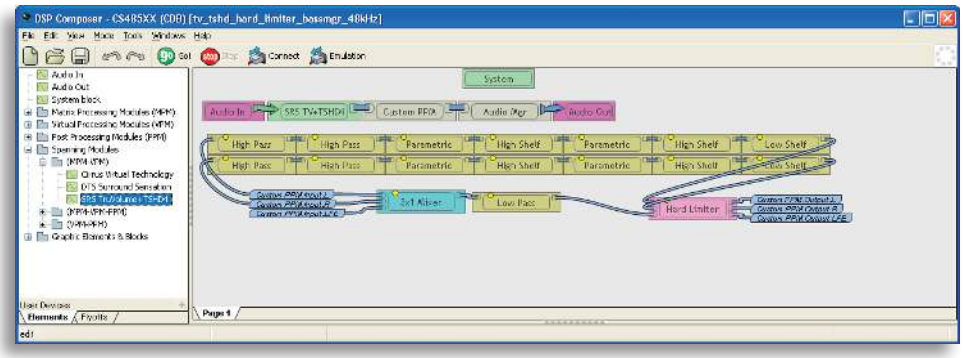
The CS48520/CS48AU2B/CS48DV2B DSP Family is programmed using the Cirrus Logic DSP Composer™ proprietary GUI software development tool. An audio signal processing chain is designed using a drag-and-drop interface. The tool then configures the DSP through the SPI™/I²C® serial port via the supplied CRD-USBMASTER-DC-Z daughter card which is connected to the PC via USB 2.0 cable.

MICROCONTROLLER PROGRAMMING SIMPLICITY

High-level, well-structured, well-documented C languange source for the 8051 microcontroller has been included which works "as-is" with the provided signal flow. With minor changes, an entirely new signal flow inside DSP Composer can



▲ The supplied USB to 8051 Debug Dongle is connected to MCU Debug Header. This connection enables a real-time, in-circuit control & debug of the 8051 family C microcontroller code as well as upgrading of the connected SPI Flash image generated by Micro-Condenser



▲ DSP Composer GUI programming interface as shown with an example .cpa file which implements: SRS TruVolume + SRS TruSurround HD / WOW HD + Multiband PEQ + Hard Limiter + Custom Filtering. The various supplied example .cpa files will allow you to come up the learning curve quickly!

be supported by using a powerful new utility called Micro-Condenser by generating "snapshots" of all of the various modes inside DSP Composer. By using the supplied USB Interface MCU Debug Adapter, with the latest available Keil compiler (available at http://www.keil.com/c51), the developer can quickly make changes to microcontroller code and then download it via the MCU Debug header.

AVAILABLE CERTIFIED AUDIO ALGORITHMS IN ROM

- Cirrus Framework™ applications library in ROM:
  - 1:2 Up-sampler
  - 2:1, 4:1 Decimator
  - Advanced Bass Manager
  - Crossbar mixer
  - Dolby®-certified pink-noise/signal generator
  - Dolby Heaphone®
  - Dolby® Pro Logic® II
  - Dolby® Pro Logic® IIx
  - Dolby® Virtual Speaker®
  - SRS® CircleSurround® II / CS Auto®
  - SRS® TruBass™
  - SRS TruSurround XT™
  - SRS WOW™
  - Multichannel Tone Control
  - Multiband Parametric/Graphic EQ
  - Independent Channel Delay

AVAILABLE CERTIFIED DOWNLOADABLE AUDIO ALGORITHMS

- Additional certified Cirrus Framework™ applications available for download:
  - Audyssey EQ™
  - Audyssey Dynamic Volume™/Dynamic EQ™
  - Audyssey Adaptive Bass eXtension (ABX)™
  - Audyssey BassXT™
  - Cirrus® Bass Enhancement (CBE)
  - Cirrus® Original Multichannel Surround 2 (COMS2) - "Hall, Theater, etc. DSP effects"
  - Cirrus® Virtualizer Technology (CVT)
  - Cirrus® Dynamic Volume Leveler (DVL)
  - Dolby® Volume
  - DTS Neo:6®
  - DTS Surround Sensation Speaker™
  - EmbracingSound EmBass® *
  - EmbracingSound® *
  - EmbracingSound Theater® * / TheaterHD® *
  - Expamedia QBS HD®
  - SRS® FOCUS™
  - SRS® Dialog Clarity™
  - SRS® Definition™
  - SRS® WOW HD™
  - SRS® TruVolume®
  - SRS® TruSurround® HD™ / HD4™
  - Waves™ MaxxBass®
  - Waves™ MaxxEQ® *
  - Waves™ MaxxTreble® *
  - Waves™ Stereo® *
  - Waves™ Volume® *

* (IN DEVELOPMENT / CONTACT 3RD PARTY FOR AVAILABILITY)

CIRRUS/3RD PARTY IP SUPPORT BY DSP PART NUMBER

Pin-Compatitlbe DSP Part Number	Audistry by Dolby	Audyssey Laboratories	Cirrus Logic	Dolby Laboratories*	Dolby Volume**	DTS, Inc.	EmbracingSound	Expamedia	SRS Labs, Inc.
CS48520	✓		✓	✓		✓	✓	✓	✓
CS48AU2B		✓	✓						
CS48DV2B	✓		✓	✓	✓				

* All currently supported Dolby algorithms listed in this document, except Dolby Volume
** All currently supported Dolby algorithms listed in this document, including Dolby Volume

OBTAINING 3RD PARTY ALGORITHM INSTALLERS

- Installers which include DSP Composer 3rd party Licensed Software Modules, Certified DSP Firmware & Documentation listed in this document are available upon request from your Cirrus Logic FAE, upon confirmed execution of: Cirrus Logic Software Licensing Agreement & respective 3rd Party Evaluation Licensing Agreement. Before going to mass production, both Cirrus Logic Software Distribution Agreement & 3rd Party Manufacturing Agreement must also be exectued.