Part Matrix vs. Code Matrix for Broadcast-based Applications

1. CS4931X/CS49330: BROADCAST APPLICATION SUBFAMILY

A Broadcast Application implies that data is either an Elementary Stream (ES) or Packetized Elementary Stream (PES) format.

Data delivery is either:

• Serial Bursty (Configure INPUTA3 and send data to the CDI port while monitoring CMPREQ throttle line to make sure that Input FIFO is not over/under-flowed.

• Parallel Bursty (Configure for INPUTA7 or INPUTA8 and send data to the parallel port in Motorola or Intel format).

• "PES over I^2S" (Typically, data can not be delivered via an I^2S or Left-Justified input, for any standard release broadcast-based application code, with the exception of AC3N, which accepts "PES over I^2S" which follows a proprietary patent-pending packing technique developed by Cirrus Logic, Inc. This technique allows for the DSP to perform the Audio/Video Synchronization in the system. Most standard release application codes listed in this document can be modified accept "PES over I^2S" upon request in addition to the signing of a CWLA.)

If compressed data is delivered to the DSP (via I^2S or LJ) according to the IEC61937 specification, this would actually no longer be considered a "broadcast-based" application (with the exception of the AAST and AACT codes), regardless of the final product's intended purpose.

If the data delivery is IEC61937-packed AC-3, MPEG Multichannel, MP3 or AAC, the designer should then refer to the "CS4932X/CS49330, Part Matrix vs. Code Matrix for AVR/Outboard Decoder-based Applications" as this would now be considered an AVR-based application in regards to the data delivery. This document is available from the Cirrus Logic website on the CS49300 Page.

All Broadcast-based applications follow these rules (except where noted):

Expected CLKIN = 27 MHz (Oscillator Value).

DSPCLK = Refer to AN162 (Sampling Frequency and Application Code Dependent).

Standard Hardware Configuration: OUTPUTA2 (DSP Masters MCLK, SCLK and LRCLK).

Refer to AN162 and its appendices for how to control Broadcast-based Standard Release Application Codes that run on the CS4931X and/or CS49330.

Part(ROMID)	AACE	AACP	AACT	AASE	AASP	AAST	AC3E	AC3N	AC3P	MP3E	MPSE	MPSP	PCMP	Minimum Licensing Required to Receive Sample/Production Quantities of IC
CS49310(2)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Dolby Digital and AAC License (from Dolby Laboratories)
CS49311(2)	Y	Y	Y	Y	Y	Y				Y	Y	Y	Y	AAC License (from Dolby Laboratories)
CS49312(2)							Y	Y	Y	Y	Y	Y	Y	Dolby Digital License (from Dolby Laboratories)
CS49330(2)										Y	Y	Y	Y	General-Purpose Part

Table 1. CS4931X/CS49330: Broadcast Application Subfamily & Associated Broadcast-Based Application Codes

The designer/manufacture should be aware that obtaining and/or evaluation of any/all application codes requires signing of a Crystal Ware Software Licensing Agreement (CWSEA). A Crystal Ware Licensing Agreement (CWLA) must be signed before any/all application codes may be used in any production-level design. Please contact your Cirrus Logic Sales Representative or FAE in order to obtain the necessary contracts, application codes and application notes.

Code Name	Required Licensing	Documentation	Supported Input Data Type	Data Delivery Technique	IEC61937 Output	IEC60958 Output	External SRAM Required
AACE	Dolby	AN162	AAC, ES	Serial/Parallel Bursty	No	Yes	Yes - 32K x 8, 70ns
AACP	Dolby	AN162	AAC, PES	Serial/Parallel Bursty	No	Yes	Yes - 32K x 8, 70ns
AACT	Dolby	AN162C	AAC, IEC61937	I^2S, LJ	No	Yes	Yes - 32K x 8, 70ns
AASE	Dolby	AN162	AAC, ES	Serial/Parallel Bursty	Yes	Yes	No
AASP	Dolby	AN162	AAC, PES	Serial/Parallel Bursty	Yes	Yes	No
AAST	Dolby	AN162C	AAC, IEC61937	I^2S, LJ	Yes	Yes	No
AC3E	Dolby	AN162	AC3, ES	Serial/Parallel Bursty	Yes	Yes	No
AC3N	Dolby	AN162B	AC3, "PES over I^2S"	"PES over I^2S or LJ"	Yes	Yes	No
AC3P	Dolby	AN162	AC3, PES	Serial/Parallel Bursty	Yes	Yes	No
MP3E	None	AN162	MP3, ES	Serial/Parallel Bursty	Yes	Yes	No
MPSE	None	AN162	MPEG, ES	Serial/Parallel Bursty	No	Yes	No
MPSP	None	AN162	MPEG, PES	Serial/Parallel Bursty	No	Yes	No
PCMP	None	AN162A	SMPTE302M	Serial/Parallel Bursty	No	Yes	No
PCMP	None	AN162A	PCM	I^2S, LJ	No	Yes	No

Table 2. CS4931X/CS49330 Broadcast-based Application Codes

Contacting Cirrus Logic Support

For a complete listing of Direct Sales, Distributor, and Sales Representative contacts, visit the Cirrus Logic web site at:

http://www.cirrus.com/corporate/contacts/

2. BROADCAST-BASED STANDARD RELEASE APPLICATION CODES

2.1 Application Code Name, Description, Notes and Associated Logo

- AACE - Multichannel MPEG-2 AAC decoder supporting elementary AAC, (LC, ADTS) input with up to a 5.1 channel discrete output. Additionally, an IEC60958 Lt, Rt output is supported from the AUDAT3/XMT958 pin. External SRAM is required for this application code.

- AACP - Multichannel MPEG-2 AAC decoder supporting PES parsing and AV Sync for PES packed AAC (LC, ADTS) input with up to 5.1 channel discrete output. Additionally, an IEC60958 Lt, Rt output is supported from the AUDAT3/XMT958 pin. External SRAM is required for this application code.

- AACT - Multichannel MPEG-2 AAC decoder supporting IEC61937-packed AAC (LC, ADTS) input with up to 5.1 channel discrete output. While this code normally would be considered AVR-based application code, it expects a 27MHz Oscillator on CLKIN and was developed specifically for a TeraLogic reference design. PCM mixing via the DAI input port is available for sources that have an input that has a matched Fs (32kHz, 44.1kHz or 48kHz) to that of the decoded AAC stream. This code has a default of OUTPUTA0, where all other Broadcast-based codes default to OUTPUTA2. Additionally, an IEC60958 Lt, Rt output is supported from the AUDAT3/XMT958 pin. External SRAM is required for this application code.

- AASE - Multichannel MPEG-2 AAC decoder supporting elementary AAC, (LC, ADTS) input with a 2-channel downmixed output. PCM mixing of a 12kHz mono stream, via the DAI input port, is available when the decoded AAC stream has an Fs of 48kHz. Beep and Tone Generation is also supported. Additionally, an IEC60958 Lt, Rt output or an IEC61937 compressed output is supported from the AUDAT3/XMT958 pin. External SRAM is NOT required for this application code.

- AASP - Multichannel MPEG-2 AAC decoder supporting PES parsing and AV Sync for PES packed AAC (LC, ADTS) input with a 2-channel downmixed output. PCM mixing of a 12kHz mono stream, via the DAI input port, is available when the decoded AAC stream has an Fs of 48kHz. Beep and Tone Generation is also supported. Additionally, an IEC60958 Lt, Rt output or an IEC61937 compressed output is supported from the AUDAT3/XMT958 pin. External SRAM is NOT required for this application code.

- AAST - Multichannel MPEG-2 AAC decoder supporting IEC61937-packed AAC (LC, ADTS) input with a 2-channel downmixed output. While this code normally would be considered AVR-based application code, it expects a 27MHz Oscillator on CLKIN and was developed specifically for a TeraLogic reference design. PCM mixing via the DAI

input port is available for sources that have an input that has a matched Fs (32kHz, 44.1kHz or 48kHz) to that of the decoded AAC stream. This code has a default of OUTPUTA0, where all other Broadcast-based codes default to OUTPUTA2. Additionally, an IEC60958 Lt, Rt output or an IEC61937 compressed output is supported from the AUDAT3/XMT958 pin. External SRAM is NOT required for this application code.

- AC3E - Dolby Digital™ decoder supporting elementary stream input. Additionally, an IEC60958 Lt, Rt output is supported from the AUDAT3/XMT958 pin.

- AC3N - Dolby Digital decoder supporting PES parsing and AV Sync for data that is delivered according to the "PES over I^{2}S" Cirrus Logic proprietary packing technique. Additionally, an IEC60958 Lt, Rt output or IEC61937 compressed output is supported from the AUDAT3/XMT958 pin.

- AC3P - Dolby Digital decoder supporting PES parsing and AV Sync. Additionally, an IEC60958 Lt, Rt output or IEC61937 compressed output is supported from the AUDAT3/XMT958 pin.

- MP3E - MP3 decoder supporting elementary stream input. Supports MPEG-1, Layer 3 as well as MPEG-2, Layer 3 streams (which includes support for Low Sampling Rate streams). Additionally, an IEC60958 stereo

output (Decoded MP3 audio in PCM format) or an IEC61937 compressed output is supported from the AUDAT3/XMT958 pin. (Please refer to the legal section for more information about the use of this application code).

- MPSE - MPEG stereo decoder supporting elementary MPEG stereo input with a 2-channel output. Supports MPEG-1, Layers 1 and 2; MPEG-2, Layer 2. MPEG-2 Low Sampling Rates not supported. Additionally, an IEC60958 stereo output is supported from the AUDAT3/XMT958 pin.

- MPSP - MPEG stereo decoder supporting PES parsing and AV Sync for PES-packed MPEG stereo input with a 2-channel output. Supports MPEG-1, Layers 1 and 2; MPEG-2, Layer 2. MPEG-2 Low Sampling Rates not supported. Additionally, an IEC60958 stereo output is supported from the AUDAT3/XMT958 pin.

- PCMP - The PCMP application code is a SMPTE 302M decoder designed for broadcast applications where PCM is delivered in an MPEG2 transport stream PES packet. It provides support for AV synchronization, channel change, bitstream parameter reporting and PLL control, among other features offered in other broadcast-based application codes discussed in AN162.

  In addition, a mutually exclusive PCM pass-through application mode is available with the PCMP releases. This is similar to the AVR-based AC-3 code that is capable of passing PCM via I^{2}S data delivery.

• Notes •

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