DVB S2 Modem IP Core in Matlab

IP Core Serial Number

Angelia DVB S2 Modem Matlab No 002 v1.0

IP Types

Soft IP

Standards

DVB S2 System from ETSI EN 302 307-1 V1.4.1 (2014-11)
Digital Video Broadcasting (DVB);

Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications;
Part 1: DVB-S2

Languages

Matlab

Development Environment

MathWorks

Maturity / Status

Pre-Silicon

Overview

The aim of this IP core is to implement RTL components for DVB-S2 Modulator and Demodulator.

The IP core will match exactly what was described on the DVB-S2 base spec (no extensions yet). This means components will handle

- Frame types: Normal and short
- Constellations: 8 PSK, 16 APSK and 32 APSK
- Code rates: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10,

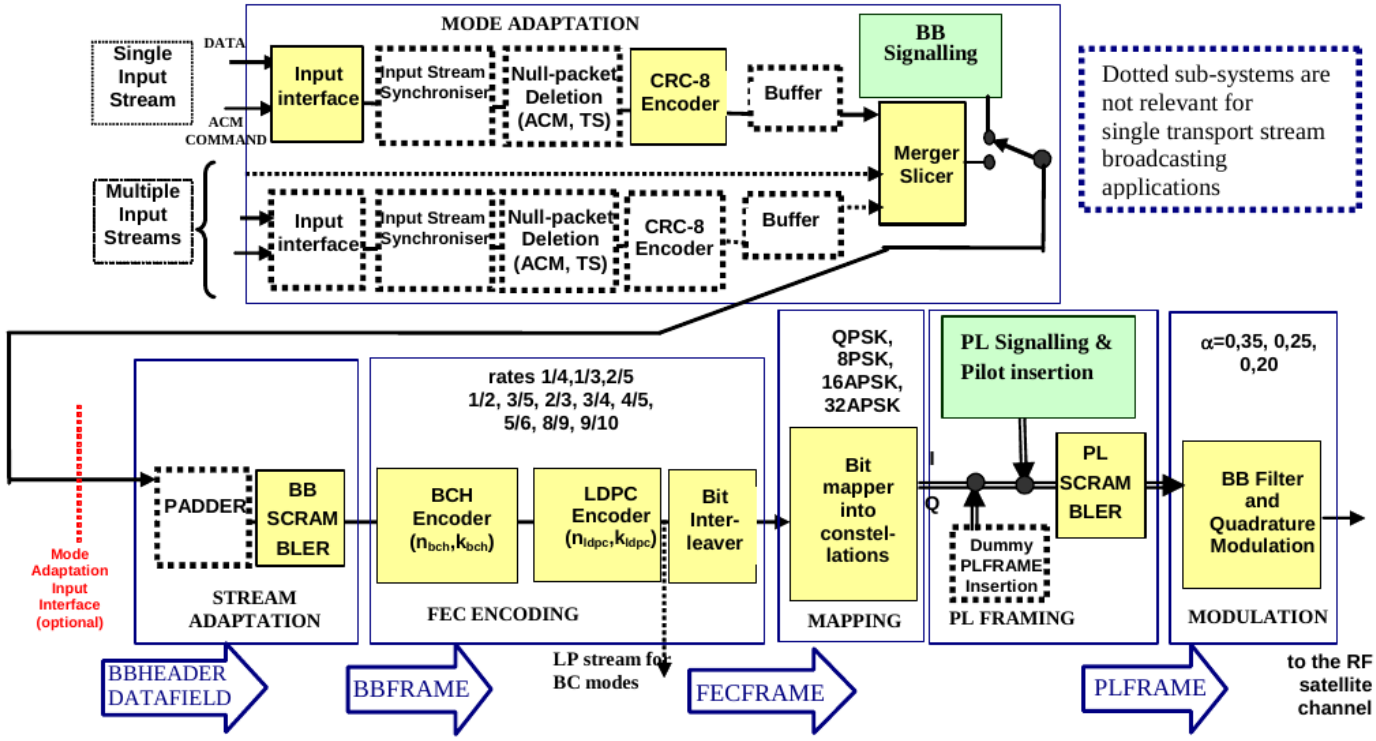
Components will also handle parameters changing on every frame, that is, they will handle frame with config A then a frame with config B immediately afterwards without requiring reset or wait cycles

Use AXI-Stream interfaces

Deliverables

Matlab source code
HDL simulation models
Comprehensive documentation

Block Diagram



Functional block diagram of the DVB-S2 System from ETSI EN 302 307-1 V1.4.1

Source File Description

Key source code files:

main.m
Main entry

dvbs2.m

DVB S2 modulation for Additive White Gaussian Noise (AWGN) channel

BCHCoeffs.m
BCH code coefficients

gamma_dvbs2
The ratio of the outer circle radius to the inner circle radius (γ =R2/R1)

modulation
Modulates the stream of input bits according to the 16apsk mapping

DVBS2Constellation
The constellation points and the bit mapping specified in the DVB-S2 Standard ETSI EN 302 307.

AWGNChannel
Additive white Gaussian noise (AWGN) Channel

soft_demod
Demodulates the stream of symbols according to the 16apsk mapping defined for a certain gamma value.
DVBS2Constellation

dvbs2_AMC.m

DVB S2 modulation for ideal channel

BCHCoeffs.m
BCH code coefficients

gamma_dvbs2
The ratio of the outer circle radius to the inner circle radius (γ =R2/R1)

modulation
Modulates the stream of input bits according to the 16apsk mapping

DVBS2Constellation
The constellation points and the bit mapping specified in the DVB-S2 Standard ETSI EN 302 307.

AWGNChannel
Additive white Gaussian noise (AWGN) Channel

raychannel.m
ray channel

soft_demod
Demodulates the stream of symbols according to the 16apsk mapping defined for a certain gamma value.

mod_8psk.m

mod_16apsk.m

mod_32apsk.m

nonlin_phase.m

nonlinearity.m

plotBER.m

Integration Guide

See INTEGRATION GUIDE.pdf

Developer

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