General Description

The ARINC 818 XGA Transceiver DO-254 Certifiable Data Package is made up of the artifacts produced by applying the DO-254 lifecycle to the Great River ARINC 818 Transceiver and fixing its generics to a specific configuration, and an encrypted version of the source code. This includes the following completed documents:

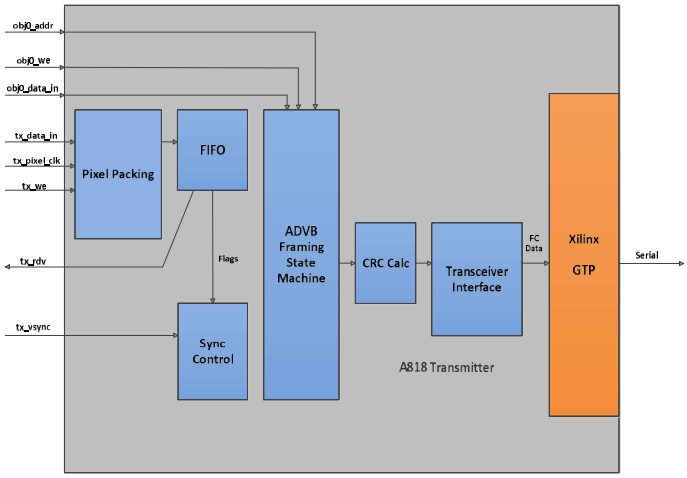
- Plan for Hardware Aspects of Certification
- Hardware Validation and Verification Plan
- Hardware Configuration Management Plan
- Hardware Design Plan
- Hardware Process Assurance Plan
- Hardware Validation and Verification Standard
- Hardware Requirements Standard
- Hardware Design Standard
- Hardware Requirements Document
- Hardware Design Document
- Hardware Elemental Analysis Results
- Hardware Configuration Index (includes Hardware Lifecycle Environment Configuration Index)
- Hardware Test Procedures
- Hardware Verification Results
- Hardware Elemental Analysis Results
- Hardware Requirements Traceability Matrix
- Hardware Accomplishment Summary

The above documents are available for certification efforts, however not all documents are included in the delivery package.

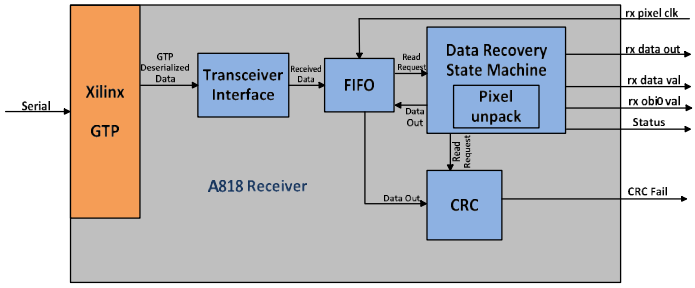
The DO-254 ARINC 818 XGA Transceiver Core IP provides a serial transmitter interface which takes XGA video data as the input, and outputs the video data in Fibre Channel frames conforming to the ARINC 818 video specification. The DO-254 ARINC 818 XGA Transceiver IP Core also provides a serial receiver interface which takes Fibre Channel frames conforming to the ARINC 818 video specification. Additionally, the DO-254 ARINC 818 XGA Transceiver Core IP outputs RGB pixels and the ARINC 818 object 0 information.

Block Diagrams

Transmitter Block Diagram



Receiver Block Diagram



Safety Features

The DO-254 ARINC 818 XGA Transceiver Core IP includes the following safety signals:

- A CRC is generated for and appended to each transmitted ADVB packet.
- A CRC is calculated and compared with the received appended CRC for each received ADVB frame, and asserts an error signal when the two do not match.

Features

- XGA to ARINC 818 Serial Transmitter
  - RGB Input
  - Standard ARINC 818 serial output packets
  - Supports VESA XGA input timing
  - User-modifiable object 0 transmission
- ARINC 818 to XGA Receiver
  - Supports reception of ARINC 818 serial packets
  - Converts ARINC 818 serial packets to object 0 data and video data
  - ARINC 818 packet CRC comparison

Supported FPGA Families

Xilinx® Spartan®-6

Development Tools

Xilinx® ISE/EDK® 13.4 or later
ModelSim® v10.1c or later (models required)
Xilinx® ISIM 13.4 or later (no models required)
Xilinx® XST 13.4 or later
Precision Synthesis 2012b or later

Assumptions

Assumption 1: The integrator will develop a full set of DO-254 artifacts to reflect the objectives, activities, and lifecycle data related to the system/safety, implementation, target test, acceptance test, production transition aspects, related validation and verification, configuration management, process assurance, and certification liaison aspects of the system/LRU. The objectives, activities and lifecycle data related specifically to the DO-254 ARINC 818 XGA Transceiver Core will be provided to the Integrator for inclusion into their overall certification package.

Assumption 2: Place and route, clock frequency, and parameter selection decisions related to the IP core will have an impact on critical areas such as timing. These decisions and the verification of these implementation decisions will be the responsibility of the integrator.

Assumption 3: Logicircuit will coordinate with the Certification Authority related only to DO-254 compliance with the DO-254 ARINC 818 XGA Transceiver Core Core.

Assumption 4: All objectives related to the building, integration and Production (including Production Testing - ATP) of the system/LRU will be the responsibility of the integrator.

Assumption 5: Objectives related to hardware components other than the DO-254 ARINC 818 XGA Transceiver Core Core are the responsibility of the integrator.

Assumption 6: The integrator will develop all DO-254 artifacts that are related to the integration and testing of the DO-254 ARINC 818 XGA Transceiver Core Core in their system.

Assumption 7: The integrator will perform implementation objectives related to the target hardware, including the integral process objectives, to verify the timing and other critical

parameters of the DO-254 ARINC 818 XGA Transceiver Core Core.

Assumption 8: The applicant is responsible for communicating with their Certification Authority relative to the implementation of the DO-254 ARINC 818 XGA Transceiver Core Core into their system.

Assumption 9: Compliance with the objectives related to system (and safety-related) requirements allocated to the hardware will be the responsibility of the integrator. The requirement to feed all IP derived requirements to the System/Safety Process will be the responsibility of the integrator. The integrator will be required to generate hardware requirements allocated from the system requirements that exercise the DO-254 ARINC 818 XGA Transceiver Core Core at the system level.

Assumption 10: The integrator is required to include a clock timing constraint for this DO-254 ARINC 818 XGA Transceiver Core core. This clock timing constraint will define the clock rate at which the IP core will operate. It is recommended that the integrator define this constraint in the UCF file. The integrator typically would also include (at a minimum, but not limited to) pinout constraints, I/O electrical standards, etc. An example UCF file can be found in Chapter 2, but it is for reference only.

Assumption 11: The integrator is not required to rerun any elemental analysis (code coverage). Code coverage results will indicate that all configurations required to attain 100% coverage are tested.

Simulation validation for the DO-254 ARINC 818 XGA Transceiver Core 1.00a is being done on a test board. The integrator must revalidate a portion of this simulation on the integrator's target. The files and data necessary to perform this revalidation can be found in Chapters 9 and 10.

In order to accomplish this revalidation, the integrator is required to design his PCB to have access to at least 22 spare FPGA pins that can be connected to a logic analyzer.

If the integrator chooses to do post place and route simulation on their system as an additional validation (again, this would only be a portion of Logicircuit's simulation), Logicircuit will provide the necessary files for the DO-254 ARINC 818 XGA Transceiver Core 1.00a.