

## GENERAL DESCRIPTION

The Xelic SONET/SDH Multi-Rate Framer/GFP Mapper Core (XCS12CGM) aligns incoming SONET/SDH frames and provides transport overhead processing, path overhead processing, pointer processing, and GFP mapping in compliance with ITU-T G.7041/Y.1303 specifications.

The XCS12CGM contains independent SONET/SDH Transport Processor, Concatenated Path Processor, and Frame Mapped GFP Processor modules with a configuration option for STS-3/STM-1 or STS-12/STM4 SONET/SDH frame rates. Incoming/outgoing SONET/SDH data is transferred using a clock valid scheme with a line side clock rate up to 100Mb/s using an 8-bit data bus.

The XCS12CGM Transmit Transport Processor inserts transport overhead blanking, calculates and inserts framing, B1/B2 parity (with corruption capability), and scrambles SONET/SDH frames. An external DCC overhead port is provided to insert section and line DCC information into generated SONET/SDH frames. Diagnostics support includes optional corruption of inserted parity, LOS insertion, and scrambling enable/disable capability. MS AIS insertion is also provided. APS information is optionally insertion through input signaling. The Transmit Concatenated Path Processor inserts high order path overhead blanking, configurable Path Signal Label (C2 Byte) information, calculates and inserts B3 parity (with corruption capability), and supports pointer increments and decrements. Pointer SS bit field insertion is provided through input signaling. AISP can be forced through external signal control. The Transmit Frame Mapped GFP Processor encapsulates incoming client data and performs rate adaptation when GFP information is requested by the Transmit Concatenated Path Processor and system side client information is not available for transport. User control of GFP core header scrambling, FCS insertion, payload scrambling, and payload header type field insertion is provided through internal register programming. Independent counters are available to monitor the accumulation of client data and client management packets received in addition to the number of GFP control frames generated.

The XCS12CGM Receive Transport Processor contains a frame alignment unit with OOF and LOF algorithm state transitions. Incoming frames are descrambled (optional) and aligned for transport overhead processing. Transport overhead interpreters are implemented to detect error conditions which include LOS, LOF, OOF, B1 errors, B2 errors, and MS AIS. Diagnostics support includes optional corruption of calculated parity, and descrambling enable/disable capability. An external DCC overhead port is provided to extract section and line DCC information from generated SONET/SDH frames. APS information is extracted each frame and provided through output signaling. The Receive Concatenated Path Processor detects Path AIS, LOP, Pointer Increments, Pointer Decrements, Pointer NDF's, and Pointer 3 in a row

conditions in addition to B3 error detection. The Receive Frame Mapped GFP Processor performs GFP frame delineation and provides a Server Signal Fail (SSF) output to indicate a fail condition. The delineator provides for a programmable in-frame count to achieve synchronization and allows for single bit core header error correction (optional) once this state is achieved. Control frames (idles), client data and client management packets, and invalid packets are detected and client information with all appropriate signaling is provided at system side interface. Single bit payload header errors are corrected (optional) to provide more reliable transport of client packet information. An FCS interpreter calculates the frame check sequence on each applicable incoming GFP frame and reports errors by detecting mismatches when comparing to extracted values. Independent counters are available through register interface access to monitor the accumulation of SSF errors, FCS errors, core header corrected frames, payload header corrected frames, payload header uncorrected frames, control frames, client management packets, client data packets, and client invalid packets.

## FEATURES

- Suitable for FPGA and/or ASIC implementations.
- Integration support and maintenance available.
- XCS12CGM is available under flexible single use licensing terms with netlist or source code deliverables.
- Supports configurable STS-3/STM-1 and STS-12/STM-4 SONET/SDH frame rates.
- Compliant with ITU-T G.707 and Telcordia GR-253-CORE Specifications.
- Supports optional SONET/SDH frame scrambling capability for diagnostic purposes.
- Calculates and inserts B1/B2/B3 parity information with optional corruption capability.
- Provides capability to force MS AIS, LOS, AIS-P, pointer increments and pointer decrement operations.
- Contains external overhead port for section/line DCC insertion/extraction.
- Detects LOS, LOF, OOF, LOP, Pointer Increments, Pointer Decrements, Pointer NDF, B1/B2/B3 errors, and AIS-P and MS AIS conditions.
- Support APS insertion/extraction through external signaling.
- Provides optional GFP core header scrambling/descrambling (Barker-like sequence of length 32).
- Provides optional GFP payload scrambling/descrambling (self-synchronous  $x^{43}+1$  polynomial).
- Provides generic register interface for programming of internal GFP registers.
- Provides test mode for generation of user specified client data or client management frame types.
- Optionally calculates and inserts GFP FCS.
- Provides 16-bit counters for the accumulation of GFP control frames generated, client data packets transmitted, and client management packets transmitted.
- Supports control frame (idle) insertion for GFP frame rate adaptation.

- Optional GFP frame payload type field configuration through input signals or internal register programming.
- Performs frame delineation on incoming GFP frames with optional CHEC scrambling.
- Supports core header and payload header single bit error correction (optional) and multiple bit error detection.
- Provides detection and accumulation of SSF errors, FCS errors, core header corrected, payload header corrected, payload headed uncorrected, control frame, client management packet, client data packet, and client invalid packet conditions to provide an indication of health status for the incoming GFP data link.

## **APPLICATIONS**

- Traffic Manager
- DWDM and WDM systems
- OTN/SONET add/drop multiplexers
- Digital cross connects
- OTN and/or SONET/SDH line cards
- Test equipment