

# MSC8157 Application Development System

For baseband applications using the MSC8157 and MSC8158 family of StarCore DSPs

## Overview

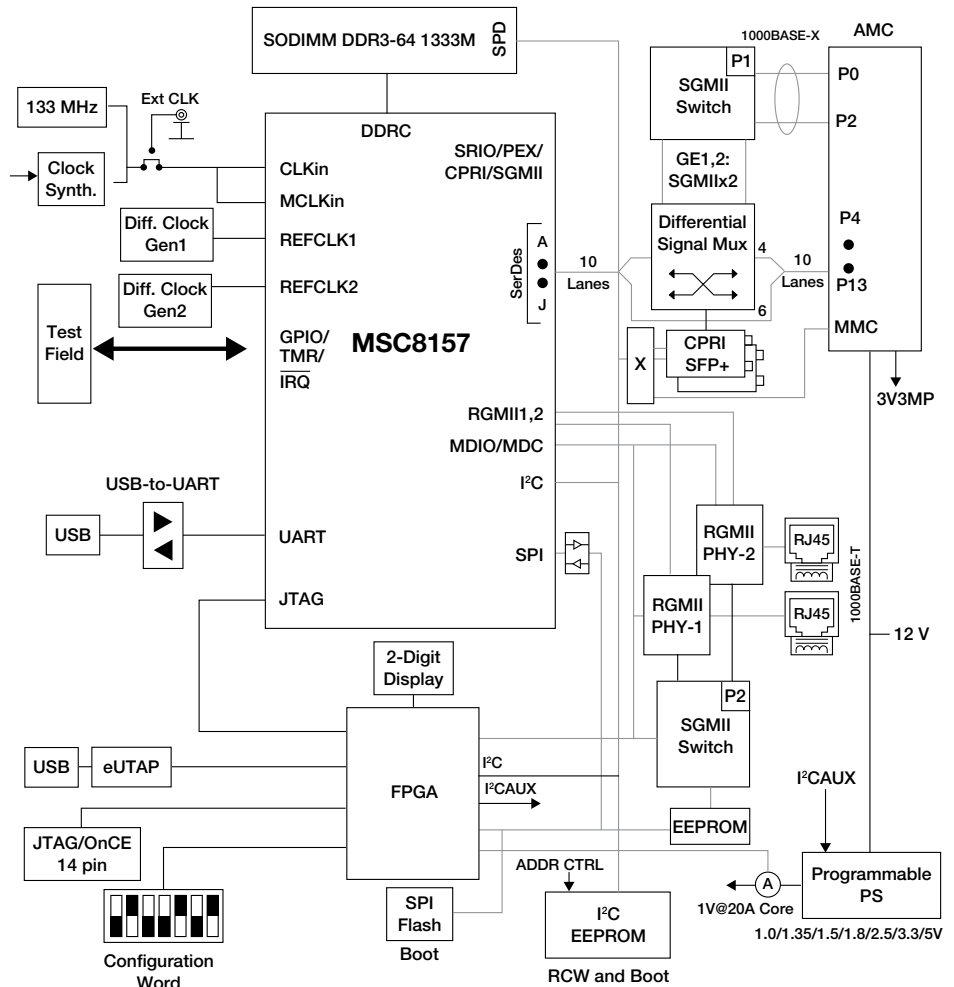
The MSC8157 application development system (MSC8157ADS) is a complete debugging environment intended for engineers developing applications for the MSC8157 and MSC8158 Freescale digital signal processors (DSPs). The MSC8157 family includes highly integrated DSP processors that contain six StarCore SC3850 DSP subsystems supporting up to 48 GMACs with each DSP core running up to 1 GHz. These devices target high-bandwidth, highly computational DSP applications such as WCDMA, TD-SCDMA, LTE and WiMAX base station applications. The MSC8157ADS is intended to serve as a platform for software and hardware development in processor environments using the MSC8157 and MSC8158 DSPs. On-board resources and the associated debugger enable developers to perform a variety of tasks, including:

- Download and run code
- Set breakpoints
- Display memory and registers
- Connect proprietary hardware via an expansion connector
- Test field allows connection to MSC8157 GPIOs

The MSC8157ADS supports two working configurations:

- Stand-alone mode: The MSC8157ADS can run in a stand-alone mode like other application development systems, with direct connections to debuggers, power supply and other external connections.
- AdvancedMC™ mode: The MSC8157ADS is inserted in a standard MicroTCA® backplane that allows testing of the high-speed Serial RapidIO® and PCI Express® ports against other platforms. For connecting to a remote antenna system, or to test and measurement equipment, there are two SFP+ optical transceivers

MSC8157 ADS Board Block Diagram



connected to the MSC8157 CPRI interfaces. Four additional CPRI lanes are available through the AMC connector. The AMC edge connector carries all high-speed interface signals between the devices. The ADS is compatible with standard MicroTCA chassis, such as a Schroff® or IDT Serial RapidIO switch development platform.

## Features

- Supports MSC8157 and MSC8158 DSPs
- DDR controller (DDRC) is configured in DDR3 mode: 204-pin SODIMM, 64-bit @ 1333 Mbps, No ECC, 1 GB of memory
- DSP RGMII (at ports GE1 and GE2) connects to two single Marvell® 88E1111 GETH PHYs for regular board configuration
- Marvell 10-port SGMII switch 88E6182 links the MSC8157 SGMII lines to 2xRJ-45 copper connectors and to the 1000Base-X over AMC MicroTCA connector ports 0 and 2
- Pericom® PI2DBS6212ZHE diff signal switch parts support programmable SerDes lines multiplexing to AMC edge connector or to the SGMII the switch and to AMC or to SFP+
- DSP configuration and boot support includes reset configuration source three-bit set by appropriate DIP switches, parallel load of programmable reset configuration word from FPGA registers sampled previously from DIP switch array, serial configuration and boot from a (64 KB) I<sup>2</sup>C EEPROM, boot from serial 8 MB SPI flash, boot from communications ports (from SerDes Serial RapidIO interface or from Ethernet SGMII or RGMII ports)
- Two available debug interfaces, including on-board USB TAP controller (eUTAP) or OnCE 14-pin header for any external TAP controller

- FPGA logic: Board control and status register (BCSR), JTAG controller allows full board programming, multiplexing of JTAG source signals, I<sup>2</sup>C master and slave controllers, MII controller to program RGMII PHY, SPI controller, boot sequencer configures ADS peripherals for boot over Ethernet, two-digit, 14-segment LED display provides current board settings
- 133 MHz clock oscillator for the DSP clock
- External pulse generator may be used as clock source
- Can function in various main supply configurations (configurable via DIP switches or BCSR) in stand-alone mode with an external power 12 VDC at 5A when S1 switch is on or as an AMC card in the MicroTCA system or interconnection with AMC-X-Over card. If the ADS is fed outside, the S1 power switch should be off
- On-board power system is comprised of two regulator steps:
  - Primary power system is a Power-One power manager with 1.0V POL regulator for MSC8157 loads, including cores, CRPE and CPRI and M3, 2.5V for I/O and 3.3V for on-board peripherals and DDR switching power supplies for the DDRC port. LDOs for on-board peripherals are fed from 2.5V and 3.3V POLs and 12V input voltage, voltage supervisor monitors all the ADS power supplies. Power good (PG) signal and dedicated LED indicate power system status. Any failures cause the nPRST signal be continuously low
  - Push buttons: Main power-on-reset, hard reset, NMI and IRQ8

## Development Support

Freescale supplies a complete set of CodeWarrior DSP development tools for the DSP device. The tools provide easier and more robust ways for designers to develop optimized DSP systems. With applications ranging from base stations to medical imaging to aerospace and defense, the development environment gives designers everything they need to exploit the advanced capabilities of the MSC8157 and MSC8158 architecture. In addition to the ADS board, support tools include:

- CodeWarrior Eclipse-based integrated development environment (IDE)
- C and C++ compiler with in-line assembly
- Librarian
- Multicore debugger
- Royalty-free RTOS
- Software simulator
- Profiler
- High-speed run control
- Host platform support

Contact your local sales office or representative for availability.

Visit [freescale.com/DSP](http://freescale.com/DSP) for more information.



## Learn More:

For current information about Freescale products and documentation, please visit [freescale.com/DSP](http://freescale.com/DSP).