



Release Notes

CodeWarrior Development Studio for eTPU v10.3 Release Notes

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1. Product Overview

eTPU2+ is an intelligent, semi-autonomous co-processor designed for timing control. Operating in parallel with the Host CPU, the eTPU2+ processes instructions, real-time input events, performs output waveform generation, and accesses shared data without Host intervention. Consequently, for each timer event, the Host CPU setup and service times are minimized or eliminated.

The *CodeWarrior Development Studio for eTPU* suite targets eTPU, eTPU2 and eTPU2+ application developers, compiler developers and integrations into higher level SoC models and Integrated Development Environments (IDE).

eTPU2+ simulator supports all instructions, memory transactions, flow control, channel modes, debugger API.

The CodeWarrior Development Studio for eTPU is a full-feature IDE, Eclipse-based, which contains a standalone C cross-compiler, preprocessor, assembler, linker, simulator, and debugger.

The product features include the following:

1.1 Features

For new features in this release please consult Change Log chapter.

1.1.1 Simulator Features

- T4DIS field to set timing mode for each channel separately and independently
UNSUPPORTED
- About 95% bit and cycle accuracy in channel related registers (in implemented modes).
- About 100% bit accurate ALU instructions execution
- Channel behavior simulation
- NDEDI (Nexus Dual eTPU Development Interface) support for breakpoints and watchpoints
- Illegal instruction decoding interrupt.
- Reset
- SRI - Match/Transition Service Request Inhibit Latch.
- Hardware Breakpoints.
- Software Breakpoints.
- Interrupt vector support.
- Output – Input pin link.
- Watchdog implementation.
- Idle Counter implementation.
- Event Reporting to Visualization plugin.
- Registers enum alignment.
- MISC implementation.
- Trace output
- Coverage dump
- Cumulative coverage dump.
- SCMOFFDATAR register support.
- Single-step Execution.
- SCM Emulation.

- eTPU / eTPU2 device type switch.
- IEEE VCD output generation
- Virtual timers support
- TCCEA - Transition Continuous Capture Enable.
- Angle mode
- Branch condition flags are implanted as separated registers.
- TCR CLK input
- Address watchpoints supported
- EAC supports up to 7 missing teeth
- EAC Angle Tick Generator can be clocked by the TCR2 prescaler output, as an alternative to the TCR1 clock
- Watchdog can be configured to disable thread forced ending and channel blocking
- New Latency Monitor allows latency measurements, either for individual channels or channels combined in a single priority

1.1.2 **Compiler features:**

- Upgraded to version 1.5.3 for bug fixes. For details please refer to the Compiler release notes located at: %INSTALL_DIR%\ETPU\Release_Notes\Compiler_Notes\FET Release Notes.txt

1.1.3 **Debugger features:**

- C source level debugging
- Register modify/display
- Memory modify/display
- Software breakpoint
- Hardware breakpoint
- Command line scripting
- Channels control
- Host registers are visible while running
- Coverage and integrated timers functionality
- Channel flags view
- Address watchpoint support
- Support for eptu2+ target

1.1.4 **ETPU visualization plugin features:**

- The following eTPU events are supported and can be visualized:
 - Channel 0 In/OUT transitions
 - Channel 1 In/OUT transitions
 - Channel Flag 0
 - Channel Flag 1
 - TDL A (Transition Detection Latch A)
 - TDL B (Transition Detection Latch B)
 - GIRQ (Global IRQ)
 - MRLA A (Match Recognition Latch A)
 - MRLA B (Match Recognition Latch B)
 - MRLEA A (Match Recognition Latch Enable A)
 - MRLEB B (Match Recognition Latch Enable B)
 - TCR1 (Time base counter 1)
 - TCR2 (Time base counter 2)
 - ATG (Angle Tick Generator)
 - AM High Rate (AM High rate mode)
 - AM Halt (AM Halt mode)

- AM Normal (AM Normal mode)
- TCRCLK (Timebase Clock Signal)
- TChange (Thread context change)
- TTC (Tooth Tick Counter)
- Dummy Teeth (TPR Dummy Teeth)
- TPR Hold (TPR Hold)
- TPR IPH (TPR Insert Physical Tooth)
- TPR Last (TPR Last)
- MPI (Measure pulse input)
- MPT (Measure pulse thread)
- PWMO (Pulse Width Modulation output)
- PWMT (Pulse Width Modulation threads)
- TST (Time Slot Transition)
- Active (Thread Active)
- Idle (Thread Idle)
- CIRQ (Channel IRQ)
- OIRQ (Channel Overflow IRQ)
- DIRQ (DMA / DATA IRQ)
- DOIRQ (DMA / DATA Overflow IRQ)
- Watchdog (Watchdog event)
- VTimer1 (Virtual Timer 1)
- VTimer2 (Virtual Timer 2)
- VTimer3 (Virtual Timer 3)
- VTimer4 (Virtual Timer 4)
- VTimer5 (Virtual Timer 5)
- VTimer6 (Virtual Timer 6)
- VTimer7 (Virtual Timer 7)
- VTimer8 (Virtual Timer 8)
- VTimer9 (Virtual Timer 9)
- VTimer10 (Virtual Timer 10)
- Debugger synchronization - Run control:
 - Debug / Resume / Suspend / Terminate /Stepping /Breakpoints
- Cycles display:
 - Left side
 - Right side
 - Timeframe
 - Markers position(left and right)
 - Distance between markers
- Overlapped signals
 - Channel Flags 0/1, TDL A/B, MRLE A/B, MRL A/B, CIRQ, OIRQ, DIRQ, DOIRQ are overlapped over channel transitions
- Goto control
- Zoom In / Zoom out in time
- Signals tree panel
- Append/Insert/Remove signal chart
- Scroll in time
- Vertical cursors
- Human readable execution trace
- Enable / Disable data acquisition
- Active waveform selection
- Snap cursor on nearest transition
- Save / Load history files
- Logging options

- Spike drawing

2 System Requirements

2.1 Hardware

2.6GHz Pentium® compatible processor or better

4GB RAM

Microsoft Mouse compliant pointing device

Internet connectivity for web downloads and updates access

2.2 Operating System

Microsoft® Windows 7 (32/64-bit) or Windows 8/8.1 (32/64-bit)

2.3 Software

Java 1.6 update 11 or newer

2.4 Disk Space

500 MB, additional space required during installation

3 Installation and Licensing

See *CodeWarrior Development Studio for eTPU v10.3 Quick Start.pdf* for installation.

Consult www.freescale.com/support for licensing issues.

4 Technical Support

Visit www.freescale.com/support for technical support.

5 Change Log

Changes included in 10.3 release

1.1. Simulator Changes

- ENGR00353413 - [ETPU] Simulator generates series of 2 cycles needles in Signal View when specific IPACx used and channel input is stimulated by input vector.
- ENGR00355002 - [ETPU] if breakpoint is placed at the next line after jmp.d instr then it stops here and then the debugger executes wrong code - no jump to label.
- ENGR00197693 - [eTPU][Simulator] When TCRCF selects etpu clock divided by 2 - setting FCSS=1 value changes the TCRCLK digital filter parameters
- ENGR00352112 - [ETPU] Channel B matches does not happend when the channel priority is 0.
- ENGR00353123 - [ETPU] Simulator cannot correctly stimulate the input channel from the same output channel.

- ENGR00348336 - [ETPU] the simulator does not correctly handle ADD + Post Shift -> Carry bit.

1.2. Compiler Changes

- ENGR00356123 - fixed issue in JMP peephole optimization
- ENGR00356641 - fixed issue for expanding load instructions with displ_index
- ENGR00358659 - fixed issue in handling _coherentwrite() intrinsic for 32-bit data
- ENGR00364761 - fixed the assembler for minimum_instructionlength in the eTPU models
- ENGR00366499 - fixed internal compiler error due to unhandled conversion of fract / fixed types
- ENGR00343155/#2 - performance improvement by adding peephole optimization for direct constant loading, avoiding the use of another register
- Performance improvement - extended the instructions recognized in rematerialization to improve code generated in some spill situations

1.3. Other Changes

- IDE has moved to Juno version of Eclipse
- ENGR00340665 - [ETPU] The execution of eTPU debugger script (AN4097SW - engine_control_demo.tcl) causes CW IDE freezes.
- ENGR00349407 - [ETPU] The watchpoint command does not correspond to "eTPU Watchpoints View".

Appendix A: Known Limitations and Workarounds

CR ID	CR Description
ENGR00266798	Order of operations is changed when the following code is compiled with -O2 <pre>tpr_reg.HOLD=1; tcr2 += someValue; tpr_reg.IPH=1;</pre> Workaround: Disable scheduling in etpu_bins (-noOsched to compiler (or) do not pass -Osched to etpu_bins if it is invoked standalone)
ENGR00204592	TCRCLK digital filter doesn't support integrator mode Workaround: None
ENGR00218192	Switch between multiple projects in the same workspace might result in unpredictable behavior. Workaround: None
	Host memory related transactions are not cycle accurate – no SPRAM Arbitration is supported Workaround: None
	Angle Mode functionality not fully validated. Workaround: None
	Working with the second engine is not fully verified Workaround: None

Appendix B: Change History

2. Changes included in 10.2.2 release

2.1. Simulator Changes

- ENGR00307168 - The eTPU simulator does not operate correctly in Angle Mode.
- ENGR00189078 - [eTPU][Simulator] First microcycle from TST state is reported as IDLE state
- ENGR00204634 - The period of TCRCLK signal is not the same in Execution trace view when we don't send vector file command in debugger shell at the beginning after project debugged
- ENGR00205220 - The timebase prescalers do not freeze when GTBE = 0.
- ENGR00201076 - The instruction after a delayed jump is not reported correctly in the coverage report
- ENGR00187062 - Default value of ETPUSCMOFFDATAR doesn't decode as illegal instruction

2.2. Compiler Changes

- ENGR00289641 : Division result is inconsistent when codes were compiled with -O0 option
- ENGR00273703 - Compiled results on Windows XP and Windows 7 become different for a specific code pattern
- ENGR00290646 - plETPU.exe crashed when 24 character typedef aliases were compiled
- ENGR00339813 - Reserve space for 0-7 engine relative memory to store/restore P/DIOB.
- Local variable is overwritten by callee variable because of P/DIOB store/restore overwrites caller memory locations.
- ENGR00336245 – Function offset allocation is not proper for a corner case having only one non-etpu function parameter of 1 byte size resulting in local variable being overwritten by callee variable.
- ENGR00340516 - Compiler calculates weird function _FRAME_SIZE value when data type of a parameter has changed

2.3. Wizard Changes

- ENGR00278269 – Wizard should create Sources folder (not Source folder)

2.4. Other Changes

- ENGR00302919 - CodeWarrior for ETPU does not accept USB dongle FLEXid license (Windows 7)

3. Changes included in 10.2.1 release

3.1. Simulator Changes

- New Feature ENGR00277104 - EAC now supports up to 7 missing teeth on hardware
- New Feature ENGR00277105 - Watchdog can now be configured to disable thread forced ending and channel blocking
- New Feature ENGR00277107 - EAC Angle Tick Generator can now be clocked by the TCR2 prescaler output
- New Feature ENGR00277108 - New Latency Monitor allows latency measurements

3.2. Compiler Changes

- Added support for two entry tables. Please check build tools reference manual for usage details.
- Added command line switch `-two_entry_tables` to enable/disable this feature for backward compatibility.
- Added new command line switch `-arch etpu2p`
- Fixed ETPUglobalimage32 expansion issue
- Fixed forced termination of compiler bug.
- Fixed Accessing chan_base structures members which are pointers.
- Fixed ::ETPUlocation macro expansion for arrays of struct(making member offsets also proper)
- Fixed inconsistency in section headers in `etpu_bins` for arch `etpu/etpu2`.
- Fixed ::ETPUentrybase and ::ETPUentrytables expansion.

3.3. Debugger changes

- New Feature ENGR00278205 - Add new target for `etpu2+`
- New Feature ENGR00278206 - Add register details needed for `etpu2+` support

3.4. Wizard changes

- New Feature ENGR00279217 - Add option "arch = `etpu2p`" in toolchain plugin
- New Feature ENGR00275903 - Create wizard support for `etpu2+`

4. Changes included in 10.2 release

4.1. Simulator Changes

- Fix for MTWX46628 - Trace information file is generated in `d:\`
- Fix for MTWX50961 - OPACB doesn't obey Match Pin Action Conflict Resolution
- Various Multiple Input Signature Calculator improvements
- Vector file support improvements
- Improved TCRCLK support – timings
- Fix for MTWX47385 Support for visualization on remote debugging

4.2. Compiler Changes

- Upgraded to 1.4.5 version, see %INSTALL_DIR%\ETPU_10\Release_Notes\Compiler_Notes\FET Release Notes.txt for details

4.3. ETPU visualization plug-in changes

- Implemented MTWX47434 - Signal Color coding indication
- Fix for MTWX48005 -Adding Signals view from Windows menu cannot be done
- Fix for MTWX46629 - Execution trace view can be opened twice - one is gray
- Fix for MTWX47386 - Improve flags viewer integration
- Fix for MTWX50909 Signal Tree can get unsynchronized with Signal view charts

4.4. Other Changes

- Improvements for multi-project scenarios (MTWX46525)
- Updated register definitions from Register view

5. Changes included in 10.1 release

5.1. Simulator Changes

- Fix for MTWX49091 Simulator does wrong function with some frequency's values

5.2. Compiler Changes

- Upgraded to 1.4.4 version, see %INSTALL_DIR%\ETPU_10\Release_Notes\Compiler_Notes\FET Release Notes.txt for details

5.3. ETPU visualization plug-in changes

- Fix for MTWX47429 Add capability to run script when starting the debug session
- Improvement for MTWX47434 Signal Color coding indication
- Fix for MTWX48766 The content of tree view in Signal view is not clear

5.4. Other changes

- Updated stationary to the mnemonic changes, see \ETPU_10\Help\pdf\ETPU2_assembler_mnemonics.pdf for details
- Fix for MTWX48003 Replaced the New project wizard templates
- Fix for MTWX47427 parse_vector command fails for large vector files
- Documentation updates
- Improved for assembler syntax color support
- New projects have memory model configured by default to small
- Fix for MTWX49102 Time markers labels shows incorrect when entering debug if system clock is not default

6. Changes included in the 10.0 - Patch 1.1

6.1. Simulator Changes

- Fix for MTWX47440: The capture registers source in some conditions was different that the one specified by the TBS[1] flag
- Fix for MTWX47720: Microcode changes to TBS flags don't update TBS register value
- Fix for MTWX47974: In em_b_dt mode, MatchB is unblocked by the clearing of MRLA

6.2. Compiler Changes

- Upgraded to 1.4.3 version, see %INSTALL_DIR%\ETPU_10\Release_Notes\Compiler_Notes\FET Release Notes.txt for details

7. Changes included in the 10.0 - Patch 1.0

7.1. Simulator Changes

- Improved vector file support
- Improved TCRCLK scripting support
- Improved and fixed UDCM scenarios
- Fix for MTWX46655 – in some cases write watchpoints do not work
- Improved AM support
- Corrected sm_st_e unfiltered input

7.2. Compiler Changes

- Upgraded to 1.4.2 version, see %INSTALL_DIR%\ETPU_10\Release_Notes\Compiler_Notes\FET Release Notes.txt for details
- Updated default LCF file

7.3. ETPU visualization plug-in changes

- Fix for MTWX45855 Translation between time units is wrong.
- Fix for MTWX46637 Flags view is not refreshed after stopping

7.4. Other changes

- Updated stationary to the mnemonic change “ldch” instead of “ldm”