uEZ v2.04 – 4/2/2013

HIGHLIGHTS

- Added support for 5 different PCAP Touch Screen LCD's in sizes of 3.5", 4.3", 5.0", 7.0" and 10.4"
- Added support for FreeRTOS+Trace for expanded debug and development capability.
- FreeRTOS support upgraded to FreeRTOS v7.3.0
- Segger JTAG SWO Viewer support added where applicable for expanded debug and development capability
- New BMP drawing routines used with new title screen.
- Screen saver features added to dim, animate, and turn off the LCD.
- Networking API improvements to separate infrastructure functions (configure, bring up, take down) from standard use. Also NetStart task created to bring up network.
- Added support for video playback from high speed SDCard at 15fps on a uEZGUI-1788-43WQR with a uEZGUI-EXP-DK Expansion Board

DETAILS

- uEZ General Changes
  - FreeRTOS Trace added as a Debug option to all LPC1788 builds
  - emWin v5.18 upgrade (from emWin v5.14)
  - FreeRTOS upgraded to FreeRTOS v7.3.0 (from v7.0.1)
- Documentation
  - Improved SPI & Timer documentation with examples.
- Application/Demo Changes
  - uEZGUI Demos & DK-TS Kit Demos
    - uEZ GUI Demos now compile with FreeRTOS+Trace enabled
    - New Title Screen using smaller BMP graphic
    - All Expansion Board dependencies in demos have been removed.
    - Draw App now uses dynamic memory instead of LOAD_SPACE to simplify memory map.
    - uEZGUI-RX62N-35QT Functional Test App no longer tries to test non-existent NOR Flash
  - Video Playback Demo added for uEZGUI-1788-43WQR
  - Screen saver enable option added to Brightness app
- Build Changes
  - Added Builds for FreeRTOS+Trace
- HAL and Device Driver Changes
  - Audio Amp
    - AudioAmp TDA8551T properly locks pins dedicated to controlling amp.
  - Audio Codec
    - Wolfson Audio Codec WM8731 is now initialized to use both I2S and DAC audio inputs and play out the headphone jack.
  - GPIO
    - Get Mux routines added
  - GPMDA

        - Burst/Single/Last requests can now be triggered through software
    - I2C
        - Added PCA9645 Mux code. Creates new I2C busses for each mux output and automatically changes lanes as needed.
    - LCD
        - LCD now has vertical sync detection and control (UEZLCDWaitForVerticalSync and callbacks). All LCD drivers have been updated.
        - LCD drivers now take parameters for SPI and GPIO pins in their Create routines instead of being hardcoded.
        - MicroTips AWT 800480T50P03 LCD Driver added.
        - MicroTips UMSH 8253MD 3T LCD Driver added.
        - MicroTips UMSH 8596MD 20T LCD Driver added.
        - MicroTips UMSH 8065MD 21T LCD Driver added.
        - Sharp LQ104V1DG28 LCD Driver added.
    - Mass Storage
        - New High Speed 4-bit parallel SDCard MCI driver added.
    - Network
        - Network API changed to allow infrastructure to be split from opening/closing the network. Infrastructure calls now configure, bring up, and bring down any network.
        - Infrastructure changes made to lwIP, GainSpan, and Redpine network drivers.
        - Option for DHCP client/server added (on networks that support it)
        - Passwords for networks now only in one place.
    - Serial RS485
        - Stability and semaphore fixes.
    - Stream
        - JTAG SWO support added for multiple compilers. Works best with Segger JTAG SWO Viewer.
    - Touch Screen
        - EXC7200 Touch Screen Driver added.
        - Direct Drive Touchscreen now has improved touch detect.
        - MSG2032 Touch Screen Driver added.
        - Sitronix ST1232 Touch Screen Driver added.
- Platform Changes
    - General
        - Removed all expansion board detection calls.
        - Proper detection of USB Host on min-AB connectors on all platforms that support it.
        - All platforms no longer have G_network or G_networkStatus as part of improved networking API.
    - LPC1788 CARRIER
        - GainSpan SPI added as feature
    - LPC2478 CARRIER
        - Fixed pin initialization problem between USB Device and LCD.

- RX62N and RX63N CARRIER
  - Direct Drive code now properly handles UEZLCDSetBaseAddr().
- uEZGUI-1788-70WVT
  - No longer incorrectly enables LCD_FP and LCD_LP pins.

- Processor Changes
  - NXP
    - General (NXP and Renesas processors)
      - GPIO GetMux function added to all processors.
      - Blue Screen of Death moved out of processor files.
    - LPC1788
      - EMAC now uses bit banging to detect presence of EMAC instead of blindly locking up the processor.
      - Blue Screen of Death pulled out of LPC1788 processor code.
      - GPDMA improved for supporting DMA/Peripheral transfers.
      - LCD Controller support for vertical sync interrupt and callback
      - MCI driver added for high speed SDCard support
      - Disabled initial power on of devices. Peripherals are now turned on ONLY by their respective drivers.
      - SSP Driver now properly disableds interrupts when doing polled transactions.
    - LPC2478
      - EMAC now uses bit banging to detect presence of EMAC instead of blindly locking up the processor.
      - LCD Controller support for vertical sync interrupt
  - Renesas
    - RX62N
      - LCD Controller support for vertical sync interrupt
    - RX63N
      - LCD Controller support for vertical sync interrupt

- Library Changes
  - BasicWeb
    - Now uses UEZGetTaskList() instead of FreeRTOS call.
    - Uses new Network API with passed in network handle.
  - BMP Drawing
    - Fixed 1 off width calculation
  - DAC Wave Player
    - Improved support for 8-Bit and 16-Bit playback.
    - Reports location within playback and completion to synchronize with video.
    - Improved stability and buffering.
  - FDI Commands
    - File test routines added
    - I2C commands added (probe, read, write).
  - File System
    - File system volume information now can be read to get used and free size.
    - Sync command added to ensure all data is flushed to media.

- GainSpan AtCmdLib
  - Program and Mode Pins are now locked when used for GainSpan
  - Improved handling of multiple network connections
  - Fixed problem with escape code encoding
- HTTPServer
  - Uses new Network API with passed in network handle.
- lwIP
  - lwIP now properly stops if error from EMAC driver.
  - MAC address now is set through settings passed in when bringing up infrastructure instead of callback.
- Screen Saver
  - New screen saver feature added with callbacks for drawing bouncing logo and dimming of screen. Turns off display after longer period of time.
- uEZFailure
  - New uEZFailure library created to handle Blue Screen of Death.

- RTOS Changes
  - Task priority can now be modified with UEZTaskPriorityGet and Set.
  - UEZGetTaskList added to OSAL for a list of tasks using RTOS independent methods.
  - FreeRTOS+Trace
    - Tasks are now registered with trace (via UEZTaskRegister) automatically.

uEZ v2.03 – 11/29/2012

- uEZ General Changes
  - Improved lwIP / SNMP operability (disabled by default).
  - RX63N CARRIER added with Direct Drive support
- Documentation
  - uEZCRC documented with doxygen.
- Application/Demo Changes
  - uEZGUI Demos
    - emWin initializes only once now in demos.
    - GainSpan logo added to icons.
    - Slideshows with audio only start next slide if audio is complete.
    - Only enable USB Host and Ethernet in demos if enabled in target's Config_Build.h file.
    - Added GainSpan test and program code.
- Build Changes
  - Added batch build files for several more combinations (including RX63N).
- HAL and Device Driver Changes
  - LCD
    - Added Sharp LQ042T5DZ11 LCD Driver
  - Generic RTC
    - Fixed a case in the Generic RTC where Hardware RTCs without a validate command would lock up in a semaphore dead lock state.
- Platform Changes
  - General
    - Added FDI CARRIER_RX63N with Direct Drive support.
  - LPC2478 DK-TS-Kits
    - Fixed Console to properly use UART2.
    - Fixed CAN test in Functional test software
    - Adjusted platform file to reserve upper 8K for bootloader.
  - LPC1788 DK-TS-Kits
    - Fixed CAN test in Functional test software
  - uEZ GUI
    - IAR builds now use a NORFlash_region at link time.
    - POE Expansion board detection no longer disables UART0 TX.
    - New EMC timing parameters and enable page mode.
    - CRC0 driver properly created on all uEZGUI platforms.
  - UEZGUI_1788_56VI
    - Added GainSpan require routine.
    - Added SSP2 require routine.
- Processor Changes
  - NXP LPC1788
    - MATRIXARB added to LPC1788 register list.
    - EMAC PHY address detection no longer requires DEBUG_LPC1788_EMAC_STARTUP fixing expansion boards with EMAC PHYs with non-zero addresses.

        - External Memory controller to NOR flash now has page mode enabled by default increasing the speed of NOR flash accesses. Parameters to EMC driver has changed and are now range checked.
        - Fixed Serial UART code to initialize PCLK dividers and power bits for all UARTs.
    - Renesas RX63N
        - Direct Drive added.
        - RTC driver added.
        - SPI transfer in/out routine fixed. Was not properly placing data into output buffer.

- Library Changes
    - uEZ Network
        - Fixed compile problem caused by disabled DNS option in lwIP.
        - Enabling LWIP_SNMP now works in uEZ Library. LWIP_SNMP_NUM_VARS allocates more memory. Private MIB also supported.
    - uEZ File System
        - File Find sessions now have a NO_DYNAMIC_MEMORY_ALLOC option that avoids requiring UEZMemAlloc.

uEZ v2.02 – 10/16/2012

- uEZ General Changes
    - LPC2478 THUMB Mode now available as compile option for smaller builds.
    - Updated projects to IAR 6.30.x.
    - Updated projects to Rowley Crossworks 2.2.
- Documentation
    - More headers are documented.
    - SWIM library documented.
- Application Changes
    - x
- Build Changes
    - Fixed problem with IAR structures not properly being packed when UEZPacked.h used.
- HAL and Device Driver Changes
    - General
        - More require routines for following drivers
            - PCA9555 (Button and LED driver)
            - Lumex SO2004DSR Character Display
    - Accelerometer
        - Fixed reading range reported by Analog Devices ADXL345
    - CRC
        - CRC Device Driver added. Supports Generic version that communicates with hardware acceleration as well as a Software version.
        - Increased number of CRC supported types in API (currently implementations usually only support a few).
    - GPIO
        - Added Enable/Disable open drain as control option
    - LCD
        - Added KOE TX13D06VM2BAA LCD display
    - Network
        - GainSpan driver added.
    - Serial
        - Using control STREAM_CONTROL_GET_READ_NUM_WAITING now reports bytes in queue waiting to be received.
    - SPI
        - API now sports a non-blocking version of SPI transfers via TransferNoBlock and IsBusy commands at all levels.
        - Device driver supports callback routines when SPI transfers complete.
    - StdInOut
        - Support added RX63N processor and RX Standard compiler.
    - USB Device
        - Support added for LPC1756.
- Platform Changes
    - General

        - Remvoed UEZPlatform_WiredNetwork0_Connect from platforms. These are now up to application to create.
        - IAR ICF files now list FRAME memory, EMWIN memory, and RAM memory in sperate blocks.
        - Added UART0-3 require routines where appropriate.
        - uEZGUI_1788_43WQR Added.
    - FDI CARRIER_RX62N
        - Properly configured for BGA176 RX62N.
    - FDI uEZGUI-1788-43WQS
        - Split USBHost to PortA and PortB require routines.
    - FDI uEZGUI-1788-56VI
        - Split USBHost to PortA and PortB require routines.
    - FDI uEZGUI-1788-70WVT
        - Split USBHost to PortA and PortB require routines.
    - FDI uEZGUI-2478-43WQS
        - Configured to support THUMB mode.
        - Added CRC0 and Watchdog support.
        - Added UEZBSP_VectorTableInit for vector table copying and remapping.
    - NXP IRD 1.0
        - Added back in for IAR compiler.
    - Renesas RDK RX63N
        - Added
- Processor Changes
    - NXP
        - LPC1756
            - Added the LPC1756 with require routines with proper pin mappings.
            - FreeRTOS and SafeRTOS builds for IAR compiler. *(SafeRTOS must be purchased to use build)*
            - Added DAC, BatteryRAM, GPDMA, I2S, and PLL driver
        - LPC1768
            - Added back in with require routines with proper pin mappings.
            - FreeRTOS and SafeRTOS builds for IAR compiler. *(SafeRTOS must be purchased to use build)*
            - Added DAC, BatteryRAM, GPDMA, I2S, and PLL driver
        - LPC1788
            - SafeRTOS build for IAR compiler added. *(SafeRTOS must be purchased to use build)*
            - Improved CRC driver (more features).
            - Turn off debug EMAC output by default.
        - LPC2478
            - Added BSOD.
            - Added Watchdog driver.
    - Renesas
        - RX62N

        - Split out BGA176 require routines from 100 pin routines (ADCBank, EMAC, I2C, and Serial).
        - Added RTC driver.
    - RX63N
        - Added the Renesas RX63N processor
- Library Changes
    - uEZ System
        - Added UEZCRC routines for doing CRC operations (hardware or software based).
        - Added UEZEEPROM for easy access to EEPROM devices.
        - UEZNetwork now has missing UEZNetworkJoin and UEZNetworkLeave commands for associating/disassociating from a network.
        - UEZSPITransferNoBlock and UEZSPIIsBusy added to support newer SPI API.
    - emWin
        - emWin now uses routines UEZEmWinGetRAMAddr() and UEZEmWinGetRAMSize() to setup memory.
    - FAT FS
        - Errors getting the current date will use a date of 1/1/2000 12:00 on files.
    - HTTPServer
        - Now defaults to drive 0: instead of drive 1: for network config.ini settings
    - SimpleUI
        - Initializes now requires using SUIInitialize in addition to SUISetSettings. This configures the SimpleUI state used when a Blue Screen of Death (BSOD) occurs.
        - SUIInitialize sets the screen orientation (flip x, flip y) and passes down to the SWIM library.
    - SWIM
        - Modified the SWIM library to use a new SWIM driver system for handling low level raster drawing.
        - SWIM now supports flipping along the x and/or y axis at runtime.
- RTOS Changes
    - FreeRTOS
        - Added LPC2478 Thumb mode support.
        - Added RX600 support.
- Templates:
    - RX600 template added for both RX62N and RX63N.
- Utilities:
    - Build files
        - Several batch files for the different uEZ libraries have been added.

uEZ v2.01 – 7/16/2012

- Documentation
  - Updated Doxygen configuration file from version 1.7.4 to 1.8.1.1
  - Added extensive number of examples to doxygen output in uEZSystem files.
  - Continued to add additional comments and doxygen tags.
- Application Changes
  - uEZDemos directory now contains all FDI demo code.
- Build Changes
  - Added macro VARIABLE_NOT_USED() similar to PARAM_NOT_USED().
  - Rowley Crossworks now compiles uEZ in EABI format for improved performance.
- HAL and Device Driver Changes
  - LCD
    - Added NewHaven 4.3" NHD43480272 LCD display support.
    - Added default touchscreen coordinates for each LCD in Config_LCD.h. Calibration is still recommended, but these values are approximate.
  - Serial
    - Fixed Half Duplex driver issue with drive enable polarity.
    - Fixed RS485 driver issue with drive enable polarity.
- Platform Changes
  - General
    - All IAR projects now have PLL configuration results stored in internal RAM instead of trying to store in external RAM that has not yet been initialized.
    - Cleaned up the macro NOP() in all platforms so they properly perform one cycle of no operation.
    - Improved .h files for many platforms to more closely match the actual platform configuration.
  - uEZGUI-1788-43WQS
    - Fixed problem with USBDeviceController always being included instead of referenced.
  - uEZGUI-1788-56VI
    - Added support for boot time configuration of USB Host or USB Device depending on actual USB connection since the new rev hardware now supports switching on the fly.
  - uEZGUI-1788-70WVE
    - Fixed LCD Controller not correctly configuring power pin timing.
    - Added UART0 to UART3 requirement and configuration routines.
  - uEZGUI-1788-70WVT
    - Added IAP driver
  - NXP IRD 1.0
    - *Removed. Please use uEZ v1.12 or earlier with this platform.*
  - DK-TS-RX62N Kits
    - Demos updated and now working with HEW
- Processor Changes
  - NXP

  - LPC1768
    - Added support back in for LPC1768.
  - LPC1788
    - Fixed issue configuring A/D pins. A/Ds would always read zero.
    - Runtime serial configuration of parity, stop bit, and parity added instead of compile time.
    - USB Device Interrupts no longer attempt to process if the USB Device driver is not initialized.
    - Exception handler information is now sent to internal RAM instead of possibly external RAM.
    - Watchdog trip now only works if watchdog has been initialized.
  - LPC2478
    - CPUEnableInterrupts and CPUDisableInterrupts moved to processor files.
    - LCD Controller now uses a start-up time of 10 ms instead of an unnecessarily long 500 ms.
    - Fixed error in configuring PLL that caused errant race condition.
    - Better definition of NOP() macro.
    - Added IN_INTERNAL_RAM tag for variables required to be in internal RAM.

- Library Changes
  - SWIM
    - Fixed early return case in swim_put_triangle causing it not to draw.
    - Added function swim_put_text_horizontal_centered for drawing centered text.
  - SimpleUI
    - Removed requirement of ScreenShot() routine to call audio routines.
  - Segger emWin
    - Updated to the latest public EABI releases of library from NXP.
  - Web
    - HTTPServer now looks for on drive 0:
- Utilities:
  - Removed Pins1788ToH utility because the new uEZ system of required routines eliminates the need for this utility.

uEZ v2.00 – 3/27/2012

- uEZ General Changes
    - Extensive changes to the directory structure of the source files, thus the step up to version 2.00.
    - Platform configuration no longer use the multi-tier #define system before. Instead, 'Require' routines are called to add the features needed by the application as provided by the platform system. UEZ_ENABLE_x defines are no longer used.
    - uEZ is now designed to be built as a library and included with an application instead of an all in one project basis. Projects for the libraries are now stored in /Build/Generic/<Company>/<Processor>/<RTOS>/<Compiler>. The libraries are now built and distributed with the source in a Debug and a Release sub-directory to the above.
    - SSP driver type has been removed as a hardware and device driver. The NXP processors that have SSP now have only a SPI interface to them.
    - BSP folder has been pulled into the uEZSystem directory.
    - Many FDI Demos have been folded into the same common source code and projects.
    - uEZGPIO system added to make manipulating IO pins as easy as a uEZGPIOSet(pin) function call. No more HAL_GPIOPort ** references required. NOTE: Not all drivers use this system yet, but will.
    - uEZGPIO Lock system added for noting which pins have been configured and should not be changed without first unlocking.
- Application Changes
    - Slideshows now use an .INI file setting to find slideshows based on the development kit.
    - Renesas RX62N RDK's audio is now working (and with MIDI too).
- Build Changes
    - uEZ is now designed to be built as a library and included with an application instead of an all in one project basis. Projects for the libraries are now stored in /Build/Generic/<Company>/<Processor>/<RTOS>/<Compiler>. The libraries are now built and distributed with the source in a Debug and a Release sub-directory to the above.
- HAL and Device Driver Changes
    - General/API
        - Create and Require routines written using the existing HAL and Device tables and configure routines. NOTE: Configure routines will be merged into Create routines in the near future.
        - Several NXP specific device drivers have been removed and properly replaced with the Generic version.
        - Timer interface added for Device driver.
    - FATFS FileSystem driver
        - Added MakeDirectory command
    - GPIO

        - Configure, Activate, and Deactivate functions are now no longer supported as their functionally are now better served by the Create and Require functions.
    - lwIP Network device driver
        - ResolveAddress command added for DNS lookup.
        - Added Leave command to disassociate from a network.
    - Freescale MMA7455 Accelerometer
        - Improved calculations (2G vs. 8G setting)
    - Generic PWM Controlled Backlight
        - device driver now supports an optional separate pin for controlling backlight power on/off.
    - LCD
        - Digital Image FG050720DSSWDG01 LCD driver added.
    - SDCard
        - The three versions of the SDCard driver have been merged into one (the SPI version) now that SSP device drivers are now SPI drivers.
    - Tone Generator
        - The Generic PWM tone generator can now be configured to fully turn off the PWM port to save power.
        - A Generic Timer-based tone generator with toggle pin output has been added.
- Platform Changes
    - General
        - Highly reworked platform system that uses 'Require' routines instead of #define UEZ_ENABLE_x. This method allows the linker to include only the source that is required automatically.
        - Large amount of file clean up, file name changes, and reorganization.
        - uEZPlatformAPI.h added to allow the platform to report common operating parameters (LCD size, processor frequency, memory organization, etc.)
    - DK-TS-RX62N Kits
        - Less graphics were used to make the demo fit better in memory.
    - Renesas RX62N RDK
        - Fixed improper FreeRTOS configuration (settings and interrupt priorities)
        - Tone generator via PWM added.
    - uEZ GUI Kits
        - UEZBSPDelay now uses nops instead using one of the system timers for doing short microsecond delays.
        - UEZBSPDelayUS() added to all uEZ GUI kits.
        - DAC device added
        - uEZGUI_LPC1788_70WVE now correctly programs the wait states on the flash.
- Processor Changes
    - General
        - Large number of Create routines added to all HAL drivers.

- Standardized the calling of SystemInit at startup before creating the heap and initializing memory.
- GPIO Pin Locking added to all HAL drivers to ensure a port pin is not double configured.
- PLL, SDRAM, and External bus configuration code separated from platform and put into processor code.
- GPIO drivers no longer have Configure, Activate, and Deactivate routines. This is deprecated from the API.

- NXP
  - LPC1756
    - Fixed Watchdog routine ClearResetFlag. Was not properly clearing flag.
    - *Removed temporarily (needs to be changed to the new system)*
  - LPC1768
    - *Removed temporarily (needs to be changed to the new system)*
  - LPC1788
    - Added GPIO Control for Set Config Bits to allow all GPIO settings to be set at once.
    - Fixed Watchdog routines ClearResetFlag and Start. Clear was not resetting and Start would reset the unit.
    - Watchdog now calculates timing based on 500 kHz instead of PCLK.
    - Fixed A/D to return proper size response when other than 10 bits.
    - EMAC correctly looks for PHY address. Was only working correctly in debug version.
    - SSP driver changed over to use SPI HAL driver interface.
    - Timer driver now supports SetMatchCallback and SetMatchRegisterFunctions routines.
    - Blue Screen of Death (BSOD) is now standard in processor routines.
  - LPC2478
    - All references to LPC24xx and LPC247x have been replaced with LPC2478.
    - Flash Acceleration turned on (it was off) for improved performance.
    - Timer now configurations PCONP for proper powered on setting.
    - Moved LPC2478_crt0.s and LPC2478_Startup.s into CrossWorks subfolder.
    - EMAC correctly looks for PHY address. Was only working correctly in debug version.
    - EXT3 interrupt is now properly cleared when activated.
    - Timer driver now supports SetMatchRegisterFunctions routines.
    - Blue Screen of Death (BSOD) is now standard in processor routines.
- Renesas
  - Added more MTU based PWM drivers.

- Library Changes
  - uEZ System
    - uEZGPIO system added to make manipulating IO pins as easy as a uEZGPIOSet(pin) function call. No more HAL_GPIOPort ** references required.
    - uEZTimer system added to access Timer device drivers. Can now easily setup a continuous or a one shot hardware timer with optional function call.
    - uEZ File UEZFileSystemMount/UEZFileSystemUnmount bug found and fixed by forum member pjanco.
    - uEZNetworkConnect added to make connecting to a wired or wireless network easier.
    - UEZNetworkResolveAddress() added to convert strings into IP address through the DNS system (if available).
    - uEZTimeDate routines added to support many different calculations on time and date structures (duration, day of week, previous/next day/week, parse, etc.)
    - uEZAccelerometer routines added for easy accelerometer usage.
    - uEZFileMakeDirectory added to file system and tested for FATFS.
    - ResourceCache system added for finding binary objects loaded into memory as one blob. The driver system allows for the cache to be stored in multiple places. The DirectAccess version assumes the whole cache is accessible directly in the memory space.
    - uEZRandom added to provide pseudo random numbers.
    - HALInterfaceFind will now cause a UEZFailureMsg when not found on debug versions.
    - UEZDeviceTableFind will now cause a UEZFailureMsg("Device not found!") when devices not found in debug versions.
    - Initial HAL workspaces are now filled with 0xCC bytes.
    - UEZBSPFatalError renamed to UEZBSP_FatalError.
    - uEZINI now allows values to be in hexadecimal when prefixed with '$' or '0x'.
    - UEZSystemInit now calls UEZGPIOReset() before starting the RTOS. UEZGPIOReset can register all the GPIO ports needed in the system.
  - BasicWeb
    - Moved to under Library/Network
    - Changed to use the uEZNetwork system instead of lwIP system.
  - C Library of Common functions
    - Added a generic library to store missing functions such as itoa() and ltoa() for better portability.
    - Alternative version of printf added.
  - FATFS File System
    - Fixed a special case where CTRL_SYNC would cause disk_ioctl to return an error. SYNC command now always works.
    - FS_FATFS_Rename added.
  - lwIP

        - SetupEMAC now properly moved into uEZ lwIP code. No longer is in each platform project.
        - MAC address is now retrieved with callback routine NVSettingsGetMACAddress.
    - MemoryTest
        - Memory test code used in demos moved into common library.
    - MIDI
        - MIDI Player defaults to “Speaker” tone generator instead of “Piezo” (Name “Piezo” is now deprecated)
    - Segger emWin
        - Trial and NXP specific libraries added to uEZ release.
        - Multi-buffer mode is now the default mode of operation.
    - SimpleUI
        - SUICallbackRGBConvert added to allow SimpleUI drawing routines to be placed in a library and still draw to any 16-bit graphics display.
        - SUISetSettings added to allow configuration of SimpleUI library. Currently only configures single or double size icons. Default is single sized.
    - StreamIO StdInOut
        - Common library for doing standard input output using putchar, printf, getchar, etc. has been created in /Library/StreamIO/StdInOut. All compiler differences are also placed here. By default, stdin and stdout is linked to the Stream device “Console”.
    - SWIM
        - Fixed the definition of LIGHTBLUE
        - Fixed the calculation of the virtual y height when setting a title.
- RTOS Changes:
    - FreeRTOSConfig.h and SaveRTOSConfig.h has been moved into their respective folders.
    - uEZTaskSuspend and uEZTaskResume added.
    - _isr_uEZTaskContextSwitch added to allow interrupt service routines to request context switches so blocking processes can be run immediately instead of waiting for a pre-emptive task switch.
    - portEND_SWITCHING_ISR added to NXP LPC23xx and Renesas RX62N implementation.
    - Removed port.c and portISR.c from RTOS/FreeRTOS directory. No longer used.
- Utilities:
    - Removed PinsToH and Pins1788ToH utilities. No longer need with new Require system.
- Documentation Changes:
    - Doxygen configuration files added.

uEZ v1.12 – 10/18/2011

- uEZ General Changes
  - Doxygen added to uEZ System functions and available online at http://www.teamfdi.com/uez/docs
- Application Changes
  - Added MIDI Player demo and graphics
  - Brightness control demo has new light sensor option
  - Added Network Settings app
- Build Changes
  - Added DK-1788-43WQH
  - Added DK-RX62N-43WQT
  - Added DK-RX62N-47WQT
- HAL and Device Driver Changes
  - General/API
    - PWM HAL API now has SetMatchCallback feature (supported on RX62N only)
    - PWM Device API also has SetMatchCallback
  - Device Driver Changes
    - Backlight
      - Use 300 Hz timing for backlight of Inteltronic LMIX0560NTN53V1
    - LCD
      - Added Tianma TM047NBH01 driver
      - Added Tianma TM043NBH02 driver
      - Added Hitachi TX11D06VM2APA driver
    - Flash for Renesas RX62N
      - Fixed semaphore release issues with errors.
    - PWM
      - SetMatchCallback added to API to support interrupts on matches
    - Touchscreen
      - Added DirectDrive Touchscreen driver
    - VFD
      - Removed all VFD drivers. Use CharDisplay drivers instead.
- Platform Changes
  - DK -TS-RX62N Kits
    - Speaker now software controlled PWM driver instead of direct control.
    - Backlight fixed to work with SOMDIMM-RX62N Rev 2 hardware.
    - Renamed device Piezo to Speaker.
- Processor Changes
  - Renesas
    - PWM split into MTU based PWMs and TMR based PWMs.
    - Fixed allocation of workspaces for SCI5 and SCI6.
    - SPI performance on 8-bit transfers optimized for better throughput.
    - SPI pin configuration fixed (was using wrong –A, -B configuration).
    - RX62N Interrupts now use the whole 15 levels instead of 7.

        - Direct Drive configuration is now platform specific instead of processor specific.
        - Added Direct Drive LCD configuration files for:
            - Tianma TM035KBH02
            - Tianma TM047NBH01
            - Toshiba LTA057A3347F
- Library Changes
    - uEZ System
        - uEZ File
            - Fixed file handle allocation error when using NO_DYNAMIC_MEMORY_ALLOC.
            - Fixed semaphore error on failed FileOpen.
    - Audio
        - MIDI Library added.
- RTOS Changes:
    - RX62N FreeRTOS
        - Fixed FreeRTOS interrupt disabling issue that caused a rare corruption of the task stacks when doing context switching.
        - Corrected FreeRTOS priority level for non-RTOS interrupts.

uEZ v1.11 – 9/1/2011

- uEZ General Changes
  - .H files added for all HAL and Device drivers to help clean-up and simplify HALInit and PlatformInit files.
  - I2C Slave support added (LPC1756)
- Application Changes
  - Test console sdded to LPC1788 uEZ GUI Demos (via RS232)
- HAL and Device Driver Changes
  - General/API
    - Added USB HID Interface
    - Added CRC HAL driver interface
    - Added I2C Slave callbacks to I2C HAL interface
    - USBHost drivers now properly unload CPU when waiting for interrupt.
  - Device Driver Changes
    - USB Host now supports Interrupt endpoints for USB HID communications (LPC1788 and LPC2478, FS only)
    - Added Inteltronic LMIX0560NTN53V1 LCD driver
    - Freescale MMA7455 Accelerometer put back to more dependable 2G setting.
    - Redpine RS9110 RS22 network driver now supports firmware upgrading.
- Platform Changes
  - All platform files have been updated to use the new system wide driver .H files.
- Processor Changes
  - LPC1756
    - Added I2C Slave support
    - Removed erroneous EMAC driver (not available on LPC1756)
  - LPC1788
    - Added CRC HAL driver
    - Fixed LPC1788 SSP routines to allow 0 in MISO/MOSI data parameters.
  - LPC2478
    - Renamed DAC driver
    - Moved prebuilt USBHost object files from root to subfolders based on compiler
- Library Changes
  - uEZ System
    - Added uEZHID for easy USB HID identification and communication
  - Graphics
    - SWIM
      - Added font winfreesystem14x16_subset to SWIM library (font only contains characters 0x20 – 0x7F)

        - emWin
            - Upgraded emWin from v5.10 to v5.12
- RTOS Changes:
    - SafeRTOS
        - Changed priority level for Cortex-M3 to allow interrupts to make RTOS calls.

uEZ v1.10 – 7/29/2011

- uEZ General Changes
  - Renesas RDK RX62N development board support added.
  - Adding more .h files to make drivers better defined and platform files easier to setup.
- Application Changes
  - Added new Renesas RDK RX62N Demo project. Still needs TCP/IP Stack and USB.
- HAL and Device Driver Changes
  - General/API
    - Added improved Handles checking
  - Device Driver Changes
    - Added Button Bank driver that uses External Interrupts as the source of the button states.
    - Added External Interrupt Device driver that interfaces between HAL and device driver layer.
    - Added generic GPIO based LED Bank device driver. Now one bank can handle any list of GPIO's.
    - Added Analog Devices ADT7420 Temperature Sensor.
    - Added Analog Devices ADXL345 Accelerometer.
- Platform Changes
  - Added Renesas RDK RX62N development board (YRDKRX62N)
  - Fixed the initialization of the console variable so it defaults to 0/NULL.
- Processor Changes
  - RX62N Driver Changes/Additions
    - Added External Interrupts driver
    - Fixed EMAC driver to allow configuration of National DSP83640
    - Interrupt handler now goes to InterruptFatalError on unhandled interrupts.
    - Exceptions now go to UEZBSPFatalError when unhandled.
- Library Changes
  - uEZ System
    - Added uEZButton routines for easy access to Button Banks.
    - Added compile option for extensive handle checking.
  - Graphics
    - Added Glyph driver, primarily to support the RDK's Okaya LCD.
  - Network
    - Fixed link between interrupt driven lwIP and EMAC driver (goes through a proper API now)
    - Fixed HTTP Server to connect to a passed in parameter instead of being hardcoded. Also will use .ini file if available.
- RTOS Changes:
  - Support for Keil compilers and the LPC24788 is now working again.

uEZ v1.09 – 7/8/2011

- uEZ General Changes
    - System wide fix of misspelling of OSCILLATOR as OSCILATTOR.
    - Improved Exception Handling now puts blink code on status LED.
    - FreeRTOS upgraded to version 7.0
    - Touchscreen Sensitivity adjusted and better filtering
- Application Changes
    - TestWebServer Demo using new uEZ Network API (based on BasicWeb)
    - Remote Slideshow and Web Server Demo using Redpine RS22 Driver (see project DK-57TS-LPC2478/RemoteSlideshowDemo)
- HAL and Device Driver Changes
    - General/API
        - New uEZ Network API Added
    - Device Driver Changes
        - Accelerometer tweaks to Freescale MMA7455 and ST LIS3LV02DQ drivers to improve readings
        - Moved PCA9551 Button driver to correct directory.
        - Network
            - Added new uEZ Network API driver on top of lwIP TCP/IP Stack.
            - Redpine Signals RS22 Network Driver (object code only for Rowley Crossworks)
        - Touchscreen
            - MicroChip AR1020 Touchscreen Driver sensitivity changed from default values.
            - Generic Four Wire Touchscreen Driver properly filters out incorrect presses.
            - Sensitivity of screens adjusted (Seiko Touchscreen is the only one affected).
- Platform Changes
    - CARRIER_LPC1788 Platform created for Rev 2 and Rev 4 Hardware
- Processor Changes
    - LPC1788
        - Fixed Watchdog crashing bug due to improper configuration
    - LPC2478
        - EMAC MII/RMII Compile Option added
        - Improved SPI to allow easy 0xFF send / 0xFF receive using null pointers.
- Library Changes
    - uEZ System
        - uEZINI system added to allow easy .INI file access.
        - Rename added to File System API
- RTOS Changes:
    - FreeRTOS v7.0 added (with Timer Functions enabled)
    - Memory and Handle failures now go to hook routines.

uEZ v1.08 – 4/21/2011

- uEZ General Changes
  - SafeRTOS support added (but not included in the Open Source release). If you need SafeRTOS for your product, contact sales@teamfdi.com for licensing information. FreeRTOS is still the default OS.
  - Improved IAR Compiler support (more builds now clean in IAR)
    - External NOR flash driver added to UEZ GUI LPC2478 and UEZ GUI LPC1788 builds. Graphic images moved to NOR flash.
  - I2S Audio added with WAV file playback
  - Redpine RS9110_N_11_22 Wireless Network demo added. Still needs work for stability. uEZ Network API added to support both wireless and wired connections.
  - Segger emWin GUI trial version and demos added. If you need Segger emWin for your application, a license is required. Contact sales@teamfdi.com for more details.
- Build File Changes
  - Updated all build files with the latest changes uEZ v1.08 changes
  - Added DK-35TS-LPC2478
  - Added NOR flash drivers to uEZ GUI LPC1788 and LPC2478 builds
- HAL and Device Driver Changes
  - General/API
    - Audio Codec API added
    - I2S API added
    - Network API added (for both wired and wireless)
  - Device Driver Changes
    - New Device Drivers
      - RS485 Half Duplex Driver added
      - Watchdog Generic Driver added
    - Audio Codec Wolfson WM8731
      - Fixed output settings (was not correctly sending 16-bit samples)
    - Generic I2S driver added
    - Sharp LQ043T1DG01 4.3" LCD
      - Added feature to flip X & Y via SPI commands. Does not work on all Sharp LQ043 versions.
    - MassStorage SDCard driver now has configurable SPI interface speed.
    - Redpine RS9110_N_11_22 Wireless Network added. Still needs work for stability.
- Platform Changes
  - SystemInit() is now the standard platform startup function before main() is called.
  - UEZBSPFatalError added to all platforms to handle any unhandled interrupt or exception errors.
  - FDI CARRIER_2478 Added.

        - Supports Rev 2 and Rev 4 hardware.
        - I2S hardware support
        - Redpine wireless support
    - UEZ GUI 7.0 LPC1788 & LPC2478
        - IAR External NOR Flash driver added. Graphic images to NOR flash
- Processor Changes
    - LPC1768
        - Added LPC1768 Watchdog driver
        - LPC1768 Interrupt driver no longer enables interrupts when registered. InterruptEnable() must be called afterward.
    - LPC1788
        - Improved handling of exceptions and interrupts. Failures will now be caught in UEZBSPFatalError() with a blink code.
    - LPC2478
        - I2S HAL Driver added.
- Library Changes
    - New Libraries
        - Segger emWin GUI trial added
    - HTTP Server
        - Changed to support either new uEZ Network API or the older lwIP netconn API. Will be removing netconn API in the near future for uEZ Network API.
    - uEZ System
        - uEZEINT added for easy external interrupt support.
        - uEZFileSystemInit() added to file system. This routine MUST be called in the platform file.
        - uEZStackMemAlloc() added for allocation of just task stacks. Needed for protected memory architectures.
        - uEZPWM routines added.
        - uEZNetwork added as part of uEZ Network API addition
- RTOS Changes:
    - Added compile options to change between different RTOS's.
    - Increased default number of uEZ handles from 100 to 150.
    - SafeRTOS stubs added. FreeRTOS is still the default.
        - Stack sizes have been changed to support SafeRTOS.
        - NO_DYNAMIC_MEMORY_ALLOC option added to avoid alloc/free usage. This avoids any heap fragmentation problems.
- Demo Changes:
    - emWin GUI trial demo added to LPC2478 and LPC1788 demos
    - Newer high resolution icons added to FDI Demos on 7.0" displays. These are licensed icons from professional-icons.com. Contact sales@teamfdi.com for more information.
    - Slideshow demo now allows playing WAV files on I2S enabled hardware
    - Demos can now use static memory instead of dynamic memory

uEZ v1.07 -- 3/7/2011

- uEZ General Changes
    - Reorganization of DK-TS-KIT build files. Builds are now by kit type first, compiler second.
    - Any exception or interrupt error in the system is now sent to UEZBSPFatalError for proper handling
- HAL and Device Driver Changes
    - General/API
        - File System Drivers
            - Seek and Tell added to change file position
        - I2S API added
        - AudioCodec API added
        - Watchdog API added
    - Device Driver Changes
        - New Device Drivers
            - RS485 Half Duplex Driver added
            - Watchdog Generic Driver added
        - Audio Amp NXP 8551T
            - Fixed problem with proper setting when setting the volume more than once.
        - EEPROM:
            - Support of larger page size EEPROMs (128 byte pages)
        - LCD
            - Seiko 70WVW2T 7.0” LCD code can now be used without a power control pin.
        - SDCard
            - SPI SDCard driver now properly returns a not found error if the SDCard is indeed not found when reading size information.
        - USB Device Driver
            - Status change function is now given a default value of 0 to avoid pointer to function errors.
        - USB Mass Storage
            - Because some USB flash drives take longer to start up, the mass storage driver now waits even longer on drive initialization (up to 10 seconds).
- Platform Changes
    - UEZBSPFatalError added to all platforms to handle any unhandled interrupt or exception errors.
    - UEZ GUI 7.0 LPC2478
        - Compile option added to allow USB Port to be USB Device or USB Host.
        - Rev 2 hardware has touch screen lines properly swapped.
- Processor Changes

  - LPC1788
    - Added 1788 Watchdog
  - LPC2478
    - Redirect all unallocated interrupt vectors to InterruptFatalError() to catch any unregistered interrupts.
    - Redirect all exception handlers to UEZBSPFatalError with blink code.
- Library Changes
  - New Libraries
    - IntelHexParser added for parsing intel hex strings into binary.
  - FDICmd library added.
    - Provides a link for entering commands and getting responses to any uEZ Stream device.
    - Usually connected to “Console” or a serial port.
  - FATFS Library
    - Added seek and tell commands to go to byte locations in a file.
  - FDI SimpleUI
    - Provide compile option to turn on/off double sized icons
  - lwIP TCP/IP Library
    - MAC address is now retrieved through required callback routine NVSettingsGetMACAddress() instead of hard coded compile time option.
  - SWIM Library
    - Added 32-point font ‘droidsansr32’
  - UEZ System
    - UEZFileSeekPostion and UEZFileTellPosition added
    - UEZToneGeneratorPlayToneContinuous added
  - USB Device
    - “GenBulk D” driver has been renamed into the “FDI Serial Bulk Driver”.
      - Provides an alternative method for reading/writing data.
      - Example PC code provided through the GenBulkConsole.
- RTOS Changes:
  - No changes.
- Demo Changes:
  - New professional-icons.com icons added. Licensing is required to use these icons - see licenses for details. Open source icons still provided.
  - Generic FDI Demo Code
    - AppMenu system can now be interrupted to go into test mode.
    - Calibration uses wider coordinates for better calibration.
    - Improved slideshow queuing to avoid occasional pauses.

uEZ v1.06 -- 12/2/2010

- uEZ General Changes
    - NEW uEZ® License (headers changed and license.txt file added)
    - NXP LPC1788 Processor for FDI uEZ GUI added
- HAL and Device Driver Changes
    - General/API
        - UEZ_ERROR_BUSY type added.
        - SSP driver type is being removed and made into a SPI driver.
        - HALInterfaceFind now returns a null pointer if not found in addition to the normal error.
    - Device Driver Changes
        - New Device Drivers
            - AudioAmp Driver type added
            - AudioAmp NXP TDA8551T added
        - EEPROM
            - 16 bit I2C EEPROM Driver now supports devices larger than 64KB .
        - Flash
            - NOR Flash S29GL064N90 16-bit driver added
        - GPIO
            - GPIO Control feature added to control other settings (e.g. input buffer enabled/disabled).
        - LCD
            - Added NEC NL6448BC18-03F VGA LCD
            - Added Seiko 43WQW1T QVGA LCD
            - Added Seiko 70WVW2T WVGA LCD
        - SPI
            - TransferInOutBytes added to SPI interface.
        - Mass Storage
            - Converted SDCard code from SSP to SPI driver interfacing.
            - SDCard SDHC support added (4 GB+ cards)
        - RTC
            - NXP PCF2129 Added
        - Touchscreen
            - Improved interrupt driven Touchscreen
        - USB Device
            - Added LPC1788 USB Device driver
- Platform Changes
    - Added FDI Carrier Rev 3 Platform for LPC2478
    - Added FDI Carrier Rev 3 Platform for LPC1788
    - Added uEZGUI_1788_70WVE
    - Added uEZGUI_2478_70WVE
- Processor Changes

- NXP LPC1788 added (under IAR and or Keil uVision 4 compiler)
  - Interrupts
  - GPIO Driver
  - ADC Driver
  - Battery RAM Driver
  - GPDMA Driver
  - I2C Driver
  - LCD Controller Driver
  - PWM Driver
  - RTC Driver
  - Serial Driver
  - SPI Driver (SSP)
  - Timers Driver
  - USB Device Controller
  - USB Host Driver

- Library Changes
  - BasicWeb
    - Fixed a lock up caused when network is not running but BasicWeb started
- RTOS Changes:
  - Fixed problem of semaphore handle being returned when really out of memory
- Demo Changes:
  - uEZ GUI 4.3 Blinking LCD added
  - DKTSKIT Demo for LPC1788 Added
  - DK-TS-KIT and DK-VTS-KIT uEZDemo now use FDI/UEZDemoCommon code.
  - uEZGUI 7.0” LPC2478 Demo Added
  - uEZGUI 7.0” LPC1788 Demo Added
  - Generic FDI Demo Code
    - Accelerometer now calibrates zero at start
    - AppMenu system now calls Idle function
    - Improve Slideshow demo with hour glass / feedback and better caching.

uEZ v1.05 -- 8/23/2010

- HAL and Device Driver Changes
  - General/API
    - SSP and SPI naming convention for in/out buffers changed to avoid confusion
    - LCD driver now supports feature to read back current backlight level
    - Flash Memory read/write subsystem added.
  - LPC2478 Drivers
    - BatteryRAM HAL driver added

        - DAC HAL driver added
        - GPDMA HAL driver added
        - SMSC LAN8720 Ethernet support added
        - Improved LCD Controller initialization (PINSEL10 and PINSEL11 registers)
        - PWM driver bug fixed (changing master counter was not resetting counter)
        - GPIO ports now support interrupts per port on falling or rising edges.
    - Device Driver Changes
        - LCD device drivers updated to support SPI and LCD API changes (see above).
        - Sharp LQ043T1DG01 LCD device driver added
        - Sharp LQ043T3DG02 LCD device driver added
        - EEPROM definitions for M24LC256 and M24LC64 added
        - EEPROM Driver for 16-bit devices added
        - ST LIS3LV02DQ Accelerometer driver added
        - SDCard Mass Storage Device Driver over SSP added.
        - Generic RTC Device Driver now handles Validate and SetClockOutHz commands correctly.
        - Generic SSP Device Driver correctly handles Start, Stop, and TransferInOut commands.
        - 4-Wire Touchscreen now uses GPIO interrupts.
- Platform Changes
    - New FDI uEZ GUI Platform added
- Processor Changes
- Library Changes
    - SWIM Library
        - Fonts droidsansr14 and droidsans76 added
        - SWIM fonts now use less memory.
        - SWIM fix to transparency spelling and flag usage.
    - USB Device
        - USB MassStorage Device driver linked to SDCard
        - USB MassStorage Device driver linked to RAM (aka RAM Drive)
    - FDI SimpleUI Added
        - Common Choices code and Drawing routines moved into reusable library
        - Choices now have a flag to repeat or not. Default is off in most places.
    - FATFS
        - Files open for append now append instead of clipping.
    - lwIP
        - Remove issue with lwIP warnings in Rowley Crossworks 2.0 compilers
- Compiler Changes:

    - Keil uVision 4.0 support added
- RTOS Changes:
    - Keil uVision 4.0 support added for LPC1768 (but not LPC2478)
- Demo changes:
    - uEZ GUI Demo added (Rowley Crossworks and IAR 5.4)
    - Used uEZDemoCommon with UEZ GUI Demo v1.04
- Subversion Revisions: 54-??
- Checksum generated with DK-TS-KIT UEZDemo v?.?? for QVGA display using Rowley Crossworks 2.0.

uEZ v1.04 -- 4/1/2010, Checksum 0x0436DF77

- uEZ Changes
    - Added LPC1768 Support
    - Added InterruptIsRegistered() command
    - General clean up of many cases of unused variables or braces in structures found by the GCC compiler used by CodeRed.
    - Added more powerful HTTPServer with inline macro parsing.
    - Fixed a bug in UEZFileFindStart that would crash on failure.
    - Added more checks into UEZ link with RTOS to ensure parameters are correct.
    - Added several UEZ System functions:
        - UEZADC
        - UEZCharDisplay
        - UEZKeypad
        - UEZLEDBank
        - UEZTemperature
        - UEZToneGenerator
    - Improved build system to support multiple build types and specifically Code Red support. Fixed various compiler setup issues (Rowley and IAR).
- HAL and Device Driver Changes:
    - Drivers added:
        - CharDisplay Driver for Lumex SO2004DSR
        - External Interrupt Driver for LPC1768
        - Keypad driver for NXP I2C PCA9555
        - SA56004X Temperature Driver
        - PWM driver (Generic)
        - Tone Generator using Generic PWM
    - Processor Support Added:
        - LPC1768
    - Fixed problem with Serial driver locking up when full.
- RTOS Changes:
    - FreeRTOS upgraded to 6.0.1
    - FreeRTOS LPC1768 support added.
- Demo changes:

    - IRDDemo v1.00 added for NXP IRD v1.00 base board.
- Subversion Revisions: 25-53
- Checksum generated with DK-TS-KIT UEZDemo v1.06 for QVGA display using Rowley Crossworks 2.0.

uEZ v1.03 -- 7/23/2009, Checksum 0x04272674

- uEZ Changes
    - Made the LCD configuration code simpler to setup and change between displays. One single configuration in Config_App.h.
- HAL and Device Driver Changes:
    - Backlight driver now correctly handles calculations for very low frequencies (<100 Hz).
    - Added OKAYA RV640480T VGA LCD driver.
    - Added OKAYA RV320240T QVGA I15 mode
    - Added OKAYA RH320240T QVGA LCD driver (with SPI configuration).
    - LCD Drivers now have a list of supported mode interfaces.
    - Fixed calculation of LCD dot clock to round down instead of round up.
- Demo changes (AppDemo v1.05):
    - Demo resized to work on 640x480 (VGA) displays as well as 320x240 (QVGA) displays.
    - Fixed bug that caused long delay when leaving Settings menu.
    - Improved speed of drawing icons and title screen.
    - Draw app now correctly reports if trying to load from USB Drive or SD Card and if either are not plugged in or missing a file.go
    - Slideshow app now correctly reports if trying to load from USB Drive or SD Card and if either are not plugged in or missing a file.
    - Increased the number of QVGA slides up to 38.
- Size (Rowley CrossWorks and ARM-57TS-KIT):
    - Internal ROM: 0x6C9FC of 0x80000 (Debug), 0x4D308 of 0x80000 (Release)
    - Internal RAM: 0xD66C of 0x10000 (Heap size 30,000 bytes)
    - SDRAM: Frame buffer
- Subversion Revisions: 22-24
- Checksums (Rowley CrossWorks)
    - ARM-57TS-KIT (Toshiba LTA057A347F): 0x04272674
    - ARM-35TS-KIT (Okaya RH320240T): 0x042571C3
    - ARM-57VTS-KIT (Okaya RV640480T): 0x0426B213

uEZ v1.02 -- 5/25/2009, Checksum 0x04299036

- uEZ Changes
    - Added support for IAR compiler v5.20
    - Added RTC device functions for validating clock and setting toggle line rate.

  - Platforms now create an initial task called uEZPlatformStartup that does a second phase of initialization before starting the main() task.
  - Many minor changes to improve overall code quality (removing unused variables and functions, fixing mixed types, returning proper error codes, correct headers, etc.)
- HAL and Device Driver Changes:
  - Fixed LPC2478_LCDController to correctly calculate the proper dot clock rate. It now properly rounds to a slower setting instead of a faster setting.
  - LPC2478 PWM is now correctly stopped before it is changed since otherwise it does not change.
- Demo changes:
  - Added feature in Time & Temperature to set the External RTC Date & Time.
  - Functional Test Loopback mode added. One unit can now be a slave and the other a host to allow FCT without the need for a separate CAN Demo board.
  - Functional test now only tests 8 MB of actual SDRAM instead of trying to size the memory and sometimes generating phantom results.
- Size (Rowley CrossWorks):
  - Internal ROM: 0x6C604 of 0x80000 (Debug), 0x4D198 of 0x80000 (Release)
  - Internal RAM: 0xD650 of 0x10000 (Heap size 30,000 bytes)
  - SDRAM: Frame buffer
  - Subversion Revisions: 14-21

uEZ v1.01 -- 4/10/2009, Checksum 0x0579BBD1

- uEZ Changes
  - EMAC is setup inside of TCP/IP thread instead of main thread to avoid a 7 second startup time delay. Now the EMAC is setup in parallel with the title screen to decrease the delay at start up.
- Demo changes:
  - Added black to the list of colors in the drawing demo to support an erase function. Black is drawn with a 3x3 brush instead of 1x1 to help with clearing issues on the erase function.
- HAL and Device Driver Changes:
  - USB Mass Storage device driver has been fixed to correctly report the drive as not initialized when no drive has been plugged in. Otherwise, the FATFS would make calls to Read with illegal data and cause a crash.
- Library Changes:
  - Turned off memp overflow checks in lwIP library because having it on will use the __FILE__ C preprocessor keyword and cause the checksum to change from compile to compile, making version tracking impossible.
- Size:
  - Internal ROM: 0x67ACC of 0x80000 (Debug), 0x48E70 of 0x80000 (Release)
  - Internal RAM: 0xD590 of 0x10000 (Heap size 30,000 bytes)

- SDRAM: Frame buffer
- Subversion Revision: 14

uEZ v1.00 -- 3/27/2009, Checksum 0x0577B471

- uEZ Changes
  - Fixed version information to not change between compiles to ensure that the checksum does not change when recompiled.
  - Changing CPU speed is now handled in one place.
- ARM-TS-KIT (IRD2.0) changes
  - Cleaned up SDRAM configuration to be a single setting.
- Demo changes:
  - Split out many of the code segments in main.c into separate files for clarity and organization.
  - Non-volatile EEPROM memory now stores the MAC address, IP Addr, IP Mask, and IP Gateway.
  - Simplified Time & Temperature demo to only show Temperature for now.
- HAL and Device Driver Changes:
  - Mass storage devices can now have logical unit addresses.
  - Fixed a problem with touch screen not correctly deleting event queue when closing.
  - Separated USB Host device driver from USB Host HAL driver.
  - SDCard driver has increased SPI rate for faster transfers.
  - USB Host device driver now correctly monitors enumeration and determines an appropriate registered device driver to call. This includes proper detection of a USB device plugged in and removed.
  - Fixed a problem where the EMAC would hang endlessly at boot.
- Size:
  - Internal ROM: 0x67E98 of 0x80000 (Debug), 0x491E8 of 0x80000 (Release)
  - Internal RAM: 0xEC25 of 0x10000 (Heap size 30,000 bytes)
  - SDRAM: Frame buffer

uEZ v0.11 3/11/2009, Checksum 0x043DC2C8 (BP)

- uEZ Changes
  - Improved calibration to ignore extremely bad results.
  - Touch screen routines now wait until screen is not being touched before sending out data.
  - Crashing bug fixed when closing a file.
  - Fixed FATFS not working with some USB flash drives due to stall on unsupported command. Now correctly continues.
  - Random crashing bug fixed. Problem in RTOS and EMAC interrupt routine.
  - Lowered memory requirements in several systems.
  - Code for checking memory integrity added into optional heap source.

  - Various small changes to memory allocation routines to track memory usage (heap blocks, HAL workspaces, and device workspaces).
  - Turned on compiler option to leave out uncalled/unused code and data.
- ARM-TS-KIT (IRD2.0) changes
  - Added power detect mode that lowers the LCD backlight intensity to save power when using a power source other than the AC supply.
  - Removed RTOS_HEAP. Everything is now running (except frame buffer) from internal memory.
- Demo changes:
  - Slideshow will load from USB drive first, SDCard second. If neither available, will use last images loaded.
  - Pressing and holding SW1 and SW4 while powering up will force the unit into calibration and allow touch screen recovery if config data is corrupted.
  - Added non-volatile settings section and routines.
    - Checksum added to non-volatile settings saved in EEPROM.
    - Settings for IP address, IP gateway, IP netmask, MAC address added.
  - Turned off telnet echo.
  - Lowered stack sizes to lower memory usage.
- HAL and Device Driver Changes:
  - Created generic device drivers for SPI, SSP, I2C and ADC and removed specific LPC2478 device drivers for these functions.
  - Converted SDCard's CRC16 table from a generated table into a hardcoded ROM based table to save memory.
- Platforms Changes:
  - Removed Customer specific and EA_OEM platforms
- Library Changes:
  - FATFS now has option for number of mass storage devices. Changed from 4 to 2 to save memory.
- Size:
  - Internal ROM: 0x6731C of 0x80000 (Debug), 0x48384 of 0x80000 (Release)
  - Internal RAM: 0xEFF4 of 0x10000 (Heap size 30,000 bytes)
  - SDRAM: Frame buffer

uEZ v0.10 -- 2/24/2009, Checksum 0x04F3587A (BP)

- Various Changes
  - Main clock speed changed from 57.6 MHz to 72 MHz
  - GPIO now has SetMux command to change functionality of pin
  - Fixed incorrect mapping of LPC2478 I2C Bus Device Driver (I2C1 and I2C2 fixed)
  - Added 15-bit color interface to LCDs and SWIM library
  - Increased lwIP memory space (now that RTOS moved to external memory)
  - Changed Generic HID driver to capture CAPS Lock key for Functional Test
  - Renamed LPC2478's RTC to "IRTC" for internal real time clock.

- Added following device drivers:
    - SDCard (via SPI) Mass Storage device driver
    - USB Mass Storage device driver
    - Generic RTC device driver
    - NXP PCF8563 RTC device driver
    - Generic I2C EEPROM device driver
    - NXP PCA9551 Button Bank device driver
    - NXP PCA9551 LED Bank device driver
    - Generic PWM Backlight device driver
    - Bosch BMA150 Accelerometer device driver
    - NXP LM75A Temperature device driver
    - Generic 4-Wire Touch resistive touch screen device driver
- Added following libraries:
    - FATFS (and linked to Mass Storage drivers)
- Added following platforms:
    - ARM CARRIER (for ARM-57TS-KIT)
- Demo changes:
    - RTOS Heap created in SDRAM instead of internal LPC2478 RAM
    - Added Accelerometer demo
    - Added Time & Temperature demo
    - Added Functional test (including simple CAN test code)
    - Slideshow now can show 1 to 9 slides instead of just 6
    - Many extra debugging tasks removed
    - Added PWM for Audio output
    - Added Settings menu item that goes to second menu
    - Added more graphics to support above changes
    - Pulled out common code being used for push buttons in one place
- Size:
    - Internal ROM: 0x7B808 of 0x80000 (Debug), 0x 53f60 of 0x80000 (Release)
    - Internal RAM: 0xFC24 of 0x10000 (Heap size 25,250)
    - SDRAM: Frame buffer and RTOS_HEAP

uEZ v0.09 -- 2/2/2009, Checksum 0x00F0B468

- Improved File System hierarchy
    - Improved File System FAT system.
    - Added LPC24xx USB Host driver.
    - Added Mass Storage device for USB Flash Drives.
    - USB Flash drive can now be unplugged and plugged back in without problem.
- Network improvements to lwIP
    - Ethernet MAC now interrupt driven instead of polled for better performance.
    - Ethernet EMAC now is configured in auto-crossover mode (Auto MDIX) to avoid requiring a hub.
    - Uses smaller blocks when receiving packets for better memory management.

- Backlight Driver added and incorporated into existing LCD drivers.
- LCD backlight is turned off as soon as possible now. LCD driver no longer automatically turns on backlight.
- Fixed EEPROM page size problem to allow smaller EEPROM reading/writing.
- Added LPC24xx RTC processor clock driver.
- Size:
    - Image size: 149,684 bytes
    - Internal ROM: 0x43A30 of 0x80000 (Debug), 0x34858 of 0x80000 (Release)
    - Internal RAM: 0xF0CC of 0x10000 (Heap size 29,000)
    - SDRAM: Only frame buffer

uEZ v0.08 -- 1/9/2009, Checksum 0x00D73536

- Added USB Device support
    - Both USB Host and Device can work simultaneously (as long as host is initialized first).
    - Generic Bulk USB library has been added that communicates with the libusb library.
- 8-bit graphics support added.
    - Default palette is 256 color 3:2:3 RGB format.
    - Writes to memory must be 16-bit values, not single 8-bit values.
    - Example code can be compiled for 8-bit or 16-bit graphics.
    - SetPaletteColor routines added.
- Touch sensitivity setting can now be passed to touch screen driver.
- Toshiba LCD display now correctly has backlight intensity control.
- TCP/IP stack uses less memory by using global memory instead of through the heap.
- File find routines added to enumerate through files in a directory. Currently only supports root directory.
- Demonstration code provided to show all features (slideshow, calibration, telnet, drawing, etc.)
- Size:
    - Image size: 133,960 bytes
    - Internal ROM: 0x3CAA0 of 0x80000 (Debug), 0x30AEC of 0x80000 (Release)
    - Internal RAM: 0xF128 of 0x10000
    - SDRAM: Only frame buffer

uEZ v0.07 -- 12/19/2008, Checksum ----

- RTOS moved timer from Timer 0 to Timer 1 to allow audio to use Timer 0.
- BSP delay routines moved from Timer 1 to Timer 2.
- Timer HAL driver added
- PWM HAL driver added
- Create Customer specific_XNC library with Audio, Flash (M25P40 support), and I2C routines (for RTC PCF8563 and EEPROM 24C08). Test routines added to main().

- LCD's backlight linked to PWM pin. LCD backlight routines now correctly set the backlight between 256 different levels.
- OKAYA LCD display fixed timing by adding to the front porch timing. This fixed the jitter problem when drawing with grays. Also upped clock to 8.0 MHz (theoretical max is 8.333 Mhz).
- Improved touch screen calibration and readings.
- Added USB Device Stack code (currently disabled due to conflict with USB Host)
- Added USB Device Controller to LPC2478 processor code.
- Added SPI HAL and Device driver
- Added SSP HAL and Device driver. Demonstrated reading/writing M25P40 flash.
- Added I2C HAL and Device driver Demonstrated reading/writing PCF8563 RTC.
- USB Host is now port selectable (port A or B) and corrected for XNC hardware.
- [[Added Virtual Comm USB driver]]
- [[Added SWIM library for graphics]]
- Pin modifications:
    - P3.25 (PIEZO) set to MAT0[0] (was GPIO)
- Size:
    - Internal ROM: 0x32068 of 0x80000 (Debug), 0x???? of 0x80000 (Release)
    - Internal RAM: 0xFD54 of 0x10000
    - SDRAM: Only frame buffer

uEZ v0.06 -- 11/26/2008, Checksum ----

- SRAM - slowed EMCStaticWaitRd timing (delay from chip select to read access) to be 2 clock cycles instead of 1 and fixed display problem.
- Serial driver - better use of hardware FIFO to lower number of interrupts.
- Default output is now referred to as Console
- Program Tag added for boot loader
- TCP/IP stack improvements
    - Use more hardware buffers
    - More internal buffers
    - Turn off debug output
    - Combine outgoing data chains for better buffer usage
- Raised OKAYA dot clock back up to where it should be to match spec.
- Improved performance of touch screen with multiple readings
- Fixed bug in deleting tasks when they exit (it was only deleting the handle, not the task as well).
- Mapped UART1 to Console
- Because the video memory required more than 128K of data and SRAM0 is at 0x80000000 and SRAM1 is at 0x81000000, the frame buffer memory was moved to a base address of 0x80FE0000 using the mirrored memory range of SRAM0 that then rolls over into SRAM1.
- Fixed macros used for setting initial pin configuration.
- Various pin modifications:

    - P0.17 (SEL_RS485) set to pull up and output high to enable 485 output as console
    - P0.18 (SEL_RS485_OPT) set to pull down
    - P2.29 (RGT/LFT_SCAN) set to output low with pull down
    - P2.30 (UP/DN_SCAN) set to output high with pull up
- Correctly initialize Micrel KSZ8041TL
- Size:
    - Internal ROM: 0x32068 of 0x80000
    - Internal RAM: 0xFD54 of 0x10000
    - SDRAM: Only frame buffer

uEZ v0.05 -- 11/21/2008, Checksum ----

- Setup platform configuration for hardware
- Configuration files were changed for more choices
- Fixed touch screen press detection
- Program Tag information added for boot loader
- Updated USB Host FAT16 code with file overwrite feature
- SRAM is now initialized
- Size:
    - Internal ROM: 0x34008 of 0x80000
    - Internal RAM: 0xFA6C of 0x10000
    - SDRAM: Only frame buffer

uEZ v0.04 -- 11/19/2008, Checksum ----

- Renamed uFlex to uEZ to avoid trademark issues.
- Added BSD-style socket functions
- Added USB Host support
- Added TCP/IP support
- Added Raw touch screen support for Embedded Artists board
- Size:
    - Internal ROM: 0x341EC of 0x80000
    - Internal RAM: 0xFA64 of 0x10000
    - SDRAM: Only frame buffer

uFlex v0.03 -- 11/10/2008, Checksum ----

- Added OKAYA LCD display support
- Size:
    - Internal ROM: 0xDD84 of 0x80000
    - Internal RAM: 0x6BA4 of 0x10000
    - SDRAM: Only frame buffer

uFlex v0.02 -- 11/9/2008, Checksum ----

- Added Stream and Serial support.

- Size:
    - Internal ROM: 0xD89C of 0x80000
    - Internal RAM: 0x6B34 of 0x10000
    - SDRAM: Only frame buffer

uFlex v0.01 -- 11/10/2008, Checksum ----

- Initial version with LCD, touch screen, SPI, and SDRAM
- Size:
    - Internal ROM: 0xBAE4 of 0x80000
    - Internal RAM: 0x62A0 of 0x10000
    - SDRAM: Only frame buffer