uTasker Bootloader Installation, Configuration, and Test

1. Cloned Mark's repository 21-Feb-2024.
2. Selected and checked out 2.0 branch

Per https://www.utasker.com/docs/iMX/MCUXpresso.pdf:

1. copied MCUxpresso/iMX project settings into root of repository
2. Imported project into MCUxpresso (upgraded to 11.9 and SDK 2.15 first)
3. verified build variables set correctly for all build configurations (RT1024 etc, no changes were required)
4. set active configuration to "uTasker Boot for XiP"
5. verified compiler settings (architecture M7 etc)
6. verified correct linker script set
7. verified this application builds.
8. Build all 4 (see below) and verify everything builds AOK.

Boot-loader and boot-loadable application must be built sequentially using these active build configurations:

1. `uTaskerBoot (uTasker Boot for XiP)`
2. `uTaskerFallbackLoader`
3. `uTaskerSerialBoot`
4. `5. uTaskerV1.4_BM_XIP` (uTasker example to be loaded via serial loader – probably not helpful here)

Create a test blinky application test per instructions in https://www.utasker.com/docs/iMX/MCUXpresso.pdf:

1. For LED, changed default to GPIO3 IO 30 (update `pin_mux.h` definitions and `pin_mux.c` initialization)
2. Verified blinky actually blinks on board AOK (before changes to make blinky boot-loadable).
3. Set `0x60020400` flash start address
4. Add post-build step "${ProjDirPath}/generate.bat" "${BuildArtifactFileBaseName}", plus generate.bat and boot_header.txt per instructions.
5. Verified assorted .bin files built AOK.

Update hardware MCU configuration in `Applications\uTaskerBoot\config.h`:

1. Correct the target MCU: undefine MIMXRT1060, define MIMXRT1024.
2. Comment out BOOT_LOADER_SUPPORTS_SDRAM as SensorBox has no SDRAM.
3. Rebuild all 4 targets in order – AOK.

Serial Loader User's Guide configuration:

1. `uTaskerSerialBoot\app_hw_iMX.h`:
   Dangerous! Multiple `app_hw_iMX.h` files (in uTaskerV1.4 + SerialLoader projects)
   This file has basic RT1024 definitions (clock configuration etc.).
   Appears to have pin definitions for EVK ie board control of PHY (for what board not documented).
   1. `#define USER_LED (PIN_GPIO_AD_B1_08_GPIO1_IO24)` ie `PORT1_BIT24` changed to:
      `#define USER_LED (PIN_GPIO_SD_B1_10_GPIO3_IO30)` ie `PORT3_BIT30`
   2. update LED init: `#define INIT_WATCHDOG_LED() _CONFIG_DRIVE_PORT_OUTPUT_VALUE(3 /*DRN: port was 1*/, (BLINK_LED), (BLINK_LED), (PORT_SRE_SLOW | PORT_DSE_HIGH))`
   3. Defines `USER_BUTTON PIN_WAKEUP_GPIO5_IO00` - SensorBox has no user button – disable how?
      The WakeUp pin 52 is not connected in SensorBox – should be OK.
2. `uTaskerSerialBoot\config.h`:
   Dangerous!! Multiple `config.h` files (in uTaskerBoot, SerialLoader, and uTaskerV1.4 projects)
   Set up for USB stick (host mode) and no other options, lines ~1826-1831:
   1. `//#define USB_MSD_DEVICE_LOADER  // DRN: disabled // USB-MSD device mode`
      `#define USB_MSD_HOST_LOADER  // DRN: enabled  // USB-MSD host mode`
   2. Ethernet interface is already disabled in line ~1831: `//#define ETH_INTERFACE`
   3. How to ensure other loader modes disabled? (Serial? RS485, MODBUS, SREC…)??
3. `uTaskerSerialBoot\Loader.h`:

1. line 324: `#define NEW_SOFTWARE_FILE "software.bin"` left as-is for now

Test!

1. Load board with `uTaskerBootComplete_MIMXRT1024.bin` (using Segger Jlink loader)
2. LED is lit as expected (note I changed `INIT_WATCHDOG_LED()` to initially turn LED on).
3. Copied `evkmimxrt1024_iled_blinky_XiP.bin` to USB stick and renamed to `software.bin`
4. Inserted USB stick. Stick LED lights, briefly blinks off then steady on.
   LED remains on so 'blinky' application is not running.
5. Tried again with `evkmimxrt1024_iled_blinky_XiP_OTFAD.bin` - same result (not running).