[VistaCube] Quick Stand-Alone Porting Guide.

Published by **Jin Park** on October 24, 2017

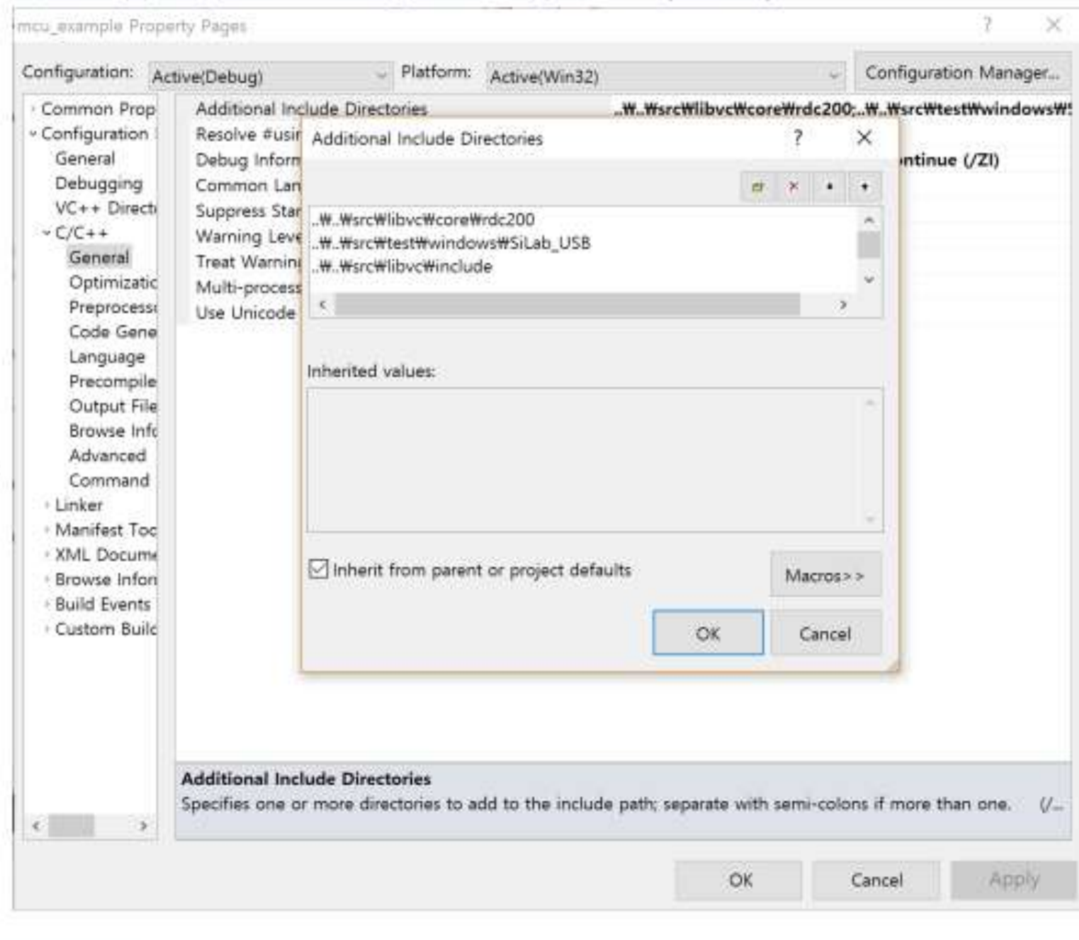
This post describes how to port the Vista Cube™ for RDCx00/RDP Flash Image download feature in stand-alone application, such as a firmware for MCU.

We assume that our stand-alone porting environment is on Win10 x64 and target products are RDC200/RDP550F. (This demo project is a Visual Studio console project and it is located in `$VISTA_CUBE_PATH\example\mcu_example\`)

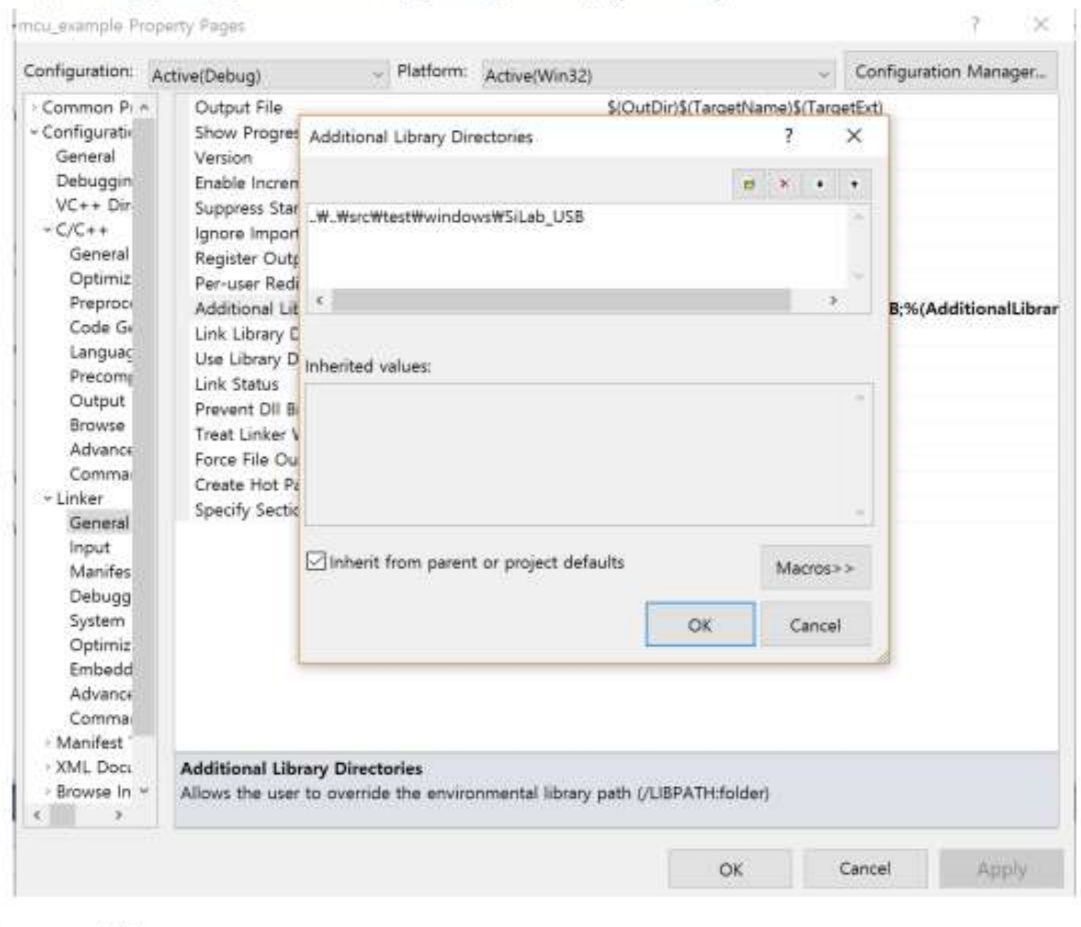
!! To try this demo, Vista Studio™ and RAON uDisplay EVB be used.

— In order to migrate Vista Cube™ download function into customer MCU platform, MCU compiler IDE and MCU I2C function should be used instead of we used Visual Studio and EVB respectively.

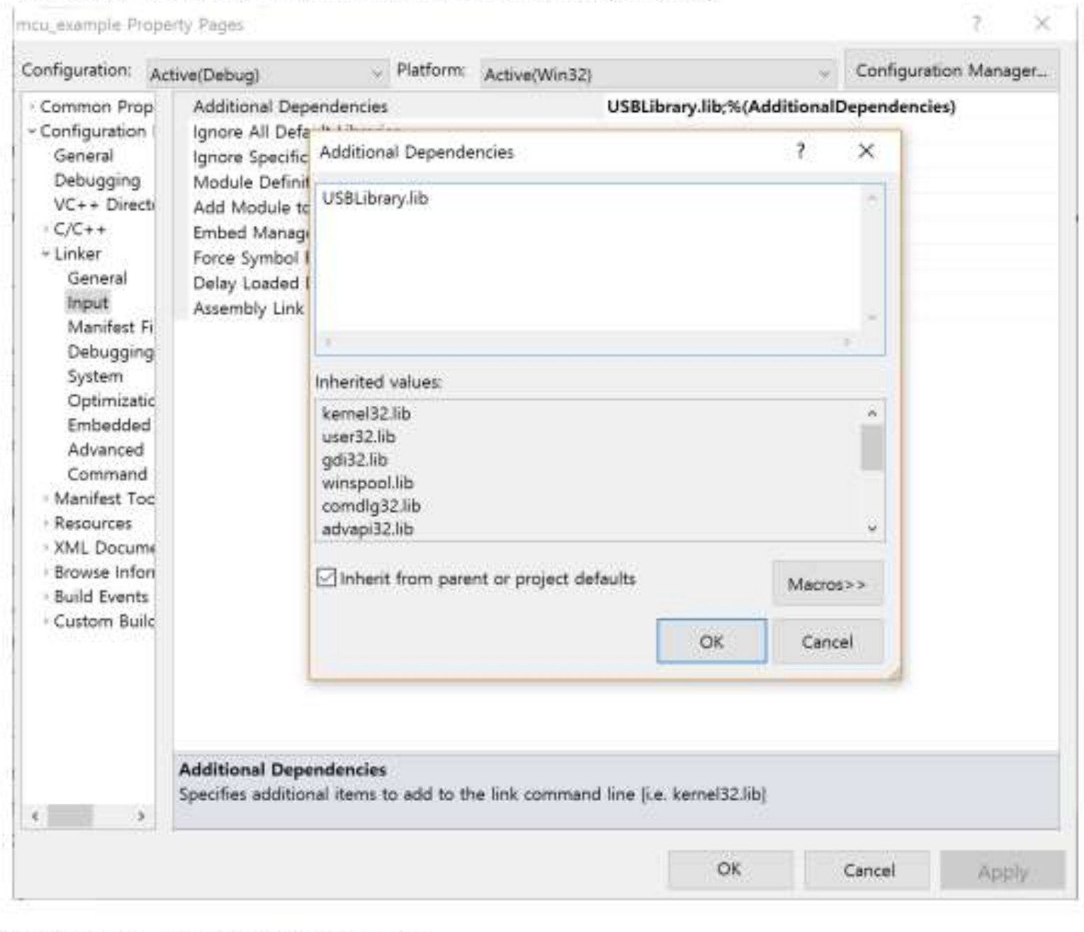
Take the following steps.

1. Download Vista Cube™.
   - You can find it on our dev-site.
   - Extract this zip file with a password (If you don't know the password, please contact us).
2. Prepare your target build system with Vista Cube™.
   - Add include path :
     - -I`$VISTA_CUBE_PATH\src\libvc\core\rdc200\`
     - -I`$VISTA_CUBE_PATH\src\libvc\include\`
     - -I`$YOUR_I2C_INTERFACE_HEADER_PATH\` (if need)
     - 

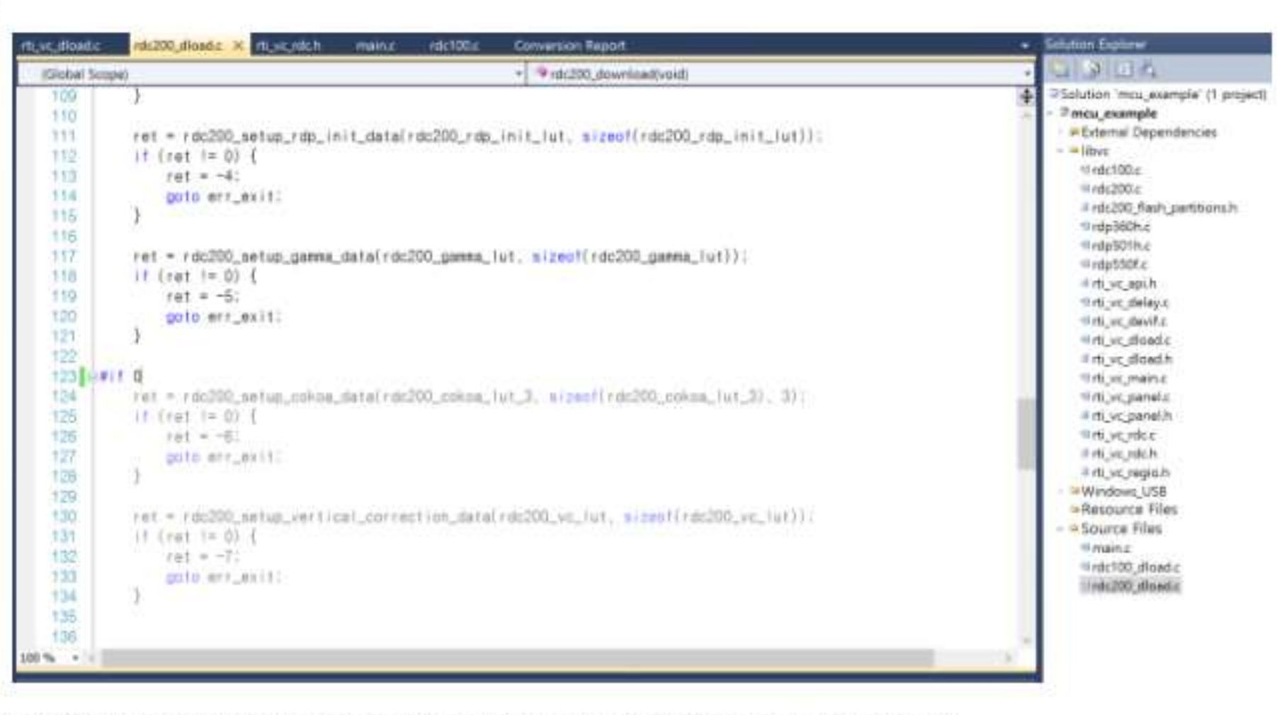
       mcu_example Property Pages
       Configuration: Active(Debug) Platform: Active(Win32)
       Additional Include Directories: ..₩..₩src₩libvc₩core₩rdc200;..₩..₩src₩test₩windows₩
       Additional Include Directories:
       ..₩..₩src₩libvc₩core₩rdc200
       ..₩..₩src₩test₩windows₩SiLab_USB
       ..₩..₩src₩libvc₩include
       ☑ Inherit from parent or project defaults
       Additional Include Directories
       Specifies one or more directories to add to the include path; separate with semi-colons if more than one.

   - Add library path :
     - -L`$YOUR_I2C_INTERFACE_LIB_PATH\` (if need)
     - 

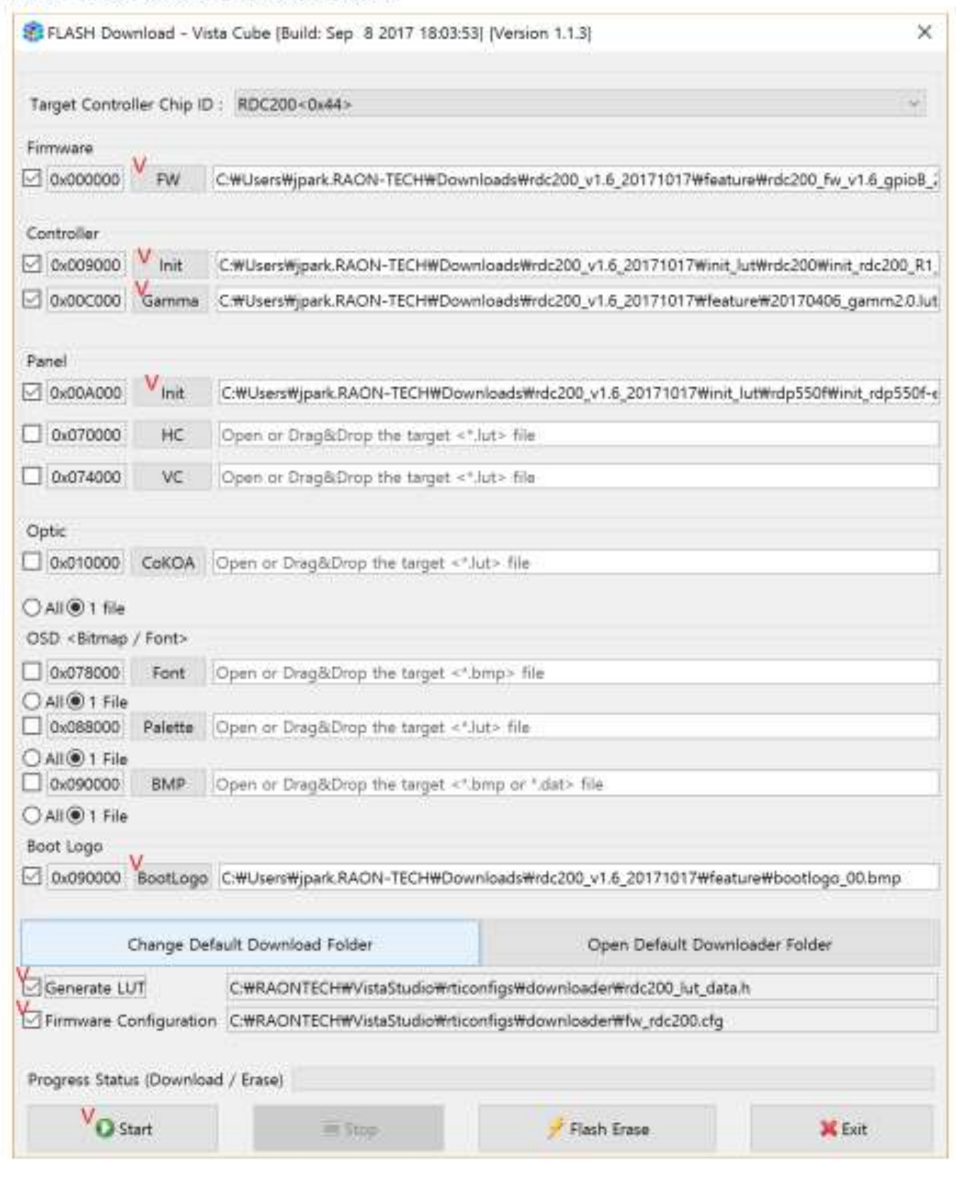
       mcu_example Property Pages
       Configuration: Active(Debug) Platform: Active(Win32)
       Output File: $(OutDir)$(TargetName)$(TargetExt)
       Additional Library Directories:
       ..₩..₩src₩test₩windows₩SiLab_USB
       ☑ Inherit from parent or project defaults
       Additional Library Directories
       Allows the user to override the environmental library path (/LIBPATH:folder)

   - Add name of library :
     - -l`$YOUR_I2C_INTERFACE_FILE_PATH` (if need)
     - 

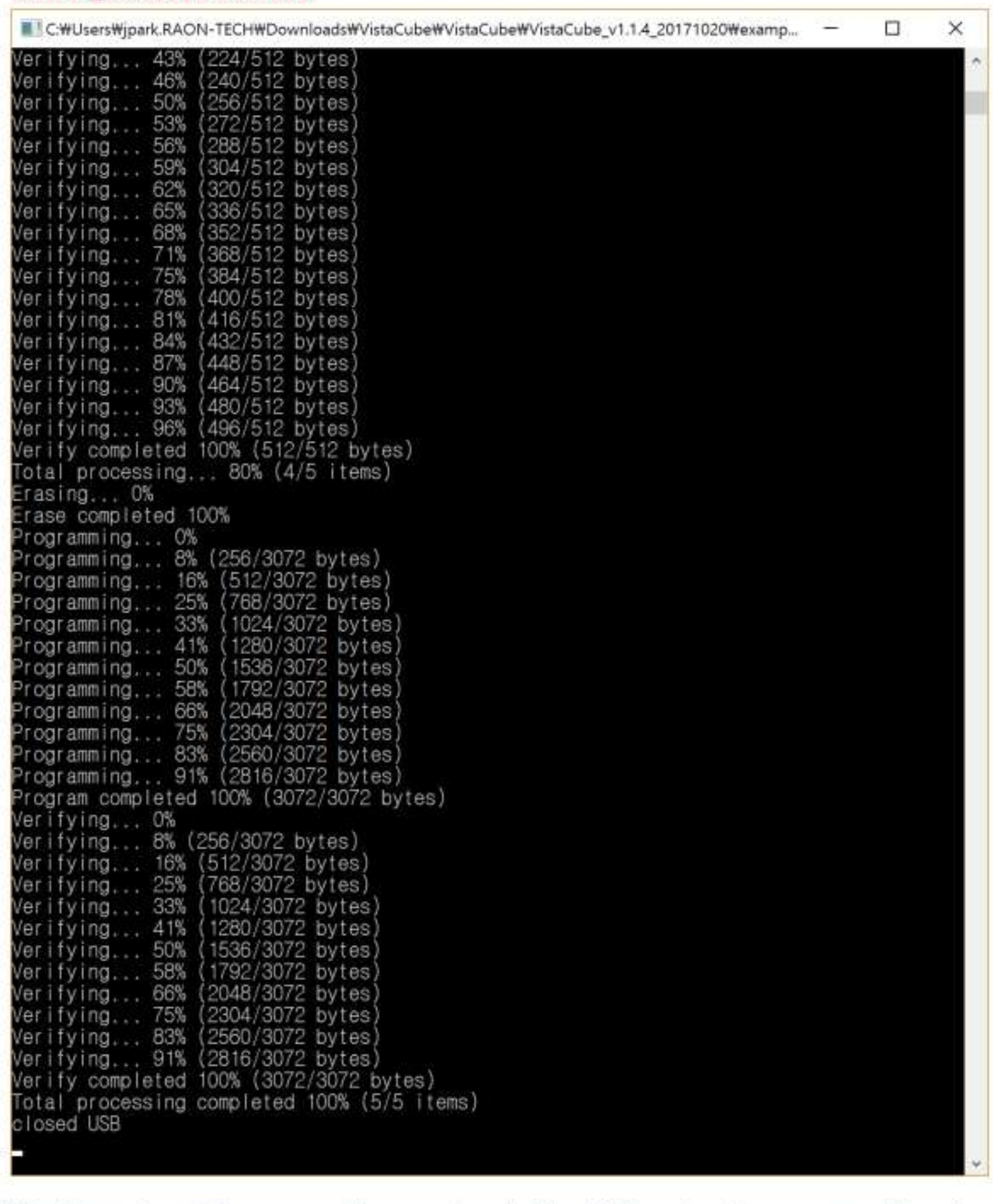
       mcu_example Property Pages
       Configuration: Active(Debug) Platform: Active(Win32)
       Additional Dependencies: USBLibrary.lib;%(AdditionalDependencies)
       Additional Dependencies:
       USBLibrary.lib
       Inherited values:
       kernel32.lib
       user32.lib
       gdi32.lib
       winspool.lib
       comdlg32.lib
       advapi32.lib
       ☑ Inherit from parent or project defaults
       Additional Dependencies
       Specifies additional items to add to the link command line [i.e. kernel32.lib]

   - Specify library loading path (if need)
     - Copy `SiLab_USB\SiUSBXp.dll and USBLibrary.dll` in `$VISTA_CUBE_PATH\src\test\windows\` to `$VISTA_CUBE_PATH\example\mcu_example\`
3. Connect your i2c interface to Vista Cube™.
   - You should implement the following i2c wrapping functions in `$VISTA_CUBE_PATH/src/libvc/port/rti_vc_devif.c` (Refer to Capter 2.3 Device interface Services in VistaCube_User_Guid_RDC200.pdf for details).
     - `rtiVC_InitDevice();`
     - `rtiVC_OpenDevice();`
     - `rtiVC_ReadDevice(…);`
     - `rtiVC_WriteDevice(…);`
     - `rtiVC_ReadBurstDeviceExt(…);`
     - `rtiVC_WriteBurstDeviceExt(…);`
     - `rtiVC_CloseDevice();`
     - `rtiVC_DeinitDevice();`
   - Check if the following functions are activated or not in `$VISTA_CUBE_PATH/example/mcu_example/rdc200_dload.c` (these functions are required for normal panels booting)
     - `rdc200_setup_firmware_data(…);`
     - `rdc200_setup_fw_cfg_data(…);`
     - `rdc200_setup_rdc_init_data(…);`
     - `rdc200_setup_rdp_init_data(…);`
     - `rdc200_setup_gamma_data(…);`
     - `rdc200_setup_bmp_data(…);`
     - 

       ```
       	}

       	ret = rdc200_setup_rdp_init_data(rdc200_rdp_init_lut, sizeof(rdc200_rdp_init_lut));
       	if (ret != 0) {
       		ret = -4;
       		goto err_exit;
       	}

       	ret = rdc200_setup_gamma_data(rdc200_gamma_lut, sizeof(rdc200_gamma_lut));
       	if (ret != 0) {
       		ret = -5;
       		goto err_exit;
       	}
       #if 0
       	ret = rdc200_setup_cokoa_data(rdc200_cokoa_lut_3, sizeof(rdc200_cokoa_lut_3), 3);
       	if (ret != 0) {
       		ret = -6;
       		goto err_exit;
       	}

       	ret = rdc200_setup_vertical_correction_data(rdc200_vc_lut, sizeof(rdc200_vc_lut));
       	if (ret != 0) {
       		ret = -7;
       		goto err_exit;
       	}
       ```

   - Check I2C SlaveAddress (It depends on your target system configuration)
     - RDC slave address : define it in your side. (e.g. `#define RDC_I2C_SLAVE_ADDR    0x44`)
     - RDP slave address : `#define _CFG_RDP_SLAVE_ADDR    0x39` in `$VISTA_CUBE_PATH/src/libvc/include/rti_vc_config.h`
4. Copy and Paste the latest init values to Vista Cube™ code inside.
   - Download an init file (RDC100 init file / RDC200 init file) in according to your target.
   - Download VisualStudio™ on our dev-site(it is also password protected).
   - Power on RAON uDiaplay EVB and connect your host computer via USB and then execute Vista Studio™. (If it is first time, board configuration wizard will be appear)
   - Burn the latest init files into Flash via Flash burning function (you can find this function on Toolbar menu of Vista Studio™)
     - Select `$RDC200_INIT_PATH\feature\rdc200_fw_v1.6_gpioB_20171017.hex` as FW
     - Select `$RDC200_INIT_PATH\init_lut\rdc200\RDC200_for_RDP501H_20170904.rega` as Controller-Init
     - Select `$RDC200_INIT_PATH\feature\20170406_gamm2.0.lut` as Controller-Gamma
     - Select `$RDC200_INIT_PATH\init_lut\rdp550f\init_rdp550f-e_20170405.rega` as Panel-Init
     - Select `$RDC200_INIT_PATH\feature\bootlogo_00.bmp` as Boot Logo
     - Check **Generate LUT**
     - And then click *Start* button.
     - 

       FLASH Download - Vista Cube [Build: Sep 8 2017 18:03:53] [Version 1.1.3]
       Target Controller Chip ID : RDC200<0x44>
       Firmware
       ☑ 0x000000 FW C:₩Users₩jpark.RAON-TECH₩Downloads₩rdc200_v1.6_20171017₩feature₩rdc200_fw_v1.6_gpioB_
       Controller
       ☑ 0x009000 Init C:₩Users₩jpark.RAON-TECH₩Downloads₩rdc200_v1.6_20171017₩init_lut₩rdc200₩init_rdc200_R1_
       ☑ 0x00C000 Gamma C:₩Users₩jpark.RAON-TECH₩Downloads₩rdc200_v1.6_20171017₩feature₩20170406_gamm2.0.lut
       Panel
       ☑ 0x00A000 Init C:₩Users₩jpark.RAON-TECH₩Downloads₩rdc200_v1.6_20171017₩init_lut₩rdp550f₩init_rdp550f-e
       ☐ 0x070000 HC Open or Drag&Drop the target <*.lut> file
       ☐ 0x074000 VC Open or Drag&Drop the target <*.lut> file
       Optic
       ☐ 0x010000 CoKOA Open or Drag&Drop the target <*.lut> file
       ○ All ● 1 file
       OSD <Bitmap / Font>
       ☐ 0x078000 Font Open or Drag&Drop the target <*.bmp> file
       ○ All ● 1 File
       ☐ 0x088000 Palette Open or Drag&Drop the target <*.lut> file
       ○ All ● 1 File
       ☐ 0x090000 BMP Open or Drag&Drop the target <*.bmp or *.dat> file
       ○ All ● 1 File
       Boot Logo
       ☑ 0x090000 BootLogo C:₩Users₩jpark.RAON-TECH₩Downloads₩rdc200_v1.6_20171017₩feature₩bootlogo_00.bmp
       ☑ Generate LUT C:₩RAONTECH₩VistaStudio₩rticonfigs₩downloader₩rdc200_lut_data.h
       ☑ Firmware Configuration C:₩RAONTECH₩VistaStudio₩rticonfigs₩downloader₩fw_rdc200.cfg
       Progress Status (Download / Erase)

   - Vista Studio™ will create rdcx000_lut_data.h in *Default Download Folder* specified above .
5. Replace the rdcx000_lut_data.h located in `$VISTA_CUBE_PATH/example/mcu_example/` with the `rdcx00_lut_data.h` made in the previous step.
   - e.g. Copy `rdc200_lut_data.h` made in step4 into `$VISTA_CUBE_PATH/example/mcu_example/`
6. Build and then execute your target system.
   - Don't forget to include the downloading calling function. (Refer to main function in `$VISTA_CUBE_PATH\example\mcu_example\main.c`)
     - `rtiVC_Initialize(RDC_I2C_SLAVE_ADDR);`
     - `rtiVC_OpenDevice();`
     - (Optional) `rtiVC_RegisterDownloadCallback(...);`
     - `rdc200_download();`
     - `rtiVC_CloseDevice();`
     - `rtiVC_Denitialize();`
     - 

       C:₩Users₩jpark.RAON-TECH₩Downloads₩VistaCube₩VistaCube₩VistaCube_v1.1.4_20171020₩examp...

       ```
       Verifying... 43% (224/512 bytes)
       Verifying... 46% (240/512 bytes)
       Verifying... 50% (256/512 bytes)
       Verifying... 53% (272/512 bytes)
       Verifying... 56% (288/512 bytes)
       Verifying... 59% (304/512 bytes)
       Verifying... 62% (320/512 bytes)
       Verifying... 65% (336/512 bytes)
       Verifying... 68% (352/512 bytes)
       Verifying... 71% (368/512 bytes)
       Verifying... 75% (384/512 bytes)
       Verifying... 78% (400/512 bytes)
       Verifying... 81% (416/512 bytes)
       Verifying... 84% (432/512 bytes)
       Verifying... 87% (448/512 bytes)
       Verifying... 90% (464/512 bytes)
       Verifying... 93% (480/512 bytes)
       Verifying... 96% (496/512 bytes)
       Verify completed 100% (512/512 bytes)
       Total processing... 80% (4/5 items)
       Erasing... 0%
       Erase completed 100%
       Programming... 0%
       Programming... 8% (256/3072 bytes)
       Programming... 16% (512/3072 bytes)
       Programming... 25% (768/3072 bytes)
       Programming... 33% (1024/3072 bytes)
       Programming... 41% (1280/3072 bytes)
       Programming... 50% (1536/3072 bytes)
       Programming... 58% (1792/3072 bytes)
       Programming... 66% (2048/3072 bytes)
       Programming... 75% (2304/3072 bytes)
       Programming... 83% (2560/3072 bytes)
       Programming... 91% (2816/3072 bytes)
       Program completed 100% (3072/3072 bytes)
       Verifying... 0%
       Verifying... 8% (256/3072 bytes)
       Verifying... 16% (512/3072 bytes)
       Verifying... 25% (768/3072 bytes)
       Verifying... 33% (1024/3072 bytes)
       Verifying... 41% (1280/3072 bytes)
       Verifying... 50% (1536/3072 bytes)
       Verifying... 58% (1792/3072 bytes)
       Verifying... 66% (2048/3072 bytes)
       Verifying... 75% (2304/3072 bytes)
       Verifying... 83% (2560/3072 bytes)
       Verifying... 91% (2816/3072 bytes)
       Verify completed 100% (3072/3072 bytes)
       Total processing completed 100% (5/5 items)
       closed USB
       ```
   - After finishing, reboot. Then you will see an input video if there is video source, otherwise you will see the bootlogo image on your panels.

A second way of getting init binaries

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