# Windows Embedded Compact 7 Custom LTC3589 Driver Integration

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## 

## Introduction

This guide is intended as a reference for porting the existing LTC3589 PMIC driver and CTK suite to Freescale’s 11.05 Windows Embedded Compact 7 BSP release. For instructions on how to run the CTK suite or utilize the driver’s capabilities, please refer to the following documents:

* Adeneo\_Auto\_CE7\_LinearTech\_Qualification\_Test\_Plan.pdf
* Adeneo\_Auto\_CE7\_LinearTech\_PC\_Setup.pdf
* WEA7\_LTC3589 User Guide.pdf

## Software Prerequisites

* Visual Studio 2008
* Windows Embedded Compact 7 installed on a Windows 7 Machine
  + Includes Compact Test Kit(CTK), Platform Builder Plugin for VS2008
* Adeneo/Linear LTC3589 Custom driver sources and Custom CTK Test

## Installing the BSP

1. Download Freescale’s 11.05 release for WEC7 BSP from their website (listed under Board Support Packages):
   1. [IMX53\_WCE700\_1105\_BSP\_SOURCE](http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=RDIMX53SABRETAB&fpsp=1&tab=Design_Tools_Tab)
2. Extract the zip file and run the .msi installer.
3. Open the **$(\_WINCEROOT)\OSDesigns\iMX53\_ARD\_Mobility\iMX53\_ARD\_Mobility.sln** file. This will open the Platform Builder in VS2008
4. Select the **Freescale i\_MX53 ARD ARMV7 Release** build configuration.
5. Modify the following BSP files:
   1. C:\WINCE700\platform\iMX53\_ARD\SRC\BOOTLOADER\EBOOT\ivt\_init.s

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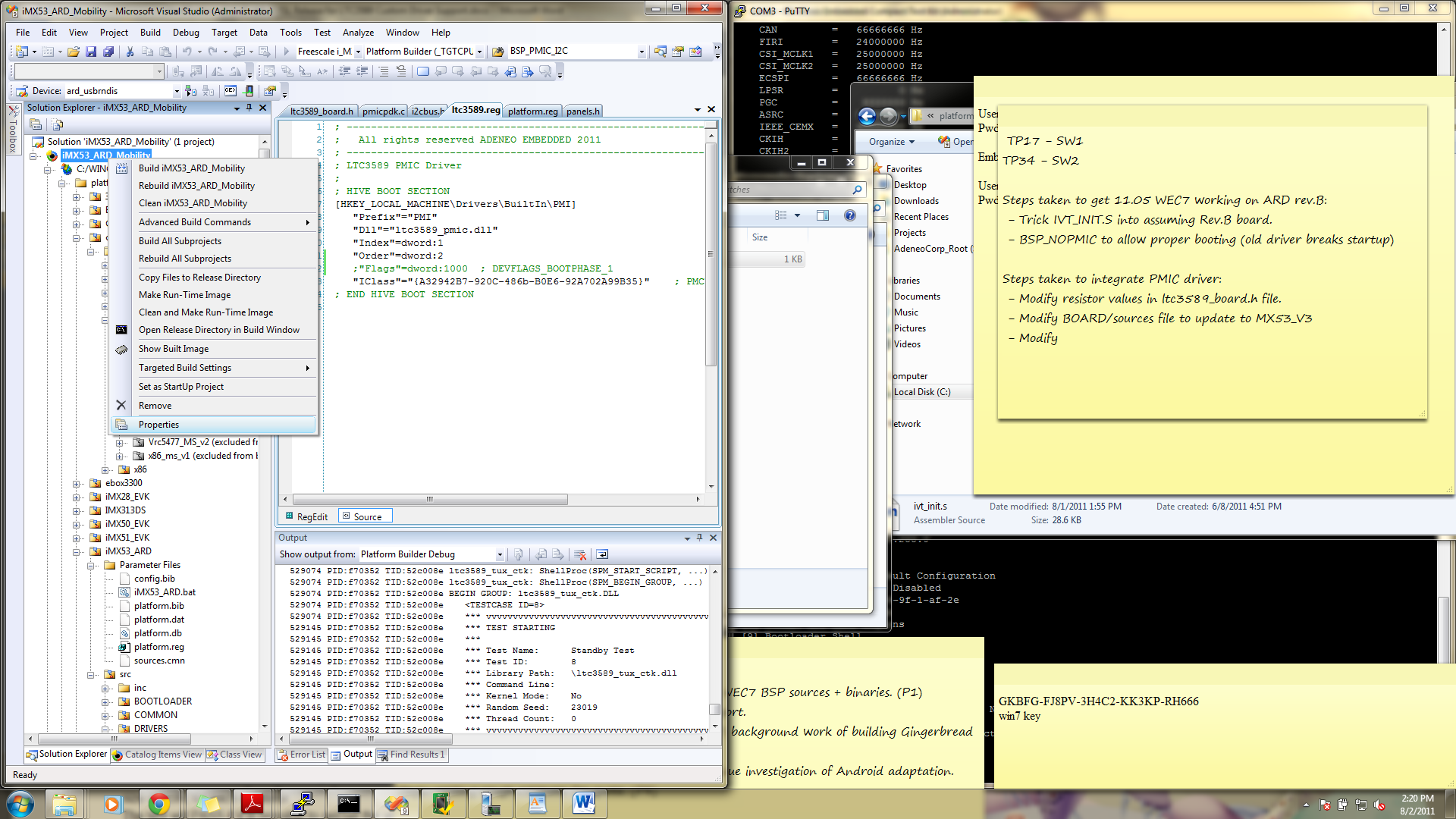
< cmp r1, #BOARD\_REV\_ARD\_REVB

---

> cmp r1, r1

* 1. To setup the DVFC plug-in for the LTC3589 PMIC copy the file: **DriverSources\platform\iMX53\_ARD\SRC\DRIVERS\DVFC\LTC3589\voltctrl.c** to **$(\_WINCEROOT)\platform\iMX53\_ARD\SRC\DRIVERS\DVFC\LTC3589/voltctrl.c**

1. Modify the environment variables for the OSDesign by:
   * 1. Right-clicking on the iMX53\_ARD\_Mobility project and selecting Properties.



* + 1. Under **Configuration**  select **Environment**
    2. Add an environment variable called: **BSP\_NOPMIC** and set it to **1**

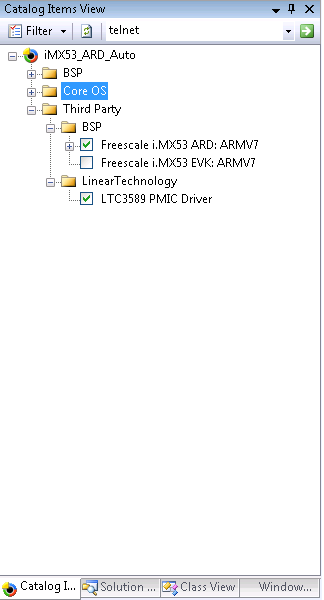
1. Copy **ltc3589\_ioctl.h** and **ltc3589\_lla.h** to the location at:
   1. **$(\_WINCEROOT)\platfrom\common\src\soc\COMMON\_FSL\_V3\inc\.**
2. Modify the **tve.cpp** file with the changes described in the tve.patch file. The tve.cpp file is located at: **$(\_WINCEROOT)\platform\iMX53\_ARD\SRC\DRIVERS\IPUV3\DISPLAY\**
3. Modify the **bspesdhc.cpp** file with the changes described in the bspesdhc.patch file. The bspesdhc.cpp file is located at: **$(\_WINCEROOT)\platform\iMX53\_ARD\SRC\DRIVERS\ESDHC\**
4. Modify the **pmicutils.cpp** file with the changes described in the pmicutils.patch file. The pmicutils.cpp file is located at: **$(\_WINCEROOT)\platform\iMX53\_ARD\SRC\COMMON\PMICUTILS\LTC3589**
5. Modify the **vga.cpp** file with the changes described in the vga.patch file. The vga.cpp file is located at: **$(\_WINCEROOT)\platform\iMX53\_ARD\SRC\DRIVERS\IPUV3\DISPLAY**
6. Modify the **tve.cpp** file with the changes described in the tve.patch file. The tve.cpp file is located at: **$(\_WINCEROOT)\platform\iMX53\_ARD\SRC\DRIVERS\IPUV3\DISPLAY**
7. Modify the **dirs** file with the changes described in the dirs.patch file. The dirs file is located at: **$(\_WINCEROOT)** **\platform\common\src\soc\COMMON\_FSL\_V3\PMIC**
8. Modify the **sources** file with the changes described in the dirs.patch file. The sources file is located at: **$(\_WINCEROOT)** **\platform\iMX53\_ARD\SRC\DRIVERS\IPUV3\DLL**
9. Remove the Atheros WiFi Driver from the wifi catalog item.

### Installing the Source Files

Copy the **/3rdParty** folder to your $(\_WINCEROOT) location on your hard drive.

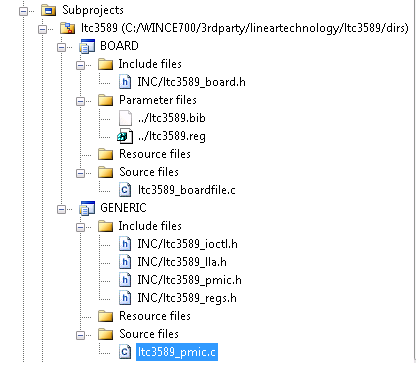
### Selecting the LTC3589 Catalog Item

The LTC3589 PMIC Driver catalog item will show up under Third Party in the catalog viewer. Select the item to include the driver in your OSDesign.



### Viewing the Driver Sources

The LTC3589 3rd party driver will be added to your OSDesign and appear under the Subprojects section as “ltc3589”.



### Modify the Driver to support iMX53-ARD Rev.B

* Open the file **ltc3589\_board.h**
  + Modify the following line:

#define LTC3589\_SW1\_R2 158

* Open the file **BOARD/sources**
  + Modify the following line:

$(\_WINCEROOT)\platform\common\src\soc\MX53\_FSL\_V3\INC; \

* Open the file **ltc3589.reg**
  + Comment out the following line:

;"Flags"=dword:1000 ; DEVFLAGS\_BOOTPHASE\_1

### Building the Driver

The driver will automatically be built when you build the OS Design by doing:

**Build->Advanced Build Commands->Sysgen**

## Hardware Setup

After flashing the SD card with the binaries:

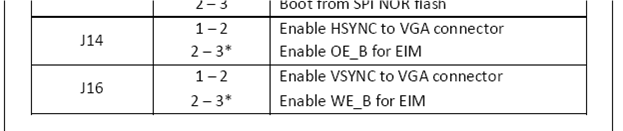
* Insert the SD Card in the CPU board’s sd card slot
* Connect a Serial Cable from the PC to the CPU board connector.
* Insert the 12V power supply into the J1 connector.
* Set the boot pins for booting from SD (described below)

### Boot Pins

Set the boot pins as follows:

* 3, 9 = ON
* 1,2,4,5,6,7,8,0 = OFF

### VGA Setup

The Jumpers on the board must be set properly. For RevB HW set J14 = 1-2 and J16 = 1-2  


### USB RNDIS Setup

Connect the USB micro cable from your Host PC to the CPU board. The connector is next to the SD Card connector.

### Serial Debug UART Setup

Connect a serial cable from your PC to the CPU board. Configure your PC with a COM terminal at 115200 BAUD 8N1, no hardware flow control.

## Flash the iMX53-ARD Rev.B board

* Open a command prompt at the location: $(\_WINCEROOT)\support\TOOL\COMMON\CFIMAGER\
* Copy the **NK.nb0** and **eboot.nb0** files from the release directory (**$(\_WINCEROOT)\osdesigns\iMX53\_ARD\_Mobility\RelDir\Freescale\_i\_MX53\_ARD\_ARMV7\_Release\**) to this location.
* To flash the OS image, use the following command:

**cfimager -f nk.nb0 -d <card reader drive letter without colon> -imx53 -a**

* To flash the bootloader, use the following command:

**cfimager -f eboot.nb0 -d <card reader drive letter without colon> -imx53**

* When it is complete with flashing, remove the SD Card and place it in the SD card connector on the iMX53-ARD CPU board.

**On the Device:**

Note: The following steps require opening a serial terminal on your PC to communicate to the device via Debug UART.

* Once the image loads press [SPACE] to pause the bootloader.
* Press [5] until the boot device is "none"
* Ensure KITL Enable Mode = Enable
* Set the MAC Address
* Press [3] to disable DHCP
* Press [0] to give a static IP Address
* Press [E] to set the Ethernet device to **USB RNDIS**
* Press [S] to save the settings
* Press [D] to select Download Image Now

**On the PC:**

* You will need to install the USB RNDIS device driver on your Windows 7 PC. When the device is not found select to install the driver yourself and point to:
  + **$(\_WINCEROOT)\ platform\common\src\common\kitldrv\usbdbg**
* In your network configuration give your USB RNDIS connection a static IP address. Make sure to set it on the same subnet as the IP address you set on the device.
* In **VS2008 Platform Builder Plug-in**:
  + Open your current iMX53-ARD project or Open the prebuilt NK.bin as a project.
  + Select the connectivity options to setup a connection via RNDIS.
  + Select the device when it pops up in the Settings window.
  + The device IP address should now be captured. Reset the device and close the Target Device Connectivity Options window on the PC.
  + When the device resets, on your PC select **Target->Attach Device**

Follow the instructions in these documents to execute the Custom Tests for the LTC3589 PMIC.

* **Adeneo\_Auto\_CE7\_LinearTech\_Qualification\_Test\_Plan.pdf**
* **Adeneo\_Auto\_CE7\_LinearTech\_PC\_Setup.pdf**