



MMWAVE Studio Release Notes

1 Introduction

The mmWaveStudio GUI is designed to characterize and evaluate the TI Radar devices. The mmWave device is configured and controlled from the mmWaveStudio by sending commands to the device over SPI. ADC data is captured using DCA1000 EVM board for single chip systems. The data is processed in Matlab and the results are displayed in the GUI.

2 Release Overview

This is the 3.1.4 version of mmwavestudio

2.1.1 Platform and Device Support

The device and platforms supported with this release are

| Supported Devices | Supported EVMs |
|-------------------|----------------------------|
| xWR294x ES2.0 | xWR294x EVM DCA1000EVM |
| xWR254x ES1.0 | xWR254x EVM DCA1000EVM |
| xWR2x4xP ES1.0 | xWR2x4xP EVM DCA1000EVM |

The solution to capture raw ADC data for single chip systems is by using Booster pack along with DCA1000 EVM.

2.2.1 Release contents and component versions

| Component | Version/Details | Device | Type |
|------------------|-----------------|--------------------------------|--------|
| RadarSS Firmware | 2.4.10 2.5.8 | xWR294x ES2.0 xWR254x ES1.0 | Binary |

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|----------------------|---|--|--|
| | 2.6.2 | xWR2x4xP ES1.0 | |
| MSS Rf Eval Firmware | 2.4.2 | xWR294x ES2.0/ xWR254x ES1.0/ xWR2x4xP ES1.0 | Binary |
| FTDI Driver | 2.12 | NA | Binary |
| mmWaveStudio | 3.1.4 | NA | Executable |
| Documents | Release Notes mmWaveStudio User's Guide DCA1000 Quick start Guide DCA1000 Debugging Handbook | NA | PDF PDF PDF PDF |
| Reference Code | DCA1000 CLI source code and documentation FTDI Library Source code and documentation | NA | Source code + Docs Source Code + Docs |
| Matlab Examples | Single chip Matlab example for parsing ADC data | NA | Source Code |
| Platform Binaries | DCA1000 FPGA Image (v2.9) | DCA1000 EVM | Binary |

2.3.1 Directory Structure

| Directory Name | Content |
|------------------|--|
| docs | mmwave_studio_release_notes.pdf mmwave_studio_user_guide.pdf DCA1000_Quick_Start_Guide.pdf DCA1000_Debugging_Handbook.pdf |
| ftdi | FTDI Drivers |
| mmWaveStudio | mmWaveStudio GUI (<i>Runtime\mmWaveStudio.exe</i>) DCA1000 FPGA file (<i>PlatformBinaries\DCA1000FPGA\</i>) Reference code for DCA1000 CLI (<i>ReferenceCode\DCA1000\</i>) Reference code for FTDI Library (<i>ReferenceCode\FTDILib\</i>) Matlab example for single chip data parsing (<i>MatlabExamples\</i>) Sample Lua scripts (Single Chip) (<i>Scripts\</i>) Sample JSON files (<i>JSONSampleFiles\</i>) |
| rf_eval_firmware | RF evaluation firmware for supported Devices |

2.4.1 Tools and dependencies

Below tools are required to run mmWaveStudio

| Tools | Version | Download Link |
|-----------------------------------|-----------------|-------------------------------|
| Matlab Runtime Engine | 8.5.1 only | download link |
| FTDI Driver | 2.12 | Included in the package |
| Matlab (only for Matlab examples) | R2017a or later | License Required |

2.5.1 Licensing

Please refer to the mmwave_studio_manifest.html, which outlines the licensing information for mmWave Studio package.

3 Release Contents

3.1.1 Features and enhancements in mmWaveStudio 3.1.1 compared with 3.0.0 release

xWR294X is TI's third generation 77GHz RF CMOS Radar, the new version of mmWave Studio incorporates changes to support this new device.

Features supported in this release are:

1. Supports 4 TX and 4 Real-only RX chains.
2. Synthesizer RF frequency supported 76 –81GHz
3. Supports 10MHz IF bandwidth
4. Supports 7 functional profiles
5. Supports 266MHz/us max slope
6. Supports programmable filter

3.1.2 Features and enhancements in mmWaveStudio 3.1.3 compared with 3.1.1 release

xWR254x is TI's third generation 77GHz RF CMOS Radar, the new version of mmWave Studio incorporates changes to support this new device.

Features supported in this release are:

1. Supports 4 TX and 4 Real-only RX chains.
2. Synthesizer RF frequency supported 76 –81GHz
3. Supports 10MHz IF bandwidth
4. Supports 7 functional profiles
5. Support for Autodetection of xWR294x, xWR2x4xP and xWR254x.

Below features are only valid for 2544 devices:

1. Supports 1ns Resolution of ADC Start Time
 - This 1ns resolution can be enabled/disabled from **StaticConfig-> Radar Miscellaneous Control** section which will allow to set ADC start time in 1 ns under **AdvChirpCfg->Chirp Configuration** section.
2. Supports multiple profiles for Synth Frequency Monitor (Live Mode)
 - This live mode can be enabled/disabled from **AnalogRxMon->Profile Enable Bit Mask Live Mode** section which will allow to set the live mode for profile 0 & 1.

3. Support for Inter-Chirp Jitter Mitigation
 - It can be enabled/disabled from **StaticConfig-> Radar Miscellaneous Control** section.
4. Support for Chirp Parameter Enable/Disable in Advanced Chirp Configuration
 - Chirp param can be enabled/disabled from **AdvChirpCfg-> Param Control** section.
5. Support to enable/disable OSCCLKOUTETH to provide reference clock for external ethernet PHY
 - It can be enabled/disabled from **StaticConfig->OscClkOutEth Configs** section.
6. Support for new FRC DCC clock monitor
 - Clock Pair 6 in **DCBISTMon->DCC Monitoring Config** section will enable/disable this monitor.

3.1.3 Features and enhancements in mmWaveStudio 3.1.4 compared with 3.1.3 release

1. xWR2x4xP is TI's third generation 77GHz RF CMOS Radar, the new version of mmWave Studio incorporates changes to support this new device
2. Enabled profile Index vs profile bit mask exclusivity in GUI for **synthFreqMonConfig**
3. In Advance Chirp Config, Start Frequency Dither now supports step size 53.644Hz and takes input in MHz
4. Added 26.47MHz IFA Loop Back Gain in Loop Back Burst Cfg, IF loopback Cfg API's both through GUI & LUA.
5. Updated RS232 connection flow, to accommodate 40MHz & 50MHz xtal frequency

Below features are only valid for 2944P devices:

1. In profile config API, RF gain supports 2dB higher for xWR2x4xP than xWR294x/xWR254x

3.2.1 Changes in mmWaveStudio 3.1.1 compared with 3.0.0 release

| Item type | Key | Issue Details/Description |
|-----------|---------------|--|
| FEATURE | MMWSTUDIO-604 | Added support for 4th TX channels to support xWR294x device in lua APIs and GUI. |
| FEATURE | MMWSTUDIO-595 | Added support for xWR294x device specific features. |
| BUG | MMWSTUDIO-598 | Fixed various bugs related to xWR294x studio features. |
| BUG | MMWSTUDIO-617 | Removed rampgen calculator from mmWave Studio GUI |
| BUG | MMWSTUDIO-522 | Removed All cascade support and examples from mmWave Studio GUI |

3.2.2 Changes in mmWaveStudio 3.1.3 compared with 3.1.1 release

| Item type | Key | Issue Details/Description |
|-----------|---------------|--|
| FEATURE | MMWSTUDIO-626 | Added support for Profile Bit Mask Live Mode for Multiple Synth Freq Monitor Profiles. |
| FEATURE | MMWSTUDIO-628 | Added support for enabling 1ns ADC Start Time Resolution. |
| FEATURE | MMWSTUDIO-629 | Added Support for Inter-Chirp Jitter Mitigation Enable/Disable. |
| FEATURE | MMWSTUDIO-630 | Added Support for OscClkOutEth, with Enable, Divider Programming and Drive Value Setting. |
| FEATURE | MMWSTUDIO-631 | Added Support for Param Control in Advanced Chirp Config |
| FEATURE | MMWSTUDIO-632 | Added Support for FRC Clock Source Addition, and measured value in Dual Clock Comp Report. |
| FEATURE | MMWSTUDIO-627 | Added Support for Recognition for xWR294x, xWR2x4xP and xWR254x. |
| FEATURE | MMWSTUDIO-637 | Support for RS232 operation on 50MHz XTAL. |
| FEATURE | MMWSTUDIO-647 | Support for setting LVDS value automatically on device detection for xWR294x and xWR254x. |

3.2.3 Changes in mmWaveStudio 3.1.4 compared with 3.1.3 release

| Item type | Key | Issue Details/Description |
|-----------|--------------------------------|---|
| FEATURE | MMWSTUDIO-652 MMWSTUDIO-653 | Added support for xWR2x4xP device |
| FEATURE | MMWSTUDIO-656 | Updated RS232 connection flow, to accommodate 40MHz & 50MHz xtal frequency for xWR2x4xP |
| FEATURE | MMWSTUDIO-657 | In profile config API, RF gain supports 2dB higher for xWR2x4xP than xWR294x/xWR254x |
| FEATURE | MMWSTUDIO-660 | Added 26.47MHz IFA Loop Back Gain in Loop Back Burst Cfg, IF loopback cfg |
| FEATURE | MMWSTUDIO-624 | Studio allows the user to configure Start Frequency Dither (for Adv Chirp Config) in steps of 53.644 Hz (1 LSB for Start Freq parameter) rather than 1KHz, and now takes inputs in MHz. |
| BUG | MMWSTUDIO-619 | Chirp Manager and Profile Manager have been updated to support new API's |
| BUG | MMWSTUDIO-651 | DynChirpCfg GUI now updates with Lua command |
| BUG | MMWSTUDIO-661 | Fixed DynChirpCfg API GUI not sending right values when row select >0 |
| BUG | MMWSTUDIO-654 | Enforced profile index vs profile bit mask exclusivity in SYNTH frequency monitor configuration |

3.2.1 Limitations

- The MATLAB post-processing only works with the following value of CQ configuration
 - CQ0 – 132
 - CQ1 – 132
 - CQ2 – 72
- Only non-Interleaved mode is supported for xWR294x device.
- The MATLAB post processing is not supported in Studio for advance frame config API
- The MATLAB post processing is not supported in Studio for advance chirp config API

3.3.1 Known issues

| Key | Description |
|-------------------|--|
| MMWSTUDIO-216 | Font on Connect tab overlap on some Windows 7 PC |
| MMWSTUDIO-577 | The frame period validity error check implemented in Studio for advance chirp config has dependency on legacy frame config API as well. Workaround: Make sure the frame period in legacy frame config is well relaxed while using advance frame config API. |
| MMWAVE_SYSVAL-250 | The Delay Comp Field in Digital compensation API may not take right LSB field in ADC low power mode, refer xWR294x mmWave ICD for appropriately updating this field. |
| MMWAVE_SYSVAL-249 | The MATLAB post processing feature is not enabled for advance chirp config API in Studio. |