

# MRD5165 Eagle Kit Programming Guide





# **Revision History**

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MRD5165 Eagle Kit Programming Guide



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## 1. Introduction

This document provides the instructions to setting up the Eagle-Kit and procedure to program the Eagle Kit board both on Windows and Ubuntu Host PC.

This document is intended for all users of Eagle-Kit.

#### 2. Eagle Kit Overview

The Mistral MRD5165 Eagle Kit is based on Qualcomm's QRB5165 processor. The MRD5165 Eagle kit provides high-performance compute platform for precise artificial intelligence (AI) and machinelearning inferencing technology to facilitate the accelerated development of innovative, powerefficient, high-computing robots and drones for enterprise, industrial, and professional service applications. It offers readily deployable SDKs, Ubuntu Root-FS and tools for product development to facilitate quick prototyping and proof-of-concept evaluations. Additionally, this kit includes high performance connectivity interfaces making it an ideal platform for connected Eagle device in IOT, Drones and Robotics.

## 3. Getting Started

The Mistral MRD5165 Eagle Kit offers a versatile platform for product developers to evaluate system functionality, experiment with sample applications, migrate existing applications, create new features, and integrate with a variety of peripheral devices. This kit provides a Linux software environment for application development, with the option to customize and update the system software using a chosen release of the QRB5165 system software.

The Eagle Kit Programming Guide provides an overall description of the hardware setup and Host PC steps to flash the Eagle Kit

#### 4. Eagle-Kit Programming Accessories

Basic Accessories required for Eagle-Kit Programming:

- 1. DC Adapter
- 2. Power Chord
- 3. Custom power cable
- 4. USB Type-C Cable
- 5. USB Micro-B Cable

Note: USB Micro-B cable is not part of the kit accessories.



# 5. Eagle Kit Setup



Figure 1 MRD5165 Eagle Kit

- 1. Connect the DC adapter using Power cable to J1
- 2. Connect a USB Type-C cable to J103 (adb connection)
- 3. Connect a Micro-B cable to J5 (Debug console)





Figure 2 MRD5165 Eagle Kit connection to PC



# 6. Setting up Eagle Kit in QDL/EDL Mode

- 1. Disconnect the Type-C cable and Power cable from the Eagle Kit
- 2. Press and hold the Eagle Kit Main Board SW5 (SDM\_FORCE\_USB\_BOOT) switch.
- 3. Connect the Power cable and Power up the Eagle Kit
- 4. Connect the Type-C cable between Host PC and Eagle Kit
- Observe the Eagle Kit device presence on the QFIL tool.
   QFIL Tool Device Detection entry check: Qualcomm HS-USB QDLoader 9008 (COMxx)
- 6. Connect the Micro-B cable between Eagle kit and Host PC for programming logs.







Figure 4 MRD5165 Eagle Kit SW5 Hold, Type-C connected and Power Up



# 7. Windows HOST PC Setup

- 1. After purchasing the Eagle Kit, please register at the Mistral website to download the most recent flat build Package.
- 2. Acquire the newest iteration of QDART that includes QFIL tool for the Windows OS from Qualcomm CreatePoint. The link for this is provided below: <u>https://createpoint.qti.qualcomm.com/search/#tools/searchArgs/q||QDART||rows||20||so</u> <u>rtField||releaseDate||sortOrder||desc</u>

Note: QDART/QFIL is required if Windows is used as host machine for programming.

- Download the Qualcomm USB driver from Qualcomm CreatePoint. The link for this is provided below: <u>https://createpoint.qti.qualcomm.com/search/#tools/searchArgs/q||USB%20driver||rows||</u> <u>20||sortField||releaseDate||sortOrder||desc</u>
- 4. Windows Host PC adb and fastbo ot installation

Download platform tools for Windows from the link provided below. https://developer.android.com/tools/releases/platform-tools



# 8. Windows Host PC QFIL Configuration and Programming

1. Extract the downloaded flat build zip package.

File         Home         Share         View         Compressed Folder Tools	IFB Devkit	- 0 × ^ 0
Pin to Culck       Copy       Pate       Copy path         Cipboard       Organ         Cipboard       Name         Culck access       Pate shortcut         Documents       Pintuid/ju2.0/r23.1/FE.2         Pictures       Pintuid/ju2.0/r23.1/FE.2         Pictures       Pintuid/ju2.0/r23.1/FE.2         Operation       Pintuid/ju2.0/r23.1/FE.2         Operation       Pintuid/ju2.0/r23.1/FE.2         Pictures       Pintuid/ju2.0/r23.1/FE.2         Operation       Pintuid/ju2.0/r23.1/FE.2         Operation       Pintuid/ju2.0/r23.1/FE.2         Operation       Pintures         Operation       Pintures         Pintures       Pintures         Operation       Pintures         Operation       Pintures         Operation       Pintures         Operation       Pintures         Operation       Pintures         Operation       Pintures         Pintures       Pintures         Pintures       Pintures         Pintures       Pintures         Pintures       Pintures         Pintures       Pintures         Pintures       Pintures         Pintures	New Item Provide Select all Select all Select all Select all Select none	<ul> <li>・ ひ P Search IFB Devkit</li> </ul>
Desktop	Next Cancel	
Downloads		
J Music		
Note: Pictures		
2 items 1 item selected 2.86 GB		1111
	Figure 5 Flatbuild Package unzip/ex	tract

2. Observe the extracted files as below:

📙 🛛 🔁 📮 🗧   flatbuild_lu2.0_	r23.1_IFB_20231030180318				– 0 ×
File Home Share	View				~ <b>?</b>
🖌 📄 📩 🖉	lut 📃 📄 🗙 🖬 📔	new item 🔹 📝	🛃 Open 👻 🖶 Select all		
	Copy path	Easy access •	Edit Belect none		
access	aste shortcut to * to * * fo	lder roperties	History 🔡 Invert selec	tion	
Clipboard	Organize	New Op	oen Select		
← → ~ ↑ 📕 > IFB De	evkit > flatbuild_lu2.0_r23.1_IFB_20231030180318	flatbuild_lu2.0_r23.1_IFB_2023	1030180318		✓ ひ Search flatbuild lu2.0 r23.1 IFB 2
	^				
Ouick access	Name	Date modified	Туре	Size	^
Documents *	abl.elf	10/30/2023 12:18 PM	ELF File	172 KB	
Downloads	aop.mbn	10/30/2023 12:18 PM	MBN File	198 KB	
Downloads X	📄 apdp.mbn	10/30/2023 12:18 PM	MBN File	14 KB	
Pictures *	BTFM.bin	10/30/2023 12:18 PM	BIN File	428 KB	
prb5165_itb_br 🖈	cmnlib.mbn	10/30/2023 12:18 PM	MBN File	384 KB	
📙 platform-tools 🖈	cmnlib64.mbn	10/30/2023 12:18 PM	MBN File	497 KB	
Desktop	devcfg.mbn	10/30/2023 12:18 PM	MBN File	54 KB	
📜 IFB Devkit	dspso.bin	10/30/2023 12:18 PM	BIN File	65,536 KB	
📜 Quick Start Guide	] featenabler.mbn	10/30/2023 12:18 PM	MBN File	85 KB	
Screenshots	gpt_backup0.bin	10/30/2023 12:18 PM	BIN File	17 KB	
OneDrive	gpt_backup1.bin	10/30/2023 12:18 PM	BIN File	20 KB	
Onebrive	gpt_backup2.bin	10/30/2023 12:18 PM	BIN File	20 KB	
🧢 This PC	gpt_backup3.bin	10/30/2023 12:18 PM	BIN File	20 KB	
3D Objects	gpt_backup4.bin	10/30/2023 12:18 PM	DIN File	20 KB	
Desktop	gpt_backups.bin	10/30/2023 12:18 PM	BIN File	24 KB	
Documents	got main1 bin	10/30/2023 12:18 PM	BIN File	24 KB	
Downloads	gpt_main2.bin	10/30/2023 12:18 PM	BIN File	24 KB	
Music	gpt main3.bin	10/30/2023 12:18 PM	BIN File	24 KB	
Pictures	gpt_main4.bin	10/30/2023 12:18 PM	BIN File	24 KB	
Videos 🗸	gpt_main5.bin	10/30/2023 12:18 PM	BIN File	24 KB	~
855 items					

Figure 6 Flat build Package Folder Files

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3. Observe and Select the Eagle Kit EDL COM port for programming.

Recycle Bin	LibreOffice	VLC media	IFB Devkit	QFIL File Tools Configuration Help	_ X
Acrobal Reader	7.0	pibyer Differ		Select Build Type       O Fat Build ()       Belect Programmer       Programmer Path	Browse
ClearPase CarCuard	PrimoPDF Drop File	Logie 2.4.7		Select Meta Build CDT Config Content XML Programmer and Patch Audition Meta Build Person Tune	Browse
pielox	WinSCP	Tero Term		RawProgram Patch	Download Content
FortiClient	Cit Bash	A Contraction of the second se		Status	
Coogle Chrome	and a second			Qualcomm Flash Image Loader (QFIL) 20.35	Exit Storage Type: ufs

Figure 7 QFIL tool Select Port

Recycle Bin	LibreOffice	VIC media	IFBIDavide Please Select an Existing Port	_ X SelectPort
Acrobat Reader	Microsoft tdge	pibyes Diffeer	Select Build Type O Rat Build  Meta Build Select Port Cusicorrm HS-USB QDLaeder 5008 (COM52)	Browse
ClearPass OnGuard	PrimePDF - Drop File	Logic 2.4.7		Browse Load Content Product Browse
Firefex	WinSCP	Tere Term	C)Show Non QDLosder/DIAG Port	Download Content
FortClient	Cir Bash	QFI	Manual Input a Port NumberCancel	
Google Chrome	putity.exe		Qualcomm Filash Image Loader (QFIL) 2035	■ Exit Storage Type: ufs

Figure 8 Eagle Kit QDL COM port selection



4. Select Build Type to "Flat Build" In QFIL

Recycle Bin	LibreOffice 7.0	VIC media player	IFB Davki	QFIL     File     Tools     Configuration     Help       Qualcomm HS-USB QDLoader 9008 (COM52)     SelectPo	_X
Acrobat Reader	Microsoft tdge	<b>Other</b>		Select Build Type  Int Build O Meta Build Select Programmer Programmer Path Browse	_
ClearPass OnGuard	PrimePDF - Drop File	Logic 2.4.7		Select Flat Build Search Path C:1 Reservements and Patch	
pice Firefox	Whisep	Tero Term		RawProgram Patch Load XM	
FortiClast	a Cir Bash	QIL		Status	' 
Google Chrome	putty.exe			Exit	
				Qualcomm Flash Image Loader (QFIL) 2035 Storage Typ	e: ufs

Figure 9 Select Build Type to "Flat Build"

5. Set the QFIL tool Configuration as below: Select Configuration -> FireHose Configuration

Select Build Type   Oraclassi   Select Build Oraclassi   Select Flat Build   Select Flat Build <	Recycle Bin	LibreOffice 7.0	VIC media player	IFB Davkir	QFIL     File     Tools     Configuration     Help    X       FireHose Configuration     Qualcomm HS-USB QULoader 9008 (COM52)     SelectPort
Image: Sect Flat Build   Sect Flat Bu	Acrobat Reader	Microsoft Edge	<b>a</b> I Other		Select Build Type                 Pat Build
Field V	ClearPass OnGuard	PrimePDF - Drop File	Logic 2.4.7		Select Flat Build Search Path C:
Image: Second law seco	jieiox	WinSCP	lera lerm		RawProgram Patch Load XML Download
Cocole puttyare Exit	FortiClient	Cit Bash	OFIL		Status -
	Google Chrome	putiy.exe			- Exit

Figure 10 Select "FireHose Configuration"



- 6. Set the Firehose programmer settings as below:
  - a. Download Protocol: 0 Sahara
  - b. Device Type: ufs
  - c. Ensure "**Provision**" is unchecked.
  - d. Check the "Erase All Before Download" checkbox and click "OK"

Provide Marcella Marcella Marcella Balabadi      Provide   Provide Provide      Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide   Provide Provide   Provide	ê ,		QFIL File Tools Configuration Help	_×_
Select Build Type     Point Data        Point Data </th <th>Recycle Bin - Lii</th> <th>ibreOifike 759</th> <th>UC machy IBIDave Qualcomm HS-USB QDLoader 9008 (COM52)</th> <th>SelectPort_</th>	Recycle Bin - Lii	ibreOifike 759	UC machy IBIDave Qualcomm HS-USB QDLoader 9008 (COM52)	SelectPort_
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Price Type       Understand         Period Value       Or Validation         Or Marriade       Or Marriade         Or Marriade       Or	ClourPass Pri OnCasard Dr	NimePDF - Drop File		
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	FourtiClianz (	Cit Sasi	OK Cancel	
Chiome Chiome	Google p Chrome	putiyoxo		Exit

Figure 11 Firehose programmer setting configuration

- 7. Select QFIL Programmer file and Flat Build package files
  - a. Set the **"Programmer Path"** to file **"prog\_firehose\_ddr.elf"** from the extracted flatbuild package folder.
  - b. Select all the rawprogram and patch and load from the extracted flatbuild package folder.

rawprogram\_unsparse0.xml rawprogram1.xml rawprogram2.xml rawprogram3.xml rawprogram4.xml rawprogram5.xml patch0.xml patch1.xml patch2.xml patch4.xml patch5.xml

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Figure 12 RawProgram and Patch configuration

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8. Observe the Programming logs over debug console too. Open Tera Term with Serial console COM port and set baudrate to 115200.

Expected logs after flash is completed.

Format: Log Type - Time(microsec) - Message - Optional Info Log Type: B - Since Boot(Power On Reset), D - Delta, S - Statistic
S - QC_IMAGE_VERSION_STRING=BOOT.XF.3.2.c2-00012-SM8250-5 S - IMAGE_VARIANT_STRING=SOc8250LAA
S - OEM_IMAGE_VERSION_STRING=d41cf1e6f4fa S - Boot Interface: USB
S - Secure Boot: Off
S - BOOT CONFIG @ 0X00786070 = 0X00000001 S - JTAG ID @ 0X00786130 = 0X0015a0e1
S - 0EM ID @ 0X00786138 = 0X00000000
S - Serial Wullder @ 0x00780154 = 0x45040201 S - OEM Config Row 0 @ 0x007841e0 = 0x000000000000000
S - OEM Config Row 1 @ 0x00784108 = 0x0000000000000000 S - Feature Config Row 0 @ 0x00784168 - 0x00402000000000
S - Feature Config Row 1 @ 0x00784200 = 0xc0000000000000
S - Core 0 Frequency, 1516 MHz S - PBL Patch Ver: 5
S - PBL freq: 600 MHZ
D -     6207 - pbl_apps_init_timestamp D -    2878668 - bootable media detect timestamp
D - 38084015 - bl_elf_metadata_loading_timestamp
D - 724 - Di_nasn_seg_autn_timestamp D - 98681 - bl elf loadable segment loading timestamp
D - 6188 - bl_elf_segs_hash_verify_timestamp
D - 821 - bl_sec_seg_hash_verify_timestamp
D - 34 - pbl_populate_shared_data_and_exit_timestamp
S - 41082344 - FBL, ENU B - 40903946 - SBL1, Start
B - 41018962 - SBL1 BUILD @ 12:43:28 on Jul 10 2023
D - 0 - boot_flash_init
D - 945 - sbl1_xblconfig_init
D - 0 - boot_config_data_table_default_init
B - 41039031 - Using default CDT
D - 4727 - DOOT_CONFIG_DATA_TADIE_INIT B - 41046869 - CDT Version:3.Platform ID:8.Major ID:1.Minor ID:0.Subtype:0
D - 17294 - sbl1_hw_platform_pre_ddr
D - 6344 - pmic DevPrg init D - 6344 - sbli hw pre ddr init
D - 0 - boot_dload_handle_forced_dload_timeout
D -
B - 41106588 - eCDT MRR - Data Starting Address: 0x09066D00
B - 41108876 - DSF version = 156.8.18
B - 41112200 - Manufacturer ID = 1, Device Type = 8
B - 41115/69 - Kalik 0 5122 = 5192 MB, Kalik 1 5122 = 0 MB
D - 00 - boot pre_ddi_entry
B - 41132025 - DevProg DDR Entry
B - 41135258 - usb: init start
B - 41138339 - USD: ENUM_CARFIED_FROM_DD1 B - 41141267 - USD: HIGH , 0X900e
B - 41145293 - usb: ENUM success
B - 41148526 - USD: VOUS_GET_pm_Unavall B - 44095222 - USD: host sends ZLP
B - 44300914 - UFS INQUIRY ID: KingstonTX17-128 003A
B - 44304574 - OFS BOOT LUN: 0 B - 44636780 - usb: host sends ZLP
B - 44955231 - usb: host sends ZLP
B - 45285308 - 050; NOST SENDS ZLP B - 45602136 - usb; host sends ZLP
B - 45934098 - usb: host sends ZLP
B - 47862186 - USD: NOST SENDS ZLP B - 316071073 - USD: host sends ZLP
B - 319002702 - usb: host sends ZLP

Figure 13 Serial Console Programming logs

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#### 9. Start Programming

- a. Once all the above steps are done click the QFIL "Download" button
- b. Observe the Download progress bar and status logs



#### Figure 14 QFIL Flash Download In-Progress

c. Upon successful completion observe "Download Succeed" and "Finish Download" on status logs.

0		1		QFIL File Tools Configuration Help	_×
Recycle Bin	LibreOffice 7.0	VLC media player	IFB Devkit	Qualcomm HS-USB QDLoader 9008 (COM52) Select	Port
Acrobat Reader	Microsoft Edge	<b>Ditter</b>		Select Build Type                 Rat Build O Meta Build             Select Programmer           Programmer Path           C:\Users           UDesktop\\IFB Devkit\flatbuild_tu2.0_r23.1_IFB_20231030180318\trill    Brow	se
ClearPass OnGuard	PrimePDF - Drop File	Logic 2.4.7		Select Flat Build Search Path C:\Users \_\Desktop\\FB Devkit\flatbuild_lu2.0_r23.1_IFB_20231030180318\fl	
Firefox	WhiseP	Tero Term		Rawprogram and Patch RawProgram rawprogram_iunspane0.xml rawprogram_1.xml patch1.xml patch1.xml	(ML
FortClient	Cit Bash	QFIL		Status           [20231143134320.340         Writing log to C:\Uters' \integration \AppData\Roaming\Qualcomm\QFIL\COMPORT_52'port_trace.txt', might take a minut           202311403134320.341         202311403134320.341           202311403134320.345         202311403134320.345           202311403134320.347         202311403134320.347           202311403134320.347         20361           202311403134320.347         20361           20231140313420.347         20361           20231140313420.347         20361           20231140313420.347         20361           20231140313420.347         20361           20231140313420.347         20361           20231140313420.347         20361           20231140313420.347         20361           20231140313420.347         20361	e ^
Google Chrome	putty.exe			2023-11-03 13/43/201330 Printin Download	cit
				Qualcomm Flash Image Loader (QFIL) 2.0.3.5 Storage	Type: ufs

Figure 15 QFIL Flash Download Succeed



### 9. Ubuntu Host PC Programming

- 1. Follow the procedure "Setting up Eagle Kit in QDL/EDL Mode" to set the Eagle Kit in EDL mode.
- 2. Extract the downloaded Flatbuild zip file \$ unzip "flatbuild\_package.zip"
- Ubuntu Host PC adb and fastboot installation Use the commands below to install adb and fastboot.

\$ sudo apt-get update

\$ sudo apt-get install android-tools-adb android-tools-

fastboot

:~\$ unzip flatbuild_lu2.0_r23.1_IFB_20231030180318.zip				
Archive: flatbuild_lu2.0_r23.1_IFB_20231030180318.zip				
creating: flatbuild lu2.0 r23.1 IFB 20231030180318/				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_36.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-grb5165-ifb-sysfs_729.ext4				
inflating: flatbuild lu2.0 r23.1 IFB 20231030180318/xbl.elf				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/gti-ubuntu-robotics-image-grb5165-ifb-sysfs 144.ext4				
inflating: flatbuild lu2.0 r23.1 IFB 20231030180318/rawprogram3.xml				
inflating: flatbuild lu2.0 r23.1 IFB 20231030180318/rawprogram unsparse0.xml				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/gti-ubuntu-robotics-image-grb5165-ifb-sysfs 128.ext4				
inflating: flatbuild lu2.0 r23.1 IFB 20231030180318/qti-ubuntu-robotics-image-grb5165-ifb-sysfs 372.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_576.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_512.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_318.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_108.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_523.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_739.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_340.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_387.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_549.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_788.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_744.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_658.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_107.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_245.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_327.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_540.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_310.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_470.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_13.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_430.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_120.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-sysfs_19.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-ifb-systs_125.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/gpt_backup2.bin				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qt1-ubuntu-robotics-image-qrb5105-ifb-systs_/22.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-iTD-systs_634.ext4				
inflating: flatbuild_Lu2.0_r23.1_IFB_20231030180318/qti-ubuntu-robotics-image-qrb5165-itb-systs_/26.ext4				
Inflating: flatbuild_LU2.0_r23.1_IFB_20231030180318/rawprogram5.xml				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qt1-ubuntu-robotics-tmage-qrDs165-ifb-systs_103.ext4				
inflating: flatbuild_lu2.0_r23.1_IFB_20231030180318/qtt-ubuntu-robotics-image-qrb5165-iTD-systs_280.ext4				
th lating: flatbulld_luz_0_r23.1 IFB_20231030180318/qt1-ubuntu-robottCs-thage-qrb5165-tfb-systs_/28.ext4				
th latting: Flatbulld_LU2.0 F23.1 IFB_20231030180318/qt1-ubuntu-FobottCS-thage-qrb5165-tFb-Systs_160.ext4				
th tacting: Flatbuild_tdz.0 F23.1 IFB_20231030180318/dtt-ubuntu-FobottCs-tmage-drbb165-tFb-systs 4/6.ext4				
inflating. Flatbuild_Lu2.e 723.1 IFB_20231030180318/QtL-UDUNTU-FODOTICS-IMage-qFD5165-IFD-SySTS_/63.eXt4				
inflating: flatbuild_luz_0_r23.1 IFB_20231030180318/ueft_sec.Mbh				

Figure 16 Ubuntu Host PC Flatbuild Package zip file extraction



Verify the Eagle Kit device is in EDL mode
 \$ lsusb

Observe Qualcomm device entry mentioned with "(QDL mode)"



 5. Observe the Programming logs over debug console too. Run the minicom command with Serial console device node and set baud rate to 115200.
 \$ sudo minicom -D /dev/ttyUSB0 -b 115200

Expected logs after flash is completed.

	Format: Log Type - Time(microsec) - Message - Optional Info					
	S - QC_INAGE_VERSION_STRING=BOOT.XF.3.2.c2-00012-5M8250-5					
	S - IMAGE_VARIANT_STRING=Soc8250LAA S - OEM_IMAGE_VERSION_STRING=d41cf1e6f4fa					
	S - Boot Interface: USB S - Secure Root: Off					
	S - Boot Config @ 0x00786070 = 0x00000001					
	S - JTAG ID @ 0x00786130 = 0x00150001 S - OFM ID @ 0x00786138 = 0x00000000					
	5 - Serial Number @ 0x00786134 = 0x450402c1					
	S - OEM CONFIG ROW 0 @ 0X00/84120 = 0X00000000000000000 S - OEM Config Row 1 @ 0X00784128 = 0X0000000000000000					
S - Feature Config Row 0 @ 0x007841f8 = 0x0040200000000400						
	S - Core Ø Frequency, 1516 MHz					
S - PBL Patch Ver: 5 S - PBL fren: 600 MHZ						
	D - 6207 - pbl_apps_init_timestamp					
	D - 2878668 - DOOTADIE_media_detect_timestamp D - 38084015 - bl_elf_metadata_loading_timestamp					
	D - 724 - bl_hash_seg_auth_timestamp					
	D - 6188 - bl_elf_segs_hash_verify_timestamp					
	D - 7006 - bl_sec_hash_seg_auth_timestamp D - 821 - bl sec segs hash verify timestamp					
	D - 34 - pbl_populate_shared_data_and_exit_timestamp					
	B - 40903946 - SBL1, Start					
	B - 41018962 - SBL1 BUILD @ 12:43:28 on Jul 10 2023 D - 1220 - sbl1 hw init					
	D - 0 - boot_flash_init					
	D - 945 - SDI_XDICONTIG_INIC D - 0 - SDI1_feature_config_init					
	D - 0 - boot_config_data_table_default_init					
	D - 4727 - boot_config_data_table_init					
	B - 41046869 - CDT Version:3,Platform ID:8,Major ID:1,Minor ID:0,Subtype:0 D - 17294 - sbli_hw_platform_pre_ddr					
	D - 6344 - pmic DevPrg init					
	D - 0 - boot_dload_handle_forced_dload_timeout					
	D - 61 - SD11_00r_set_params B - 41081914 - Can't detect if LP5 or LP4. If it fails to start check build/harware combo					
	B - 41106588 - eCDT MRR - Data Starting Address: 0x09066D00					
	B - 41108876 - DSF version = 156.8.18					
	B - 41112200 - Manufacturer 1D = 1, Device Type = 8 B - 41115769 - Rank 0 size = 8192 MB, Rank 1 size = 0 MB					
	D - 38826 - sbl1_ddr_init D - 0 - boot pre ddi entry					
	D - 91 - sbl1_do_ddr_training					
	B - 41132025 - Deverog DDK Entry B - 41135258 - usb: init start					
	B - 41138339 - usb: enum_carried_from_pbl B - 41141267 - usb: HTGH . 0X900e					
	B - 41145293 - usb: ENUM success					
	B - 44095222 - USD: VOUS_DEL_pm_Unavail B - 44095222 - USD: host sends ZLP					
	B - 44300914 - UFS INQUIRY ID: KingstonTX17-128 003A B - 44304574 - UFS Boot LUN: 0					
	B - 44636780 - usb: host sends ZLP					
	B - 4535251 - 050. NOST SENDS 2LP B - 45286308 - usb: host sends ZLP					
	B - 45602136 - usb: host sends ZLP B - 45934098 - usb: host sends ZLP					
	B - 47862186 - usb: host sends ZLP					
	B - 319002702 - usb: host sends ZLP					

Figure 18 Ubuntu Host PC Serial Console Logs

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#### 6. Start Programming: Run the below command.

```
$ sudo chmod +x ./ubuntu_flash_flat.sh
```

```
$ sudo ./ubuntu_flash_flat.sh -x
```

```
rawprogram_unsparse0.xml,rawprogram1.xml,rawprogram2.xml,rawprogram3.
xml,rawprogram4.xml,rawprogram5.xml,patch0.xml,patch1.xml,patch2.xml,
patch3.xml,patch4.xml,patch5.xml -i ./ -f prog_firehose_ddr.elf -s
ufs
```

-> cd flatbuild [u2, 0_r23.1] [FB_20231030180318/ -//latbuild [u2, 0_r23.1] [FB_20231030183185 sudo ./ubuntu_flash_flat.sh -x rawprogram_unsparse0.xml,rawprogram1.xml,rawprogram2.xml,rawprogram3.xml,rawprogram4.xml,rawprogram5.xml,patch5.xml nl,patch1.xml,patch3.xml,patch4.xml,patch5.xml, -t ./ .f prog_flrehose_ddr.elf -s ufs [sudo] password for vasuki:
ModerManager will be stopped, If you actually need ModerManager, you can start it again after the flashing is complete. ModerManager can be started by "sudo systemcil start ModerManager" Are you sure to continue (Yiyes)?
y /tmp/turbox_edl_tools/QSaharaServer -p /dev/ttyUSB0 -s 13:prog_firehose_ddr.elf Binary build date: Oct 21 2020 @ 11:45:40 QSAHRARSERVER CALLED LIKE THIS: '/tmp/turbox_edl_tools/QSaharaServe'Current working dir: /home/vasuki/flatbuild_lu2.0_r23.1_IF6_20231030180318 Sahara napotnos:
2: ans:s.nchn 6: apps:nchn 8: dsp1.nchn 19: db1.nchn
11: osDL-bh 12: dsDL-bh 13: dsTL-bh 14: dsTL-bh
22: 1:33-min 21:301bri 23: rpm.mbn 23: rpm.mbn
28: d53.mhn 29: acdb.mhn 30: wdc.mbn 31: mba.mbn
<pre>13: prog_ftrehose_ddr.elf</pre>

Figure 19 Ubuntu Host PC Programming command execution

7. Once the flashing is completed, "All Finished Successfully" logs will appear on the screen as shown below.

13:01:43: INFO: 817	'/home/vasukl/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_main0.bin'			
13:01:43: INFO: 818	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_backup0.bin'			
13:01:43: INFO: 819	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./xbl.elf'			
13:01:43: INFO: 820	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./xbl_feature_config.elf'			
13:01:43: INFO: 821	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_main1.bln'			
13:01:43: INFO: 822	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_backup1.bin'			
13:01:43: INFO: 823	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_main2.bin'			
13:01:43: INFO: 824	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_backup2.bin'			
13:01:43: INFO: 825	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./IOT_qrd_0_1.0.bin'			
13:01:43: INFO: 826	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./zeros_Ssectors.bin'			
13:01:43: INFO: 827	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_main3.bin'			
13:01:43: INFO: 828	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./gpt_backup3.bin'			
13:01:43: INFO: 829	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./aop.mbn'			
13:01:43: INFO: 830	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./tz.mbn'			
13:01:43: INFO: 831	'/home/vasukl/flatbulld_lu2.0_r23.1_IFB_20231030180318/./hyp.mbn'			
13:01:43: INFO: 832	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./NON-HLOS.bin'			
13:01:43: INFO: 833	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./BTFM.bin'			
13:01:43: INFO: 834	'/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./abl.elf'			
13:01:43: INFO: 835	//home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./dspso.bin'			
13:01:43: INFO: 836	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./km4.mbn'			
13:01:43: INFO: 837	'/home/vasukl/flatbuild_lu2.0_r23.1_IFB_20231030180318/./qti-ubuntu-robotics-image-qrb5165-ifb-boot.img'			
13:01:43: INFO: 838	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./cmnlib.mbn'			
13:01:43: INFO: 839	'/home/vasukl/flatbuild_lu2.0_r23.1_IFB_20231030180318/./cmnlib64.mbn'			
13:01:43: INFO: 840	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./devcfg.mbn'			
13:01:43: INFO: 841	/home/vasukl/tlatbuild_lu2.0_r23.1_IFB_20231030180318/./qupv3fw.elt'			
13:01:43: INFO: 842	/home/vasuk1/flatbulld_lu2.0_r23.1_IFB_20231030180318/./ueft_sec.mbn'			
13:01:43: INFO: 843	/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/./multi_tmage.mbn			
13:01:43: INFO: 844	/home/vasukl/flatbuild_lu2.0_r23.1_IFB_20231030180318/./featenabler.mbn'			
13:01:43: INFO: 845	/home/vasuk1/flatbulld_lu2.0_r23.1_IFB_20231030180318/./imagefv.elf'			
13:01:43: INFO: 846	/home/vasuk1/flatbulld_Lu2.0_r23.1_IFB_28231030180318/./apdp.mbn			
13:01:43: INFO: 847	/home/vasukt/flatbutld_tu2.6_r23.1_fFB_20231030180318/./spunvm.btn			
13:01:43: INFO: 848	/nome/vasuki/flatbuild_lu2.0_r23.1_1FB_20231030180/3/l0gfs_uTS_BMD.bln			
13:01:43: INFO: 849	/nome/vasukt/flatbuild_lu2.6_r23.1_IFB_20231030180/./gpt_Math4.bln			
13:01:43: INFO: 850	/home/vasuk//flatbulld_lul2.b_/23.1_lFB_/20231030180310/./gpt_backup4.bln/			
13:01:43: INFO: 851	/100Me/vdsUkt/rtatbuitd_tu2.0_r23.1_1FB_zdz31030180/./gpt_maths.btn*			
13:01:43: INFU: 852	/nome/vasuki/fiatbutid_tu2.6_r23.1_iFb_20231030180318/./gpt_Dackups.bin			
13:01:43: INFO:	(done)			
13:01:43: INFO:				
13:01:43: INFO:				
13:01:43: INFO: /				
13:01:43: INFO:   (				
13:01:43: INFO: \				
13:01:43: INFO: {All	Finished Successfully}			
13:01:43: INFO: Over	all to target 77.079 seconds (114.95 MBps)			
13:01:43: INFO: (percent files transferred 100.00%)				
Mriting log to '/home/vasuki/flatbuild_lu2.0_r23.1_IFB_20231030180318/port_trace.txt', might take a minute				
Log is '/home/vasuki	/flatbuild lu2.0 r23.1 IFB 20231030180318/port trace.txt'			
:~/fla	cbuild_u2.0_r23.1_IFB_20231030180318\$			

Figure 20 Ubuntu Host PC Program Successfully



# 10. Eagle Kit Boot and Login Verify

- 1. Power up the Eagle Kit normally
- 2. Observe the Boot logs over Serial Console/Micro-B connection.

Welcome to min	ilcom 2.7.1		
OPTIONS: I180			
Compiled on De	c 23 2019, 02:06:26.		
Port /dev/ttyU	JSB0, 13:58:07		
Press CTRL-A Z	for help on special keys		
Press CTL.A.Z format: log Ty Log Type: B 5 - CC   PAGL, W 5 - CC   PAGL, W 5 - CC   PAGL, W 5 - CC   PAGL, W 5 - STC   P	<pre>f for help on special keys pr - Time(nicrosec) - nessage - optional Info Sice Bost(Peer On Reset), D - Delas, S - Statistic FRIDU_STRIME.BOST AF.J. 200012-SM230-S UNISTON_STRUME.TOCOMPACT NISTON_STRUME.TOCOMPACT NISTON_STRUMENTS NISTON_STRUMENTS Face: UTS trigft g BostSills = brodsobools berg 0.0037081JA = 0.004000000 Berg 0.0037081JA = 0.0040000000 Berg 0.0037081JA = 0.0040000000 Berg 0.0037081JA = 0.0040000000 Berg 0.0037081JA = 0.00400000000 Berg 0.0037081JA = 0.00400000000 Berg 0.0037081JA = 0.00400000000 Berg 0.0037081JA = 0.004000000000000 Berg 0.0037081JA = 0.0040000000000000 Berg 0.0037081JA = 0.00400000000000000000000000000000000</pre>		



Serial Console Login: Username: root Password: oelinux123



Figure 22 Ubuntu Host PC Eagle Kit Complete Boot and Login Prompt



## 11. Fastboot Programming

- 1. Host PC setup
  - a. Windows Host PC adb and fastboot installation Download platform tools for Windows from the link provided below.

https://developer.android.com/tools/releases/platform-tools

b. Ubuntu Host PC adb and fastboo-t installation Use the commands below to install adb and fastboot.

```
$ sudo apt-get update
```

```
$ sudo apt-get install android-tools-adb android-tools-
fastboot
```

- 2. Eagle Kit fastboot mode set
  - a. Fastboot mode set using adb commands
    - Connect the device over adb, verify the device presence in adb mode \$ adb devices
    - Enter as a root user
      - \$ adb root
    - Enter into fastboot mode
       \$ adb reboot bootloader
    - After few seconds, check the device presence in fastboot mode \$ fastboot devices



Figure 23 Eagle-Kit fastboot mode set using adb commands



- b. Fastboot mode set using VOL- key
  - Disconnect the Type-C and Power cable
  - Press Vol- Key/SW3 switch



Figure 24 Eagle-Kit fastboot mode set using Vol- Key press

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- Hold the VOL- key
- Connect the type-c cable to host pc
- Power up the Eagle Kit



Figure 25 Eagle-Kit fastboot mode set using Vol- Key press and power up

After few seconds, check the device presence in fastboot mode
 \$ fastboot devices



s

3. Fastboot mode programming

Once the device is present in fastboot mode, run the following command for fastboot programming/flashing.

\$ fastboot flash <partition name> <file name>

#### Example: Boot image flash

```
$ fastboot flash boot_a qti-ubuntu-robotics-image-qrb5165-ifb-
boot.img
$ fastboot flash boot_b qti-ubuntu-robotics-image-qrb5165-ifb-
boot.img
```

#### Once flash is completed, reboot the device to boot the flashed images

\$ fastboot reboot

C:\Users\ df746529	\Downloads\platform-tools_r33.0.3-w. fastboot	indows\platform-tools>fastboot	devices
C:\Users\ Sending 'boot_a Writing 'boot_a Finished. Total	\Downloads\platform-tools_r33.0.3-w. ' (19452 KB) ON ' ON time: 0.291s	rindows∖platform-tools>fastboot ЖАҮ [ 0.039s] ЖАҮ [ 0.126s]	flash boot_a qti-ubuntu-robotics-image-qrb5165-ifb-boot.img
C:\Users\ Sending 'boot_b Writing 'boot_b Finished. Total	\Downloads\platform-tools_r33.0.3-w ' (19452 KB) OF ' OF time: 0.280s	nindows∖platform-tools>fastboot KAY [ 0.034s] KAY [ 0.111s]	flash boot_b qti-ubuntu-robotics-image-qrb5165-ifb-boot.img
C:\Users\ Rebooting Finished. Total	\Downloads\platform-tools_r33.0.3-w Of time: 0.003s	nindows∖platform-tools>fastboot KAY [ 0.000s]	reboot
C:\Users\ List of devices df746529	\Downloads\platform-tools_r33.0.3-w. attached device	indows\platform-tools>adb devic	es

#### Figure 26 Eagle-Kit fastboot mode flash example