ENN SDK Release Notes for ExynosAuto v920 family

Revision 1.0.13
8th October 2024

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Table of Contents

1 Introduction

This document describes the various releases of ENN SDK. The releases are listed in reverse chronological order (latest release on top).

2 Release version: V14

Release version	V14
Samsung internal release version	enntools-rel-5.34.7.2
Release date	8th October 2024
DCC link	Doc ID: SOC045574002 ENN SDK V14_Tools_ENN SDK V14_ALL_REV 5.34.zip Docker loading script is included within the above *zip* file

Download instructions	Run md5sum command to make sure the downloaded file is valid
	
	Rename "ENN SDK V14_Tools_ENN SDK V14_ALL_REV 5.34.zip" to enntools-v14.zip
	
	$ md5sum enntools-v14.zip
	
	926a95004645f896e2f15ee6dc4e5ceb enntools-v14.zip
	
	Unzip the file
	
	$ unzip enntools-v14.zip
	
	A folder called 'enntools-v14' will be available after the unzip command above.
	
	enntools-v14/enntools-rel-5.34.7.2.image is the docker image
	
	enntools-v14/automotive_5.34.7.2.sh is the script that can be executed to launch the docker.
	
	Check md5sum of the image file
	
	$ md5sum enntools-rel-5.34.7.2.image
	
	a5cef8f500081140e6f2c5ec9e900ce5 enntools-rel-5.34.7.2.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fixes for issues related to last layer being reshape & concat. 2. Fixes for activation fusion optimization for PReLU. 3. Fixes for bug in Transpose Softmax optimization in order to support Yolo-v9t.
Known issues	None.

3 Release version: V13

Release version	V13
Samsung internal release version	enntools-rel_5.33.5.1
Release date	6 September 2024
DCC link	Doc ID: SOC045544003 ENN SDK V13_Tools_ENN SDK V13_ALL_REV 5.33.zip Docker loading script is included within the above *zip* file

Download instructions	Run md5sum command to make sure the downloaded file is valid
	
	Rename "ENN SDK V13_Tools_ENN SDK V13_ALL_REV 5.33.zip" to enntools-v13.zip
	
	$ md5sum enntools-v13.zip
	
	50f34dcdaed9be164c54f122bd02c32f enntools-v13.zip
	
	Unzip the file
	
	$ unzip enntools-v13.zip
	
	A folder called 'enntools-v13' will be available after the unzip command above.
	
	    enntools-v13/enntools-rel:5.33.5.1_updated.image is the docker image
	
	    enntools-v13/automotive_5.33.5.1.sh is the script that can be executed to launch the docker.
	
	Check md5sum of the image file
	
	$ md5sum enntools-v13/enntools-rel:5.33.5.1_updated.image
	
	428b54fd90654fcf375c9ebbf94d191f enntools-v13/enntools-rel:5.33.5.1_updated.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fix for conversion of Resnet50 Int8 model
Known issues	Resnet50 has some layers with a very large range of weights & bias values. This info is lost in int8 quantization, leading to a drop in accuracy at those layers. It is suggested to use FP16 quantization for Resnet50.

4 Release version: V12

Release version	V12
Samsung internal release version	enntools-rel_5.32
Release date	21 August 2024
DCC link	Doc ID: SOC045525004 ENN SDK Tools_Miscellaneous_ALL_REV 12.00 Docker loading script: Included within the above *zip* file

Download instructions	Run md5sum command to make sure the downloaded file is valid
	Rename ENN SDK Tools_Miscellaneous_ALL_REV 12.00.zip to enntools-rel_5.32.zip
	$ md5sum enntools-rel_5.32.zip
	994172cb031145f4094023c07175a3f6 enntools-rel_5.32.zip
	
	Unzip the file
	$ unzip enntools-rel_5.32.zip
	A folder called 'enntools_V12' will be available after the unzip command above.
	   enntools_V12/enntools-rel_5.32.12.1.image is the docker image
	   enntools_V12/docker.sh is the script that can be executed to launch the docker.
	Check md5sum of the image file
	$ md5sum enntools_V12/enntools-rel_5.32.12.1.image
	8cf1e20e214cff5be4bb795f583088fe enntools_V12/enntools-rel_5.32.12.1.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	2. Support for Yolo-v4 tiny ONNX model was already supported in previous release. In this release, we added support for Darknet based yolov4 tiny model. 3. Fixing bug related to default parameters of PAD layer. 4. Update the DSP libraries. 5. Accuracy related fixes added. 6. Minor optimizations.
Known issues	None

5 Release version: V11

Release version	V11
Samsung internal release version	enntools-rel_5.31
Release date	20 July 2024
DCC link	Doc ID: SOC045494001 (ENN SDK V11_Tools_ENN SDK ver 11_ALL_REV 5.31.bz2) Docker loading script: Included within the above *tar.bz2* file

Download instructions	Run md5sum command to make sure the downloaded file is valid.
	
	Rename ENN SDK V11_Tools_ENN SDK ver 11_ALL_REV 5.31.bz2 to enntools-rel_5.31.tar.bz2
	
	$ md5sum enntools-rel_5.31.tar.bz2
	
	75eafb393f638ec7faeb4bd365e124c5 enntools-rel_5.31.tar.bz2
	
	Unzip the file
	
	$ tar -xvjf enntools-rel_5.31.tar.bz2
	A folder called 'docker' will be available after the untar command above.
	
	   docker/enntools-rel:5.31.20.2_v2.image is the docker image
	   docker/docker_5.31.20.2_v2.sh is the script that can be executed to launch the docker.
	
	Check md5sum of the image file
	$ md5sum enntools-rel\:5.31.20.2_v2.image
	9d736e2c1272bcc5c2f10e8df9c80ef0 enntools-rel:5.31.20.2_v2.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Support for Yolo-v4 tiny ONNX model.
Known issues	None

6 Release version: V10

Release version	V10
Samsung internal release version	enntools-rel_5.30.21.2_v2
Release date	21 June 2024
DCC link	Doc ID: SOC045491004 (ENN Tools SDK _Software_ALL_REV 10.00) Docker loading script: SOC045491005 (Docker load script_Miscellaneous_ALL_REV 10.00)

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	
	Rename ENN Tools SDK_Software_ALL_REV 10.00 to enntools-rel_5.30.zip
	
	$ md5sum enntools-rel_5.30.zip
	
	243fc7cbe48e95b272f83bd9f8f2ee12 enntools-rel_5.30.zip
	
	Unzip the file
	
	$ unzip enntools-rel_5.30.zip
	
	Check md5sum of the image file
	
	$ md5sum enntools-rel_5.30.21.2_v2.image
	
	10632a804902c6d367128c3474b1a313 enntools-rel_5.30.21.2_v2.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fixes to support Yolo-v8n 2. Support for Matmul and Gather ops on NPU
Known issues	1. Yolo-v4-tiny onnx model does not built correctly.

7 Release version: V9.01

Release version	V9.01. This has a minor fix on top of release V9.
Samsung internal release version	enntools-rel_5.28.11.2
Release date	12 April 2024
DCC link	Doc ID: SOC045394013 (ENN Tools SDK_Miscellaneous_ALL_REV 9.01) Docker loading script: SOC045394014 (Docker loading script _Miscellaneous_ALL_REV 9.01)

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	
	Rename ENN Tools SDK_Miscellaneous_ALL_REV 9.01 to enntools-rel_5.28.zip
	
	$ md5sum enntools-rel_5.28.zip
	
	7d5d3a3e02f1add3057a27990baaf683 enntools-rel_5.28.zip
	
	Unzip the file
	
	$ unzip enntools-rel_5.28.zip
	
	Check md5sum of the image file
	
	md5sum enntools-rel_5.28.11.2_v2.image
	
	dae8bae67811dd8294a6ad44b1cd9eb2 enntools-rel_5.28.11.2_v2.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fixes to support ResNet18 & yolov4-tiny model. 2. Fixed LSTM model compilation failure in SDK release version - v9
Known issues	2. Yolo-v8 models are not built correctly.

8 Release version: V9

Release version	V9
Samsung internal release version	enntools-rel_5.28.3.2
Release date	12 April 2024
DCC link	Doc ID: SOC045394003 (ENN Tools SDK _Software_ALL_REV 9.00) Docker loading script: SOC045394004 (Docker load script_Miscellaneous_ALL_REV 9.00)

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	
	Rename ENN Tools SDK_Software_ALL_REV 9.00 to enntools-rel_5.28.zip
	
	$ md5sum enntools-rel_5.28.zip
	
	6d3f9eb8b22b9bf45e55b4d3b093a786 enntools-rel_5.28.zip
	
	Unzip the file
	
	$ unzip enntools-rel_5.28.zip
	
	Check md5sum of the image file
	
	$ md5sum enntools-rel_5.28.3.2_v5.image
	
	6d5f457f87af1e5fb1cd32966b65d7eb enntools-rel_5.28.3.2_v5.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	3. Fixes to support ResNet18 & Yolo-v4 tiny models.
Known issues	3. Yolo-v8 model is not built correctly.

9 Release version: V8

Release version	V8
Samsung internal release version	enntools-rel_5.26.28.2
Release date	29 Feb 2024
DCC link	Doc ID: SOC045351020 (EnnTools_Software_SDK_ALL_REV 8.00) Docker loading script: SOC045351021 (Docker loading script_Miscellaneous_ALL_REV 8.00)

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	Rename EnnTools_Software_SDK_ALL_REV 8.00 to enntools-rel_5.26.zip
	$ md5sum enntools-rel_5.26.zip
	8a0180d7020ea3b4972ab6a7589d9911 enntools-rel_5.26.zip
	Unzip the file
	$ unzip enntools-rel_5.26.zip
	Check md5sum of the image file
	$ md5sum enntools-rel_5.26.28.2.image
	5600ede208da89da903a4f8839364238 enntools-rel_5.26.28.2.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fixes to support LSTM ONNX models. 2. Error Log addition in certain code-paths to help debug model building errors. 3. Updates to DSP compiler libs. 4. Fixes to conversion tool (SCVT).
Known issues	1. ResNet18 and Yolo-v8 models are not built correctly.

10 Release version: V7

Release version	V7
Samsung internal release version	enntools-rel_5.22.8.1.231020
Release date	19th December 2023
DCC link	https://dcc.sec.samsung.net:9806/common/detailsearch/registrationDocumentDetail.do?docId=SOC045219005&docVer=81851&popFlag=popup Doc ID : SOC045219005 Docker loading script : SOC045140001

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	Rename Enn Tools_V7_Software_ALL_REV 7.00 to enntools-rel_5.22.zip
	$ md5sum enntools-rel_5.22.zip
	474c09b3c6090c2250dd5859d4c6ceea enntools-rel_5.22.zip
	Unzip the file
	$ unzip enntools-rel_5.22.zip
	Check md5sum of the image file
	$ md5sum enntools-rel_5.22.8.1.231020.image
	0ab266d877bfb492e922c5497657a25c enntools-rel_5.22.8.1.231020.image

Supported Features	Refer Section: *Ops Support*
Fixes / New features	Support for LSTM, GRU and exponential ops for v920 EVT1 and EVT2.
Known issues	None

11 Release version: V6

Release version	V6
Samsung internal release version	enntools-rel_5.20.1.1.230801
Release date	2nd August 2023
DCC link	https://dcc.sec.samsung.net:9806/common/detailsearch/registrationDocumentDetail.do?docId=SOC045140028&docVer=80607&_menuId=AWtoAvlaANPld5zH Doc ID : SOC045140028 Docker loading script : SOC045140001

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	Rename Enn Tools_V6_Software_ALL_REV 6.00 to enntools-rel_5.20.zip
	$ md5sum enntools-rel_5.20.zip
	abdf1890a4d0f71a469c1bbbdb63eaa9 enntools-rel_5.20.zip
	Unzip the file
	$ unzip enntools-rel_5.20.zip
	Check md5sum of the image file
	$ md5sum enntools-rel_5.20.1.1.230801.image
	32ece059693cd7f40382c93b1e1ddb87 enntools-rel_5.20.1.1.230801.image

Supported Features	Refer Section: *Ops Support*

Fixes / New features	1. Fixes for activation functions:
	    a. PReLU
	    b. Leaky ReLU
	    c. Sigmoid
	    d. ELU
	Note: PReLU, Leaky ReLU and Sigmoid are supported on v920 EVT0/1 and EVT2. ELU is supported only on v920 EVT2.

Known issues	1. LSTM and GRU models fail to compile. 2. Exponential activation function – test vector has bit mismatching.

12 Release version: V5

Release version	V5
Samsung internal release version	enntools-rel_5.16.5.2.230605
Release date	9th June 2023
DCC link	https://dcc.sec.samsung.net:9806/common/detailsearch/registrationDocumentDetail.do?docId=SOC045086001&docVer=79861&_menuId=AWtoAvlaANPld5zH Doc ID : SOC045086001 Docker loading script : SOC045086003

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	Rename Enn Tools_V5_Software_ALL_REV 5.00 to enntools-rel_5.16.zip
	`$ md5sum enntools-rel_5.16.zip`
	`6e5645925347f080264af0fa698a693a  enntools-rel_5.16.zip`
	Unzip the file
	`$ unzip   enntools-rel_5.16.zip`
	Check md5sum of the image file
	`$ md5sum enntools-rel_5.16.5.2.230605.image`
	`5bf46d8d884988ebd04b4813acc44462  enntools-rel_5.16.5.2.230605.image`

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Support for kittv2 evt2 2. Added Gen-5a option to reflect Kittv2 evt2 in GUI & CLI. 3. Removed unsupported compiler options like GPU/CPU/DSP.
Known issues	1. DSP for FC layer 2. CPU for FC layer 3. LSTM Layer Compilation failing.

13 Release version: V4

Release version	V4
Samsung internal release version	enntools-rel_5.16.2.2.230412.image
Release date	12th Apr 2023
DCC link	https://dcc.sec.samsung.net:9806/common/distribution/distributionDetail.do?distrbId=DS20230412013328&_menuId=AWtoAvIaANPld5zH Doc ID : SOC045028003 Docker loading script : SOC044957009

Download instructions	Run md5sum command to make sure the downloaded docker file is valid.
	
	Rename Enn Tools_Software_ALL_REV 4.00 to enntools-rel_5.16.2.2.zip
	
	`$ md5sum enntools-rel_5.16.2.2.zip`
	
	`22a921aaf8abfadd1fb33f4d2a88d785  enntools-rel_5.16.2.2.zip`
	
	Unzip the file
	
	`$ unzip  enntools-rel_5.16.2.2.zip`
	
	Check md5sum of the image file
	
	`$ md5sum enntools-rel_5.16.2.2.230412.image`
	
	`7723e9047f143498f445b420dfd105ed  enntools-rel_5.16.2.2.230412.image`

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fixed the issues with using GPU for FC layer.
Known issues	1. Compiler options ; only NPU works, DSP & CPUGPU etc not working.

14 Release version: V3

Release version	V3
Samsung internal release version	enntools-rel_5.14.0.2.230206
Release date	7th Feb 2023
DCC link	https://dcc.sec.samsung.net:9806/common/distribution/distributionDetail.do?distrbId=DS20230207012185&_menuId=AWtoAvIaANPld5zH Part 1 : SOC044964001 Part 2: SOC044964002 Docker loading script : SOC044964003

Download instructions	Download the docker parts mentioned above from DCC.
	Rename enntools part1_Software_ALL_REV 5.14 to part-1.zip
	Rename enntools part2_Software_ALL_REV 5.14 to part-2.zip
	Concatenate the parts
	
	```$ cat part-1.zip part-2.zip > enntools-rel_5.14.zip```
	
	You can run md5sum command to make sure the combined file is valid.
	
	```$ md5sum enntools-rel_5.14.zip```
	```280fb3beaf0dda6d570a475e9af76c9a enntools-rel_5.14.zip```
	
	Unzip the file
	```$ unzip enntools.zip```
	
	Check md5sum of the image file
	```$ md5sum enntools-rel_5.14.0.2.230206.image```
	```c8713849a557e2cb15c91ebfc00cf90c enntools-rel_5.14.0.2.230206.image```

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fix for PE issue: Performance Estimator is not working in rel 5.13
Known issues	1. Adding layer is failing (failed to add CPU/ GPU layer) For Alexnet & Mobile, last layer assign to GPU/CPU/DSP was not working.

15 Release version: V2

Release version	V2
Samsung internal release version	enntools-rel_5.13.4.1.230127
Release date	31st Jan 2023
DCC link	https://dcc.sec.samsung.net:9806/common/distribution/distributionDetail.do?distrbId=DS20230131012053&_menuId=AWtoAvIaANPId5zH Part 1 - SOC044957006 Part 2 - SOC044957007 Part 3 - SOC044957008 Docker loading script - SOC044957009

Download instructions	Download the docker parts mentioned above from DCC.
	
	Rename enntools part1_Software_ALL_REV 5.13 to part-1.zip
	
	Rename enntools part2_Software_ALL_REV 5.13 to part-2.zip
	
	Rename enntools part3_Software_ALL_REV 5.13 to part-3.zip
	
	Concatenate the parts
	
	`$ cat part-1.zip part-2.zip part-3.zip> enntools.zip`
	
	You can run md5sum command to make sure the combined file is valid.
	
	`$ md5sum enntools.zip`
	
	`e1733b92368fb5feb85363ecbebb851c  enntools.zip`
	
	Unzip the file
	
	`$ unzip  enntools.zip`
	
	Check md5sum of the image file
	
	`$ md5sum enntools-rel_5.13.4.1.230127.image`
	
	`50eca5317e6fec2b6c5edf1ded6293d9  enntools-rel_5.13.4.1.230127.image`

Supported Features	Refer Section: *Ops Support*
Fixes / New features	1. Fixes for Alexnet and mnist_siamese models: - Caffe Siamese model conversion - crash is seen in enntools at the end of conversion process
Known issues	1. Performance Estimator is not working in rel 5.13

16 Release version: V1

Release version	V1
Samsung internal release version	enntools-rel_5.11.1.2.221103
Release date	8th Nov 2022
DCC link	https://dcc.sec.samsung.net:9806/common/distribution/distributionDetail.do?distrbId=DS20221108010582&_menuId=AWtoAvlaANPld5zH Part 1: SOC044872010 Part 2: SOC044872011 Part 3: SOC044872012 Docker loading script - SOC044872009

Download instructions	Download the docker parts mentioned above from DCC.
	
	Rename EnnTools Docker Part 1_Software_ALL_REV 1.00 to part-1.zip
	
	Rename EnnTools Docker Part 2_Software_ALL_REV 1.00 to part-2.zip
	
	Rename EnnTools Docker Part 3_Software_ALL_REV 1.00 to part-3.zip
	
	Concatenate the parts
	
	`$ cat part-1.zip part-2.zip part-3.zip > enntools-rel_5.11.1.2.221103.zip`
	
	Run sha256sum command to make sure the combined file is valid.
	
	`$  sha256sum enntools-rel_5.11.1.2.221103.zip`
	
	`d2374c18c5d6f0a9a2ea5686c6e689744c3d70e32e81a0c4c6df742ebd715adc  enntools-rel_5.11.1.2.221103.zip`
	
	Unzip the file
	
	`$ unzip enntools-rel_5.11.1.2.221103.zip`

Supported Features	Refer Section: *Ops Support*
Known issues	1. Caffe Siamese model conversion - crash is seen in enntools at the end of conversion process

17 Ops support

The SDK supports compilation of models that use NPU, DSP, GPU and CPU. Following table lists the most commonly used ops based on customer requests. This is not an exhaustive list of supported ops.

Note:

1. 'O' in a column indicates that the operation/feature is supported.

S.no.	Operator Name	KITTv2 EVT0/1		KITTv2 EVT2		Note
		NPU	DSP	NPU	DSP	
1	Split	O		O		
2	Resize_Bilinear (Upsampling)	O		O		We support two algorithms of Upsample which are popular. Ref: https://www.tensorflow.org/api_docs/python/tf/image/resize Support for integer ratio size, and align_corners=False
3	Resize_Nearest_Neighbor (Upsampling)	O		O		Support for integer ratio size, and align_corners=False
4	ELU	O		O		
5	LSTM	O		O	O	On EVT2, Eltwise runs on DSP, rest of the layers run on NPU.
6	GRU	O		O	O	On EVT2, Eltwise runs on DSP, rest of the layers run on NPU.
7	Concatenate	O		O		
8	Convolution	O		O		Support 1x1, 3x3, 5x5 and 7x7; support for stride 1,2,4 and padding; support for channel-wise / depth-wise / point-wise
9	Crop	O		O		
10	Depthwise Convolution	O		O		Support 1x1, 3x3, 5x5 and 7x7; support for stride 1,2,4 and padding; support for channel-wise / depth-wise / point-wise
11	Element Sum	O		O	O	
12	Element Mul	O		O	O	
13	Exponential	O			O	
14	Fully Connected	O		O		
15	Permute	O		O		
16	Max Pool	O		O		Support 2x2, 3x3 and 4x4
17	AvgPool	O		O		Support 2x2, 3x3 and 4x4
18	ReLU	O		O		
19	Reshape	O		O		

20	Sigmoid	O		O		
21	Slice	O		O		
22	Softmax		O		O	Softmax is not supported on EVT1, but is supported on DSP of EV2.
23	Leaky ReLU	O		O		
24	Deconvolution	O		O		Support 1x1, 3x3, 5x5 and 7x7; support for stride 1,2,4 and padding; support for channel-wise / depth-wise / point-wise
25	PReLU	O		O		
26	Matmul			O		
27	Gather			O		