Application Note:

ACUITY Operation Mapping and Support List

Revision 1.12
14 December 2021

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Preface

This document provides neural network operation mappings between ACUITY, OVXLIB, and high level neural network (NN) frameworks.

This document contains the following chapters:

- *1, Operation Mappings Between NN Networks and ACUITY*
- *2, ACUITY to OVXLIB Operation Mapping*

For the compatible ACUITY, OVXLIB and Unified Driver versions, see the *Document Revision History* Chapter.

For the supported NN frameworks, see Section *1.1, Supported NN Frameworks*.

1 Operation Mappings Between NN Networks and ACUITY

The chapter contains the following sections:

1.1 Supported NN Frameworks

ACUITY translates the following NN frameworks into its own formats. Then, ACUITY exports them into OpenVX applications for use with the Vivante Unified Driver.

The supported NN frameworks include:

- TensorFlow (TF) 2.6.0

- TensorFlow Lite (TFLite) generated from TF 2.3.0

- Keras generated from TF 2.6.0

- ONNX 1.10.2

- Caffe

- Darknet

1.2 TF to ACUITY Operation Mapping

The following table lists the operation mapping between TensorFlow (TF) and ACUITY.

For the supported TF version, see Section *1.1, Supported NN Frameworks*.

TF Operation	ACUITY Operation
tf.abs	abs
tf.add / tf.nn.bias_add	add
tf.add_n	addn / add
tf.argmin	argmin
tf.argmax	argmax
tf.batch_to_space_nd	batch2space
tf.nn.batch_normalization	batchnormalize / instancenormalize / layernormalize / batchnorm_single
tf.nn.fused_batchnorm	batchnormalize
tf.cast	cast
tf.clip_by_value	clipbyvalue
tf.concat	concat
tf.nn.conv1d	conv1d
tf.nn.conv2d / tf.nn.depthwise_conv2d / tf.nn.conv1d	convolution
tf.nn.conv3d	conv3d
tf.image.crop_and_resize	cropsandresize
tf.nn.conv2d_transposed	deconvolution
tf.depth_to_space	depth2space
tf.equal	equal
tf.exp	exp
tf.nn.elu	elu
tf.nn.embedding_lookup	embedding_lookup
tf.erf	erf
tf.maximum	eltwise(MAX)
tf.floor	floor
tf.matmul	fullconnect

TF Operation	ACUITY Operation
tf.floordiv	floor_div
tf.gather_nd	gathernd
tf.gather/ tf.nn.embedding_lookup	gather
tf.nn.gelu	gelu
tf.nn.rnn_cell_GRUCell tf.nn.dynamic_rnn	gru
tf.nn.rnn_cell_GRUCell	gru_cell
tf.greater	greater
tf.greater_equal	greater_equal
tf.image.resize_bilinear / tf.image.resize_nearest_ neighbor	image_resize
tf.contrib.layers.instance_n orm / tf.nn.fused_batch_norm	instancenormalize
tf.nn.local_response_ normalization	localresponsenormalization_ tf
tf.nn.l2_normalize	l2normalize
tf.nn.rnn_cell_LSTMCell / tf.nn_dynamic_rnn	lstm
tf.rnn_cell.LSTMCell	lstm_unit
tf.less	less
tf.less_equal	less_equal
tf.logical_or	logical_or
tf.logical_add	logical_and
tf.nn.leaky_relu	leakyrelu
tf.multiply	multiply
tf.nn.moments	moments
tf.minimum	minimum
tf.matmul / tf.batch_matmul	matmul

TF Operation	ACUITY Operation
tf.not_equal	not_equal
tf.negative	neg
tf.one_hot	one_hot
tf.pad	pad
tf.transpose	permute
tf.nn.avg_pool / tf.nn.max_pool / tf.reduce_mean	pooling
tf.nn.max_pool_with_ argmax	poolwithargmax
tf.pow	pow
tf.reduce_any	reduceany
tf.reduce_max	reducemax
tf.reduce_mean	reducemean
tf.reduce_sum	reducesum
tf.reverse / tf.reverse_sequence	reverse
tf.nn.relu	relu
tf.nn.relu6	relun
tf.rsqrt	rsqrt
tf.realdiv	real_div
tf.repeat	repeat

TF Operation	ACUITY Operation
tf.reshape / tf.expand_dims / tf.squeeze	reshape
tf.round	round
tf.strided_slice	stridedslice
tf.sqrt	sqrt
tf.square	square
tf.subtract	subtract
tf.scatter_nd	scatternd
tf.stack	stack
tf.nn.sigmoid	sigmoid
tf.signal.frame	signalframe
tf.slice	slice
tf.nn.softmax	softmax
tf.space_to_batch_nd	space2batch
tf.space_to_depth	space2depth
tf.split	split
tf.nn.swish	swish
tf.tile	tile
tf.nn.tanh	tanh
tf.unstack	unstack
tf.where/tf.select	where

1.3 TFLite to ACUITY Operation Mapping

The following table lists the operation mapping between TensorFlow Lite (TFLite) and ACUITY.

For the supported TFLite version, see Section *1.1, Supported NN Frameworks*.

TFLite Operation	ACUITY Operation
ADD	add
ADD_N	addn
ARG_MAX	argmax
ARG_MIN	argmin
AVERAGE_POOL_2D / MAX_POOL_2D	pooling
ABS	abs
BATCH_TO_SPACE_ND	batch2space
CAST	cast
CONV_2D / DEPTHWISE_CONV_2D	convolution
CONCATENATION	concat
DEPTH_TO_SPACE	depth2space
DEQUANTIZE	dequantize
DIV	divide
ELU	elu
EMBEDDING_LOOKUP	embedding_lookup
EXP	exp
EQUAL	equal
EXPAND_DIMS	expanddims
FLOOR_DIV	floor_div
FLOOR	floor
FULLY_CONNECTED	fullconnet / fullconnet_op
GATHER_ND	gathernd
GATHER	gather
GREATER	greater
GREATER_EQUAL	greater_equal
HARD_SWISH	hard_swish
LOGICAL_OR	logical_or

TFLite Operation	ACUITY Operation
LOCAL_RESPONSE_NORMALIZATION	localresponsenormalization
LOGISTIC	sigmoid
LSTM	lstmunit
L2_NORMALIZATION	l2normalize
L2_POOL_2D	l2pooling
LESS_EQUAL	less_equal
LOGICAL_AND	logical_and
LOGICAL_NOT	logical_not
LOG_SOFTMAX	log_softmax
LESS	less
LEAKY_RELU	leakyrelu
MAXIMUM	maximum
MUL	multiply
MEAN	reducemean
MIRROR_PAD	pad
NON_MAX_SUPPRESSION_V5	nms
NOT_EQUAL	not_equal
NEG	neg
ONE_HOT	one_hot
POW	pow
PACK	stack
PAD / PADV2	pad
PRELU	prelu
RANK	rank
REDUCE_ANY	reduceany
REDUCE_MIN	reducemin
RSQRT	rsqrt
REDUCE_MAX	reducemax
RELU	relu

TFLite Operation	ACUITY Operation
RELU1 / RELU_N1_TO_1 / RELU6	relun
RESIZE_BILINEAR/RESIZE_NEAREST_NEIGHBOR	image_resize
REVERSE_SEQUENCE	reverse_sequence
REVERSE_V2	reverse_v2
ROUND	round
SCATTER_ND	scatternd
SEGMENT_SUM	segment_sum
SELECT	where
SHAPE	shapelayer
SIN	sin
SQUEEZE / RESHAPE	reshape
SPLIT / SPLIT_V	split
SOFTMAX	softmax
SPARSE_TO_DENSE	sparse_to_dense
SVDF	svdf
SQUARE	square
SQUARED_DIFFERENCE	squared_difference

TFLite Operation	ACUITY Operation
SUB	subtract
SUM	reducesum
SLICE	slice
SPACE_TO_BATCH_ND	space2batch
STRIDED_SLICE	stridedslice
SPACE_TO_DEPTH	space2depth
TOPK / TOPK_V2	topk
TRANSPOSE_CONV	deconvolution
TRANSPOSE	permute
TILE	tile
TANH	tanh
UNIQUE	unique
UNPACK	unstack
UNIDIRECTIONAL_SEQUEENCE_LSTM	lstm
WHERE	where

1.4 Keras to ACUITY Operation Mapping

The following table lists the operation mapping between Keras and ACUITY.

For the supported Keras version, see Section 1.1, Supported NN Frameworks.

Keras Operation	ACUITY Operation
Add	add
Activation(relu)	relu
Activation(sigmoid)	sigmoid
Activation(softmax)	softmax
Activation(tanh)	tanh
BatchNormalization / BatchNormalizationV1	batchnormalize
Conv1D	conv1d
Conv2D	convolution
Conv2DTranspose	deconvolution
Conv3D	conv3d
ConvLSTM2D	conv2d_lstm
Cropping2D	slice
Concatenate	concat
DepthwiseConv2D	depthwise_convolution
Dense	fullconnect
Embedding	embedding_lookup
Flatten / Reshape	reshape
GRU	gru
LeakyRelu	leakyrelu

Keras Operation	ACUITY Operation
LSTM	lstm
Maximum	maximum
Minimum	minimum
Multiply	multiply
MaxPooling2D / AveragePooling2D / GlobalAveragePooling2D / GlobalMaxPooling2D	pooling
Permute	permute
PRelu	prelu
RELU	relu_keras
RNN	keras_rnn_lstm
SeparableConv2D	depthwise_convolution
Subtract	subtract
SimpleRNN	lstm_keras
Softmax	softmax
ThresholdedReLU	relun
UpSampling2D	image_resize
ZeroPadding2D	pad

1.5 ONNX to ACUITY Operation Mapping

The following table lists the operation mapping between ONNX and ACUITY.

For the supported ONNX version, see Section *1.1, Supported NN Frameworks*.

Note: In the table, operations in blue are either added or updated in this release.

ONNX Operation	ACUITY Operation
ArgMin	argmin
ArgMax	argmax
Add	add
Abs	abs
And	logical_and
BatchNormalization	batchnormalize
Clip	clipbyvalue
Cast	cast
CastLike	cast
Ceil	ceil
Celu	celu
Concat	concat
ConvTranspose	deconvolution / deconvolution1d
Conv	conv1d / group_conv1d / depthwise_conv1d / convolution / conv2d_op / depthwise_conv2d_op / conv3d
Cumsum	cumsum
Div	divide
Dropout	dropout
DepthToSpace	depth2space
DequantizeLinear	dequantize
Einsum	einsum
Equal	equal
Erf	erf
Exp	exp
Elu	elu
Expand	expand_broadcast
Floor	floor

ONNX Operation	ACUITY Operation
InstanceNormalization	instancenormalize
Gemm	matmul / fullconnect
Gather	gather
Greater	greater
GreaterOrEqual	greater_equal
GatherND	gathernd
GRU	gru
HardSigmoid	hard_sigmoid
HardSwish	hard_swish
Logsoftmax	log_softmax
LRN	localresponsenormalization
Log	log
LeakyRelu	leakyrelu
Less	less
LessOrEqual	less_equal
LSTM	lstm
MatMul	matmul / fullconnect
Max	eltwise(MAX)
MaxPool / AveragePool / GlobalAveragePool / GlobalMaxPool	pooling / pool1d / pool3d
MaxRoiPool	roipooling
Mean	eltwise(MEAN)
MeanVarianceNormalization	instancenormalize
Min	eltwise(MIN)
Mod	mod
Mul	multiply
Neg	neg
NonZero	nonzero
Or	logical_or

ONNX Operation	ACUITY Operation
Prelu	prelu
Pad	pad
Pow	pow
QuantizeLinear	quantize
QLinearMatMul	matmul
QLinearConv	convolution / conv1d
Relu	relu
Reshape / Squeeze / Unsqueeze / Flatten	reshape
ReduceSum	reducesum
ReduceMean	reducemean
ReverseSequence	reverse_sequence
ReduceMax	reducemax
ReduceMin	reducemin
ReduceL1	abs + reducesum
ReduceL2	reducesum + multiply + sqrt
ReduceLogSum	reducesum + log
ReduceLogSumExp	exp + reducesum + log
ReduceProd	reduceprod
ReduceSumSquare	multiply + reducesum
Reciprocal	variable + divide
Resize	image_resize
ScatterND	scatter_nd_update

ONNX Operation	ACUITY Operation
Shape	shapelayer
Sigmoid	sigmoid
Sign	sign
Sin	sin
Size	size
Slice	slice / stridedslice
Softmax	softmax
Softplus	softrelu
Softsign	abs + add + divide + variable
SpaceToDepth	space2depth
Split	split / slice
Sqrt	sqrt
Squeeze	squeeze
Sub	subtract
Sum	eltwise(SUM)
Tile	tile
Transpose	permute
Tanh	tanh
Unsqueeze	reshape
Upsample	image_resize
Where	where
Xor	not_equal

1.6 Caffe to ACUITY Operation Mapping

The following table lists the operation mapping between Caffe and ACUITY.

For the supported Caffe version, see Section *1.1, Supported NN Frameworks*.

Note: The current release does not support non-standard Caffe operations.

Caffe Operation	ACUITY Operation
absval	abs
axpy	a_times_b_plus_c
batchnorm / bn	batchnormalize
convolution	convolution
concat	concat
convolutiondepthwise	convolution
dropout	dropout
depthwiseconvolution	convolution
deconvolution	deconvolution
elu	elu
eltwise	eltwise
flatten	flatten
innerproduct	fullconnect
lrn	localresponsenormalization
l2normalizescale	l2normalizescale
leakyrelu	leakyrelu
lstm	lstm
normalize	l2normalize
poolwithargmax	poolwithargmax

Caffe Operation	ACUITY Operation
premute	premute
prelu	prelu
pooling	pooling
priorbox	priorbox
proposal	proposal
reorg	reorg
roipooling	roipooling
relu	relu
reshape	reshape
reverse	reverse
swish	swish
slice	split
scale	multiply
shufflechannel	shuffle
softmax	softmax
sigmoid	sigmoid
tanh	tanh

1.7   Darknet to ACUITY Operation Mapping

The following table lists the operation mapping between Darknet and ACUITY.

For the supported Darknet version, see Section *1.1, Supported NN Frameworks*.
For more details about Darknet, visit https://pjreddie.com/darknet/.

Darknet Operation	ACUITY Operation
avgpool	pooling
batch_normalize	batchnormalize
connected	fullconnect
convolutional	convolution
depthwise_convolutional	convolution
leaky	leakyrelu
logistic	sigmoid
maxpool	pooling
mish	mish
region	region

Darknet Operation	ACUITY Operation
reorg	reorg
relu	relu
route	concat / slice
softmax	softmax
shortcut	add/slice + add/pad + add
scale_channels	multiply
swish	swish
upsample	upsampling
yolo	yolo

2   ACUITY to OVXLIB Operation Mapping

The following table lists the mapping between the ACUITY operations and the OVXLIB operations.

Note 1: The OVXLIB operation prefix VSI_NN_OP_ is omitted from the following table.
Note 2: In the table, operations in blue are either added or updated in this release.

ACUITY Operation	OVXLIB Operation	ACUITY Operation	OVXLIB Operation
abs	ABS	depthwise_conv2d_op	CONV2D
add	ADD	depthwise_convolution	CONV2D
addn	ADDN	deconvolution	DECONVOLUTION
argmin	ARGMIN	deconvolution1d	DECONVOLUTION1D
argmax	ARGMAX	depthwise_conv1d	DEPTHWISE_CONV1D
a_times_b_plus_c	A_TIMES_B_PLUS_C	embedding_lookup	EMBEDDING_LOOKUP
batchnorm_single	BATCHNORM_SINGLE	einsum	Not available currently
batch2space	BATCH2SPACE	erf	ERF
batchnormalize	BATCH_NORM	expand_broadcast	EXPAND_BROADCAST
cast	DATACONVERT / CAST	exp	EXP
ceil	CEIL	elu	ELU
celu	Not available currently	equal	RELATIONAL_OPS_EQUAL
conv3d	Not available currently	fullconnectrelu	FCL_RELU
concatshift	CONCATSHIFT	fullconnect_op	FCL2
crop	CROP	floor	FLOOR
concat	CONCAT	floor_div	FLOORDIV
conv2d_op convolution	CONV2D	floor_mod	Not available currently
		fullconnectaxis	FCL2
conv1d	CONV1D	fullconnectreluaxis	FCL2
conv2d_lstm	CONV2D_LSTM	fullconnect	FCL
conv3d	CONV3D	gelu	GELU
cos	Not available currently	greater	RELATIONAL_OPS_GREAT
clipbyvalue	CLIP	greater_equal	RELATIONAL_OPS_GREAT_EQUAL
convolutionrelu	CONV_RELU		
convolutionrelupool	CONV_RELU_POOL	groupnormalize	GROUP_NORM
depth2space	DEPTH2SPACE	gather	GATHER
downsample	RESIZE	gathernd	GATHER_ND
divide	DIVIDE	gru	GRU
dropout	DROPOUT	gru_cell	GRUCELL
dtype_converter	DATACONVERT	group_conv1d	CONV1D
dequantize	DATACONVERT	hard_sigmoid	HARD_SIGMOID

ACUITY Operation	OVXLIB Operation		ACUITY Operation	OVXLIB Operation
hard_swish	HSWISH		rank	Not available currently
image_resize	RESIZE		real_div	DIVIDE
instancenormlize	INSTANCE_NORM		reducemax	REDUCE_MAX
lstm	LSTM_OVXLIB		reducemin	REDUCE_MIN
Localresponsenormalization _tf	LRN2		reorg	REORG
			repeat	REPEAT
l2normalizescale	L2NORMALIZESCALE		relu	RELU
l2pooling	POOL		rsqrt	RSQRT
log_softmax	LOG_SOFTMAX		relun	RELUN / CLIP
log	LOG		relu_keras	RELU_KERAS
l2normalize	L2_NORMALIZE		reduceany	REDUCE
layernormalize	LAYER_NORM		reducemean	REDUCE_MEAN
lstmunit	LSTMUNIT_OVXLIB		reduceprod	Not available currently
leakyrelu	LEAKY_RELU		reducesum	REDUCE_SUM
less	RELATIONAL_OPS_LESS		reshape	RESHAPE
less_equal	RELATIONAL_OPS_LESS_EQUAL		reverse_sequence	REVERSE_SEQUENCE
logical_and	LOGICAL_AND		reverse	REVERSE
logical_not	LOGICAL_NOT		reverse_v2	Not available currently
logical_or	LOGICAL_OR		resizebilinear_image / resizenearest_image	RESIZE
localresponsenormalization	LRN			
minimum	MINIMUM		roipooling	ROI_POOL
max	ELTWISEMAX		round	ROUND
mod	Not available currently		sequence_mask	SEQUENCE_MASK
moments	MOMENTS		sigmoid	SIGMOID
mish	MISH		scatter_nd_update	SCATTER_ND_UPDATE
matmul	MATRIXMUL		segment_sum	Not available currently
maximum	MAXIMUM		shapelayer	Not available currently
multiply	MULTIPLY		sign	Not available currently
neg	NEG		size	Not available currently
nms	Not available currently		sparse_to_dense	Not available currently
nonzero	Not available currently		squared_difference	Not available currently
not_equal	RELATIONAL_OPS_NOT_EQUAL		squeeze	RESHAPE
one_hot	ONE_HOT		square	SQUARE
prelu	PRELU		subtract	SUBTRACT
pow	POW		slice	SLICE
proposal	PROPOSAL		space2batch	SPACE2BATCH
pooling / pool1d	POOL		swish	SWISH
poolwithargmax	POOLWITHARGMAX		shuffle	SHUFFLECHANNEL
pad	PAD		svdf_ext	SVDF
permute	PERMUTE		spatialtransformer	SPATIAL_TRANSFORMER
quantize	DATACONVERT		signalframe	SIGNAL_FRAME

ACUITY Operation	OVXLIB Operation
space2depth	SPACE2DEPTH
split	SPLIT
stridedslice	STRIDED_SLICE
stack	STACK
stack_concat	TENSORSTACKCONCAT
softmax	SOFTMAX
softrelu	SOFTRELU
sin	SIN
sqrt	SQRT
scatternd	SCATTER_ND

ACUITY Operation	OVXLIB Operation
tanh	TANH
tile	TILE
topk	TOPK
upsampling	RESIZE
upsample	UPSAMPLE
unique	Not available currently
unstack	UNSTACK
variable	VARIABLE
where	WHERE

Document Revision History

This section describes changes of each document revision.

Revision	Date	Compatible Software	Change History

1.12	2021-12-14	• ACUITY 6.3.x and later
		• Unified Driver 6.4 and later
		• OVXLIB 1.1.37 and later
			• Section *1.1, Supported NN Frameworks*:
			  ▪ Updated the support of TensorFlow 2.3.0 to TensorFlow 2.6.0.
			  ▪ Updated the supported TensorFlow version for Keras model generation from 2.3.0 to 2.6.0.
			  ▪ Updated the support of ONNX 1.8.0 to ONNX 1.10.2.
			• Section *1.5, ONNX to ACUITY Operation Mapping*:
			  Added the following ONNX operations and their ACUITY equivalents: `CastLike`, `Cumsum`, `HardSwish`, and `MaxRoiPool`.
			• Chapter *2, ACUITY to OVXLIB Operation Mapping*:
			  Added the ACUITY operation `conv3d` and its OVXLIB equivalent.

1.11	2021-09-22	• ACUITY 6.0.0 and later
		• Unified Driver 6.4 and later
		• OVXLIB 1.1.34 and later
			• Section *1.2, TF to ACUITY Operation Mapping*:
			  Added the TF operation `tf.nn.gelu` and its ACUITY equivalent.
			• Section *1.4, Keras to ACUITY Operation Mapping*:
			  Added the Keras operation `ConvLSTM2D` and its ACUITY equivalent.
			• Section *1.5, ONNX to ACUITY Operation Mapping*:
			  Added the ONNX operation `HardSigmoid` and its ACUITY equivalent.
			• Chapter *2, ACUITY to OVXLIB Operation Mapping*:
			  ▪ Added the following ACUITY operations and their OVXLIB equivalents: `conv2d_lstm` and `gelu`.
			  ▪ Updated the ACUITY operation gru with its OVXLIB equivalent changed to GRU.
			  ▪ Updated the ACUITY operation gru_cell with its OVXLIB equivalent changed to GRUCELL.
			  ▪ Updated the ACUITY operation lstm with its OVXLIB equivalent changed to LSTM_OVXLIB.
			  ▪ Added the OVXLIB equivalent for the ACUITY operation `scatter_nd_update`.

Revision	Date	Compatible Software	Change History

1.10	2021-06-28	• ACUITY 5.24.0 and later
		• Unified Driver 6.4 and later
		• OVXLIB 1.1.32 and later
			• Section *1.1, Supported NN Frameworks*:
			Updated the support of ONNX 1.6.0 to ONNX 1.8.0.
			• Section *1.2, TF to ACUITY Operation Mapping*:
			Added the following TF operations and their ACUITY equivalents: `tf.erf`, `tf.one_hot`, `tf.reduce_any`, `tf.reduce_max`, `tf.repeat`, and `tf.round`.
			• Section *1.3, TFLite to ACUITY Operation Mapping*:
			Added the following TFLite operations and their ACUITY equivalents: `ELU`, `LOGICAL_NOT`, `NON_MAX_SUPPRESSION_V5`, `ONE_HOT`, `PADV2`, `RANK`, `REDUCE_ANYREVERSE_SEQUENCE`, `REVERSE_V2`, `ROUND`, `SCATTER_ND`, `SEGMENT_SUM`, `SELECT`, `SHAPE`, `SIN`, `SPLIT_V`, `SPARSE_TO_DENSE`, `SQUARED_DIFFERENCE`, `TOPK/TOPK_V2`, and `UNIQUE`.
			• Section *1.4, Keras to ACUITY Operation Mapping*:
			Added the following Keras operations and their ACUITY equivalents: `Conv3D`, `Maximum`, `Minimum`, and `Permute`.
			• Section *1.5, ONNX to ACUITY Operation Mapping*:
			  ▪ Added the following ONNX operations and their ACUITY equivalents: `Ceil`, `Celu`, `Einsum`, `Erf`, `GreaterOrEqual`, `LessOrEqual`, `Mean`, `MeanVarianceNormalization`, `Mod`, `NonZero`, `ReduceProd`, `ScatterND`, `Shape`, `Sign`, `Size`, and `Unsqueeze`.
			  ▪ Updated the ONNX operation Conv with an ACUITY equivalent `conv3d` added.
			  ▪ Updated the ONNX operation MaxPool/AveragePool/ GlobalAveragePool/GlobalMaxPool with an ACUITY equivalent `pool1d` added.
			• Chapter *2, ACUITY to OVXLIB Operation Mapping*:
			  ▪ Added the following ACUITY operations and their OVXLIB equivalents: `ceil`, `erf`, `groupnormalize`, `logical_not`, `one_hot`, `pool1d`, `repeat`, `reduceany`, `reverse_sequence`, `round`, `sequence_mask`, and `topk`.
			  ▪ Specified the ACUITY operations that are not mapped to OVXLIB.
			• Refined the document structure and content.

1.03	2020-12-25	• ACUITY 5.18.0 and later • Unified driver 6.4.5 and later • OVXLIB 1.1.29 and later	• Section 2, Deep Learning Framework-ACUITY Operation Mapping: Updated the compatible version of TensorFlow to 2.3.0. • Section 2.3, TFLite to ACUITY Mapping: Added the TFLite operation `DEPTH_TO_SPACE` and its ACUITY equivalent. • Section 2.4, ONNX to ACUITY Mapping: Updated the ONNX operation `ConvTranspose` with an ACUITY equivalent `deconvolution1d` added. • Section 3, ACUITY to OVXLIB Mapping: Added the ACUITY operation `deconvolution1d` and its OVXLIB equivalent.

Revision	Date	Compatible Software	Change History

1.02	2020-09-23	• ACUITY 5.16.0 and later
		• Unified driver 6.4.4 and later
		• OVXLIB 1.1.27 and later
			• Section 2: Updated the version of TensorFlow API from 1.13 to 2.0.0.
			• Section 2.2: Added TensorFlow operation: `tf.cast`.
			• Section 2.3: Added TFLite operations: ARGMAX, ARGMIN, SUM, and MIRROR_PAD.
			• Section 2.4:
			  ▪ Added ONNX operations: DequantizeLinear, Expand, QuantizeLinear, QLinearMatMul, QLinearConv, Reciprocal, and Resize.
			  ▪ Updated ONNX operations: Slice and Split.
			• Section 2.6:
			  ▪ Updated the version of TensorFlow from 1.13.x to 2.0.0.
			  ▪ Removed Keras operation: Dropout.
			• Section 3:
			  ▪ Added ACUITY operations: expand_broadcast and scatternd.
			  ▪ Updated ACUITY operation: cast.

1.01	2020-07-24	• ACUITY 5.15.0 and later
		• Unified driver 6.4.3.1 and later
		• OVXLIB 1.1.25 and later
			• Section 2.2: Added TensorFlow operation: `tf.nn.conv1`.
			• Section 2.4: Added ONNX operations: GRU, LSTM, Min, MaxPool/AveragePool, ReduceL1, ReduceL2, ReduceLogSum, ReduceLogSumExp, ReduceSumSquare, Softsign, Softplus, Sin, and Xor.
			• Section 2.5:
			  ▪ Added Darknet operation: mish.
			  ▪ Updated Darknet operations: logistic, route, and shortcut.
			• Section 2.6:
			  ▪ Removed Keras operation: SimpleRNN.
			  ▪ Updated Keras operation: LSTM.
			• Section 3: Added ACUITY operation: sin.

1.00	2020-07-09	• ACUITY 5.14.0 and later • Unified driver 6.4.3 and later • OVXLIB 1.1.24 and later	• Initial release • Adapted from Vivante.AppNote.VIP.Neural.Nework.Layer.and.Operation.Support v1.1.7 • Updated format of all tables. • Deleted Section 4.