RX DSP Library Version 5.0

Release Note

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Introduction

This document describes the modification of RX DSP Library Version 5.0.

Contents

1. Changes

1.1 RXv1, RXv2 and RXv3 CPUs Support

- DSP library files and a sample project supporting RXv3 CPU are newly developed.
- This version of the DSP library supports the RXv1, RXv2 and RXv3 CPUs. So far, DSP libraries were provided as version 3.0 and 4.1 by RX CPU generations, while this version provides all DSP libraries collectively.
- Refer to the application note “RX Family RX DSP Library Version 5.0” (R01AN4359) for DSP library files and sample projects corresponding to each CPU.

1.2 RX DSP Library APIs Version 5.0 User’s Manual

- The “RX DSP Library APIs Version 5.0 User’s Manual: Software” is changed to use commonly for the RXv1, RXv2 and RXv3 CPUs.

1.3 Application Note RX DSP Library APIs Version 5.0 Additional Information

- Application notes describing information depending on each of the RXv1, RXv2 and RXv3 CPUs are newly provided as “RX DSP Library APIs Version 5.0 Additional Information”. The application notes are divided into each CPU and described internal functions, resource requirements and execution cycles.

1.4 Version Acquisition API

- Providing DSP libraries collectively in this version, the Version Acquisition API is changed to get information of the supported CPU version. For details, refer to “3.1 Version Acquisition API” in the User’s Manual.

1.5 Statistics Operation API

- The definition of maximum number of input data is specified 65536.

1.6 Mean absolute value and maximum absolute value functions

- Processing to return R_DSP_STATUS_OVERFLOW at an overflow occurrence is made the same for all the fixed-point operations of libraries with _Check.

1.7 Histogram functions

- Errors in judgement processing for R_DSP_STATUS_HISTO_OUT_OF_RANGE are corrected. Due to errors the operation was disrupted before completion.

1.8 Filter Operation API

- Leaky LMS filter, Lattice FIR filter, Lattice IIR filter and Generic IIR filter are removed from the filter operation API.

1.9 Generic FIR Filter Operation Functions

- Processing to return R_DSP_STATUS_OVERFLOW at an overflow occurrence is made the same for all the fixed-point operations of libraries with _Check.
- In the User’s Manual, descriptions about return value R_DSP_ERR_INVALID_OPTIONS are removed because those were unnecessary.

1.10 IIR Biquad Filter Initialization Functions, IIR Biquad Filter Delay Data Array Size Acquisition Functions

- The default value for handle-> form is specified as follows for all the operations;
  For Fixed-point operations: R_DSP_BIQUAD_FORM_I
  For Floating-point operations: R_DSP_BIQUAD_FORM_II

- In the User's Manual, the definition of return value R_DSP_ERR_INVALID_STAGES is corrected to "Number of stages is outside the specifiable range".

1.11 IIR Biquad Filter Operation Functions

- Errors in judgment processing for error code R_DSP_ERR_INVALID_SCALE are corrected.
- The valid range for handle->scale.i32 in R_DSP_IIRBiquad_ci16ci16 is corrected to 1 to 30.
- Processing to return R_DSP_STATUS_OVERFLOW at an overflow occurrence is made same the for all fixed-point operation of libraries with _Check.
- In the User's Manual, the definition of return value R_DSP_ERR_INVALID_STAGES is corrected as "Number of stages is outside the specifiable range".

1.12 Single pole IIR Filter Operation Functions

- R_DSP_ERR_INPUT_NULL was returned when the input data count is 0 but it is changed to return R_DSP_ERR_INVALID_INPUT_SIZE.
- Processing to return R_DSP_STATUS_OVERFLOW at an overflow occurrence is made the same for all the fixed-point operation of libraries with _Check.
- Checking processing for the specifiable range of coefficients is added to prevent frequent overflow occurrence.
- Error code R_DSP_INVALID_COEFF is added to confirm whether or not coefficients are a specifiable range.

1.13 Complex IDFT Functions, Complex Conjugate Symmetric IDFT Functions

- Errors in checking processing for the argument dst->n is corrected.
- The error checking operation when accessing NULL pointer is corrected.
- Internal function calling processing is corrected because an internal function of Complex Conjugate Symmetric IDFT Functions was called.

1.14 Real DFT Operation Functions

- The definition of dst->n in the User's Manual is corrected.

1.15 FFT/IFFT API

- The R_DSP_FFT_OPT_NO_BITREV option is deleted from the specification of options of the r_dsp_fft_t structure.

1.16 FFT/IFFT Memory Size Acquisition Functions, FFT/IFFT Initialization Functions

- The list of return values is corrected in the User's Manual so that the return value R_DSP_ERR_INVALID_POINTS is specified for the case of "conversion point count is outside the specifiable range". In the previous version it was R_DSP_ERR_INVALID_INPUT_SIZE.

1.17 Complex FFT Operation Functions, Complex IFFT Operation Functions, Real FFT Operation Functions, Complex Conjugate Symmetric IFFT Operation Functions

- Processing to return Error code R_DSP_ERR_INPUT_NULL is added.
- Processing to return R_DSP_STATUS_OVERFLOW at an overflow occurrence is made the same for all the fixed-point operation of libraries with _Check.
- The list of return values is corrected in the User's Manual. The correction is that the return value R_DSP_ERR_INVALID_POINTS is specified for the case of "conversion point count is outside the specifiable range".
- In the User's Manual, R_DSP_ERR_INVALID_OPTIONS is added in the list of error codes.

1.18 Complex Number Addition Functions

- Processing to return R_DSP_STATUS_OVERFLOW as an overflow occurrence is made the same for all the fixed-point operation of libraries with _Check.

1.19 Complex Number Multiplication Functions

- The output format is changed to Q1.XX.
- Processing to return R_DSP_STATUS_OVERFLOW as an overflow occurrence is made the same for all the fixed-point operation of libraries with _Check.

1.20 Complex Number Magnitude Functions

- In order to prevent an overflow occurrence, output format of operation result is changed as follows:
  in case of i16: Q2.14
  in case of i32: Q2.30

1.21 Complex number magnitude squared functions

- In case of fixed-point operation, the output format is changed from Q1.xx to Q3.xx.

1.22 Complex Conjugate Functions

- Return value is changed to R_DSP_ERR_INVALID_INPUT_SIZE when input->n is 0.
- Judgment processing for R_DSP_ERR_INVALID_OUTPUT_SIZE is added.
- Processing to return R_DSP_STATUS_OVERFLOW as an overflow occurrence is made the same for all the fixed-point operations of libraries with _Check.

1.23 Matrix Addition Functions

- Processing to return R_DSP_STATUS_OVERFLOW as an overflow occurrence is made the same for all the fixed-point operations of libraries with _Check.

1.24 Matrix Subtraction Functions

- Processing to return R_DSP_STATUS_OVERFLOW as an overflow occurrence is made the same for all the fixed-point option of libraries with _Check.

1.25 Matrix Multiplication Functions

- Operation processing error is corrected.
- Judgement processing for error code R_DSP_ERR_INVALID_SCALE is made the same for all the operations.
- Judgment processing for error code R_DSP_ERR_DEMENTIONS is made the same for all the operations.
- Processing to return R_DSP_STATUS_OVERFLOW as an overflow occurrence is made the same for all the fixed-point operation of libraries with _Check.
- R_DSP_ERR_INVALID_SCALE is added in the list of error codes in the User' Manual.

1.26 Matrix Transposition Functions

- It is corrected because the outputs are an incorrect transposed matrix.

1.27 Matrix Real Number Multiplication Functions

- Judgment processing for error code R_DSP_ERR_INVALID_SCALE is corrected.
- Processing to return R_DSP_STATUS_OVERFLOW as an overflow occurrence is made the same for all the fixed-point operation of libraries with _Check.
- R_DSP_ERR_INVALID_SCALE is added in the list of error codes in the User's Manual.

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