



VC-1 Decoder Software Release Note

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This document contains all errata known at the date of issue.

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Introduction

Scope

This document describes errata categorised by level of severity. Each description includes:

- the current status of the defect
- where the implementation deviates from the specification and the conditions under which erroneous behavior occurs
- the implications of the erratum with respect to typical applications
- the application and limitations of a 'work-around' where possible

Categorisation of Errata

Errata recorded in this document are split into three levels of severity:

- | | |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category 1 | Behavior that is impossible to work around and that severely restricts the use of the product in all, or the majority of applications, rendering the device unusable. |
| Category 2 | Behavior that contravenes the specified behavior and that might limit or severely impair the intended use of specified features, but does not render the product unusable in all or the majority of applications. |
| Category 3 | Behavior that was not the originally intended behavior but should not cause any problems in applications. |

Change Control

07 Dec 2004: Changes in Document v1	ARM
14 Jan 2005: Updated copyright statement	Microsoft
01 Apr 2005: New entries added	Microsoft, Radha Giduthuri
01 Jul 2005: New entries added	Microsoft

Status	ID	Cat	Summary
Old	1	Cat 2	Output YUV file should be to MAX_CODED_SIZE and not DISPLAY_SIZE
Old	2	Cat 2	MV prediction interlaced B 4MV fill in
Old	3	Cat 2	Chroma derivation change
Old	4	Cat 2	Motion compensation pull back for interlaced field not strong enough
Old	5	Cat 2	Intensity compensate field the wrong way around
Old	6	Cat 2	Interlaced Frame ACPred default zig-zag table changed to left
Old	7	Cat 2	4MV MB in 1MB wide images
Old	8	Cat 2	Fix overflow in HRD model calculations
Old	9	Cat 2	Zero MV history for skipped frames
Old	10	Cat 2	Padding and pull-back wrong when interlaced predicted from progressive
Old	11	Cat 2	DMV_Y not decoded correctly when EXTENDED_DMV set
Old	12	Cat 2	Update HRD parameters to CD2r1
Old	13	Cat 2	Broken link behaviour has been updated to CD2r1
Old	14	Cat 2	Ensure that RndCtrl is not toggled for skipped frame in main and simple profiles
Old	15	Cat 2	Ensure that MVs are not sent when macroblock is coded in Direct Mode
Old	16	Cat 2	Check for invalid Intensity Compensation requests
Old	17	Cat 2	Bitstream handling miscalculates the length on empty packets
Old	18	Cat 2	Update First-Stage Chroma Motion Vector Reconstruction to FCD1r3
Old	19	Cat 2	Fix Potential Chroma MV Pullback Problem in Interlace Field Pictures
Old	20	Cat 2	Limit the Backward Reference Frame Distance in Field Pictures to ≥ 0
Old	21	Cat 2	Interlaced Frame ACPred default zig-zag table changed from left to normal
Old	22	Cat 2	Update of RndCtrl in Skipped Pictures of Simple/Main Profile changed
New	23	Cat 2	Ensure RFF, TFF/RPTFRM and Pan-Scan Flags are decoded in skipped frames
New	24	Cat 2	Ensure decoded PsF value is interpreted correctly
Old	25	Cat 3	Inverse transform changed
Old	26	Cat 3	PsF bit is decoded in Sequence Layer of Advanced Profile
New	27	Cat 3	Fix casting problems causing compiler warnings
New	28	Cat 3	Ensure Field Start Codes are always present in Interlace Field Pictures

New	29	Cat 3	Ensure Reserved Start Code suffixes are correctly handled
New	30	Cat 3	Ensure Chroma MV pullback in Main Profile B pictures matches FCD1r3

Errata - Category 1

There are no Errata in this Category

Errata - Category 2

1: Output YUV file should be to MAX_CODED_SIZE and not DISPLAY_SIZE

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

For advanced profile the output YUV file should be set to the MAX_CODED_SIZE and the DISPLAY_SIZE should be ignored.

Implications

The decoder will output YUV data at the wrong resolution.

Workaround

None.

2: MV prediction interlaced B 4MV fill in

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

For interlaced field B 4MV forward or backward macroblocks, to fill in the corresponding backward or forward MV the code should use 1MV rather than 4MV prediction.

Implications

Some bitstreams will be incorrectly handled.

Workaround

None.

3: Chroma derivation change

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

The specification has been updated on the handling of interlaced field chroma motion vector derivation. Conversion of the coordinate system from field to frame takes place before the MV median.

Implications

Some bitstreams will be incorrectly handled.

Workaround

None.

4: Motion compensation pull back for interlaced field not strong enough

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

When decoding an interlace field picture that is not a multiple of 32 high (e.g., 320x240), the padding pads to the next block boundary + standard pad rather than macroblock boundary + pad since each macroblock is twice as high. This leads to motion vectors going off the bottom of the padded area.

Implications

The decoder will incorrectly decode some bitstreams.

Workaround

None.

5: Intensity compensate field the wrong way around

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

For Interlaced Field intensity compensation, the two intensity compensation values are for top and bottom field not first and second reference field.

Implications

Bitstreams with TFF=0 that use intensity compensation will be incorrectly processed.

Workaround

None.

6: Interlaced Frame ACPred default zig-zag table changed to left

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

The specification has been clarified: interlaced frame I MB with AC prediction but no top or left intra MBs should use the left zig-zag table rather than the normal table.

Implications

Some bitstreams will be incorrectly handled.

Workaround

None.

7: 4MV MB in 1MB wide images

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

Interlaced field pictures should not use the B predictor for MV prediction for 4MV when predicting the MV of blocks 0 and 2 when the image is 1MB wide.

Implications

Interlace field bitstreams which are 1 macroblock wide may not be correctly handled.

Workaround

None.

8: Fix overflow in HRD model calculations

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

If a large frame rate denominator and HRD bitrate are specified, interim calculations in the HRD model can overflow a 32-bit integer.

Implications

Some bitstreams will not be correctly processed.

Workaround

None.

9: Zero MV history for skipped frames

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

In the instance where anchor frames are skipped, the MV history should be zeroed out for future B frames' direct mode vectors.

Implications

Some bitstreams will not be correctly handled.

Workaround

None.

10: Padding and pull-back wrong when interlaced predicted from progressive

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

The decoder is in error in the following circumstances:

1. Reference picture is progressively padded AND
2. Current picture uses an interlaced field motion vector AND
3. (Field is top and Y is off the bottom) OR (Field is bottom and Y is off the top) AND
4. BiCubic interpolation used (Luma only)

In these circumstances the decoder should clip to the Y range (-18,Height+1) rather than (-17,Height) as in the case where the current and reference pictures are of the same type.

Implications

Some bitstreams will be incorrectly processed.

Workaround

None.

11: DMV_Y not decoded correctly when EXTENDED_DMV set

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

For advanced interlaced images with EXTENDED_DMV, the DMV_Y component can be incorrectly decoded. This happens in the cases where (EXTENDED_DMV_Y==1 && DMV_Y==0) or when (EXTENDED_DMV_X==1, EXTENDED_DMV_Y==0 && DMV_Y!=0).

Implications

Some bitstreams are incorrectly decoded.

Workaround

None.

12: Update HRD parameters to CD2r1

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

Specification CD2r1 states that the number of leaky buckets is encoded as N, not N-1.

Implications

The code needs updating to match the revised specification.

Workaround

None.

13: Broken link behaviour has been updated to CD2r1

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

CD1r2 specifies that following a broken link:

1. A B picture with a missing anchor should be dropped
2. A P/I picture following a broken link should have the P replaced by a copy of the I

Implications

The decoder must implement the required behaviour.

Workaround

None.

14: Ensure that RndCtrl is not toggled for skipped frame in main and simple profiles

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

RndCtrl should not be toggled for a skipped frame but should remain the same as the previous decoded I,BI,P frame in simple and main profile.

Implications

The decoder should not toggle RndCtrl for skipped frame in simple and main profiles.

Workaround

None.

15: Ensure that MVs are not sent when macroblock is coded in Direct Mode

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

In B pictures, if a MB is coded in direct mode, motion vectors will not be sent. This should be verified at the decoder.

Implications

The decoder should assert if a DirectMode coded macroblock has coded MVs.

Workaround

None.

16: Check for invalid Intensity Compensation requests

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

Intensity Compensation is not available in Simple profile but the decoder does not check this.

Implications

The decoder should check for invalid requests for Intensity Compensation.

Workaround

None.

17: Bitstream handling miscalculates the length on empty packets

Status

Cat 2, Present in release 1, Fixed in release 2.

Description

'End of Sequence' markers are not followed by any bytes of data. The decoder does not recognise this when attempting to strip the stop bit from the EBDU.

Implications

The decoder wrongly reports that bits were unused when processing an End of Sequence.

Workaround

None.

18: Update First-Stage Chroma Motion Vector Reconstruction to FCD1r3

Status

Cat 2, Present in release 1 and release 2. Fixed in release 3.

Description

In specification FCD1r3, the offset 'n' is removed from the equations in the first-stage Chroma Motion Vector Reconstruction.

Implications

The code needs updating to match the revised specification.

Workaround

None.

19: Fix Potential Chroma MV Pullback Problem in Interlace Field Pictures

Status

Cat 2, Present in release 1 and release 2. Fixed in release 3.

Description

The chroma motion vector pullback in field pictures would pull back the motion vector one line too far for the case where the reference frame was coded as progressive.

Implications

The last line of a reference block could have incorrect subpixel interpolation results if the motion vector pointed to a location completely outside the reference frame and the reference frame was coded as progressive.

Workaround

None.

20: Limit the Backward Reference Frame Distance in Field Pictures to ≥ 0

Status

Cat 2, Present in release 1 and release 2. Fixed in release 3.

Description

According to the backward reference frame distance calculation in FCD1r3, the backward reference frame distance for B field pictures could be negative. For this case the backward reference frame distance is set equal to zero.

Implications

Negative backward frame distances are undefined resulting in unpredictable behavior in the decoder.

Workaround

None.

21: Interlaced Frame ACPred default zig-zag table changed from left to normal

Status

Cat 2, Present in release 2, Fixed in release 3.

Description

Reverted the change made in Errata Category 2 Item 6. The specification has been clarified: interlaced frame I MB with AC prediction but no top or left intra MBs should use the normal zig-zag table instead of the left zig-zag table.

Implications

Some bitstreams will be incorrectly handled.

Workaround

None.

22: Update of RndCtrl in Skipped Pictures of Simple/Main Profile changed

Status

Cat 2, Present in release 1 and release 2. Fixed in release 3.

Description

The value of RndCtrl should not be toggled if a skipped picture is decoded in simple/main profile. This has been clarified in FCD1r3.

Implications

Bitstreams with skipped picture in simple/main profile would have been incorrectly handled.

Workaround

None.

23: Ensure RFF, TFF/RPTFRM and Pan-Scan Flags are decoded in skipped frames

Status

Cat 2, Present in release 3. Fixed in release 4. New in this document.

Description

RFF, TFF, RPTFRM and Pan-scan Flags were not being decoded in skipped frames. This has been fixed.

Implications

Display meta-data for skipped frames is now parsed correctly.

Workaround

None.

24: Ensure decoded PsF value is interpreted correctly

Status

Cat 2, Present in release 3. Fixed in release 4. New in this document.

Description

Sequence-layer PsF flag was not being interpreted correctly. This has been fixed.

Implications

Streams with PsF Flag will now be interpreted correctly.

Workaround

None.

Errata - Category 3

25: Inverse transform changed

Status

Cat 3, Present in release 1 and release 2. Changed in release 3. New in this document.

Description

Replaced the implementation of the inverse transform specified in informative Annex A.2 with the implementation specified in normative Annex A.1 of FCD1r3.

Implications

None.

Workaround

None.

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26: PsF bit is decoded in Sequence Layer of Advanced Profile

Status

Cat 3, Present in release 1 and release 2. Changed in release 3. New in this document.

Description

The Reserved bit which was present in sequence layer of advanced profile is now decoded as the PsF bit.

Implications

The code needs updating to match the revised specification.

Workaround

None.

27: Fix compiler warnings

Status

Cat 3, Present in release 3. Changed in release 4. New in this document.

Description

Fixed compiler warnings related to unused variables, and casting.

Implications

None.

Workaround

None.

28: Ensure Field Start Codes are always present in Interlace Field Pictures

Status

Cat 3, Present in releases 1–3. Changed in release 4. New in this document.

Description

Added check to ensure that field start codes are always present.

Implications

The code needs updating to match the revised specification which now mandates the presence of field start codes in interlace field pictures.

Workaround

None.

29: Ensure Reserved Start Code suffixes are correctly handled

Status

Cat 3, Present in releases 1–3. Changed in release 4. New in this document.

Description

Ensure that the decoder is able to continue parsing the bitstream even if reserved start codes are present.

Implications

None.

Workaround

None.

30: Ensure Chroma MV pullback in Main Profile B pictures matches FCD1r3

Status

Cat 3, Present in releases 1–3. Changed in release 4. New in this document.

Description

Ensure that the implementation order in the code precisely matches the order defined in the spec.

Implications

None. There is no change in output reconstructed frames.

Workaround

None.