

Box mode #8

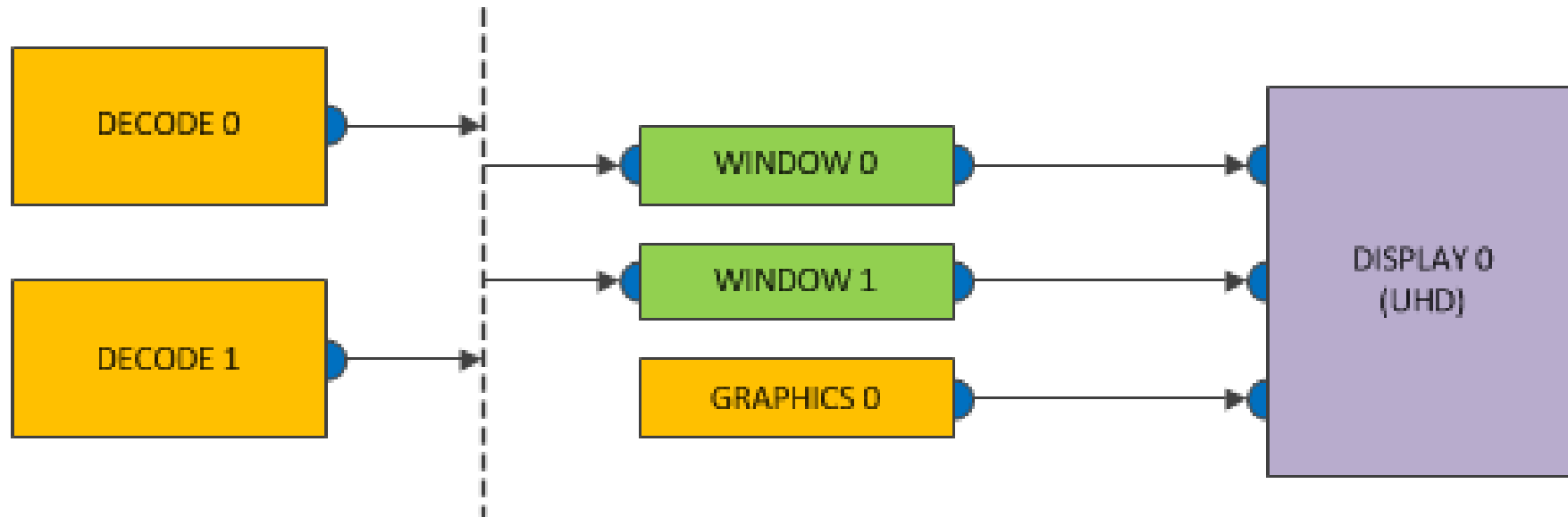
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Box mode #8

- Required memory speed: 1x 32-bit LPDDR4-3733
 - No high-temperature refresh
- Features:
 - Two decoders:
 - One 3840x2160p60 10-bit decode
 - One 1080p30 10-bit decode
 - Multi-PIP supported (3+1)
 - UHD display only (no SD)
 - Main + PIP
 - PIP has some mosaic capabilities
 - No HDMI input
 - No transcoding

Possible video routings



Source limitations

- Decode 0
 - 3840x2160p60 10-bit HEVC / VP9
 - 1920x1080p60 8-bit AVC / MPEG2
 - Multi-PIP (3x)
 - 1920x1080p30/60i 10-bit HEVC
 - 1920x1080p30/60i 8-bit VP9 / AVC / MPEG2
 - No MTG
- Decode 1
 - 1920x1080p30/60i 10-bit HEVC / VP9
 - 1920x1080p30/60i 8-bit AVC / MPEG2
 - Mosaic (4x)
 - 480p60/60i 8-bit HEVC / VP9 / AVC / MPEG2
 - No MTG
- Graphics 0 (UHD)
 - 1080p60 32-bit ARGB
 - Requires graphics compression

HARDWARE RESOURCE MAPPING

- Requires overclocking of HVD0 to achieve 4kp60 + 1080p30 rates
 - Implemented through a power profile

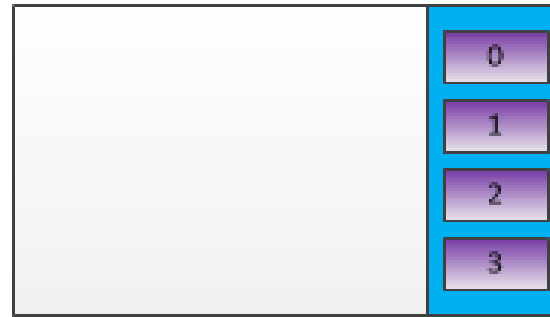
Decoder	MFD	Hardware
Decode 0	MFD0	HVD0
Decode 1	MFD1	HVD0

Window limitations

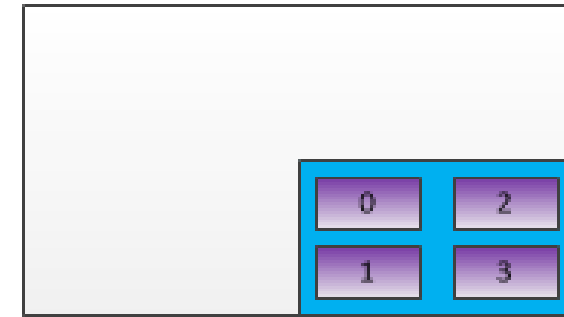
- Window 0 (MAIN / UHD)
 - Up to full-screen display (smooth scaling)
 - 1080i60 de-interlacing
 - Multi-PIP (3x)
 - Each display rectangle up to 25% x 25%
 - 480i60 de-interlacing
- Window 1 (PIP / UHD)
 - The window is limited to 100%x25%, 50%x50%, or 25%x100% (smooth scaling)
 - See next slide.
 - Supports 1080i60 de-interlacing
 - Mosaic (4x):
 - Each display rectangle up to 25% x 25%
 - 480i60 de-interlacing
 - Limited placement due to the bounding boxes.

Mosaic Bounding Box

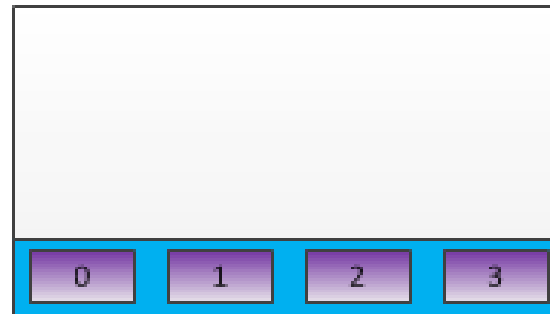
- Typically the mosaic usages have a size limitation and can be located anywhere on the display canvas.
 - 100% x 100% of the canvas is available.
- In this particular box mode, we have both a size limitation as well as limitation on where the mosaic rectangles can be located.
- All of the mosaics must be constrained to be within one of the three defined bounding boxes:
 - 25% x 100% of the canvas
 - 50% x 50% of the canvas
 - 100% x 25% of the canvas
- This bounding box limitation exists for a single source PIP (non-mosaic) as well.



VALID 25% x 100%
Bounding box



VALID 50% x 50%
Bounding box



VALID 100% x 25%
Bounding box



INVALID 100% x 25%
Bounding box

Display and encode limitations

- Display 0 (UHD)
 - 3840x2160p60