



Pinnacle Imaging Systems Denali-MC HDR ISP and its MFSO HDR provides the highest possible DR and is HDR motion compensated. The DOL HDR mode provides customers with an alternative HDR solution with slightly less DR, but potentially higher frames rates, lesser compute requirements and no motion artifacts.

**Below are HDR methods Pinnacle can potentially support:**

1. Multiple frameset output - MFSO (Sony) [completed development]
2. Dual gain merge - (Omnivision)
3. Split diode (Omnivision, CMOSIS, Fairchild Imaging)
4. Dual conversion gain – DR-Pix (Aptina/ON Semi)
5. Digital overlap - DOL (Sony) –[currently in development]
6. Binning multiplexed exposure (Sony)
7. Spatially multiplexed exposure (Sony)
8. Multi region of interest – ROI within ROI with different exposure values (e2v)
9. Frame-based sequential (Omnivision)
10. Line-based staggered (Omnivision)
11. Deep-well dual exposure – dual conversion gain (Omnivision)
12. Multiple photodiodes per pixel (ST Micro)

**Pinnacle’s Denali-MC Full End to End ISP basic specs:**

- Xilinx Zynq 7010 FPGA with SoC
- Sony Starvis IMX290LQR low illumination plus near IR capability
- Maximum output 1080p/60fps
- 16-bit processing
- 2-4 brackets up to 8 EV offset
- Up to 16 EV stops for output HDR
- Tone map up to 24 EV
- Noise reduction due to merging of 10 EV LDR to a single 16 EV HDR — up to 64x (compared to input LDR).
- LATM reduces system noise by 8x

### **Pinnacle Imaging Systems Denali-MC Full End-to-end ISP System Cores:**

- Auto sensor calibration
- 4 proprietary IP cores (critical to merge block IP)
- Bad pixel correction
- Veiling glare
- Noise suppression
- Auto exposure
- Auto focus (under development)
- Auto white balance
- Ultra HDR II merge
- LATM (proprietary locally adaptive tone mapping)
- Auto black point
- Sharpening
- Automated controls
- React! concurrent HDR video stream with user selectable interval, duration and resolution HDR still capture without disruption of HDR video stream
- De-mosaic (under development)
- CCM readjustment

**Current Pixel-level HDR Sensors Pinnacle Can Support with the Denali-MC HDR ISP with Customized Development NRE**

Provider	Model
Aptina / ON Semi	AR0331
Aptina / ON Semi	AR0230AT
Aptina / ON Semi	AR0230CS
Aptina / ON Semi	AR0140AT
Aptina / ON Semi	AR0231AT
Aptina / ON Semi	AR0136AT
Aptina / ON Semi	AR0132AT
Aptina / ON Semi	Python 1300
Aptina / ON Semi	AR023Z
E2V	EV76C771ABT/ACT
Omnivision	OV10640
Omnivision	OV10626
Omnivision	OV4689
Omnivision	OV9716
Omnivision	OS05A10
Omnivision	OS08A10
Sony	IMX136
Sony	IMX174
Sony	IMX123LQT
Sony	IMX214
Sony	IMX224LQR
Sony	IMX225LQR
Sony	IMX230
Sony	IMX290

Sony	IMX274LQC
Sony	IMX291
Sony	IMX326
ST	VXY769