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HELIOS® LED Processing Platform

PX1 Processing Card

Release Notes v26.10.0

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Introduction

The HELIOS® LED Processing Platform also includes the PX1 Tile Processing Card and Netgear switches as part of a complete system.

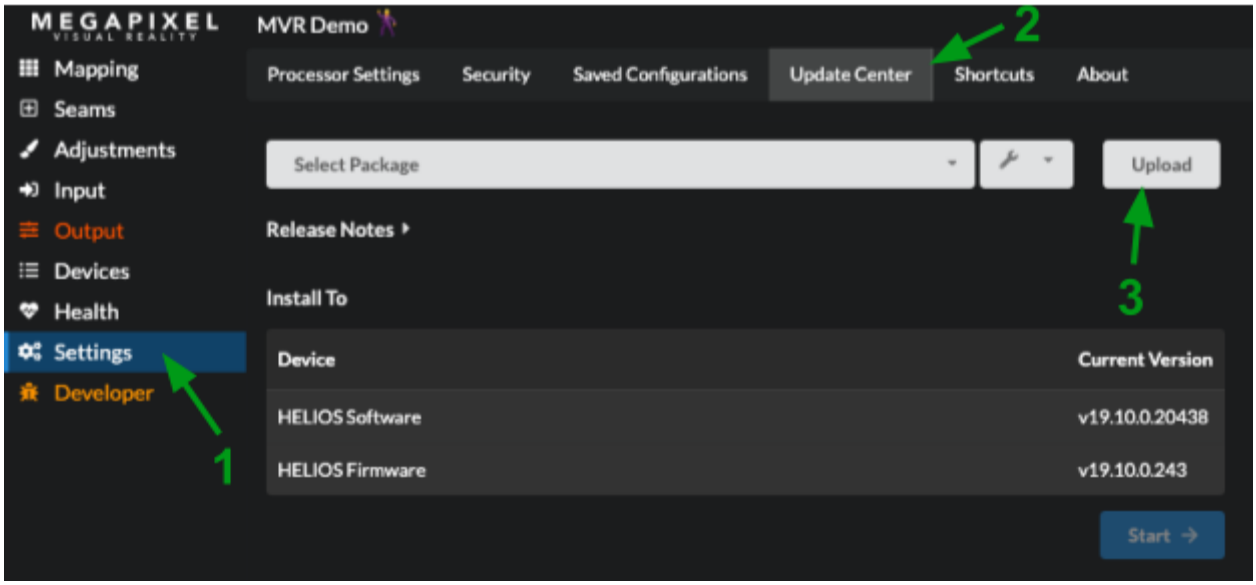
Some features/improvements may require updating the PX1 processing card firmware and network switch firmware also.

The current user manual and releases for HELIOS can be found at:
https://megapixelvr.com/product-support/helios/

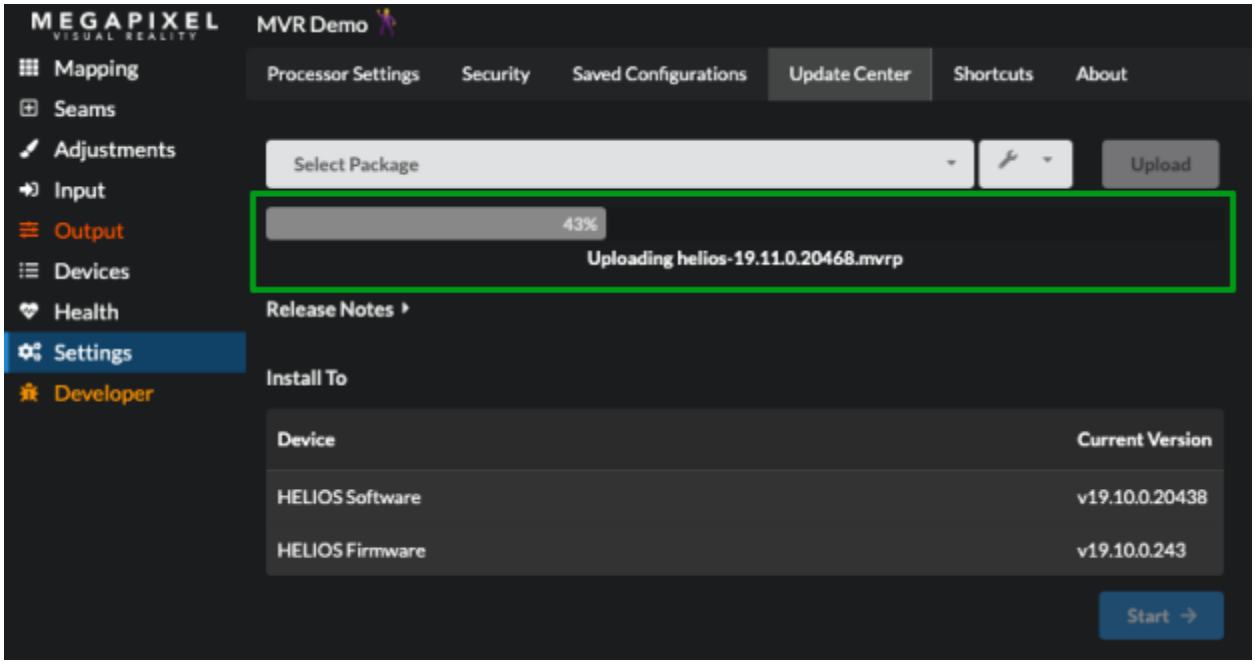
It is always recommended to update the HELIOS software prior to upgrading the PX1 Processing Card firmware. Upgrading HELIOS will upgrade both the software and firmware versions as needed on HELIOS.

HELIOS Upgrade Instructions

In the HELIOS web UI navigate to: Settings->Update Center and select the “Upload” button.

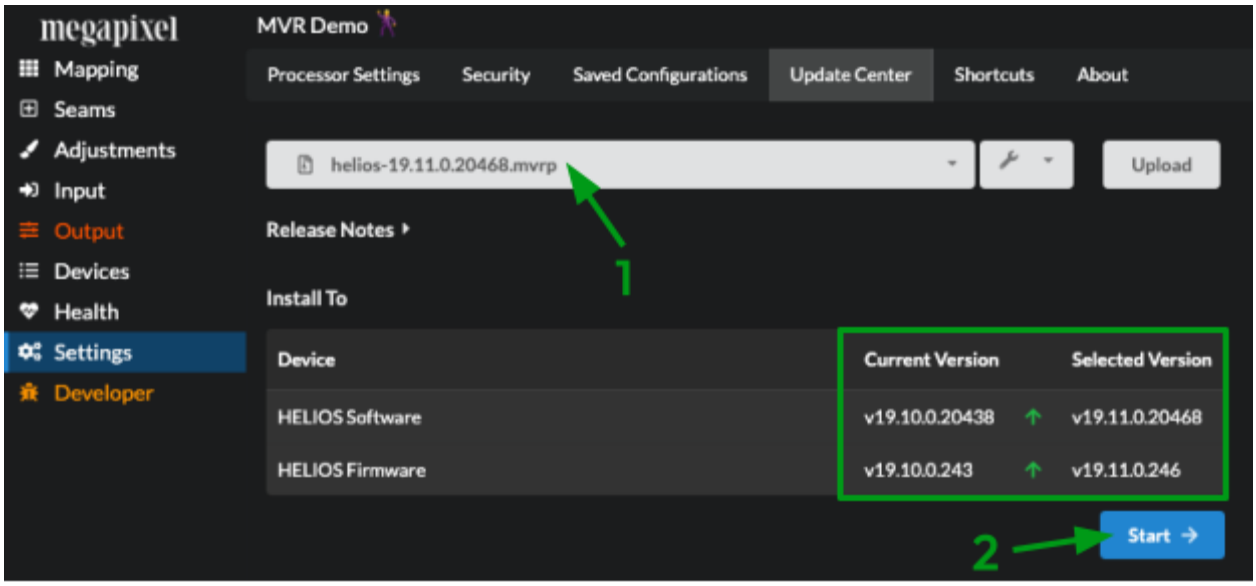


Browse to the current software .MVRP file on your computer and upload it. You should see the following progress bar as the file is being uploaded.

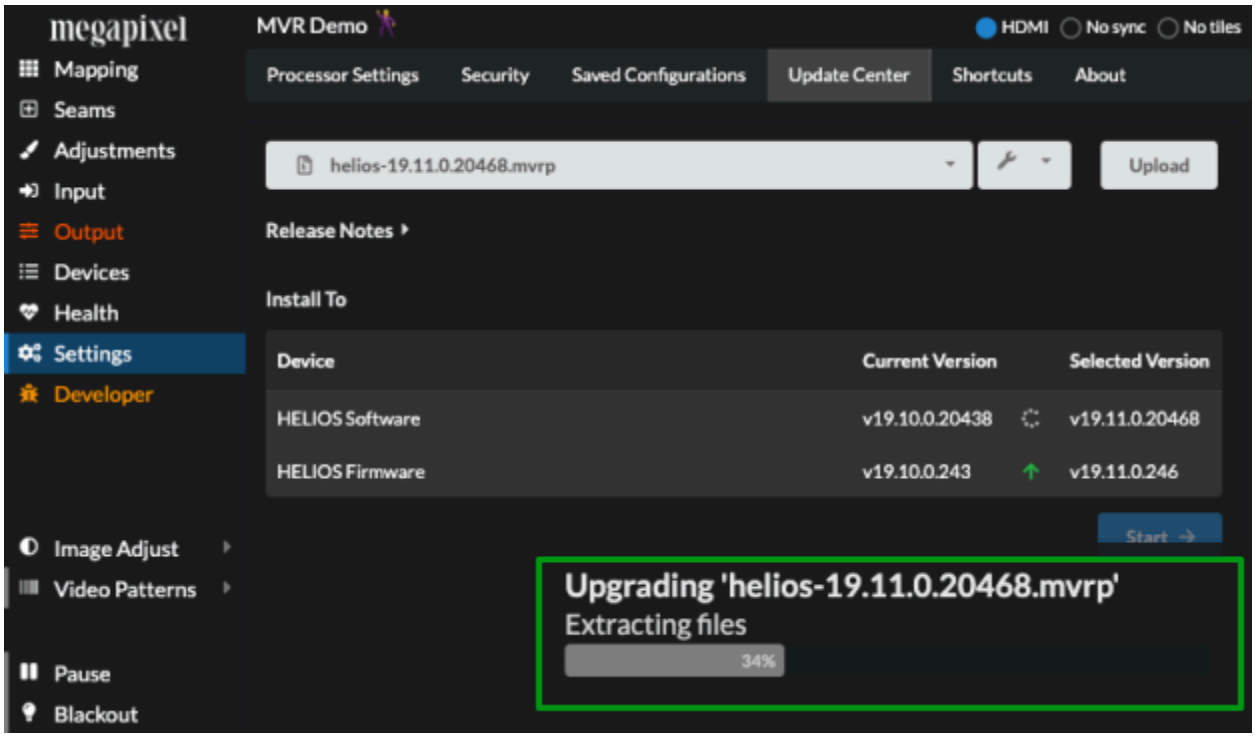


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After the package has been uploaded, you can then execute installation by selecting the appropriate MVRP package in the drop down list (1) and then clicking on *"Start" (2).*

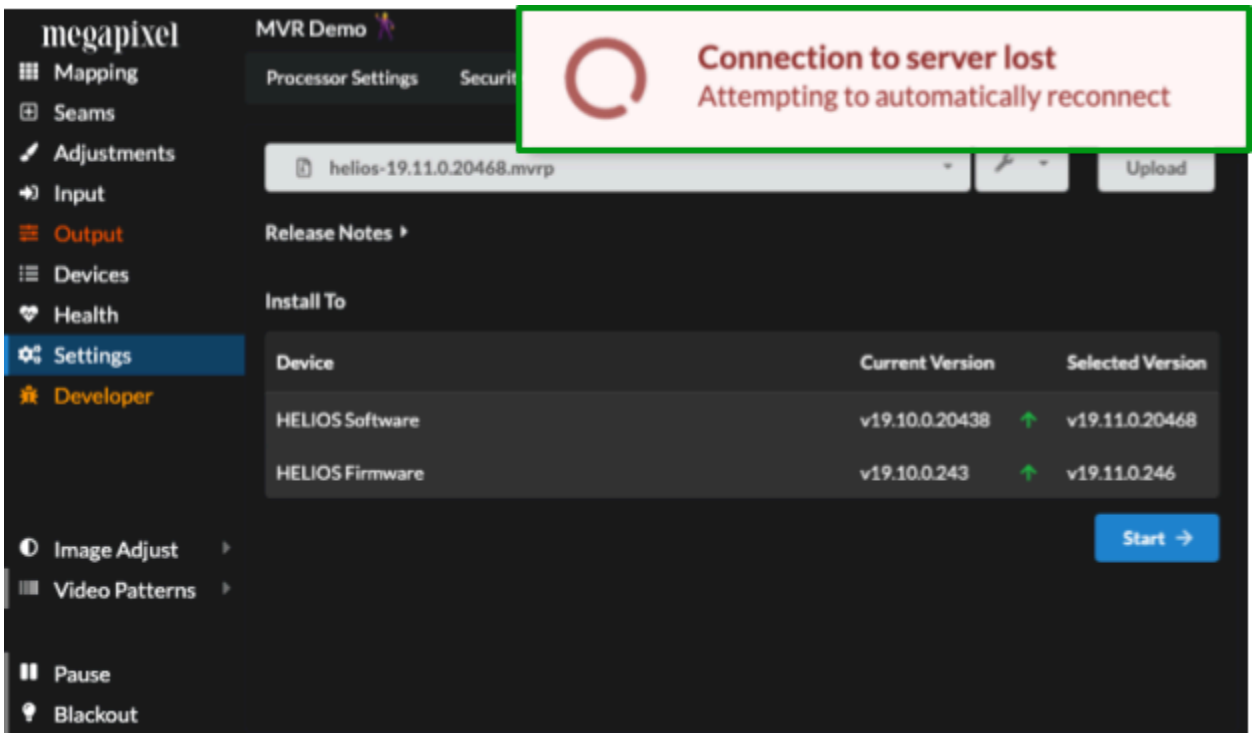


You will then see the upgrade process continuing as shown below.

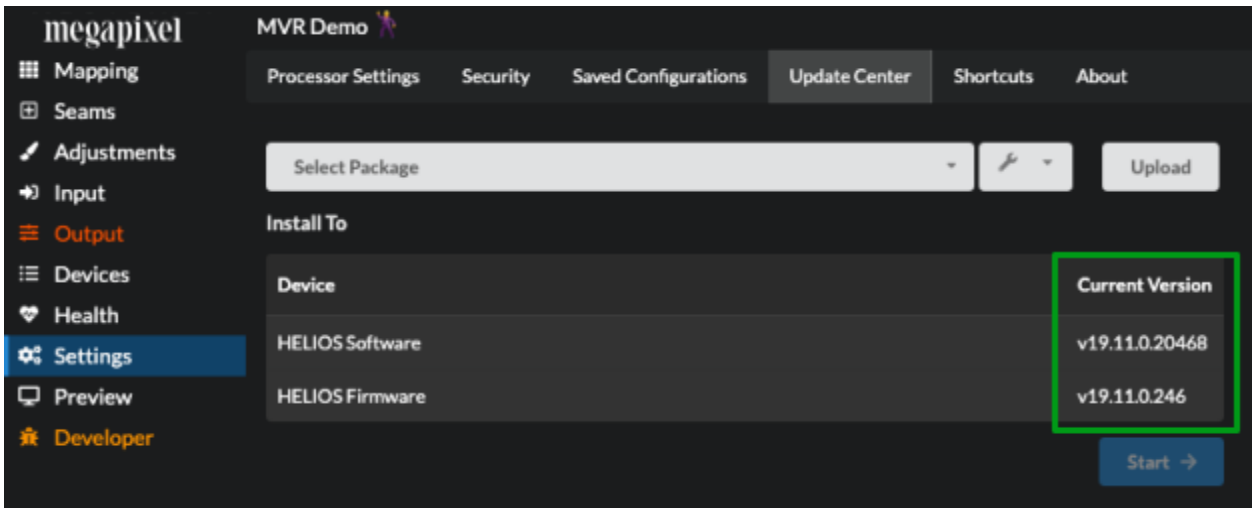


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During the upgrade, you will see the “Connection to server lost” message as HELIOS is performing the upgrade and restarting.



Once the upgrade is complete, you can see the current software and firmware versions displayed below.

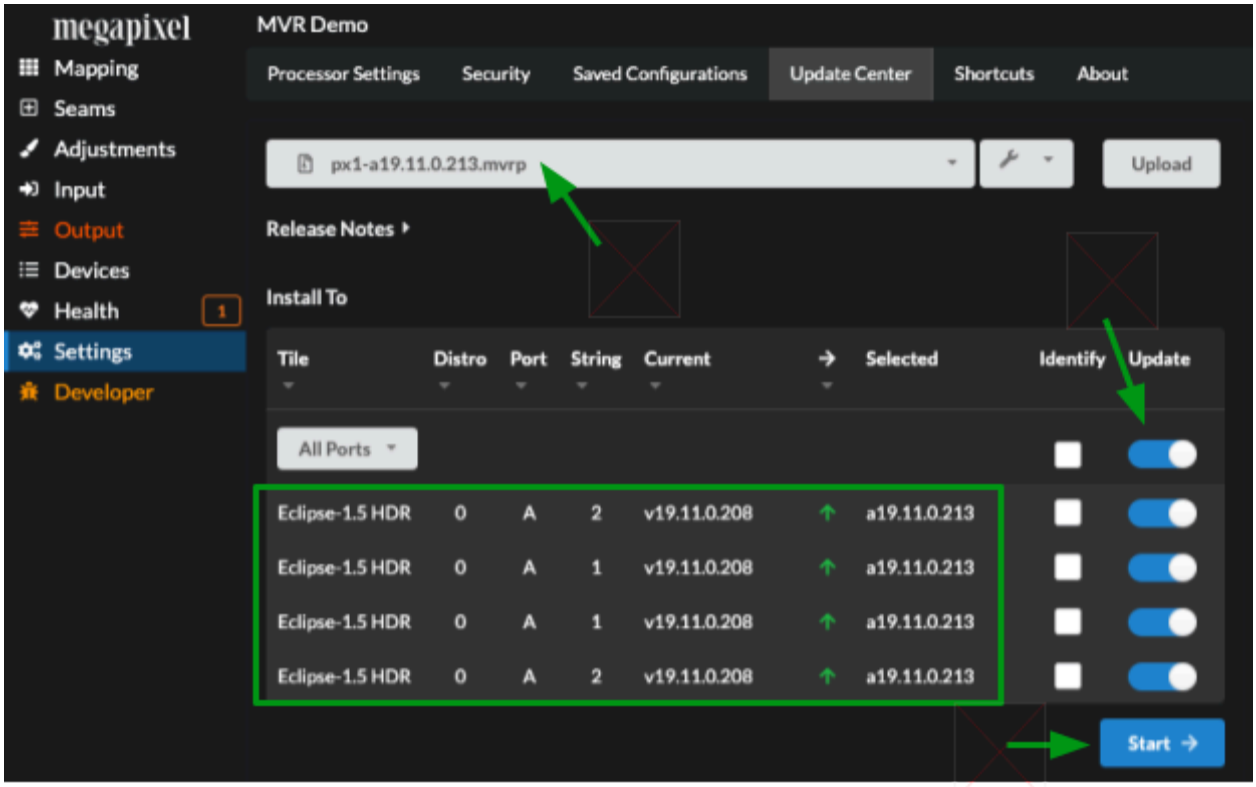


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PX1 Upgrade Instructions

Once the HELIOS software/firmware has been updated, then the firmware for the PX1 Tile Processing Cards may also be upgraded using a similar process. Upload the PX1 Processing Card firmware (px1-xx.xx.xx.xxx.mvrp) using the same process above and then select it in the drop down list.

You will then be presented options for which tiles to update to the latest firmware.
You can enable/disable which tiles are included in the firmware update and then press the *"Start"* button in order to initiate the firmware upgrade process.



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Network Switch Upgrade Instructions

HELIOS now includes the capability to upgrade the Netgear network switch firmware as easily as you can update the PX1 firmware. Upload the Netgear switch firmware package (helios-switches--M4250-12M2XF1xx.x.x.xx-M4200-10MG-PoE+xx.x.x.xx.mvrp) using the same process above and then select it in the drop down list.

You will then be presented options for which switches to update to the latest firmware.
You can enable/disable which switches are included in the firmware update and then press the *"Start"* button in order to initiate the firmware upgrade process.

Version Information

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v26.10.0.24138
HELIOS Firmware	v26.10.0.468
HELIOS OS	v25.11.0
PX1 Processing Card	v26.10.0.717
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.6.7

Officially Supported Tiles

- 5TEN DGH-RGBW-HB
- 5TEN TR-MCAAD
- 5TEN LB-RGBW-10/16
- 5TEN VX24-RGB
- 5TEN VX24-BGR
- 5TEN VX64-RGBW
- Absen CL1.2 V2
- AOTO RM1.9 V3
- RM2.3-2076T
- RM2.3S

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- CreateLED MIP 1.25
- CreateLED VBD-PVH 1.25
- Infiled ORAR 5.9-7S-A8
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 0.9
- Jupiter ZavusXP 1.2
- Kino Flo MIMIK 10
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP007 (P0.7)
- LG MAGNIT LSAP009 (P0.9)
- LG MAGNIT LSAP012 (P1.2)
- LG P3.9 (GSCE039)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana ST12 Matte
- Megapixel Ventana XR06/ XR08 / XR12 (Liquid Black/Deep Matte)
- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens HDS COB V2 0.7 / 0.9 / 1.2
- Nanolumens HDS COB V3 0.7 / 0.9 / 1.2
- Nanolumens Nixel 1.25 / 1.56 / 1.87
- Planar CLI 1.3 C-M4
- Planar CLM 3.9 C-M5
- Planar CLM 7.8 C-M5
- Planar CLM 15.6 C-M5
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Amber 1.5 V1.1 / (2.5G) / V2.0 (2.5G)
- ROE Black Marble 2 V2.1 / V2.4 / V2.7

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- ROE Black Marble 2 Pro V1.1
- ROE Black Marble 2 Pro V1.2
- ROE Black Marble 2V2 V1.2/V1.4
- ROE Black Marble 4
- ROE Black Marble 4 Triangle
- ROE Black Marble 4 V2.1
- ROE Black Marble 4i V2.0
- ROE Black Marble 5
- ROE Black Pearl 2.8 V1.0 / V2 / V2.1
- ROE Black Pearl 2.8 Triangle V2.1
- ROE Black Pearl-C 2.8 V2.1
- ROE Black Pearl 3.9 FF
- ROE Black Quartz 3.9 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz Lightweight 3.9 V1.0
- ROE Black Quartz 4.6 (Full/Half)
- ROE Black Quartz 6.2 V1 / V1.1 / V1.2 (Full/Half)
- ROE Carbon 3 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3FF (Megapixel) V2.1 (Full/Half)
- ROE Carbon 3 MKII V1.1 / V1.3 / V1.4 (Full/Half)
- ROE Carbon 5 MKII V1.1 / V1.3 (Full/Half)
- ROE Carbon 5 White V1 / V1.2 / V1.4 (Full/Half)
- ROE Carbon 5L MKII (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII RGBCA V1.1
- ROE Carbon 8 MKII V1.4 (Full/Half)
- ROE Coral 0.9 B V1.0
- ROE Coral 0.9 V3.0
- ROE Coral 0.9 V3.1
- ROE Coral 1.2 V1.0
- ROE Coral 1.2 V2.0
- ROE Coral 1.2 V2.2

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- ROE Coral 1.5 V1.0
- ROE Coral 1.5 V1.2
- ROE Coral S 0.9 V1.0
- ROE Coral S 1.2
- ROE Coral S 1.5 V1.0
- ROE Denali 0.7 V1.1
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Emerald 3.9 v1.0 (Full, Half(V)/Quarter/Half Triangle TL/TR)
- ROE Emerald 5.9 v1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Emerald 8.9 v1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Flex Banner 6 v1.0 (Full/Half)
- ROE Garnet 2.6 V1.1 2.5G (Full/Half)
- ROE Graphite 2.6 v1.0 (Full/Half) / v1.1 / v1.2 / (Round Corner / Right-Angle / Triangle)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Rounded Corners/Right-Angle)
- ROE Graphite 2.6 Right Angle V1.1
- ROE Graphite 2.6 Triangle TL/TR V3.0
- ROE Jasper 1.9 MK2 V1
- ROE Jasper 2.6 (Full/Half)
- ROE Jasper 2.6 v1.2 (Full/Half/Half V/Half Right Angle)
- ROE Jasper 3.9 (Full/Half)
- ROE Jet 1.9 V1.0 Half
- ROE Jet 2.6 v1.0 (Full/Half)
- ROE Meru 1.9 V1.1/V1.2/V1.3/V1.4 (Full/Half)
- ROE Meru 2.6 V1/V1.1 (Full/Half)
- ROE Obsidian 2.6 v1.3
- ROE Opal 1.25 V1.1 (Full/Half)
- ROE Opal 3
- ROE Ruby 1.2 v1.0 / v1.2
- ROE Ruby 1.2F (4in1) v1 / v1.1
- ROE Ruby 1.5 2.5G (Full/Rounded Corners)
- ROE Ruby 1.5 Film 2.5G
- ROE Ruby 1.5 Film v2.0
- ROE Ruby 1.5 Film V5 (Full/-C)

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- ROE Ruby 1.5B v1.0
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2) / V6.1 (Full/-B/-C) / V6.2 (Full/-B/-C)
- ROE Ruby 1.9F (4in1) v1.0 (Full/-B/-C)
- ROE Ruby-C 1.9F (4in1) v1.1
- ROE Ruby 1.9F (4in1) v1.2 (Full/-B/-C) (Full/Half)
- ROE Ruby 2.2 (UVA) V1
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0 / Ruby-C 2.6 Film V2.0 / Ruby Film 2.6 V3.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Ruby 2.6 V1.4 (Full/-B/-C)
- ROE Sapphire 1.5
- ROE Sierra 1.2 V1.0
- ROE Topaz 1.5 V2.2 / V2.3 (Full/-C)
- ROE Topaz 1.5 V3.1 (Full/-C)
- ROE Topaz 1.9 V1.1 (Full/-C)
- ROE Topaz 1.9 V1 (4in1) (Full / -C / -Cube)
- ROE Topaz 1.9 V1.2 (4in1) (Full / -C / -Cube / Round Corners)
- ROE Topaz 1.9 V2
- ROE Topaz 2.2 V1 (Full / -C / -Cube)
- ROE Topaz 2.6 V2.0 (Full/-C / -Cube)
- ROE Vanish Solid Touring 3 V1.0 (Full, Half (H), Half (V), Quarter)
- ROE Vanish V8S (W) v1.3/v1.4
- ROE Vanish V8T v1 (Full/Half) / v1.1 (Full/Half) / V1.4 (Full) / V1.7 (Full / Half(V) / Half(H))
- ROE Vanish V8T(B) v1.1 (Full/Half)
- ROE ROE163 5.9 V1.0
- Silicon Core - SCT P1.26
- Silicon Core - SCT P1.583
- Silicon Core - SCT P1.95
- Sony Crystal LED Verona - ZRD-VP15EM / ZRD-VP23EM
- Sony Crystal LED Capri - ZRD-VS25FM
- Unilumin UGC03
- Unilumin UHF3.9
- Unilumin Unano 1.8

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- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel1.2S plus
- Unilumin Upanel1.5S plus
- Unilumin Upanel1.9S plus
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Upanel II 1.2 Pro+
- Upanel II 1.5 Pro+
- Unilumin UslimII1.5 Pro-MP
- Unilumin UslimII1.5 Pro-MP 500x250
- Unilumin UslimII1.8 Pro-MP
- Unilumin UslimII1.8 Pro-MP 500x250
- Unilumin UslimII3.9 500x1000
- Unilumin UslimII3.9 500x500
- Unilumin UslimII3.9 500x250
- Unilumin UslimII3.9 300x1000
- Unilumin UsportF24 P3.8
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

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SUPER IMPORTANT NOTE (v26.10.0): Tiles using Marvell 2.5G Ethernet PHY's will receive a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

VERY IMPORTANT NOTE: After updating tile firmware to release v25.11.0, it will no longer be possible to downgrade the tile firmware below v24.03.0.

VERY IMPORTANT NOTE: Use of the SeamlessLoop™ redundancy with M4250 (MSM4214X) switches requires the switch firmware to be updated before use to the current version. There are several other improvements listed that also require updating the M4250 switch firmware.

IMPORTANT NOTE: It is important to always update firmware in all tiles in a screen to the same version. Many tiles may have slight improvements made to the tuning and accuracy that will cause visual differences from previous versions. This is also important to consider for on-camera applications where consistency is important during a shoot and firmware update timing must be planned.

IMPORTANT NOTE: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

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IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: HELIOS with serial numbers 0201250205-XXXX (motherboard serial number -4000) and later can not be downgraded below v24.11.0.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

New Functionality

- Cloud
    - Support for fleet control. Pulling/Pushing configs and upgrading multiple HELIOS via Megapixel CLOUD.
    - Expose link to Cloud's agent page via processor cloud settings and LCD's cloud settings.
- Pattern - Full size gradient horizontal & vertical test patterns(#3142).
- Reports - Fiber - Show SFP counters (#3079).
- Saved configs
    - Show if a preset is active (#3188).
    - Show preset IDs and allow adding/editing of the ID (#3206).
    - Edit a preset's filter (#3187).
- Scheduler - Import/Export

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Bug Fixes

- Alerts - Don’t throw Ethernet Errors when pulling tile support logs (#3111).
- App
    - Improve canvas recovery, releasing context when hidden (#3124).
    - Asset cache headers now populating correctly.
    - Rare crash when thrown error scheduled on a different thread (#3198).
- API
    - General hardening & auditing of API user access flags.
    - Reduced general request throttling in favor of a more targeted approach.
    - Cross-origin requests are now blocked with a 403 error.
        - Web pages hosted on a different origin (remote server/local file) will now be rejected when calling HELIOS' API. While convenient, it turned out to be a little *too* convenient (see HELIOS-SA-2026-002).
        - API requests without an `Origin` header, such as from a server, control system, or script, are unaffected. This is typical of requests not made by a web browser.
        - For cases where local web pages are communicating directly with HELIOS, those requests should now be routed through the server those pages were served from.
        - Refer to our Public API documentation "Cross-origin requests" for more information.
- Group mask
    - Keep right & bottom masks when group is placed at negative coordinates (#3253).
    - Clear out mask on group removal (#3255).
- Heatmap - Single tile select works again (#3189).
- Input
    - ST 2110 : ST 2022-7 path selection could result in truncated SDP when path content lengths differed.
    - Fix border corruption on PLL resync / scaler glitch (#2907/#3119).
    - Internal Error due to SDI sync issue (#2480).
    - Workaround for DP Hot Plug Detect causing training failure with Aquilon (#2371).
    - Fix image tearing after input change (#3061).

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- LCD
    - Performance improvements with reduced CPU & memory usage.
    - Avoid showing HDMI/DP when they are unavailable (HDMI 2.1 & ST 2110 modes) (#3247).
    - Corrupted thumbnail previews with HDMI 2.1 (#3251).
- LUT
    - Relaxed strictness on .cube file parsing (#3240).
    - Added support for scientific notation (#3160).
- Mapping - Persist snap edges & merge ports (#3226).
- Network - Allow setting of a /31 subnet (#3192).
- Output - Disable Ethernet Rx Overflow alerts on output ports (#3195).
- Patterns
    - Prioritize patterns over input failover still (#3161).
    - Rename & localize HELIOS' test patterns.
- Previews - Corrupted previews with HDMI 2.1 (#3250).
- PTP - Advertise as 2.0 (was 2.1) for compatibility with older equipment (#3229).
- Reports - Tile LDM calibration - Tile support & identify columns (#3234).
- Saved configs - Store description color.
- Scheduler - Fail over entry now editable again (#3179).
- Security
    - Self signed cert CN based on HELIOS-MAC, no longer includes CA.
    - Restrict public WebSocket to public RPC methods.
    - Disconnect user on password/role change, revoke token on logout, sliding window token refresh.
    - sACN enablement restricted to admins, users can view.
    - Clear out *all* fields when adding a new user (#3252).
    - Logging in over http no longer fails after logging in over https to the same processor due to cookie collision.
- Sensors
    - Adjust 100G current alarms to reduce false alerts (#3123).
    - Adjust voltage limits to reduce false alerts (#3122).
- Settings - Cloud - Routed connections can now adjust cloud settings. Cloud remote still blocked from disabling.
- Still Store - Video slightly blurry after exiting Show Still (#3155).

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- Switches - Skip querying M4250's sensors when it has older FW, avoiding communication disruption (#3197).
- System - Fixed rare I2C issue that could cause system EEPROM corruption (#1826).
- Tile
    - Improve communication responsiveness which regressed in 26.07.0. Particularly impacted seam correction (#3191).
    - Addressed rare crash on tile topology change.
    - Store notes last modified in UTC.
    - Update pixel error compensation confirm "detection" -> "compensation" (#2854).
- Update center - Notifies other clients of package additions/removals
- Upgrades
    - Clean up lingering support artifacts.
    - Wait for device(s) to come back before completing the upgrade.
    - Negotiate who performs tile upgrades when upgrading from main/backup at the same time (#3239).
- UI - Visible slider endpoints in light mode.

Security Advisories

- HELIOS-SA-2026-002 - Cross-site request forgery (CSRF) due to cross-origin requests not being rejected
    - Severity: High
    - Impact: A malicious web page opened by anyone with network access to HELIOS could change its configuration.
    - Affected: HELIOS v19.05.0 - v26.07.0
    - Fixed in: HELIOS v26.10.0
    - Mitigation: Configure user accounts, and avoid browsing untrusted sites from machines on HELIOS' control network.
    - Action: Recommend updating HELIOS at the next available maintenance window.

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- HELIOS-SA-2026-003 - Uploading a malformed upgrade package may crash HELIOS.
    - Severity: Low
    - Impact: A crafted upgrade package could crash and/or corrupt memory of HELIOS during package verification.
    - Affected: HELIOS v19.05.0 - v26.07.0
    - Fixed in: HELIOS v26.10.0
    - Action: Recommend updating HELIOS at the next available maintenance window.
- HELIOS-SA-2026-004 - Media management could affect files outside of media storage.
    - Severity: Medium
    - Impact: A user able to manage media could affect files on the processor outside of media storage, which could disrupt its operation.
    - Affected: HELIOS v22.11.0 - v26.07.0
    - Fixed in: HELIOS v26.10.0
    - Action: Recommend updating HELIOS at the next available maintenance window.
- HELIOS-SA-2026-005 - Signed in users could apply settings beyond their role
    - Severity: Medium
    - Impact: A user without administrator rights could change settings reserved for administrators.
    - Affected: HELIOS v24.11.0 - v26.07.0
    - Fixed in: HELIOS v26.10.0
    - Action: Recommend updating HELIOS at the next available maintenance window.
- HELIOS-SA-2026-006 - Support archives were available to any signed in user.
    - Severity: Medium
    - Impact: A user without administrator rights could download support archives, which may hold diagnostic data such as crash dumps.
    - Affected: HELIOS v21.05.0 - v26.07.0
    - Fixed in: HELIOS v26.10.0
    - Action: Recommend updating HELIOS at the next available maintenance window.

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- HELIOS-SA-2026-007 - Factory default retained crash dumps
    - Severity: Low
    - Impact: Diagnostic data from previous use could remain on the processor after a factory default.
    - Affected: HELIOS v22.04.0 - v26.07.0
    - Fixed in: HELIOS v26.10.0
    - Action: Recommend updating HELIOS, and performing a factory default before a unit changes hands.

TILES

- SUPER IMPORTANT: All tiles using Marvell 2.5G Ethernet PHY's will receive a microcode update after the PX1 update. This will take another 3 minutes and the tile will remain in black during this time. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening. (#3154).
- IMPORTANT: ROE Sapphire/Opal 3/ Black Onyx 2.8/Black Pearl 2.8 v1, v1.1, and v1.3 no longer support internal MCU microcode updates. If you are upgrading from firmware v22.04 or older then you must upgrade to v25.11.0 firmware first for the final microcode updates before upgrading to a newer PX1 release. These tiles are all still supported, but there have not been any microcode updates for years, so those updates are being removed (#2831).
- Fixed packet corruption issue causing tile association issues in some redundant systems (#3182).
- Fixed bad pixel detection on DP3350N / DP3365S drivers (#2776).
- Fixed LDM not detected on hotplug (#3176).
- Issue with ICND2055S pixel error detect immediately on boot (#3076/#3051).
- Flashing video artifacts when enabling Tile Low Latency on some MBI drivers (#2426).
- Improve grayscale gradients (#2807).
- Ruby 1.5 corner - Not matching regular tiles (#3164).

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PREVIOUS RELEASES

Version v26.07.0

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v26.07.0.23968
HELIOS Firmware	v26.07.0.458
HELIOS OS	v25.11.0
PX1 Processing Card	v26.07.0.698
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.5.16

Officially Supported Tiles

- 5TEN DGH-RGBW-HB
- 5TEN TR-MCAAD
- 5TEN LB-RGBW-10/16
- 5TEN VX24-RGB
- 5TEN VX24-BGR
- 5TEN VX64-RGBW
- Absen CL1.2 V2
- AOTO RM1.9 V3
- CreateLED MIP 1.25
- CreateLED VBD-PVH 1.25
- Infiled ORAR 5.9-7S-A8
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 0.9
- Jupiter ZavusXP 1.2
- Kino Flo MIMIK 10
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)

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- LG MAGNIT LSAP007 (P0.7)
- LG MAGNIT LSAP009 (P0.9)
- LG MAGNIT LSAP012 (P1.2)
- LG P3.9 (GSCE039)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana ST12 Matte
- Megapixel Ventana XR06/ XR08 / XR12 (Liquid Black/Deep Matte)
- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens HDS COB V2 0.7 / 0.9 / 1.2
- Nanolumens HDS COB V3 0.7 / 0.9 / 1.2
- Nanolumens Nixel 1.25 / 1.56 / 1.87
- Planar CLI 1.3 C-M4
- Planar CLM 3.9 C-M5
- Planar CLM 7.8 C-M5
- Planar CLM 15.6 C-M5
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Amber 1.5 V1.1 / (2.5G) / V2.0 (2.5G)
- ROE Black Marble 2 V2.1 / V2.4 / V2.7
- ROE Black Marble 2 Pro V1.1
- ROE Black Marble 2 Pro V1.2
- ROE Black Marble 4
- ROE Black Marble 4 V2.1
- ROE Black Marble 5
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)

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- ROE Black Quartz Lightweight 3.9 V1.0
- ROE Black Quartz 4.6 (Full/Half)
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1 / v1.3 (Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII RGBCA V1.1
- ROE Carbon 8 MKII V1.4 (Full/Half)
- ROE Coral 0.9 B V1.0
- ROE Coral 0.9 V3.0
- ROE Coral 0.9 V3.1
- ROE Coral 1.2 V1.0
- ROE Coral 1.2 V1.2
- ROE Coral 1.2 V2.0
- ROE Coral 1.2 V2.2
- ROE Coral 1.5 V1.0
- ROE Coral 1.5 V1.2
- ROE Coral S 1.2
- ROE Denali 0.7 V1.1
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Emerald 3.9 v1.0 (Full, Half(V)/Quarter/Half Triangle TL/TR)
- ROE Emerald 5.9 v1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Emerald 8.9 v1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Flex Banner 6 v1.0 (Full/Half)
- ROE Graphite 2.6 v1.0 (Full/Half) / v1.1 / v1.2 / (Round Corner / Right-Angle / Triangle)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Rounded Corners/Right-Angle)
- ROE Graphite 2.6 Right Angle V1.1
- ROE Jasper 2.6 (Full/Half)
- ROE Jasper 2.6 v1.2 (Full/Half/Half Right Angle)

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- ROE Jasper 3.9 (Full/Half)
- ROE Jet 1.9 V1.0 Half
- ROE Jet 2.6 v1.0 (Full/Half)
- ROE Meru 1.9 v1.1/v1.2/v1.3/v1.4 (Full/Half)
- ROE Meru 2.6 V1 (Full/Half)
- ROE Obsidian 2.6 v1.3
- ROE Opal 3
- ROE Ruby 1.2 v1.0 / v1.2
- ROE Ruby 1.2F (4in1) v1 / v1.1
- ROE Ruby 1.5 2.5G (Full/Rounded Corners)
- ROE Ruby 1.5 Film v2.0
- ROE Ruby 1.5 Film V5
- ROE Ruby 1.5B v1.0
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2) / V6.1 (Full/-B/-C)
- ROE Ruby 1.9F (4in1) v1.0 (Full/-B/-C)
- ROE Ruby-C 1.9F (4in1) v1.1
- ROE Ruby 1.9F (4in1) v1.2 (Full/-B/-C) (Full/Half)
- ROE Ruby 2.2 (UVA) V1
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0 / Ruby-C 2.6 Film V2.0 / Ruby Film 2.6 V3.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Ruby 2.6 V1.4 (Full/-B/-C)
- ROE Sapphire 1.5
- ROE Sierra 1.2 V1.0
- ROE Topaz 1.5 V2.2 (Full/-C)
- ROE Topaz 1.5 V3.1 (Full/-C)
- ROE Topaz 1.9 V1.1 (Full/-C)
- ROE Topaz 1.9 V1 (4in1) (Full / -C / -Cube)
- ROE Topaz 1.9 V2
- ROE Topaz 2.2 V1 (Full / -C / -Cube)
- ROE Topaz 2.6 V2.0 (Full/-C)
- ROE Vanish Solid Touring 3 V1.0 (Full, Half (H), Half (V), Quarter)
- ROE Vanish V8S (W) v1.3/v1.4

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- ROE Vanish V8T v1 (Full/Half) / v1.1 (Full/Half) / V1.4 (Full) / V1.7 (Full / Half(V) / Half(H))
- ROE Vanish V8T(B) v1.1 (Full/Half)
- ROE ROE163 5.9 V1.0
- Silicon Core - SCT P1.26
- Silicon Core - SCT P1.583
- Silicon Core - SCT P1.95
- Sony Crystal LED Verona - ZRD-VP15EM / ZRD-VP23EM
- Unilumin UGC03
- Unilumin UHF3.9
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel1.2S plus
- Unilumin Upanel1.5S plus
- Unilumin Upanel1.9S plus
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Upanel II 1.5 Pro+
- Unilumin UslimII1.5 Pro-MP
- Unilumin UslimII1.5 Pro-MP 500x250
- Unilumin UslimII1.8 Pro-MP
- Unilumin UslimII1.8 Pro-MP 500x250
- Unilumin UslimII3.9 500x1000
- Unilumin UslimII3.9 500x500

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- Unilumin UslimII3.9 500x250
- Unilumin UslimII3.9 300x1000
- Unilumin UsportF24 P3.8
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

VERY IMPORTANT NOTE: After updating tile firmware to release v25.11.0, it will no longer be possible to downgrade the tile firmware below v24.03.0.

SUPER IMPORTANT NOTE (Tiles currently running <v22.11.0): Tiles still using previous versions prior to release v22.11.0 and that support 2.5G Ethernet will receive a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

VERY IMPORTANT NOTE: Use of the SeamlessLoop™ redundancy with M4250 (MSM4214X) switches requires the switch firmware to be updated before use to the current version. There are several other improvements listed that also require updating the M4250 switch firmware.

IMPORTANT NOTE: It is important to always update firmware in all tiles in a screen to the same version. Many tiles may have slight improvements made to the tuning and accuracy that will cause visual differences from previous versions. This is also important to consider for on-camera applications where consistency is important during a shoot and firmware update timing must be planned.

IMPORTANT NOTE: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

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- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: HELIOS with serial numbers 0201250205-XXXX (motherboard serial number -4000) and later can not be downgraded below v24.11.0.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- App - Show Alert severity bubble in fav icon (#2982).
- API - Pixel error detection - initiate + summary (#2856).
- Command Palette - Added send feedback and jump to Health report.
- Input
    - ST2110 - ST 2022-7 stream filter/selector for testing specific paths, suppressing alerts with isolated red/blue networks where HELIOS is only receiving a single stream (#2737).
    - EOTF - HLG (scene) toggle (bypasses OOTF for in-camera workflows) (#2980).
    - Improved ST 2110 SDP inspector - exposed more stream info (video stream/resolution/etc).
- GhostFrame® - Updated to GhostFrame® (previously Camera) & GhostFrame® Pro (previously GhostFrame®) naming (#3043).
- Output
    - 3D LUTs! Support for 17x17x17 3D LUTs, loadable as `.cube` files (#1088).
    - Light Illusion ColourSpace integration (#2069/#2125).
- Reports
    - Pixel errors - Consolidate pixel error detect & pixel error report
    - Pixel errors - Highlight non-zero counts
    - Pixel errors - Pixel error compensation toggle
    - Added column for downloading tile supports (#2960).
- Security - Change user removal confirmation to popup and show dialog when removing self (#3100).
- Settings
    - PTP - Show active leaders advertised on the network (#2698).
    - Processor - Reset - Added reboot button.
- Tiles
    - Added tile color bar test pattern.
    - Added tile/video details pattern - refresh rate, FPS, bit depth (#2764).
- Uploads - Added various file drop zones for dropping files onto Update Center and the like.

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Bug Fixes

- Adjustments/Seams - Disable sliders when no items are selected.
- Adjustments - Correct selection of overlapped tiles to be by draw order (same as mapping).
- Alerts
    - Indicate sensor + reading with sensor related alerts.
    - False watchdog alert after HELIOS reboot (#3036).
- App
    - Exclude {string} from description when used in favicon.
    - Grey out Image Settings/Video Patterns while locked (#3070).
- Auth - Switch to an http only access token.
- Cloud
    - HELIOS continually pushes config to the Cloud when no interface color is set (#3027).
    - HELIOS UI and front panel does not reflect enrollment (#3139).
- Doc - Added dev.switches to API documentation.
- Feedback - Support for sending larger feedback archives (#3025).
- Input -
    - ST 2110 use internal sync frequency when using PTP during loss of input (#3001).
    - EDID Improvements for better specification compliance.
- Keyboard - Allow undo/redo in text boxes.
- Mapping
    - Tooltip explain GhostFrame stream selector (#3012).
    - In HELIOS Jr mode mapping topology displayed incorrectly (#3132).
- NMOS
    - Add manual registry entries with Advanced settings. (#3000).
    - Fixed manual registry input parser issue (#3000).
    - Query DNS outside of local subnet for unicast DNS-SD (#3008).
- NTP - Check valid time when IP/link change occurs.
- Output
    - Internally apply post correction curves on start (UI was showing these correctly, but not applied internally).

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    - Screen out of sync when showing active input with Sync set to Internal (#3028).
    - Tiles not responding to group control brightness change (#2800).
    - Tiles not mapping after tile reboot or switch link down (#3113).
- PTP
    - Avoid going immediately into fault when internal packet timestamp delayed (#2821).
    - increase threshold for PTP resync due to timebase change causing Sync Mismatch alert (#3010).
- Reports
    - Tile calibration - Populate calibration time correctly.
    - Counters were displaying as signed values instead of unsigned ones (#3125).
- Saved configs - Tie HDCP to selected input (#2946).
- Scaler
    - Border flickering when changing input scaling method (#3065).
    - Black output when enabling/disabling Output Scaler (#3065).
- Sensors
    - VCC0_PSIO3 showing false undervoltage alert (#3122).
    - 100G_VCCINT_I showing false overcurrent alert (#3123).
- Settings
    - Tiles - Faulty pixel compensation/Run detection during startup -> Pixel error detection/Automatic compensation.
    - Tiles - Pixel error auto compensation wasn't being honored after a HELIOS reboot.
- Security
    - HELIOS Logins rejected requiring reboot (#3024).
    - Clarified policy password requirements when entering password (#3013).
    - Throw error when trying to create a user account with a duplicate name (#3014).
- SSDP - Handle erroneous requests lacking end of headers newline.
- Still Store
    - Show Still on Input Failure not working correctly across stacked systems (#2954).
    - Black image showing when enabling Show Still fixed (#3085).
- Tile - Avoid showing internal pattern during failover when main HELIOS is in over-cap (#2999).

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- Further stability fixes

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TILES

- IMPORTANT: ROE Sapphire/Opal 3/ Black Onyx 2.8/Black Pearl 2.8 v1, v1.1, and v1.3 no longer support internal MCU microcode updates. If you are upgrading from firmware v22.04 or older then you must upgrade to v25.11.0 firmware first for the final microcode updates before upgrading to a newer PX1 release. These tiles are all still supported, but there have not been any microcode updates for years, so those updates are being removed (#2831).
- Fixed reboot crashing while tile is in safe mode.
- Resolved unstable tile boot not triggering safe mode and alerting correctly (#3067).
- SCL8081 drivers low calibration not properly loading on boot (#3064).
- Allows brightness adjustments to apply for internal tile patterns (#3071).
- Tile showing old image during processor reboot (#3072).
- Tile occasionally booting up into glitchy state (#2611/#2649).
- Automatically dismiss “LDM has been removed” alert once replaced (#2576).
- LDM Gains Low Gray divide by zero error (#3026).
- Some LDM’s brighter/show tint after exiting low power blackout (#2918).
- Ventana tiles double black flash during reboot (#2827).
- Ventana XR06 high current alert (#3078).
- Sapphire 1.5: line artifacts showing using diagonal gradient in low brightness (#3015).
- Emerald 3.9: artifacts after boot (#3091).
- Tile reboot counter showing large negative count.

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Version v26.04.0

Version Information

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v26.04.0.23779
HELIOS Firmware	v26.04.0.450
HELIOS OS	v25.11.0
PX1 Processing Card	v26.04.0.678
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.5.16

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Absen CL1.2 V2
- AOTO RM1.9 V3
- CreateLED MIP 1.25
- CreateLED VBD-PVH 1.25
- Infiled ORAR 5.9-7S-A8
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 0.9
- Jupiter ZavusXP 1.2
- Kino Flo MIMIK 10
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP007 (P0.7)
- LG MAGNIT LSAP009 (P0.9)

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- LG MAGNIT LSAP012 (P1.2)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08 / XR12
- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens HDS COB V2 0.7 / 0.9 / 1.2
- Nanolumens HDS COB V3 0.7 / 0.9 / 1.2
- Nanolumens Nixel 1.25 / 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Amber 1.5 V1.1 / (2.5G) / V2.0 (2.5G)
- ROE Black Marble 2 V2.1 / V2.4 / V2.7
- ROE Black Marble 2 Pro V1.1
- ROE Black Marble 2 Pro V1.2
- ROE Black Marble 4 / 5
- ROE Black Marble 4 V2.1
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz Lightweight 3.9 V1.0
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1 / v1.3 (Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII (Full/Half)

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- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII RGBCA V1.1
- ROE Coral 0.9 B V1.0
- ROE Coral 0.9 V3.0
- ROE Coral 0.9 V3.1
- ROE Coral 1.2 V1.0
- ROE Coral 1.2 V1.2
- ROE Coral 1.2 V2.0
- ROE Coral 1.2 V2.2
- ROE Coral 1.5 V1.0
- ROE Coral 1.5 V1.2
- ROE Denali 0.7 V1.1
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Emerald 3.9 v1.0 (Full, Half(V)/Quarter/Half Triangle TL/TR)
- ROE Emerald 5.9 v1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Emerald 8.9 v1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Flex Banner 6 v1.0
- ROE Graphite 2.6 v1.0 (Full/Half) / v1.1 / v1.2 / (Round Corner / Right-Angle / Triangle)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Right-Angle/Rounded Corners)
- ROE Jasper 2.6 (Full/Half)
- ROE Jasper 2.6 v1.2 (Full/Half/Half Right Angle)
- ROE Jasper 3.9 (Full/Half)
- ROE Jet 2.6 v1.0 (Full/Half)
- ROE Meru 2.6 V1 (Full/Half)
- ROE Obsidian 2.6 v1.3
- ROE Opal 3
- ROE Ruby 1.2 v1.0 / v1.2
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.5 Film V5
- ROE Ruby 1.5B V1.0
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2) / V6.1 (Full/-B/-C)
- ROE Ruby 1.9F (4in1) v1.0 (Full/-B/-C)
- ROE Ruby-C 1.9F (4in1) v1.1

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- ROE Ruby 1.9F (4in1) v1.2 (Full/-B/-C) (Full/Half)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0 / Ruby-C 2.6 Film V2.0 / Ruby Film 2.6 V3.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Ruby 2.6 V1.4 (Full/-B/-C)
- ROE Sapphire 1.5
- ROE Sierra 1.2 V1.0
- ROE Topaz 1.5 V2.2 (Full/-C)
- ROE Topaz 1.5 V3.1 (Full/-C)
- ROE Topaz 1.9 V1.1 (Full/-C)
- ROE Topaz 1.9 V1 (4in1) (Full / -C / -Cube)
- ROE Topaz 1.9 V2
- ROE Topaz 2.2 V1 (Full / -C / -Cube)
- ROE Topaz 2.6 V2.0 (Full/-C)
- ROE Vanish V8S (W) v1.4
- ROE Vanish V8T v1 (Full/Half) / v1.1 (Full/Half) / V1.4 (Full) / V1.7 (Full / Half(V) / Half(H))
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Silicon Core - SCT P1.26
- Silicon Core - SCT P1.583
- Silicon Core - SCT P1.95
- Sony ZRD-VP15EM / ZRD-VP23EM
- Unilumin UGC03
- Unilumin UHF3.9
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G

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- Unilumin Upanel1.2S plus
- Unilumin Upanel1.5S plus
- Unilumin Upanel1.9S plus
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Upanel II 1.5 Pro+
- Unilumin UslimII1.5 Pro-MP
- Unilumin UslimII1.5 Pro-MP 500x250
- Unilumin UslimII1.8 Pro-MP
- Unilumin UslimII1.8 Pro-MP 500x250
- Unilumin UslimII3.9 500x1000
- Unilumin UslimII3.9 500x500
- Unilumin UslimII3.9 500x250
- Unilumin UslimII3.9 300x1000
- Unilumin UsportF24 P3.8
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

VERY IMPORTANT NOTE: After updating tile firmware to release v25.11.0, it will no longer be possible to downgrade the tile firmware below v24.03.0.

SUPER IMPORTANT NOTE (Tiles currently running <v22.11.0): Tiles still using previous versions prior to release v22.11.0 and that support 2.5G Ethernet will receive a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up

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in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

VERY IMPORTANT NOTE: Use of the SeamlessLoop™ redundancy with M4250 (MSM4214X) switches requires the switch firmware to be updated before use to the current version. There are several other improvements listed that also require updating the M4250 switch firmware.

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IMPORTANT NOTE: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: HELIOS with serial numbers 0201250205-XXXX (motherboard serial number -4000) and later can not be downgraded below v24.11.0.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.

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- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

New Functionality

- About - Added a Software BOM link in the Open Source Credits (#2616).
- Alerts
    - Added alerts for unsupported Processor Low Latency data streams (#2899).
    - Added alert for PTP time discontinuity of actual vs expected (#2698).
- App - Browser title bar - change from “HELIOS-<name>” to “<name>-HELIOS” for dense browser tab viewing (#2919).
- Image Settings - Added notice when the brightness is being limited by a Theater Mode (#2593).
- NMOS - Added support for Unicast DNS-SD (#2830).
- Patterns - Include main/backup (0:/1:) as part of tile's topology string.
- Reports - Include identify state in CSV exports (#2771).
- Saved configs - Added the following settings:
    - NMOS, PTP, Stacking, Tile Low Power (#2869).
    - Post correction curves.
    - Sync to (#2473).
- Settings
    - Interface - Ability to set user-defined top bar background color for browser window (#2870).
    - Tiles - Added option to run faulty pixel detection/fix at startup for supported tiles (#2854).
    - Network - Added DNS search domain.

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- Still store
    - Keyboard shortcuts (cursor navigation, enter to rename, space to play).
    - Single-click selected still to rename file (#2634).

Bug fixes

- Alerts
    - Corrected SNR high severity to warning (was previously error severity).
    - When HDCP licensed, but hardware is not HDCP capable (#2007).
    - Fixed spurious frame sync alerts caused by user changing sync delay (#2939).
- App - Continuing to tweak themes. Making it easier to differentiate between input & disabled fields.
- Input
    - Combo DP/HDMI inputs showing incorrect DP frame rate due to incorrect metadata from source (#2891).
    - Added Output Image Scaler disable option (#2756).
- LCD - Factory defaults from front panel fixed (#2857).
- LightScience ® - display properly as a registered trademark.
- NMOS
    - Fixed crash when using deprecated IS-04 PUT command (#2852).
    - Improved conformance when switching between registries.
- PTP
    - Correct 37 second offset by taking into account TAI to UTC conversion when displaying PTP in local time (#2842).
    - Failing to lock to GrandMaster with > 128 priority (#2865).
- Output
    - Fix off-by-one when drawing the output spline curves.
    - Packet scheduling for Processor Low Latency improvements (#2862).
- Reports - Prefix an ellipsis along with a tooltip to avoid wrapping long serial numbers (#2847).
- Sensors - Delay checking sensors on boot to avoid spurious alerts (#2922).

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- Switch
    - Perform parallel queries to mitigate slow responses
    - Update DAC detection for naming change in MSM4214X switch firmware v13.0.5.16 to not display zero voltage/zero current alerts (#2889).
- Sync - Restrict internal frequency to int and 1000/1001 fractional (#2707).
- Tile
    - Improve bandwidth calculation accuracy (#2791).
    - Prevent tile from being re-added in HELIOS after a tile reboot command has already been sent but before the reboot happened (#2948).
    - Occasional green flash during reboot (#2732).

TILES

- IMPORTANT: ROE Sapphire/Opal 3/ Black Onyx 2.8/Black Pearl 2.8 v1, v1.1, and v1.3 no longer support internal MCU microcode updates. If you are upgrading from firmware v22.04 or older then you must upgrade to v25.11.0 firmware first for the final microcode updates before upgrading to a newer PX1 release. These tiles are all still supported, but there have not been any microcode updates for years, so those updates are being removed (#2831).
- CB5: Fixed regression that caused black pixel lines (#2885/#2888).
- Tile test pattern corrupted if enable if enabled soon after boot (#2975).
- Reboot and runtime counters showing 0 (#2896).
- ADV4: Fix loading old data and replication (#2950).
- SP15: Theater modes not working (2953).
- Graphite: Round corner tiles weren't previously published for updates (#2920).
- Graphite 2.6: Added DLUT for round corner tiles to match rest of Graphite (#2933).
- Fix corrupted reboot counter for new production (#2929).
- MBI5359/MBI5759 pixel error readback on duplex designs not working (#2930).
- Fix spurious alerts when enabling Processor Low Latency (#1703).
- Light Science looks like falling rain in extremely low brightness (#2903).
- Improved LDM hotplug detection (#1422).
- Improved ghosting issue for tiles using RT59 with glitch at end of frame (#2708).
- Improved time to resync when enabling Tile Low Latency mode (#2813).
- Removed support for Advanced Timings that allows user to set higher clock frequencies (#2897/#2917).

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- Removed unnecessary LDM changed alert “One or more LDMs were changed during low event” (#2928).
- Resolved rare issue with tiles that have direct links (multiple PX1 cards inside or Ventana) where after a reboot the tile may not link without a power cycle (#2808).
- Delay tile reboot until after seam correction data has been saved (#2877).
- Ventana spurious low current alerts on boot (#2895).

Security Advisory

- libpng - CVE-2026-33416 (use after free) & CVE-2026-33636 (out-of-bounds read/write, ARM/Aarch64 only)
    - Severity: Low
    - Impact: Failure to load malicious still store PNGs as image loads are sandboxed
    - Additional impact: Viewing still store page containing malicious PNGs may crash browser tabs of unpatched browsers
    - Affected: HELIOS v22.11.0 - 25.11.0
    - Fixed in: HELIOS v26.04.0
    - Action: Recommend updating HELIOS at the next available maintenance window

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Version v25.11.0

Version Information

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v25.11.0.23637
HELIOS Firmware	v25.11.0.448
HELIOS OS	v25.11.0
PX1 Processing Card	v25.11.0.654
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.5.16

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Absen CL1.2 V2
- AOTO RM1.9 V3
- CreateLED MIP 1.25
- CreateLED VBD-PVH 1.25
- Infiled ORAR 5.9-7S-A8
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 0.9
- Jupiter ZavusXP 1.2
- Kino Flo MIMIK 10
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP007 (P0.7)
- LG MAGNIT LSAP009 (P0.9)

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- LG MAGNIT LSAP012 (P1.2)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08 / XR12
- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens HDS COB V2 0.7 / 0.9 / 1.2
- Nanolumens HDS COB V3 0.7 / 0.9 / 1.2
- Nanolumens Nixel 1.25 / 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Amber 1.5 V1.1 / (2.5G) / V2.0 (2.5G)
- ROE Black Marble 2 V2.1 / V2.4 / V2.7
- ROE Black Marble 2 Pro V1.1
- ROE Black Marble 2 Pro V1.2
- ROE Black Marble 4 / 5
- ROE Black Marble 4 V2.1
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz Lightweight 3.9 V1.0
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII RGBCA V1.1

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- ROE Coral 0.9 B V1.0
- ROE Coral 0.9 V3.0
- ROE Coral 0.9 V3.1
- ROE Coral 1.2 V1.0
- ROE Coral 1.2 V1.2
- ROE Coral 1.2 V2.0
- ROE Coral 1.2 V2.2
- ROE Coral 1.5 V1.0
- ROE Coral 1.5 V1.2
- ROE Denali 0.7 V1.1
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Emerald 3.9 V1.0 (Full, Half(V)/Quarter/Half Triangle TL/TR)
- ROE Emerald 5.9 V1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Emerald 8.9 V1.0 (Full/Half(V)/Half(H)/Quarter)
- ROE Flex Banner 6 V1.0
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Right-Angle/Rounded Corners)
- ROE Jasper 2.6 (Full/Half)
- ROE Jasper 2.6 V1.2 (Full/Half/Half Right Angle)
- ROE Jasper 3.9 (Full/Half)
- ROE Meru 2.6 V1 (Full/Half)
- ROE Obsidian 2.6 V1.3
- ROE Opal 3
- ROE Ruby 1.2 V1.2
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.5 Film V5
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2) / V6.1 (Full/-B/-C)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0 / Ruby-C 2.6 Film V2.0 / Ruby Film 2.6 V3.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Ruby 2.6 V1.4 (Full/-B/-C)
- ROE Sapphire 1.5

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- ROE Sierra 1.2 V1.0
- ROE Topaz 1.5 V2.2 (Full/-C)
- ROE Topaz 1.5 V3.1 (Full/-C)
- ROE Topaz 1.9 V1.1
- ROE Topaz 1.9 V1 (4in1) (Full / -C / -Cube)
- ROE Topaz 1.9 V2
- ROE Topaz 2.2 V1 (Full / -C / -Cube)
- ROE Topaz 2.6 V2.0 (Full/-C)
- ROE Vanish V8S (W) v1.4
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- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel1.2S plus
- Unilumin Upanel1.5S plus
- Unilumin Upanel1.9S plus
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII

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- Unilumin Upanel2.5SII
- Unilumin UslimII1.5 Pro-MP
- Unilumin UslimII1.5 Pro-MP 500x250
- Unilumin UslimII1.8 Pro-MP
- Unilumin UslimII1.8 Pro-MP 500x250
- Unilumin UslimII3.9 500x1000
- Unilumin UslimII3.9 500x500
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NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- API - Processor reboot.
- Heatmap - Include tile notes in hover tooltip (#2749).
- Input
    - Show sync offsets for stitched inputs.
    - Show sync offsets of stitched inputs along with a sparkline (#2824).
    - Option to limit SDR input to 100 nits (#2605).
    - Option to ignore content's PQ meta data and alway assume mastered for connected display (#2603).
    - Added HDMI 2.1 support (DSC not supported). (#2190).
    - Extend Genlock Multiplier up to 10x (#2671).
- Output - Added option to copy actual/target gamut to custom gamut.
- Redundancy - Blue for active, yellow for mixed, white for standby, and orange for alert.
- Still store - Added button to download still images from HELIOS (#2184).
- Switch (available on MSM4214X only)
    - Fan control - auto, full, quiet, off (requires SW FW 13.0.5.16+) (#1963).
    - Port configuration - auto vs force 1GbE (requires SW FW 13.0.5.16+) (#1706).

Bug fixes

- Alerts
    - Fixed issue where similar alerts were incorrectly being displayed (#2792).
    - Internal error briefly appearing on input switch (#2783).
    - Internal error alert when enabling Processor Low Latency (#2739).
    - Processor Low Latency alert getting stuck when toggling.
- Devices
    - Fixed display of 'connected' icon when in a dual HELIOS redundant setup.
    - Show main PCB PLL clock component hardware details (#2709).
    - Adjust sensor limit for 100G VCCINT_I to 1.7A (#2742).
    - Adjust 100G CPU temperature alert limit (#2754).
    - Adjust sensor SFP voltage lower limit (#2608).
    - 100G Added support for single lambda QSFP module fiber power (#2627).
    - Tiles lingering in Devices list after being disconnected (#2678).

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- EDID - Fallback on RBv2 when CTA timing doesn't fit in a DTD18 (e.g., 2160p50).
- Feedback - When submitting support logs online it now requires email and contact info,
- Freeze - Intermittent when crop window enabled on stacked processors (#2786).
- Pattern Generator
    - Fixed overflow creating oddly shaped ellipses with larger walls (#2757).
    - Avoid freaking out on unknown drawable types, just ignore them
    - Infer color space from EOTF.
- Input
    - Fixed Re-acquire buttons from wrapping text.
    - Source resolution change with external sync causing firmware watchdog (#2619).
    - Shrink resolution text to prevent overflow (#2596).
    - ST 2110 missing redundant stream alert not present after reboot (#2719).
    - Remove SDP should also remove manually entered SDP URL (#2713).
    - HDMI 2.0 Added 1440p60/120 support.
    - Frame Sync error w/SDI Level B on Blackmagic (#2447).
    - Stitched source missing sub-input when using external sync (#2640).
    - 100G: Auto-reset link if receiver comes up with errors.
    - 100G: Added support for Arista QSFP with up to Class 6 power draw (#2578).
    - ST 2110 increase FPS mismatch tolerance.
    - ST 2110 separate FPS/resolution mismatch alerts.
    - ST 2110 stitched inputs getting out of sync (helios#2779).
    - ST 2110 fix internal buffer overflows when using output scaler on >5K (#2727).
    - ST 2110 scaler reporting out of range with 8K60.
    - ST2110 100G channel A not working with non-multiple of 12pix width (#2738).
    - ST 2110 100G channel B bandwidth increase (#2661 / #2662 / #2727).
    - ST 2110 Alert when there is an SDP mismatch vs actual input (#2672).
    - ST 2110 SDP URL mode causes reset every minute (#2675).
    - ST 2110 Spurious sync mismatches with jittery source and external sync (#2600).
    - ST 2110 Relax stitched input sync requirement to 100us (#2613).
    - ST 2110 IGMP not joining all streams (#2572).
    - ST 2110 Re-uploading SDP record not taking effect (#2681).
    - Fix EDID to avoid DP FIFO overflows at 4k120 (#2695).
    - AppleTV - 4K SDR is being shown as 4:2:0 (#2722).
    - SDI 1.5G colorimetry decoding to wrong color space (#2570).

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    - HDMI issues with PlayStation 5 Pro (#2522).
    - Show Input not working on input failure (#2645).
    - EDID Generator giving error with HDMI 2160p50 (#2653).
- Mapping
    - Fixed picking up LDM configs & Test pattern names (#2592).
    - Only populate LDM layout to LDM config name when name is empty (#2592).
    - Group test pattern color picker now sets colors correctly.
- Network
    - Clear invalid default gateway on switch to DHCP (#2778).
    - mDNS discovery causing rare crash (#2659).
- Output
    - SDR Scaler curve causing artifacts in low end (#2817).
    - Occasional video corruption on tiles mapped outside of active raster (#1870).
    - Changing scaler settings causes corruption outside active raster (#1972).
- PTP
    - Notify UI clients of PTP locking state (#2338).
    - Only use PTP when considered locked (#2666).
- Redundancy
    - Keep offline during startup (#2706/#2793).
    - Adjust announcement timing to correct issues with main sometimes staying in standby (#2743).
    - SeamlessLoop redundancy not supported alert after tile reboot (#2304).
    - Upgrade all tiles from Main but then Main won't rediscover them after update (#2636).
    - Processor names truncated in list for remote processors (#2641).
- Seams - Defaulting seam correction and rebooting HELIOS does not persist the default seam state (#2761).
- Sync
    - Don't report sync mismatch on Processor Low Latency phase mismatch (#2753).
    - Timing delay between redundant systems in mixed state (#2755).
- Report - Show out of range tile gamut coefficients.
- Still Store
    - Showing black when enabled sometimes (#2760).
    - Showing black on input failure (#2769).

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    - Showing frozen video when Processor Low Latency enabled (#2658).
    - Showing still store in redundant system takes other processor offline (#2805).
- Support Archives - Capturing logs causing occasional glitch (#2796).
- System
    - Lockup on reboot/power cycle when warm (#1940).
    - OS hang on soft reboot (#2538).
    - HELIOS frozen with black LCD (#2524).
    - Sporadic reboot due to CPU core deadlock (#2547).
    - Screen in black randomly but no settings indicate blackout (#2822).
- Tiles
    - Communicate pixel processing rate & processing delay (#2351).
    - Consolidate tile route alerts (#2555).
    - Retry querying of redundant routes to properly detect string position (#2557).
    - Avoid rare crashing when communicating with tile that goes offline (#2655).
    - Tile Eject button not displaying properly (#2723).
- Update center
    - Downloading of packages with '+' in the filename (#2620).
    - Deleting packages with '+' in the filename fails (#2642).
- Web - Shorter timeout for disconnecting unresponsive clients.
- UI - Corrected input box font.

TILES

- Save LDM gains before reboot (#2574).
- Make Identify arrows larger (#2624).
- Enhance greyscale performance at very low levels. Added 64x18 video shaper LUTs (#2077 / #2595).
- Fix rounding problem in timing calculation (Topaz / 50Hz) (#2795 / #2716).
- Fix Black Pearl 2.8S1 video artifacts with Tile Low Latency (#2751).
- Fix tearing when going in/out of blackout (#2752).
- Fix blackout occasionally not working on input loss (#2735).
- Fix various low latency and redundancy issues (#2724 / #2449 / #2704 / #2717).
- Fix occasional long delay on displaying video after reboot (#2644).
- Fix video errors in Tile Low Latency mode (#2710).
- Fix crash on boot with cabled mode.

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- Fix glitching at 29.94 Hz (#2686).
- Some tiles staying black after turning off low power mode (#2689).
- Sync lost with heavily slewing source (#2693).
- Fix video errors with long tile chains and high slices (#2704).
- Fix frame sync with Processor Low Latency and high slice count (#2449).
- Seamless loop tile disconnect causing black flash on screen (#2660).
- Fix dropped tiles if network busy causing tiles to land in incorrect state when flipping between main/backup (#2617).
- Tiles flash when switching between main/backup (#2577).
- Emerald 5.9 fans showing slow or stopped at high brightness (#2569).
- Black Pearl 2.8 v2.1-2 and ZRD-VP23EM showing horizontal lines (#2573).
- No video on tile reboot and Switch Port showing '-1' (#2575).
- Carbon 3FF v2.1 add published tile flag (#2614).
- MAGNIT LSAP 0.9 failing firmware updates for every tile except first in string (#2618).
- Ventana and multi-PX1 tiles missing a tile occasionally after reboot (#2808).

Known Issues

- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 25.07.0

Version Information

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v25.07.0.23474
HELIOS Firmware	v25.07.0.431
HELIOS OS	v24.12.1
PX1 Processing Card	v25.07.0.622
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.4.19

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Absen CL1.2 V2
- AOTO RM1.9v3
- CreateLED MIP 1.25
- CreateLED VBD-PVH 1.25
- Infiled ORAR 5.9-7S-A8
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 0.9
- Jupiter ZavusXP 1.2
- Kino Flo MIMIK 10
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP P0.9 (LSAP009)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR

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- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08 / XR12
- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens HDS COB V2 0.7 / 0.9 / 1.2
- Nanolumens HDS COB V3 0.7 / 0.9 / 1.2
- Nanolumens Nixel 1.25 / 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Amber 1.5 V1.1 / (2.5G) / V2.0 (2.5G)
- ROE Black Marble 4 / 5
- ROE Black Marble 4 V2.1
- ROE Black Marble2 V2.1 / V2.4 / V2.7
- ROE Black Marble 2 Pro V1.1
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz Lightweight 3.9 V1.0
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII RGBCA V1.1
- ROE Coral 0.9 V3.1
- ROE Coral 1.2 V2.0
- ROE Coral 1.2 V2.2
- ROE Coral 1.5 V1.0

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- ROE Coral 1.5 V1.2
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Emerald 3.9 V1.0
- ROE Emerald 3.9 (V) V1.0 Half
- ROE Emerald 3.9 V1.0 Quarter
- ROE Emerald 5.9 V1.0
- ROE Emerald 5.9 V1.0 HV
- ROE Flex Banner 6 V1.0
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Right-Angle/Rounded Corners)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Obsidian 2.6 V1.3
- ROE Opal 3
- ROE Ruby 1.2 V1.2
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2) / V6.1 (Full/-B/-C)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0 / Ruby-C 2.6 Film V2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Ruby 2.6 V1.4 (Full/-B/-C)
- ROE Sapphire 1.5
- ROE Sierra 1.2 V1.0
- ROE Topaz-C 1.5 V3.1
- ROE Topaz 1.9 V1.1
- ROE Topaz 1.9 V1 (4in1) (Full / -C / -Cube)
- ROE Topaz 1.9 V2
- ROE Topaz 2.2 V1 (Full / -C / -Cube)
- ROE Topaz 2.6 V2.0 (Full/-C)
- ROE Vanish V8S (W) v1.4
- ROE Vanish V8T v1 (Full/Half) / v1.1 / V1.4 (Full) / V1.7 (Full / Half)
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Silicon Core - SCT P1.26

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- Silicon Core - SCT P1.583
- Silicon Core - SCT P1.95
- Sony ZRD-VP15EM / ZRD-VP23EM
- Unilumin UGC03
- Unilumin UHF3.9
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel1.2S plus
- Unilumin Upanel1.5S plus
- Unilumin Upanel1.9S plus
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Unilumin UslimII1.5 Pro-MP
- Unilumin UslimII1.5 Pro-MP 500x250
- Unilumin UslimII1.8 Pro-MP
- Unilumin UslimII1.8 Pro-MP 500x250
- Unilumin UslimII3.9 500x1000
- Unilumin UslimII3.9 500x500
- Unilumin UslimII3.9 500x250
- Unilumin UslimII3.9 300x1000
- Unilumin UsportF24 P3.8
- Unilumin UTWII1.2

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It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

SUPER IMPORTANT NOTE (Tiles currently running <v22.11.0): Tiles still using previous versions prior to release v22.11.0 and that support 2.5G Ethernet will receive a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

VERY IMPORTANT NOTE: Use of the SeamlessLoop™ redundancy with M4250 (MSM4214X) switches requires the switch firmware to be updated before use to the current version. There are several other improvements listed that also require updating the M4250 switch firmware.

IMPORTANT NOTE: It is important to always update firmware in all tiles in a screen to the same version. Many tiles may have slight improvements made to the tuning and accuracy that will cause visual differences from previous versions. This is also important to consider for on-camera applications where consistency is important during a shoot and firmware update timing must be planned.

IMPORTANT NOTE: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

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IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: HELIOS with serial numbers 0201250205-XXXX (motherboard serial number -4000) and later can not be downgraded below v24.11.0.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- API - Adds Group management capabilities. (#2385).
- EDID
    - Advanced option to include VICs, for sources which require them, but may result in fractional frequencies.
    - Include colorimetry data block for HDR support (#2388).
    - Enable under scan of IT formats by default.
    - Other various improvements.
- Input
    - HDCP enable toggle exposed in Advanced Mode (#2401).
    - Surround input on canvas with a yellow border while HELIOS is showing a test pattern.
    - Show HDMI SPD (Source Product Description) data when available.
    - Show link state of 2110 inputs.
    - Show SDI stitched state (2SI vs Square).
    - Add SDI 12G 2SI scaling support for 8K (#1820/#2461).
    - 100G: Add support for Arista FR type modules (#2405).
    - ST 2110: Add support for static IP address settings (#1148).
- Mapping - Add 2x Tile scaler support (requires license) (#2249).
- Patterns
    - Reworked aspect pattern (#378).
    - Added REC-BT.2111. (PQ) (#2382).
- Saved configs
    - Disable global toggle when there's no sections/items shown.
    - Filterable selection.
- Seams - Add Gradient Seam Correction (#325).
- Still store - Increase capacity supporting 35,389,440 pixels (8192x4320) (#1255 / #1744).
- Sync
    - Add Genlock multiplier up to 4x (#1157).
    - Improved handling of source jitter (#2036).
- 100G Card: Add multiple temperature sensors for blower controll (#2504).
- Updates - Filterable selection.

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Bug fixes

- Demo - Support updating of presets (#2452).
- Devices
    - Use dashes to make redundancy backup ports more obvious (#2361).
    - Skip labels when information is unavailable.
    - Change Sensor valid lower limits for: 100G_12V_I and 100G_VCCINT_I to 0.75A, 1.9A (#2514).
- EDID
    - Increased max TMDS to 600MHz to workaround problems with Crestron NVX (#2333).
- Gamepad
    - Correct for Nintendo's A/B X/Y button mappings (#2219).
    - Restrict to one (same) browser window at a time (#2490).
- HELIOS Jr - Show redundant routes on HELIOS output ports (#2172).
- Inputs
    - SDI 2x2 2SI/square division not updating on VPID change (#2496).
    - Preview issue with quad link 2160p 4x3G Level (#2496).
    - SDI level B frame sync errors with BlackMagic Decklink card (#2447).
    - Stitched input mismatch alerts improvements (#2464/#2465).
    - No longer rely on DP/HDMI FPS from metadata; clean up input switching (#2375/#2412/#2354/#2329).
    - Report no carrier if combo input is over a system limit (#2208/#2400).
    - HDCP renegotiation causes HDMI input to go invalid (#2372).
    - Fix HDMI quantization range detection. HDMI using limited when should be full (#2278).
    - Scaling settings lost when switching in/out of stitched inputs (#2156).
    - ST 2110: No input after disconnecting 100G input and HELIOS reboot (#2206).
    - ST 2110: “Internal systems” alerts when disconnecting 100G input (#2207).
    - ST 2110: Automatically set HDR EOTF settings to match SDP record (#2413).
- Internal
    - Fix potential data stream corruption which could result in temporary firmware missing and screenglitch (#2137).
    - Constant CEC errors causing firmware crash ‘No Firmware’ alert (#2337).

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- LCD - QR code no longer blurry after entering menu (#2399).
- NanoSync
    - Only sync internal frequency across the stack while auto is disabled.
    - Was showing locked to Active Input when Internal was selected (#2344).
    - External sync jitter causing video glitches (#1763).
    - Use internal vsync for test patterns instead of source sync (#563).
- NMOS - Stability improvements when there's issues connecting to a discovered registry.
- Output
    - Improve calculations with negative/zero coefficients (#2014).
    - Processor low latency support for 240Hz input (#1816).
    - Some tiles flashing black during Lift/Gamma/Gains adjustments (#2499).
- Output report - Expose Tile Identify check boxes (#2467).
- Palette - Remove initial fade when showing command palette.
- Preview
    - Fix previewing of quad SDI 2SI signals (#2376).
    - Preview skewed with custom EDID (#2383).
- Redundancy
    - Avoid temporarily going over cap on link loss (#2386).
    - Avoid display disruption during intermittent switch communication (#2503).
    - Fix video glitch in seamless mode on tile map rebuild (#2364).
- Reports - Fix column widths during browser resize to avoid confusion (#2321).
- Scaler - Glitch when exceeding scaler capabilities: scale+crop (#1267/#2194).
- Scheduler - Don't run events without a timezone set (#2273).
- Still Store - Ability to manually specify the desired EOTF for a still.
- Switch - Add support for MSM4214X v13.0.5.x firmware.
- Test Patterns
    - Spurious alert when toggling test pattern (#2381).
    - Improved on/off transition (#531/#2329).
    - Custom Color Pattern not changing with every selection from color picker (#2365).
- Tiles
    - Avoid 2.5G tiles temporarily going over capacity on redundant link loss (#2363).
    - Wait for tile initialization to fully complete before pushing newly modify settings (#2367).
    - Re-request tile meta data if it initially failed (#2346).

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    - Avoid flicker when constantly mapping/unmapping large number of tiles (#959).
- UI - Darker dark mode.
- Upgrade - Fix switch firmware stalling at 51% during ‘Check For Updates’ download (#2515).

TILES

- KinoFlo MIMIK KF10 - Removed built-in firmware LUT in favor of storing in onboard memory (#1930).
    - KF10 tiles running firmware older than v23.12.0 require updating firmware to v24.11.1 BEFORE updating to this release (or later) in order to have the LUT properly stored in memory.
- Pixel error detection not working with ICND3069/3065 drivers (#2476).
- ROE Vanish V8S (W) v1.4 showing incorrect width (#2335).
- Fix for corrupted LDM EEPROM (#2478).
- Resuming from Low Power Blackout on some tiles was loosing calibration (#2203).
- No Video on tile after performing tile reboot (#2212/#2550).
- Add 2x Scaler to tile (#2249).
- Add 600 nit Theater Mode for Kelvin HDR 2.6 tiles (#2407).
- Ignore spurious Ethernet errors when toggling test pattern (#2043).
- Add Gradient Seam Correction (#325).
- Tile hot plug may cause no video/PHY speed mismatch (#2187).
- Add calibration correction mesh support (#2067).
- Stop throwing ‘abnormal sensor alert’ when rebooting switch or hot plugging tile Ethernet (#2121).

Known Issues

- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 24.11.1

Version Information

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v24.11.1.23129
HELIOS Firmware	v24.11.0.415
HELIOS OS	v24.12.0
PX1 Processing Card	v24.11.1.573
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.4.19

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Absen CL1.2 V2
- AOTO RM1.9v3
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 1.2
- Kino Flo MIMIK 10
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP P0.9 (LSAP009)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08

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- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens Nixel 1.25 / 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Amber 1.5 V1.1 / (2.5G) / V2.0 (2.5G)
- ROE Black Marble 4 / 5
- ROE Black Marble2 V2.1 / V2.4 / V2.7
- ROE Black Marble 2 Pro V1.1
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz Lightweight 3.9 V1.0
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII RGBCA V1.1
- ROE Coral 1.2 V2.0
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Flex Banner 6 V1.0
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Right-Angle/Rounded Corners)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Obsidian 2.6 V1.3
- ROE Opal 3

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- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2) / V6.1 (Full/-C)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Ruby 2.6 V1.4 (Full/-B/-C)
- ROE Sapphire 1.5
- ROE Topaz 1.9 V2
- ROE Topaz 2.6 V2.0 (Full/-C)
- ROE Vanish V8S (W) v1.4
- ROE Vanish V8T v1 (Full/Half) / v1.1 / V1.4 (Full) / V1.7 (Full)
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Sony ZRD-VP15EM / ZRD-VP23EM
- Unilumin UGC03
- Unilumin UHF3.9
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Unilumin UslimII3.9 500x1000
- Unilumin UslimII3.9 500x500
- Unilumin UslimII3.9 500x250

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- Unilumin UslimII3.9 300x1000
- Unilumin UsportF24 P3.8
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

SUPER IMPORTANT NOTE (Tiles currently running <v22.11.0): Tiles still using previous versions prior to release v22.11.0 and that support 2.5G Ethernet will receive a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

VERY IMPORTANT NOTE: Use of the SeamlessLoop™ redundancy with M4250 (MSM4214X) switches requires the switch firmware to be updated before use to the current version. There are several other improvements listed that also require updating the M4250 switch firmware.

IMPORTANT NOTE: It is important to always update firmware in all tiles in a screen to the same version. Many tiles may have slight improvements made to the tuning and accuracy that will cause visual differences from previous versions. This is also important to consider for on-camera applications where consistency is important during a shoot and firmware update timing must be planned.

IMPORTANT NOTE: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.

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- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: HELIOS with serial numbers 0201250205-XXXX and later can not be downgraded below v24.11.0.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- App - Use control key to use a smaller step size in numeric inputs (#2282).
- Heatmap - Added Network errors view.
- Mapping - Show selected tile dimensions in number of tiles wide x high (#2265).
- Network - Manually specify NTP server to use (requires OS 24.12.0) (#1513).
- Saved configs - Support uploading of support archive as a saved config.

Bug fixes

- Adjustments - LDM adjustments intensity slider not reflecting internal state after main/backup flip (#2291/2292).
- EDID - Include VCDB selectable quantization
- Input - HDCP - Immediately disable on license loss (#2310).
- LCD - Show external sync frequency rather than zero (#2285).
- Output
    - No longer dim screen when enabling output grading controls in HDR (trad.) (#2297).
    - Correct green output curve from being applied twice! (#2296).
- Mini Preview will not update when using Safari browser (#2320).
- Scheduler - Show 'failover' in dialog when deleting failover entry (#2284).
- Settings - Hide experimental mesh mode when not in experimental mode.
- Stacking - Stacked settings not always being applied to newly added/rebooted processor (#2293).
- Sync - Internal sync option exposed (#2281).
- Restrict PTP frequency to 2 decimal points (#2283).
- Updates - Bump max package limit to 512MB.

TILES

- Tile flash when switching between Main/Backup while in Test pattern (#2289).
- Video errors and no video on tile reboot/upgrade (#2261).

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- Tile Hot plug may cause no video/Phy speed mismatch on 2.5G links (#2187).
- Tile alerts not always being cleared (dangling) with SeamlessLoop (#2084).

Known Issues

- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 24.11.0

Version Information

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v24.11.0.23030
HELIOS Firmware	v24.11.0.415
HELIOS OS	v24.11.0
PX1 Processing Card	v24.11.0.571
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.4.19

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Absen CL1.2 V2
- AOTO RM1.9v3
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 1.2
- Kino Flo MIMIK 10
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP P0.9 (LSAP009)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08

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- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens Nixel 1.25 / 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Amber 1.5 V1.1 / (2.5G) / V2.0 (2.5G)
- ROE Black Marble 4 / 5
- ROE Black Marble2 V2.1 / V2.4 / V2.7
- ROE Black Marble 2 Pro V1.1
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz Lightweight 3.9 V1.0
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII RGBCA V1.1
- ROE Coral 1.2 V2.0
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Flex Banner 6 V1.0
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Right-Angle/Rounded Corners)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Obsidian 2.6 V1.3
- ROE Opal 3

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- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2) / V6.1 (Full/-C)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Ruby 2.6 V1.4 (Full/-B/-C)
- ROE Sapphire 1.5
- ROE Topaz 1.9 V2
- ROE Topaz 2.6 V2.0 (Full/-C)
- ROE Vanish V8S (W) v1.4
- ROE Vanish V8T v1 (Full/Half) / v1.1 / V1.4 (Full) / V1.7 (Full)
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Sony ZRD-VP15EM / ZRD-VP23EM
- Unilumin UGC03
- Unilumin UHF3.9
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Unilumin UslimII3.9 500x1000
- Unilumin UslimII3.9 500x500
- Unilumin UslimII3.9 500x250

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- Unilumin UslimII3.9 300x1000
- Unilumin UsportF24 P3.8
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

SUPER IMPORTANT NOTE (Tiles currently running <v22.11.0): Tiles still using previous versions prior to release v22.11.0 and that support 2.5G Ethernet will receive a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

VERY IMPORTANT NOTE: Use of the SeamlessLoop™ redundancy with M4250 (MSM4214X) switches requires the switch firmware to be updated before use to the current version. There are several other improvements listed that also require updating the M4250 switch firmware.

IMPORTANT NOTE: It is important to always update firmware in all tiles in a screen to the same version. Many tiles may have slight improvements made to the tuning and accuracy that will cause visual differences from previous versions. This is also important to consider for on-camera applications where consistency is important during a shoot and firmware update timing must be planned.

IMPORTANT NOTE: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.

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- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: HELIOS with serial numbers 0201250205-XXXX and later can not be downgraded below v24.11.0.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- API - Added Camera/GhostFrame® and tile still store to public API (#1378).
    - Refer to the camera control section in public API documentation.
- Devices - Added additional color coding for link speeds.
    - Dark blue is 10G, Light blue is 1G, Lavender 2.5G.
- Input
    - Added built-in EDID generator! Build your own EDID for a custom resolution (#744).
    - Added HDMI/DP Input Reacquire button to reset link (#2158).
- Heatmap
    - Added per-tile identify check boxes (#2113).
    - Added humidity view for tiles with humidity sensor support (#1974).
- LCD
    - Added support page QR code, split out under new info section (#2117).
    - Rollover when entering IP octets without having to go all the way around the horn (#2073).
- Mapping
    - Device baseline! After setting baseline it will raise an alert when a device goes missing or is unexpected (#710).
    - Show notes tooltip when canvas is locked, or while holding alt.
- PTP
    - Added support for using PTP (ST 2059) as an external sync (#343).
    - Support synchronizing ST 2110 input to PTP (#932).
    - Note: *PTP is currently only supported on HELIOS' management interface.*
- Reports
    - Added tile topology report.
    - Renamed columns in Tile Counters to be more intuitive (#2010).
    - Added Link Drops counter to track number of times the link speed has completely dropped to 0 (#2010).
- Scheduler - Failover entry, triggered when the schedule is unable to run (#2108).

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- Tiles
    - Added support for humidity sensors (#1974).
    - Ability to save LDM gain adjustments in the tiles themselves (#1281).
    - Numerous enhancements for RGBCA tile performance (#1829).
    - Added ability to pull tile log while in Safe Mode (#2175).
    - Added additional Theater mode options for Ventana (#2211).

Bug fixes

- Alerts
    - Fixed spurious input error alerts (#2162).
    - Updated references from 'MVR' to 'Megapixel' (#2101).
- Camera
    - Alert when more video streams are being used than supported by tile(s) (#2045).
    - Fix slice gain sliders becoming decoupled and no longer working (#2134).
- Feedback - Show loader while submitting feedback.
- Input
    - ST 2110: Associate missing redundant stream alert with an input (#2038).
    - ST 2110: 2x2 stitching option was missing (#2227).
    - ST 2110: Allow provisioning for HDCP keys for 100Gb card.
    - ST 2110: Add hardware support for Rev 2 of 100G card.
- Mapping
    - Improve keyboard navigation between tiles of different sizes (#2059).
    - Update visual mark for bypassed tiles to use an olive colored hash (#2104).
    - Show selected tile's topology including SeamlessLoop backup topology (#2131).
    - Keep tiles in a hidden group hidden when editing another group (#2132).
    - Maintenance - Un-invert LDM power control (#2240).
    - Tile remaining black after disabling Bypass Mapping (#2183).
- Output - Persist 1931/1976 color space selection (#2138).
- Preview
    - Preview block was still showing previews in support logs (#2178).
    - Preview not working with non-standard ST2110 resolutions (#2204).

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- Redundancy
    - Take processor offline on input failure was conflicting when Test Patterns were enabled and treated incorrectly as an input failure (#2169).
    - Tile mapping incorrect in SeamlessLoop mode after rebooting tile (#2195).
    - SeamlessLoop: Fixed issue tile discovery issue that resulted in tiles not being shaded correctly in Mapping page (#2217).
- Switch
    - Fixed issues when using full redundancy and 20G switch capacity that resulted in tiles occasionally flipping to backup (#2159).
    - Fixed issues in 20G mode where some tiles come up in overcapacity state after reboot (#2163).
    - Fixed issue in UI in 20G mode where both fiber ports sometimes come up with bold border instead of one (#2164).
    - Fixed persistent overcapacity issue in 20G mode where one fiber is temporarily pulled (#2166).
    - Fixed 'controller mismatch' alert when modifying from 20G switch configuration (#2239).
- Scheduler - Fix rare condition where scheduler would stop executing (#1903).
- System
    - Fixed HELIOS 'no firmware' error after performing cold tile boot (#1970).
    - Failed sensor was disappearing instead of showing a failure alert (#2025).
    - Feedback will default 'send screenshot' to off if there is any preview blocking security set (#2274).
    - DHCP getting into inconsistent state (#2276).
- Updates - Correct ordering of update packages for packages with higher version # but are actually older versions (#2129).

TILES

- Fix internal test patterns with rotation (#2122).
- Rename Frame Alert to Video Error (#2215).
- Fix issue with toggling LDM power too quickly on tiles that support LDM Power Control (#2240).
- For tiles that use SFP modules, if module connectivity is lost then perform self-reset (#1681).

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- Fixed occasional issue with tiles being in a glitchy state immediately after a firmware update until power cycled (#1863/#2081).
- LBAG015 - Fixed issues with some tiles not detecting after Ethernet hot plug event (#2065).
- Fixed race issue on power up that caused occasional “Auth Fail” alerts (#2144).
- Fixed regression in v24.07.0 that resulted in the default DLUT missing from MBI5359 based tiles. *Note that there will be a slight shift in color in these tiles now from v24.07.0 as they are again color accurate back to v24.03.0* (#2154).
- Fixed rare calibration data warning from driver power up race condition (#2173).
- ROE Diamond 2.6 v1.2 - Fixed driver tuning regression after v22.12.

Known Issues

- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 24.07.0

Version Information

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v24.07.0.22791
HELIOS Firmware	v24.07.0.406
HELIOS OS	v24.01.0
PX1 Processing Card	v24.07.0.539
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.0.4.19

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Absen CL1.2 V2
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 1.2
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP P0.9 (LSAP009)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08
- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens Nixel 1.25 / 1.56

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- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Amber 1.2 Half (2.5G)
- ROE Black Marble 4 / 5
- ROE Black Marble2 v2.4
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0 (EU Converted panels)
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Right-Angle/Rounded Corners)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Ruby-C 2.6 v1.1
- ROE Sapphire 1.5
- ROE Topaz 1.9 V2
- ROE Topaz 2.6 V2.0
- ROE Vanish V8S (W) v1.4

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- ROE Vanish V8T v1 (Full/Half) / v1.1
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Sony ZRD-VP15EM / ZRD-VP23EM
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

SUPER IMPORTANT NOTE (Tiles currently running <v22.11.0): Tiles still using previous versions prior to release v22.11.0 and that support 2.5G Ethernet will receive a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

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VERY IMPORTANT NOTE: Use of the new SeamlessLoop™ redundancy with M4250 (MSM4214X) switches requires the switch firmware to be updated before use. There are several other improvements listed that also require updating the M4250 switch firmware.

IMPORTANT NOTE: It is important to always update firmware in all tiles in a screen to the same version. Many tiles may have slight improvements made to the tuning and accuracy that will cause visual differences from previous versions. This is also important to consider for on-camera applications where consistency is important during a shoot and firmware update timing must be planned.

IMPORTANT NOTE: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- Adjustments - Show tile outlines with a dark border.
- Heatmap - Show min-avg-max value of selected tiles, along with associated temperature color.
- HTTP - Support gzip responses.
- Input
    - Added support for USB-C Input modules.
    - Show stitched input order (#1919).
    - Add support for ST 2110-7 seamless redundancy (#1412).
- Mapping
    - Layout merge ports option - Disable this to have the mapping layout engine start a new row/column for each tile string (#1977).
    - Rearranged layout controls moving the select section to the left (#1976).
    - Select tiles in a group by clicking on the tiles in the groups panel (#1914).
    - Include tile maintenance options in the context menu.
- NMOS - Support for NMOS over the management interface when in ST2110 mode (#1659).
- Sensors - Added humidity reporting for tiles that support it (#1974).
- SFPs - Add support for "Megapixel" branded SFPs (#2002).
- Slider - Reset value button
- Tile -
    - Allow specifying a default theater mode below max luminance (#1955).
    - Added low power mode for MBI5264/5754 drivers (#2034).

Bug fixes

- HELIOS
    - API
        - Optimized preset retrieval to use less memory.
        - Support gzip compressed responses.
        - Gamepad no longer requires a secure context (https://) (#729).

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- Cloud
    - Back off on tunnel connection failure.
    - Show alert label when using static IP and no DNS or Router have been set.
- Feedback - Still gather feedback when there are no tiles connected (#1964).
- Groups
    - Sync test pattern color across stack when using groups (#2070).
    - Ignore group gains when using tile test pattern (#1985).
- Input
    - Fix issue with inputs >8192 pixels wide (#1707).
    - Display serial number info for 100G DAC SFP modules (#1978).
    - 100G Card not recognizing DAC cables (#1979).
    - 10G DAC cable erroneously reporting overcurrent (#1981).
    - Fixed issue with internal reader errors (#1994).
    - HELIOS boots up with video corruption (#1587).
    - Fix stitched input sync mismatch DP(2x1) when only using 1 input (#1988).
- LCD - Remove rogue preview thumbnail on input monitoring page (#1938).
- Mapping - Unable to select tiles in mapping canvas after tile FW update (#2000).
- Network - Fixed displayed router address to no longer show 0.0.0.0 after reboot (display issue, underlying route was correct) (#1980).
- Output
    - Actually disable adjustments when disabled (#1967).
    - Processor Low Latency not working with Canvas wider than 8K (#1894).
    - Pixel capacity alert does not clear when setting M4250 switch from 20G to 10G (#2044).
- Output report - Fix tile selection not always correctly filtering information (#1990).
- Preview - Preview the failed over input.
- Reports - Add UTF-8 BOM to CSV files for apps such as Excel to properly export non-English languages (#1957).
- Scheduler - Show blinking 00:00 time when NTP is unavailable.
- Sensors - Improved SFP sensor information to not display invalid sensors (#1975).
- Saved configs - Show saturation value when adjustments disabled (#1966).
- Stills
    - Allow uploading of multiple stills via upload file dialog.
    - Fix occasional visual corruption in uploaded still images (#1969).

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    - Switch
        - Workaround for switches sometimes losing the primary interface MAC from the MAC table (#1945).
        - Mix of switch firmwares not flagged as needing update in Alerts or Check for Updates (#2058).
        - Clean up traffic filters on secondary uplink on switch discovery. This corrects issues with using 20G and then switching to a dual redundancy setup. (#1965).
    - System
        - Added alert for DDR/BIST test failure (#1993).
    - Tile
        - Allow achievable gamut to have a slightly negative Z, or poor blue (#1942).
        - Fix pixel limit calculations to better take multiple streams info account (#1929).
        - Address spurious “SeamlessLoop not supported” false positives (#2075).
        - Fixed a rare JSON corruption issue that would sometimes cause tile not to be discovered on boot (#1931).
        - Fixed an issue with some drivers not always going into low power mode when they should (#2027).
    - Updates - Show firmware as unknown in cases where firmware information is unavailable

- TILES
    - Fixed issue with ROE Amber 1.5 v1.1 with MY9758 driver flicker on power-up (#1992).
    - Fixed issue with Jupiter tile visual corruption when coming out of low power mode (#1848).
    - Fixed visual artifacts on boot for LG LBAG015 (#1946/#1948).
    - Fixed visual artifacts when coming out of low power mode or toggling low latency modes for LG LBAG015 (#1950/#1951).
    - Fixed dead pixel detection counters for Megapixel ST 1.2 (#1959).
    - Fix 1G SFP MDIO commands.

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Known Issues

- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 24.03.0

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v24.03.0.22583
HELIOS Firmware	v24.03.0.394
HELIOS OS	v24.01.0
PX1 Processing Card	v24.03.0.508
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.9.7.23

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 1.2
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP P0.9 (LSAP009)
- LG P3.9 (LFCM039)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08
- Nanolumens HDS 0.97 / 1.25 / 1.56 / 1.87
- Nanolumens Nixel 1.25 / 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 /0.9 Thin / 1.2 (1G/2.5G) / 1.5 (1G/2.5G) / 1.5 v2.0 / 1.8
- ROE Black Marble 4 / 5

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- ROE Black Marble2 v2.4
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0 (EU Converted panels)
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 3.9 v2.1 (Full/Half)
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Diamond 2.6 v1
- ROE Diamond 2.6(MC) v1.2
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Graphite 2.6 (Full/Half) / v2.0 2.5G (Full/Half/Right-Angle/Rounded Corners)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Sapphire 1.5
- ROE Topaz 1.9 V2
- ROE Topaz 2.6 V2.0
- ROE Vanish V8T v1 (Full/Half) / v1.1
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Sony ZRD-VP15EM / ZRD-VP23EM
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2

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- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
- Unilumin Upanel1.5SII
- Unilumin Upanel1.9SII
- Unilumin Upanel2.5SII
- Unilumin UTWII1.2

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- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

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NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- 20G switch aggregated 2 x 10G support (#518).
    - Connect an additional 10G link to a M4250 switch to get twice the bandwidth.
    - Ports are then split in half with ports 1-6 using the first 10G link and ports 7-12 using the second 10G link.
    - First 10G link is still used for switch management, so if that link is lost then so is the connection to the switch.
    - NOTE: This capability is NOT available with the older 8-port M4200 switches due to switch firmware limitation.
- Health - Added Tile sensors report.
- Groups - Mask - Border can now be adjusted up to +/- 1000 pixels (#1805).
- Input - Added support for 100G DAC cables (#1850).
- Input failover - Switch to still on input failure (#1901).
- LCD - Option to disable previews altogether (#1862).
- Settings
    - Networking - Toggle to disable iframe prevention HTTP headers (#1913).
    - Stacking - Join button, name generator, and reordered columns (#1712).
- Tile Maintenance - Added “Mark Log”. Allows users to tag all HELIOS and tile logs when an issue occurs to aid in support team diagnosis. (#1812).
- Tiles:
    - Added Calibration status test pattern.

Bug fixes

- HELIOS
    - Factory default - Clear out firmware's SDP for ST2110 when no SDP loaded (#1910).
    - Group mask - Improved repetition scaling of asymmetric masks (#1877).
    - Mapping/Input/Preview - Video overlay not showing after tiles downgraded (#1868).
    - Output

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        - Reordered and renamed "widest" to "widest achievable" (#1771).
        - Update Output Report to use long tile names (#1899).
    - Still Store
        - Optimized showing of still store images (needs OS 24.01.0) (#1859).
        - Fixed “Media load failed” alert after deleting still image and then enabling Still Store (#1881).
    - Switch - Improved switch discovery time switch.
    - Switch - Fixed issue where switch was not being discovered after HELIOS upgrade without a reboot (#1838).
    - Translations - Spanish updated (#1907).
    - ST2110
        - Fix 100G hardware error alert not going away when connecting DAC (#1904).
        - SDP - Always use source-filter when present; don't try to validate using addrtype/dest-address fields (#1908).
        - Fix redundant stream SDP parsing with different destination fields (#1909).
    - Fix still/test pattern mapping with vertical GhostFrame multi-source (#1895).
    - Fix possible crash from unstable HDMI (#1875).
- TILES
    - Don't alert for zero RPM fans when set to silent fans (#1844).
    - Improve topology test pattern text size consistency (#1873).
    - Fix internal issue with high sub-frame count [tile would be slow to change inputs or timeout] (#1799).
    - Fix erroneous sensor alerts when tiles are in low power mode (#1886).
    - Deal with Un-programmed LDM memory in return from low power (#1832).
    - Fixed issue with Safe Mode not booting correctly when connected to HELIOS.
    - Refactored timing registers for XM10480G/XM10486G drivers.
    - Fixed an initialization issue for the XM11202G driver.

Experimental

- Input - Output image scaler toggle - Disables image scaler to allow for larger resolutions (e.g., > 8K) (#1707).
- Output - Split out "Perceptual primaries" option from "Clip to widest" (#1771).

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Known Issues

- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 23.12.1

This is a minor patch release for v23.12.0.

Device	Version
HELIOS Software	v23.12.1.22504
HELIOS Firmware	v23.12.0.382
HELIOS OS	v23.12.0
PX1 Processing Card	v23.12.1.488
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.9.7.23

Officially Supported Tiles

- 5Ten DGH 16 RGBW LED Strip
- 5Ten Voxel Panel 24
- Jupiter ZavusXP 0.7
- Jupiter ZavusXP 1.2
- LAMP RN2.6S-PLUS
- LAMP R3.9S
- LG MAGNITVP LBAG P1.56 (LBAG015)
- LG MAGNIT LSAP P0.9 (LSAP009)
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Megapixel Ventana XR08
- Nanolumens HDS 0.97 / 1.25 / 1.56
- Nanolumens Nixel 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1

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- ROE Amber 0.9 / 1.2 (1G/2.5G) / 1.5 / 1.5 v2.0 / 1.8
- ROE Black Marble 4 / 5
- ROE Black Marble2 v2.4
- ROE Black Onyx 2.8
- ROE Black Pearl 2.8 v1.0 (EU Converted panels)
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Black Quartz 3.9 Round Corners (BL/BR/TL/TR)
- ROE Black Quartz 6.2 v1.2 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 3 MKII v1.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Diamond 2.6 v1
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Graphite 2.6 (Full/Half)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Sapphire 1.5
- ROE Topaz 2.6 V2.0
- ROE Vanish V8T v1 (Full/Half) / v1.1
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9

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- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G
- Unilumin Upanel0.9SII
- Unilumin Upanel1.2SII
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NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

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- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- Mapping - Maintenance - LDM power control toggle (requires tile hardware support) (#1682).
- Public API - New route for retrieving a list of saved configurations without the additional data (/api/v1/presets/list)

Bug fixes

- HELIOS
    - App - Show Still toggle wasn't persisting the last selected Still image across reboots, and could show garbage (#1856).
    - Image - Expand Duv range to +/-0.02 (#1835).
    - Masks - Allowing masking and adjusting border without an image.
    - Check for updates - Fixed an issue where it was prompting for OS update when OS was already current (#1824).
    - Redundancy SeamlessLoop - Stitched - Fixed video stutter when disconnecting ethernet on tile / or fiber (#1793).
    - Saved Configurations
        - Fix rows being incorrectly hidden when creating a new configuration.
        - Include Duv in CCT.
        - Show gains values to 2 decimal places.
        - Fixed issue where it was unable to restore to Factory Defaults (#1861).
    - Seams - Fix arrow navigation after hiding/showing groups (#1860).
    - Update center
        - Re-added support for tile global calibration packages (overwrites all tile calibration).
    - Translations - Netherlands updated (#1852).
- TILES
    - Fixed an issue where tile may boot up, or come out of low power blackout, in a visual glitchy state (#1503).
    - ADV4/ADV5 tiles: Fixed an issue with erroneous Auth Fail alerts.

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- ST1.2 tiles: Fixed an issue with LDM occasionally reporting bad calibration data after upgrade to v23.12.0 (#1828).
- Carbon 5 MKII v1.1 tiles: Fixed an issue where they were not allowed to upgrade to v23.12.0 (#1830).
- Ventana: Improve gradient performance at super low brightness levels (#1841).

Experimental

- Updates - Always show channel selection when not a release build.

Known Issues

- Downgrading HELIOS to a release earlier than v21.08.0 can result in a “No Firmware” error. If this occurs, simply power cycling HELIOS after the downgrade will resolve the issue.
- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 23.12.0

Device	Version
HELIOS Software	v23.12.0.22415
HELIOS Firmware	v23.12.0.382
HELIOS OS	v23.12.0
PX1 Processing Card	v23.12.0.485
M4200 (GSM4210P) Switch	v12.0.17.6
M4250 (MSM4214X) Switch	v13.9.7.23

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- ROE Graphite 2.6 (Full/Half)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0 (Batch ID 1,2)
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Sapphire 1.5
- ROE Topaz 2.6 V2.0
- ROE Vanish V8T v1 (Full/Half) / v1.1
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- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin Upanel2.5S 2.5G

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- Unilumin Upanel1.2SII
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- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- User Guide Updates!! - It's worth noting that all new features have been documented in the User Guide as well as lots of additional information on existing features. Even if you've read the user guide before, it's good to review it again!! (It also makes our technical writer happy).
- App
    - Added Command palette (ctrl/cmd + k).
        - A new menu that allows the use of shortcuts to trigger most common functions or to navigate quickly around the menus.
    - Show Go Main/Go Backup available in the top right processor list.
    - Added white point Duv (Image Settings) and improved CCT calculation accuracy (#1322).
- Camera
    - Can now use up to two video streams and two still stores without requiring a license (no inversion capabilities).
    - Camera+ (new license) - Allows all of the above options plus up to four video streams (no inversion capabilities) (#1630).
    - Added buttons to quickly assign active slices to a specific track.
    - Added button to restore gains to default (unity) (#1379).
- Cloud
    - Propagate user agent permissions (admin/user) when remotely connecting from Megapixel Cloud (#1578).
    - Show enrollment code expiry time on LCD and in UI under Cloud Settings (#1489).
- Discovery - mDNS - Now includes Stack name in advertisements.
- Groups
    - Added solid color test patterns controllable via sACN (#1331).
    - Image masks! Can now give groups of tiles rounded corners, jaggy corners, or your own mystery science theater theme (#1294).
- Health - Reports
    - Exposed switch interface counters report.
    - Can clear switch interface counters from reports page (#1532).
- Input - Add 100G ST 2110 Input module support! (#640).

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- LCD
    - Show management MAC and OS version.
    - Tile Settings - Tile identify front & back control from LCD (#1661).
    - Configure Gateway + DNS network settings from LCD (#1375).
    - Show Bureau of Indian Standards (BIS) for Self-Declaration of Conformity (SDOC) (#1401).
- NanoSync - Increased no input signal frequency max limit to 240Hz (#1386).
- Mapping
    - Ability to store short notes within tiles. Notes persist within the tiles between processors.
- Output
    - Increased saturation function to up to 10 (#1538).
    - Report - Opens in the same tab/window, shows back button, zoom/pan, and tooltips.
- Preview - Reduced resolution and increased frequency (#166).
- Public API
    - Exposed the following in the Public API:
        - dev.ingest.info.type
        - dev.receivers.MAC.info.type
        - dev.switches.MAC.info.type
        - sys.fixtures
        - display.blackClipping
        - display.gains
        - display.camera.enabled
        - display.showTopology
        - receiver identifyEnabled
        - ingest/switch port sensors
    - Stop showing still endpoint (/api/v1/media/hide)
- Redundancy - Added SeamlessLoop™ HELIOS single processor redundancy! (#514).

  Provides for redundancy for:
    - Tiles looped back into the same switch
    - Tiles looped back into a different switch
    - Tiles looped back into HELIOS (Jr mode)
- Saved configs - Added LDM adjustments and LDM seams (#1575).

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- Scheduler - Added Weekdays & Weekend buttons (#1435).
- Security - Added security policies to control password complexity.
- Stacking - Advertise & show processor's redundancy role.
- Tiles
    - Add capability for technician notes stored on the tile (#1480).
    - Added checkerboard tile test pattern (#1524).
    - Added RGBWW tile support.
    - Added support for alpha masks in tiles (#1294).
- UI
    - Internationalization support!!
        - Default is to automatically select based on browser language.
        - Language can be overridden in Settings->Interface->Language
        - Supported languages:
            - German (DE)
            - English (US) i.e. color not colour ;-)
            - Spanish (ES)
            - French (FR)
            - Italian (IT)
            - Dutch (NL)
            - Japanese (JA)
            - Simplified Chinese (ZH)
        - Not all translations are perfect nor all human-translated. Please help contribute any translation corrections so we can make it better! (support@megapixelvr.com).
    - Ctrl/Alt + Left Mouse button now allows panning in canvas (#1742).
    - Numeric input boxes now support mathematical expressions!
    - Megapixel re-branding to new logo and style.
- Updates - Added support for dedicated OS update packages (#1690).
- Update Center - Expand/Collapse table toggle added.

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Bug fixes

- HELIOS
    - Adjustments/Seams - Avoid blinking when tiles are added/removed.
    - App - Raise a temporary alert when processor restarts due to an internal fault.
    - Alerts
        - Fixed potential dangling alert during large tile churn with alerts (#1600).
        - Show an alert when the OS needs updating (to support mode switching)
    - Camera - Additional camera video streams now only sent while camera mode is enabled (#1713).
    - Cloud
        - Alert state not being updated correctly on problematic connections (#1671).
        - Fixed memory leak when there's ongoing internet connectivity issues.
        - Prevent remote connections from adjusting cloud settings.
        - Addressed memory leaks caused by constant network disruptions.
    - Devices - Update LDM serial number on hot swap (#1382).
    - EOTF - IMPORTANT - Changed default SDR to "SDR" (power curve) (#1463/#1571). Please use the EOTF override to select “SDR (Preserve details)” when desired.
    - Group - Intensity not always settling on a whole number (#1621).
    - Group mask - Invert alpha channel so that transparent = video region (#1398).
    - Hardware - Implemented hardware watchdogs to improve recovery in the event of a process lockup (#1455).
    - Health - Prefer showing sensor name rather than object.
    - Input
        - Improved client-side EDID DisplayID decoding.
        - Go into low power mode when input is invalid (loss of signal) (#1647).
        - Increase max frequency to 1000Hz (#1388).
        - Support moving output window again.
        - Reduce brightness on input status LED’s to extend life (#1639).
        - ST 2110: Use the first ST 2110 stream listed in SDP file (#1409).
        - ST 2110: Use colorimetry data from SDP file (#1372).

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        - ST 2110: Fixed stutter when ST 2022-7 redundancy stream stopped with stitched inputs. (#2566)
        - Avoid spurious internal errors on unstable input (#1648).
        - Fix HDMI not re-linking on color depth change (#1495).
        - Fix HDMI 4:2:2 sometimes reporting 8 bpc (#1612).
        - Add unsupported alert for HDMI 4:2:0 input (#1635).
        - Fall back to SDR when receiving unrecognized metadata (i.e. PS5). (#1781).
        - Updated DP DisplayID EDID to prefer 60Hz instead of 120Hz (#1550).
        - Fix aspect ratio test pattern getting clobbered by SDI4 (#1622).
        - Fix glitching on frame rate change (#1536).
        - Fix reader sometimes getting stuck - causes video to freeze on tiles (#1604).
        - Fix sync phase check at 24Hz that resulted in erroneous sync mismatch alert (#1441).
        - Fix race condition where rapid External Sync toggle could leave screen black (#1483).
        - Fix issue where blackout can cause sporadic frame error alerts (#1593).
        - Fix crash when sending input of >3840 x 1 (yes, one pixel wide). (#1768).
    - LCD
        - Only show QR when there's an active link to Cloud.
        - Use stitched input details when generating stitched preview (#1481).
        - Address potential startup crash (#1396).
        - Show pattern list when selected pattern is empty after a factory default.
    - Output
        - CIE - Improved color accuracy of chart.
        - Grading - Limit intensity changes to vertical scroll wheel, to prevent accidental changes during horizontal page scrolling.
        - Gamut - Ignore tile's with erroneous calibration when calculating widest.
        - Reports - Tweak coverage calculation to avoid getting stuck at 100% when region exceeds standard.
        - Curves - Fixed points sometimes not being moveable.
        - Fixed issue where tile overcapacity red test pattern did not clear after capacity became available (#1490/#1614).

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- Mapping
    - Restore tile positions based on topology only when tile product IDs haven't changed.
    - Locally persist grid settings. So now when navigating away from mapping, then coming back, the grid will be there for you.
    - Skip assigning tile's group ID when the group no longer exists (#1397).
- mDNS - Reduced number of records being cached.
- Picker - Tweak sliders styling to make them more obvious (#1628).
- Previews
    - Additional preview slots for future inputs (#1615/#1616).
    - Discard cached previews on internal fault, so previews will be black rather than stuck.
    - More controlled memory consumption when connection abnormally terminated while previewing.
- Redundancy - Show self as offline on input failure (#1535).
- Saved Configurations – Hide invalid preset rows (#1787).
- Scheduler
    - Always show 24 hour clock regardless of current locale (#1434).
    - Periodically check local clock to become valid if enabled on startup but the time hasn't yet been acquired yet via NTP (#1444).
- Seams - Update cached seams on tile change (reboot, etc).
- Sensors
    - Reduce hysteresis based on minimum sensor limit.
    - Report and add more persistent sensors for max/min readings (#1726).
    - Report sensors for 10G Fiber SFP+ modules when used as ST 2110 inputs (#1517).
- Switch - Force 2.5G port clock mode to master (#1180).
- Stacking
    - Addressed rare deadlock/crash when stacking with a large number of device changes (#1468/#1508).
    - Be less strict on accepting settings from stacked units. If there's still an issue with settings getting out of sync, make sure all the HELIOS' are at least v22.12.1 (#1393).

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    - Support - Made generation more async to avoid client connection during download.
    - Stability improvements and improved support archive logging.
    - Still store
        - Add still store enable state to Stacking (selected still remains per-HELIOS) (#1734).
        - Fix glitches when using still store (#1554/#1555).
        - Delete orphaned media files (#1597).
    - Updates:
        - Check for updates: Filter online packages by supported tile types.
        - Check for updates: Indicate upgrade/downgrade direction when showing available online package versions.
        - Fix rare race condition that generated “Bulk Data response” error during tile firmware update (#1502).
    - Web
        - Set HSTS (HTTP Strict-Transport-Security) header when HTTPS redirect is enabled (#1684).
        - Removed ECDHE/RSA ARIA 128/256 GCM key exchange from TLS (#1684).
        - Reply back with a hint that your request URL is incorrect when you PATCH/PUT to /.
        - Verify cookie origin to mitigate CSWSH (cross-site WebSocket hijacking).
        - Set hard limits on Web Server's memory usage.
        - Fixed web server lockup issues (#1633).
    - UI
        - Improved latency compensation for input boxes.
        - Standardized on “Freeze” instead of “Pause” (#1445).
- TILES
    - Optimize tile network discovery.
    - Add new Route Announce to handled packet list.
    - Downloading Tile Support log no longer causes tile to flash (#1584).
    - Downloading pixel error report with large number of errors causes controller disconnect (#1657).

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- Updates to reduce ‘Invalid Sys Config Alerts’ and make them more descriptive (#1698/#1699).
- Keep tile black until fully booted.
- Speed up tile boot sequence.
- Change LDM number test pattern to show full LDM outline (#1469).
- Alert if the tile test button started safe mode.
- Increased pixel pipeline bit depth (#1406).
- Change how extreme packet loss is reported (#1388).
- Clean up stale alerts after hotplugging LDMs (#1383).
- Reread LDM data when new LDM is attached.
- Fixed frame errors with high Ghostframe sub-frame slice count (#1373).
- Fixed issue with fan controller not detecting hard faults (#1423).
- Fixed issue coming out of low-power blackout that caused tile repeated glitching (#1503/#1655).
- Fix gamma LUT being processed incorrectly when switching HLG mode (#1782).
- ROE Ruby 2.3: Fixed tuning for issues at 50Hz frame rate (#1407).
- ROE Amber 1.5: Fixed tuning for issues at 23.98Hz and 50Hz (#1494).
- Megapixel Kelvin B 2.6: Fixed tuning artifacts when using >3 sub-frames (#1501).
- Many other general tile bug fixes / system stability / performance improvements.

Experimental

- API
  - Sequence report with customizable formatting (#1432).
  - Add tile LDM calibration retrieval endpoint.
- Input - Un-blackout tiles when fade input switch disabled (#1702).
- Mapping
  - Button to add a logging mark to selected tile logs. Useful to mark the logs before triggering a weird condition and grabbing support logs. (#1794).
  - Pixel debug! - Select a pixel on a tile and read back the current video input levels and output levels (#1410/#1466).
- Support for a different number of HELIOS input & output ports (e.g., 100G Input is considered a fifth input port).

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- Output
    - Upload CDL - Treat SOPNode & SatNode as case insensitive to workaround external tools using the incorrect case.
    - Color transform - Fixed color output override.

Known Issues

- Downgrading HELIOS to a release earlier than v21.08.0 can result in a “No Firmware” error. If this occurs, simply power cycling HELIOS after the downgrade will resolve the issue.
- Group mask can scramble if tiles are rotated after the mask has been applied. Workaround is to re-apply the mask by toggling the group's mask off and then back on (#1387).

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Version 22.11.1

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v22.11.1.21832
HELIOS Firmware	v22.11.0.369
PX1 Processing Card	v22.11.0.443
M4200 (GSM4210P) Switch	v12.0.2.40
M4250 (MSM4214X) Switch	v13.0.4.8

Officially Supported Tiles

- 5TEN DGH 16 RGBW LED Strip
- Jupiter ZavusXP .7
- KinoFlo Mimik KF10
- Lamp RN2.6S-PLUS
- Lamp R3.9S
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Nanolumens HDS 0.97 / 1.25 / 1.56
- Nanolumens Nixel 1.56
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1
- ROE Amber 0.9 / 1.2 (1G/2.5G) / 1.5 / 1.5 v2.0 / 1.8
- ROE Black Marble 4 / 5
- ROE Black Onyx 2.8

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- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 / 2.8 v2 / 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6 (Full/Half)
- ROE Carbon 3 v2.1 (Full/Half)
- ROE Carbon 5 MKII v1.1(Full/Half)
- ROE Carbon 5 White v1 / v1.2 / v1.4 (Full/Half)
- ROE Carbon 5L MKII v1.1 (Full/Half)
- ROE Diamond 2.6 v1
- ROE Graphite 2.6 v1.0 (Right-Angle) / v1.1 / v1.2 (Full/Half)
- ROE Jasper 2.6 / 3.9 (Full/Half)
- ROE Ruby 1.5 2.5G / 1.5 Film v2.0 / 2.3
- ROE Ruby 1.9 v2.0 / v6.0
- ROE Ruby 2.3 v1 / v2 / v2 2.5G
- ROE Ruby 2.6 v1.0 / 2.6 Film v2.0
- ROE Ruby-C 2.3 v3 / 2.3 v3 2.5G
- ROE Sapphire 1.5
- ROE Vanish V8T v1 (Full/Half) / v1.1
- ROE Vanish V8T(B) v1.1 (Full/Half)
- Unilumin Unano 1.8
- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / Upanel1.2S 2.5G / UHQ1.2
- Unilumin Upanel1.5S / Upanel1.5S 2.5G / UHQ1.5
- Unilumin Upanel1.9S / Upanel1.9S 2.5G / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

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SUPER IMPORTANT NOTE: : Tiles that support 2.5G Ethernet include a PHY microcode update that will deploy automatically after the PX1 firmware update. This will result in another 3 minutes to the firmware update process. HELIOS will indicate the firmware update process is complete since this is an internal tile update. During this time the tiles will remain in black and not show up in HELIOS until complete. BE PATIENT. Do NOT power cycle the tiles while this internal microcode update is happening.

VERY IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTES: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 0203-220624-XXXX and later will not be allowed to be downgraded lower than v22.04.1.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- Input
    - SMPTE2110 input support added!
        - HELIOS has the capability to ingest (4) 10G inputs of SMPTE 2110 using the standard Megapixel 10G SFP modules (same modules as used on outputs).
    - Failover behavior selection (blackout, switch input, show still image) (#296).
    - Custom EDID can be user uploaded for DisplayPort and HDMI inputs (#1181).
- Output
    - Gamut - Added tabs to switch between actual and target coefficients (#1084).
- Camera / GhostFrame
    - Added support for GhostFrame demo licenses (#1124).
    - Sub-frame timing units can be selected to display as shutter angle, fractional frames or in milliseconds (#1261).
- Groups - Option to ignore/override system gains, allowing group gains to act independently.
- Health
    - Reports - new fiber sensors report (#566).
    - Reports - Bulk downloading of pixel error reports.
    - Reports - Device reboot buttons.
- LCD - Added option to lock front panel screen (Settings -> Security) (#737).
- HTTP - Added support for basic auth (#1309).
- Settings
    - Scheduler - (#1034).
        - Added scheduler for changing the following on specific days/times:
            - Blackout
            - Brightness
            - Inputs
            - Application of presets
        - Requires NTP connection for maintaining accurate time of day.
    - Still store - Upload still images (jpeg & png) and display them.
    - Network - Support uploading of custom certificates (PEM format) (#1048).
    - Network - Show IPv6 address.

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    - Tiles - Adjustable delay before low power mode is engaged during blackout (#1329).
    - Updates - Allow uploading entire zip file of all software/firmware .mvrp files at once (#1218).
- Patterns - Show tile cabling topology pattern (#1063).
- Preview - Front panel setting to disable remote previews (Settings -> Security) (#1307).
- mvrp - xz compress firmware for ~10MB savings
- ST2110 operating mode
- Web - Support for basic authentication added (#1309).
- Blackout - Show a leaf when in low power mode (#1329).
- Megapixel Cloud support added (requires a Cloud license).

Bug fixes

- HELIOS
    - Alerts
        - Accumulate sub-device alert counts (was causing count differences with OMNIS).
        - Show associated processor input/port on health alerts.
        - Reduce spurious 10G Ethernet errors on link up/down (#1215).
        - Reduce spurious 1G Ethernet errors in HELIOS Jr on link up/down (#1240).
    - App
        - Image adjust - Re-mapped gamma slider range when using HDR inputs with a nominal value of 1.0 for HDR and 2.4 for SDR (#1263).
    - Camera / GhostFrame
        - Dimmed canvas area outside of stream 1 when multiple video streams are in use to make it clearer where tiles should be mapped.
        - Clamp slice video streams to the maximum system supported.
        - IMPORTANT video streams now prefer horizontal division unless input is a 1xN type. For those still wanting a vertical split of a 2x2 try 2 streams with a 4x1 input.
        - Indicate when tiles cannot support GhostFrame (#1220).

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        - Allow both GhostFrame multi-source and Processor Low Latency together (#1186).
    - Canvas - Workaround fix when using Safari 15.4 on Mac M1 causing a hall-of-mirrors canvas redraw issue (#1199).
    - Device - Flag incompatible input SFP modules.
    - Discovery
        - Improve mDNS/SSDP IPv6 conformance.
        - General mDNS conformance improvements.
    - Feedback - Default option now includes tile logs in the feedback archive.
    - Groups
        - Changed group settings access button to be a cog to make it more obvious.
        - Added group settings access to mapping popup menu.
        - Block accidental double-clicking while creating groups (#1277).
        - Prevent group announcements from getting wedged after quickly adding/removing (#1282).
    - HTTP / Security
        - Disable insecure ciphers, set CSP & X-Frame-Options headers (#1198).
        - Removed Cross Origin Resource Sharing (CORS) exception for sys/ping (#1198).
        - Correct asset cache control headers.
        - Correct login routes cache control headers.
        - Return HTTP200 status for mjpeg previews.
    - Input
        - Respect scaler's total size limits (#1206 / #1222).
        - Disable fit & cropping when using stitched inputs (#1337).
        - Input - Restrict scaling size to input's total scaled pixels (previously we were using just the width/height restrictions) (#1206).
        - Stitched/Dual inputs would go black on input disconnect while frozen/paused (#1295).
        - Fix SDI level B issues (#1286.)
        - ST2110: IP would become invalid after link disruption (#1335).
        - ST2110: Alerts not clearing out on loss of signal (#1289).
        - ST2110: Fix deadlock (#1248).

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- LCD - Show thumbnails for ST2110 inputs (#1187).
- Mapping
  - More noticeable canvas lock (#1276).
  - Improved mapping with half tiles (#1212).
  - Highlight tiles that are in a visible error condition such as port over capacity.
- NanoSync - Adjusted unit labels to make the steps clearer (#1221).
- Output
  - Preserve curve aspect ratio when scaling browser window (#1175).
  - Adjust curves alignment in browser window (#1225).
  - Display tile latencies by tile type.
  - Changed order of output adjustments so gamma is applied last (per ASC-CDL) and added an adjustments option to revert back to the "legacy gamma" mode.
  - Fix edge condition causing screen to get stuck in blackout (#1259).
- RPC - Enforce user authorization across internal RPC calls.
- Saved configurations - Include the default "New" option in the dropdown menu making it easier to find.
- Scaling
  - Fix odd canvas widths getting rounded down by 1 pixel (#1249).
  - Fix scaler gamma so limited range black is black when scaling (#1169).
- Seams - Enable/Disable view corrections toggle now replicates across stack (#1346).
- Sensors
  - Adjust acceptable SFP lower current limits (2-65mA) (#1167).
  - Adjust acceptable SFP fiber power level ranges (-8.0-2.49dB) (#1306).
  - Workaround SFPs sporadically misreporting sensor readings.
  - Optimized fan speeds to reduce noise.
- Settings
  - Network - Advertise DHCP Client ID after reboot/release (#1315).
  - Network - Set appropriate HW type when Client ID is a MAC address (useful for RFC non-compliant DHCP servers).
- Shortcuts - Show shortcut shortcut (#1304).
- Switches

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        - Disables Switch OOB Service Port access (sorry, this was done for security reasons) (#1198).
        - Set fan limits (0-12k).
    - Protocol
        - Refer to tile's meta data for supported messages and test patterns.
        - Pixel max bandwidth limit capped to 8.5M pixels per 10G link (#1204).
        - Freeze video during input/color changes to avoid visible green/magenta flashes (#532).
        - Treat tile frame delay as a fractional frame and compensate for differences in timing between different tile types when in LL mode (#1231 / #1285).
        - Take overcapacity tiles out of test pattern in a redundant setup when capacity becomes available.
    - Web - Actually set cache control headers for long lived web assets.
- TILES
    - Added ability to synchronize different tile types together when using Low Latency (#1285).
    - Fixed tearing on top row in certain Low Latency configurations (#1270).
    - Improved tile rear button responsiveness for quick presses (#1299).
    - Processor Low Latency not working in certain stitched input configurations (#1297).
    - Fix Tile Low Latency on BP2v2.1 (#1230).
    - Fix frame error alerts on BP2v2.1 using Processor and Tile Low Latency modes with GhostFrame enabled too (#1233).
    - Adjusted pixel scaling so limited range black is actually black (#1169).
    - Workaround for M4250 (MSM4214X) network switches linking at 1G instead of 2.5G occasionally (#1180).
    - Improve bad LED detection.
    - Added GhostFrame demo watermark (#1124).
    - Improved non-linearity at low end for BP2v2.1 and other MBI5264-based tiles (#1205).
    - Fixed test pattern font selection for low resolution tiles to not overdraw (i.e. 8mm) (#1202).

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    - Stitched/Dual inputs (DP) goes black on input disconnect while frozen/paused (#1295).
    - Added luminance modes for BM4 based on surface type (#1110).
    - Enhanced driver linearization.
    - Upgrade Ethernet PHY microcode for 2.5G based tiles.

Experimental

- Input - Color standard override
- Health
    - Reports - Switch interface counters report
- Output - Upload & apply ASC-CDL coefficients (.cdl => Slope, Offset, Power, Saturation)
- Updates
    - Display channel selector

Known Issues

- Downgrading HELIOS to a release earlier than v21.08.0 can result in a “No Firmware” error. If this occurs, simply power cycling HELIOS after the downgrade will resolve the issue.

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Version 22.04.1

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v22.04.1.21572
HELIOS Firmware	v22.04.0.359
PX1 Processing Card	v22.04.0.427
M4200 (GSM4210P) Switch	v12.0.2.40
M4250 (MSM4214X) Switch	v13.0.2.34

Officially Supported Tiles

- Lamp RN2.6S-PLUS
- Lamp R3.9S
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Nanolumens HDS1.25
- Nanolumens HDS1.5
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1 / RS2 / RS3
- ROE Amber 0.9 / 1.5 / 1.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 v2
- ROE Black Pearl 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6
- ROE Carbon CB5W (Full/Half)
- ROE Diamond 2.6
- ROE Jasper 2.6 / 3.9
- ROE Ruby 2.3
- ROE Sapphire 1.5
- Unilumin Unano 1.8

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- Unilumin Unano 1.3
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel0.9S-2.5G
- Unilumin Upanel1.2S / UHQ1.2
- Unilumin Upanel1.5S / UHQ1.5
- Unilumin Upanel1.9S / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL
- Unilumin UTWII1.2

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

VERY IMPORTANT NOTE: If upgrading from v21.05.0 or older it requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTES: PX1 cards beginning with the following serial numbers have component changes that require newer firmware for proper operation. Once upgraded, these PX1 cards will not be allowed to downgrade below their minimum base version.

- PX1 cards with serial numbers 0203-210401-XXXX and later will not be allowed to be downgraded lower than v21.08.0.
- PX1 cards with serial numbers 020A-22XXXX-XXXX and later will not be allowed to be downgraded lower than v21.08.0.

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NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

New Functionality

- Grouping (#410)
    - Adds ability to create independent screen groups.
    - Tile Groups RGB + intensity can be controlled via sACN or via our REST API (#473 / #1013).
- Mapping - Editable local & global tile position when canvas repeat is enabled (#964).
- Canvas
    - Item selection will now jump to the next LDM/tile based on how many items are selected. (Hold down ctrl/alt to revert back to the old single step behavior) (#270).
    - Support jumping selection across gaps, provided items on the other side are lined up and are of the same size (#940 / #1105).
- Input
    - Added detailed timing popup (advanced mode) (#966).
    - Alert when links of a stitched input are out of sync (#1102).
    - HDMI EDID now advertises 120Hz (#993).
- Output
    - Post gains can now go to 200% (warning: sACN ranges have also been updated!).
    - Added ACEScg output gamut.
    - Increased HDR PQ accuracy for low levels (#987).
- GhostFrame
    - GhostFrame can now be disabled/enabled on a per-tile basis through the mapping page or through the API (#1006).
    - With GhostFrame disabled on individual tiles, allow selection of which video feed they display in a multi-source system GhostFrame system (#1133).
    - Increased maximum number of sub-frame slices up to 32, dependent on individual tile capabilities.

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    - ROE BP2.8 v2.1 (batch 3) - Increased the number of sub-frame slices to 14 at 60Hz.
    - Unused GhostFrame sub-frame slices now gray out (#1045).
- Settings
    - Network - Option to enable/disable mDNS + SSDP.
    - Saved configurations - Added a Factory Default preset; quickly discover which settings have been changed on a HELIOS.
    - Stacking - now shows all available stacks of processors on the network (#1011).
- Video Patterns - Custom color test patterns are now available, including using custom colors with all black and white patterns (#1070).
- HELIOS
    - Allow 10G DAC for MVR-branded cables (#884).
    - HDCP upgrade option now available. Requires new HDMI VFMC board with appropriate HELIOS license. Note that to comply with HDCP licensing; video will only be shown on authentic tiles when HDCP is active (#908).
    - Added support for MVR MultiMode fiber modules (#1046).
- sACN - Ranges have changed.
    - RGB gains are now 0 - 200 which maps to 0 - 200%
    - Blackout/Freeze/Test pattern enable now requires a level >= 128 to enable.
- Tiles
    - Consolidate tile short names for variations of the same tile (#1126).

Bug fixes

- HELIOS
    - Canvas
        - Improved canvas object rendering. Expect cleaner lines and less jaggy circles (#719 / #919).
        - iPad - Improved touch handling for dragging tiles on map (#909).
        - Mapping - Port drop-down should close after making selection (#1027).
    - Input
        - Persist aspect ratio setting (#1039).
        - Restore crop settings on reboot (#1042).

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        - Fixed NVidia input errors running on Windows at UHD/50 (#868).
        - Fixed tearing with mismatched (non-multiple) sync and frame rates (#997).
        - Scaling - fixed rounding error in scaler causing bright border on object (#1016).
    - Freeze
        - Avoid color space updates due to input changes while frozen (#1026).
        - Tile glitch when plugging input back in while frozen (#1134).
    - Output
        - "Custom gamut not applied" message is now more reactive and should only show when values differ (#1060).
        - Corrected LUT not updating properly on some color curve/wheels adjustments (#1071).
        - Lift setting no longer effects black test pattern (#1044).
    - Preview - Preserve image aspect ratio (#949).
    - GhostFrame - Multiple sources with Low Latency enabled had occasional sub-frames out of sync (#1131).
    - Devices - Phantom switch association edge case causing switch to appear to be associated with multiple HELIOS outputs at once (#1161).
    - Health
        - HELIOS Jr. - PHY error reports corrected (#871).
        - Greatly reduce the amount of “Page/Frame errors” generated on user initiated actions (such as enabling/disabling test patterns or changing inputs).
        - Added some new video alerts for more precise identification of input issues.
        - Fix frame error alerts that were not resolving after a tile reboot (#1129).
    - Seams
        - Rotated seams should now match the rotated tile (this was incorrectly flipped for 90 & 270 degrees) (#1066).
        - Reduced large step size to 0.01 (#1069).
    - Upgrades

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        - Boost priority on tile upgrade to force tile re-association. Meaning you can finally upgrade tiles from either the main or backup without having to manually flip them first.
        - Support firmware upgrading for new M4250 network switches (#1038).
    - Web Server
        - Improved handling of low level Websocket errors.
- Tiles
    - Send tile string topology information on association (#1031).
    - Re-apply fan control setting on tile reboot/re-association (#1090).
    - Sliding Color Temperature slider quickly resulted in inconsistent settings (#1024).
    - Batched tile support retrieval. Greatly improves tile support downloads at the cost of reduced coffee break time.
    - Update test patterns that use larger fonts, rearranged some screens to fit better, and added more patterns.
    - Fixed uneven gradient at low brightness levels (#1095).
    - Random tile authorization failure alert (#1072).
    - Tile Low Latency reporting Ethernet errors for tiles near end of chain (#1112).
    - ROE BP2.8 v2.1 (batch 3) - Corrected data corruption issue when running Tile Low Latency (#1065).
    - ROE BP2.8 v2.1 - Corrected issue with frame error notices occurring while in low power mode (#1064).
    - Improve Rec.709 accuracy on ROE Sapphire and MVR Eclipse tiles (#1059).
    - ROE Sapphire driver block artifacts after tile power cycle fixed (#1097).

Experimental

- SMPTE2110 support available in Beta now (#641).
    - HELIOS has the capability to ingest (4) 10G inputs of SMPTE 2110 using the standard Megapixel 10G SFP modules (same modules as used on outputs). If you are interested in beta testing ST2110 inputs to HELIOS please contact MVR Support (support@megapixelvr.com) for more information.
    - Numerous improvements have been made to the ST2110 implementation in this release.

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Known Issues

- Downgrading HELIOS to a release earlier than v21.08.0 can result in a “No Firmware” error. If this occurs, simply power cycling HELIOS after the downgrade will resolve the issue.

Version 21.08.1

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v21.08.1.21311
HELIOS Firmware	v21.08.1.347
PX1 Processing Card	v21.08.1.392
M4200 (GSM4210P) Switch	v12.0.2.40

Officially Supported Tiles

- Lamp RN2.6S-PLUS
- Lamp R3.9S
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1 / RS2 / RS3
- ROE Amber 0.9 / 1.5 / 1.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 v2
- ROE Black Pearl 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6
- ROE Carbon CB5W (Full/Half)

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- ROE Diamond 2.6
- ROE Jasper 2.6 / 3.9
- ROE Ruby 2.3
- ROE Sapphire 1.5
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel1.2S / UHQ1.2
- Unilumin Upanel1.5S / UHQ1.5
- Unilumin Upanel1.9S / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5
- Unilumin Upanel1.5S-EL

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

VERY IMPORTANT NOTE: This release absolutely requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: PX1 cards with serial numbers 0203-210401-XXXX and later have a component update that requires newer firmware for proper operation. Once updated to v21.08.0 these PX1 cards will not be allowed to be downgraded lower than this release.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- Health - Serial report - Show aggregated LDM Batch ID (#916).
- LCD - Show external sync information (#1004).
- Gamepad - L1 to adjust pattern + display brightness (#969).
    - L1+L adjusts display brightness
    - L1+SEL toggles test pattern on/off
    - L1+D-pad buttons to select test pattern
- Input - Canvas repeat mode (requires advanced mode enabled) (#1020).
    - Under Input->Output Window->"Canvas Repeat".
    - When zooming out on Mapping page you will see multiple identical canvases to allow duplicating multiple screens using same raster.
- Public API - Exposed test patterns enable + type
- Sync section renamed to NanoSync (#939).
- Additional stitching options for SDI inputs of (1x2, 1x3, 2x1, 3x1) (#985).
- Added Theater Mode settings for Black Pearl 2 v2.1

Bug fixes

- HELIOS
    - Adjustments - Holding shift is no longer necessary when using keyboard adjustment shortcuts.
    - Mapping - Snap tiles to canvas repeated input window.
    - Test patterns showing up on panels that are off of the active input area (#968).
    - Changing SDI from ImagePro between 50hz to 48hz causing crash (#991).
- Tiles (Note: issues fixed below may have also been present in tiles beyond specific models listed).
    - Fix Sapphire authentication failure warning (#999).
    - Fix Sapphire tile artifacts after power cycle or extended blackout (#1000).
    - Fix visual artifacts when using GhostFrame and Low Latency mode with Black Marble 4 tiles.
    - Fix BlackPearl 2 v2.1 pulsating at low frame rates. Also applies to other tiles (#975).
    - Fix visual artifacts in UPanel1.25 using 50Hz (#995).

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- Fixed corruption on 8th GhostFrame slice on Black Pearl 2 tiles running at 59.94Hz (#998).
- Fix tile metadata corruption on Diamond 2.6v1 and Ruby 2.3 (#1001).
- Fix Eclipse watchdog occasional reset with bad Ethernet link (#1007).
- RS1 tiles not displaying full image (#1025).
- Fix JSON read error (#1015).

Experimental

- SMPTE2110 support available in Beta now (#641).
  - HELIOS has the capability to ingest (4) 10G inputs of SMPTE 2110 using the standard Megapixel 10G SFP modules (same modules as used on outputs). If you are interested in beta testing ST2110 inputs to HELIOS please contact MVR Support (support@megapixelvr.com) for more information.

Known Issues

- Downgrading HELIOS to a release earlier than v21.08.0 can result in a “No Firmware” error. If this occurs, simply power cycling HELIOS after the downgrade will resolve the issue.

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Version 21.08.0

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v21.08.0.21260
HELIOS Firmware	v21.08.0.343
PX1 Processing Card	v21.08.0.371
M4200 (GSM4210P) Switch	v12.0.2.40

Officially Supported Tiles

- Lamp RN2.6S-PLUS
- Lamp R3.9S
- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1 / RS2 / RS3
- ROE Amber 0.9 / 1.5 / 1.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 v2
- ROE Black Pearl 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6
- ROE Carbon CB5W (Full/Half)
- ROE Diamond 2.6
- ROE Jasper 2.6 / 3.9
- ROE Ruby 2.3
- ROE Sapphire 1.5
- Unilumin Upanel0.9S / UHQ0.9
- Unilumin Upanel1.2S / UHQ1.2
- Unilumin Upanel1.5S / UHQ1.5

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- Unilumin Upanel1.9S / UHQ1.9
- Unilumin Upanel2.5S / UHQ2.5

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

VERY IMPORTANT NOTE: This release absolutely requires that the HELIOS software be updated to this release PRIOR to upgrading the PX1 tile firmware.

- Changes to the package structure have been made that require HELIOS to be updated first.

IMPORTANT NOTE: PX1 cards with serial numbers 0203-210401-XXXX and later have a component update that requires newer firmware for proper operation. Once updated to v21.08.0 these PX1 cards will not be allowed to be downgraded lower than this release.

NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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New Functionality

- Image Settings
    - Expanded min CCT to 1667K.
    - Support specifying min display brightness in nits.
- LCD
    - Preview of stitched inputs (#167).
    - Show QR code on network overview page (#862).
- Mapping
    - Toggle to disable tile snapping (#876).
    - Pan canvas when moving selected object to edges.
- Camera mode - Provides limited slice control when GhostFrame is unavailable.
- Feedback - Option to save locally for later sending.
- GhostFrame
    - Show total HELIOS pixel utilization to better illustrate the impact of additional video streams.
    - Undo/Redo support.
- Input
    - Plot EOTF curve (EOTF adjustments pane) refs (#658).
    - Restrict sizing based on input limits. This was already happening behind the scenes, and the UI will now make this more apparent (#210 / #924).
    - Show hTotal + vTotal timings per input (#866).
    - Show input's sync offset relative to the current sync (#838).
    - Enable DP HDR (#521).
    - Migrated to Vivado tool set 2021.1.
    - Update DP EDID with new tool set.
- Output
    - Color grading controls (Lift, Gamma, Gain, Offset).
    - YRGB curve adjustments.
    - Calibration report (#892).
- Preview - Show preview of stitched inputs (2x2, 4x1, etc)
- Redundancy
    - Communicate + show when in a mixed redundancy state.

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    - Offline redundancy mode - Tiles will not associate with an offline processor. For workflows where a specific processor within a larger stack needs to be taken offline.
- Saved Configuration:
    - Clone, rename, delete, download, and update.
- Licensing - Support licensing via an activation key (requires internet connectivity).
- Update Center - Support upgrading of network switches (#520).
- Network Switches - Adds ability to view SFP fiber power levels for the switch (requires firmware update to network switch).

Bug fixes

- Mapping - Improved meta/ctrl handling to disable snapping on drag start (#876).
- Input
    - HLG OOTF requires tile firmware a21.07.0.357 or later. Older tile firmware will alert and appear very red-ish while using HLG.
        - NOTE: Downgrading HELIOS to an older version while using HLG may require rebooting of tiles to restore color. (#522).
    - Turn HDMI LED off when source removed (#935).
    - Round frame rate to known standard rate if really close (#874).
    - Fix ImagePro-II firmware crash on DP removal (#852).
    - Address DP FIFO overruns on less than 4 lanes (#787).
- Device lists - Prefer long device names (#923).
- RevNet
    - Improved internal grouping of tile strings which could lead to temporary id exhaustion when large id fragmentation was occurring (i.e. rebooting a large system)
    - Use VLAN assignment to determine switch port when switch not yet discovered
    - Workaround tile upgrade bug which would cause transfers to timeout (#888).
    - Increase database table column constraint for firmware with a larger list of supported devices (#911).
    - Send firmware build number when initiating a tile upgrade (#936).

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- Settings
    - Redundancy - Re-label offline on input failure (#928).
- Sync
    - Round no input signal frequency for Dual DP (#874).
    - Signal frequency rounding error and sync mismatch errors (#874).
    - Sync mismatch from same sync source at same frequency (#838).
    - Fix vsyncPos not updating when switching inputs (#838).
    - Use HDMI measured sync instead of reported sync (#865).
- Security - Show user's connected user agent (this was broken by 21.05.0).
- Switch
    - Raise alerts for incompatible SFPs (#547).
    - Optimized discovery of pre-connected switches.
    - Copper SFP module reported as Up when it wasn't.
- Test Patterns
    - Test Pattern should honor selected input's sizing restrictions (#924).
    - Improve speed of Test Pattern on/off (#917).
- Support - Increased timeout when retrieving support from firmware.
- Update Center - Paginate devices to improve page performance (#922).
- Pause - Fix pause randomly not working on test patterns with Nanosync (#943).
- Network - Fix spurious Ethernet Error alerts (#937).
- Downgrades - Check for and prevent stuck GIC resulting in 'no firmware' errors during downgrades (#904)

Experimental

- Input - Canvas repeat mode, infinitely repeats the output window across the canvas area (#879).
- Health Reports - Include tile support log download buttons (#827).
- SMPTE2110 support available in Beta now (#641).
    - HELIOS has the capability to ingest (4) 10G inputs of SMPTE 2110 using the standard Megapixel 10G SFP modules (same modules as used on outputs). If you are interested in beta testing ST2110 inputs to HELIOS please contact MVR Support (support@megapixelvr.com) for more information.

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Known Issues

- Downgrading HELIOS can result in a “No Firmware” error. If this occurs, simply power cycling HELIOS after the downgrade will resolve the issue.

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Version 21.05.0

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v21.05.0.21119
HELIOS Firmware	v21.05.0.321
PX1 Processing Card	v21.05.0.347

Officially Supported Tiles

- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1 / RS2 / RS3
- ROE Amber 0.9 / 1.5 / 1.8
- ROE Black Pearl 2.8 v1.0
- ROE Black Pearl 2.8 v2
- ROE Black Pearl 2.8 v2.1
- ROE Black Quartz 3.9 / 4.6
- ROE Diamond 2.6
- ROE Jasper 2.6 / 3.9
- ROE Ruby 2.3
- ROE Sapphire 1.5
- Unilumin Upanel2.5S / UHQ2.5

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

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IMPORTANT NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

New Functionality

- GhostFrame feature added (#706).
  - See https://ghostframe.com for details.
- Added NanoSync feature.
  - See user guide for details.
- Migrated web app to newer technology frameworks (#548).
  - Improved canvas.
  - Dark/Light mode (processor settings).
- App
  - Image adjust
    - Indicate tile's current brightness in nits.
    - Indicate when brightness has been limited (by max tile or content).
    - Expand CCT range to 3K-10K (#694).
  - Added feedback submission (top right) to ease giving us feedback! Have an idea, something we should fix, or something else we should know? Feel free to reach out.
  - Gamepad - Hold R1 for fine adjustments (#765).
- Input
  - Show SDI flavor (e.g., 3G Level A) (#746).
  - EOTF - Split SDR option to "SDR" and "SDR (Preserve Details)" (#675).
  - Added option to allow/ignore external sync (#453).
  - Show mismatch alert if active sync is a different frequency to the currently selected input (#550).

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    - Automatically adjust the internal frequency (used for test patterns/no signal) to be the last valid selected input frequency reference (#742).
    - Expose internal frequency setting under the Sync pane (#742).
    - Enabled maximum incoming refresh rate up to 250Hz (#771).
    - Added Dual HDMI/Dual DP input options to HELIOS Jr. (#712/#783).
    - Added handling/notification for invalid sync inputs (#550).
    - Added support for HDMI at 144Hz (#808).
- Mapping
    - Show serial number for the selected tile (#621).
    - Select Port(s) - Show colored dots to match up with the tiles on the canvas (#570).
    - Added Black tile test pattern option.
    - Maintenance
        - Added capability to retrieve tile support logs. Requires PX1 firmware v21.05.0.346 or later (#613).
        - Added Tile ejection capability for tiles supporting motorized ejection (#695).
- Seams
    - Support for tile to tile seams added. These are stored within HELIOS and saved configurations. LDM seams continue to be stored within tiles. (#354).
- Output
    - HELIOS & tile Ultra Low Latency mode toggles (Output/Latency) (#459).
        - See user guide for full details on how to use Ultra Low Latency modes.
    - Option to add additional tile frame delay (Output/Latency) (#294).
    - Expand black clipping range 0 - 0.5.
    - Render CIE chart and include an option to see the 1976 variant.
- Devices
    - Show HDMI/DP input card details (Part #, Serial #, etc) (#538).
- Settings
    - Redundancy - Indicate processor readiness. A processor is considered "not ready" when it's input is invalid or its firmware is missing.
- Stacking - Show IP address of discovered processors along with a clickable link (#766).
- Saved configurations - Can be applied via API endpoints (request our API doc for details) (#527).
- Authentication

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    - Extended authentication to also support JSON Web Tokens (Bearer). Digest authentication continues to be supported, but bearer authentication allows a more visually pleasing authentication flow.
    - Added user roles; admin users continue to have full functionality, while a "user" role can have a more limited subset.
- Added "secure" connections via https:// as a proof of concept. This uses a self-signed certificate so your browser will show a security warning.
- Tiles
    - Align all VSyncs in a chain to be within 1uS to exactly align PWM (#679).
    - Separated tile blackout and low power modes internally (#711).

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Bug fixes

- Mapping
    - Improved mapping of mixed sized tiles.
    - Filter available tile test patterns based on advanced/developer settings (#530).
- Input - Auto EOTF would mistakenly flip over to the forced setting on an EOTF update.
- Settings
    - Correctly restore factory defaults; previously HELIOS would delete all the settings, but then would occasionally try to repopulate them as it was restarting.
    - Default output gamut to auto.
- Saved configurations - Limit to 1000 presets.
- Shortcuts - Include gamepad/controller button mappings (#764).
- OS - Enable ntpd to update the internal time automatically (when possible).
- Devices
    - Show tile connection relative to redundancy role (#757).
    - Increased threshold for fiber transmit power level to avoid false alert (#825).
- App
    - Avoid deadlock when quickly re-adding a tile.
    - Avoid spurious EOTF updates when nothing has changed.
- Test Patterns
    - Renamed “Image” to “Aspect Ratio Test” (#673).
    - Horizontal and vertical gradients swapped (#683).
- Inputs
    - Improved Genlock Sync at 29.97 (#559).
    - Lightware DP Router support added. Fixed issue when DP link but no video packets (#698).
    - Analog Way Aqualon DP support added. Fixed DP connectivity issue (#820).
    - Removed input mismatch alert when only single input is active (#791).
    - Added ability to force DP negotiation to use HBR2 links (#787).
    - Fixed dual DP input mismatch alert when DRM differs (#786).
    - Fixed persistent external sync mismatch alert after setting source refresh back to matching refresh rate (#788).
    - Fixed image corruption of bottom image border at certain frame rates (#730).

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- System - Firmware missing error on downgrade (#809).
    - Fixed an issue where this might occur on downgrade. A power cycle will resolve it. Downgrading from future releases to this release will not have this issue. Downgrading to something older than this release may exhibit the issue, but a simple power cycle will resolve it.
- Tiles
    - Updated tile short name list in UI to match proper tile naming (#681).
    - Redundancy Mode 'Manual' setting fixed issues where tiles would fall to backup instead of waiting for main processor to come back (#653).
    - Backup processor not always aware when tile goes offline temporarily (#824).
    - Tile brightnesses occasionally different after HELIOS reboot (#753).

Known issues

- HDR over DisplayPort is still in progress (#521).
- Gamepad API will soon require a secure context (#729).
    - In order to use the Game Controllers for seam correction it may require connecting to HELIOS using https:// and proceeding past the certificate warning in order to connect.
- Redundancy and Ultra Low Latency fully running together may result in Ethernet errors in some cases (#857).
    - For better performance, when attempting to run Ultra Low Latency and Redundancy together use Fail-Over Redundancy mode.

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Version 20.09.0

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v20.09.0.20886
HELIOS Firmware	v20.09.0.291
PX1 Processing Card	v20.09.0.303

Officially Supported Tiles

- Megapixel Eclipse 1.5 HDR
- Megapixel KELVIN B / W / HDR 2.6
- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1 / RS2 / RS3
- ROE Amber 0.9 / 1.5 / 1.8
- ROE Black Pearl 2.8 v2
- ROE Black Quartz 3.9 / 4.6
- ROE Diamond 2.6
- ROE Jasper 2.6 / 3.9
- ROE Ruby 2.3
- ROE Sapphire 1.5

It is strongly recommended to fully upgrade both HELIOS and all LED tiles to this release. Numerous improvements have been made in HELIOS and PX1 greatly improving both performance and reliability. Best performance and interoperability expects both HELIOS and PX1 cards are operating with the version numbers listed above for consistent behavior.

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IMPORTANT NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.

- Unfortunately older tile firmware versions can fail to respond to processors in a redundant configuration.
- WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

New Functionality

- Redundancy
  - Reworked redundancy to improve workflow and avoid terminology confusion (#583) & (#594).
  - Processors can now be assigned a desired redundancy role (main/backup).
  - Redundancy role is used as part of "Go Main" & "Go Backup" to instruct tiles to connect to the appropriate processor. This is then consistent when controlling from either the main or backup processor.
  - Processors are considered "active" when tiles are connected, "mixed" when tiles are connected to both the main + backup processors, or "standby" when no tiles are connected.
  - A different processor test pattern can be assigned to backup processors to make it much clearer which processor a tile is currently connected to (#604).
- Stacking
  - Syncs input adjustments & output color gamut settings across processors in the stack.
    - WARNING: Selecting widest gamut can result in different coefficients for different processors in a Stack.
  - Sync actions such as "Go Main" & "Go Backup" operate across the stack (#583).
- LCD
  - Show redundancy state & stacking group (top right).
  - Added a line under input to show the EOTF.
  - Added input selection to the main menu.
  - Added a pattern menu to be able to select processor test pattern & toggle motion.
- Devices - Support naming of network switches (#223).

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- Saved Configurations
    - EOTF Adjustments, Input range override added to saved configurations (#655).
    - Display gamut, Light science, Output adjustments added.
    - Removed LDM seam corrections (for now) from Saved Configurations as these values are stored in the tiles.
        - NOTE: We plan to add this back to Saved Configurations when we have tile-level seam correction (#354).
- Processor Settings
    - Tile fan control option to request tile fans run automatic or silent. Requires tile firmware 20.09.299 or newer (#633).

Bug fixes

- LCD - No longer shows the rotary knob position on the main menu.
- Redundancy
    - Adjusted processor announcement periods & improved hand-over to reduce visible disruption when tiles connect to a different processor (#579).
    - Avoid processor backup missing on "Go Backup" (#618).
- Stacking
    - Fixed surprising state changes when initially stacking processors (#584).
    - General communication robustness; addressing startup races, and improving initial discovery + connection (#664).
- Switches
    - Fixed "Unable to communicate with switch" occurring on some switches (#615).
    - Workaround switch sensors not being immediately available (#577).
    - Reported switch uptime errors fixed (#574).
    - No longer crash while initializing newly connected switches (this was pretty rare and really hard to find) (#552).
- Attempt to restart firmware when encountering "Firmware missing"startup error (#196)
- Assert EOTF/range override on the selected input (toggling test pattern was temporarily disabling, which was very confusing).
- Alert when selected stitched input is missing one or more links (#646).
- Avoid getting stuck during a tile firmware update when one, or more, tiles go offline during the update.

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- Increase LED Driver power down on blackout to five minutes, delay un-blanking tiles from low power state to avoid visual glitch (#624).
- Sliders - Preventing tabbing into a slider which could reset the slider's value (#671).
- Firmware logging will report more data for alerts and report Sensor ID.
- Continue sending vsync packets even if no tiles are connected.
- Fixed occasional unknown tile type/auth fail issue (#600).
- Scan SFP changes if interrupt is lost (#644).
- Sensors
    - Increased low SFP power range to avoid temporary sensor fault alerts (#603).
    - Renamed SFP alerts to "Over/Under fiber power" (#535).
    - SFP current readings were off by factor of 10x (#581).
    - Added SFP Temperature sensors (#635).
    - Rename fiber SFP sensors (#565).
    - Adjust fiber SFP optical power alert thresholds (#535).
    - Raised chassis over temperature alert to 50C.
- Inputs
    - Update DP EDID for YCC 12-bit input.
    - Increased accuracy of reported refresh rate on HDMI (#558).
    - Fixed an issue with invalid DP data causing invalid refresh rate resulting in pixel capacity exceeded event (#661).
    - Block inputs with invalid sync source (related to #661).
    - Fixed DP input not accepting video, automatically re-initializes input (#620).
    - Added alert for DP input failure (#634).
    - Corrected EDID Manufacturer ID (#516).
    - Fixed jitter in DP sync.
    - Use measured frame rate on DP to display accurate refresh rate (#650).
    - Fixed video artifacts on DP 2x1 when tiles are mapped with a large offset from (0,0) (#629).
    - Fixed occasional DP link issue where Input was lagging by a frame and striping image (#619).
- Fixed I2C issue that could cause internal comm bus to lock (#83).
- Test Patterns
    - Fixed “Image” aspect ratio pattern (#529).
    - "Image" Test Pattern doesn't switch back to normal test patterns correctly (#571).

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- Tiles
    - Added Silent Fan setting (#633).
    - Removed scan lines and artifacts going in/out of Blackout (#329).
    - Eliminate white lines when performing tile reboot (#591).
    - Fixed tile freezing in Seamless Redundancy failover mode (#553).
    - Improved Failover Redundancy time (#605).
    - Fixed Tile re-association when looking main processor (#609).
    - Fixed single frame glitch in Seamless mode when rebooting switches (#610).
    - Fixed delay in going to black on loss of signal (#557).
    - Fixed authentication errors in redundant system (#562/#630).
    - Changed Ethernet indicator behavior and include them in 'Show Rear Indicators' setting (#564).
    - Fixed Ethernet issue causing tile to get into persistent glitchy state (#575).
    - Fixed clearing tile counters in redundant system (#576).
    - Fixed tile re-association issue when flipping between Main/Backup states (#579).
    - Fixed tile power up in redundant system initially coming up in wrong mapping state (#584).
    - Fixed MDIO issue causing tile-tile connectivity loss (#585).
    - Fixed invalid Ethernet PHY temperature readings due to MDIO issue (#596).
    - Fixed random tile redundancy flip due to command processing overhead in some messages (#631).
    - Fixed Ethernet MDIO issues (#665)
    - Disable IPv6 announce packets (#588).
    - Fixed Tile Identify arrow appearance (#590).
    - Improved correlation between HELIOS error counters and OMNIS reporting for PHY errors (#614).
    - Fixed tile reset when flipping rapidly between test patterns and live video (#628).
    - Fixed tile reset when flipping rapidly between main/backup systems (#663).

Known issues

- HDR over DisplayPort is still in progress (#521)

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Version 20.05.0

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v20.05.0.20743
HELIOS Firmware	v20.05.0.270
PX1 Processing Card	v20.05.0.276

Officially Supported Tiles

- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1 / RS2 / RS3
- ROE Amber 1.5
- ROE Black Quartz 4.6
- ROE Diamond 2.6
- ROE Ruby 2.3
- ROE Sapphire 1.5

New Functionality

- System Redundancy
    - System redundancy capabilities now available using a main/backup HELIOS both driving from each end of a string of tiles.
    - Both traditional failover backup mode and new seamless failover mode available.
    - Please refer to the User Guide for full details on configuration and operation.
    - IMPORTANT NOTE: Redundancy operation requires tile firmware v20.02.0.250 or later.
        - Unfortunately older tile firmware versions can fail to respond to processors in a redundant configuration.
        - WORKAROUND: Disconnect the tile from the backup processor (or power off the backup processor) then perform the tile upgrade.

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    - IMPORTANT NOTE: HELIOS will need to reconfigure its attached network switches to support redundancy. (#487)
        - Switch reconfiguration will happen automatically when a network switch is connected to an upgraded HELIOS.
        - Current switch configuration version can be seen by looking at the switch's Contact field on the devices page, "v3" is the latest version.
        - WARNING: Once a switch has been reconfigured, it is not compatible with previous versions of HELIOS. Please contact us if you need to downgrade.
        - Please upgrade the HELIOS and its switches in an isolated environment before trying out the redundancy.
- HDR - High Dynamic Range with Dynamic Metadata support
    - IMPORTANT NOTE: Requires tile firmware v20.01.0.245 or later.
    - Initial support for SDR, HDR (traditional), HLG, and ST 2084 (PQ) curves
    - Initial support for dynamic range metadata.
    - Improved detection of (most) input colorimetry (DP is a known issue).
    - Please refer to the User Guide for full details on configuration and operation.
- Web Interface
    - Re-worked top right status icons.
    - Update sync status icon to indicate sync source (e.g., "Sync to HDMI") (#452)
    - Added a "Global settings" lock (#300).
    - Mobile - Added a test pattern selection to the mobile view (#478).
- Front panel LCD
    - Show the current operating mode (Standard/Jr) (#499).
    - Turning knob moves between pages.
    - Pressing knob now opens a menu:
        - Brightness %, Blackout, Freeze, and Test Pattern toggles.
        - Restore Factory Defaults.
        - Configure DHCP/Static IP address.
- Mapping
    - Identify option will now include "(rear only)" option when the "Rear indicator only" processor setting is set (#467).
    - Editable tile XY position can now be found under the "Positioning tools" (#460).

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- Input
    - Added luminance-only support for HDMI 4:2:0. (#456)
- Output
    - Black clipping is no longer considered an “Advanced” function.
    - Default brightness limit to lowest to false, moved toggle to Output adjustment.
    - Added Gray Step Test Pattern (#365)
- Settings
    - Option to reset to factory settings while keeping the assigned IP (#351).
    - Update Center - Sort tiles by identify (#321).
- Shortcuts - Updated CSS. You can always use '?' to see keyboard shortcuts (#389).
- Switches
    - Temperature & fan speed monitoring added.
- Tiles
    - Alert when there's an authentication failure (#458)
    - Added diagonal line test patterns, and additional stats patterns to tiles (#423).

- Public API
    - Exposed device counters & sensors, available inputs, redundancy state, and the directly connected switches.
- Stacking
    - Should now discover other HELIOS when automatically assigned a link-local address (#495).
    - Improved/Reduced HELIOS-HELIOS connection time.

Bug fixes

- Devices - Support for > 1GbE tile port speeds (#484).
- Output - Less truncated edit fields when using an iPad (#470).
- Settings - Support uploading of licenses via Safari.
- SDI Level B fixed (#439).
- Fixed PSU reporting thresholds for VCCINT & VCC_PSINTFP (#465).
- Fixed DP errors on DP disconnect (#481).
- Avoid flickering when the input doesn't match the external sync's frequency (#482).

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- Stop reporting that the external sync is valid after the external sync has been removed (#486).
- Changed wording when LDM is not in factory position (#503).
- Corrected DP EDID Vendor ID (#516).
- Heat Map - Hover temperature info above selection (#29).
- Mapping - Simplified selecting tiles when using port dropdown (#355).
- Output - show auto detected gamut (#525).
- Settings - pseudo-random static IP based on unit's MAC address.
- Fixed Interrupt handling issue causing memory corruption (#534).
- Fixed memory allocation issues and improved memory checking.
- Improved RPU crash handling.
- Reduced HELIOS Fan speeds.
- Adjusted ranges for SFP power limits for valid ranges.
- Update crash handlers in PX1 card.

Known issues

- Support HELIOS to same HELIOS redundancy is on our road map (#514)
- HDR over DisplayPort is still in progress (#521)

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Version v20.01.0

After updating, the following should be displayed as the current versions:

Device	Version
HELIOS Software	v20.01.0.20551
HELIOS Firmware	v20.01.0.252
PX1 Processing Card	v20.01.0.245

Officially Supported Tiles

- Revolution Display ADVHD1.5
- Revolution Display ADV4 / ADV5 / ADV8
- Revolution Display RS1 / RS2 / RS3
- ROE Amber 1.5
- ROE Black Quartz 4.6
- ROE Diamond 2.6
- ROE Ruby 2.3
- ROE Sapphire 1.5

New Functionality

- New HELIOS Jr. model released.
- Adjustments - Intensity adjustment to quickly adjust the brightness of a group of LDMs added. (#449)
- Canvas - Escape to deselect any selected objects. (#433)
- Input - Alert when an unrecognized/invalid input is detected. (#436)
- Mapping
    - Show aggregated port details when multiple tiles are selected.
    - Theater mode settings to adjust tile(s) max luminance to a different calibration target. (#450)
    - Show additional test patterns in HELIOS that are supported by tile firmware. (#415)

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- Output
    - No longer categorized as “advanced functionality”.
    - "Automatic" gamut automatically adjusts the display's gamut to match the source advertisement (which is going to be Rec. 709, see known issues).
    - Added "Limit max to lowest tile max" setting to control how max display brightness is calculated. (#411)
- Light Science feature added for tiles which support enhanced low level controls. (#432)
- PX1
    - Improved control over gamma curves added.
    - Advertise available test patterns to HELIOS. (#415)
    - Added small grid test pattern.
    - Ethernet PHY LED’s are now disabled when turning off “Show Indicators” for the tiles.
- Health
    - Reports - Include device's serial number in all reports.
- Settings
    - Identify behavior option added- "Front identify & Rear indicator", or "Rear indicator only". (#264)
    - Licensing (#6)
        - Support for per-unit feature based licensing added.
        - All existing HELIOS units will automatically be issued a "Standard" license to allow selection between Standard & Jr modes.
    - Operating mode (#326)
        - Control whether HELIOS is configured in "Standard" mode (8 x 10GbE SFP+) or a new "Junior" mode (8 x 1GbE copper SFP).
        - Requires HELIOS using at least a OS 19.10.0 release. This can be verified under Devices->Processor->expand HELIOS and note the version listed for “OS”. (For those needing this functionality with an OS version lower than 19.10.0, please contact Support for details on upgrading your OS.)

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Bug Fixes

- Devices - Removed support for incompatible SFPs. (#6)
- LCD
    - Show dual DP/HDMI in preview thumbnails for HELIOS configured using dual DP or dual HDMI input card configurations.
    - Update current input details if the input is changed while test pattern is active.
- Input
    - Avoid truncating reported frequency (e.g., 59.94).
    - Fix a DP state issue on disconnect. (#387)
- Output
    - Corrected bit depth calculation for 10-bit with non-60Hz frequencies. (#445)
    - Removed "Disabled" gamut.
- Settings
    - Networking - Keep static IP assignment when a DHCP server is available. (#462)
- Updates - Show HELIOS port information when updating tiles.
- Addressed an EEPROM write issue.
- Fixed bad sensor readings after a reboot. (#403)
- Sensor report improvements.
- Suppress some repeat error messages.
- PX1: Clearing Counters isn't clearing PHY errors. (#407)

Known Issues

- Input - Advertised input colorimetry is often incorrectly assumed to be Rec. 709 (#64)
- Output - Still need to handle non-scalable and wide inputs (#210)
- Previews - Only single inputs are supported. i.e., 2x2 SDI, 4x1 SDI will be black (#395)

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Version v19.11.0

Device	Version
HELIOS Software	v19.11.0.20468
HELIOS Firmware	v19.11.0.246
PX1 Processing Card	v19.11.0.216

New Functionality

- Input - Automatically expand details for the selected input (#358)
- LCD - Make it more obvious when in blackout/test pattern (#209)
- Processor Settings - Renamed Experimental to Advanced mode (#334)
- Preview - Support preview for single inputs, but still working on stitched inputs (#159)

Bug Fixes

- Application - Continue showing current input while test pattern is active (#357)
- Devices - Timeout detected sensor faults (#388)
- PX1 - Added delay after blackout before putting tiles into low power mode (#329)
- Fixed Alert Names (#163)

Known Issues

- Previews - Only single inputs are supported. i.e., 2x2 SDI, 4x1 SDI will be black (#395)

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