Release Notes

D730 H.264 Encoder / Modulator PCB

Version 3.0.1
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Change History

Version	Main Changes from Previous Version	Released By
v1.0	Initial release for 1st PCB revision.	RL
v1.1	Initial support for 2nd PCB revision. Improved latency and HDMI audio compatibility.	RL
v1.1.1	Corrected spectrum polarity.	RL
v1.1.2	Bug Fixes, support for 3rd PCB revision.	RL
v1.1.3	Production only code for ENGTX enclosures.	RL
v1.2	Solo narrowband RF modes, pattern generator, ENGTX support, encoding improvements, audio improvements, 6.4-8.6GHz unit types, bug fixes.	RL
v1.3	Legacy SD ASP encoder mode, pre-set range modes, front panel support, 500mW ENGTX support, 1.98-2.7GHz unit type, bug fixes.	RL
v1.3.1	Power calibration bug in v1.3 fixed.	RL
v1.4	Improvements to fade detection and video lock status.	RL
v1.5	UMVL modulation, standard AES128/256 encryption modes, new 4.4-5.0GHz / 6.4-7.5GHz / 8.1-8.6GHz unit types, increased mux bitrate limit, bug fixes.	RL
v1.5.1	New 3.0-3.7GHz unit type, interim encoder improvements, bug fixes.	RL
v1.5.2	New 6.4-7.5GHz / 8.1-8.9GHz unit types for revised D1142 and D1143.	RL
v2.0	Ultra-low delay mode, CCrypt encryption modes, encoder/decoder behavioural improvements, bug fixes.	RL
v2.1	Improved audio encoder, auto HD format detection, bug fixes.	RL
v2.2	Flexible audio gain, bug fixes.	RL
v2.2.1	ADL license.	RL
v3.0	Ultra Low delay improvement for HD formats, bug fixes.	RL
v3.0.1	RS-232 data input fixed.	RL

Introduction

This document describes to the reader the key features, improvements, known issues and bug fixes implemented in the software for the SOLO H.264 (D73x based) Transmitter range.

The document will be up issued with every software release and as such gives a traceable history in a single document.

It is DTC's intention to continue to use one version of software for all of its SOLO H.264 (D73x based) Transmitter variants. Certain features will only be active where the required hardware is present in certain designs. These dependencies will be highlighted throughout.

For all current SOLO H.264 Transmitters it is possible to upgrade the unit with a single software file which will be named with the version number.

Upgrade procedures are covered in separate documentation available on request from solent.support@domotactical.com

Software Releases

Version 1.0

File Names

- d730_rev1_v1.0.mcs

New features

- Initial release for 1st PCB revision.

Enhancements

- None.

Bug Fixes

- None.

Known Issues

- 3/8 horizontal down sampling not yet implemented.
- Spectrum polarity is inverted when set to normal, and normal when set to inverted. Fixed in version v1.0.1.

Known Issues with IDLV-5000P decoder

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.
- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.
- inverto have been informed of both issues.

Version 1.1

File Names

- d730.1_v1.1.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.1.mcs (for 2nd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.1.m0 (64Mbit image) checksum = 0x61BA6BE4
- d730-loader_v1.1.hex (flash loader program)
- d730-eeprom_v1.1.s (EEPROM s-record)

New features

- Support for 2nd PCB revision with same flash size as 1st PCB revision.
- Initial support for full 2nd PCB revision.

  Untested support for larger flash size once hardware arrives.
  Pre-programmed flash image and loader.
- New remote commands for balanced audio gain and mic bias (for 2nd PCB revision only).

  The Balanced audio gain command (abal) can be used on its own, or in combination with original Audio level command (alev).
  The Audio level command also has an expanded range (0-120dB gain) which automatically uses a combination of balanced and unbalanced gains.

Enhancements

- Improved HDMI EDID for greater compatibility with HDMI video/audio sources.
- Improved latency in 25fps encoding modes.
- New PTS offset mode (epts) command allowing for lower latency with PRORX-HD(D)SDEC.

  The video PTS offset transmitted is usually VBV delay + DTS delay. Setting this mode to 1 (DTS) rather than 0 (VBV+DTS) allows a lower PTS offset to be transmitted.

  This command should be used with caution as this does not guarantee compatibility with all decoders and requires the DTS delay to be adjusted based on other encoder settings.
- GRACE LICENSE banner text added to video when unit is not licensed.
- External ASI loop mode (chio) allowing for external encryption.

Bug Fixes

- Fixed an intermittent start-up fault with low delay mode.

- Spectrum polarity corrected.
- ASI chaining PCR correction now works with video input turned off.
- Analogue audio now works with video input turned off.

Known Issues

- None.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.
- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.
- inverto have been informed of both issues.

Version 1.1.1

File Names

- d730.1_v1.1.1.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.1.1.mcs (for 2nd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.1.1.m0 (64Mbit image) checksum = 0x61BA60B0
- d730-loader_v1.1.1.hex (flash loader program)
- d730-eeprom_v1.1.1.s (EEPROM s-record)

New features

- None.

Enhancements

- None.

Bug Fixes

- Spectrum polarity corrected.

  This was actually correct in v1.0 and incorrect in v1.1.

Known Issues

- None.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.
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- inverto have been informed of both issues.

Version 1.1.2

File Names

- d730.1_v1.1.2.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.1.2.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.1.2.m0 (64Mbit image) checksum = 0x61A96ADE
- d730-loader_v1.1.2.hex (flash loader program)
- d730-eeprom_v1.1.2.s (EEPROM s-record)

New features

- Support for 3rd revision PCBs.

Enhancements

- None.

Bug Fixes

- Improved HDMI embedded audio performance on 2nd revision PCBs.
- Improved video lock status reliability for SDI and HDMI.
- Fixed bug which could cause analogue audio not to work with HD NTSC clock rates (720p59, 1080i29, 1080p23, 1080p29, 1080psf23, 1080psf29).
- Power/Trim frequencies now shown to 0.25MHz resolution (previously 1MHz which affected SOLHDTX-034047 only during production).

Known Issues

- 1200 baud data input does not work.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.
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Version 1.1.3

File Names

- d730.2_v1.1.3_ENGTX_PRODUCTION_ONLY.mcs
  (for 2nd or 3rd revision PCBs with 64Mbit flash fitted, and being used in SOLH264ENGTX)
- This release is for production of the SOLH264ENGTX only, prior to the release of v1.2.

New features

- Enables the RF LED on SOLH264ENGTX enclosure.
- Ensures future upgrade compatibility for SOLH264ENGTX products.

Enhancements

- None.

Bug Fixes

- None.

Known Issues

- 1200 baud data input does not work.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.
- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.
- inverto have been informed of both issues.

Version 1.2

File Names

- d730.1_v1.2.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.2.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.2.m0 (64Mbit image) checksum = 0x5FEB9A8E
- d730-loader_v1.2.hex (flash loader program)
- d730-eeprom_v1.2.s (EEPROM s-record)

New features

- Support for more standard RF variants 640700, 700750, 810860 and special 700720 variant.
- Solo narrowband modes. Requires TX control application v2.7.2 or later to control options, or D588 front panel software/menus v1.4.
- Licensable to 2.5MHz, 1.25MHz, and 625kHz bandwidths.
  FEC rates of 2/3 and 1/3, guard intervals of 1/16 and 1/8.
  QPSK, 16QAM, BPSK or 8PSK constellations.
- Pattern generator with several modes (vpgn).
- 0 = Active when no video lock, moving component + 1kHz tone
  1 = Active when no video lock, black screen
  2 = Always active, moving component + 1kHz tone
  3 = Always active, static frame + 1kHz tone
  4 = A/V sync flash and beep generator, flash + 1kHz beep every 3s
  5 = Disabled
- Support for camera back ENG enclosure.

  Read battery/supply voltage using remote commands (gvba/gvin). Also contained in metadata packets.

  PA control command (gpac), 0 = Auto, 1 = Bypass/Off. Allows bypass mode of 500mW amp where used to reduce power back to 100mW.
- Added a command to force remote code download.
- Analogue audio level measurement remote commands.
- Video noise reduction level command (enrd), strength from 0 (off) to 2.

Enhancements

- Improved encoder efficiency, picture quality and content adaptively. Improved reliability at low bitrates.

- Rate buffer improvements.

  Buffer size / delay now dependant on GOP size and sub-frame rate in standard delay mode.
  Longer GOP = Better picture quality but increased delay.
  Shorter GOP = Reduced delay but also reduced picture quality.
  GOP length now defaults to 1 second rather than 48 frames.

- Actively drop frames at low bitrates when buffer overflows to improve playback reliability at decoder end. Only in standard delay mode.

- Defaults settings changed to target low delay applications with PRORXB.

  Encoding mode: Standard delay interlaced -> Low delay interlaced
  DTS delay: 90 -> 0ms. (For PRORX-HDIDEC / IDLV-5000P see below).

- EIT/TDT SI packets in DVB-T mode.

Bug Fixes

- Improved video lock status reliability.
- Correct resolution now sent in header for 720p 2/3rd horizontal res modes.
- NTSC SIF (1/2 horizontal, 1/2 vertical) resolution fixed.
- Corrected audio PTS.
- Private video lock and serial number descriptors added to PMT.
- Fixed bug which could cause garbled audio effect when switching to HDMI embedded audio with the MPEG Layer II encoder.
- Audio bitrates are now internally clipped in MPEG layer II Mono modes to 192kbps. Higher bitrates are not valid.
- SI play out rate was too high.
- Force analogue audio when video encoder is turned off.

Known Issues

- Poor narrowband SNRs in some situations (fixed in next release).
- 1200 baud data input does not work.

Related Product Changes

- As of v2.7.2 of the TX control application and v1.4 of D588 menu structure three HD input formats will be renamed: 1080i25 -> 1080i50, 1080i29 -> 1080i59 and 1080i30 -> 1080i60. Their function remains the same.
- v2.7.2 of the TX control application or v1.4 of D588 menu structure required to control new features.

Known Issues with PRORXB internal decoder

- None.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding HD streams:
  An additional DTS delay is required of up to 90ms for HD streams to decode smoothly. This was previously set as default, but default settings now target the PRORXB internal or PRORX-HD(D)SDEC / MRD 3187B external decoders which require no additional delay.

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.

- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.

- inverto have been informed of all issues.

Version 1.3

File Names

- d730.1_v1.3.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.3.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.3.m0 (64Mbit image) checksum = 0x5F9D6E71
- d730-loader_v1.3.hex (flash loader program)
- d730-eeprom_v1.3.s (EEPROM s-record)

New features

- [SOLHDTX-3] - Legacy ASP encoder mode

  Limited to SD inputs and narrowband modulation. Includes additional D730 features such as the pattern generator for digital inputs only.

  Included with TX-NBUP narrowband license.

- [SOLHDTX-5] - Pre-set range modes

  There are two sets of modes depending on whether the input is set to SD or HD video source. Video settings will effect whichever encoder is currently in use; it will not change between H.264 and ASP.

Mode	Modulation	Video	Audio
SD mode 1	2.5MHz 16QAM 2/3 about 4800kbps	Low delay interlaced, full resolution, full frame rate	1x no limit 2x no limit
SD mode 2	2.5MHz QPSK 2/3 about 2400kbps	Low delay interlaced, 3/4 resolution, full frame rate	1x no limit 2x 192kbps each
SD mode 3	2.5MHz QPSK 1/3 about 1200kbps	Low delay progressive, 3/4 resolution, full frame rate	1x 128kbps 2x 64kbps each
SD mode 4	1.25MHz QPSK 1/3 about 600kbps	Standard delay progressive, 3/4 resolution, 1/2 frame rate	1x 96kbps 2x minimum rate
SD mode 5	625kHz QPSK 1/3 about 300kbps	Standard delay progressive, SIF resolution, full frame rate	1x no audio 2x no audio
SD mode 6	625kHz BPSK 1/3 about 150kbps	Standard delay progressive, QSIF resolution, 1/2 frame rate	1x no audio 2x no audio
HD mode 1	DVB-T 16QAM 3/4 about 18260kbps	Low delay interlaced, full resolution, full frame rate	1x no limit 2x no limit
HD mode 2	DVB-T 16QAM 1/2 about 12180kbps	Low delay interlaced, full resolution, full frame rate	1x no limit 2x no limit
HD mode 3	DVB-T QPSK 3/4 about 9130kbps	Low delay interlaced, full resolution, full frame rate	1x no limit 2x no limit
HD mode 4	DVB-T QPSK 1/2 about 6090kbps	Low delay progressive, 3/4 resolution, full frame rate	1x no limit 2x no limit

HD mode 5	2.5MHz 16QAM 2/3 about 4800kbps	Low delay progressive, 1/2 resolution, full frame rate	1x no limit 2x 192kbps each
HD mode 6	2.5MHz QPSK 2/3 about 2400kbps	Standard delay progressive, 1/2 resolution, 1/2 frame rate	1x 128kbps 2x 64kbps each

- [SOLHDTX-4] - Add SOLO4 style front panel support

  Support for AP000231, OEM documentation also updated to reflect this.

- [SOLHDTX-7] - Ensure 500mW SOLH264ENGTX support

  Output power command (ohls) extended with presets power outputs.
  Legacy modes... 0 = Low, 1 = High
  100mW variant presets... 2 = 10mW, 3 = 50mW, 4 = 100mW
  500mW variant presets... 5 = 200mW, 6 = 500mW

  Units now default to 100mW output rather than High mode.

  500mW variants require 2 passes of power calibration, for standard (500mW) mode and then bypass (100mW) mode.

  Attenuation command (oplv) which applies to preset power outputs.

  PA command (gpac) modified for individual internal and external control. Internal bypass only affects Low/High power modes, not presets.
  0 = Auto, 1 = Internal Bypass, 2 = External Bypass, 3 = Bypass Both.

- [SOLHDTX-9] - Add 1980-2700MHz unit type

  Uses 7 calibration points rather than usual 5 points due to the range.

- [SOLHDTX-23] - Narrowband spectrum invert

  Command to invert narrowband spectrum (onsp), 0 = Normal, 1 = Inverted. In normal operation this should not be used.

Enhancements

- [SOLHDTX-24] - Limit starting power during power cal

  Standard units will start at around 15dBm rather than maximum power to avoid surprise damage. Note that 500mW variants will still start at around 22dBm.

- [SOLHDTX-26] - Default to 1080i50 rather than 1080i60

- Improved HDMI E-DID.

- Reduced PCR rate for mux/modulator bitrates less than 300kbps.

Bug Fixes

- [SOLHDTX-6] - SNRs poor in narrowband mode

  I/Q calibration corrected to give correct performance.

- [SOLHDTX-27] - Data time-out too short resulting in wasted packet space

Known Issues

- 1200 baud data input does not work.
- ASP encoder is currently slightly less efficient than the D510/D550 implementation.
- QSIF resolution is unavailable for SD range mode 6 when using the H.264 encoder.

Related Product Changes

- v2.7.2 of the TX control application or v1.4 of D588 menu structure required to control new features.

Known Issues with PRORXB internal decoder

- None.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding HD streams:
  An additional DTS delay is required of up to 90ms for HD streams to decode smoothly. This was previously set as default, but default settings now target the PRORXB internal or PRORX-HD(D)SDEC / MRD 3187B external decoders which require no additional delay.
- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.
- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.
- inverto have been informed of all issues.

Version 1.3.1

File Names

- d730.1_v1.3.1.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.3.1.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.3.1.m0 (64Mbit image) checksum = 0x5F9D4FA3
- d730-loader_v1.3.1.hex (flash loader program)
- d730-eeprom_v1.3.1.s (EEPROM s-record)

New features

- None.

Enhancements

- None.

Bug Fixes

- [SOLHDTX-28] - Power calibration ignored on 100mW units when using pre-set power levels

  Could cause power output to be above expected 100mW when using v1.3.

Known Issues

- 1200 baud data input does not work.
- ASP encoder is currently slightly less efficient than the D510/D550 implementation.
- QSIF resolution is unavailable for SD range mode 6 when using the H.264 encoder.

Related Product Changes

- None.

Known Issues with PRORXB internal decoder

- None.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding HD streams:
  An additional DTS delay is required of up to 90ms for HD streams to decode smoothly. This was previously set as default, but default settings now target the PRORXB internal or PRORX-HD(D)SDEC / MRD 3187B external decoders which require no additional delay.

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- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.

- inverto have been informed of all issues.

Version 1.4

File Names

- d730.1_v1.4.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.4.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.4.m0 (64Mbit image) checksum = 0x5F6F0158
- d730-loader_v1.4.hex (flash loader program)
- d730-eeprom_v1.4.s (EEPROM s-record)

New features

- None.

Enhancements

- [SOLHDTX-29] - Fade detection improvements

  Improved encoder performance in fade situations, camera irising, varying light conditions. Fixed issue where sensor noise caused unnecessary fading and therefore picture flickering in low light situations.

- [SOLHDTX-25] - Adjust video lock to detect PAL/NTSC clock difference

  Video lock status is now correct for all HD input formats, will recognise source-setting miss match between...
  24 <-> 23.976 fps
  30 <-> 29.97 fps
  60 <-> 59.94 fps

Bug Fixes

- None.

Known Issues

- 1200 baud data input does not work.
- ASP encoder is currently slightly less efficient than the D510/D550 implementation.
- QSIF resolution is unavailable for SD range mode 6 when using the H.264 encoder.

Related Product Changes

- None.

Known Issues with PRORXB internal decoder

- None.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding HD streams:
  An additional DTS delay is required of up to 90ms for HD streams to decode smoothly. This was previously set as default, but default settings now target the PRORXB internal or PRORX-HD(D)SDEC / MRD 3187B external decoders which require no additional delay.

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.

- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.

- inverto have been informed of all issues.

Version 1.5

File Names

- d730.1_v1.5.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.5.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.5.m0 (64Mbit image) checksum = 0x31D41A64
- d730-loader_v1.5.hex (flash loader program)
- d730-eeprom_v1.5.s (EEPROM s-record)

New features

- [SOLHDTX-37] - UMVL Modulation

  Modulation scheme based on our narrowband system from SOLO products, but running in 6/7/8MHz bandwidths. Four times the symbol rate of DVB-T aiding tracking of the RF channel at high speeds or high frequencies (C/X band). LDPC Forward Error Correction gives improved performance and better resilience to short term errors with its deeper interleaver. Good for short range links up to 1-2 miles. For long range links DVB-T is still the recommended system. Achievable modulation bitrates range from 1.31Mbps to 14.87Mbps.

  Shares the same FEC (ofec), guard interval (ogua), and modulation (omod) settings as Narrowband. The modulation bandwidth command (owid) has been expanded as follows.

0 = 6MHz DVB-T	3 = 2.5MHz NB	6 = 6MHz UMVL
1 = 7MHz DVB-T	4 = 1.25MHz NB	7 = 7MHz UMVL
2 = 8MHz DVB-T	5 = 625kHz NB	8 = 8MHz UMVL

  UMVL is a licensable feature requiring a TX-UMVLUP upgrade and is only supported on hardware that accepts d730.2 upgrade files.

- [SOLHDTX-20] - PCR in Video PID

  Option to move the PCR into the Video PID. This provides an available video bitrate increase of around 42kbit/s, significant in very low bitrate applications. Only available with H.264 encoder, and compatible with current H.264 receiver software if scrambling is not used. If scrambling is used at the same time, the receiver needs to be running a software version compatible with PCR in Video PID de-scrambling.

  PCR Location command (ploc).
  0 = PCR PID (default)
  1 = Video PID

- [SOLHDTX-33] - Standard AES128/256 encryption modes

  Added modes labelled as AES128 or AES256 on controllers, previously only supported BCrypt128 or BCrypt256. The same AES keys apply to either variant.

  AES and BCrypt are separately licensable features, requiring AESxxxTX or BCRYPTxxxTX upgrades respectively.

- [SOLHDTX-34] -Add 6400-7500MHz unit type (D1142 support)

  Unit type 32 (640700) extended to 640750 range, was previously un-used.
  Unit type 33 (700750) removed as redundant, also previously un-used.

- [SOLHDTX-35] - Add replacement 8100-8600MHz unit type (D1143 support)

  Unit type 34 (810860) is for new D1143.
  Unit type 35 (810860) remains for legacy D1140.

- [SOLHDTX-36] - Add extended 4400-5000MHz unit type

  Unit type 41 (440500) is for extended D1108/D1118 range.
  Units currently using unit type 28 (450500) can be extended but will require re-calibration.

- [SOLHDTX-40] - Add extended 3000-3525MHz unit type

  Unit type 81 (300352) is a special extended D1105/D1115 range.

Enhancements

- [SOLHDTX-42] - Raise manual Mux bitrate

  Manual Mux bitrate limit raised to 42Mbit/s (previously 30Mbit/s).
  Video bitrate is now limited to 32Mbit/s (whether set automatically or manually).

- [SOLHDTX-44] - Support remux where PAT/SDT contain adaptation fields

  Previously a PAT/SDT containing an adaptation field would be ignored.

Bug Fixes

- [SOLHDTX-1] - Black level issues

  Previously had slightly yellowish/grey stripes visible with some 3rd party decoders in very low light areas.

- [SOLHDTX-30] - AD4350 synth prescaler set incorrectly in some situations

  Could have affected RF performance between ranges…
  375-425MHz / 750-850MHz / 1.5-1.7GHz / 3.0-3.4GHz / 6.0-6.8GHz.

- [SOLHDTX-38] - PAL/NTSC SAR based on 720 rather than 704 pixels

  Small correction to aspect ratio which would affect PC stream players. Aspect ratio was previously calculated for PAL/NTSC, based on 720 horizontal pixels rather than 704 pixels (720 with overscan).

- [SOLHDTX-45] - Manual Audio PIDs over 0x0FFF/4095 wrap round

  This would cause a manual Audio PID of 0x1234 for example to appear in the transport stream as 0x0234.

Known Issues

- 1200 baud data input does not work.
- ASP encoder is currently slightly less efficient than the D510/D550 implementation.
- QSIF resolution is unavailable for SD range mode 6 when using the H.264 encoder.

Related Product Changes

- Pro-RX software v1.6 onwards required for demodulation of UMVL.
- v2.8 of the TX control application or v1.6 of D588 menu structure required to select UMVL bandwidths.

Known Issues with PRORXB internal decoder

- None.

Known Issues with PRORX-HD(D)SDEC (MRD 3187B) decoder

- None.

Known Issues with PRORX-HDIDEC (IDLV-5000P) decoder

- When decoding HD streams:
  An additional DTS delay is required of up to 90ms for HD streams to decode smoothly. This was previously set as default, but default settings now target the PRORXB internal or PRORX-HD(D)SDEC / MRD 3187B external decoders which require no additional delay.

- When decoding SD streams:
  Currently an additional DTS delay is required of up to 1000ms for SD streams to decode smoothly. The DTS delay can be adjusted using the TX control application. For solutions where a low delay SD H.264 stream is required, a more suitable decoder can be suggested or new firmware from inverto may be available.

- Regular black screen interruptions in video:
  If the decoder receives no audio packets then video can be interrupted periodically by a black screen. Even if audio is not required it is suggested to turn on audio encoder 1 with analogue input at a low bit rate to resolve this issue.

  inverto have been informed of all issues.

Version 1.5.1

File Names

- d730.1_v1.5.1.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.5.1.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.5.1.m0 (64Mbit image) checksum = 0x31D3BA74
- d730-loader_v1.5.1.hex (flash loader program)
- d730-eeprom_v1.5.1.s (EEPROM s-record)

New features

- [SOLHDTX-75] - Add 3000-3700MHz unit type (Modified D1105 support)

  Unit type 43 (300370) is a new unit type for D1105 revision 1.2 or newer only. For older D1105/D1115 PCBs continue to use unit type 25.

Enhancements

- [SOLHDTX-76] - Improvements to motion tracking and refresh pattern

  Small encoder tweaks to improve motion tracking and refresh pattern in low delay mode.

Bug Fixes

- [SOLHDTX-77] - Composite video lock status unreliable

  Could cause the test pattern to appear intermittently depending on the composite/s-video source and its content.

Known Issues

- 1200 baud data input does not work.
- ASP encoder is currently slightly less efficient than the D510/D550 implementation.
- QSIF resolution is unavailable for SD range mode 6 when using the H.264 encoder.

Version 1.5.2

File Names

- d730.1_v1.5.2.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v1.5.2.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v1.5.2.m0 (64Mbit image) checksum = 0x31D353F1
- d730-loader_v1.5.2.hex (flash loader program)
- d730-eeprom_v1.5.2.s (EEPROM s-record)

New features

- [SOLHDTX-85] - Add 6400-7500MHz unit type (Issue 2.0 D1142 support)

  Unit type 62 (640750) is a new unit type for D1142 revision 2.0 or newer only. For older D1142 PCBs continue to use unit type 32.

- [SOLHDTX-86] - Add 8100-8900MHz unit type (Issue 3.0 D1143 support)

  Unit type 64 (810890) is a new unit type for D1143 revision 3.0 or newer only. For older D1143 PCBs continue to use unit type 34.

Enhancements

- None.

Bug Fixes

- None.

Known Issues

- [SOLHDTX-79] - 1200 baud data input does not work.
- [SOLHDTX-22] - ASP encoder motion prediction sub-optimal

  ASP encoder is slightly less efficient than the D510/D550 implementation.

- [SOLHDTX-32] - H.264 1/4 resolution down-sampling

  QSIF resolution is unavailable for SD range mode 6 when using the H.264 encoder.

Version 2.0

File Names

- d730.1_v2.0.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v2.0.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v2.0.m0 (64Mbit image) revoked 30 June 2014
- d730-loader_v2.0.hex (flash loader program)
- d730-eeprom_v2.0.s (EEPROM s-record)

New features

- [SOLHDTX-48] - Backward compatibility command for v2.0 features

  IMPORTANT NOTE: H.264 encoder features implemented in this version of software require **Pro-RXB v1.6.1+** or **NanoVue / SOL5RX v2.2+**. As such it is recommended that you upgrade associated receivers to their latest available software before moving to this release.

  Alternatively an engineering command can be sent to put the encoder into a backward compatible mode (**wgbac;15;**), or enable features (**wgbac;0;**).

- [SOLHDTX-18] - Vertical stripe refresh mode

  Ultra-low delay H.264 encoding mode. Low delay latencies have also been improved. Below is an end-to-end latency guide measured at 8MHz, DVB-T, ¾ FEC, QPSK to a Pro-RXB. Different modulation rates will affect latency to various degrees, as will using genlock.

	D730 < v2.0	D730 >= v2.0	
Format	**Low delay**	**Low delay**	**Ultra-low delay**
1080psf 23.976 / 24		83 ms	57 ms
1080psf 25		81 ms	55 ms
1080psf 29.97 / 30		74 ms	48 ms
1080p 23.976 / 24		51 ms	25 ms
1080p 25		49 ms	23 ms
1080p 29.97 / 30		45 ms	16 ms
1080i 50	93 ms	81 ms	56 ms
1080i 59.94 / 60	83 ms	74 ms	49 ms
720p 50	59 ms	45 ms	19 ms
720p 59.94 / 60	52 ms	41 ms	15 ms
PAL		96 ms	71 ms
NTSC		87 ms	62 ms

- [SOLHDTX-51] - AES-EBU audio for OEM

  See D730 OEM Integration document v1.4+ for details.

- [SOLHDTX-52] - Test source application type

  TESTSOURCE type should be selected with being used as a test source during D732 production.

- [SOLHDTX-56] - CCrypt 128/256-bit encryption

  Requires AES 128/256-bit licenses.

- [SOLHDTX-61] - Mode where RF is off on power-up and/or config change

  The small front panel button can be held down during power up to ensure RF output is not enabled automatically. Release the button when you see the "Turning RF off…" message.
  Requires Front Panel (D588) software at v1.9+.

  The Modulation Initialises Off command (gout) can also be used to always disable RF when powering up the unit or changing config.

- [SOLHDTX-67] - Battery status in metadata for non-ENG units

  Battery voltage is transmitted over metadata for standard "brick" units.
  Requires Front Panel (D588) software at v1.9+.

- [SOLHDTX-87] - Audio noise gate control

Enhancements

- [SOLHDTX-43] - Add H.264 access unit delimiter NAL

  Improved 3rd party decoder compatibility.

- [SOLHDTX-46] - Add SEI to allow receiver to match output to input format

  Allows end-to-end format matching. For example if a psf source format is selected the Pro-RXB will now output psf, as opposed to progressive.

- [SOLHDTX-47] - Allow PES per GOP for improved low bitrate performance

  Improvements seen at video bitrates less than 300kbps.

- [SOLHDTX-50] - Video/audio PTS improvements

  Improvements to end-to-end latency and audio lip-sync. In some cases video delay is now less than the minimum achievable audio delay. Default behaviour is the keep video delay to a minimum even if audio then ends up out of sync. Note that Layer I audio delay is less than Layer II.

  The Force video sync command (asyn) can be used to force video to be delayed to align with audio where required.

- [SOLHDTX-53] - Show AV status issues by flashing ENG TX LED

ENGTX LED	RF Status	AV Status
Flashing	N/A	Video or Audio input not locked or chaining overflow
Solid On/Off	RF On/Off	Video and Audio input locked and chaining OK/off

- [SOLHDTX-64] - Reduce upgrade file size
- [SOLHDTX-90] - Default to narrowband when not licensed for DVB-T

Bug Fixes

- [SOLHDTX-2] - ASI output doesn't work at very low rates

  Minimum ASI output rate is now a bit less than 70kbps.

- [SOLHDTX-59] - Increase PAT and PMT frequency

  Fixed an issue where the PAT and PMT interval could exceed 500ms.

  The PMT Rate command (pmra) can also be used to adjust the PMT interval for applications requiring a faster repetition rate.

- [SOLHDTX-66] - Unit brickable by not following upgrade procedure

  Improved code upgrade behaviour preventing the “Pre-programmed flash found” message being shown incorrectly.

- [SOLHDTX-79] - 1200 baud data input
- [SOLHDTX-89] - No SD-SDI audio group 2/4 when group 1/3 present

Known Issues

- [SOLHDTX-22] - ASP encoder motion prediction sub-optimal

  ASP encoder is slightly less efficient than the D510/D550 implementation.

- [SOLHDTX-32] - H.264 1/4 resolution down-sampling

  QSIF resolution is unavailable for SD range mode 6 when using the H.264 encoder.

Version 2.1

File Names

- d730.1_v2.1.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v2.1.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v2.1.m0 (64Mbit image) checksum = 0x3D64A8CF
- d730-loader_v2.1.hex (flash loader program)
- d730-eeprom_v2.1.s (EEPROM s-record)

New features

- [SOLHDTX-55] - MicroBlaze audio encoder

  Audio encoder 1 has been replaced by a higher quality encoder core. Improved audio quality throughout the bitrate range.

  Not implemented for audio encoder 2 due to resource limitations, or 1st revision PCBs which use the d730.1 upgrade files. In these cases the older encoder core remains.

- [SOLHDTX-60] - Automatic HD format detection

  With video source set to HD-SDI or HD HDMI the HD format of the source will now be automatically detected and the encoder configured to match.

  Power up standard can be set by selecting a format manually. If psf is selected manually then the auto detection will prefer psf over interlaced standards, for example will pick 1080psf25 rather than 1080i50.

  Auto detection can be disabled using the engineering command (**vafh;1;**). *This option may be added to control applications in future releases.*

Enhancements

- None.

Bug Fixes

- [SOLHDTX-95] - Pre-prog image for v2.0 is junk

  If used it would have required a full software update in production to boot correctly.

- [SOLHDTX-96] - Increase PTS repetition rate in standard delay mode

  PTS repetition rate in standard delay mode was 1s by default which exceeds the ETR 290 specification of 700ms. PTS repetition rate is now limited to 500ms max to ensure compliance.

- [SOLHDTX-97] - Unnecessary jitter on PCR re-stamping of remux

  Slight improvement made to jitter on PCR when using remux input.

Known Issues

- [SOLHDTX-22] - ASP encoder motion prediction sub-optimal
- [SOLHDTX-32] - H.264 1/4 resolution down-sampling

Version 2.2

File Names

- d730.1_v2.2.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v2.2.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v2.2.m0 (64Mbit image) checksum = 0x3D626D96
- d730-loader_v2.2.hex (flash loader program)
- d730-eeprom_v2.2.s (EEPROM s-record)

New features

- [SOLHDTX-99] - Independent left/right audio gain with lower resolution

  The 12dB step analogue level option continues to define a base level of gain for both left and right inputs. Continue to us this for course gain selection where possible as this provides the best noise performance.

  There are now two new commands (adgl / adgr) for setting additional left and/or right input gain in 1dB steps.
  This option will be added to control applications in future releases.

Enhancements

- None.

Bug Fixes

- [SOLHDTX-100] - Audio streams missing PES packet length

  Affected the new MicroBlaze audio encoder only. Had potential for causing interoperability issues with 3rd party decoders.

- [SOLHDTX-101] - Unnecessary delay/offset added to MPEG audio

  Resulted in minimum audio end-to-end delay being longer than necessary.

- [SOLHDTX-103] - Long start-up times in sub-frame rate low delay modes

  Some encoder combinations could result in decoder start-up time of over a minute due to very infrequent SPS/PPS headers.

Known Issues

- [SOLHDTX-22] - ASP encoder motion prediction sub-optimal
- [SOLHDTX-32] - H.264 1/4 resolution down-sampling

Version 2.2.1

File Names

- d730.1_v2.2.1.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v2.2.1.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v2.2.1.m0 (64Mbit image) checksum = 0x3D62481B
- d730-loader_v2.2.1.hex (flash loader program)
- d730-eeprom_v2.2.1.s (EEPROM s-record)

New features

- None.

Enhancements

- None.

Bug Fixes

- [SOLHDTX-99] - ADL License

  ADL license code was missing from previous release.
  ADL256 encryption can now be enabled by adding licence code **M**.
  Requires purchase of ADL256TX.

Known Issues

- [SOLHDTX-22] - ASP encoder motion prediction sub-optimal

  ASP encoder for legacy support only, will not be improved.

- [SOLHDTX-32] - H.264 1/4 resolution down-sampling

  Supported on D1500/D1600, will not be supported on this platform.

Version 3.0

File Names

- d730.1_v3.0.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v3.0.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v3.0.m0 (64Mbit image) checksum = 0x3DF28DAA
- d730-loader_v3.0.hex (flash loader program)
- d730-eeprom_v3.0.s (EEPROM s-record)

Compatibility

- No change.

New features

- None.

Enhancements

- [SOLHDTX-112] - Random refresh

  Improvement to Ultra Low delay refresh pattern for HD formats only. Drastically reduced visibility of intra refresh in this mode, in particular in dark environments or during irising up/down on the camera.

Bug Fixes

- [SOLHDTX-107] - Low mux rate audio late and/or missing packets

  Acceptable audio bitrates could not be used reliably in narrowband modes where audio bitrate was taking over 50% of the total modulation bitrate.

- [SOLHDTX-110] - Loss of colour on composite input

  Included latest firmware patch for composite input device to fix day/night colour issue. Video surveillance cameras sometimes disable the colour (i.e. no colour burst) at night. When the camera re-enables the colour during the day, the colour was previously not being properly restored.

- [SOLHDTX-111] - Manual audio Stream ID ignored

Known Issues

- [SOLHDTX-109] - Multiple audio commands can cause crash

  Sending multiple audio remote commands in quick succession could cause control interface and encoder to lockup until power cycled. Some improvements were made in v3.0 however it's unclear as to whether this has been fully resolved.
  Introduced in v2.1.

Version 3.0.1

File Names

- d730.1_v3.0.1.mcs (for 1st or 2nd revision PCBs with 32Mbit flash fitted)
- d730.2_v3.0.1.mcs (for 2nd or 3rd revision PCBs with 64Mbit flash fitted)
- d730.2_preprog_v3.0.1.m0 (64Mbit image) checksum = 0x3DF26274
- d730-loader_v3.0.1.hex (flash loader program)
- d730-eeprom_v3.0.1.s (EEPROM s-record)

Compatibility

- No change.

New features

- None.

Enhancements

None.

Bug Fixes

- [SOLHDTX-113] - Serial Data no longer working

  Wasn't being reset correctly so didn't pass any data.

Known Issues

- [SOLHDTX-109] - Multiple audio commands can cause crash

  Sending multiple audio remote commands in quick succession could cause control interface and encoder to lockup until power cycled. Some improvements were made in v3.0 however it's unclear as to whether this has been fully resolved.
  Introduced in v2.1.