



## Overview

ECO 19275 releases NV8500 router applications and firmware that update control cards and IOXM<sup>1</sup> cards. The version assigned to this release is 3.6.2 and its build number is 3104.

This release addresses the following major issues:

## Major Changes

This release is for phase 3 of frame sync code. This code includes

- A “flyover” feature that allows a control card changeover to have minimal to no effect on the output video.

## Bugs Fixed

- [NV8500-1530] Frame sync did not work properly in the bottom half of an NV8576. (The ports did not follow the correct ordering.)
- [NV8500-1531] Frame sync card showed glitches with a control card fail-over.
- [NV8500-1383] Added 1080p24/23.98 and 1080sf24/23.98 formats to the frame sync card.
- [NV8500-1398] The frame sync card should report, under IOXM 2, all board temperatures, output video format of each video (if a video is being converted from 59.94 to 60 or vice-versa, it should report what the card is outputting), MADI present/absent, MAC address, and IP address.
- [NV8500-1605] The frame sync card’s channel 5 had output timing offset (6 $\mu$ s HD and 30 $\mu$ s, SD). This is the only channel that had the the problem.
- [NV8500-1613] The (NV8900) AES-to-MADI converter producing errors on any monitored channel when 16 or more inputs were being used.
- [NV8500-1617] iControl Solo showed a ‘Reference Mismatch’ alarm when frame sync is bypassed.

## Known Issues

Some of these issues will be resolved in the next general release.

- [NV8500-1314] Embedded Dolby E occasionally leaves router delayed by 8–15 lines.

The problem has been found in:

3Gig SDI EMB 16 COAX OUT

3Gig SDI DEM/EMB 16 COAX OUT

and has *not* been found in:

3Gig SDI HYBRID 16 COAX OUT

3Gig COAX 16 SDI / 2 TDM OUT

Standard output cards of course

- [NV8500-1221] Audio break-in tally is incorrect if the [partition’s] controller input start is not 1.
- [NV8500-1208] There are video glitches when a take is done between the Main and Expansion frames.
- [NV8500-1037] There are switching problems in a NV8576 expanded router when using an HRC288 (hybrid redundant crosspoint).

---

1. IOXM is shorthand for Input, Output, Xpt, Monitor and essentially means any NV8500 card that can be read by a control card, in other words any card but a control card. However, the term IOXM does not (yet) apply to standard NV8500 cards.

# NV8500 v3.6.2 Release Notes

The port numbering in iControl is “off-by-1” for the lower bays of NV8576 and NV8576-Plus routers. This problem will be fixed in the next general release.

Reference type reporting, in iControl, is wrong. This problem will be fixed in the next general release.

## MRC Changes

There were no changes in MRC for hybrid firmware version 3.6.2.

## Requirements

The upgrade has certain requirements.

- A PC running MRC (version 3.5.0 or later). This version of MRC has been used for all testing.
- One or two EM0833 control cards for each router frame you intend to upgrade. (These cards are probably already in use at the site.)
- A boot ROM (IC), with SV1038-05A code, only for EM0833-20 control cards.
- All the firmware files available (on a memory stick or other suitable medium).  
NV8500\_HYB\_FW\_3.6.2.3104.RF This is SV1052-51 (A1) of EM0833 firmware.

---

## Firmware Notes

The following notes list the changes and bug fixes.

### SV1052-51 Rev A

NV85000 hybrid firmware

This is NV8500\_HYB\_FW\_3.6.2.3104.RF - EM0833 Firmware - July 25, 2014; Version: 3.6.2.3104

Length	Date	Time	DevType	NamePart#	Version
-----	----	----	-----	-----	-----
53641	05/21/14	3:00pm	BOOT	BIN/BOOT	SV0000-00A EM0833Boot May 7 2014 12:00:01
833977	05/21/14	3:00pm	APP0	BIN/APP0	SV0000-00A EM0833App May 7 2014 11:59:41
2969683	05/21/14	3:00pm	PLD0	PLD/PLD0	SV1033-15A EM0833PLD 8500 Frames, REL 12/19/13
3072084	06/27/14	2:02pm	PLD1	PLD/PLD1	SV1072-16A EM0833PLD 8500 Frames, REL 6/27/14
0	05/21/14	3:00pm	CPLD	SV105500A	SV1055-00A
0	05/21/14	3:00pm	CPLD1	SV105501	SV1055-01A
163379	05/21/14	3:00pm	MTRX0	BIN/MTRX0	SV0000-00A EM0833Mtrx8144 May 7 201412:00:15
162091	05/21/14	3:00pm	MTRX1	BIN/MTRX1	SV0000-00A EM0833Mtrx8280 May 7 201412:00:21
162747	05/21/14	3:00pm	MTRX3	BIN/MTRX3	SV0000-00A EM0833Mtrx8576 May 7 201412:00:29
162813	05/21/14	3:00pm	MTRX4	BIN/MTRX4	SV0000-00A EM0833Mtrx8576Plus May 7 201412:00:36
160995	05/21/14	3:00pm	MTRX5	BIN/MTRX5	SV0000-00A EM0833Mtrx8140 May 7 201412:00:08

# NV8500 v3.6.2 Release Notes

2330470	05/21/14	3:00pm	OS	BIN/OS	SV0000-00A EM08330SMay7 2014 12:00:43
4006296	05/21/14	2:59pm	IOXM0	SV0984-1301	EM0814, SV0984-13, Build: 1, "NV8500 3Gig SDI DEM 8 COAX IN"
5103005	05/21/14	2:59pm	IOXM1	SV0985-0600	EM0817, SV0985-06, Build: 0, "NV8500 288X288 3Gig XPT HYBRID"
7799500	05/21/14	2:58pm	IOXM2	MRC_SV1036-2000	EM0815, SV1036-20, Build: 0, "NV8500 3Gig SDI EMB 16 COAX OUT"
7769204	05/21/14	2:59pm	IOXM3	MRC_SV1056-1800	EM0815, SV1056-18, Build: 0, "NV8500 3Gig COAX 16 SDI / 2 TDM OUT"
4006296	05/21/14	2:59pm	IOXM4	SV1015-1301	EM0814, SV1015-13, Build: 1, "NV8500 3Gig COAX 8 SDI / 1 TDM IN"
4529126	05/21/14	2:59pm	IOXM5	SV1004-0700	EM0819, SV1004-07, Build: 0, "NV8500 144X144 3Gig XPT HYBRID"
232020	05/21/14	2:59pm	IOXM6	SV0825-1400	EM0785, SV0825-14, Build: 0, "NV8500 3Gig SDI 18 COAX OUT"
235176	05/21/14	2:59pm	IOXM7	SV0824-1401_EM0783	EM0783, SV0824-14, Build: 1, "NV8500 3Gig SDI 9 COAX IN"
235840	05/21/14	2:59pm	IOXM8	SV0854-1301	EM0662, SV0854-13, Build: 1, "NV8500 288x288 3Gig XPT STD"
235860	05/21/14	2:58pm	IOXM9	SV0975-1100	EM0678, SV0975-11, Build: 0, "NV8500 144x144 3Gig RED XPT STD"
210600	05/21/14	2:58pm	IOXM10	SV0917-2200_EM0799	EM0799, SV0917-22, Build: 0, "NV8500 144X144 3Gig XPT STD"
210600	05/21/14	2:58pm	IOXM11	SV0917-2200_EM0894	EM0894, SV0917-22, Build: 0, "NV8500 144X144 3Gig XPT STD"
210600	05/21/14	2:58pm	IOXM12	SV0917-2200_EM0895	EM0895, SV0917-22, Build: 0, "NV8140 144x144 3Gig RED XPT STD"
229372	05/21/14	2:59pm	IOXM13	SV0935-1100	EM0676, SV0935-11, Build: 0, "NV8500 288x288 3Gig RED XPT STD"
236232	05/21/14	2:59pm	IOXM14	SV0960-1400_EM0783	EM0783, SV0960-14, Build: 0, "NV8144 3Gig SDI 9 COAX IN"
235840	05/21/14	2:59pm	IOXM15	SV1108-1101	EM0785, SV1108-11, Build: 1, "NV8500 HD SDI 18 COAX OUT"
231608	05/21/14	2:59pm	IOXM16	SV1110-1400_EM0783	EM0783, SV1110-14, Build: 0, "NV8500 HD SDI 9 COAX IN"
235840	05/21/14	2:58pm	IOXM17	SV1109-1000	EM0785, SV1109-10, Build: 0, "NV8144 HD SDI 18 COAX OUT"
207212	05/21/14	2:58pm	IOXM18	SV1111-1000	EM0783, SV1111-10, Build: 0, "NV8144 HD SDI 9 COAX IN"
235840	05/21/14	2:59pm	IOXM19	SV0961-1000	EM0785, SV0961-10, Build: 0, "NV8144 3Gig SDI 18 COAX OUT"
235840	05/21/14	2:59pm	IOXM20	SV0826-1200	EM0787, SV0826-12, Build: 0, "NV8500 3Gig SDI 9 COAX OUT+EXP"
235840	05/21/14	2:59pm	IOXM21	SV1112-1000	EM0787, SV1112-10, Build: 0, "NV8500 HD SDI 9 COAX OUT+EXP"
235840	05/21/14	2:59pm	IOXM22	SV0977-1200	EM0697, SV0977-12, Build: 0, "NV8500 3Gig SDI 18 FIBER OUT"
235840	05/21/14	2:58pm	IOXM23	SV1113-1000	EM0692, SV1113-10, Build: 0, "NV8500 3Gig SDI EXP FILLER OUT"
341600	05/21/14	2:58pm	IOXM24	SV0939-1100	EM0688, SV0939-11, Build: 0, "NV8500 AES ASYNC 18 OUT"
235840	05/21/14	2:59pm	IOXM25	SV0978-1000	EM0695, SV0978-10, Build: 0, "NV8500 3Gig SDI 9 FIBER OUT+EXP"

## NV8500 v3.6.2 Release Notes

235840	05/21/14	2:59pm	IOXM26	SV0976-1000	EM0693, SV0976-10, Build: 0, "NV8500 3Gig SDI 9 FIBER IN"
341600	05/21/14	2:59pm	IOXM27	SV0938-1200	EM0687, SV0938-12, Build: 0, "NV8500 AES ASYNC 9 IN"
235840	05/21/14	2:58pm	IOXM28	SV0872-1101	EM0663, SV0872-11, Build: 1, "NV8500 3Gig SDI 2 Monitor"
3968228	05/21/14	2:59pm	IOXM29	SV1088-0015	EM0869, SV1088-00, Build: 15, "NV8500 3Gig XR SDI DEM 8 COAX IN"
3240140	05/21/14	2:59pm	IOXM30	SV1089-0001	EM0869, SV1089-00, Build: 1, "NV8500 3Gig XR COAX 8 SDI / 1 TDM IN"
6880152	05/21/14	2:59pm	IOXM31	SV1082-0800	EM0816, SV1082-08, Build: 0, "NV8500 3Gig SDI EMB 8 COAX OUT+EXP"
6738412	05/21/14	2:59pm	IOXM32	SV1083-0800	EM0816, SV1083-08, Build: 0, "NV8500 3Gig COAX 8 SDI / 1 TDM OUT+EXP"
3120264	05/21/14	2:59pm	IOXM33	SV1095-0700	EM0816, SV1095-07, Build: 0, "NV8500 3Gig HYBRID OUT+EXP FILLER"
5347409	05/21/14	2:59pm	IOXM34	MRC_SV1092-0100	EM0818, SV1092-01, Build: 0, "NV8500 288X288 3Gig RED XPT HYBRID"
423490	05/21/14	2:58pm	IOXM35	SV1094-0200	EM0818, SV1094-02, Build: 0, "NV8500 288X288 3Gig RED XPT HYBRID"
4527051	05/21/14	2:58pm	IOXM36	SV1114-0301	EM0820, SV1114-03, Build: 1, "NV8500 144X144 3Gig RED XPT HYBRID"
227820	05/21/14	2:59pm	IOXM37	SV1115-0302	EM0820, SV1115-03, Build: 2, "NV8500 144X144 3Gig RED XPT HYBRID"
235840	05/21/14	2:59pm	IOXM38	SV1138-0101	EM0887, SV1138-01, Build: 1, "NV8140 3Gig SDI 18 COAX IN"
4566094	05/21/14	2:59pm	IOXM39	SV1164-0200_EM0899	EM0899, SV1164-02, Build: 0, "NV8500 144X144 3Gig XPT HYBRID"
4566094	05/21/14	2:59pm	IOXM40	SV1164-0200_EM0900	EM0900, SV1164-02, Build: 0, "NV8140 144X144 3Gig RED XPT HYBRID"
3996376	05/21/14	2:59pm	IOXM41	SV1162-0102	EM0898, SV1162-01, Build: 2, "NV8140 3Gig SDI DEM 18 COAX IN"
3996376	05/21/14	2:59pm	IOXM42	SV1163-0102	EM0898, SV1163-01, Build: 2, "NV8140 3Gig COAX 16 SDI / 2 TDM IN"
235840	05/21/14	2:59pm	IOXM43	SV1159-0100	EM0887, SV1159-01, Build: 0, "NV8140 HD SDI 18 COAX IN"
235840	05/21/14	2:59pm	IOXM44	SV1169-0100	EM0892, SV1169-01, Build: 0, "NV8140 3Gig SDI 18 FIBER IN"
235840	05/21/14	2:59pm	IOXM45	SV1149-0200	EM0896, SV1149-02, Build: 0, "NV8500 288x288 3Gig XPT STD"
13756032	05/21/14	2:59pm	IOXM46	MRC_SV1126-1902	EM0878, SV1126-19, Build: 2, "NV8500 3Gig SDI DEM/EMB 16 COAX OUT"
235176	05/21/14	2:59pm	IOXM47	SV0824-1401_EM0902	EM0902, SV0824-14, Build: 1, "NV8500 3Gig SDI 9 COAX IN"
236232	05/21/14	2:59pm	IOXM48	SV0960-1400_EM0902	EM0902, SV0960-14, Build: 0, "NV8144 3Gig SDI 9 COAX IN"

## NV8500 v3.6.2 Release Notes

231608	05/21/14	2:59pm	IOXM49	SV1110-1400_EM0902	EM0902, SV1110-14, Build: 0, "NV8500 HD SDI 9 COAX IN"
4006296	05/21/14	2:59pm	IOXM50	SV1172-0401	EM0903, SV1172-04, Build: 1, "NV8500 3Gig SDI DEM 8 COAX IN"
4006296	05/21/14	3:00pm	IOXM51	SV1173-0401	EM0903, SV1173-04, Build: 1, "NV8500 3Gig COAX 8 SDI / 1 TDM IN"
6878208	05/21/14	2:58pm	IOXM52	SV1174-0800	EM0816, SV1174-08, Build: 0, "NV8500 3Gig SDI DEM/EMB 8 COAX OUT+EXP"
11149316	07/25/14	11:01am	IOXM53	SV1123-0603	EM0886, SV1123-06, Build: 3, "NV8500 3Gig SDI FRAMESYNC 8 COAX IN"
391240	05/21/14	2:59pm	IOXM54	SV1189-0100	EM0919, SV1189-01, Build: 0, "NV8500 288x288 3Gig RED XPT STD"
424079	05/21/14	2:58pm	IOXM55	SV1190-0100	EM0919, SV1190-01, Build: 0, "NV8500 288x288 3Gig RED XPT STD"
4250631	05/21/14	2:59pm	IOXM56	SV1187-0101	EM0920, SV1187-01, Build: 1, "NV8500 144X144 3Gig RED XPT STD"
227916	05/21/14	2:59pm	IOXM57	SV1188-0101	EM0920, SV1188-01, Build: 1, "NV8500 144X144 3Gig RED XPT STD"
232324	05/21/14	2:58pm	IOXM58	SV1203-0000	EM0785, SV1203-00, Build: 0, "NV8500 3Gig SDI 16 M3 / 2 COAX OUT"
0	05/21/14	3:00pm	ROM	SV103804	SV1038-04A EM0833ROM Oct 1 2010 09:37:32
0	05/21/14	3:00pm	ROM1	SV1038-05	SV1038-05A EM0833ROM Jun 10 2011 11:40:33
72088	05/21/14	3:00pm	APP	MADI_APP	SV1073-06AVersion 6.1.0.58
8382	05/21/14	3:00pm	BOOT	MADI_BOOT	SV0770-01A0 Version 1.2.0.0
1484404	05/21/14	3:00pm	PLD	MADI_FROM_AA	SV1066-04A0; NV8900-AA->MADI
1484960	07/24/14	3:44pm	PLD	MADI_FROM_AES	SV1066-03A0; NV8900-AES(Coax)->MADI, NV8900-AES(Bal)->MADI
1484404	05/21/14	3:00pm	PLD	MADI_TO_AA	SV1067-05A0; NV8900-MADI->AA
1484960	07/24/14	3:44pm	PLD	MADI_TO_AES	SV1067-03A0; NV8900-MADI->AES(Coax), NV8900-MADI->AES(Bal)
5016	07/25/14	11:03am	DB/RF.VER		

The following frames are supported by this RF file:

NV8576  
 NV8280  
 NV8144  
 NV8576 Plus  
 NV8140

## SV1066-0300

### File Names

SV1066-03.bin, .bit, .mcs

### General Notes

Starting at revision SV1066-02, we changed the PLL phase detection circuitry on HSync to be synchronous with the VCXO clock. This prevents glitches on the HSync from causing double clock edges when more than 16 AES inputs are plugged in. [Jira NV8500-1613]

## SV1067-0300

### File Names

SV1067-03.bin, .bit, .mcs

### General Notes

Starting at revision SV1066-02, we changed the PLL phase detection circuitry on HSync to be synchronous with the VCXO clock. This prevents glitches on the HSync from causing double clock edges when more than 16 AES inputs are plugged in. [Jira NV8500-1613]

## SV1072-16.bin

### Supported Assemblies

This file is for the EM0833-10 assemblies and newer.

### Key Features, Additions, or Changes for this Release

(Changes with respect to SV1072-15.bin)

- 1 SV1072-15 added commands to input cards to specifically turn on select outputs. This command did not function properly for NV8144. This update is necessary for the APC2 Frame Sync phase 3 to work in an NV8144.
- 2 Added the SlaveFrame bit to the FrameType command so that all IOXM cards may know whether it is in the master or the slave frame of an NV8576+ system.

### Caveats

This version of the FPGA code is **not** compatible with SV1040-07 and older applications because of changes in the interrupt registers and address.

## SV1123-0602

File Names: SV1123-0602.jic, Main\_FrameSyncIn\_MasterEraseHistory.sof

### Supported Assemblies

- EM0886-00

### Key Features, Additions, or Changes for this Release

Although these features are built into the FPGA, some features might not be accessible through iControl. This is the “phase 3” release:

- Added video processing in the RGB color space, but there is no RGB gamut.
- Added ability to use two references, e.g., 50Hz and 59.94Hz, at the same time.
- Added support for several video formats. [JIRA NV8500-1383].
- Added color bar generator.
- Added audio tone generators.
- Incorporated ability to support both die revisions of the SiLabs Si5324 and Si5374.
- Added IOXM2 support.
- Fixed audio to work in the bottom half of the frame (Jira NV8500-1530). Also remapped registers so iControl sees the channels in the right order in the bottom half of the frame.
- Previous build of SV1123-05 reported incorrect temperatures through IOXM. This was fixed. [JIRA NV8500-1398]
- Because of changes in Altera’s *Quartus* tool, no builds of SV1123-05 can be loaded with the MRC firmware updating feature. We fixed that. We replaced Altera’s flash access module with a homegrown module to avoid future problems with Altera’s.
- Added a “flyover” feature that improves performance during control card changeover or reference signal dropouts.
- Fixed the misreporting of video formats (or reporting signals that didn’t exist) through both IOXM and iControl (Jira NV8500-1606).
- Fixed an issue where switching video formats on the input did not always get detected (changes were “flywheel’d over”) and corresponding modules were reset for the new format.

### Known Issues

- The card provides no MADI support.
- The Quartus 13.1 Programmer must be used. Grass Valley engineers and technicians must place the `quartus.ini` file in the path of the Quartus programmer, i.e.,

```
C:\altera\13.1\qprogrammer\bin
```

If this file is not present, the programmer will report a corrupted .jic file.

### Basic Operation

If the received video has the same frame rate as the router’s video reference then operation will be according to settings in iControl. Otherwise, the unit will go into a bypass mode, wherein the video is passed from the input equalizers directly to the output, bypassing the processing path in the FPGA.

# NV8500 v3.6.2 Release Notes

## SV1192-0100

### File Names

APC2\_SD\_160build0039.tar.gz, APC2\_README.txt, APC2\_160build0039.bin

### Supported Assemblies

EM0886-00

### Key Features, Additions, or Changes for this Release

- Restructured code that uses common u-boot, worklib etc. based on “APC2” code base.
- Port number being reported in iControl FrameSync Panel was off by 1.
- The APCII card alarming temperature was set too high.
- iControl now reports new video formats (listed in SV1123-0603.xlsx).
- Added support for RGB video processing.
- Fixed NV8576 operation in the bottom of the frame.

### Other Changes

There were no changes in any other component.