

HDMI to 3G/HD-SDI Converter
Extended Operating Temperature Range

Data Sheet

Features

- + HDMI 1.4a video input
- + HDMI input over board to board connector
- + Resolution up to 1920x1080p @ 60fps
- + RGB444, YCbCr444 and YCbCr422 input format support
- + Two SDI outputs supporting bit rates due to SMPTE292M and SMPTE424M, 1.485 Gbps, 1.485/1.001 Gbps, 2.97 Gbps, 2.97/1.001 Gbps
- + Supported video formats
 - + 1080i at 50/59.94/60
 - + 1080p at 50/25/24/59.94/29.97/23.98/60/30
 - + 720p at 50/ 59.94/60
- + Video output connectors: 75 ohms MCX jacks
- + Native video signal processing and encoding only. No image scaling, no format conversion.
- + Power input + 5V up to +15V DC regulated
- + PCB dimensions 38mm x 38mm



General Description

NA1012B-ET is a very small form factor HDMI to SDI converter module. It is designed for applications where minimum size and a wide operating temperature range have highest priority. For this purpose HDMI input video as well as power supply voltage are supplied over a board2board connector eliminating the need for HDMI and power cables. The converter module can be easily plugged onto system boards having a mating board2board connector available. SDI video output is available on two right angled MCX coaxial connectors.

Applications

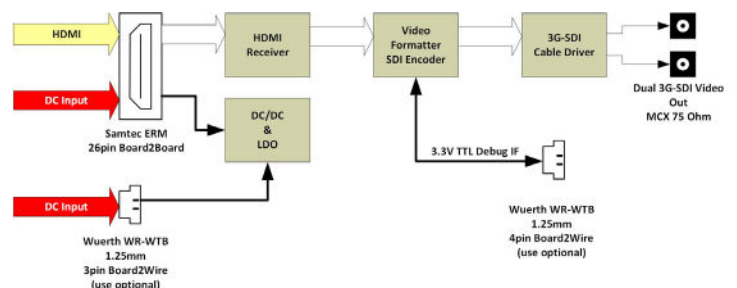
- + Integrated, very small sized HDMI to SDI conversion
- + Applications having -40C to +85C extended temperature range requirements
- + Industrial, medical, security, law enforcement, professional video

Important Note:

NA1012B-ET converts video signals received from a DVI or HDMI source for transmission over an 3G/HD-SDI interface which requires clock signals to be in a well defined range. This might not be the case when standard HDMI or DVI output of desktop computers, laptop computers or other consumer devices are used as signal source.

Quick Specification

- HDMI input over board2board connector
- Video support up to 1920x1080@60fps
- Dual SDI output
- Supply voltage 12V DC typ.
- Operating ambient temperature range -40°C to +85°C
- Operating humidity range 20% to 80%
- Power consumption 2.1W (12V DC supply, 1080p60 video)
- Board size (L x W) 38mm x 38mm
- RoHS compliant (2002/05/EG and 2011/65/EU)
- UL/UR compliant

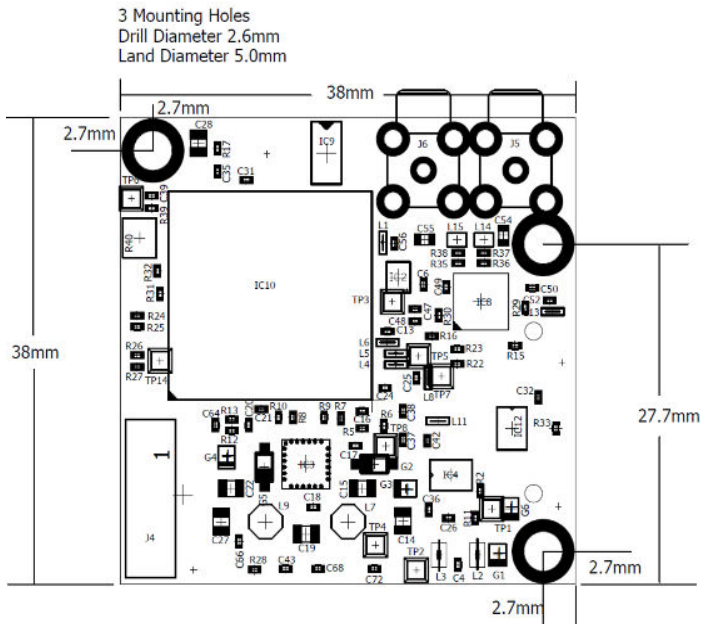


Internet: www.aivion.com
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Board Mechanical (top view)



I/O connector types on top side:

- J4: Wuerth WTB 1.25mm, 653 106 131822
- J5: MCX 75 ohms, Samtec MCX7-J-P-H-RA-TH1
- J6: MCX 75 ohms, Samtec MCX7-J-P-H-RA-TH1

I/O connector types on bottom side:

- J1: Wuerth WTB 1.25mm, 653 103 131822
- J2*: Samtec Board2Board, ERM8-013-05.0-L-DV-TR
- J3: Wuerth WTB 1.25mm, 653 104 131822

*Samtec ERF8-013-05.0-L-DV-TR mating connector is required on the system board

Connector Signals

J1:

- 1 VIN, DC Supply voltage input
- 2* Reset (has 4k7 pullup to VIN)
- 3 GND (0V)

*Pull pin 2 to GND(0V) for 1ms or longer for reset, leave open for normal operation.

J3:

- 1 RXD_TTL (3,3V debug interface data input)
- 2 TXD_TTL (3,3V debug interface data output)
- 3 GND (0V)
- 4 Do not connect

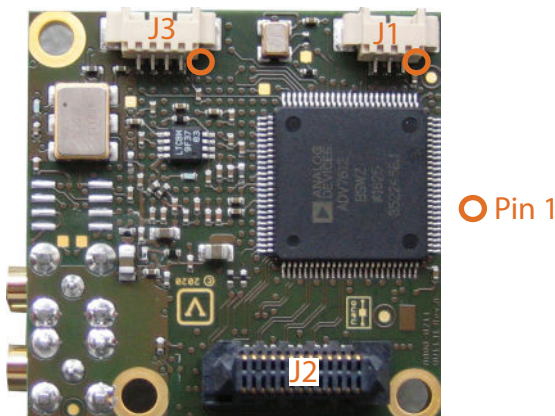
J4: Do not connect.

J5, J6: SDI output connectors

J2:

- (See page 4 for details)
- 1 Reset (same operation as J1 pin2)
- 4,6 HDMI_CLK_N, HDMI_CLK_P
- 17,19 HDMI_DATA2_N, HDMI_DATA2_P
- 11,13 HDMI_DATA1_N, HDMI_DATA1_P
- 5,7 HDMI_DATA0_N, HDMI_DATA0_P
- 2,3,9,14 GND(0V)
- 15,21 GND(0V)
- 18 HDMI_HPD (hot plug detect)
- 8 HDMI_CEC
- 10,12 HDMI_DDC_CLK, HDMI_DDC_DATA
- 16 HDMI_5V_input
- 20 VIN DC supply input (same as J1 pin1)
- 23,25 RXD_TTL, TXD_TTL (same as J3 pin1/pin2)
- 22,24,26 Do not connect

Board Bottom Side



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Board Top Side



3D CAD model (Step Format) is available on request.



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Important Notes

1. NA1012B-ET converts video signals received from a DVI or HDMI source for transmission over an 3G/HD-SDI interface which requires clock signals to be in a well defined range. This might not be the case when standard HDMI or DVI output of desktop computers, laptop computers or other consumer devices are used as signal source.

The HDMI/DVI TMDS input clock requirements are:

3G mode:

148.5MHz or 148.5 MHz/1.001 +/- 60ppm

HD mode:

74.25MHz or 74.25MHz/1.001 +/- 80 ppm

2. The current device version does not support audio.

3. NA1012B-ET does not process HDCP encrypted HDMI input signals.

4. The device detects and measures video input parameter and adjusts all necessary settings accordingly. Manual control is not required. However, the serial control interface can be used for status checking. Terminal software like TeraTerm can be used, whereas parameters have to be set to 38400bps, 8 data bits, no parity and 1 stop bit (8N1). No handshake must be used.

5. Depending on the system configuration and thermal as well as mechanical design of the system board, a heat sink might be required. In such a case the heat sink or heat pipe should contact to one of the devices marked with a yellow square (see images below),

Power and Environment

POWER INPUT:

5V to 15V DC regulated supply input voltage range

CHARACTERISTICS:

$P_D = 2.1W$ (12V DC, video 1080p60), $I_{DD} = 0.17A$
($T_A = 25^\circ C$, Humidity = 40%)

OPERATING CONDITIONS:

Ambient temperature (min/max) $-40^\circ C/+85^\circ C = -40^\circ F/185^\circ F$

Humidity: 20% - 80%

STORAGE CONDITIONS

Ambient temperature (min/max) $-10^\circ C/+60^\circ C = 14^\circ F/140^\circ F$

Humidity: 20% - 80%

Evaluation Adaptor

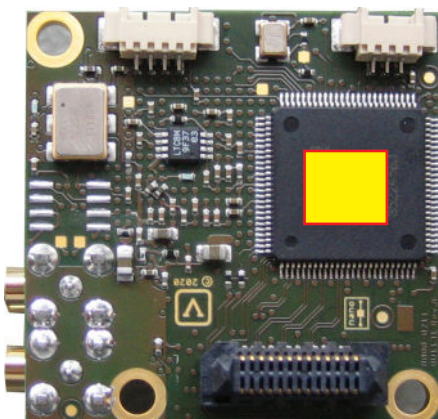
For test and evaluation purposes adaptor EK-PA-1131 is available. It provides a HDMI A-type connector for video input as well as USB2 connector which can be used to supply 5V DC power to NA1012B-ET. In addition it allows easy access to the debug/status port by an USB2 UART.

USB2 UART chip is Cypress' CY7C65213-32. Drivers for windows and linux operating systems can be downloaded from www.cypress.com.

Contact sales for any request regarding EK-PA-1131.

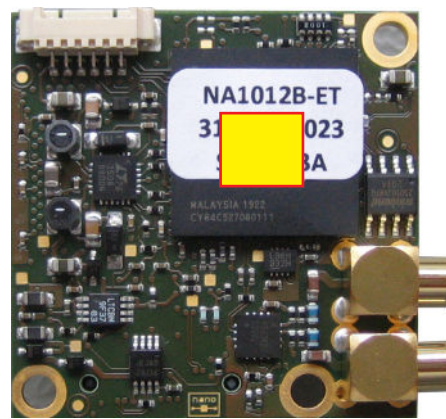


Board Bottom Side



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Board Top Side

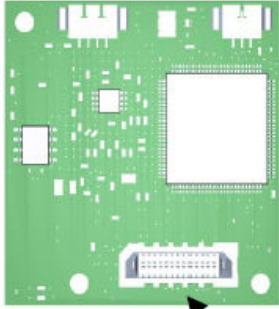


J2 Board2Board Connector Details

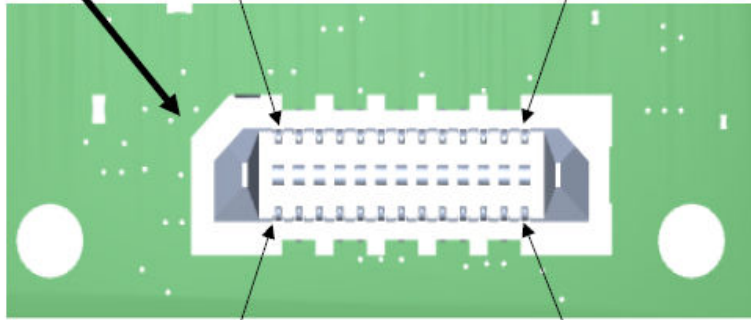
NA10120B-ET
Board to Board Connector Signal/Pin Assignment

Connector Type on NA1012B-ET Converter Module:
Samtec ERM8-013-05.0-L-DV

Required Connector on System Board:
Samtec ERF8-013-XX.X-L-DV



ERM8-013-05.0-L-DV



Pin	Signal	Type
1	Reserved/Reset_n	In
3	GND	
5	HDMI_DATA0_N	In
7	HDMI_DATA0_P	In
9	GND	
11	HDMI_DATA1_N	In
13	HDMI_DATA1_P	In
15	GND	
17	HDMI_DATA2_N	In
19	HDMI_DATA2_P	In
21	GND	
23	RXD_LVTTL_EXTERNAL	In
25	TXD_LVTTL_EXTERNAL	Out

HDMI Port Signals

Type	Signal	Pin
	GND	2
In	HDMI_CLOCK_N	4
In	HDMI_CLOCK_P	6
In	CEC	8
In	DDC_CLK	10
Out	DDC_DATA	12
	GND	14
In	HDMI_5V_INPUT	16
Out	HPD	18
In	P12V_PWR_INPUT	20
I/O	Do not connect	22
I/O	Do not connect	24
In	Do not connect	26

HDMI Port Signals