LOG Storm

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Revision history

Version	Date	Description
1.00	April 2012	Document creation

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1 Main features

▸ High-speed digital data logger
▸ 1 to 20 bits parallel sampling
▸ 98 kHz to 100 MHz sampling frequency
▸ 8 MS internal memory buffer
▸ Advanced hardware data storage qualification / data filtering capability
▸ Continuous streaming to PC through USB, enabling gigabytes of data storage on PC
▸ Zero latency (hardware) trigger rearm
▸ High-speed USB 2.0 host interface
▸ USB-powered and controlled
▸ Selectable internal (USB bus) or external power supply for I/Os voltages
▸ System interface operating from +1.25 V to +3.3V
▸ Selectable internal / external reference clock sampling
▸ Delivered with LOG Storm Studio(TM) software including: documentation, drivers and host control software (MS-Windows XP / MS-Windows 7, 32-bit and 64-bit)

2 LOG Storm Overview

2.1 LOG Storm at a glance

Byte Paradigm's LOG Storm is a high-speed digital data logger used for digital bus and embedded system digital lines sampling and observation. Its data filtering and extended PC storage capabilities makes it especially well-suited for extracting specific traffic from microcontroller bus long periods of observation of digital embedded systems.

LOG Storm is delivered with LOG Storm Studio(TM) control software with graphical user interface and direct C/C++ DLL access.

Figure 1:   **LOG Storm - Overview**
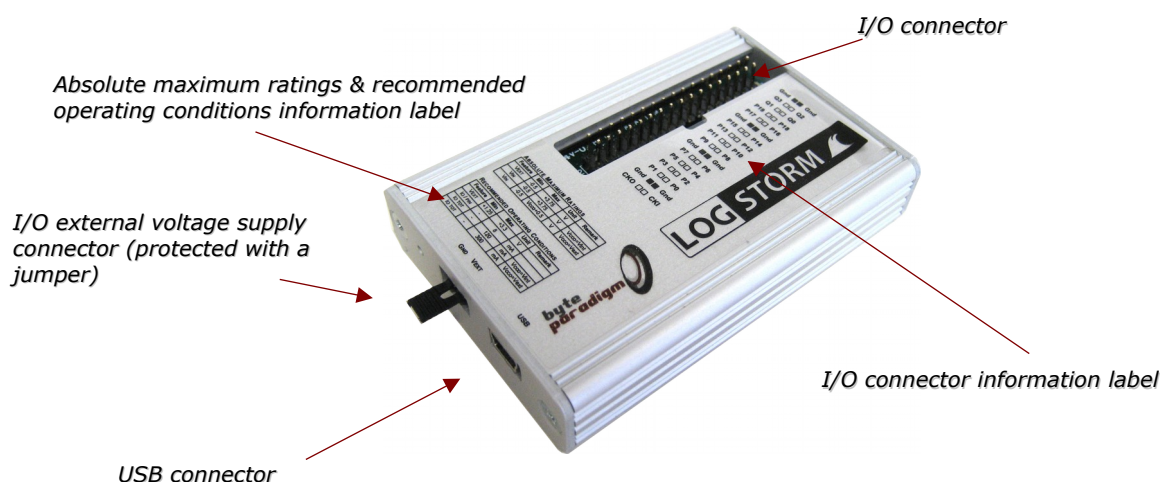
Device dimensions (WxLxH) : 55 x 80 x 16 mm

2.2 Minimum Host PC requirements

LOG Storm connects to any PC using Microsoft Windows XP or Windows 7 operating systems (32-bit/64-bit) through a USB 2.0 port connector.

.NET 4.0 or .NET 4.0 (or a more recent version) client profile framework must be installed – link: http://www.microsoft.com/downloads/en/details.aspx?FamilyID=e5ad0459-cbcc-4b4f-97b6-fb17111cf544

2.3 Operating power

The main power supply of the LOG Storm device is taken from the USB bus to provide the necessary voltage to the device core. By default, the I/O voltage standard is +3.3V LVCMOS.

To use a different voltage standard for the I/O, the jumper located on the I/O external voltage supply connector must be removed and an external voltage source must be applied on this connector. External voltage level must be between +1.25V and +3.3V.

The external power supply connector is located at the side of the device. It is protected with a jumper. This power connector is labelled "GND VEXT". **! Respect the connector polarity !**

Figure 2:   **System connector external power supply pins**

VEXT connector location

GND pin

VEXT (positive voltage) pin
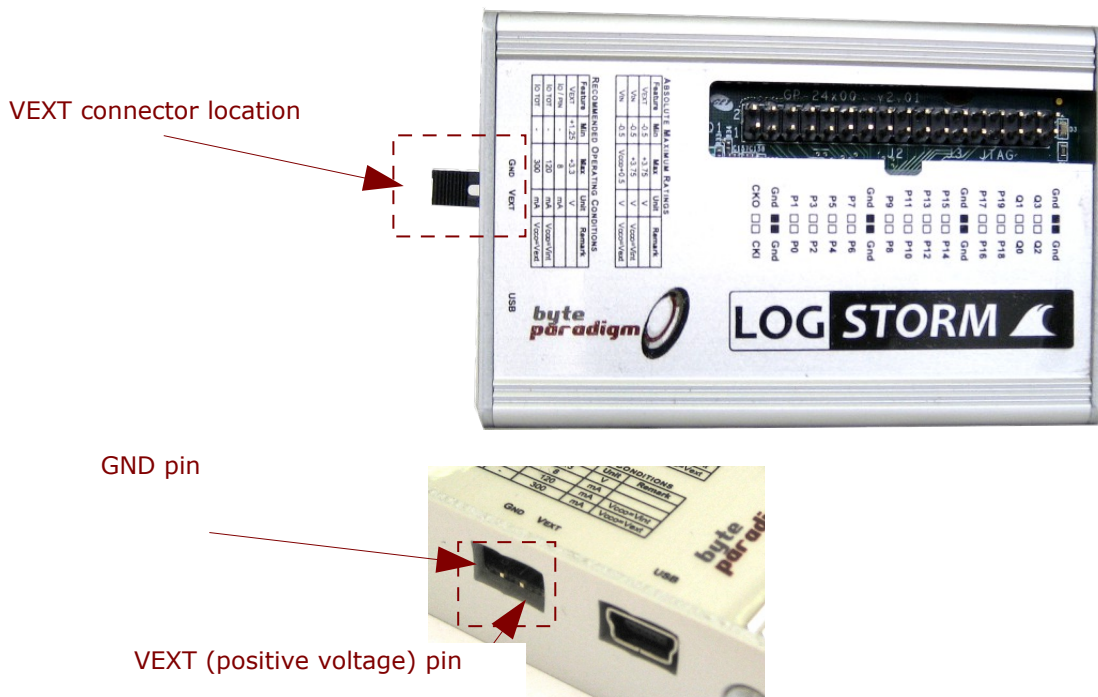
2.4 USB and system interface connections

A USB mini-B to USB type A cable is provided with the LOG Storm device.

A set of 34 flying lead wires connect the LOG Storm device to the board under test. A standard pin header with 2.54 mm (0.1 inch) pitch must be foreseen on the target board where access is desired.

3 LOG Storm I/O connector

PORTS:

▸ CLOCK PORT : CKI clock input for external reference clock; CKO: reserved for future use.
▸ DATA INPUT PORT: used for connecting to the bus and data lines to be observed.

Figure 3: **LOG Storm I/O connector ports**
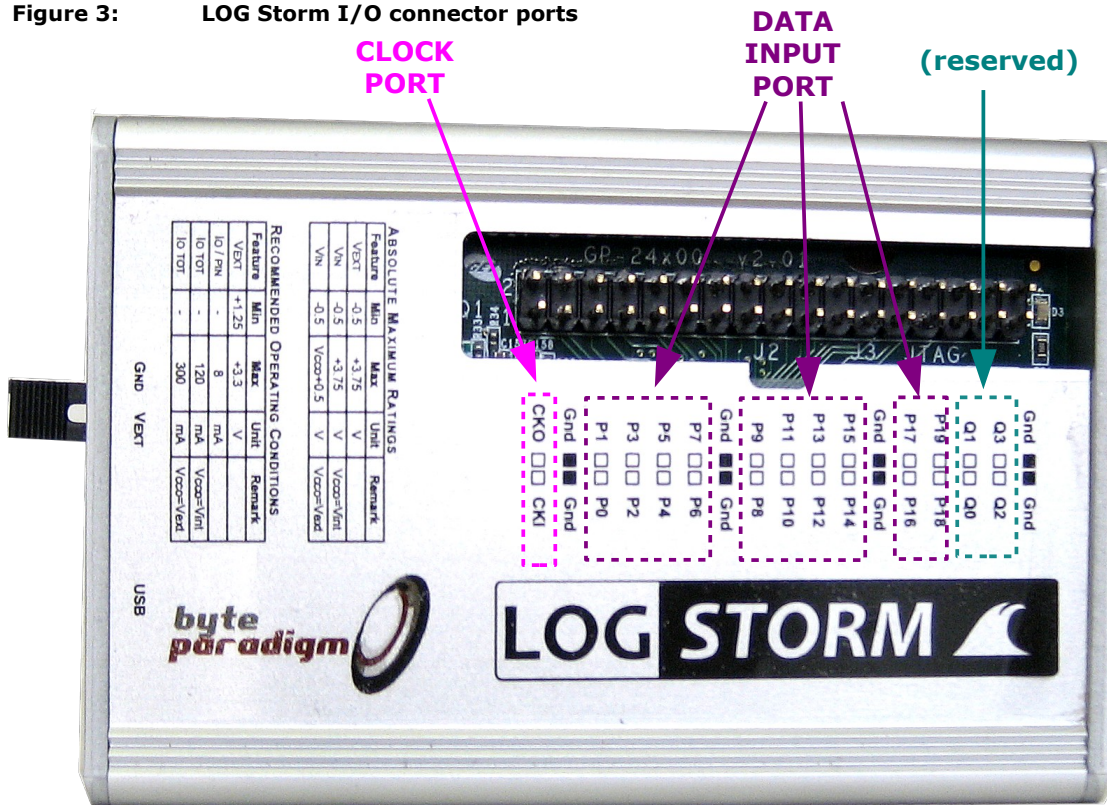
The other pins are ground pins (**'GND'**) and cannot be used for functional signalling. Ground pins must be connected to the ground of the system under test for proper operation.

Table 1 : LOG Storm I/O connector details

Pin name	Direction	Description / Options
CLOCK PORT		
CKO	Output	Reserved for future use
CKI	Input	Input used to supply an external reference clock signal.
DATA INPUT PORT		
SCLK	Output	Serial clock
P0 … P19	In	Data input port. Data is sampled from these 20 bits. LOG Storm triggering condition is also defined from this port.
(reserved)		
Q0... Q3	Output	Reserved for future use

4 DC and Switching Characteristics

4.1 Absolute maximum ratings

Table 2: **Absolute maximum ratings**

Symbol	Description	Conditions	Min	Max	Unit
V_{EXT}	External DC supply voltage relative to GND		-0.5	+3.75	V
V_{IN}	Voltage applied to any user I/O pins relative to GND	$V_{CCO}{}^2 = V_{INT}$	-0.5	+3.75	V
V_{IN}	Voltage applied to any user I/O pins relative to GND	$V_{CCO}{}^2 = V_{EXT}$	-0.5	$V_{CCO}+0.5$	V

Notes:

1. Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those listed under the Recommended Operating Conditions is not implied. Exposure to Absolute Maximum Ratings conditions for extended periods of time adversely affects device reliability.
2. Vcco is the supply voltage of the I/O pin output driver. It can be supplied internally (VINT) or externally (VEXT), through the external connector.

4.2 Recommended operating conditions

Table 3: **Recommended operating conditions**

Symbol	Description			Min	Max	Unit
V_{EXT}	External DC supply voltage relative to GND			$+1.25^1$	+3.3	V
I_{CCO}	Quiescent supply current for any user I/O pin.	I/O voltage > 1,38 V		-	8	mA
		1.25 V> I/O voltage > 1.38 V		-	6	mA
$I_{CCO-TOT}$	Total quiescent current for all user I/O used simultaneously	$V_{CCO}{}^2= V_{INT}$		-	120	mA
$I_{CCO-TOT}$	Total quiescent current for all user I/O used simultaneously	$V_{CCO}{}^2 = V_{EXT}$		-	300	mA
T_{OP}	Operating ambient temperature			0	45	°C
$V_{IH}{}^3$	Logic high voltage threshold	$V_{CCO}{}^2 = V_{INT}$		2.0	-	V
$V_{IL}{}^3$	Logic low voltage threshold	$V_{CCO}{}^2= V_{INT}$		-	0.8	V

Notes:

1. This is an absolute minimum. The supply noise and accuracy must be taken into account when applying external voltage to the device. For example, if the accuracy of the supply is 5%, the provided level should be 1.25/0.95 = 1.316V.
2. Vcco is the supply voltage of the I/O pin output driver. It can be supplied internally (VINT) or externally (VEXT), through the external connector.
3. Refer to Figure 4 for the V_{IH} and V_{IL} threshold voltage when the external supply voltage is selected.

Figure 4: **User I/O input threshold voltage vs external supply voltage**
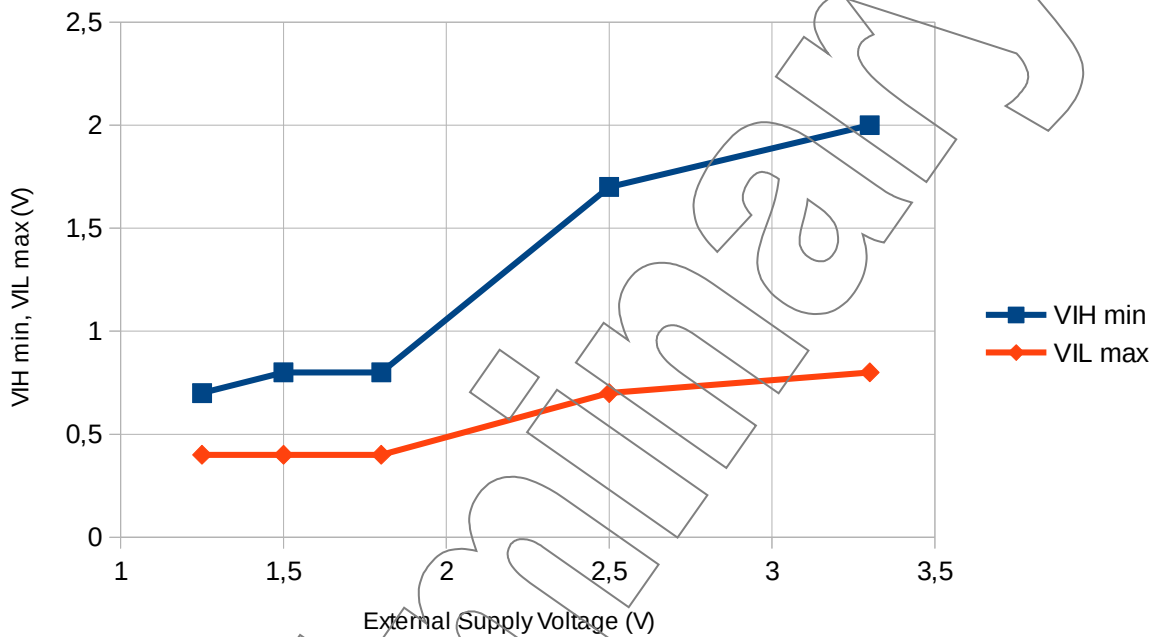
4.3 System Characteristics and Performance

Table 4: **System characteristics**

Description	Min	Typ.	Max	Unit
USB 2.0 interface total throughput	-	-	480	Mbps
			60	MByte/s
USB 2.0 interface useful throughput for data	-	-	48	MByte/s
User I/O operating frequency	-	-	100	MHz
Internal memory buffer	-	-	32	MByte

4.4 Switching Characteristics

Table 5: Clock frequencies, rise and fall time and skews

Symbol	Description	Conditions	Min	Typ	Max	Unit
f_{CKI}	External clock frequency on CKI pin		98 kHz	-	100 MHz	
t_{sCKI}	Setup time between data and clock provided on CKI pin		Tbd	Tbd	Tbd	ps
t_{hCKI}	Hold time between data and clock provided on CKI pin		Tbd	Tbd	Tbd	ps

(tbd = to be defined)