P339

4-lane MIPI CPhy Probe

Data Sheet

&

User Manual

January 2018 - Rev 1.41

P339 – MIPI C-PHY Probe

IMPORTANT SAFETY and USEAGE INFORMATION

Please review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

Only The Moving Pixel Company should perform service procedures. Do not attempt service yourself. Return the unit to The Moving Pixel Company for service.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury or Damage to Equipment

Qualified Personnel to Operate this Product

This manual and the product marking assumes that the user has more than basic electrical/electronic circuit knowledge and is a person comfortable by experience and education to safely connect probes to electrical circuits and systems. Do not operate this equipment nor connect it to any circuit or system if you are not qualified to do so by either education or experience.

Use Proper Power Cord.

Use only the power cord specified for this product and certified for the country of use. Use only the external power supply that is included with the product.

Connect and Disconnect Properly.

Do not connect or disconnect probes or test leads while they are connected to a voltage source.

Ground the Product.

This product is not inherently grounded through the grounding conductor of the power cord; it has a "floating" power supply. The negative lead of the power supply is directly connected to the metal shell of the unit and all SMA connections are also electrically connected to the metal shell of the unit. It is possible that improper connection to an external system could electrify the shell to potentially high voltages above "ground". To avoid electric shock, the product must be tied to ground externally.

Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Any markings, symbols, or textual references to "ground", GND, and similar refer to the metal shell of the unit and assume that the metal shell is tied to a saftey ground externally.

Observe All Terminal Ratings.
To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.
The inputs are not rated for connection to mains or Category II, III, or IV circuits.
Connect the probe reference lead to earth ground only, no floating grounds allowed.

Power Disconnect.
The power cord disconnects the product from the power source. Do not block the power cord; it must remain accessible to the user at all times.

Do Not Operate Without Covers.
Do not operate this product with covers or panels removed.

Do Not Operate With Suspected Failures.
If you suspect that there is damage to this product, have it inspected by **The *Moving Pixel* Company.**

Avoid Exposed Circuitry.
Do not touch exposed connections and components when power is present.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Provide Proper Ventilation.
Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

Symbols and Terms
These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

The following symbol(s) may appear on the product:

Before Operating the Instrument

- Verify the ambient temperature: 5 °C to +45 °C.

- Verify the operating humidity:
  8% to 80% relative humidity at up to +32 °C
  5% to 45% relative humidity above +32 °C up to +45 °C noncondensing, and is limited by a maximum wet-bulb temperature of +29 °C
  (derates relative humidity to 32% at +45 °C)

- Verify the operating altitude: 3,000 m, derate maximum
  operating temperature by 1 °C per 300 meters above 1500 meters altitude.

CAUTION.
Operate in upright position only, keeping cooling holes on the sides of the unit clear of obstructions.

Power Supply Requirements for the external power supply (provided):

Source Voltage	100–240 VAC
Frequency	50–60 Hz
Power Consumption	70 W maximum

It may be helpful to check our website for any updates to this documentation before you operate the instrument: http://www.movingpixel.com/MIPI.html

If you have any questions at all about the warnings or operating conditions listed above:

STOP!
Do not operate the instrument.

Contact **The *Moving Pixel* Company** and resolve your question before continuing.

Contacting The Moving Pixel Company

Phone +1.503.626.9663 US Pacific Time Zone (UTC-8)

Fax +1.503.626.9653

Address **The *Moving Pixel* Company**
4905 SW Griffith Drive, Suite 106
Beaverton, Oregon 97005 USA

Email information@movingpixel.com
Web site http://www.movingpixel.com

Declaration of Conformity

The ***Moving Pixel*** **Company** declares that the **P339** product conforms to the following Standards:

EN/IEC 61326-1:2013, Class A	Radiated Emissions
AS/NZS CISPR 11:2011 Class A	Radiated Emissions
FCC 15.109(g):2014 Class A	Radiated Emissions
FCC 15.109:2014 Class A	Radiated Emissions
ICES-003:2012 Class A	Radiated Emissions
VCCI:2014-04 Class A	Radiated Emissions
EN/IEC 61326-1:2013, Class A	Conducted Emissions
AS/NZS CISPR 11:2011 Class A	Conducted Emissions
FCC 15.107:2014 Class A	Conducted Emissions
ICES-003:2012 Class A	Conducted Emissions
VCCI:2014-04 Class A	Conducted Emissions

EN61326-1:2013 Industrial in the following areas:

IEC 61000-4-2:2008	ESD immunity
IEC 61000-4-3:2010	RF electromagnetic field immunity
IEC 61000-4-4:2012	Electrical fast transient/burst immunity
IEC 61000-4-5:2005	Power line surge immunity
IEC 61000-4-6:2013	Conducted RF immunity
IEC 61000-4-8:2009	Magnetic Field immunity
IEC 61000-4-11:2004	Voltage dips and interruptions immunity

Equipment type: Test and measurement equipment, indoor use only.
Pollution Degree 2 as defined in IEC61010-1. Rated for indoor use only.

This product is intended for use in nonresidential areas only. Use in residential areas may cause electromagnetic interference.

Emissions which exceed the levels required by this standard may occur when this equipment is connected to a test object.

For compliance with the EMC standards listed here, high quality shielded interface cables that incorporate low impedance connection between the cable shield and the connector shell should be used.

Product end-of-life handling

Observe the following guidelines when recycling an instrument or component:

Equipment recycling. Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. To avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.

This symbol indicates that this product complies with the applicable European Union requirements according to Directives 2012/19/EU and 2006/66/EC on waste electrical and electronic equipment (WEEE) and batteries. For information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).

Restriction on Hazardous Substances Directive 2011/65/EU

EN 50581:2012 – Technical documentation for the assessment of electrical and electronic products with respect to the restrictions of hazardous substances.

P339 – MIPI C-PHY Probe

1.0 General:

The P339 is a stand-alone C-Phy Pattern Generator. It features 4 data lanes. Data rate operation up to 2.5 Gb/s per wire (up to 12 wires) is supported.

LP Voh, LP Vol, HS Voh and Vol are adjustable. Power is from an external 24 V supply (included). This manual assumes that the user has a reasonable level of familiarity with the MIPI C-Phy standard. It is designed to run in conjunction with the CPhyGenCtl software.

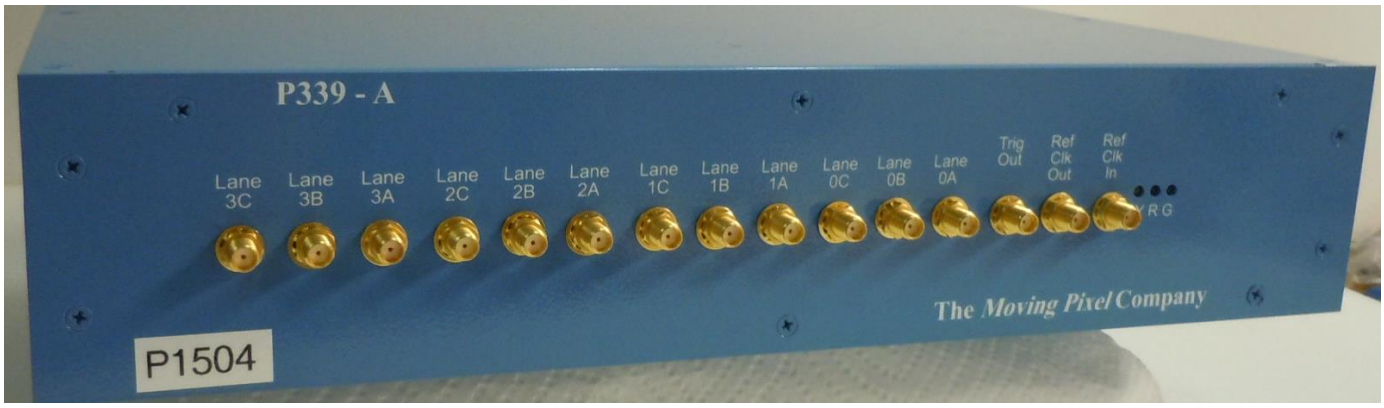
2.0 Requirements:

- The P339 requires a USB2.0 or USB3.0
- A Windows XP or Win7 PC with a USB 2.0 or USB 3.0 connection.
-

Updated versions of the instrument firmware and the CPhyGenCtl software can be freely downloaded from the PG3A website: www.movingpixel.com/CPhyGen.html.

3.0 Connections

The data and clock lane connections on the front panel are made via SMA connectors arranged as illustrated below.



Additional indicators and connections:
"Y" yellow LED currently reserved for future use.
"R" red LED currently reserved for future use
"G" green LED currently on after unit boots.

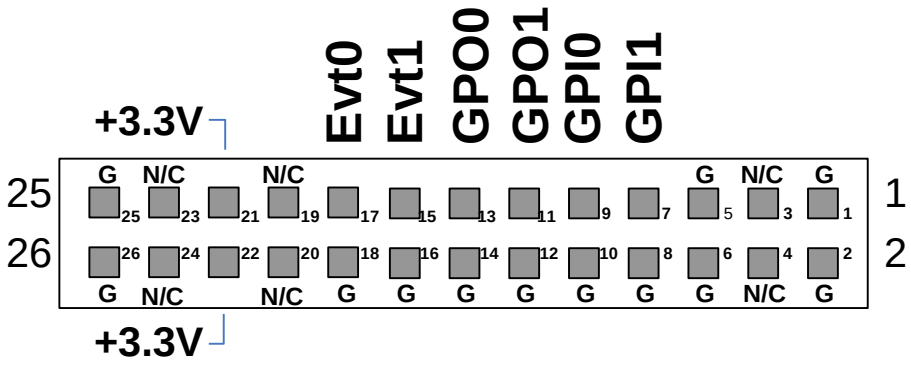
TrigOut: SMA carrying the trigger out signal
Clk Out: SMA carrying a tbd clock out
RefClkIn: reserved for future use.

Connections to the rear panel:

Starting from the left:

- DC adapter connection
- Indicator that power has been applied.
- General Purpose I/O.
- USB 3.0 "Micro B" connector used for communication with a PC.

Details for the connections to the GPIO connector:



We have designed this to take a mass-terminated 2x13 0.1” square pin socket connector. Also we have provided 2 connections that output low current 3.3Vdc and many additional ground connections.
The signals Evt0,1, GPI0,1, and GPI 0,1 are either reserved for future use or are supplying signals as described in the CPhyGenCtl manual.

4.0 Usage

Connect external 24 volt power to P339.

Note that there is a green LED visible next to the power connector.

A note about the MIPI low power signals: low power signals are not terminated at the user system. Additionally, the output impedance for the low power signals is in the range of 200 ohms. Connection to 50 ohm coaxial cables will result in a very slow rise and fall times (which is anticipated by the MIPI spec) that is length-dependent. This is not an error condition. Cable lengths should also be kept to a minimum (probably should not exceed 0.3m) because of the reflections that will occur in LP mode and the resultant glitches perceived by the user system under test.

If you terminate the MIPI signals into a 50 ohm scope, you will not see the LP signals – they will have about the same amplitude as the standard HS signal. This will not damage the P339.

Appendix A to this document has pictures that show high speed traffic both as the transmitter sends it (single-ended) and how a receiver sees it (differential). The packet shown is a Null Packet with length = 10 payload bytes.

5.0 Electrical specification for the P339 probe

Characteristic	Specification	Notes
Maximum data output rate	2.5 Gb/s	per wire
HS mode: Voh/Vol	-0.6 V - +1.19 V	open circuit, user-adjustable, 2 mV resolution[1]
HS mode: rise/fall time	~1.5V/nS	Loaded, typ, 20%-80% 200mV time ~130pS
LP mode: Voh	0.6 V to +1.8 V	open circuit, user-adjustable, 2mV resolution (@Vol = 0V)
LP mode: Vol	-0.2V to +0.7	2mV resolution,
LP mode: rise/fall time	~14nS/V ~5nS/V	typ, 20%-80%, user-system dependent at the sma, no cable
HS output resistance	50 Ω	nominal, single ended
LP output resistance	210 Ω	nominal
Pattern memory capacity	1 GByte	
External Power Supply	24 Vdc, 40 watts max	supplied with P339
Weight	~1300 grams	approximate, without supply
Weight, power supply and cord	~620 grams	approximate,
Overall Dimensions	345mm x 195mm x 80mm	Approximate, without supply

For more information, contact:
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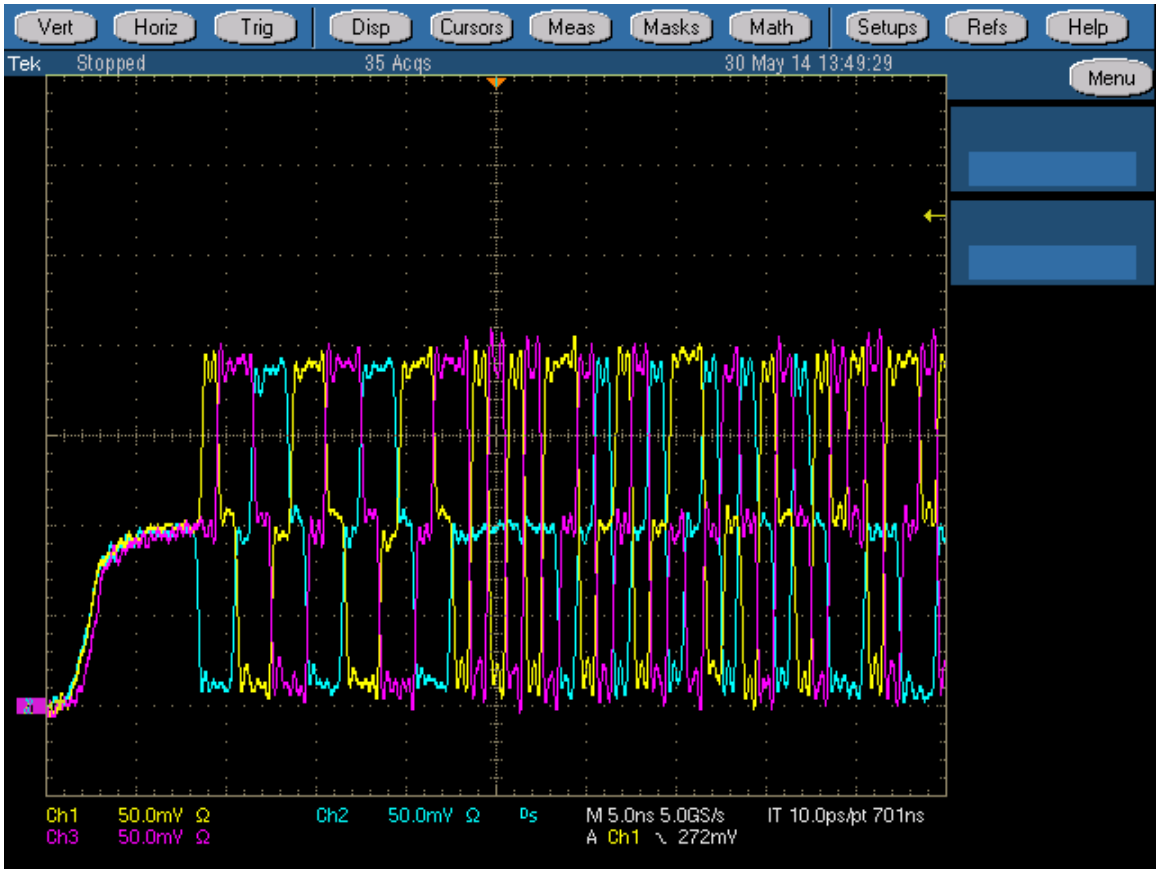
Beaverton, Oregon 97005
+1.503.626.9663 phone PST

www.movingpixel.com
information@movingpixel.com

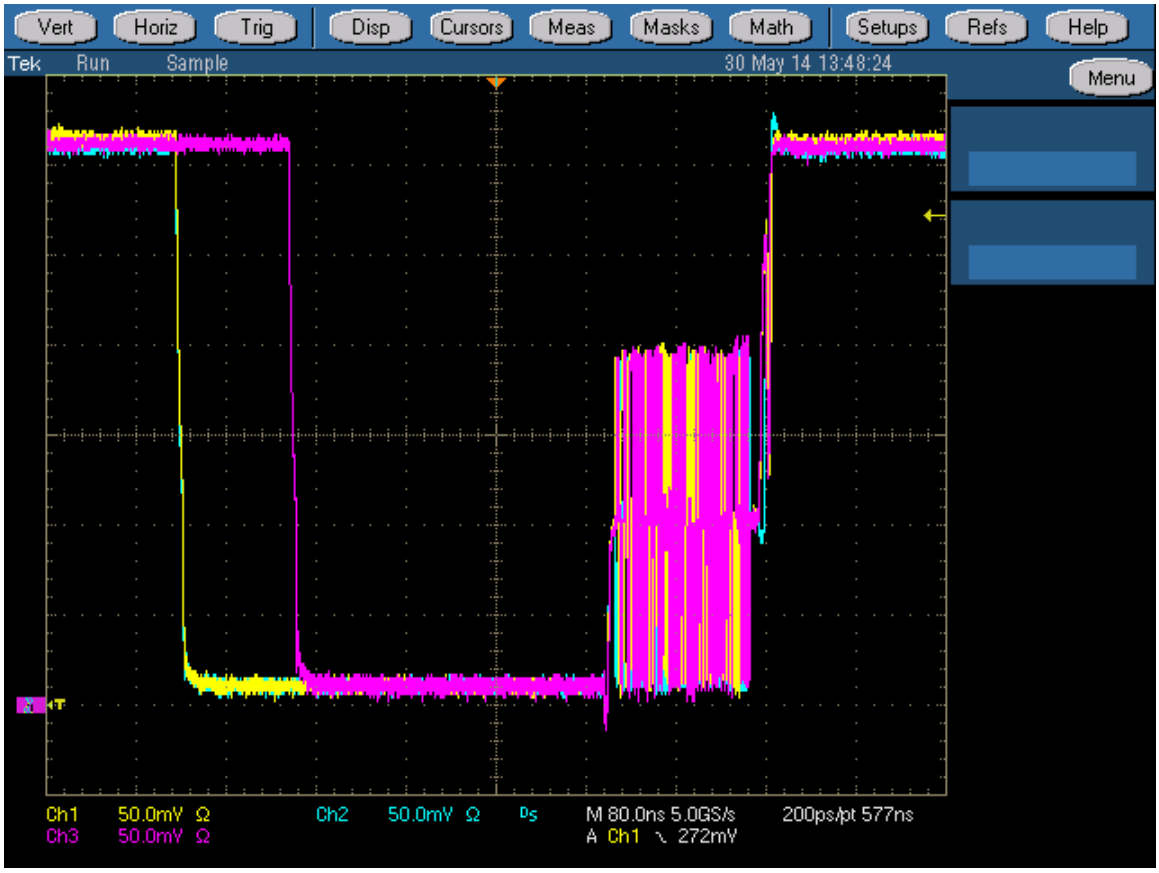
[1] implies that the minimum amplitude is 0 volts, both single-ended and differential.

Appendix A Transmitter and Receiver scope traces

ATx 1.1 Transmitter beginning of HS data – preamble
Yellow: Wire A; Blue: Wire B; Magenta: Wire C
Corresponding Received waveform below
Yellow: A-B; Blue: B-C; Magenta: C-A



ATx 1.3 Transmitter: Packet through header
Yellow: Wire A; Blue: Wire B; Magenta: Wire C
Corresponding Received waveform below
Yellow: A-B; Blue: B-C; Magenta: C-A

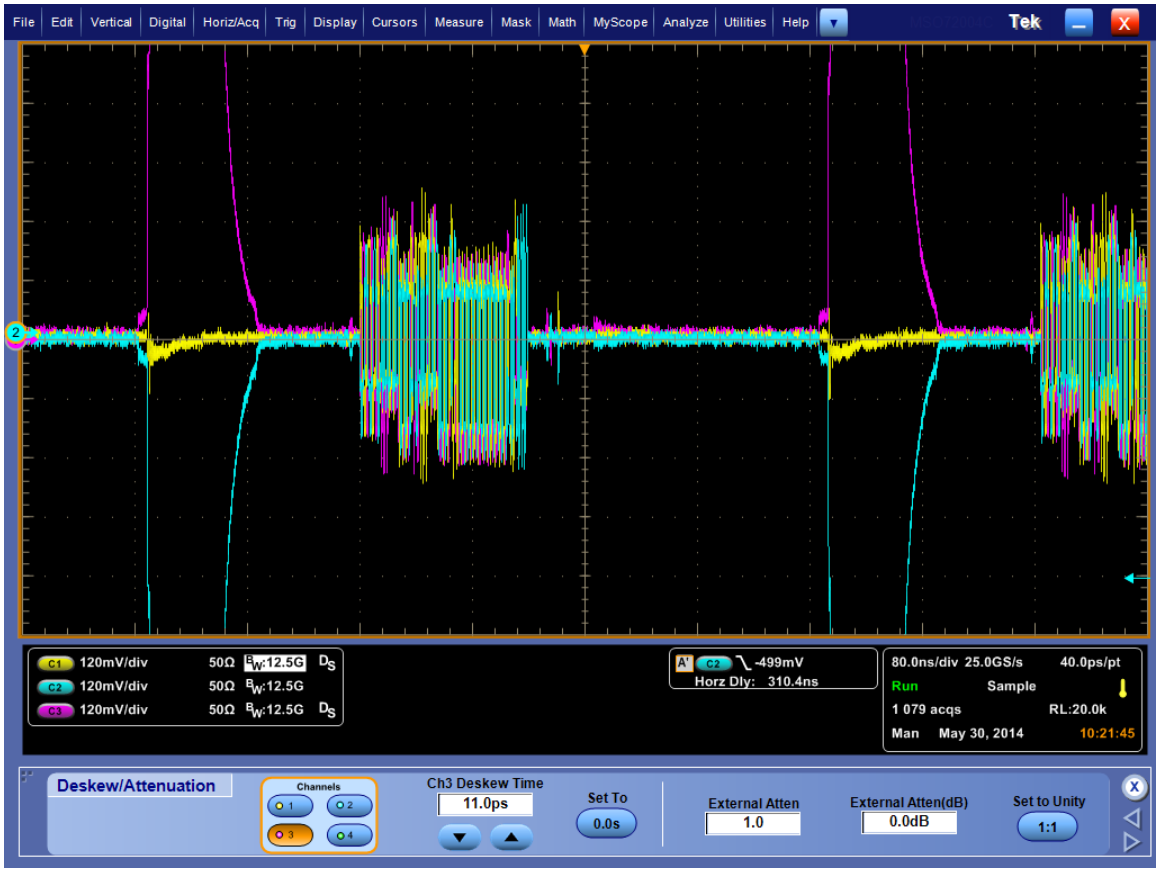


ATx 1.5 Transmitter: Whole Packet including LP (LP voltages incorrect due to overtermination)

Yellow: Wire A; Blue: Wire B; Magenta: Wire C

Corresponding Received waveform below

Yellow: A-B; Blue: B-C; Magenta: C-A


File
Edit
Vertical
Digital
Horiz/Acq
Trig
Display
Cursors
Measure
Mask
Math
MyScope
Analyze
Utilities
Help
Tek
C1 120mV/div 50Ω BW:12.5G DS
C2 120mV/div 50Ω BW:12.5G
C3 120mV/div 50Ω BW:12.5G DS
A C2 -499mV
Horz Dly: 310.4ns
80.0ns/div 25.0GS/s 40.0ps/pt
Run Sample
1 079 acqs RL:20.0k
Man May 30, 2014 10:21:45
Deskew/Attenuation
Channels
1
2
3
4
Ch3 Deskew Time
11.0ps
Set To
0.0s
External Atten
1.0
External Atten(dB)
0.0dB
Set to Unity
1:1