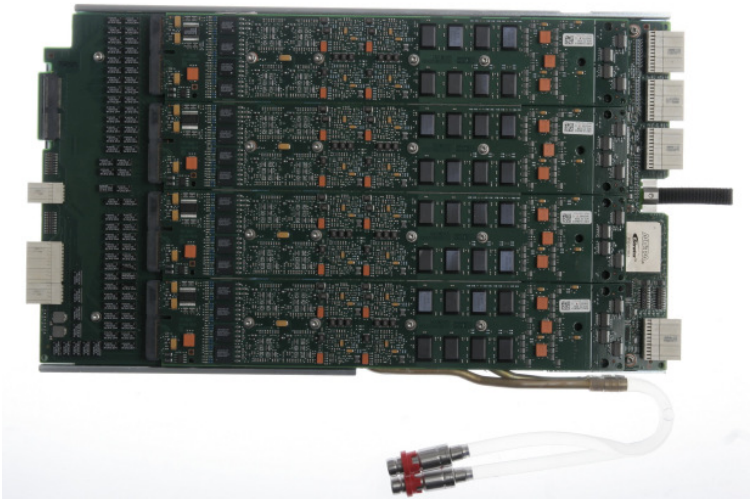
Verigy V93000 SOC

Pin Scale 400

Digital Card

Technical Specifications
Rev 1.0.1 April 26. -2007



Note: The specifications are preliminary and are subject to change.

VERIGY

CONTENTS

Overview and Configuration

Overview:

Pin Scale 400 is a high density flexible digital Channel Card for the V93000 Platform to address the general purpose core digital needs while complementing Verigy´s digital offering.

This Pin Card addresses the entire application range from structural testing (reduced pin count plus DC IO) to broadside access functional testing in one instrument via flexible license options. Pin Scale 400 is plug in compatible and mixable with existing Pin Scale Digital cards as well as with the entire fleet of DC, mixed signal and RF options available for the V93000 platform. This pin card is functional compatible to the P and Ce series of digital pin cards. Pin Scale 400 is built upon the proven V93000 test processor per pin architecture, features true per pin AC and DC resources, sequencer per pin structure, APG per pin structure, fail capture per pin, integrated TIA per pin plus new high speed backbone communication technology to enable unprecedented data transfer from and to the host computer.

Test Processor-Per-Pin architecture

Maximum channel count	2048 digital pins[1)]
Vector memory (max)	224 MVectors[2)]

License	**DC**	**100 Mbps**	**200 Mbps**	**400+ Mbps**
Max. I/O data rate (≤3V swing)	d.n.a	100 Mbps	200 Mbps	400 Mbps
Max. I/O data rate (≤1V swing)	d.n.a	100 Mbps	200 Mbps	>533 Mbps
Max. clock rate (≤3V swing)	d.n.a	100 MHz	200 MHz	200 MHz
Max. clock rate (≤1V swing)	d.n.a.	100 MHz	200 MHz	>266 MHz

Software environment

Test programming and debug

The SmarTest production test environment includes manufacturing test interfaces to operators, handling equipment and factory networks. A graphical test flow editor links device tests into a production-ready test program, where the tests are set up via fill-in-the-blank test functions. User-specific tests are programmed with test methods in C. Links are available for design-to-test conversion. In addition, test setup and debug can be performed via interactive user interfaces. Result analysis tools are available for error locations, timing behavior, analog waveforms, shmoo plots, pin margin tests and memory bit map.

1) The pin count is a function of card slots taken by DC, analog or RF modules , therefore the maximum pin count is a function of selected infrastructure. Density of PS400 cards (64pins per card) will allow future extension to 4096 pin max in the large test head form factor, consult factory for details.

2) Vector depth for full I/O operation using x4-mode wavetable

Compatibility

The SmarTest software is compatible with Agilent 93000 Pin Scale 3600, Pin Scale 800,Pin Scale HX, P-models, C-models, Ce-models and BIST ASSIST. Pin Scale 400 is supported in SW Rev 6.0 and up.

System Controller

PC Workstation: see most current workstation support list

Operating system: Linux Red Hat Enterprise

Configuration:

Channels per board	64
Maximum number of boards per system Compact test head Small test head Large test head	 16 32 64
Momory Depth	up to 56MByte (=224MVectors in I/O mode)

Scope of specifications

Verigy specifies and verifies the specifications at the DUT interface pogo level. Using an adequate DUT board, valid system calibration and a fixture delay measurement (TDR), these specifications are valid at the device under test as well. Specifications describe warranted product performance. Characteristics are included as typical values to provide additional useful information by describing typical non-warranted performance.

Calibration and operation

Warm-up time	60 minutes
Basic maintenance period	6 months
Base calibration period (traceable calibration)	6 months
Calibration period (system auto adjustment)	3 months[1]
DC update period	2 weeks

1 Valid at ambient temperature within ±2.5 K of calibration temperature. For temperature requirements during calibration please see "Maintenance Guide".

Environmental

Operating	15°C to 30°C (59°F to 86°F)
Specification guarantee temperature	20°C to 30°C (68°F to 86°F)
Maximum humidity at 30°C	< 70% R. H., non-condensing
Storage (without water)	–40°C to +70°C

Timing

Timing

Overall timing accuracy (OTA)	± 400 ps
Edge placement accuracy (EPA = OTA/2)	± 200 ps
Edge placement resolution	1 ps
Edge placement range	-4 to 12 Periods Max -8000 ns to +24000ns

Vector period

Range	2.5 ns to 31250 ns
Accuracy	± 15 ppm
Resolution	0.001 fs

Digital Channels

Drivers

AC Performance

Maximum transition time (10 to 90%)	
at 1 V swing	1.3 ns
at 3 V swing	2.0 ns
Minimum pulse width	
at 1 V swing	2.0 ns
at 3 V swing	2.8 ns

DC performance

Level range	–1.0 V to 6.2 V
Level resolution	1 mV
Level accuracy	±10mV[1)]
Minimum swing	200mV[2)]
Maximum swing	7.2V

Impedance characteristic

Source impedance	50 Ohm±5 Ohm

Z-Clamp mode

Voltage range	-1.0 to 6.2 V
Maximum voltage window	7.2 V
Voltage resolution	2.5 mV
Voltage accuracy	±100 mV

1) Valid for -1 to +5.5V, ±20mV beyond 5.5V

2) Software allows programming to 0 mV swing, specification valid down to 200 mV.

Comparators

AC performance

Minimum detectable pulse width	1.5 ns

DC performance

Threshold range	-1.0 to 6.2 V
Threshold resolution	1 mV
Threshold accuracy	±10mV[1)]
Pin leakage current	±10µA[2)]

Programmable Load

Currents (Ioh, Iol)	0 to 24 mA 0 to 30 mA[3)]
Current resolution	12.5 µA
Current accuracy	±75 µA±1% of max (Ioh, Iol)
Commutation voltage range (Vcom)	-1.0 V to 5.5 V
Voltage resolution	2.5 mV
Voltage accuracy	±100 mV

1) Valid for -1 to +5.5V, ±20mV beyond 5.5V

2) Characteristics: ±2µA for 0…3V

3) total load for 64 pins per pin card may not exceed 1600 mA at any time

Per-pin DC Measurement Unit

Force Voltage **Measure Current**

Range	Accuracy	Resolution	Range	Accuracy	Resolution
-1.0 to 5.5 V	±10 mV 1)	1 mV	±20 mA	±100 uA ±0.1%	10uA
-2.5 to 6.2 V	±10 mV 1,2)	1 mV	± 1 mA	±4 uA ±0.1%	250nA
-2.5 to 6.2 V	±10 mV 1,2)	1 mV	±100uA	±400nA ±0.1%	100nA
-2.5 to 6.2 V	±10 mV 1,2)	1 mV	±10 uA	±50 nA ±1%	10nA

Force Current **Measure Voltage**

Range	Accuracy	Resolution	Range	Accuracy	Resolution
±20 mA	±80 uA ±0.1 %	10 uA	-1.0 to 5.5V	±10 mV [1)]	1mV
± 1 mA	±25 uA ±1%	1 uA	-2.5 to 6.2V	±10 mV [1,2)]	1mV

1) ± (Ia*R), Ia is the actual current, R is the wiring resistance of ≤ 1.0 Ohm

2) Valid for -1 to +5.5V, ±20mV beyond 5.5V

High Precision PMU

Number of High Precision PMUs is depending on system configuration (1 PMU per card cage)

Voltage range (force/measure)	-5 V to 8 V
Resolution	250 µV
Accuracy	±2 mV – (Ia*R) [1)]

	Current range	**Resolution**	**Accuracy**
Range 1	±200 mA	6 µA	±200 µA ± 0.1% of reading/setting
Range 2	±5 mA	250 nA	±10 µA ± 0.1% of reading/setting
Range 3	±200 µA	6 nA	±200 nA ± 0.1% of reading/setting
Range 4	±5 µA	250 pA	±10 nA ± 0.1% of reading/setting [2)]

1) Ia is the actual current, R is the wiring resistance of ≤ 1.0 Ohm

2) If connected directly to DUT pin, ± 30nA if connected through digital pin

Per Pin TIA

DC performance

Specifications of comparators (see above) apply.

AC performance

Maximum input frequency	>266MHz
Resolution	1.5ps
Minimum input slope	0.1V/ns
Time measurement accuracy (single measurement)	±180ps [2] (=Δt, see Fig. 5 below)
Time measurement accuracy (with averaging)	±50ps, typical [3]
Frequency/period measurement accuracy (using N cycles averaging, see Fig. 4 below)	±180ps/N [4]
Time measurement accuracy against internal reference (see Fig. 5 below) [5]	±100ps + tEPA (see section 2 Timing) [4]

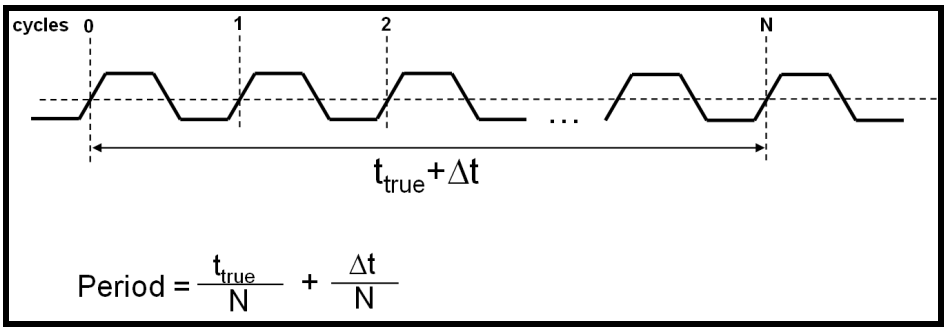


Fig. 4: N cycles averaging

2 Condition: square wave.

3 Same slope; averaging over 100 samples.

4 For <=450 MHz input; (±100ps + period)/N for >450MHz input.

5 Internal reference is generated by the driver of the pin that performs the measurement.

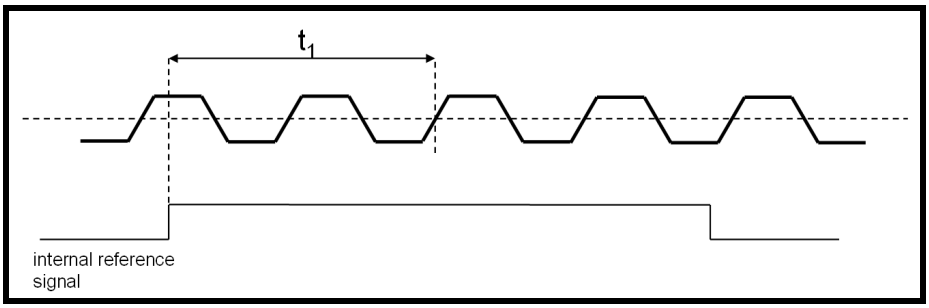


Fig. 5: Measurement against internal reference signal

Measurements between pins (propagation delay (PD), skew) are derived from individual measurements on each pin against the internal reference signal
(see Fig. 6)

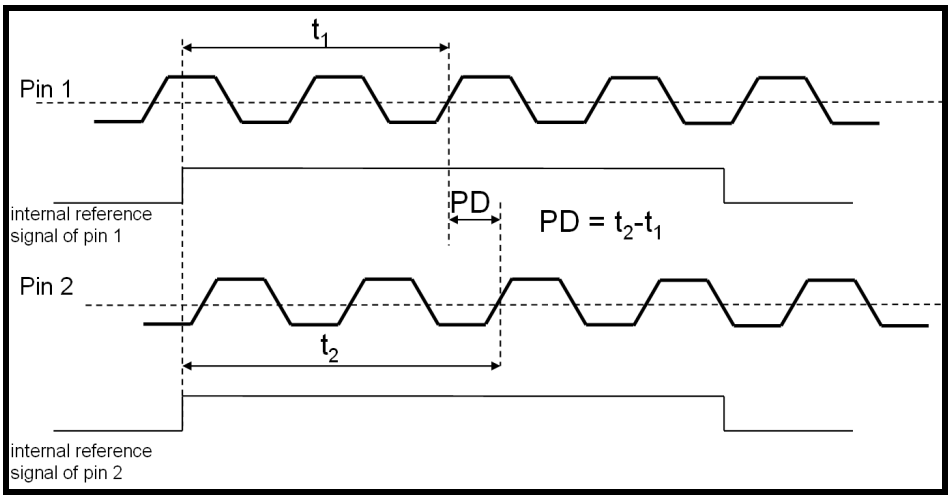


Fig. 6: Measurement between two pins (propagation delay (PD)

Other

Measurement functions	time interval, frequency, period, pulse width, jitter, propagation delay, rise/fall time
Measurement mode	single ended
Maximum sampling rate	100k samples/sec
Averaging	up to 32k samples
Event counter	max 217 events
Sample point randomization	0…100% of sample period
Arming/triggering	internal (arming on event in the measurement signal)

www.verigy.com

Related Information

For more information about the Verigy V93000 SOC Series, please visit the following website:

www.verigy.com/go/soc

Contact Information

For more information about the Verigy V93000 Pin Scale 400 , please contact your local Verigy sales representative:

www.verigy.com/go/contactus

June 1, 2006
5989-5107EN
Revision 1.0