

SC-Pure

Extremely-low Phase Noise Audio clock

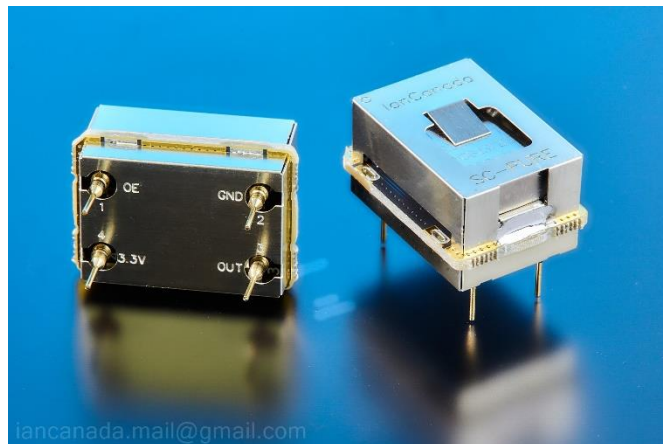
V1.0 IanCanada Inc.

General Description

SC-Pure is a top-level audiophile clock made from the best selected SC-CUT crystals. To achieve the highest possible low phase noise performance, an advanced oscillator architecture has been developed. The sound quality can be significantly enhanced by replacing existing clocks with SC-Pure in DACs, DDCs, or network streamers.

Features

- True SC-CUT crystal.
- A specially designed pure sine topology has been introduced to convert the ultra-high-purity sine signal into a square wave directly from the SC-CUT crystal resonator, bypassing any active components. As a result, the best possible low-phase noise performance can be achieved.
- Extremely low close-in phase noise and phase noise floor make SC-Pure capable of challenging any high-end clocks in the world.
- Femtosecond RMS phase jitter.
- In standard compact size DIP14 package with 3.3V power supply voltage and LVCMOS output. Plug and play. Easy to install for all applications.
- Featuring an OE standby function to eliminate interference from unselected frequencies, the SC-CUT crystal can still operate in low-power mode without disrupting the break-in process.
- Operating the standard 83°C OCXO crystal at room temperature, the frequency will be approximately 20ppm lower than the rated frequency, which is the natural characteristic of the SC-CUT crystals.
- Dual shield cans are located on both the top and bottom sides of the PCB for the best possible EMI noise suppression.
- A 3.3V ultra-capacitor or a LiFePO4 battery power supply can be used directly to optimize the performance. Also has a LED power indicator.
- One-year limited warranty and lifetime service.



Order Information

P/N	Frequency
#80A	45.1584MHz
#80B	49.1520MHz
#80C	22.5792MHz
#80D	24.5760MHz

Pin Connections

Pin#	Functions
1	OE 1: Output, 0: High Z
2	GND
3	Output (LVCMOS)
4	V _{CC} : 3.3V

Operation Notes

1. Reversing the installation orientation will result in permanent damage to the SC-Pure clock, which is not covered by the warranty. Repair is possible, but fees for PCB replacement and re-testing will apply.
Exercise caution when installing the SC-Pure.
2. The pins of the SC-Pure clock are machined from solid-core copper and are gold-plated. Exercise extreme caution during installation, as these pins are prone to breaking if bent. Broken pins are not covered by the warranty and will incur re-work and re-testing fees. Damage to the shield can will also void the warranty.
3. SC-CUT crystals require an extended period to achieve

optimal phase noise performance. For new SC-Pure clocks, please refrain from serious listening until they have operated continuously for more than 24 hours. Further improvements can continue to develop over weeks or months of continuous operation.

4. Power supplies are crucial for maintaining the SC-Pure's optimal phase noise performance and sound quality. Linear power supplies may serve as an entry-level option. The best power supplies are direct ultra-capacitor supplies or LiFePO4 battery supplies. Below is a list of recommended power supplies for SC-Pure, ranked by performance.

- #1: UcPure 3.3V with 3000F ultracapacitors
- #2: LifePO4 Mini 3.3V with UcConditioner 3.3V
- #3: PurePi 3.3V with UcConditioner 3.3V
- #4: LifePO4 Mini 3.3V or PurePi 3.3V
- #5: LinearPi 3.3V with UcConditioner 3.3V
- #6: LinearPi 3.3V

5. We highly recommend using the SYNC charging function of UcPureMkIII or PurePi II. Operating passive power supplies at a slightly higher voltage range can positively impact lower phase noise performance.

6. Please never use a switching mode power supplies for SC-Pure clock because they can degrade a lot to the phase noise.
7. It's highly recommended to operate SC-Pure continuously without interrupting the power supply. This can be achieved by connecting the FifoPi clean side or so on SC-Pure power input to the direct output of a UcBalancer or the continuous output connector of a UcPure.
8. SC-CUT crystals operate under extremely low phase noise conditions and are highly sensitive to environmental factors like vibration, airflow (temperature), and EMI noise. Measures to reduce vibration, stabilize temperature, or block EMI noise will positively impact sound quality.
9. SC-Cut crystals have an unwanted B-mode, which is approximately 9% higher than the rated frequency. SC-Pure is calibrated precisely at the rated frequency. If an SC-Pure consistently starts at the B-mode frequency and cannot be reset by powering up, it must be returned to the manufacturer for recalibration.

Specifications

Item	Description	Min	Typical	Max	Unit
V _{CC}	Power Supply Voltage	2.9	3.3	3.7	V
I _{CC}	Supply Current	25	30	35	mA
I _{CC}	Standby Current	10	15	20	mA
V _{OH}	Output Logic High		90% V _{CC}		V
V _{OL}	Output Logic Low		10% V _{CC}		V
% _{DC}	Duty Cycle	45%	50%	55%	%
R _O	Output Impedence	48	50	52	ohm
t _R	Rising Time	0.9	1	1.2	ns
t _F	Falling Time	0.9	1	1.2	ns
t _s	Start-up Time	3	5	10	ms
R _{OE}	OE pin pull-up resistor		22K		ohm
I _O	Output Current		+/- 24		mA
t _{en}	Enable time	1.2	3	5.3	ns
C _L	Load Capacitance	1	10	15	pF
V _{IH}	OE input high level	1.8	2		V
V _{IL}	OE input low level		0.6	1	V

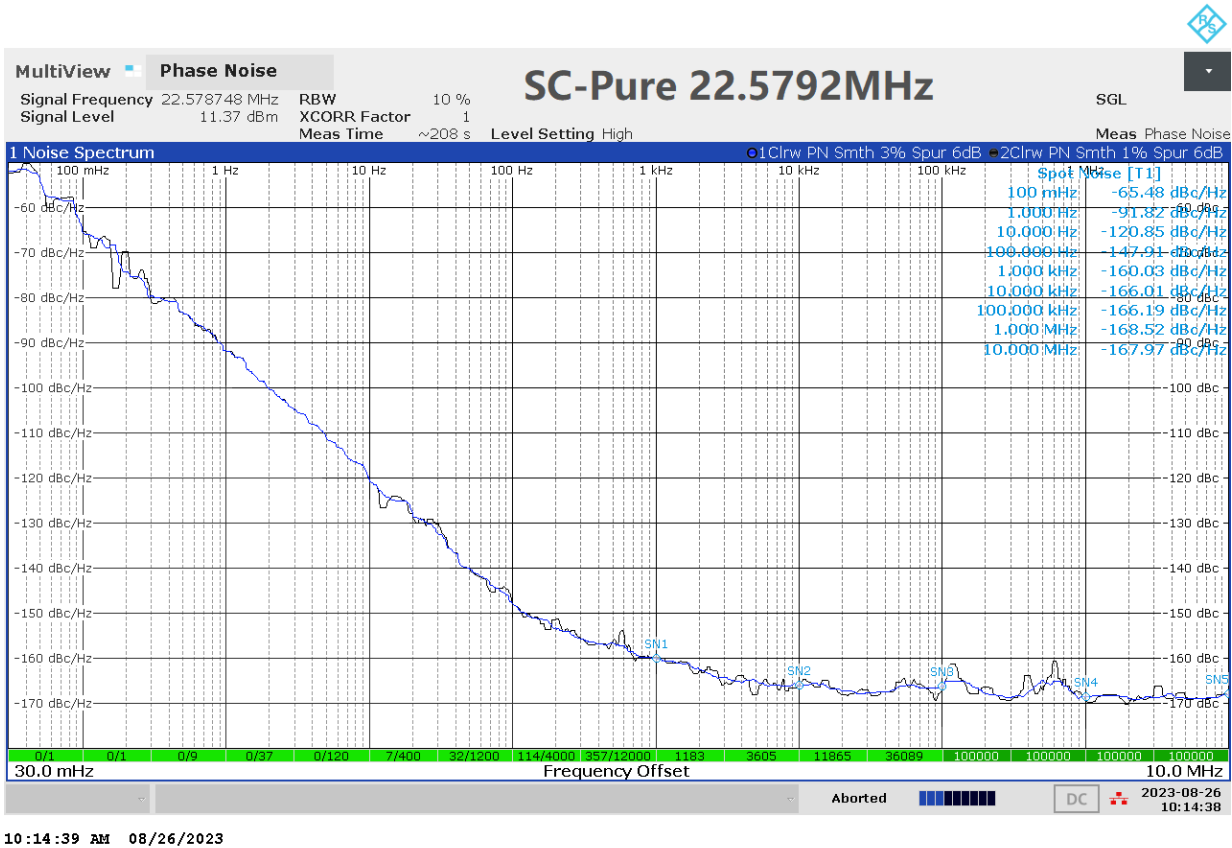
Phase Noise (Typical)

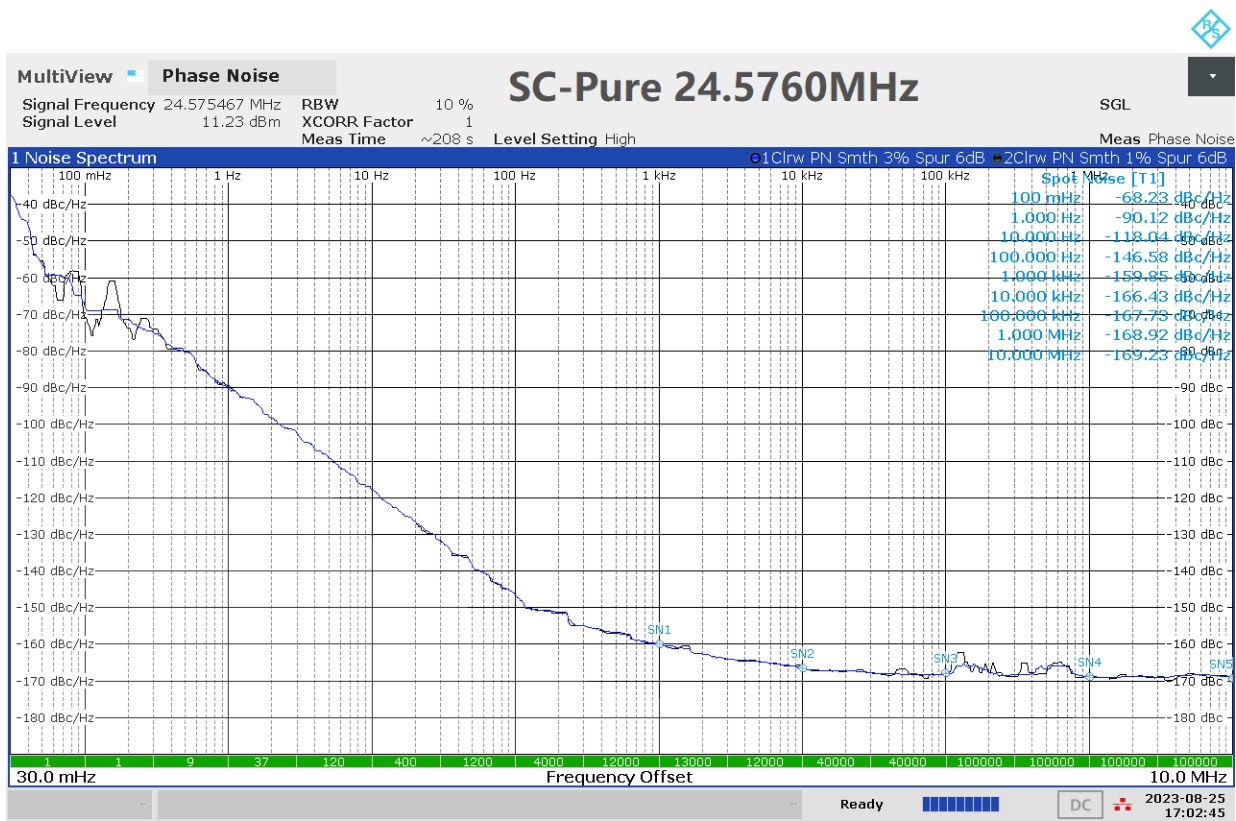
Phase Noise (dBc/Hz)	Offset Frequency from Carrier								
SC-Pure Frequency	0.1Hz	1Hz	10Hz	100Hz	1kHz	10kHz	100kHz	1MHz	10MHz
22.5792 MHz	-65.48	-91.82	-120.85	-147.91	-160.03	-166.01	-166.19	-168.52	-167.79
24.5760 MHz	-68.23	-90.12	-118.04	-146.58	-159.85	-166.43	-167.73	-168.92	-169.23
45.1584 MHz	-56.42	-84.38	-113.49	-143.32	-162.15	-167.81	-169.04	-169.02	-169.56
49.1520 MHz	-56.67	-84.98	-112.70	-142.92	-161.76	-167.02	-168.07	-168.09	-168.79

RMS Phase Jitter (Typical)

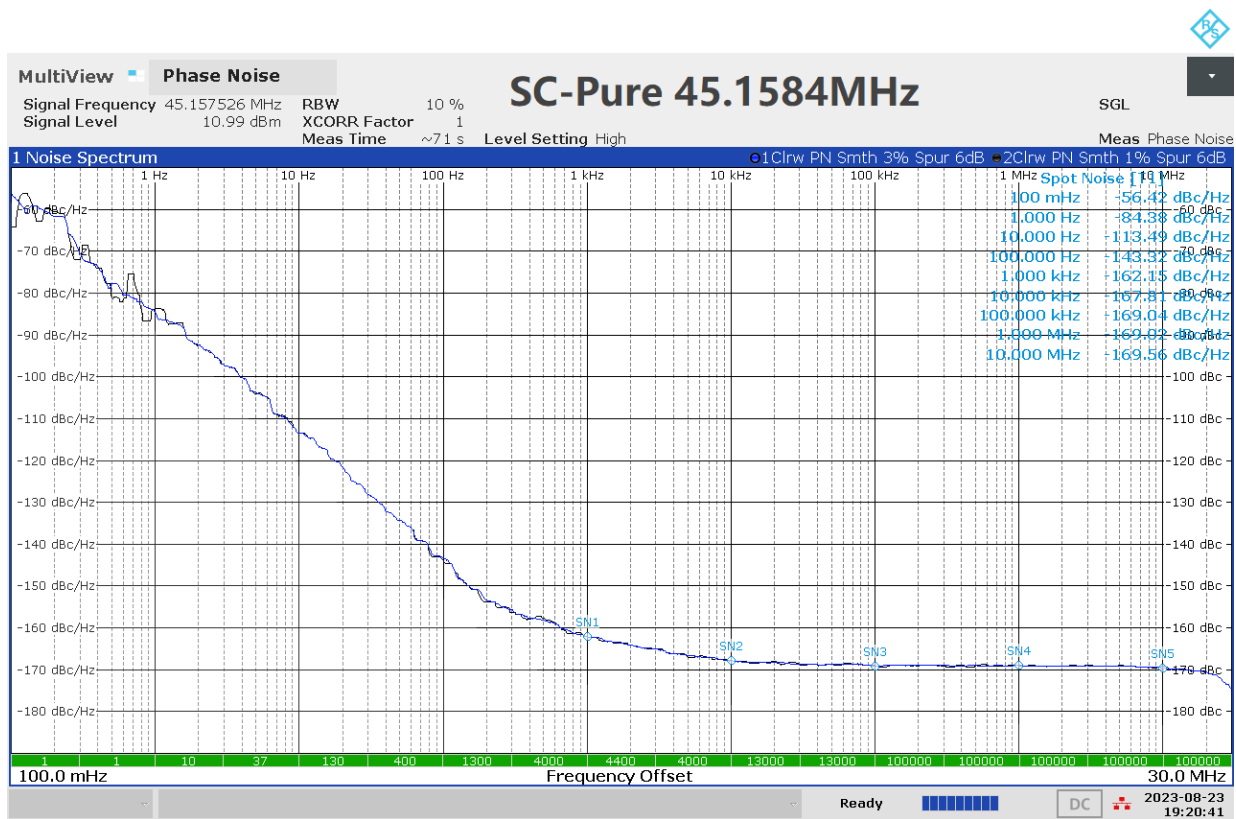
RMS Jitter (f _s)	Integration Bandwidth	
SC-Pure Frequency	10Hz – 1MHz	10kHz – 10MHz
22.5792 MHz	47.59 f _s	124.2 f _s
24.5760 MHz	45.54 f _s	102.7 f _s
45.1584 MHz	29.71 f _s	53.73 f _s
49.1520 MHz	29.89 f _s	54.36 f _s

Phase Noise Measurement Plots (Typical)

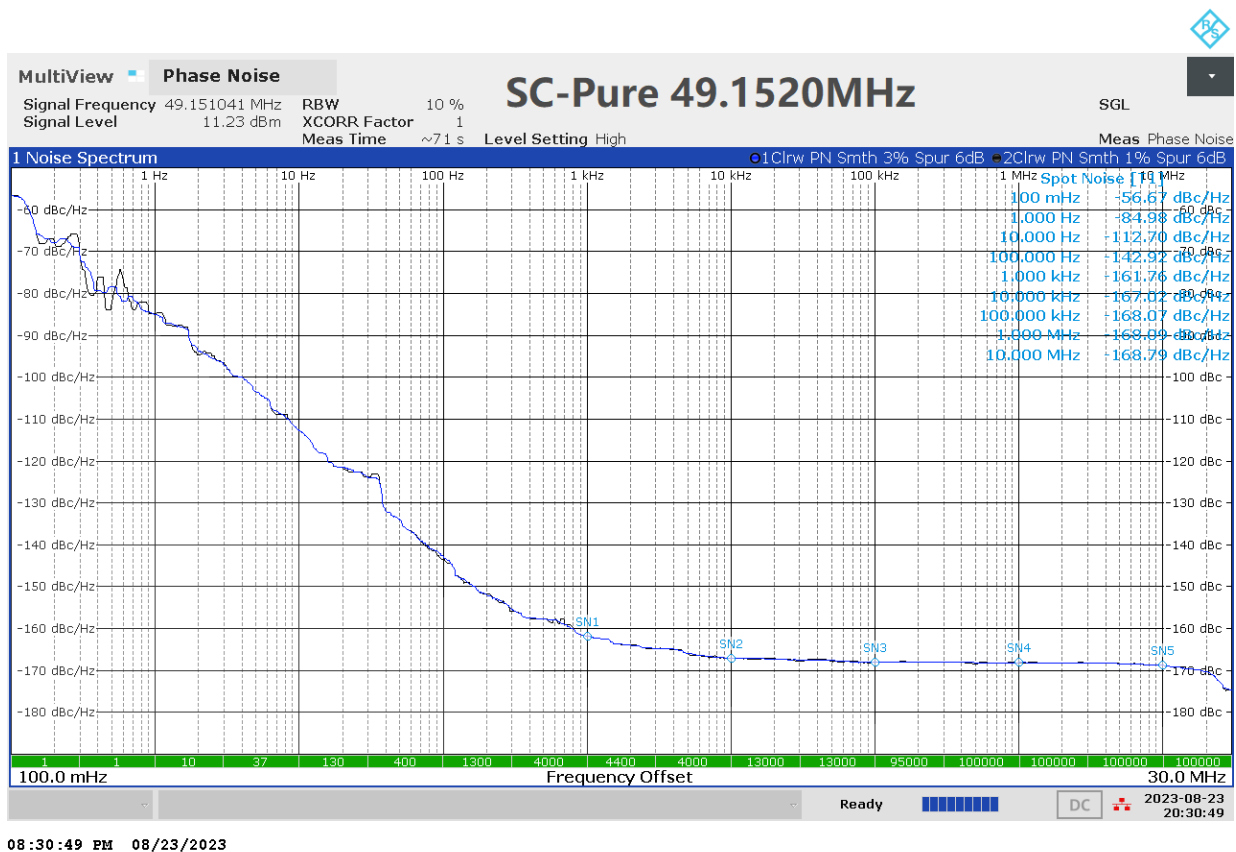




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Note1: Measured by an official calibrated phase noise analyzer.

Certificate Number:18700081126327521913

Note2: Keep powering SC-Pure for 8 hours before take the measurement

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