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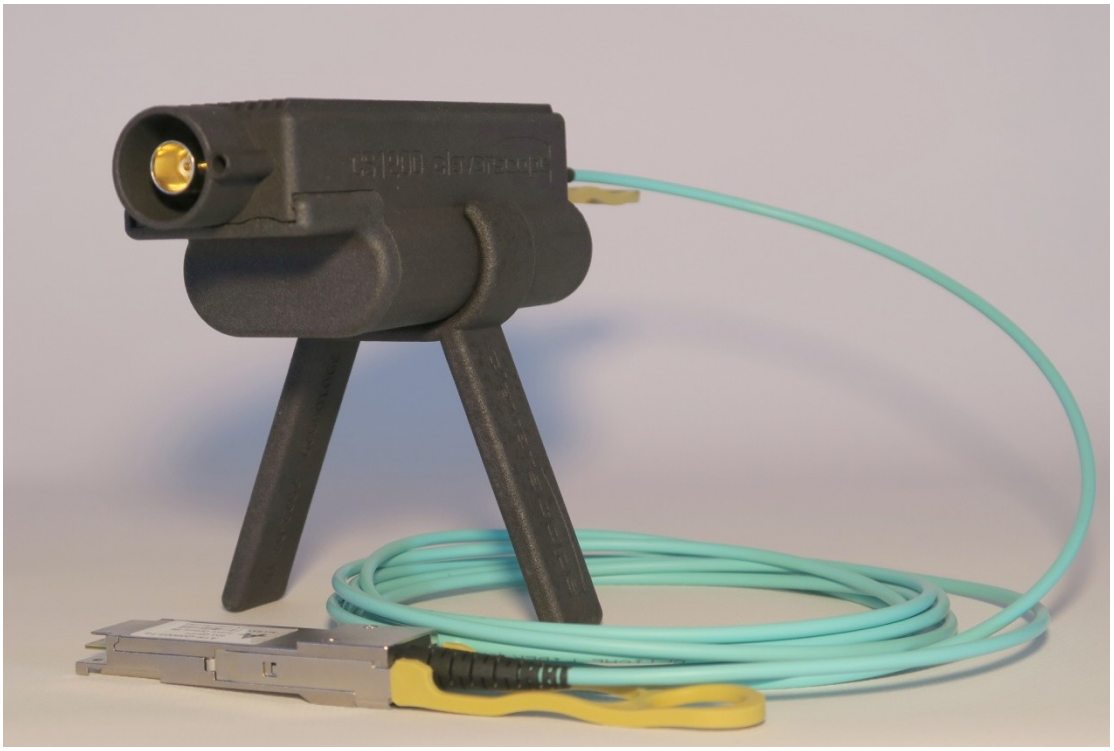
CS1200 IsoPod specification

Summary

The CS1200 **IsoPod** is a remote isolated digitizer Pod for the CS548. It uses a standard QSFP terminated active optical cable (AOC) to connect the CS1200 IsoPod to the QSFP remote sockets on the CS548 front Panel. The input specification is identical to the CS548 internal channels. The CS1200 is supplied with a standard 3m cable. The standard cable can be replaced with other cable lengths up to 30m at no extra charge.

The user chooses the remote probe using the CS302 Cleverscope 4 x64 application. Sample rate is 400 or 500 MSPS dependant on the CS548 firmware.



CS1200 IsoPod

- 30kV isolation provided >150mm spacing between IsoPod and other structures.
- 2 pF free space capacitance >50 mm above reference plane
- 100 dB CMRR at 50 MHz
- 14 bit resolution, 100dB dynamic range
- 200 MHz Analog BW
- 100uV resolution on 0.8v range
- 200uV rms noise on 0.8V range
- 21700 5.5AHr cells included - 10 hour operating life
- 2 cell charger included with one CS1200, 8 cell charger included with 2+ CS1200 supplied.
- 3m AOC included

Battery

The CS1200 may be used battery powered using two included 21700 Lithium Ion Cells, or with an optional adaptor powered by an external 12V Gel cell for longer life. The CS1200 uses 4W while sampling. The two cells are fitted in the lower half of the CS1200 body, with a battery cover that may be removed without tools. Battery state is indicated using the application, or the built in LED indicator (Good - green, Low - Orange, Turned off - Red), which is also mirrored on the CS548 remote led. If the battery is low, the digitizer is put into a low power state and the Red led illuminated on both the CS1200, and on the CS548 Remote indicator Led. The standard two cells store 40WHr, sufficient for 10 hours operation.

An external power cable and adaptor is available on request for connection to 12V Gel Cells.

Charging

One of two chargers is supplied, dependant on how many CS1200's have been supplied. For single CS1200 supply, we provide a 2 cell charger, while for 2+ CS1200 supplied, we include an 8 cell charger.

2 cell charger, Xtar VC2	8 cell charger, Xtar VC8
	

Specification

Power Supply

Parameter	Specification	Notes
Input Voltage Range	7-12C DC	Over voltage is protected using a high current zener.
Battery	2 x 21700 5.5 Ahr LiIon cells	
Battery protection	Under voltage cutout @3V /cell Short Circuit protection Reverse polarity protection	Protects the battery if over discharged, or a fault in the CS1200.
Power consumption	4W	
Indicators	Connection status, battery status	Software controlled.

Analog Inputs

* Item still to be implemented. See Specification Status section.

Parameter	Specification	Notes
Number of channels	1	Fibre optic isolated IsoPod to Remote Input on CS548.
Isolation Voltage –Remote IsoPod	±30 kVdc	When mounted >150mm from reference plane or other structures not at the common mode voltage. If measured signal frequency is >1 MHz, then must be mounted >1m from any other conductive structure not at the common mode voltage.
CMRR	> 120 dB at 1 MHz > 115 dB at 10 MHz > 100 dB at 50 MHz	20dBV signal applied to coax common and earth reference plane 50mm below IsoPod.
ADC resolution	14 bits	
Input Ranges	±0.8V and ±8V	Use probes to extend the range, eg 800V with 100x probe. The application automatically scales all values to compensate for probe attenuation.
Sample Rate	500 MSPS * 400 MSPS now	Dependant on CS548 firmware
Sample Memory	500 M Samples * (installed)	Currently 4 x simultaneous channels with 10M per channel.
Channel to Channel Skew	< ±500ps	After automatic calibration of cable delay
RMS Channel Noise 1 M samples	~ 200 uV rms, ±0.8V range ~ 2mv rms, ±8V range	Inputs open
Pk-Pk Channel noise 1 M samples	1.8mVp-p for ±0.8V range 15mVp-p for ±8V range	Inputs open
Sample clock jitter	300 fs rms	
Sample clock Freq tolerance	max ±2ppm	At 25 deg C
Sample clock temp stability	max ±0.5 ppm	Over -40 to +85 deg C
Enob (rms)	11.6 bits, or 1 part in 3,300	Inputs open
Noise free bits	10.3 bits, or 1 part in 1300	Inputs open
Spectral Noise floor, no protrusions	-100 dBV -115dBV	<2MHz, 200 MHz BW, 1kHz resolution >2MHz, 200 MHz BW, 1kHz resolution
Sinad	> 64 dBc at 1 MHz > 63 dBc at 10 MHz > 55 dBc at 30 MHz	1 Vp-p into 50 ohms signal
HD2+3	< -80dB at 1MHz < -76 dB at 10 MHz < -71 dB at 30 MHz	1 Vp-p into 50 ohms signal
THD	< -76 dB at 1 MHz < -74 dB at 10 MHz < -67 dB at 30 MHz	1 Vp-p into 50 ohms signal
Pulse Flatness	< 700uV < 2mV < 200mV	0.5V pulse, 500us duration, ±0.8V range 0.5V pulse, 500 us duration, ±8V range 500V pulse, 500us duration, 100x probe
Overload recovery	4ns	Recovery from 10x overload
Maximum Differential Input Voltage	±1 kV, derated above 1 MHz.	Derated at 20dB/decade
Spectral Flatness	±0.5dB from 0 - 160 MHz -3 dB at 200 MHz	Supports 200 MHz Bandwidth
Input Resistance	1 M Ohm	DC resistance
Input Capacitance	20 pF	Signal Input to Signal Common
Isolation Capacitance	2 pF	Channel ground to Reference plane, 50mm seperation.

Environmental

Parameter	Specification	Notes
Temperature	0°C to +40°C -20°C to +60°C	Operating Storage
Cooling Method	Passive dissipation	
Humidity	0°C to +40°C >40°C	<90% relative humidity <60% relative humidity
Altitude	<3,000m 15,000m	Operating Non-operating

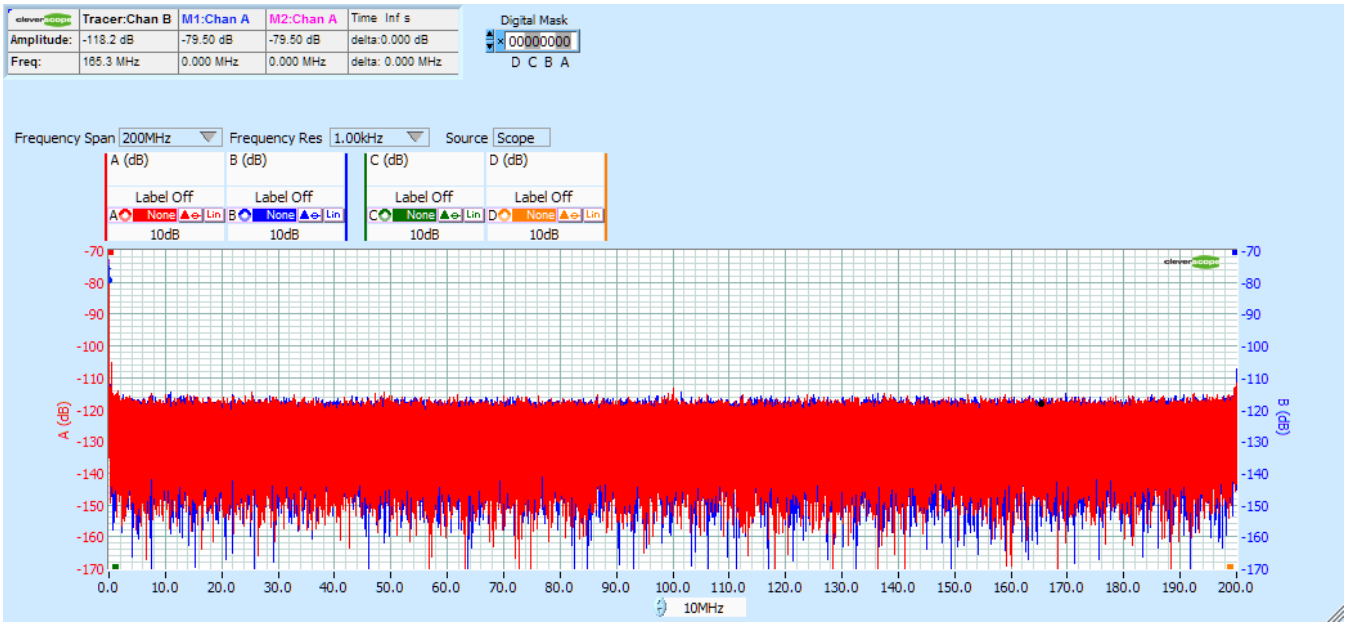
Mechanical

Parameter	Specification	Notes
Size	Height 45 mm Height 111 mm Width 46 mm Length 130 mm	Body alone Including Bipod
Weight (approx)	340 gm	Including two cells (150 gm), but not AOC.
Material	Shielded internal enclosure, High CTI, high dielectric withstand external plastic enclosure (HP PA12 material).	

Measurements

Spectral Noise Floor

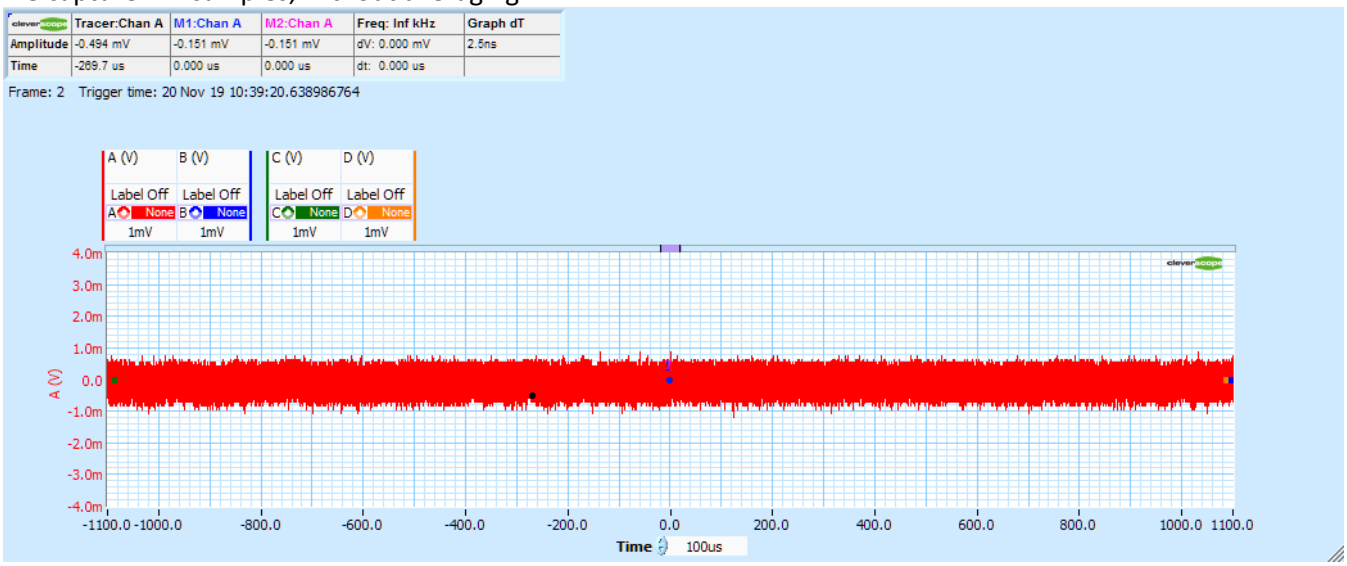
This is the full bandwidth noise with all four channels being captured with open inputs, 1kHz resolution, in dBV:



The noise floor is uniform, and below about -115 dBV per bin.

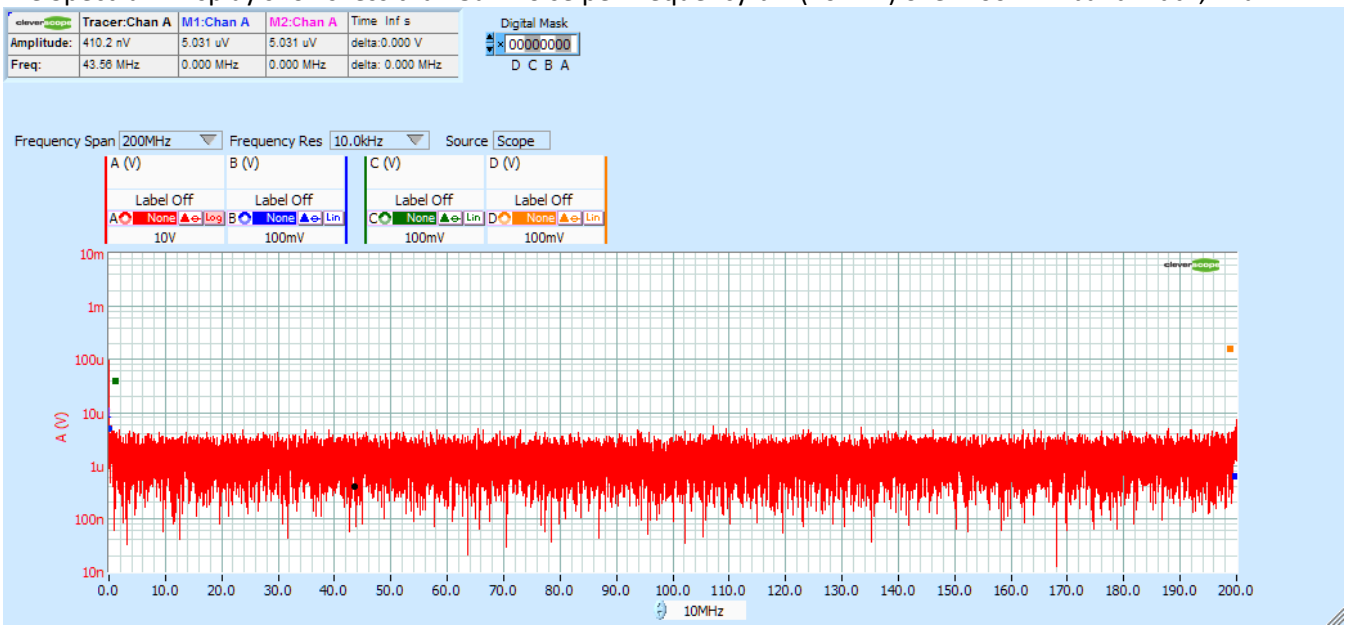
Time Noise Floor

We capture 1M samples, without averaging:

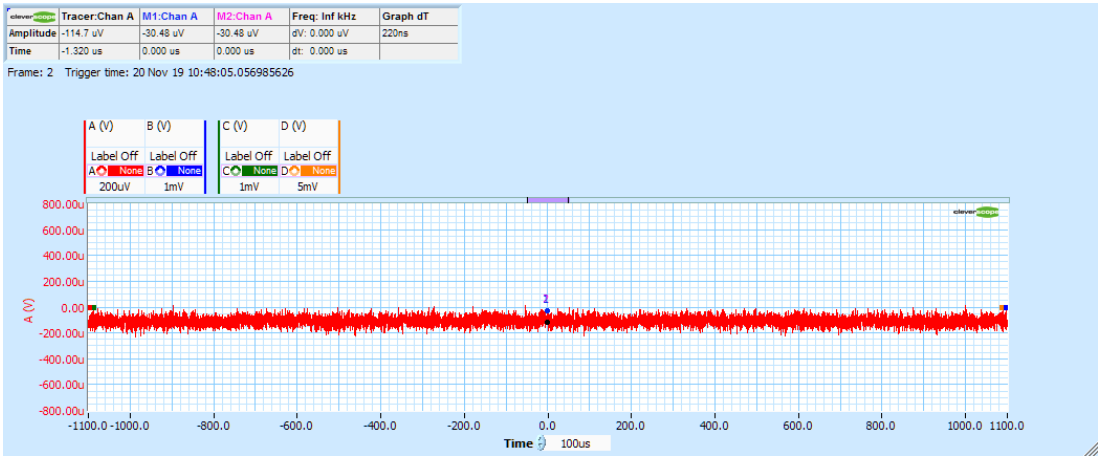


We use the signal information display to calculate the Standard Deviation (a good estimate of RMS, less the DC) and the peak to peak. We see about 200uVrms noise, and less than 1.8mV p-p noise.

The Spectrum Display shows less than 8uV noise per frequency bin (10 kHz) over 200MHz bandwidth, in uV:



Averaging, and the moving average filter can be used to improve the noise floor to around 200uV p-p :



Document changes:

24 May 2022 v1.0 - initial CS1200 specification

