



HARDWARE PRODUCT SPECIFICATION

DAQ Array - 3-Channel IQ Acquisition

A USB data acquisition instrument with three synchronized channels, raw sampling and IQ demodulation modes, built as the front end for software-defined radio and coherent array processing, in a current configuration that combines the acquisition array with an integrated L1/L5 switchable RF front end.

DRAFT - CONTENT NOT FINAL

Product Specification | Revision 0.1 (draft) | 2026-09-15

DOCUMENT CONTROL

Revision	Date	Author	Change
0.1 (draft)	2026-09-15	Vector Intelligence Labs	Initial document skeleton. Acquisition figures carried over from the published product text; no section reviewed or measured. Engineering review outstanding.

Source: the existing published product text for this instrument plus the internal design records. This draft is a structural skeleton: figures marked [TBD] are unresolved and must not be read as specifications.

1. Overview

The DAQ Array is a USB data acquisition instrument with three synchronized channels. It runs in two modes: raw sampling, in which each channel streams wideband samples to the host, and IQ demodulation, in which the instrument outputs complex baseband I/Q centred at an intermediate frequency. In the current configuration the acquisition array is combined with an integrated L1/L5 switchable RF front end, so band selection between L1 and L5 is part of the instrument.

The current configuration is therefore the acquisition array plus the integrated L1/L5 switchable RF front end. A DAQ-only variant, without the RF front end, is a future product variant: its scope is [TBD] and it is not available today.

The three channels are intended to be phase-coherent with one another, which is what makes the instrument usable as the digitizer for multi-antenna array work: coherent processing and direction finding need the relative phase between channels to be stable and known.

This document is a placeholder skeleton published ahead of the finished specification. It fixes the document structure, the specification-table shape and the branding; it does not state measured performance. Rows that read [TBD] have no settled value.

2. What is settled and what is not

Carried over from the published product text

- Three channels, sampled simultaneously.
- Two operating modes: raw sampling and IQ demodulation.
- Raw sample rate: 40 MSPS per channel.
- IQ demodulation centred at 50 MHz with 10 MHz bandwidth.
- Host interface: USB 3.0 (USB-C); no PCIe slot required.
- Continuous streaming to the host, with software and hardware trigger options.
- Integrated L1/L5 switchable RF front end - the current configuration of the instrument.

Open - not specified anywhere yet

- The DAQ-only variant (no RF front end) - a future product variant whose scope, configuration and availability are [TBD].
- RF front-end detail for the current configuration: band-switching architecture, control interface, gain, noise figure and connector family.
- ADC resolution, input bandwidth, input voltage range and input impedance.
- SFDR, SINAD, channel-to-channel isolation and channel skew.
- I/Q sample rate, I/Q resolution, image rejection, LO feedthrough, quadrature error and gain imbalance.
- Maximum sustained throughput, onboard buffer size and FPGA part.
- SDK / API surface and supported host operating systems.
- Enclosure, dimensions, weight, connectors and power architecture.
- Operating and storage temperature ranges, humidity, shock and vibration.
- Regulatory and compliance status.

Sample-rate discrepancy on record: the internal design records describe three IQ channels at 10 MSPS, and the companion software receiver's design document describes 12-bit 10 MSPS I plus 10 MSPS Q per channel, while the published product text states 40 MSPS raw sampling. These are not reconciled. The published figure is shown here unchanged and the alternate figure is shown alongside it, marked [TBD]; no figure is asserted as final.

3. Specification summary

3.1 Acquisition

Parameter	Min	Typ	Max	Unit	Notes
Number of channels	-	3	-		Sampled simultaneously; phase coherence target [TBD]
Raw sample rate (per channel)	[TBD]	40 (see note)	[TBD]	MSPS	Published figure; alternate 10 MSPS figure on record
ADC resolution	-	[TBD]	-	bits	Not specified
Input bandwidth	-	[TBD]	-	MHz	Not specified
Input voltage range	[TBD]	[TBD]	[TBD]	V	Not specified
Input impedance	-	[TBD]	-	ohm	Not specified
Input coupling	-	[TBD]	-	AC / DC	Not specified
SFDR	-	[TBD]	-	dBc	Not specified
SINAD	-	[TBD]	-	dB	Not specified
Channel-to-channel isolation	-	[TBD]	-	dB	Not specified
Channel skew	-	[TBD]	-	ps	Not specified

3.2 IQ demodulation mode

Parameter	Min	Typ	Max	Unit	Notes
Centre frequency	-	50	-	MHz	Published figure
Bandwidth	-	10	-	MHz	Published figure
I/Q sample rate	-	[TBD]	-	MSPS (complex)	Not specified
I/Q resolution	-	[TBD]	-	bits/component	Not specified
Image rejection	-	[TBD]	-	dBc	Not specified
LO feedthrough	-	[TBD]	-	dBm	Not specified
Quadrature error	-	[TBD]	-	deg	Not specified
Gain imbalance (I/Q)	-	[TBD]	-	dB	Not specified

Output format: interleaved I/Q or dual-channel streaming - [TBD]

3.3 RF front end and product variants

Parameter	Min	Typ	Max	Unit	Notes
RF front end (current configuration)	-	-	-		Integrated L1/L5 switchable RF front end; band switching is part of the instrument
Band selection	-	-	-		L1 / L5 switching present in the current configuration; control interface and switching time not specified
Frequency bands	-	-	-		L1 and L5 via the integrated front end; frequencies not restated here
Product variant - current	-	-	-		DAQ array combined with the integrated L1/L5 switchable RF front end
Product variant - future (DAQ-only)	-	-	-		DAQ-only variant without the RF front end: [TBD], future product variant, not available today

3.4 Digital and host interface

Parameter	Min	Typ	Max	Unit	Notes
Host interface	-	-	-		USB 3.0 (USB-C), published figure
Max sustained throughput	-	[TBD]	-	MB/s	Not specified
Onboard buffer	-	[TBD]	-		Not specified
FPGA	-	[TBD]	-		Part not specified
Trigger modes	-	-	-		Software, external and internal (published)
SDK / API	-	[TBD]	-		Published text claims a C / Python cross-platform API - unverified
Supported operating systems	-	[TBD]	-		Not specified

4. Mechanical and environmental

4.1 Mechanical

Parameter	Min	Typ	Max	Unit	Notes
Dimensions	[TBD]	[TBD]	[TBD]	mm	Not specified
Weight	[TBD]	[TBD]	[TBD]	g	Not specified
Enclosure	-	[TBD]	-		Not specified
Input connectors	-	[TBD]	-		Connector family not specified

Parameter	Min	Typ	Max	Unit	Notes
Power	-	[TBD]	-		Bus-powered vs external not specified

4.2 Environmental

Parameter	Min	Typ	Max	Unit	Notes
Operating temperature	[TBD]	[TBD]	[TBD]	degC	Not specified
Storage temperature	[TBD]	[TBD]	[TBD]	degC	Not specified
Humidity	[TBD]	[TBD]	[TBD]	%RH	Not specified

5. Compliance

Item	Status	Notes
EMC / radio certification	[TBD]	No certification is claimed on the published page
Safety certification	[TBD]	No certification claimed
RoHS / REACH	[TBD]	Not stated

6. Open items before this specification can be issued

- Define the DAQ-only variant (no RF front end) or mark it out of scope: it is a future product variant with no settled configuration.
- State the RF front end of the current configuration: band-switching architecture, control interface, gain and noise figure, and connector family.
- Resolve the sample-rate discrepancy (40 MSPS published vs 10 MSPS per I/Q component on record) and pin a single authoritative figure with its mode and conditions.
- State ADC resolution, analog front-end ranges and coupling, and measured dynamic-range figures with test conditions.
- State the digital back end: FPGA part, buffering, sustained throughput, output format.
- State mechanical and environmental limits, or explicitly declare them out of scope for this document.
- Define the host SDK surface and the supported operating systems.