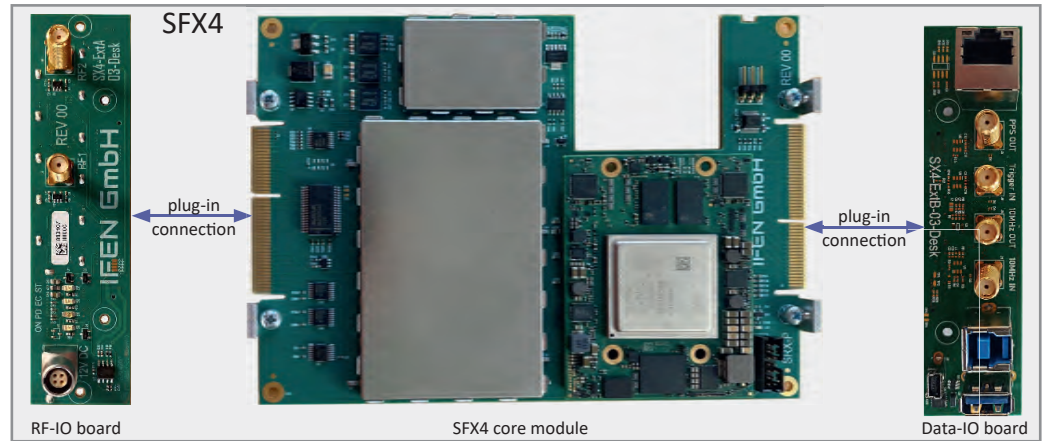# SFX4

GNSS SDR Receiver Platform

2024

SFX4 Modular Platform Concept

The SFX4 ia a highly modular SDR GNSS receiver platform, designed for high performance, scalability and flexibility, enabling application driven designs. The high performance SFX4 core module hosts the signal conditioning & processing, but also the different PVT processing solutions. The RF Flex-IO and Data Flex-IO boards can be easily customized to fit different application needs.

SFX4

plug-in connection

plug-in connection

RF-IO board · · · · · · · · · · SFX4 core module · · · · · · · · · · Data-IO board

Specification

Flexible RF-IO Board	SFX4 Core Module	Flexible Data-IO Board
Baseline board • 2 x sma RF inputs • Active antenna support: 5V/150 mA • 1st LNA per chain for low receiver noise figure • 12 VDC power supply interface • Rear-side: connector to SFX4 core module	**Signal processing board** • 4 RF chains simultaneously with 50 MHz RF bandwidth each • 1.1 to 2.5 GHz (all L- and S-band) frequency support • 11-bit ADC with custom ceramic RF-filter • Plug-in MPSoC (FPGA & ARM) for scalable processing power • Connectors to RF-IO and Data-IO boards	**Baseline board** • 1 x 1 GB Ethernet • 2 x USB 3.0, 1 x RS-232 • 10-MHz in, 10-MHz out • 1-pps-out, trigger-in • Rear-side: connector to SFX4 core module
RF-IO options • Other RF connector types: TNC, N-type • 1, 2 or 4 RF-in connectors • Up to 8 RF-in connectors (beamforming, by combining two SFX4 boards)	**GNSS signal options** • Galileo E1, E5ab (AltBOC), E6 (HAS SL1) • GPS L1-CA & L1C, L2C & L2P, L5 • BeiDou B1I & B1C, B2I & B2a • GLONASS L1, L2 • NavIC L5, S • QZSS L1, L2, L5 • SBAS L1 (and L5 tracking only)	**Communication options** • Additional Ethernet ports • SFP+ or QSPF+ ports • CAN bus • USB 2.0
Signal routing options • Configurable signal splitters • Configurable signal combiners • Routing of single or dual antenna inputs to different SX4 RF-chains	**Acquisition and tracking capability and configurability** • Standard Tong acquisition, but also fast acquisition unit (FAU) • From 60 (standard) up to 300 (next. gen. MPSoC) tracking channels • Full channel configurability (PLL/DLL order, loop bandwidth, integration time, multi-correlator, no. of complex correlators, BOC(m,n), chip rate,...) • Interference dectection and mitigation (notch filter and pulse blanking)	**Signaling options** • 10-MHz out • Trigger-in • Synchronisation lines to combine multiple SFX4 boards (e.g. for beamforming)
Signal amplifiers options • Optional dual-stage LNA (for low CN0) • By-passable LNA (for high CN0)	**Measurement performance** • Code accuracy: < 0.2 ... 20 cm (depending on CN0) • Carrier accuracy: < 1.5 mm • CN0 range from 20 dBHz up to 105 dBHz	**Wireless communication options** • WLAN & Bluetooth • LTE & 5G
Signal frequency conversion options • Custom signal down-converters (e.g. from Ka-band to L-band) • Custom signal up-converters (e.g. from L-band to Ka-band)	**PVT capabilities and performance** • PVT modes: WLSQ, SBAS, DGNSS, PPP (including HAS) • PVT update rate: 0.02 - 20 Hz (up to 100 Hz with IMU) • TTFF: 60 s(cold), 30 s(warm), 10 s(hot), 2 s (re-acquisition) typical • Operational limits: < 600 m/s velocity, < 18.000 m height	**Sensors options** • MEMS IMUs • Barometer • Magnetic field sensor • Temperature
Power options • ADC power supply option • 12 - 36 VDC power supply option	**Outputs at all levels** • IQ samples, IQ correlator values • Code and carrier measurements in IFEN binary & ASCII, RTCM, RINEX • PVT solution in IFEN binary & ASCII and NMEA format	**Clock options** • TCXO or OCXO clocks • CSAC • RTC clock (battery backed)

Applications

Test & Measurement (T&M)		CORS & RFI Monitoring (C&M)
• Galileo 2G Test User Receiver Non-PRS • Galileo 2G Legacy Payload Test Receiver • Galileo 1G In-Orbit Test	Application Use Cases	• Continuously Operating Reference Station • Multi-Antenna RFI Detection and Localization Receiver