SWIFT®-XTS

High Performance X- Band Transmitter and S-Band Transceiver

TETHERS UNLIMITED

Transformative Technologies for Space, Sea, Earth, & Air

SWIFT-XTS provides unprecedented communications agility and throughput performance for small satellite missions using the NEN, DSN, TDRS, US DoD, and commercial ground stations operating coherently in S- and X-bands.

Capabilities

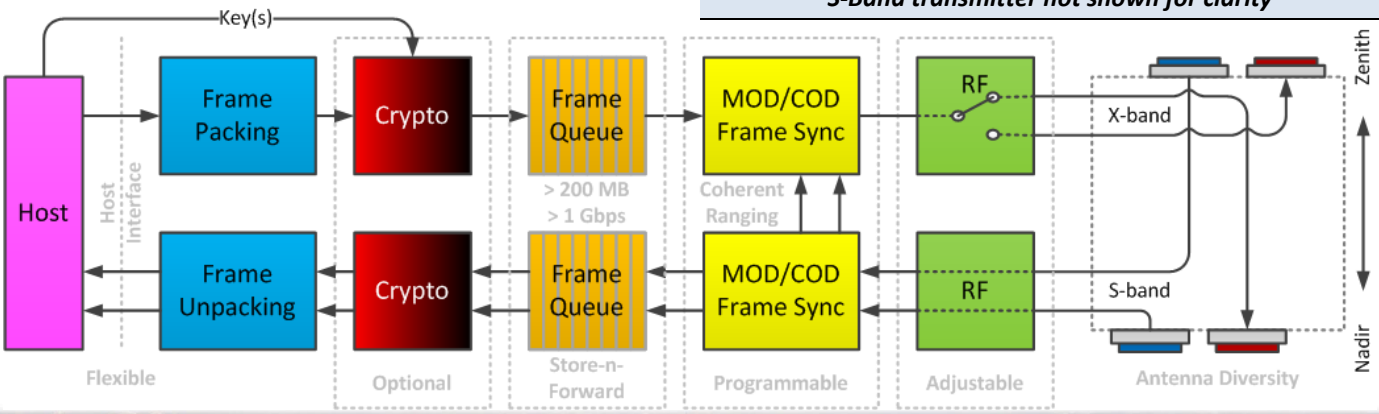
SWIFT-XTS provides small satellites with a high-performance X-band transmitter and S-band transceiver in a small form factor.

- >100 Mbps real X-band downlink rates and >10 Mbps real S-band downlinks
- >1 Mbps real S-band uplink rates on up to two independent, simultaneous channels
- >6 dB continuously adjustable X-band Tx power w/o losing efficiency
- MIMO antenna connectivity for attitude diversity and ADCS error recovery
- Runtime configurable link parameters
  - BPSK/[O]QPSK/8PSK (8PSK Tx Only)
  - LDPC/Reed-Solomon/Convolutional
  - Continuously adjustable symbol rates
- Integrated framing w/ deep store-and-forward buffers, automatic frame sizing and padding
- AES-256 crypto offload w/ multiple key indexing
- Flexible high-speed digital interface options, including separate command and data ports:
  - RS-422: Async or sync. up to 50 Mbps each
  - SpaceWire: dual up 100 Mbps each
  - Ethernet: 10/100/1000 Mbit via integrated PHY and magnetics
  - GPIO: discrete on/off, receive interrupts

Specifications

	X-band Tx	S-Band Rx (x2)
Power/Sensitivity	1-7W RF Output	0.75 dB NF typ.
Gain Control Range	-30 to +6 dB	>90 dB AGC
Dynamic Range	>60 dBc Harmonic Suppression	>66 dBc SFDR
Bandwidth	>70 MHz	7 MHz/ea typ.
Frequency	7000-8500 MHz	1500-2500 MHz
Input Power	2.5W base input power	
	+24-42W	1x Rx: +3.0W 2x Rx: +4.5W
Shock/Vibe	Pre-qualified to NASA GEVS levels	
Temperature	Pre-qualified to -45 to +60°C	

S-Band transmitter not shown for clarity



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SWIFT®-LINK

Packet-to-RF abstraction for SWIFT software-defined radios

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SWIFT-LINK is the link-layer software architecture built into every SWIFT-SDR enabling abstract and frequency-agnostic multi-network, multi-channel, full-duplex communications support using a variety of host interface protocols.

Network Compatibility

The flexibility of the SWIFT-LINK and SWIFT-SDR architecture enables support across a broad spectrum of existing networks and protocols:

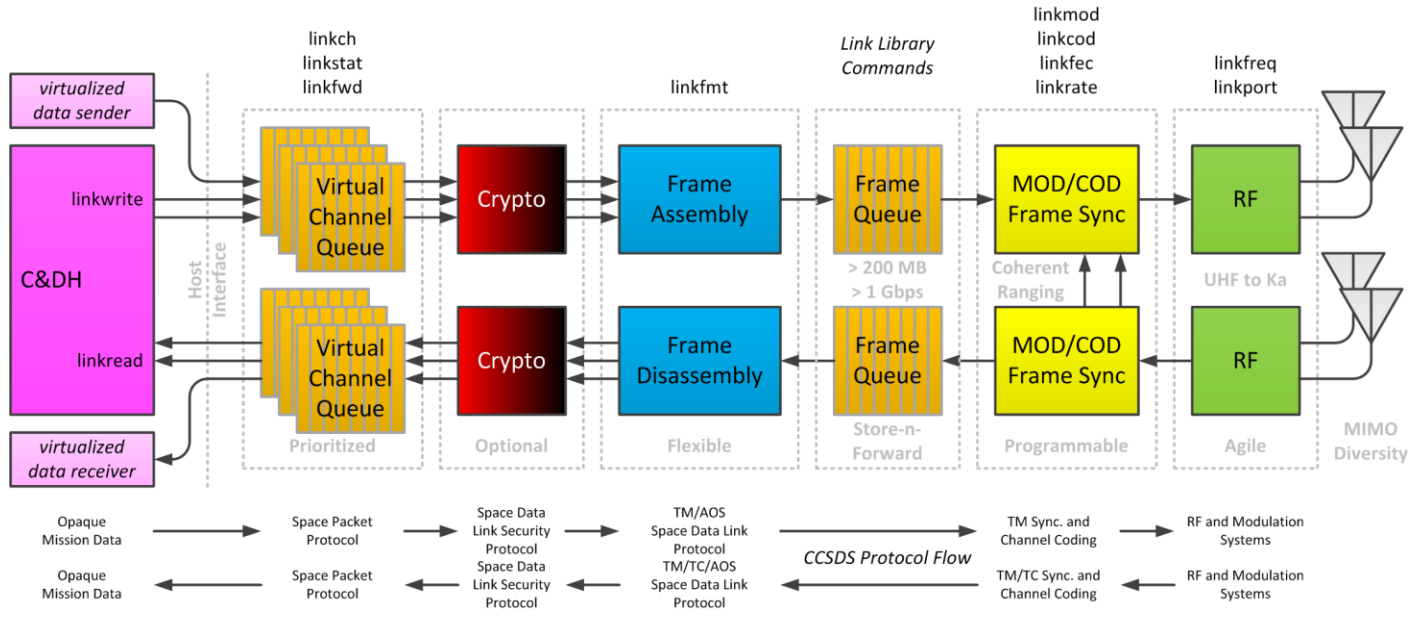
- NEN/DSN: CCSDS TC/TM, Raw bit-sync
- USN: SGLS, CCSDS
- AFSCN: SGLS, USB
- SpaceFlight Networks
- Custom/commercial/private
- Frequency coverage from UHF to Ka-band

Spacecraft Interfaces

Host interface flexibility enables packet data and commands to be layered on top of a wide variety of industry-standard, cross-strap capable interfaces:

Physical Standards	Protocols (Max. Typical Speed)
• RS-232/422/485 • LVDS • 3.3V CMOS/TTL • UART/SPI/I²C • 10/100 Ethernet (via breakout)	• Sync. Clock+Data (200 Mbps) • Dual SpaceWire (100 Mbps) • Dual UART (10 Mbps) • Sync./Async. HDLC Framing • UDP/TCP/IP (via Ethernet) • GPIO for Rx IRQ/Tx Enable

Don't see what you're looking for? Ask us! A SWIFT-SDR can be customized to meet your RF communications requirement.



Link Layer Feature Support Matrix

Encryption	FEC	Modulation	Misc. Support	Framing
AES-{128,192,256} ECB/CBC/CFB/CTR/GCM Multiple keys and key-gen Per virtual channel	Reed-Solomon w/ interleaving Convolutional w/ puncturing Soft-Viterbi BCH, CRC Turbo/LDPC[1]	Rx/Tx: BPSK/QPSK Tx: 8PSK/16APSK/32APSK OQPSK, GMSK PM, CPM SGLS-Ternary Spread-spectrum	Idle/pilot insertion Randomization Bit-diff., Bi-Phase NRZ-L/M/S Coherent tone ranging PN ranging	Raw, bit-sync HDLC CCSDS-TM/TC/AOS Prox-1 Space Packet Space Security

[1]Transmitter Turbo/LDCP code support is in development, receiver decoding not currently supported.

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