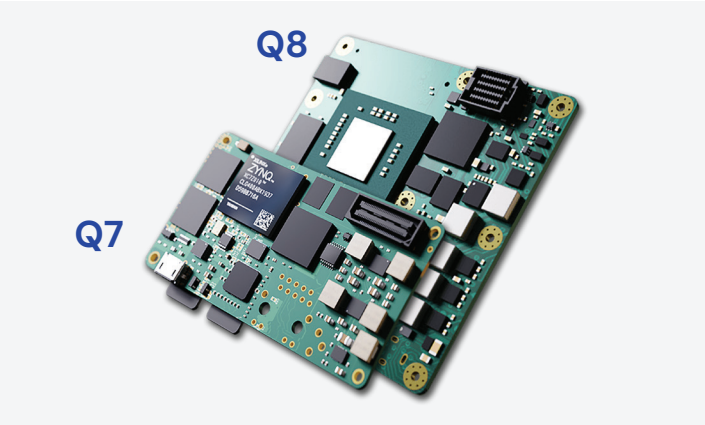
XIPHOS

XIPHOS OVERVIEW

Almost all functions in a spacecraft need a brain to control them, and often multiple. We've been focused on space processing for more than 20 years, and have seen enormous changes over the several hundred systems that we have successfully supplied for missions. Even before 'new space' was new, we were designing low size, weight and power processing solutions for commercial, scientific and military use. Over that period, we have learned over 8 generations of products about how to maximize reliability and radiation tolerance, while steadily increasing processing capability while reducing power consumption, size and cost. Because we've been through the pain, you don't have to. We specialize in very small cards - but don't let the size fool you, these are some of the latest and most powerful processors available.



The table below and the product photos on the next page are only a flavor - contact us or visit our website for more details, particularly for all of the processing features on these powerful platforms.

Market	Applications	Almost all platforms that go in space, including rovers, satellites, launch vehicles, landers and deep space probes. On those, the functions range from processing for images, video, software defined radios (SDRs) synthetic aperture radar (SAR), hyper-spectral imaging, networking and buses, robotic control, SIGINT, comms, guidance, navigation and control (GNC) and many others. On larger platforms there might be a dozen processor boards each dedicated to a particular subsystem or payload function, whereas on cubesats, one processor card might support all needs. Our cards are so small and powerful, they've even been fitted inside robotic arms.
	Trends	Vastly improved sensors tiny enough to squeeze into the smallest platforms produce more high speed data than can ever be sent to earth. This is being solved through more pre-processing on-orbit as well as temporary storage of raw data. The latest 60nm silicon technology allows Multi-Processor System on Chip (MPSoC) platforms like ours to be low power but immensely powerful and mission-upgradeable after launch.
	Challenges	Size, weight power, cost, radiation, reliability - the usual suspects. However, to these can be added recency and timescales - highly qualified and traceable space processor systems tend to be several generations behind terrestrial equivalents and take years to qualify while project schedules are getting tighter and the necessary compute loads steadily bigger.
Solutions	Heritage	Over 20 years, with deployments on just about every kind of mission.
	Products	Currently two families which each center around a different MPSoC - the Q7s use a Xilinx Zynq with dual cores and a very large FPGA space for real-time processing. The Q8s use the larger Xilinx Zynq UltraScale+ with 7 cores including 4 general purpose, 2 real-time and a GPU core and huge FPGA space. Both come in several variants, but are supported by standard and custom daughter cards, some of which include enhanced high speed IOs such as LVDS, SpaceWire, and Gigabit Ethernet as well as Software Defined Radios, Attitude Control Systems (ACS), solid state storage and many others.
	Reliability	We've perfected a fault-tolerant architecture which includes triple-mode redundancy in our control FPGA, EDAC-protected RAM, upset and multi-current monitoring, multiple methods of over-current protection, FPGA bit stream scrubbing and software robustness/ watchdogs. It supports a track record we're proud of.
	Competitors	Usually suppliers of complete subsystems, or customers who try to design their own. Complete subsystems are usually much larger, heavier, costlier and more complex than our solutions and you're stuck with the interface, bus and backplane choices they've made for you. Home-designed approaches don't benefit from the 8 generations of learning we've accumulated, or the schedule time, cost, labor and heartache saved using our off-the-shelf solutions.
	Customers	Commercial, scientific, military. Organizations that we can talk about include NASA, ESA, MDA, GHGSAT, ASTROBOTIC, EarthDaily Analytics, CSA, JAXA, Surrey Satellite, ABB, Honeywell and many others.

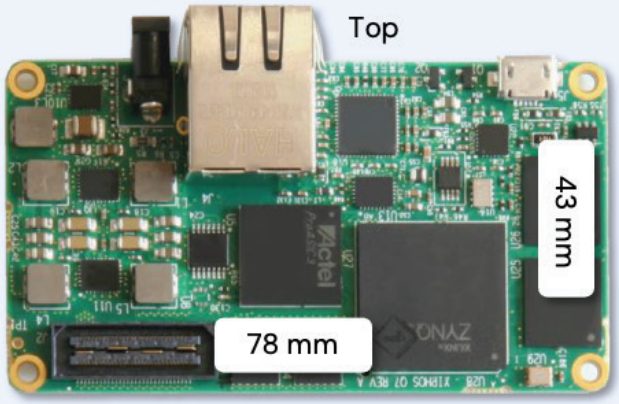
Approximate Size Comparison

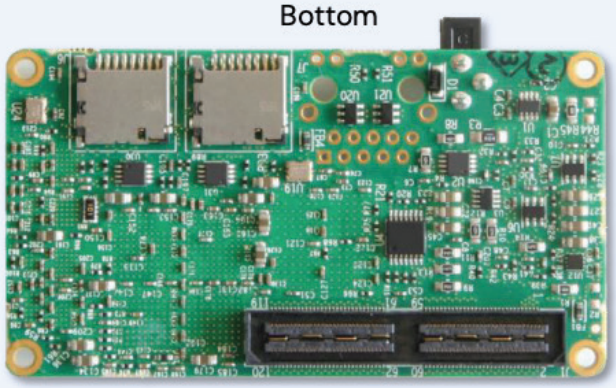
Brief Summary

	Q7 Family	Q8 Family
Size (mm)	78 x 43 x 19/ 9*	80 x 80 x 22.6/ 11*
Power (typ.)	2W	5W
Mass (g)	32/ 24*	64/ 56*
Cores	2	7
Temperature	-40 to +60 °C	
Specs	Datasheet	Datasheet

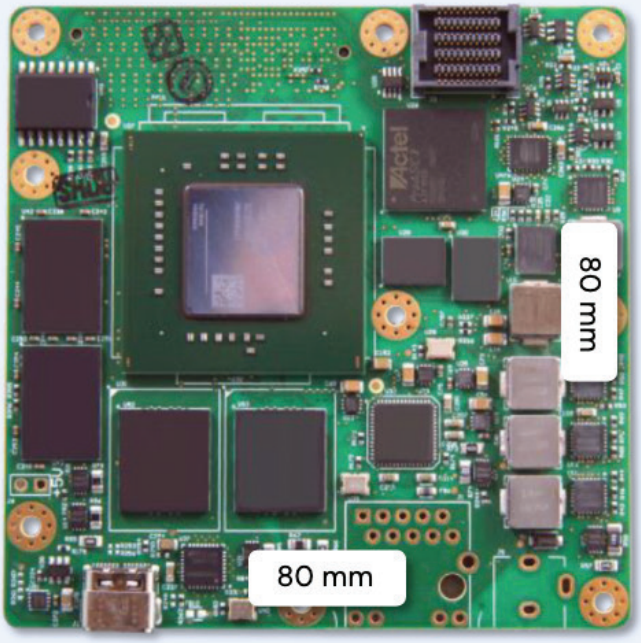
(* Without connectors)

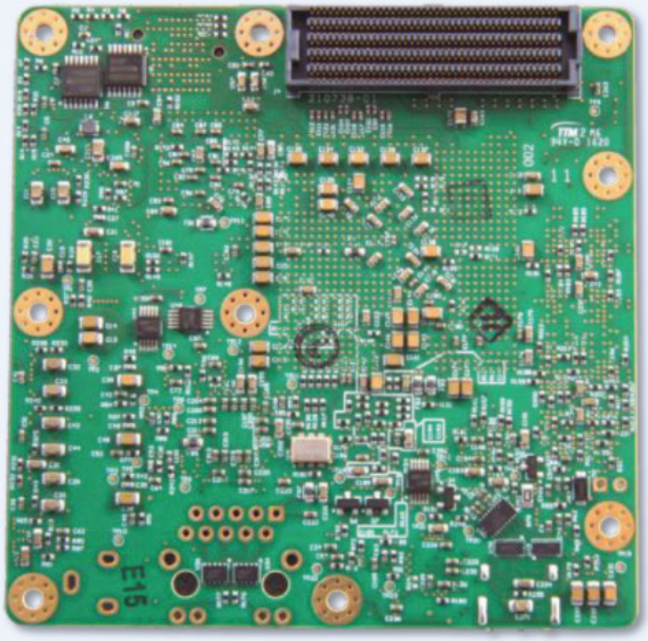
Q7





Q8





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