NEWS RELEASE

General Micro Systems (GMS) Creates Multi-Function Rugged, Daisy-Chained, High-Definition Thunderbolt 4 Portable Rugged Displays with Touch, NVIS, Storage and PCI Express I/O

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Using Thunderbolt™ 4 technology from Apple® and Intel®, GMS re-invents the rugged display

WASHINGTON--(BUSINESS WIRE)-- AUSA 2023 —**General Micro Systems** (GMS) this week will show off innovation that re-invents the rugged display using open-standard Thunderbolt™ 4 technology. The X9 Spider Rugged Thunderbolt Display, the market's lightest 1-inch thin, mobile-ready multi-function touchscreen display, is available today in 12-, 17-, 24- or 36-inch sizes, in standard and high-definition resolution. Using Thunderbolt 4 technology developed by Apple® and Intel® allows the display to be connected by an exceptionally thin single copper or fiber optic cable up to 50m, which also powers the display and all its features. The display can be daisy-chained to expand to multiple independent displays, while acting as a plug-in peripheral appliance for the main host computer by adding COTS M.2 add-in I/O like software-defined radio (SDR) or GPS, or a removable SSD storage drive.

The X9 Spider Rugged Thunderbolt Display enables military and commercial system designers to rethink the display as more than just an output device. For the 12- and 17-inch versions, displays can function as "manpack" portable tablets, usable by dismounted soldiers/Marines or first responders. GMS patent-pending LightBolt™ cables using Thunderbolt 4 technology provide incredible freedom to use the display separately but distantly tethered to the host computer, which may be in a Molle manpack or on a vehicle at-the-halt. Mobile features include an optional wide-angle camera for F2F conferencing between front-line squads and the forward operating base (FOB), and versions with lightweight carbon fiber frames for easy hand holding. Carbon fiber provides superior and even cooling and is one-fifth (80 percent less) the weight of metal displays. Additionally, the X9 Spider Rugged

Thunderbolt Display costs around $10,000, less than one-third the price of competing displays.

When is a display more than just a visual output device?

"GMS' military-grade LCD technology gives us the lightest, brightest and most full-featured display anywhere in the market," said Ben Sharfi, CEO and chief architect, GMS. "But what makes our display truly innovative is how Thunderbolt 4 technology lets us daisy chain multiple displays together—each with their own video feed; add internal I/O like MIL-STD-1553; give the user a convenient 8TB removable drive right on the display itself; include a wide-angle camera for F2F interaction, and power the whole display with the same cable that feeds it video."

Never before incorporated into a rugged display, Thunderbolt also includes PCI Express, the "data bus" used internally in the host computer. This puts any I/O or storage device installed in the display's two M.2 sites right on the bus as if they were in the host computer. Placing them in the display eases wiring, allows convenient cable disassembly for plug-in peripherals like audio headsets and push-to-talk, and brings radio electronics to the forefront and away from possible EMI sources while allowing antennas to be conveniently mounted right on the display. Having a local storage drive in the display simplifies the user interface by allowing mission profile changes, data removal and system declassification using a removable M.2 2280 storage drive.

For comparison, competing smart displays without Thunderbolt connectivity rely on networks, such as 1 Gigabit/s Ethernet over copper cable. Thunderbolt technology is 40 Gigabits/s—40 times faster—and has no network overhead. With a thinner copper or fiber optic cable, data between the display and the host is 40 times faster with lower latency. The cable is also lighter—a tremendous weight savings on long runs in aircraft or ships.

The X9 Rugged Thunderbolt Display also reduces cabling and wiring with up to 100W of power sent to the display using the same data cable, eliminating a separate power source and cable. The GMS patent-pending LightBolt cable even provides power over a fiber optic cable, up to 50m. Other features include resistive touch screen compatible with gloves, resolutions from standard to high definition, each supported with GMS's "boot kick" glass, anti-reflective/anti-glare coatings, water resistant coating, and NVIS night vision support with special GMS backlight controls. A GMS-customizable 10-button keypad allows program-specific functions.

"Beyond all of the incredible specs built into these displays, there are really only a few key takeaways," Sharfi said. "First, Thunderbolt gives us never-before-imagined capabilities in rugged displays—and we are using these to the fullest. Two, this display allows designers to rethink their system architecture where the display does so much more. And last: only GMS has this—we continue to look at the best COTS technology and will always bring it to the battlefield first."

The display integrates flawlessly with the rest of the GMS X9 Spider family of rugged, open distributed computing architecture (DCA) small form factor systems designed to reduce the development barriers to rugged high-

performance computing, high-definition video, sensor processing, AI, battlefield edge processing, storage, display and intelligent I/O.

Much more than an average ruggedized panel

Beyond the exceptional ruggedization with MIL-SPEC features—the hallmarks of all GMS displays—the X9 Spider Rugged Thunderbolt Display brings unparalleled value to systems with:

- Multiple displays can be daisy-chained from a single cable
- Portable hand-held (12-, 17-inch) or panel mount
- 1-inch thick, with carbon fiber option for up to 80% weight savings
- Lower price point compared with smart displays: up to 60% less
- High-definition options, with dual-mode backlights for daylight readability and superior low-light NVIS viewing
- Variety of filters and coatings for all environments: sunlight anti-glare to rain-shedding
- Resistive touchscreen, with PCAP option
- Add-in Thunderbolt 4 I/O on M.2 modules
- Removable M.2 NVMe SSD up to 8TB
- USB 3.2 ports, plus audio and push-to-talk feature
- Single-cable video, data and power, copper or fiber
- Built-in wide angle, ultra-low light camera for F2F video
- GMS-customizable keypad for user-defined capabilities
- A fully EMI-shielded resistive touchscreen for glove and/or stylus operation
- Ultra-rugged “boot kick” glass for a virtually unbreakable screen
- GMS SecureDNA™ cyber security sanitize, including host’s BIOS and storage

The display supports mounting options ranging from VESA and panel/surface, to portable/handheld, including full customization options to meet any need. Plus, the lightweight 12-inch display version expands capabilities to suit dismounted soldier/marine operations. Carbon fiber is lighter than metals, like aluminum. In the X9 Display, it can also save up to 80% of the weight while providing superior cooling by spreading the heat across the microscopic carbon strands.

The dual Thunderbolt 4 ports support daisy chains of up to 4 displays such as three 4K 60Hz monitors, two 4K 120Hz monitors, or four HD 1080p monitors. By connecting to an X9 Spider Mission Computer, Thunderbolt 4 provides power plus 40 Gbps of data, including PCIe Gen 3, DisplayPort video, 10 Gbps Thunderbolt networking and USB. The display may be powered directly from the host up to 50 meters away or powered with external +20 VDC power via a Smart Power™ (patent pending) connector for safe, ultra-low EMI and IP67 waterproof operation. An optional MIL-STD-1275 power supply is available, with optional 50ms hold-up.

The built-in, removable M.2 2280 storage drive is suitable for mission planning, tactical maps, data recorder applications, and the declassification of the entire X9 distributed computing architecture (DCA) system, including the host. Add-in I/O on a separate M.2 3042 module brings local functions such as Wi-Fi, Bluetooth, GPS and APNT. I/O connectors (such as for antennas) can be accommodated into the display chassis.

Displays built for harsh, high-performance environments

All X9 rugged display products support optional display coatings to maximize the screen readability and clarity in wet, bright or multi-light source environments. Coatings include anti-reflective (AR), anti-glare (AG), polarizer and water-rejection options. The X9 Spider Rugged Thunderbolt Display optionally supports Night Vision Imaging System (NVIS) MIL-STD-3009 to reduce eye strain in applications where night vision glasses are used. GMS has created dual backlight arrays, one for ultra brightness, and a second for superior NVIS stealth. A unique “COV” (Cover) button instantly lowers the LCD and keys backlights to a pre-programmed, ultra-low level for surveillance environments.

About General Micro Systems:
Over 45 years, General Micro Systems (GMS) has built a reputation as the industry expert in highest-density, modular, compute-intensive, and rugged small form-factor embedded computing systems, servers and switches. These powerful systems, all built in America, are ideal for demanding C5ISR defense, aerospace, medical, industrial, and energy exploration applications. GMS is an IEC, ISO, AS9100, NIST-800-171, and MIL-SPEC supplier with infrastructure and operations for long-life, spec-controlled, and configuration-managed programs. For more information, visit **www.gms4sbc.com**.

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