



WIDE - BAND

MICRO-MINIATURE TRI-AXIAL ACCELEROMETER UNIT

WB MicroTAU™

INVOCON, INC.

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The High-Speed Wireless Tri-Axial Accelerometer



The Wide-Band Microminiature Tri-Axial Accelerometer Unit (WB MicroTAU) system is a wireless, high-speed data acquisition network for dynamic acceleration sensing and recording applications. The system includes WB MicroTAU Remote Units, a WB MicroTAU Receiver Unit, and the Graphical User Interface (GUI).

The **WB MicroTAU Remote Unit** (pictured at left) is a small, battery-powered, autonomous, wireless device designed for trigger initiated acquisition and recording of high-speed acceleration data. The units acquire data from three external accelerometers, and each unit can be programmed for a triggered acquisition event. The user selects the trigger threshold and axis, and places the units in a low-power consumption, *sleep*, mode until a specified time. Then, the WB MicroTAU Remote Unit will enter into a circular buffered data trigger mode sampling all three channels at 20KHz. Once the trigger threshold has been passed, the unit will break out of the circular buffer and continue acquisition and storage for ten minutes of acquisition from all three channels. Finally, the unit will re-enter the low power consumption mode to wait for a data download command from the user. If the detection sequence passes a programmable time-out without a trigger, up to three additional detection sequences may be initiated at later specified times.

Download and event setup commands are issued either wirelessly or through a standard USB connection from the **WB MicroTAU GUI** running on a PC. The wireless connection is through a **WB MicroTAU Receiver Unit** that connects to the PC via a standard RS-232 serial port.

The WB MicroTAU system was designed for NASA to monitor the dynamic behavior between the SSME (Space Shuttle Main Engine) feedlines and the SSME low-pressure turbo-pump that produced the cracks that temporarily grounded the Shuttle fleet in the summer of 2002. The WB MicroTAU is intended to acquire tri-axial accelerometer data on and around the SSME LH₂ and LO₂ feedlines and their supporting brackets. STS-114 is scheduled to be the first flight of WB MicroTAU hardware in early 2003.

Other applications where the triggered initiation capability may be appropriate are aircraft, engines, gearboxes, industrial equipment, and other components that experience random vibration events.

Specifications

DATA ACQUISITION RATE	20KHz.
SENSORS	3 external accelerometers. ±100g range and less than 30 milli-g resolution. 16-bit Analog-to-Digital Conversion. 1 external RTD temperature sensor.
INTERNAL TEMPERATURE	10-bit A/D with quarter degree C resolution—Sample Rate 1Hz.
POWER	Battery powered, 3.0-4.0V input range.
OPERATING TEMPERATURE RANGE	-40°C to +85°C (Reduce battery life by 50% when continuous operation at -35°C.)
BATTERY LIFE	Over 50 cumulative hours of active data acquisition or trigger mode.
MEMORY	For every acquisition, 10 minutes of data from each channel is stored in non-volatile memory.
PACKAGING	Snap enclosure (pictured) with replaceable internal battery—6.9 cm x 5.3 cm x 3.3 cm. Ruggedized housing in current development.

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System specifications subject to change without notice.

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