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Industrial PC provides mobile I/O processing for heavy equipment

Logging is one of the most dangerous occupations and increasing safety is a continuous struggle. However, Acromag's I/O Server Industrial PC is working hard to protect loggers and their expensive equipment in an extremely challenging environment.

The I/O Server is mounted externally to a lumber harvester in an enclosure that is subjected to extended summer and winter temperatures. A variety of sensors are connected to the I/O Server which processes the data to ensure safe operation. USB ports support WiFi and GPS devices that enable a supervisor to remotely monitor and update the industrial PC's data from a laptop and track the vehicle's location. Power is sourced from the vehicle's 24V utility supply.

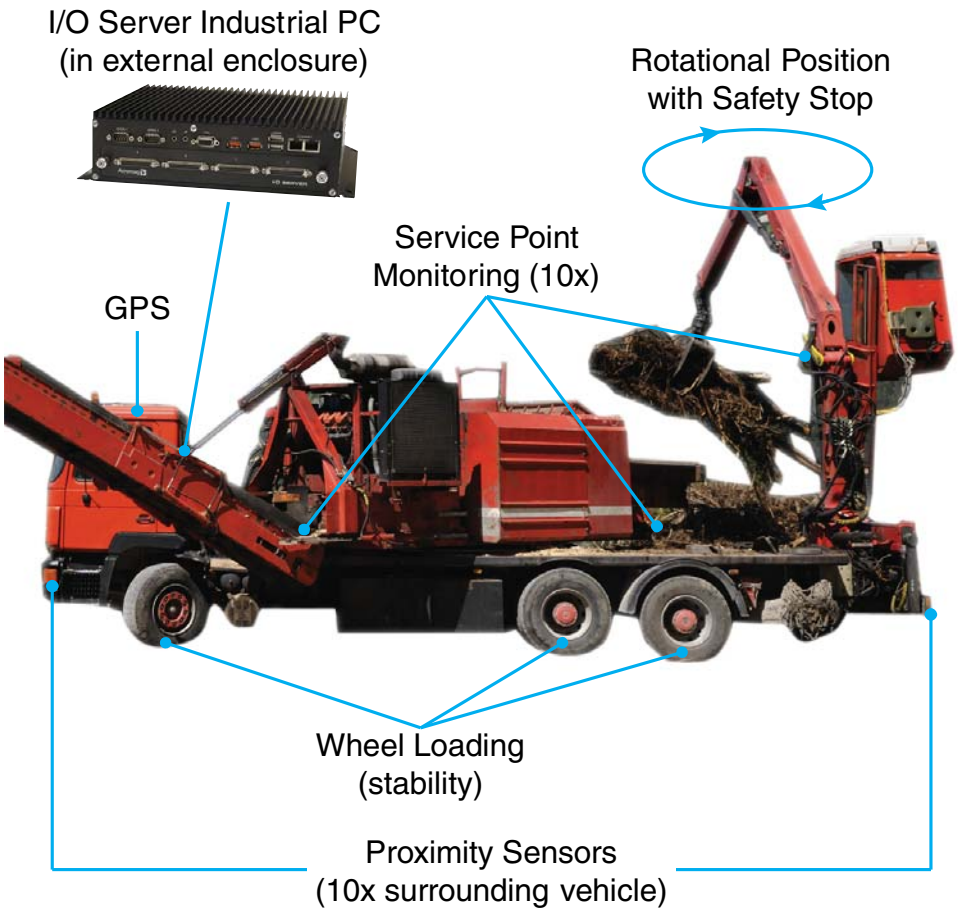
Inside the I/O Server, three I/O modules collect data from numerous proximity sensors, quadrature position sensors, and strain gage sensors. If unsafe conditions exist, movement is restricted and alerts are sent to the vehicle operator.

An IOS-440 digital input module monitors ten ultrasound proximity sensors that are tuned to a fixed distance from the heavy equipment. These sensors surround the vehicle to detect external workers and other obstacles. A remote supervisor laptop can use WiFi communication to download data and upload field boundaries periodically.

To monitor the harvester's two booms, an IOS-484 counter/timer module reads data from the position sensors and applies quadrature decoding. In a forest, the booms have a dynamically changing range of motion and it is important to know when an obstacle is encountered. Using the I/O module's countdown timer, the I/O Server checks if a boom is rotated but the stop position is not reached in a preset time limit. The rotation is stopped and an error message is sent to the operator console.

Wheel-weight strain gage sensors are used to detect if a tip-over condition exists. The sensor outputs are coupled to an IOS-330 A/D converter module to measure individual wheel weight, calculate the vehicle center of gravity, and warn if the tip-over threshold is approached.

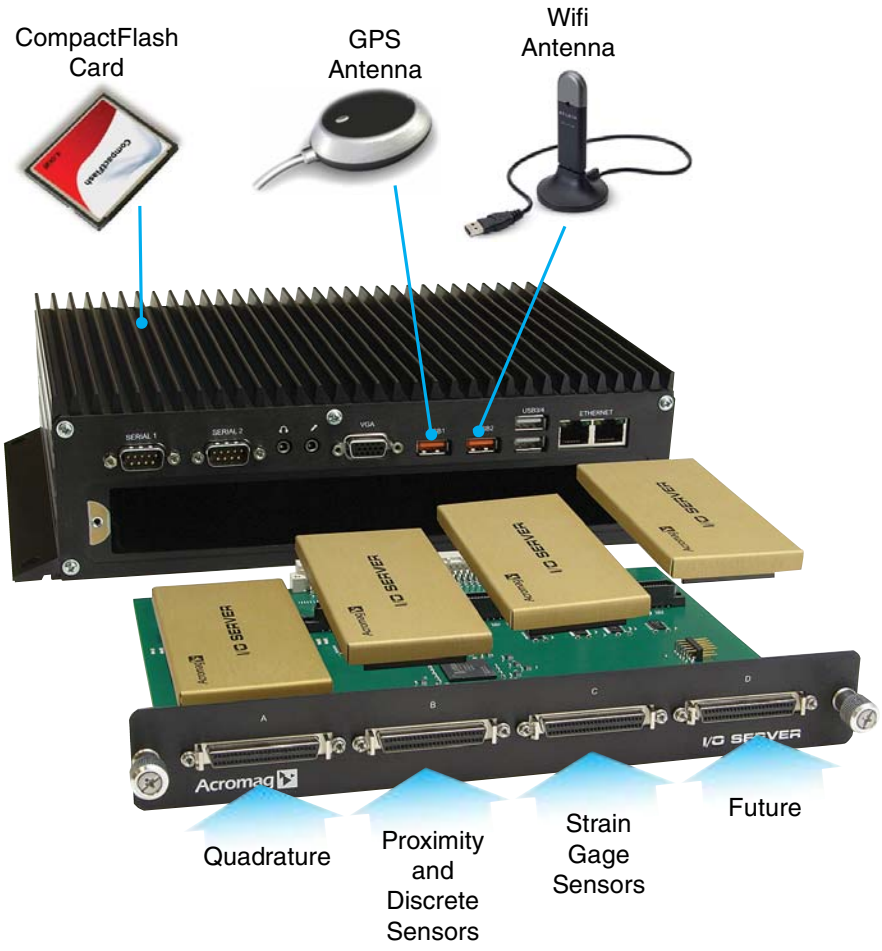
Wheeled Forestry Harvester Application



Commercial WiFi dongles and GPS antennae/receivers are used to keep system costs down and to take advantage of the manufacturer-provided software drivers. Two high-retention USB ports help keep the devices securely in place.

I/O Server Configuration

I/O Port	Description
USB 1	GPS (field location)
USB 2	Wifi (data download)
IOS-482	Quadrature (log handler boom position x 2)
IOS-440	Proximity and discrete sensors (safety and system check x 20)
IOS-330	Strain gage sensors (wheel loading)
CompactFlash	Windows Embedded Operating System



Acromag's I/O Server provides an ideal solution for this heavy equipment monitoring and control application. By combining an industrial PC with integrated I/O modules, the I/O Server is compact, rugged and highly flexible. The modular I/O enable users to easily mix and match functions to meet their signal processing needs and quickly adapt to changing requirements. Advanced thermal management techniques ensure reliable operation across a wide temperature spectrum. Shock and vibration resistance withstands the constant pounding as the vehicle moves across the rocky terrain. Most importantly, the fanless design has no moving parts and prevents debris from entering the unit to provide the long-term dependability so critical for such a remote operation.