# TRIO™

VIBRATION DATA COLLECTOR | MACHINE INSPECTION | PERFORMANCE DATA LOGGER

AZIMA DLI

Azima DLI's proven methodology and diagnostic automation offers the user many new benefits.

# TRIO™

**CX7**
DIAGNOSTIC DATA COLLECTOR / ANALYZER

**CA6**
VIBRATION DATA COLLECTOR / ANALYZER

## Finally, your ideas become reality.

**TRIO™** has arrived and is demonstrating that there is a better way to implement machine condition monitoring. TRIO is more than a vibration data collector; it is a powerful computerized system in a mobile industrial package that sets aside the traditional data collection model and brings forth a new focus on ergonomics, efficiency and safety. TRIO will improve the effectiveness of your condition monitoring program and will allow you to get more done in less time with a high degree of success while lowering the overall cost of your program.

TRIO is unique in its capabilities and modular approach to vibration data instrumentation. TRIO uses a robust Bluetooth® connection to integrate its rugged Windows® 7 user interface from its small, independent four-channel data acquisition device. Combined with Azima DLI's proven methodology and diagnostic automation, TRIO offers the user many new benefits.

**TRIO CX7 tablet, data processor and triaxial vibration sensor**

## Powerful User Interface

The TRIO™ line of data acquisition products include the most powerful, Windows 7 Ultimate, industrial tablet computers. It includes a solid state hard drive, bright sunlight readable touch screen and Wi-Fi access allowing TRIO to communicate with your desktop or networked PCs and servers.

TRIO's user interface not only provides you more capability and ease of use, but allows you to bring your other Windows PdM and Office productivity applications into the field.

## Lower Cost and Flexibility of Ownership

TRIO™ recognizes that computer technology is rapidly changing. Its distributed system configuration allows the tablet PC component* to be replaced or upgraded for a small fraction of the cost of replacing a traditional vibration data collector. TRIO's Embedded ALERT™ operating software is updated regularly allowing new features to be implemented by downloading the most current software from Azima DLI via the Internet.

*Minimum Windows 7 OS with integrated Bluetooth v.2.0 + EDR Compliant Personal Area Networking (PAN) is required.
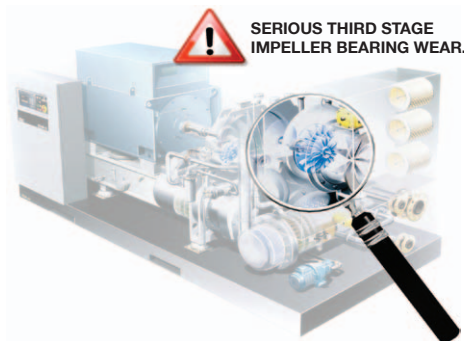
## Safer around Dangerous Machines

There is no safer vibration data collector on the market. Azima DLI has decades of experience providing predictive maintenance services to the industy. We understand that climbing around running machines is dangerous and know that risk to safety increases when managing sensors and cables while operating your vibration data collector. In response, TRIO applies wireless and voice recognition technology allowing users to collect data from safe distances up to 30' from dangerous machine locations.  In addition, TRIO's break-away utility belt configuration and voice activated data collection allows total HANDS FREE operation.

## Collection Automation

TRIO's vibration data collection automation is proven to be more efficient when compared to competitive collectors. TRIO automatically queues multiple frequency ranges of FFT, time, overall and demodulated vibration tests for a single machine location and collects X, Y and Z axis data simultaneously with a single command. You will collect more quality data in less time with TRIO.

## Automated Diagnostics

**SERIOUS THIRD STAGE IMPELLER BEARING WEAR.**

TRIO CX7 utilizes Azima DLI's proven automated machine diagnostic technology that has been deployed in commercial industry and by the military for decades. For mature machine databases, the automated diagnostic accuracy exceeds that of a vibration engineer with 2-4 years of experience and can fully analyze a machine in mere seconds, allowing you to get the answers on the plant floor in near real time.
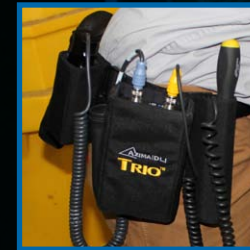
## Easy Remote Access to TRIO™ from your PC

Bring TRIO back to your office and connect to it via Ethernet or Wi-Fi and launch Windows Remote Desktop Connection, allowing you to access its Desktop from your PC, using your full keyboard, mouse and large monitor.

# Variety of Configurations

TRIO™ has a variety of configuration options. Depending on your specific use model, you can wear it, carry it or sling it over your shoulder.

| Utility Belt | Shoulder Soft Case | Hard Case | Casual Fit |

TRIO's break-away utility belt configuration and voice activated data collection allows total HANDS FREE operation.

## Unmatched Capability

TRIO™'s very capable tablet PC and Windows 7 operating system allows you to install your own Windows-based predictive maintenance or office applications. To collect visual information in the field, the TRIO features a built-in 2-megapixel camera with LED light. You can also extend your work capacity with an array of connectivity opportunities including Wi-Fi, waterproof USB 2.0 and RS232 ports, plus LAN ports.

## Your Complete Machine Database is Onboard

Azima DLI's proven replication combined with TRIO's large solid state hard drive provides an exact replica of your plant's condition monitoring SQL database while in the mobile environment. When your work is completed and you are reconnected to the network, TRIO will update all the databases associated with it, whether on your PC, your network servers or even to the "cloud" on the WATCHMAN Reliability Portal data centers.

## The TRIO Family

**TRIO CX7** – DIAGNOSTIC DATA COLLECTOR / ANALYZER
The CX7 is our most powerful TRIO vibration data collector / analyzer built on a rugged industrial tablet PC, 7" wide format screen, Windows 7 Ultimate, embedded ExpertALERT, automated machine diagnostics and data acquisition hardware. No host system is required.

**TRIO CA6** – VIBRATION DATA COLLECTOR / ANALYZER
The CA6 is our mid-range vibration data collector/analyzer that integrates with Azima DLI's ExpertALERT or StandardALERT software. It is built on a rugged industrial tablet PC, 7" wide format screen, Windows 7 Ultimate and includes advanced vibration analysis capabilities.

### 2011 TRIO MODELS

|  | CX7 | CA6 |
|---|---|---|
| Triaxial Sensor | ✓ | ✓ |
| Route-based Data Collection | ✓ | ✓ |
| Analysis Software | ✓ | ✓ |
| Automated Diagnostic System | ✓ |  |
| Machine and Route Setup | ✓ |  |
| Operating System | Windows 7 Ultimate | Windows 7 Ultimate |
| Host System | Integral | ExpertALERT or StandardALERT |
| WATCHMAN Reliability Portal™ compatibility | ✓ | ✓ |
| Troubleshooting / Advanced Analysis Software | Option | Option |
| In-place Machine Balancing | Option | Option |
| Handheld Laser Tachometer | Option | Option |

### ACCESSORIES INCLUDED

- Triaxial Accelerometer w/ 6' coiled cable
- Ball driver
- TRIO™ Casual Fit Carrying Option (Utility Belt, DP-1 holster, Triaxial sensor holster, Controller shoulder strap)
- Controller shoulder strap
- Transit Case
- 4 GB USB thumb drive
- USB communications & power cable
- Battery chargers (handheld controller and data processing units)

### OPTIONAL ACCESSORIES

- Handheld laser tachometer
- TRIO Shoulder-worn Soft Case
- TRIO Belt Components
  – Controller holster, Handheld tachometer holster, Tool pouch
- TRIO Hard Case
- 12V vehicle charger
- ALERT Real Time Analyzer (RTA) software
- Balance Kit – Includes ALERT Multiplane Balance software, laser tachometer and digital scale

- Database replication software
- Extended life Li-Polymer Battery Pack batteries (5200mAh x 2)
- Four-channel, male BNC adapter cable

## Specifications* (TRIO CX7/CA6)

### SYSTEM OVERVIEW
- Triaxial vibration data collector
- Industrial Windows® 7 Ultimate tablet PC controller
- Wireless, belt worn data acquisition unit (DP-1)
- Handheld laser tachometer
- Flexible carrying options including utility belt or shoulder-worn soft case
- CX7 includes embedded ExpertALERT™ (no host software required)
- CA-6 includes embedded ALERT™ onboard analysis software
  o Requires host system; ExpertALERT, StandardALERT™ or WATCHMAN Reliability Portal™
- Sybase 12 SQL database onboard allows full PdM database to be mobile on unit
- Database replication option allows multiple units and networked host systems to automatically receive data collected, share analysis and routes
- Battery life up to 12 hours (with optional extended use batteries)
- Ergonomic design allows more efficient and safer use than traditional data collectors
- 4 plane machine in-place balancing and advanced analysis software options available
- Remote operation using Windows Remote Desktop from networked PC

### USER INTERFACE / RUGGED TABLET PC CONTROLLER
**Physical**
- Size - 5.56" (144 mm) x 9.5" (242 mm) x 1.57" (40 mm)
- Weight - 1.1 kg (2.42 lb)

**Environment**
- Operating - 9.4 °F to 140 °F (-23 °C to 60 °C)
- Storage - -40 °F to 158 °F (-40 °C to 70 °C)
- Drop - 4ft Drop, Free to Concrete. 26 drops from 4 ft (1.22 m) MIL-STD-810G, Method 516.5, Procedure IV
- Vibration - MIL-STD-810G, Method 514.5 Procedures I & II
- Sealing - IP65, MIL-STD-810G

**Processor/Memory/Operating System**
- Intel Ultra Low Power Atom Z530 1.6 GHz processor (w/ US15W Chipset), 2 GB DDR2 RAM, 64 GB SSD solid state hard drive
- Microsoft Windows® 7 Ultimate operating system
- 7" widescreen 1024x600 resolution TFT LCD, MaxView™ sunlight readable resistive touchscreen display

**Battery**
- Hot-swappable Dual Li-Polymer Battery Pack, 2600 mAh each, support minimum 6 hours operation
- 5200 mAh extended capacity batteries are available

**Connections**
- 2 x USB 2.0 port (one fully waterproof, even when the latch is open)
- 1 x 9-pin serial RS-232 port (fully waterproof, even when the latch is open)
- 1x Ethernet LAN
- 1 x DC power port
- Docking Connector (Contact Pin Type)
- Audio Out
- 1 x Microphone

**Wireless Communication**
- Wireless LAN 802.11 b/g/n
- PAN - Integrated Bluetooth v.2.0 + EDR Compliant
- Integrated GPS Mediatek, WAAS/EGNOS capable

**Camera**
- 2 Megapixel Camera + LED light
- Video recording

### TRIO DATA ACQUISITION / PROCESSOR (DP-1)
**Inputs**
- 4 simultaneous sampled, fully phase matched, ICP programmable
- Other Coupling - AC (for proximity probe connection)
- AC Input Voltage Range - ±5V
- AC Bandwidth  0.5Hz to 40kHz
- DC Bias/Gap Measurement - ±25V range for ICP bias voltage check and proximity probe gap measurement
- Measurements - Acceleration, velocity (by h/w integration), bearing demod (all from accelerometers), and displacement (from proximity probes)
- Gain Ranges - Gain steps 1, 2, 5, 10, 20 and 50
- Digital trigger input - External trigger, tachometer speed, ordered data (by phase-lock-loop)

**Processing**

**AC Measurements**
- ADC - 24-bit sigma-delta, simultaneous on four AC channel inputs, better than 104 dB dynamic range
- Sampling Rates - 64Hz to 102.4kHz
- Bandwidth Ranges - 0.5Hz–25Hz to 0.5Hz–40 kHz, protected by anti-alias filters
- Data Block Lengths - 64 to 400,000 samples
- Spectral lines - Up to 12800
- Noise Floor - Less than 0.2 micro-volts per root Hz from 0.5 to 1000 kHz

**DC Measurements**
- ADC - 16-bit multiplexed for bias voltage, process, and probe gap measurements, 0-10 kHz Bandwidth

**Analysis Capabilities**
- Dynamic Analysis - Overall, Spectra, Waveform, Phase & Speed
- Cross-Channel[1] - Cross-power, Transfer Function, Coherence, Phase and Magnitude
- Demodulation Function - Digital amplitude demodulator and Digital Moment/Min-Max Demodulation for low speed detection
- Averaging - RMS, Exponential, Peak Hold, Order Tracking, Synchronous Time and Negative Averaging
- Number of averages - 1-1000
- FFT Window Function - Hanning, Hamming, Rectangular, Flattop

**Communications with Host Tablet PC/Controller**
- Wireless - Bluetooth v2.0 with EDR (1.5Mbps max), backward compatible to Bluetooth v1
- Interface Port - USB user port (includes data stream and remote power to DP-1)

**Power**
- Charging rate - 0.5A from USB PC input (4 hrs), 1.0 A from USB mains power adapter (2 hrs)
- Battery Life - 12 hours between charges

**Physical**
- Dimensions - 15cm (6.0") x 9cm (3.5") x 4cm (1.5") approx
- Weight - 450g
- Operating Temperature - -10ºC to +60ºC (14ºF to +140ºF)
- Sealing - IP-65 (Dust tight, protected from water jet)
- Compliance - CE, RoHS
- Carrying options – Belt worn holster or shoulder worn soft pack

**Bluetooth®**  CE

# TRIO™

## TECHNOLOGY YOU CAN'T IGNORE

Learn more today:

**www.AzimaDLI.com/trio**

or call (800) 654-2844, ext. 3

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