

## GENERAL INFORMATION

### 1.1 Product Description

The Equipment Under Test (EUT) is a Computational Systems, Inc. UltraSpec<sup>®</sup> RF Adapter, Models 8215 & 8225. The Model 8215 & 8225 is sold as part of a Computational Systems, Inc. UltraSpec<sup>®</sup> Laser Head Alignment System. This system consists of the following:

- Two Laser Head units (either model 8215 or 8225, but not used as a mixed system), approx. size 4" x 1.5" x 5" each
- One Model 8000RF Adapter, approx. size 2" x 1.5" x 1.5", which is the RF communications interface between the laser heads and auxiliary CSI data acquisition equipment not subject of this approval. An included 2 ft. head-head cable may be used optionally for a special data mode while in RF.
- One A821500 Wired Adapter cabled interface to optionally use between the laser heads and auxiliary CSI data acquisition equipment not subject of this approval (if RF communication is not desired).

Both above adapters connect directly to auxiliary CSI data acquisition equipment (not subject of this approval) via a DB-25 connector.

#### System Description:

The laser heads are used to align a shaft that spins (e.g., motor, pump, etc.) by mounting on the parked shaft separated by some distance determined by the length of the shaft and other factors. Each head has a laser output aperture and a photosensitive detector (PSD) aperture. The difference between each head of a pair is the configuration of these two apertures: one unit's apertures are inverted such that each laser beam will strike the opposite mounted unit's PSD surface. With both heads properly mounted on the shaft, the shaft is slowly rotated by hand while both heads are collecting position data on each PSD and rotation angle data via internal sensors. Data is transferred to auxiliary CSI data acquisition equipment for analysis and mathematical calculations, resulting in corrections reported to the user for moving the motor feet, mountings, etc. for straightening the spin axis. The difference between the 8215 and 8225 models is that the 8215 is specified for a maximum head-to-head separation distance of 30 feet, and the 8225 is specified for mounting up to 100 ft. apart. This difference is solely due to the optical parts used: a laser diode and the photosensitive detector. The laser diode has its optics modified for the appropriate range, and the PSDs are of differing surface area, the longer range 8225 having a 20 mm x 20 mm surface area vs. the 8215's 10 mm x 10 mm surface area. The electronics, laser and sensor drive levels, RF circuitry, metalwork cutouts, etc. are the same for both models.

## 1.1 Product Description (Cont.)

### Power

The laser heads are each powered by a 4 cell, 650 mAH Ni-Cad battery. The batteries are not recharged while the system or its components are in use. Both communication adapters (RF and wired) obtain their power from 5 VDC regulated voltage supplies in the auxiliary data acquisition equipment to which they are connected.

### RF

The RF circuitry in both heads and the 8000RF adapter is the same except for the transmit drive level circuit. Although component values are slightly different there, no unit is intended to transmit up to the vendor's rated limit of about 0.85mW. The transmit frequency is 916.5 MHz and the modulation is OOK. The circuit used is per RF Monolithics, Inc. of Dallas, Texas and uses their model TR1000 transceiver integrated circuit chip. All three transceiver units use 2" helical whip antennas, Linx Technologies model ANT-900-CW-RH, which are mounted on reverse-SMA connectors.