

## **SYSTEM DESCRIPTION, APPLICATIONS & COMPONENT FUNCTIONS**

### **System Purpose:**

To easily sense, over approximately distance of 4.0m (further distance for special LED targets), the 3D (three-dimensional) positions of one or more point-light sources made of LEDs (light emitting diodes).

### **Applications:**

#### Industrial

- Motion-capture for animation, movie special-effects and games
- Position sensing for machine control, choreography design

#### Scientific

- Position sensing for kinematics analysis of sportspeople
- Shape and sizes measurement of objects
- Virtual-reality environments development

#### Medical (possible future applications)

- Tools position/orientation sensing for robot-assisted operations or tele-surgery
- Body shape and sizes measurements for prognosis
- Position sensing for treatment effects monitoring

### **System Block Components:**

- One AC/DC switching power converter certified with CE, UL, CSA, TUV marks
- Seven electronic circuit boards, constituting the 'sensing unit'
- One low-power RF transmitter
- A multiple number of small light-emitting-diodes (LEDs), 'targets'
- Up to eight electronic target-controllers, each with an RF receiver
- A 9-pin communication cable
- A shielded coaxial control cable

### **Block Component Descriptions:**

#### AC/DC Converter

- Certified with CE, UL, CSA, TUV marks
- Converts local ac power to +5Vdc and +12Vdc for operating the sensing unit

#### Seven Electronic Circuit Boards

- One supervisor board, three slave boards, three 'driver' boards

#### Supervisor Board

- Signal processing and programming of target controller(s) through wires or via the RF transmitter

#### Slave Boards

- Signal processing

#### Driver Boards

- Control sensing elements

#### RF Transmitter

- FM transmitter with FCC compliant output power
- Manufactured by LINX Technologies, Oregon, U.S.A.
- Operates with one of eight switch-selectable carrier frequencies: 903.37, 906.37, 907.87, 909.37, 912.37, 915.37, 919.87, 921.37MHz

#### Light-Emitting Diodes

- Used as targets sensed by the sensing unit
- Up to 512 may be used with one sensing unit

#### Target Controllers

- Up to eight may be used with one sensing unit
- Each contains an RF receiver to receive signals from the RF transmitter

#### Control Cable

- Passes data from the sensing unit to the target controllers

#### Communication Cable

- Passes data to and from a host computer

#### **Intended Markets:**

- World wide (South-East Asia, Europe, North and South America)

#### **Power Requirements:**

##### Sensing Unit

- Powered by one single certified AC/DC switching power converter
- +5Vdc requirement: 2.2±0.3A RMS
- +12Vdc requirement: 0.6±0.1A RMS

##### Target Controllers

- Each powered by up to two 9V (MN 1604) batteries or by a utility +10~12Vdc adaptor (not included)
- Current requirement: 35~ 200mA RMS

#### **Major System Parts:**

##### AC Power Adaptor

- Model TR9CM3000N00-A, GlobTek Inc., N.J. USA

- Certifications: CE, UL, CSA, TUV
- Input: 100-240Vac, 50-60Hz
- Outputs: 3A @ 5Vdc, 1.5A @ 12Vdc

#### Electronic Parts

- CCD sensing elements, Texas Instruments
- Data converters, Brooktree Corporation

#### Signal Processors

- Digital signal processor chips, Texas Instruments

#### Programmable Devices

- Complex programmable logic devices, Xilinx

#### Signal Drivers

- Signal voltage converters, 5V to 12V, National Semiconductor

#### Data Communicator

- Universal asynchronous receiver transmitter, National Semiconductor

#### CPU & Micro-controller Operating Frequencies

- 80MHz, 60MHz, 20MHz, and 12MHz

#### Radio Transmitter

- FCC compliant 902-928MHz FM transmitter, LINX Technologies

#### Radio Receivers

- FCC compliant 902-928MHz FM receivers, 1~8, LINX Technologies

#### Extendable Tripod

- 1 x AL tripod, for supporting and encasing the sensing unit

#### Mechanical Parts

- 1 x AL back-panel & printed-circuit-board support plate
- 1 x AL square tubing as system enclosure
- 1 x rectangular carbon-composite tubing
- Miscellaneous plastic parts for aesthetics and bump protection

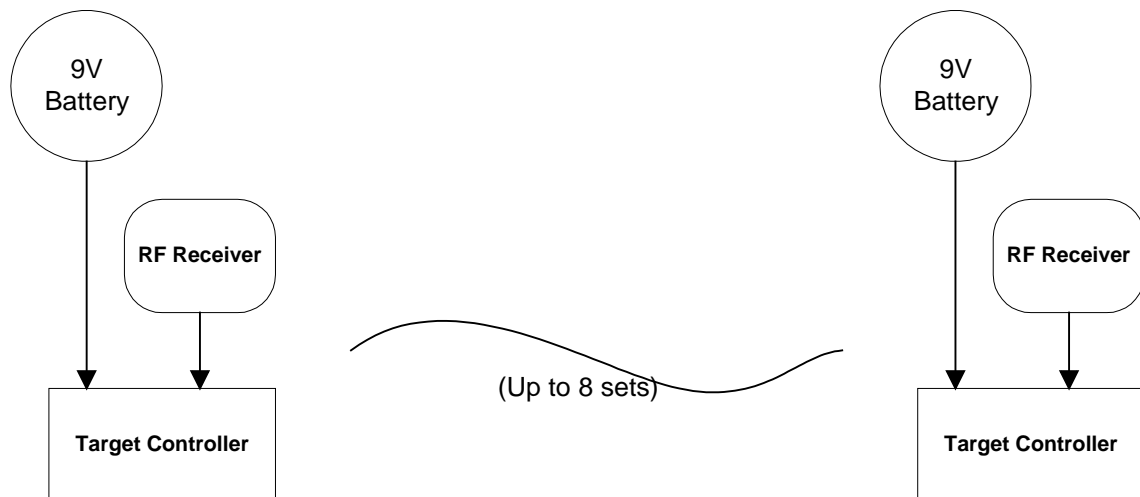
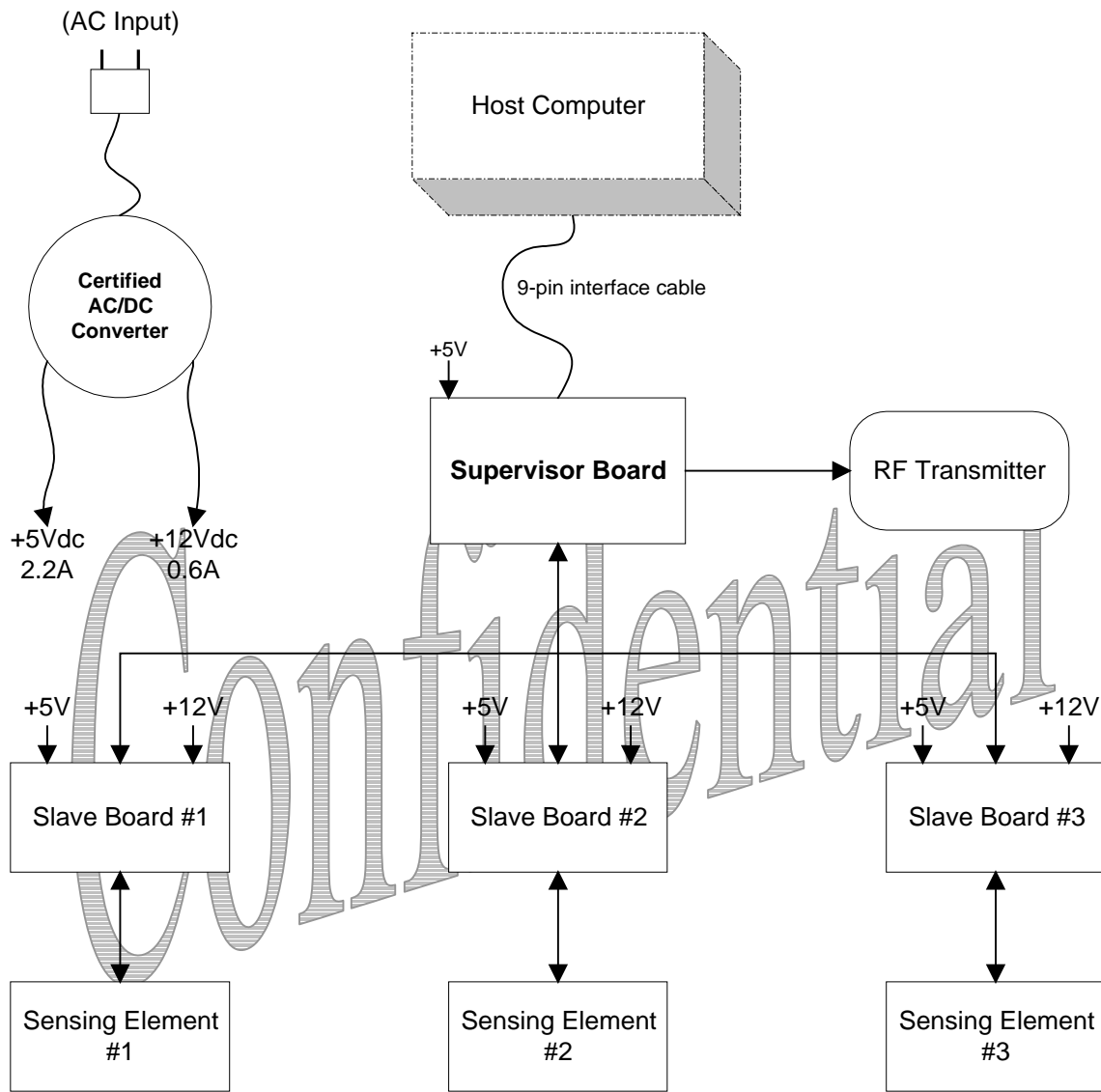
### **Product information**

1. Test sample trademark
  - Visualeyez
2. Model Name/Numbers
  - VZH1000, VZH2000, VZH3000, VZH4000, VZH5000, VZH6000, VZH7000, VZH8000, VZH9000
  - VZ1000, VZ2000 (Test unit model), VZ3000, VZ4000, VZ5000, VZ6000, VZ7000,

- VZ8000, VZ9000
- 3. Serial Numbers of Accessories
  - Target Control Module (Receiver) -- TCM99090800 to TCM99999999
  - Tripod -- TP99318088 to TP99999999
- 4. Serial Numbers of Main Unit
  - Test unit (VZ2000, SN#VZ99318092)
  - VZ98318087
  - VZ99318088, VZ99318089, VZ99318090, ..., VZ99319000
  - VZ00319000 to VZ99999999
- 5. Product description
  - 3D motion capture system to sense 3D positions of a point light source.
  - Portable, can be floor-standing on a tripod, bench top or wall mounted (test on a tripod only)
  - The dimensions and weight of the sample:
    - Sensor only: ~5.2 kg, 10.2cm dia. x 115cm
    - Sensor with tripod: ~13.1 kg, 120cm x 200cm (Tripod Height)
  - Hosing material:
    - 2 1/2" x 2 1/2" x 0.079" thick square aluminum tube, anodized.
  - CPU & micro-controller clocks: 80MHz, 60MHz, 20MHz, 12MHz

**Power Supply Wiring Block Diagram:**

(See attached diagram)



- Components within dashed boxes are not included in the system
- Components without voltage indications draw power from other components