# *UART TTL Zoom Lens Electronics Control Interface Data Sheet*

**Description**

Beck Optronic Solutions offers a variety of high performance, non-ITAR controlled, ruggedized zoom lenses suitable for applications including long range surveillance, border security and remote weapon stations.

This document details the interface and control requirements of the integrated control electronics.

Beck Optronics zoom lenses use DC brushed motors, with potentiometer feedback or microswitches to control the following functions:-

- Main Zoom (Variator)
- Slave Zoom (Compensator)
- Focus
- Iris (if fitted)
- Filter Wheel (if fitted)
- Extender Changeover Mechanism (if fitted)

All zoom lens models are fitted with a common Smart Control Card which has an arrangement of PIC + FPGA, where a PIC is used to perform the Zoom Program calculation and handle communications with PC Software leaving an FPGA to perform the closed loop algorithm where a fast response time is critical. DC Motor drives are made by 3 Dual Pulse Width Modulation Controllers.

Communications between the Smart Control Card and the Host PC are made via a USB or UART TTL interface. The Smart Control Card accepts commands simultaneously from either without the need to make a selection or fit jumpers. The card has two connectors:

| | | |
|---|---|---|
| CN1 | Molex 54819-0589 | Mini USB Type B |
| CN2 | Molex 43650-0400 | 4-way 3.0 mm pitch power and serial control for system integration |

UART TTL pinout;

| Pin | Signal | Description |
|---|---|---|
| 1 | +VDV | Nominal +12V DC powers the lens controller through regulated internal supplies and lens motors direct. Supported V(in) range = +7.0V to +16.0V DC. |
| 2 | RX | TTL Serial Receive data direction from system to lens. Tolerant to +5V. |
| 3 | TX | TTL Serial Transmit data direction from lens to system. Outputs at 3.3V |
| 4 | GND | Signal Ground |

Recommended Operating Conditions;

| | Min | Nom | Max | Unit |
|---|---|---|---|---|
| Supply Voltage | 7.0 | 12.0 | 16.0 | V |
| Rx pin Input Voltage | 0 | | 5.5 | V |
| Tx pin Output Voltage | 0 | | 3.3 | V |
| Tx pin Output Current | | | 7 | mA |
| Rx High-Level Input Voltage | 1.39 | | | V |
| Rx Low-Level Input Voltage | | | 0.62 | V |
| Rx Input Current | | | 1.0 | µA |
| Rx Input Capacitance | 2 | | 10 | pF |
| Rx Input Transition Rise/Fall rate | | | 20 | Ns/V |

| Operating current | |
|---|---|
| At rest | 200 mA |
| With motors running | 220 mA |

Interface – The Smart Control Card accepts messages and transmits replies over this interface on Rx and Tx circuits. Data should be 7-bit ASCII with optional parity bit and 1 stop bit at a Baud Rate of 38400.

USB Interface – This is a “COM port” style interface provided in the form of a standard USB mini connection, using a readily available device driver. With this installed the USB connection will appear to be the “COMn” device where ‘n’ is the port number assigned by the plug and play driver.

Irrespective of which interface is chosen, the protocol for communicating with the Smart Control Card remains the same; a simple command/response always initiated by the host. Every complete command generates a single response and if the Smart Control Card fails to parse a command (e.g. due to incorrect formatting or data corruption), it will return an error response.

The protocol allows customers to easily develop software for the host system that can control lens functions and read lens status (such as Position and Travel Limits). With some straightforward message translation, customers can use Standard Device Utility Software such as Pelco-D Protocol.

Beck Optronic Solutions provides control software which allows the operation of the Zoom Lens functions by an on-screen Control Panel from a host Windows PC.