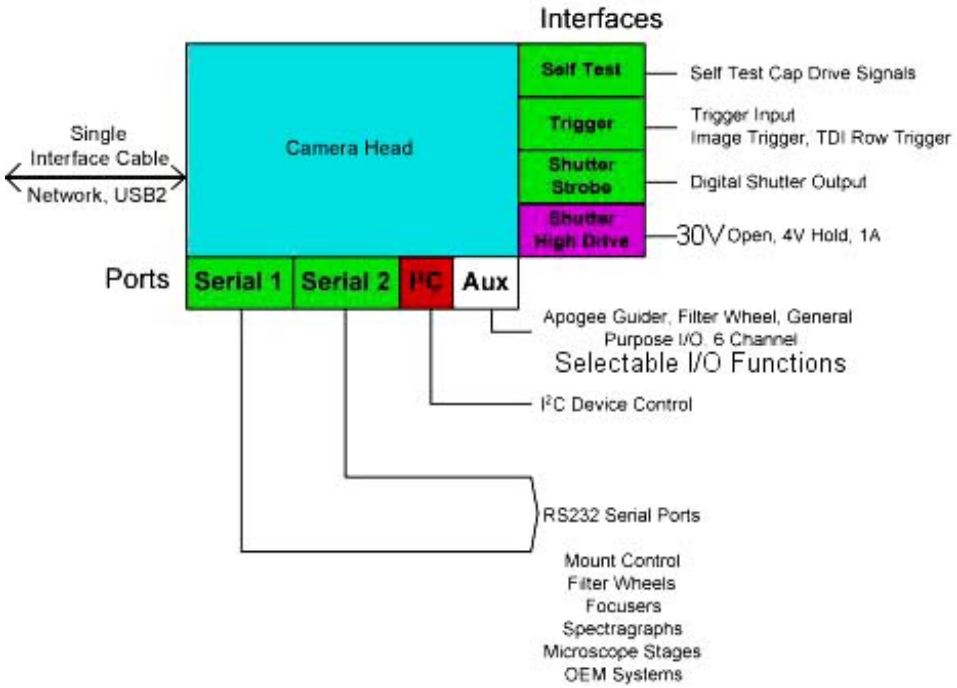
USB2.0 Interface
Compact Enclosures
Advanced Cooling System
SDRAM On-board Memory
Dual Digitization
Single +12V Supply
Digital I/O, Two Slave Serial Ports
Programmable Status LEDs
Programmable Fan Speed
Binning to 4095 Vert. x 8 Horiz.
Image Sequences
Fast Reliable Shutters
No External Control Units
Field Upgradeable Firmware
Overscan Display
Precision TDI Readout
Watertight Carry Case

**Alta® Input/Ouput Port**

**Serial ports, I2C port, and other useful I/O for embedded peripheral control**

A common requirement for installations requiring cameras is the control of peripheral equipment or advanced control of the camera readout. OEM customers seek to integrate camera control with the rest of the system. Researchers seek to synchronize camera control with laser pulses or other functions within the experiment. The Alta systems have been optimized with a host of interfaces designed to meet most needs out of the box. Two RS232 serial ports provide remote control of peripherals.

**Control Ports and Interfaces**

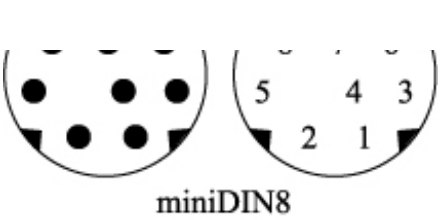



**Technical Details**

The 8 pin mini din connector contains the following signals:

- Ground
- +12V
- LVTTL Signal #1
- LVTTL Signal #2
- LVTTL Signal #3
- LVTTL Signal #4
- LVTTL Signal #5

- LVTTL Signal #6



miniDIN8

Each LVTTL signal can be defined as an input or output via a register definition controlled by the camera driver as described in the firmware specification:

R50: I/O Port Direction

Defines I/O port signal direction. Signals defined as “out” are defined by the pattern written to register 49 and can also be read back with register 90. Signals defined as “in” are supplied by external devices and can be read by register 90. These definitions are superseded by the Register 51 settings.

| Bit | Function |
|---|---|
| 0 | Gen 1 0=IN, 1=OUT |
| 1 | Gen 2 0=IN, 1=OUT |
| 2 | Gen 3 0=IN, 1=OUT |
| 3 | Gen 4 0=IN, 1=OUT |
| 4 | Gen 5 0=IN, 1=OUT |
| 5 | Gen 6 0=IN, 1=OUT |

For Each LVTTL signal defined as an output, one of two signal assignments may be given as described in the firmware specification:

R51: I/O Assignments

Selects special I/O port signal configurations. The I/O port can be used as a simple user definable port, or it can be configured to provide special signals such as trigger inputs, shutter strobes and other signals. For functions like guider outputs (AL10), filter control, etc, the user defined ports can be used by the application. This scheme allows the user to select a mix of user defined and strobe controls.

| Bit | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|
| Pin | Gen 6 | Gen 5 | Gen 4 | Gen 3 | Gen 2 | Gen 1 |
| User Defined | User defined per R49, R50 | User defined per R49, R50 | User defined per R49, R50 | User defined per R49, R50 | User defined per R49, R50 | User defined per R49, R50 |
| Fixed Functions | Timer Pause In | Ext Readout Start | Ext Shutter In | Shutter strobe out | Shutter out | Trigger In |

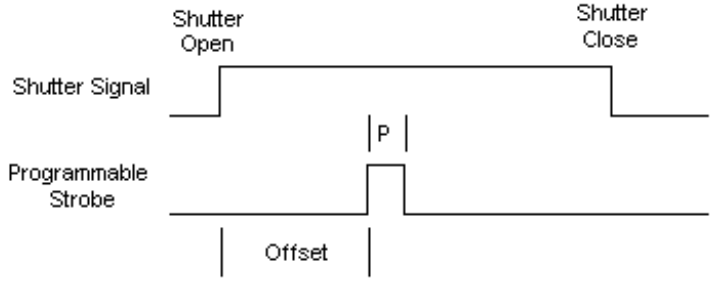
User defined assignments are normally set by a user's application. The user definable I/O can also be used by Apogee applications for controlling a filter wheel or providing a guider output, as well as any custom functions required by our OEM customers.

Outputs defined as fixed functions can be as follows:

- **Timer Pause In:** Closes shutter and halts timer during exposure. Can be used for blanking events during expose.
- **Ext Readout Start:** Used in conjunction with Ext_ Shutter_ In in to begin digitization of image.
- **Ext Shutter In:** Provides for external control of exposures. In first mode, a rising edge halts flushing, opens shutter, and begins exposure. A falling edge closes shutter and begins digitization process. In the the second

edge closes shutter and begins digitization process. In this the second mode, a rising edge halts flushing, opens shutter, and begins exposure. A falling edge closes the shutter, but does not begin readout. Readout is started with the Ext Readout Start signal. This mode allows the shutter to be closed as many times as desired during an externally controlled exposure.

- **Shutter Strobe Out:** Programmable pulse that can be positioned from 3.3uS to 167mS after exposure start with a programmable period from 45nS to 2.6uS




- **Shutter Out:** High when the shutter is open.
- **Trigger In:** Used to initiate triggered exposures or TDI row reads.

Two RS232 Serial ports are provided on two RJ11 jacks. In addition to the RS232 signals, the normally unused pins on each jack have been given additional definition as follows:

Serial Port 1 Jack

- Shutter High Drive -
- LED Test + (used for self test fixture)
- LED Test - (used for self test fixture)

Serial Port 1 Jack

- Shutter High Drive +
- I2C SDA
- I2C SCL

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