



Application Note: I/O Characteristics



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Alta Data Technologies LLC
4901 Rockaway Blvd., Building A
Rio Rancho, NM 87124 USA
(tel) 505-994-3111 • www.altadt.com

CUSTOMER NOTES:

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Contact:

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## Introduction

This application note provides detailed information on electrical characteristics for:

- Bi-Directional Avionics Discretes
- Input and Output Triggers
- RS-485 I/O
- TTL I/O
- IRIG Input

These specifications apply to most Alta Interface Cards.

In addition to this information, the reader may also want to reference the following documents provided on the CD and our Web Site

- **AltaCore™** Specifications and User Manual: Detailed description of the 1553 protocol engine of the card. Most people do not need this detail and will mainly reference the **AltaAPI** manual for their application development.
- **AltaAPI™** User's Manual: Detailed description of the application program interface (API) and device drivers of this software package.
- **AltaView™** User's Manual: AltaView is the latest 1553 analyzer on the market and this manual details the usage of the product.
- **AltaRTVal™** User's Manual: This manual details the usage of AltaRTVal, which is an automated program to run AS4111/4112 RT Validation and Production Test Plans.
- 1553 Tutorial and Reference, and 1553B Standard. These documents provide a detailed review of the 1553 standard, which is required for proper usage of this product.

## Absolute Maximum Ratings

### Bi-Directional Discretes

Input Voltage: 35V

Output Current Sink: 1.2A (Note 1)

### Triggers

Input Voltage: -0.3V to 3.6V

Output Current Sink: 1.2A (Note 1)

### RS-485 I/O (Note 2)

Driver Output Voltage (A, B): +/-14V

Receiver Input Voltage (A, B) : +/-14

### TTL I/O

Input Voltage: -0.3V to 3.6V

### IRIG Input

Input Voltage: +/-8.5V

*Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

## Characteristics

Typical values are at TA = +25°C

| Symbol                                   | Parameter                                  | Min  | Typ. | Max  | Unit            |
|------------------------------------------|--------------------------------------------|------|------|------|-----------------|
| <b>Bi-Directional Avionics Discretes</b> |                                            |      |      |      |                 |
| DV <sub>IL</sub>                         | Discrete Input Low Voltage                 |      |      | 1.60 | V               |
| DV <sub>IH</sub>                         | Discrete Input High Voltage                | 1.70 |      |      | V               |
| DV <sub>Hyst</sub>                       | Discrete Input Hysteresis                  |      | 4    |      | mV              |
| DR <sub>inod</sub>                       | Discrete Input Impedance (output disabled) |      | 10K  |      | Ω               |
| DR <sub>inoe</sub>                       | Discrete Input Impedance (output enabled)  |      | 0.35 |      | Ω               |
| <b>Triggers</b>                          |                                            |      |      |      |                 |
| TV <sub>IL</sub>                         | Trigger Input Low Voltage                  |      |      | 1.60 | V               |
| TV <sub>IH</sub>                         | Trigger Input High Voltage                 | 1.70 |      |      | V               |
| TV <sub>Hyst</sub>                       | Trigger Input Hysteresis                   |      | 4    |      | mV              |
| TR <sub>IN</sub>                         | Trigger Input Impedance                    |      | 10K  |      | Ω               |
| T <sub>OPW</sub>                         | Trigger Output Pulse Width                 |      | 2    |      | μS              |
| T <sub>IPW</sub>                         | Trigger Input Pulse Width                  | 500  |      |      | nS              |
| <b>RS-485 I/O</b> (See Note 2)           |                                            |      |      |      |                 |
| <b>TTL I/O</b>                           |                                            |      |      |      |                 |
| TTL <sub>VIL</sub>                       | TTL Input Low Voltage                      |      |      | 0.8  | V               |
| TTL <sub>VIH</sub>                       | TTL Input High Voltage                     | 2    |      |      | V               |
| TTL <sub>IO</sub>                        | TTL Output Current Drive                   |      | 24   |      | mA              |
| TTL <sub>RIN</sub>                       | TTL Input Impedance                        |      | 10K  |      | Ω               |
| TTL <sub>fmax</sub>                      | TTL Max Frequency In and Out.              |      |      | 10   | MHz             |
| <b>IRIG Input</b>                        |                                            |      |      |      |                 |
| IRIG <sub>Vpp</sub>                      | IRIG Input Voltage                         | 2    |      | 16   | V <sub>pp</sub> |
| IRIG <sub>Rin</sub>                      | IRIG Input Impedance                       |      | 25K  |      | Ω               |
| I <sub>fmax</sub>                        | IRIG Max Input Frequency                   |      | 4.5  |      | KHz             |

**Note 1:**

There is no short-circuit protection available. The user must ensure that input current never exceeds 1.2A.

**Note 2:**

Unless otherwise noted, the following RS-485 Device is used: ST Micro, PN ST1480ABDR. Datasheets are available at <http://www.st.com/stonline/>. There is no termination resistor populated at the device although there is a physical pad available on the PCB for adding termination. Please contact the Factory for more information on adding termination resistors.

## Example Logic Diagrams

Note: Bi-Directional Discrete and Trigger I/O designs are similar, so the following figures apply to both.

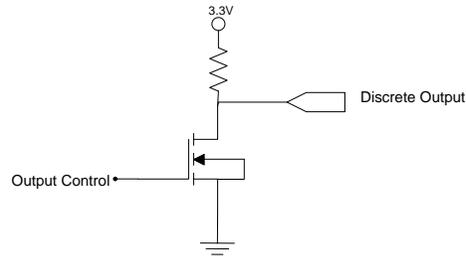


Figure 1 Example Bi-Directional Discrete and Trigger Output Logic

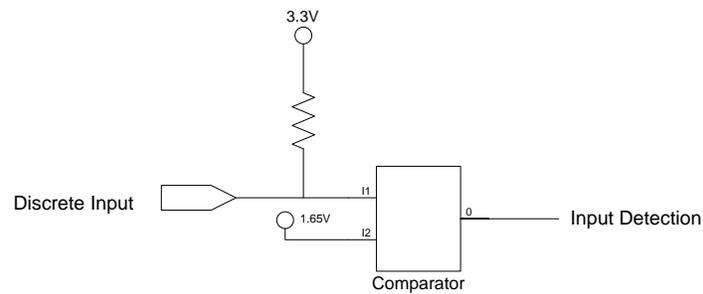


Figure 2 Example Bi-Directional Discrete and Trigger Input Logic