



## Application Note: I/O Characteristics for Auxiliary (AUX) Signals



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## CUSTOMER NOTES:

### Revision Control History

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## Introduction

This application note provides detailed information on electrical characteristics various Auxiliary (AUX) I/O signals offered with most products (**configurations vary across products**):

- Bi-Directional, Single-Ended Discretes (SDISCs)
  - Avionics Level Discretes
  - SDISC1 Can Also Be 5V TTL Input Trigger with Register Settings
- Dedicated Input and Output Triggers
- RS-485 I/O – Differential Discretes (DDISCs)
  - These are discretes, clocks and triggers only.
    - These are NOT serial UARTs.
- LV TTL I/O (clock)
- IRIG Input

Settings for the above are controlled by **AltaCore-1553/ARINC** registers (Global and PE Root Registers). The **AltaAPI** manual and example programs show how to program/manage the respective registers. **Please refer to the AltaCore, the AltaAPI, and your products' hardware manuals for configurations and pin-outs.**

## Absolute Maximum Ratings

### Bi-Directional Avionics Discretes (SDISCs)

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 Can Also Be used with AltaCore Register Setting.

5V TTL Input Can Used on SDISC Line 1 with AltaCore Register Setting.

### RS-485 I/O (DDISCs)

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

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

See Note 2.

### LV TTL I/O (clock input/output)

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 and void the warranty. 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 (SDISC)</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 (DDISC - See Note 2)</b>           |                                            |      |      |      |                 |
| <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 (SDISC) and Trigger I/O designs are similar, so the following figures apply to both.

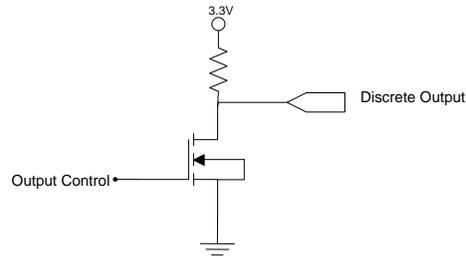


Figure 1 Example Bi-Directional Discrete (SDISC) and Trigger Output Logic

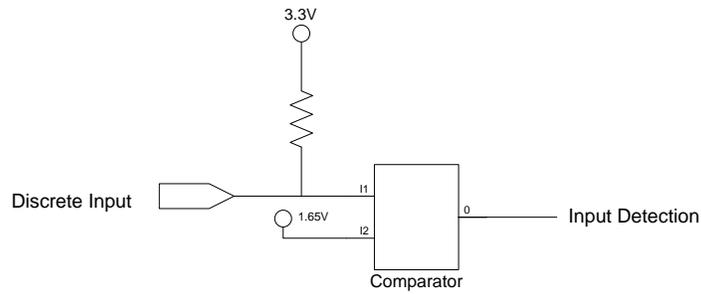


Figure 2 Example Bi-Directional Discrete (SDISC) and Trigger Input Logic