

12. Signal characteristics

12.1 Signal levels

- *Signal levels at the Crate Segment connector shall conform to the industry standards for the particular type of logic used (see Annex A).*

The examples in this standard are based on ECL implementations of FASTBUS. However, the possibility remains for other implementations in the future. Logic signal levels within Modules are not specified.

Other than for the Segment Connector and front panel interconnections (see Appendix B), any reasonable signal levels are allowed at connectors. The following standards, when used, should be color coded with a marker located near the associated connector.

- Industry standard Emitter Coupled Logic (ECL) employing active high inputs and outputs. Brown color code (see Annex A).
- Industry standard Transistor Transistor Logic (TTL) employing active low inputs and outputs. Light blue color code.
- NIM standard, Fast Logic Signals as shown in the Table below. Black color code for internal termination; gray for external termination (see US Department of Energy Report DOE/ER-0457T, May 1990).

	Output Driver Current (mA) Into 50 Ohms ¹	Receiver Input Voltage (V) Response ^{1,2}
Logic 1	-14 to -18 mA	-0.6 max. to -1.8 min.
Logic 0	-1.0 to +1.0	-0.2 min. to +1.0 max.

¹ Receiver response to input voltages more positive than +1.0 V or more negative than -1.8 V is not specified.

² **Response** means **shall** respond fully within specifications to any voltage within this range. Circuit designers are alerted to the overdrive required in many receiver circuits to assure full specification performance, and the need therefore to set the receiver trigger threshold accordingly.

- Non-standard logic levels less than 24 V. Yellow color code.
- Analog signal levels. Green color code.

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