ARINC-429

TEC/NOT/006

This paper introduces the ARINC-429 bus. In particular the physical layer and word definition are discussed.

The following topics are discussed:

4.1 Overview

The first revision of the ARINC-429 Mark 33 Digital information Transfer System (DITS) was generated on 11 April 1978. The current specification is ARINC-429-10.

Components connected to the busses are Transmitter (source), Receiver (sink) or Transmitter and Receiver. All data is transmitted over a single, twisted pair in one direction only.

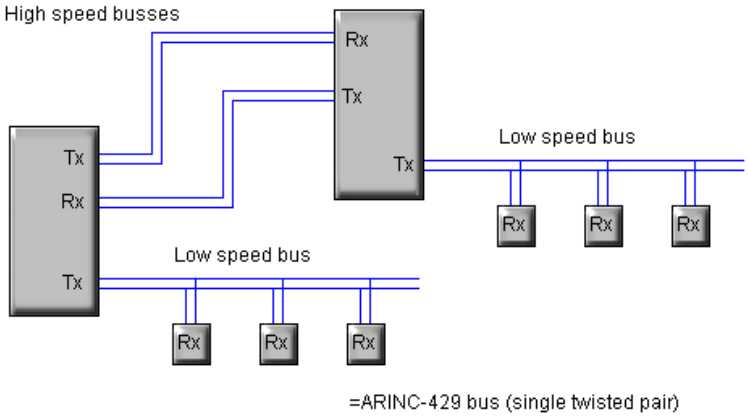

Figure 4-1: An example ARINC-429 architecture

A transmitter (Tx) may transmit (only) to up to 20 Receivers (Rx). If a Receiver is required to acknowledge reception of data, another ARINC-429 is required in the opposite direction.

Data is sent in single words identified by one of 255 Labels and a 2-bit Source/Destination identifier.

4.2 The physical layer

Data is transmitted in a bipolar return to zero (RZ) format. This is a trilevel code as illustrated in the following figure.

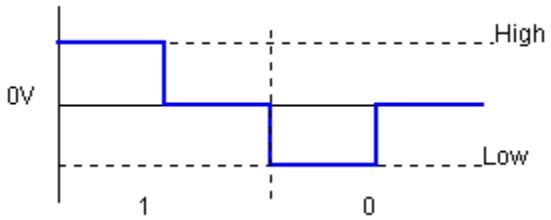

Figure 4-2: ARINC-429's bipolar, RZ code

For a transmitter, the high (low) voltage must be +10V ±10% (-10V ±10%). A receiver must be specified to a minimum of ±5V. The transmitter output impedance is 75Ω (±5Ω) and should correspond to the transmission line characteristics.

There are two bit-rates associated with ARINC-429. The high speed bus is 100 kbps and the low speed bus is between 12 and 14.5 kbps. Only one data rate is allowed per bus.

ARINC-429 also specifies the data rate tolerances and rise and fall times.

4.3 Word definition

The general format of an ARINC-429 word is as shown in the following figure.

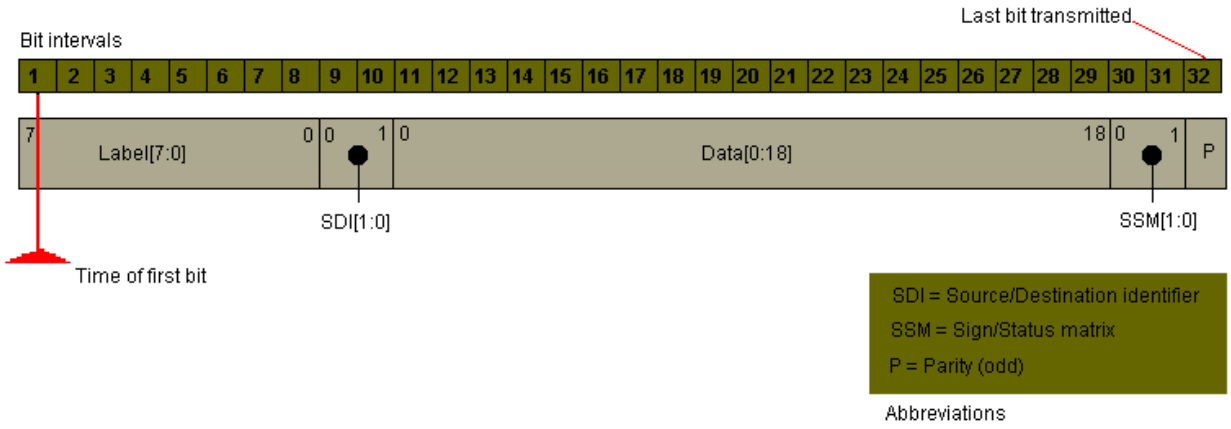

Figure 4-3: Generic word definition for ARINC-429

The 8-bit label identifies the parameter being transmitted.

The main purpose of the Source/Destination Identifier (SDI) bits is to direct data words to a particular receiver. The SDI bits are not used with certain types of data.

The Sign/Status Matrix (SSM) bits are used to indicate minus, south and so on for certain types of data, the word type for AIM (Acknowledge, ISO alphabet No. 5 and Maintenance) data and the status of the transmitter. For binary data, bit 29 (Data18) is used to indicate sign.

There are five types of data words:

- Binary
- BCD subset of ISO Alphabet No. 5
- Discrete
- Maintenance
- AIM

Also, file transfer is supported.

4.4 Conclusion

In this paper some of the nomenclature associated with ARINC-429 was introduced. The generic word definition was also discussed.

4.5 References

An Overview of ARINC-429

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Standards

ARINC-429-10