

AS8202NF

TTP-C2NF Communication Controller



The AS8202NF communication controller is an integrated device supporting serial communication according to the TTP specification version 1.1 (with provided firmware upgrade 2.05 or higher). It performs all communication tasks such as reception and transmission of messages in a TTP cluster without interaction of the host CPU. AS8202NF is available as standard product from austriamicrosystems and TTTech. It is designed using the DO254-compliant C2NF chip IP model from TTTech.

Deployment in Distributed Real-Time Systems

TTP provides mechanisms that allow the deployment in high-dependability distributed real-time systems. It provides the following services:

- Predictable transmission of messages with minimal jitter
- Fault-tolerant distributed clock synchronization
- Consistent membership service with small delay
- Masking of single faults

The CNI (communication network interface) forms a temporal firewall. It decouples the controller network from the host subsystem by use of a dual ported RAM (CNI). This prevents the propagation of control errors. The interface to the host CPU is implemented as a 16-bit wide non-multiplexed asynchronous bus interface.

KEY FEATURES/BENEFITS

- TTP communication controller chip with support for redundant channels
- Synchronous Data rate: 25 Mbit/s
- Asynchronous data rate up to 5 Mbit/s
- Temperature range: -40 °C to +125 °C
- 80 pin LQFP80 package
- Bus guardian support
- 16 KB x 16 SRAM for status, control and scheduling information (MEDL)
- RTCA DO-254 level-A certification artefacts available

Time Division Multiple Access

TTP follows a conflict-free media access strategy called time division multiple access (TDMA). It deploys a time slot technique based on a global time that is permanently synchronised. Each node is assigned a time slot in which it is allowed to perform transmit operation. The sequence of time slots is called TDMA round, a set of TDMA rounds forms a cluster cycle. The operation of the network is repeated after one cluster cycle. The sequence of interactions forming the cluster cycle is defined in a static time schedule, called message descriptor list (MEDL). The definition of the MEDL in conjunction with the global time determines the response time for a service request. The membership of all nodes in the network is evaluated by the controller and presented to all nodes in a consistent fashion within one TDMA round.

Key Features

- Dedicated controller supporting TTP
- Suited for dependable distributed real-time systems with guaranteed response time
- Application fields: automotive (by-wire braking, steering, vehicle dynamics control, drive train control), aerospace (aircraft electronic systems), industrial systems, railway systems
- Asynchronous data rate up to 5 Mbit/s (MFM/Manchester)
- Synchronous data rate 20 Mbit/s (MII)
- Bus interface (speed, encoding) for each channel selectable independently
- 40 MHz main clock with support for 10 MHz crystal, 10 MHz oscillator or 40 MHz oscillator
- 16 MHz bus guardian clock with support for 16 MHz crystal or 16 MHz oscillator
- Single power supply 3.3 V, 0.35 µm CMOS process
- Full automotive temperature range (-40 °C to +125 °C)
- 16 k x 16 SRAM for message, status, control area (communication network interface) and for scheduling information (MEDL)
- 4 k x 16 (plus parity) instruction code RAM for protocol execution code
- Data sheet conforms to protocol revision 1.02
- 16 k x 16 instruction code ROM containing startup execution code and deprecated protocol code revision 1.00
- 16 Bit non-multiplexed asynchronous host CPU interface
- 16 Bit RISC architecture
- Software tools, design support, development boards available (www.tttech.com)
- 80 pin LQFP80 Package

Application domain

TTP mechanisms are suitable for high-dependable distributed real-time systems. TTP is applied in several industrial areas, the railway, robotics and aerospace domain. DO-254 level A certifications artefacts are available.

Benefits

AS8202NF provides support for fault-tolerant, high-speed bus systems in a single device. The communication controller is qualified for the full temperature range required for automotive applications and is certifiable according to RTCA standards. It offers superior reliability supports data transfer rates of 25 Mbit/s with MII and up to 5 Mbit/s with MFM/Manchester. AS8202NF is the first TTP controller to support both MFM and Manchester coding. Manchester coding is important for DC-free data transmission, which allows the use of transformers in the data stream. AS8202NF is pin-compatible with its predecessor, AS8202.

Order Numbers

- C02.01.1 Engineering samples (for prototyping)
- C03.01.1 Commercial products

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