TMC2084

Standalone Mode CircLink™ Controller

PRODUCT FEATURES

Data Brief

- Low Power CMOS, 3.3 Volt Power Supply with 5 Volt Tolerant I/O
- Enhanced Token Passing Protocol from ARCNET
  - Maximum 15 node per network
  - Token Retry Mechanism
  - 64/128 Byte Per Packet
  - Consecutive Node ID Assignment
- Memory Mirror
  - Shared Memory within Network
- Network Standard Time
  - Network Time Synchronization
  - Automatic Time Stamping
- Coded Mark Inversion
  - Intelligent 1-Bit Error Correction
  - Magnetic Saturation Prevention
- Standalone (I/O) Mode Operates without MCU
  - Supports 16 Bit Input and 16 Bit Output
- Up to 14 Intelligent Remote I/O Ports:
  - Programmable with 8-bit basis (16 to 32 outputs; 0 to 16 inputs)
  - Selectable output type (push-pull or open-drain)
  - The part of port is definable as strobe outputs and/or external trigger inputs
  - The anti-chatter circuit on the input port can be set in ON/OFF
  - The sampling frequency of the anti-chatter circuit can be set (19.1Hz/1.22KHz)
- Feature Rich Transmit Trigger
  - After receiving OUTPUT DATA packet or expiring on-chip timer
  - Continuous transmission
  - External trigger input
- Flexible Transceiver Interface:
  - RS-485 transceiver + twist pair cable
  - RS-485 transceiver + pulse transformer + twist pair cable
  - Hybrid transceiver (HYC4000 or HYC2000 from SMSC Japan)
  - Fiber Optics also supported
- 48-Pin, TQFP Lead-Free RoHS Compliant Package
  - Body size: 7 × 7mm; pitch: 0.5mm
- Temperature Range from 0 to 70 degrees C

ORDER NUMBER:

TMC2084-HT FOR 48 PIN, TQFP LEAD-FREE ROHS COMPLIANT PACKAGE

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General Description

About CircLink

The CircLink networking controller was developed for small control-oriented local network data communication based on ARCNET's token-passing protocol that guarantees message integrity and calculatable maximum delivery times.

In a CircLink network, when a node receives the token it becomes the temporary master of the network for a fixed, short period of time. No node can dominate the network since token control must be relinquished when transmission is complete. Once a transmission is completed the token is passed on to the next node (logical neighbor), allowing it to be come the master.

Because of this token passing scheme, maximum waiting time for network access can be calculated and the time performance of the network is predictable or deterministic. Industrial network applications require predictable performance to ensure that controlled events occur when required.

However, reconfiguration of a regular ARCNET network becomes necessary when the token is missed due to electronic and magnetic noise. In these cases, the maximum wait time for sending datagrams can not be guaranteed and the real-time characteristic is impaired. CircLink makes several modification to the original ARCNET protocol (such as maximum and consecutive node ID assignment) to avoid token missing as much as possible and reduce the network reconfiguration time.

CircLink implements other enhancements to the ARCNET protocol including a smaller-sized network, shorter packet size, and remote buffer mode operation that enable more efficient and reliable small, control-oriented LANs. In addition, CircLink introduces several unique features for reducing overall system cost while increasing system reliability.

CircLink can operate under a special mode called "Standalone" or "I/O" mode. In this mode, CircLink does not need an administrating CPU for each node. Only one CPU is needed to manage a CircLink network composed of several nodes, reducing cost and complexity.

In a CircLink network, the data sent by the source node is received by all other nodes in the network and stored according to node source ID. For the target node the received data is executed per ARCNET flow control and the data is stored in its buffer RAM. The receiving node processes the data while the remaining nodes on the network discard the data when the receiving node has completed. This memory-mirroring function assures higher reliability and significantly reduces network traffic.

Network Standard Time (NST) is also a unique CircLink feature. NST is realized by synchronizing the individual local time on each network node to the clock master in the designated node from which the packet is sent. CircLink also uses CMI code for transmitting signals, rather than the dipulse or bipolar signals that are the standard ARCNET signals. Since CMI encoding eliminates the DC element, a simple combination of a standard RS485 IC and a pulse transformer can be used to implement a transformer-coupled network.

About TMC2084

The TMC2084 is CircLink's standalone mode controller acting as an intelligent remote I/O controller that uses the enhanced token passing protocol. TMC2084 I/O nodes are controlled by the Host node (TMC2074/72) via the network. Thus, TMC2084 enables a single-processor with multi-remote I/O controllers environment at reasonable cost.

The TMC2084 has thirty-two I/O port lines featuring programmable direction, with 8-bit basis (output: 16 to 32 bit; input: 0 to 16 bit). The maximum number of nodes per network is fifteen, including the host node. This configuration enables a processor to control a total of 448 (14×32) remote I/O lines.

The Output Port type is selectable from either open-drain or push-pull, while one part of the I/O ports is definable as either output pins for network status monitoring, strobe output pins to handshake with AD or DA converter, or input pins for external trigger.

TMC2084 also has additional functions including the function to notify the host of its status, the states of its Output Ports and settings, the function to send packets with timestamp, and the function to synchronize the on-chip timer to the host.

This rich feature set is contained in a single 48-pin TQFP package.

Block Diagram

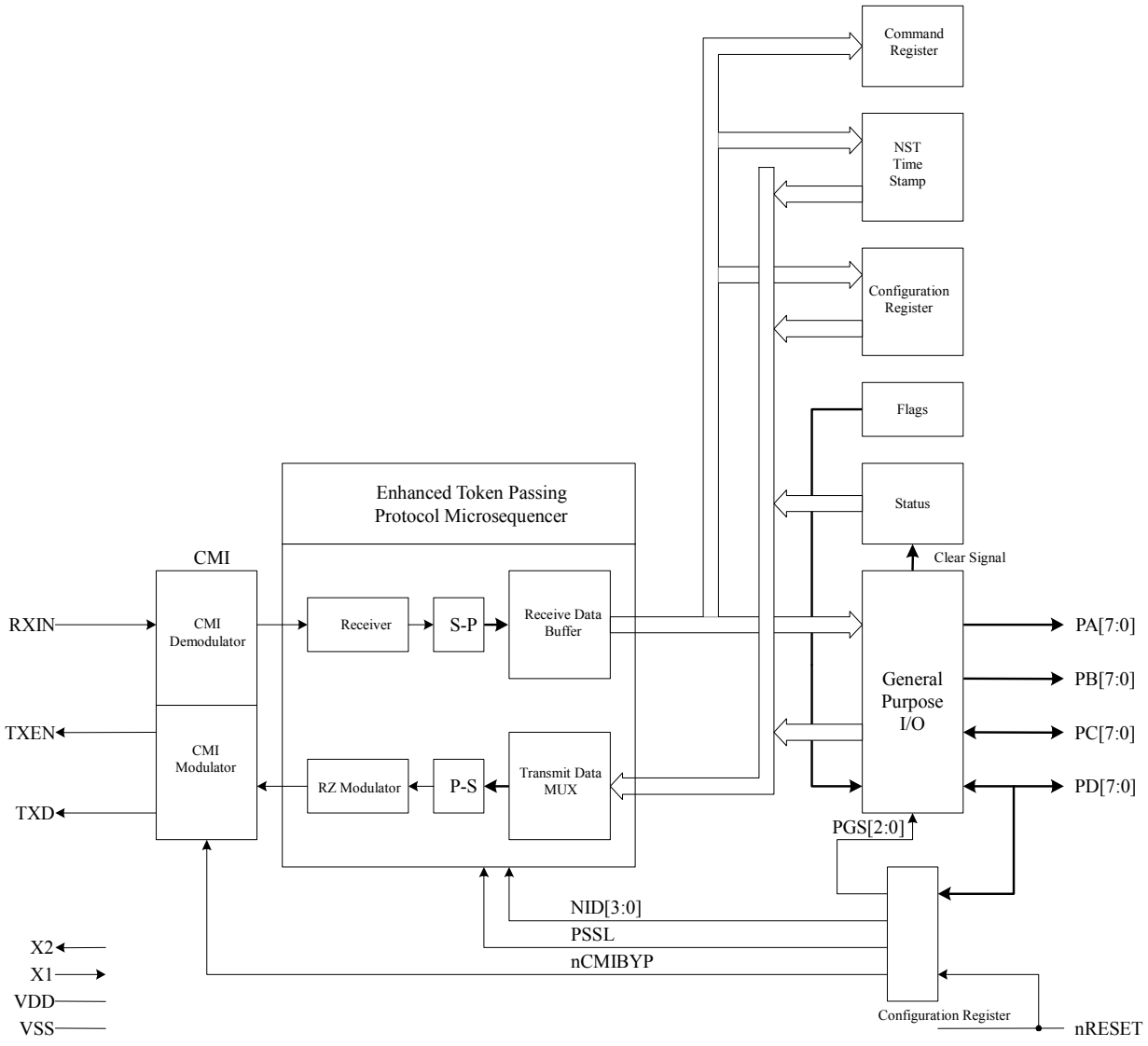

Figure 1 TMC2084 Block Diagram

PRODUCT PREVIEW

Package Outline

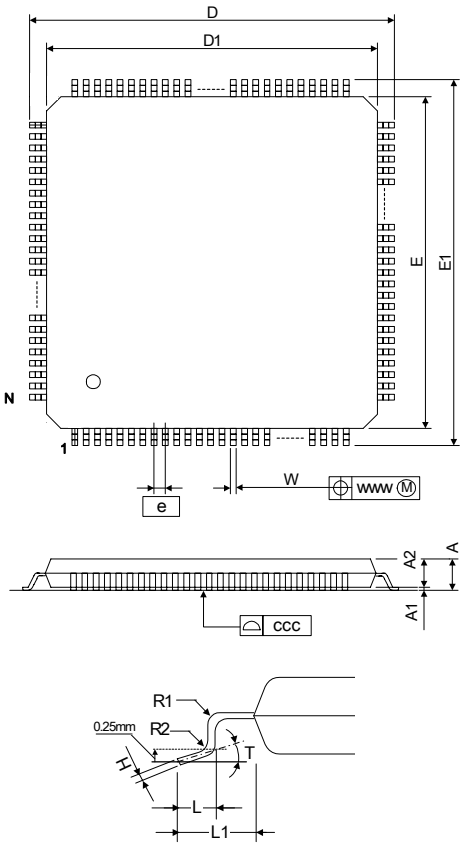

Figure 2 TMC2084 48-Pin TQFP Package Outline

Table 1 TMC2084 48-Pin TQFP Package Parameters

SYMBOL	ITEMS	MIN	TYP	MAX
A	Overall Package Height	-	-	1.6
A1	Standoff	0.05	-	0.15
A2	Body Thickness	1.35	-	1.45
D	X Span	8.8	-	9.2
D1	X body Size	6.9	-	7.1
E	Y Span	8.8	-	9.2
E1	Y body Size	6.9	-	7.1
H	Lead Frame Thickness	0.09	-	0.2
L	Lead Foot Length	0.45	0.6	0.75
L1	Lead Length	-	1.0	-
e	Lead Pitch		0.5 Basic	
T	Lead Foot Angle	0°	-	7°
W	Lead Width	0.17	0.22	0.27
www	Lead position Tolerance	-0.04	-	0.04
R1	Lead Shoulder Radius	0.08	-	-
R2	Lead Foot Radius	0.08	-	0.2
ccc	Coplanarity	-	-	0.08
N	Pin count		48	

Notes:
1. Controlling Unit: millimeter
2. Package body dimensions D1 and E1 do not include the mold protrusion
3. Maximum mold protrusion is 0.25 mm

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Microchip:
TMC2084-HT