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MAX-651

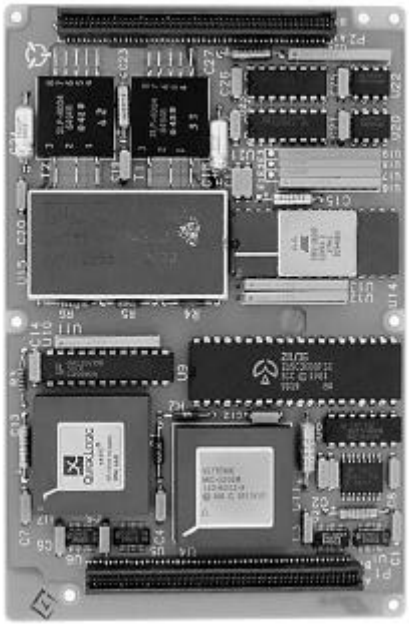
MIL-STD-1553B Serial/ Parallel MAXPack

Features

- *Mezzanine board supporting MAXPack slave interface*
- *Single MIL-STD-1553B dual-redundant A/B channel interface:*
  - *61580 Advanced Communication Engine (ACE) 1553B interface device with 8K bytes dual-port RAM*
  - *Support for transformer-coupled and direct-coupled (resistor) interfaces*
  - *BC, RT, MT modes*
  - *Support for 1553A, 1553B Notice 2 and STANAG 3838*
- *1553B interface software package available supporting BC, RT and MT modes*
- *Dual serial channels EIA-232 or EIA-422*
- *MEPCAM Utility Bus (M1A2) Interface (Optional)*
- *32-pin JEDEC site for EEPROM/Flash*
- *10-bit Parallel Interface*
- *Vectored interrupt reduces CPU overhead*
- *Software compatible with MAX-654*
- *Air-cooled and conduction-cooled for MIL-E-5400, MIL-E-4158, and MIL-STD-2036*
- *Optional levels of ruggedization available*

Description

The MAX-651 Mil-Std-1553B/Serial/Parallel MAXPack is a mezzanine module that provides a highly integrated solution of I/O and processing power when mated to a DY 4 base card. MAXPack modules are supported by DY 4's latest generation of 68040 single board computers such as the SVME/DMV-162 SBC and the SVME/DMV-163 SBC, as well as RISC-based SBC's such as the SVME/DMV-170. The MAX-651 is available in versions to mate with either air-cooled or conduction-cooled base boards. The compact size of the MAXPack design allows considerable I/O capability to be added to fully functional single board computers, thus increasing the packaging density available to the system integrator. Figure 1 shows a block diagram of the MAX-651.



MIL-STD-1553B Interface

The MIL-STD-1553B interface is implemented with 61580 Advanced Communication Engine (ACE) device made by ILC Data Device Corporation (DDC). The ACE is a highly integrated device providing a complete interface between a host processor and the MIL-STD-1553B bus. Features of the 61580 ACE include:

- Bus Controller (BC), Remote Terminal (RT) and Bus Monitor (MT) modes
- 8K bytes of dual port RAM
- Bus Controller features
  - BC frames up to 512 messages
  - Programmable inter-message gaps
  - Single frame or auto-repeat
  - Automatic retries
- Remote Terminal features
  - Multiple monitor modes

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- Message selection based on RT address
- Programmable trigger command word

The 61580 ACE device is software compatible with the 61554 AIM device which is used on the previous generation DY 4 DMV-154 SBC with 1553B. The MAX-651 is software compatible with the DMV-154 and MAX-654 products with only minor software modifications. The MAX-651 provides support for both direct-coupled and transformer-coupled interfaces via the host SBC P2 connector.

UBIC Interface

The MAX-651 is equipped with a Multiplexed Electrical Power/Data Control & Management (MEPCAM) interface from Vetronix Research Corporation. Also known by the US Army as a Utility Bus Interface Chip (UBIC), the UBIC uses two customized EIA-485-compatible serial communication channels which operate a 32-bit Manchester-encoded serial data protocol at speeds up to 3M bps.

The UBIC uses redundant serial lines to provide a decentralized CPU-less power/data distribution architecture for remote Vetronix systems. UBIC interrupts can be disabled by software control.

The MAX-651 is available without the UBIC installed.

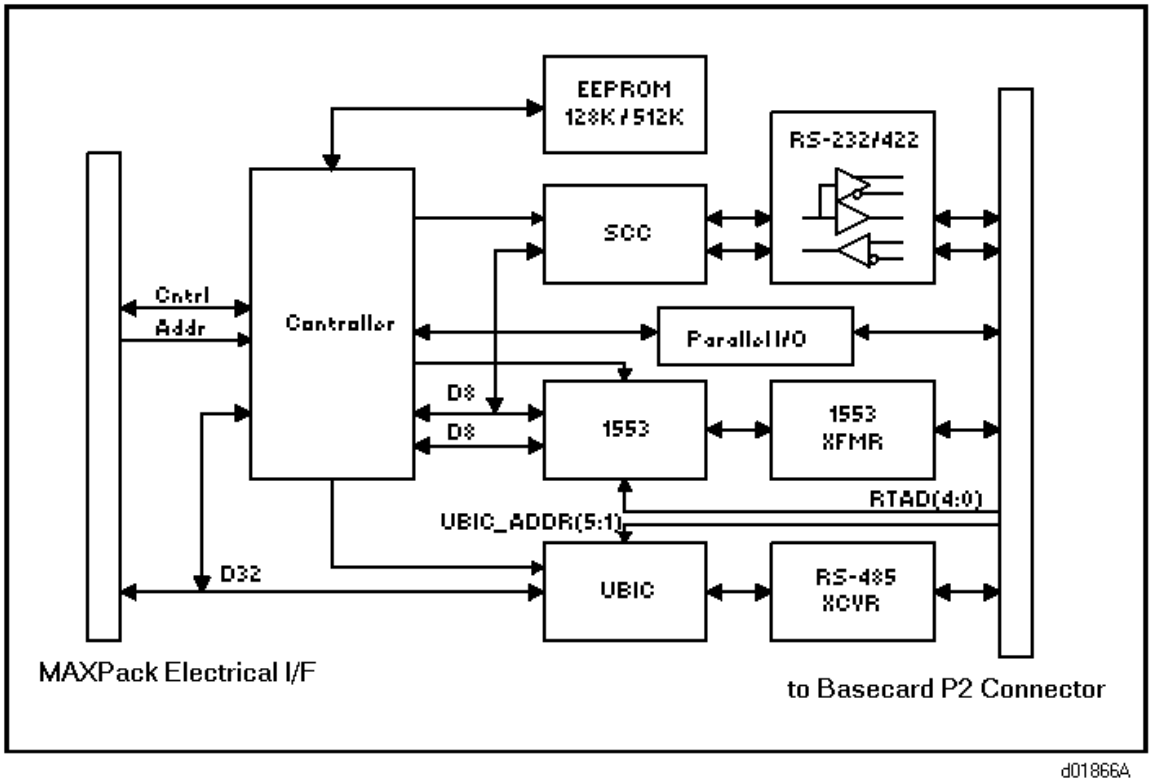


Figure 1 MAX-651 1553B/Serial/Parallel MAXPack Block Diagram

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Serial Channels

Using the industry-standard 85C30 serial communications controller, the MAX-651 can provide either two EIA-232C or two EIA-422 channels, or one of each. The EIA-422 outputs may be tri-stated under software control for multi-drop or half-duplex applications.

	Channels	
Signal	**1**	**2**
TxD	•	•
TxClk[1]	•	•
RxD	•	•
RxClk[2]	•	•
RTS[1]	•	•
CTS[2]	•	•

Notes:

1. Either TxClk or RTS must be selected on all channels.
2. Either RxClk or CTS must be selected.

	Channels Speed (Kbps)[1]	
Interface	**1**	**2**
EIA-232C	38.4	38.4
EIA-422	38.4	38.4

Notes:

1. All speeds are asynchronous; synchronous operation is possible with significant CPU support.

32-Pin JEDEC Site

A 32-pin industry-standard JEDEC site is available on the MAX-651 for the inclusion of either Flash EPROM or EEPROM devices of up to 512K bytes. This non-volatile storage is for use by the base card processor and is visible to the VMEbus interface.

Parallel I/O

The MAX-651 provides 8 dedicated TTL inputs and 2 lines which are configurable as inputs or outputs. All of the parallel I/O signals are equipped with on-board 4K7 pull-up resistors. These lines are particularly useful for general purpose TTL sensor or status inputs and to drive resultant outputs.

Vectored Interrupts

The Utility Bus interface, and the 85C30 Serial Communications Controller support vectored interrupts. A vectored interrupt for the 61580 device is provided by logic on the MAX-651. The feature reduces the CPU overhead required to service interrupts from the MAX-651, as each interrupting device can generate a unique vector to the host CPU.

MAXPack Interface

MAXPacks are mezzanine modules which may be fitted to several of DY 4's latest generation Single Board Computers. There are both air-cooled and conduction-cooled versions available. The conduction-cooled models incorporate an aluminum thermal plane which provides structural rigidity, and a good thermal path to the base board. The integrated assembly of base board and MAXPack module meets the same demanding environmental specifications as all other DY 4 conduction-cooled products. The MAXPack interface specification defines the electrical and mechanical elements of the MAXPack design, so that modules such as the MAX-651 can be used on future single board computer products. This will allow the systems integrator to upgrade to higher

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performance hardware while preserving the software invested in the MAXPack module.

Refer to document number 803705 *"MAXPack Mezzanine Interface Specification"* for additional details.

Supported Firmware/Software

The MAX-651 has available the following firmware:

- Card Level Diagnostics (CLD) - provides diagnostic routines which perform a self-test function in conjunction with the Built-In-Test equipment (refer to Card Level Diagnostics, document number MS00050)
- 1553B Interface Software. An optional 'C' language source code package implementing BC and RT functions. (refer to MIL-STD-1553B Interface Software, document number MS00217). P/N DSW-651-000
- VxWorks Driver. An optional 'C' driver includes the MIL-STD-1553B interface software above. P/N DSW-651-001

The CLD, 1553B interface software, and VxWorks driver components execute on the processor of the host SBC carrying the MAX-651.

Accessories/Variants

The MAX-651 is available in varying configurations to match the features, performance and ruggedizaton required for the target application. Additional items to assist in software development and system integration are available. The MAX-651 options and accessories consist of:

- De-populated 1553B interface
- De-populated UBIC interface
- Flash EPROM or EEPROM
- P2 I/O cable for development system use
- 1553B Interface Software Source Code Package
- VxWorks driver for the above

The SMAX-651 cards are available in ruggedization levels 0 to 3, and the DMAX-651 cards are available in levels 2 and 3.

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Table 1
Specifications

ENVIRONMENTAL SPECIFICATIONS		
Temperature	**(Level 0)**	
Operating	0°C to 50°C	MIL-STD-810
Storage	-40°C to 85°C	Methods 501.3 & 502.3
Temperature	**(Level 1)**	
Operating	-40°C to 85°C	MIL-STD-810
Storage	-40°C to 85°C	Methods 501.3 & 502.3
Temperature	**(Levels 2, 3)**	
†Operating	-55°C to 85°C	MIL-STD-810
Storage	-62°C to 125°C	Methods 501.3 & 502.3
Humidity (DMAX CCA and SMAX CCA - Level 3)		
Operating	0 to 95% non-condensing	MIL-STD-810
Non-Operating	0 to 100% condensing	Method 507.3
Vibration (DMAX CCA)		
Sine	5g at 15 to 2,000 Hz	MIL-STD-810
Random	$0.1g^2/Hz$	Method 514.4
Shock (DMAX CCA)		
	40g/11ms half sine	MIL-STD-810 Method 516.4, Proc 1
Altitude (DMAX CCA)		
	21,350m (70,000 ft)	MIL-STD-810 Method 500.3

Weight	**SMAX CCA**	**DMAX CCA**
	<180g (<0.40 lb)	<240g (<0.53 lb)

POWER REQUIREMENTS		
+5v (+5%, -2.5%)	1.4 A (maximum)	1.0 A (typical)
+12v (+5%, -2.5%)	35 mA (maximum)	16 mA (typical)
-12v (+5%, -2.5%)		
1553 idle	35 mA (maximum)	16 mA (typical)
25% duty cycle	120 mA (maximum)	80 mA (typical)
50% duty cycle	185 mA (maximum)	130 mA (typical)
100% duty cycle	305 mA (maximum)	230 mA (typical)

† As a general design objective, the junction temperature of all components on the DMAX-651-XXX is limited to 110°C maximum (when the chassis cold-wall temperature is 85°C.) When reliability or performance factors permit, a component's junction temperature may exceed 110°C marginally. SMAX board operating temperature is based on air flow of 11 cfm.

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