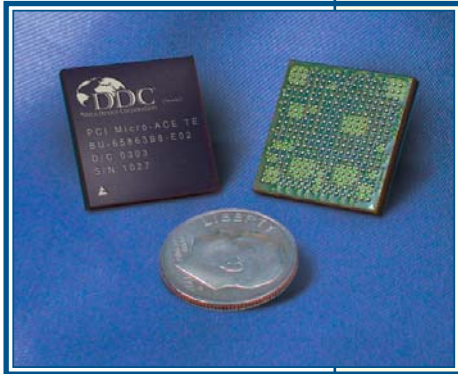


Micro-ACE, Micro-ACE TE™ and PCI Micro-ACE TE



MODEL: BU-6474XB/BU-6484XB/6486XB/6584XB/6586XB/61740B3/61840B3/61860B3



.8 X .8 inches,
1 mm Ball Grid Array

FEATURES

- World's Smallest 1553 Terminal
- Fully Compatible with Enhanced Mini-ACE Software and Architecture
- Available with PCI or Generic Processor Interface
- Extended Industrial Temperature Range: -40°C to +100°C Available
- Options for 3.3 Volt Only, 5.0 Volt Only or Mixed Voltage Operation
- 324 Ball 1.0 mm Pitch Ball Grid Array 0.64 in² Footprint
- 0.120" Max Height
- Fully Integrated 1553A/B Notice 2, 1760
- Highly Autonomous BC Architecture
- Built-In Controller with 20-Instruction Set
- Flexible RT Buffering
- Selective Message Monitor with Filtering
- 50% Rollover Interrupts for Stacks & Circular Buffers

DESCRIPTION

The Micro-ACE, Micro-ACE TE and PCI Micro-ACE TE are the world's smallest extended temperature range MIL-STD-1553 terminals. With a BGA package body of 0.64in², the Micro-ACE TE and PCI Micro-ACE TE are ideal for extended temperature range applications where PC board space is at a premium. The Micro-ACE TE and PCI Micro-ACE TE can be powered entirely by 3.3 volts, or they can be ordered with 5V transceivers for mixed 3.3V/5V operation.

The Micro-ACE version is available in a 128-ball BGA package, rated for -40°C to +85°C operation. The Micro-ACE TE version is rated for -40°C to +100°C operation.

The Micro-ACE, Micro-ACE TE and PCI Micro-ACE TE are fully software and architecturally compatible with DDC's Enhanced Mini-ACE and PCI Enhanced Mini-ACE series of devices. They integrate dual transceivers, protocol engine and up to 64K words of internal RAM. The PCI Micro-ACE TE makes it simple to connect to 32 Bit / 33 MHz PCI buses while the Micro-ACE TE's flexible generic processor interface allows direct connection with little or no glue logic to a variety of 8, 16 and 32-bit processors.

Advanced architecture is the key to the Micro-ACE series' high performance. Advanced bus controller architecture gives the Micro-ACE, Micro-ACE TE, and PCI Micro-ACE TE a high degree of flexibility and autonomy. This creates advantages in a number of areas: improving message scheduling control, minimizing host overhead for asynchronous message insertion, facilitating bulk data transfers and double buffering, message retry and bus switching strategies, and data logging and fault reporting. In addition, its remote terminal architecture provides flexibility in meeting all common MIL-STD-1553 protocols. RT data buffering and interrupt options offer robust support for synchronous and asynchronous messaging, ensure data sample consistency, and support bulk data transfers.



Figure 1: Micro-ACE TE BGA Outline Drawing

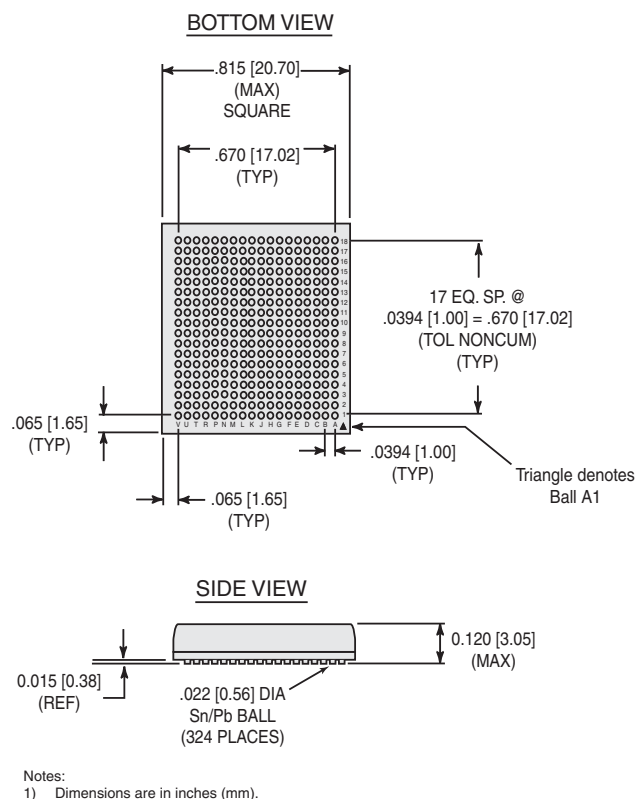
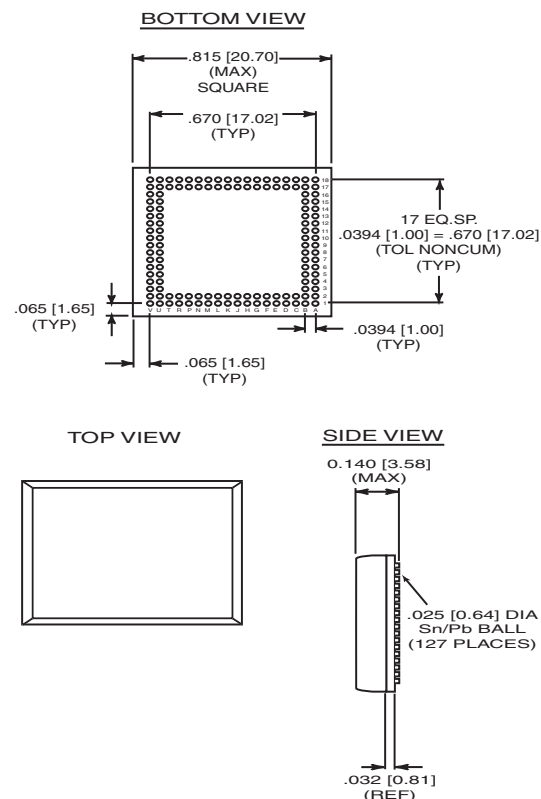


Figure 2: Micro-ACE BGA Outline Drawing



Smallest Extended Industrial Temperature Range MIL-STD-1553 Micro-ACE TE Terminal

- 324-Ball Plastic BGA
- Single 3.3V supply required for 3.3V transceiver versions
- 5 Volt-Tolerant Logic Signals (PCI signals are NOT 5V tolerant)
- Multiple thermal balls allow direct heat-sinking to PCB
- 3.3V transceivers have SLEEPIN input to reduce transceiver power further

Smallest Complete MIL-STD-1553 Micro-ACE Terminal

- 128-Ball Plastic BGA
- 0.815 x 0.815 inch Maximum Footprint Size
- 0.120 inch Maximum Height
- Thermal Balls to Improve Heatsinking
- -40° to +85°C Temperature Range

Most Autonomous BC Architecture

- Built in message control engine offloads host processor
- Control/Status Block for each message
- Minor and Major Frame Scheduling to control timing of 1553 messages
- High and Low Priority Asynchronous Message Insertion
- Conditional Messages of Subroutines based on User Defined Conditions
- Defined Set of Opcodes for Message Status, Time Tag, Immediate Data and Interrupt History
- Legacy made for compatibility with ACE and Mini-ACE applications

Remote Terminal Flexibility

- Multiprotocol: MIL-STD-1553A/B, STANAG-3838
- Choice of Subaddress Single Message, Double Buffering* or Circular Buffering; or Global Circular Buffering
- 50% and 100% Circular Buffer Rollover Interrupts
- Hardware or Software Programmable RT Address
- Programmable Command Illegalization
- Programmable Busy by Subaddress
- Interrupts on All Messages, or Individual Subaddresses and/or Mode codes
- 32-entry Interrupt Status Queue
- Bail-strappable for RT AUTO-BOOT (MIL-STD-1760 Applications): Initialize to RT Mode with Busv bit SET Following Power-UP

True Message Monitor

- Selective Message Monitor Filter Based on RT Address, T/R bit, Subaddress
- Command and Data Stacks
- 50% and 100% Rollover Interrupts
- 32-Entry Interrupt Status Queue

Autonomous Built-In Self-Test

- Protocol Self-Test
- RAM Self-Test
- Online Loopback Test
- Capability for CH. A-to-CH.B Wraparound Test
- Capability to Test Transmitter Timeout Function

Processor Bus or PCI Interface Flexibility

- Direct Interface to 8,16 or 32-bit Microprocessor or Microcontrollers
- Support for DMA Interface to External RAM*
- PCI versions have 33 MHz, 32-bit PCI target interface
- Supports 3.3V Logic Interface

Extensive User Configurability

- All devices can be used with external transceivers
- Software programmable divider to enable master 1553 clock of 10, 12, 16 or 20 MHz
- RT Auto-Boot Option

Hardware Evaluation Tool

- DDC Part# BU-64863B8-600: Daisy chain mechanical samples, with on-board die and ball pairs internally wired, for environmental (mechanical / thermal) integrity testing

* Not available for PCI Micro-ACE TE

Specifications

PARAMETER	MIN	TYP	MAX	UNITS	PARAMETER	MIN	TYP	MAX	UNITS
POWER SUPPLY REQUIREMENTS					POWER DISSIPATION (Micro-ACE TE) (continued)				
Voltages/Tolerance					25% Duty Transmitter Cycle			0.86	W
Logic/RAM +3.3V	3.0	3.3	3.6	V	50% Duty Transmitter Cycle			1.09	W
Logic/RAM +5.0V	4.5	5.0	5.5	V	75% Duty Transmitter Cycle			1.33	W
Transceivers +3.3V	3.15	3.3	3.45	V					
Transceivers +5.0V	4.75	5.0	5.25	V					
CURRENT DRAIN (Micro-ACE TE)					POWER DISSIPATION (Micro-ACE) (See Note 5)				
BU-64843B(R)8-E02, BU-65843B8-E02 (Note 1)					Total Hybrid				
(add 15 mA for BU-64863B(R)8-E02, BU-65863B8-E02)					BU-61740B(R)3, BU-61840B(R)3				
+3.3V					(Operated with 3.3V logic power)				
0% Transmit/Monitor w/ transceiver SLEEPIN asserted			54	mA	0% Transmit/Monitor		0.41	0.63	W
0% Transmit/Monitor w/ transceiver SLEEPIN negated			95	mA	25% Duty Transmitter Cycle		0.72	0.86	W
25% Duty Transmitter Cycle			315	mA	50% Duty Transmitter Cycle		0.97	1.09	W
50% Duty Transmitter Cycle			535	mA	75% Duty Transmitter Cycle		1.21	1.33	W
75% Duty Transmitter Cycle			755	mA					
BU-64840B3-E02, BU-65843B3-E02					BU-61860B(R)3				
(add 20 mA to +5V for BU-64860B(R)3-E02, 65864B3-E02) Note 4					(Operated with 3.3V logic power)				
+5V (Ch. A, Ch. B)					0% Transmit/Monitor		0.44	0.80	W
0% Transmit/Monitor			100	mA	25% Duty Transmitter Cycle		0.80	1.09	W
25% Duty Transmitter Cycle			216	mA	50% Duty Transmitter Cycle		1.17	1.39	W
50% Duty Transmitter Cycle			332	mA	75% Duty Transmitter Cycle		1.53	1.68	W
75% Duty Transmitter Cycle			449	mA					
+3.3V (Logic)			40	mA	Hottest Die (Transceiver chip)				
					0% Transmit/Monitor		0.18	0.28	W
CURRENT DRAIN (Total Hybrid) (Micro-ACE)					25% Duty Transmitter Cycle		0.48	0.58	W
BU-61740B(R)3, BU-61840B(R)3					50% Duty Transmitter Cycle		0.78	0.88	W
(Operated with 3.3V logic power)					75% Duty Transmitter Cycle		1.09	1.18	W
+5V (CH A, CH B)									
0% Transmit/Monitor		65	100	mA					
25% Duty Transmitter Cycle		180	216	mA					
50% Duty Transmitter Cycle		295	332	mA					
75% Duty Transmitter Cycle		410	449	mA					
+3.3V (Logic)		25	40	mA					
BU-61860B(R)3,									
(Operated with 3.3V logic power)									
+5V (CH A, CH B)									
0% Transmit/Monitor		66	120	mA					
25% Duty Transmitter Cycle		174	236	mA					
50% Duty Transmitter Cycle		282	352	mA					
75% Duty Transmitter Cycle		390	469	mA					
+3.3V (Logic)		25	40	mA					
POWER DISSIPATION (Micro-ACE TE) (1553 Bus dissipation subtracted)									
BU-64843B(R)8-E02, BU-65843B8-E02									
(3.3V transceiver, Note 1 and 2)									
(add .05W for BU-64863B(R)8-E02, BU-65863B8-E02)									
0% Transmit/Monitor w/ transceiver SLEEPIN asserted			0.18	W					
0% Transmit/Monitor w/ transceiver SLEEPIN negated			0.31	W					
25% Duty Transmitter Cycle			0.71	W					
50% Duty Transmitter Cycle			1.08	W					
75% Duty Transmitter Cycle			1.46	W					
BU-64840B3-E02, BU-65843B3-E02									
(3.3V logic, 5V transceiver, add .1W for BU-64860B(R)3-E02, BU-65864B(R)3-E02)									
Note 2 and 4									
0% Transmit/Monitor			0.63	W					

Notes:

1. Current drain and power dissipation specs are based upon a small sampling of 3.3V transceivers and are subject to change.
2. Power dissipation is the input power minus the power delivered to the 1553 fault isolation resistors, the power delivered to the bus termination resistors and the copper losses in the transceiver isolation transformer and the bus coupling transformer.
3. The thermal resistance numbers indicated are preliminary.
4. See Micro-ACE TE Data Sheet for current drain and power dissipation numbers for 5V only operation.
5. Power dissipation specifications assume a transformer coupled configuration with external dissipation (while transmitting) of 0.14 watts for the active isolation transformer, 0.80 watts for the active bus coupling transformer, 0.45 watts for each of the two bus isolation resistors and 0.15 watts for each of the two bus termination resistors.

Ordering Information

BU-64XX3X8-E02

- Test Criteria:**
2 = MIL-STD-1760 Amplitude
- Process Requirements:**
0 = Standard DDC Processing, no Burn-In
- Temperature Grade/Data Requirements:**
E = -40°C to +100°C
- Voltage/Transceiver Option:**
3 = +5V, rise/fall times = 100 to 300ns (-1553B)
8 = +3.3V, rise/fall times = 100 to 300ns (1553B)
- Package Type:**
B = 324 Ball BGA
R = Lead Free 324 Ball BGA
- Logic/RAM Voltage:**
0 = 3.3V or 5V Logic/5V RAM (5V RAM in BU-64860B(R)3 ONLY)
3 = 3.3 V Logic/RAM
- Product Type:**
BU-6474 = RT Only with 4K X 16 RAM
BU-6484 = BC/RT/MT with 4K X 16 RAM
BU-6486 = BC/RT/MT with 64K X 17 RAM

Available Micro-ACE TE Devices:

- BU-64743B8** = RT Only, 4K RAM x 16 RAM, 3.3V logic, 3.3V RAM, 3.3V Transceiver
- BU-64840B3** = BC/RT/MT, 4K RAM X 16 RAM, 3 or 5V logic, 5V transceiver NOTE 1
- BU-64840R3** = Lead Free BC/RT/MT, 4K RAM X 16 RAM, 3 or 5V logic, 5V transceiver NOTE 1
- BU-64860B3** = BC/RT/MT, 64K RAM X 17 RAM, 3 or 5V logic, 5V RAM, 5V transceiver
- BU-64843B8** = BC/RT/MT, 4K RAM X 16 RAM, 3.3V logic, 3.3V transceiver NOTE 1
- BU-64843R8** = Lead Free BC/RT/MT, 4K RAM X 16 RAM, 3.3V logic, 3.3V transceiver NOTE 1
- BU-64863B8** = BC/RT/MT, 64K RAM X 17 RAM, 3.3V logic and RAM, 3.3V transceiver
- BU-64863R8** = Lead Free BC/RT/MT, 64K RAM X 17 RAM, 3.3V logic and RAM, 3.3V transceiver

NOTE 1: See Application Note 37 for operating these devices in Simple System RT mode

BU-61XX0X3-202

- Test Criteria:**
2 = MIL-STD-1760 Amplitude Compliant
- Process Requirements:**
0 = Standard DDC Processing, no Burn-In
- Temperature Grade**/Data Requirements:**
E = -40°C to +85°C
- Voltage/Transceiver Option:**
3 = +5 volt, rise/fall times = 100 to 300 ns (-1553B)
- Package Type:**
B = 128 Ball BGA
R = Lead Free 128 Ball BGA
- Logic/RAM Voltage:**
0 = 3.3 V or 5.0V Logic
- Product Type:**
BU-6174 = RT-only with 4K X 16 RAM
BU-6184 = BC/RT/MT with 4K X 16 RAM
BU-6181 = BC/RT-MT with 64K X 17 RAM

** Temperature Range applies to ball temperature

Unless otherwise specified these products contain tin lead solder

BU-65XX3X8-E02

- Test Criteria:**
2 = MIL-STD-1760 Amplitude
- Process Requirements:**
0 = Standard DDC Processing, no Burn-In
- Temperature Grade/Data Requirements:**
E = -40°C to +100°C
- Voltage/Transceiver Option:**
8 = +3.3V, rise/fall times = 100 to 300 ns (-1553B)
3 = +5V, rise/fall times = 100 to 300 ns (-1553B)
- Package Type:**
B = 324 Ball BGA
R = Lead Free 324 Ball BGA
- Logic/RAM Voltage:**
3 = 3.3V Logic/RAM
4 = 3.3V Logic/5V RAM
- Product Type:**
BU-6584 = PCI BC/RT/MT with 4K X 16 RAM
BU-6586 = PCI BC/RT/MT with 64K X 17 RAM

Available PCI Micro-ACE TE Devices:

- BU-65843B3** = BC/RT/MT, 4K RAM X 16 RAM, 3.3V Logic and RAM, 5V transceiver
- BU-65864B3** = BC/RT/MT, 64K RAM X 17 RAM, 3.3V Logic and 5V RAM, 5V transceiver
- BU-65864R3** = Lead Free BC/RT/MT, 64K RAM X 17 RAM, 3.3V Logic and 5V RAM, 5V transceiver
- BU-65843B8** = BC/RT/MT, 4K RAM X 16 RAM, 3.3V Logic and RAM, 3.3V transceiver
- BU-65863B8** = BC/RT/MT, 64K RAM X 17 RAM, 3.3V logic and RAM, 3.3V transceiver

BU-61860B3-601

μ-ACE (128-ball BGA) mechanical sample, with "daisy chain" connections of alternating balls for use in environmental (mechanical/thermal) integrity of testing.

ORDERING INFORMATION for Daisy Chain Mechanical Sample:

BU-64863B8-600

Micro-ACE TE 324 Ball BGA Daisy Chain Mechanical Sample, ball pairs internally wired, fully populated with silicon die.



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