

ATCA BACKPLANES-DUAL STAR



* Photo of backplane is an older configuration. New photo coming soon!

FEATURES

- Compliant to PICMG 3.0 Rev. 1.0 specification
- Gigabyte/Terabyte per second bandwidth per shelf
- Connections to IPM Sentry shelf manager
- EasyPlug™ and standard versions available
- 18 layer controlled impedance stripline design
- Fourteen slot Dual Star topology - 2 Fabric slots, 12 node slots
- Dual shelf manager connectors in slot 0, allows full 14 slots

BOARD SPECIFICATIONS

- 18-layer board
- 2 oz. copper power and ground
- PCB UL recognized 94V-0
- PCB FR-4 or equivalent
- PCB .132" thick

MECHANICAL SPECIFICATIONS

- 5U height
- 14 slots (other sizes available)
- 1.2" pitch

DESCRIPTION

The Elma Bustronic 14-slot Dual Star AdvancedTCA (ATCA) backplanes are compliant to the PICMG 3.0 Rev.1.0 specification. The experts in high-speed differential pair routing, Elma Bustronic's ATCA backplanes have been simulated and characterized by our signal integrity lab to optimize performance.

The EasyPlug™ version is fully pluggable, offering hot-swappability "everywhere", saving cabling time and money, and reducing mean-time-to-repair (MTTR). These 7U backplanes feature pluggable connectors beneath the card cage area for fan trays, power entry modules, shelf managers, etc. Just like the 5U version, there is approximately 3U of space above the backplane in Zone 3 for rear transition modules.

PERFORMANCE

The theoretical performance of the 14-slot Dual Star ATCA Backplanes is a transfer rate of 10 Gb/s from each slot to each switch.

The speed performance of AdvancedTCA depends quite a bit on the fabric that runs over the architecture. With the new blade sizes and bandwidth capabilities of the fabrics, the performance of these systems will hit Gigabyte/Terabyte per second bandwidth across each shelf. The chosen ZD connector, is capable of handling 5 Gbps speeds over standard FR-4 PCB material.

SLOT POSITIONING

Dual Star Backplanes and frames require installation of Fabric Boards to provide connectivity between Node Boards. PICMG 3.0 requires Fabric Boards to be installed into the lowest numbered Logical Slots (e.g. Slots 1 & 2). PICMG 3.0 systems may, however, have Fabric Slots/Boards located in any physical slot position. To facilitate system configuration, the Chassis FRU ROM is required to provide a mapping of Logical Slot positions to Physical slot positions.

Through simulation/characterization studies from Bustronic's signal integrity lab, we have found that placing the hub slots in the middle of the backplane generally generates the best results. For more info on Bustronic's simulation studies for ATCA, contact Elma Bustronic.

UPDATE CHANNEL CONNECTIONS




The update channel connections for the 14-slot Dual Star backplanes are 1-4, 2-3, 5-6, 7-8, 9-10, 11-14, 12-13.

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DATA TRANSPORT

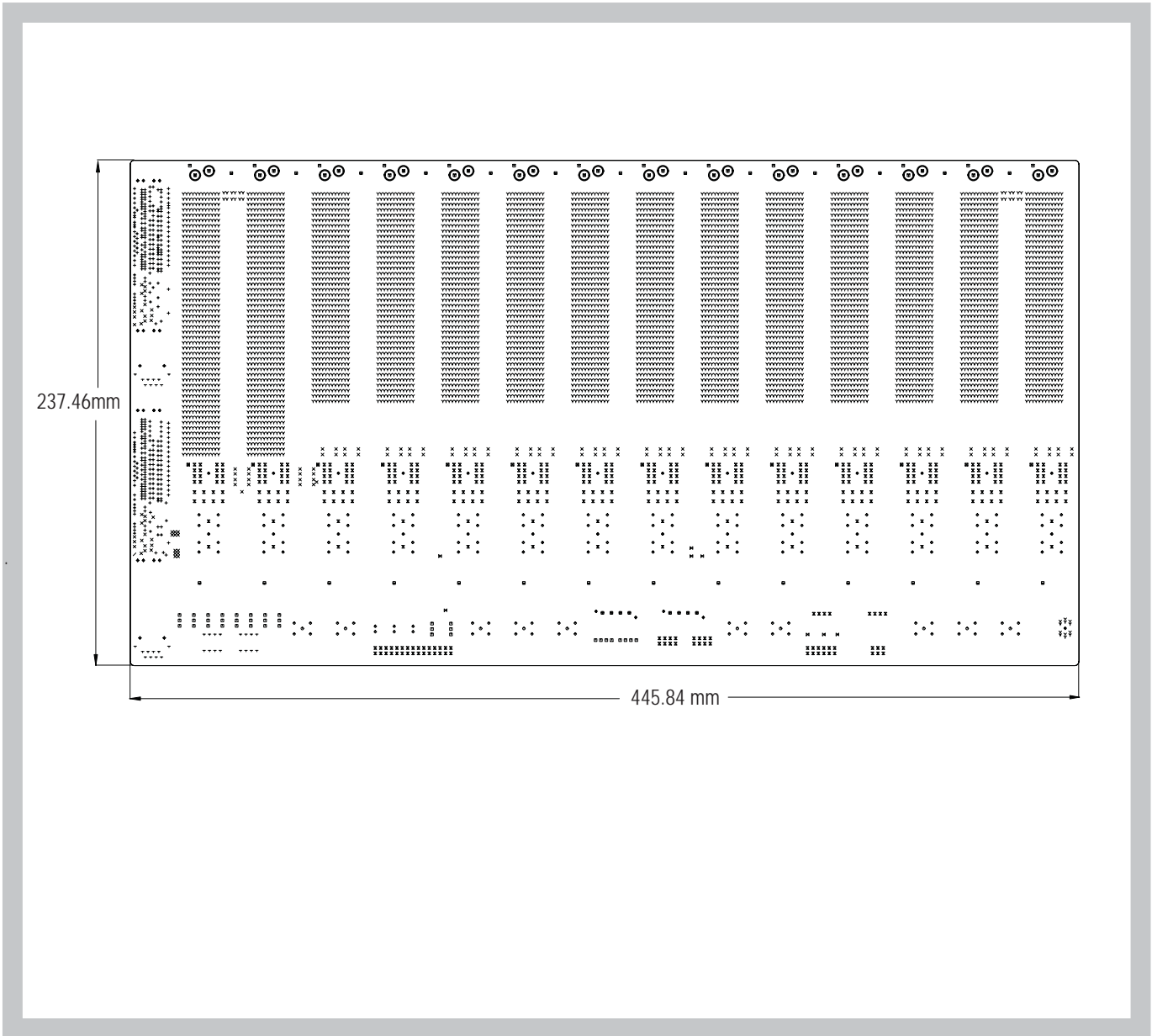
Table 6-12 Base Interface + Fabric Interface Dual Star routing assignments

| Logical Slot # | | | | | | | | | | | | | | | | | |
|----------------|-------------------|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| Connector | Channel # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| P20 | Fabric Channel 15 | 16-1 | 16-2 | | | | | | | | | | | | | | |
| P20 | Fabric Channel 14 | 15-1 | 15-2 | | | | | | | | | | | | | | |
| P20 | Fabric Channel 13 | 14-1 | 14-2 | | | | | | | | | | | | | | |
| P21 | Fabric Channel 12 | 13-1 | 13-2 | | | | | | | | | | | | | | |
| P21 | Fabric Channel 11 | 12-1 | 12-2 | | | | | | | | | | | | | | |
| P21 | Fabric Channel 10 | 11-1 | 11-2 | | | | | | | | | | | | | | |
| P21 | Fabric Channel 9 | 10-1 | 10-2 | | | | | | | | | | | | | | |
| P21 | Fabric Channel 8 | 9-1 | 9-2 | | | | | | | | | | | | | | |
| P22 | Fabric Channel 7 | 8-1 | 8-2 | | | | | | | | | | | | | | |
| P22 | Fabric Channel 6 | 7-1 | 7-2 | | | | | | | | | | | | | | |
| P22 | Fabric Channel 5 | 6-1 | 6-2 | | | | | | | | | | | | | | |
| P22 | Fabric Channel 4 | 5-1 | 5-2 | | | | | | | | | | | | | | |
| P22 | Fabric Channel 3 | 4-1 | 4-2 | | | | | | | | | | | | | | |
| P23 | Fabric Channel 2 | 3-1 | 3-2 | 2-2 | 2-3 | 2-4 | 2-5 | 2-6 | 2-7 | 2-8 | 2-9 | 2-10 | 2-11 | 2-12 | 2-13 | 2-14 | 2-15 |
| P23 | Fabric Channel 1 | 2-1 | 1-1 | 1-2 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 | 1-9 | 1-10 | 1-11 | 1-12 | 1-13 | 1-14 | 1-15 |
| | | | | | | | | | | | | | | | | | |
| P23 | Base Channel 1 | ShMC | ShMC | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 | 1-9 | 1-10 | 1-11 | 1-12 | 1-13 | 1-14 | 1-15 | 1-16 |
| P23 | Base Channel 2 | 2-2 | 1-2 | 2-3 | 2-4 | 2-5 | 2-6 | 2-7 | 2-8 | 2-9 | 2-10 | 2-11 | 2-12 | 2-13 | 2-14 | 2-15 | 2-16 |
| P23 | Base Channel 3 | 3-1 | 3-2 | | | | | | | | | | | | | | |
| P23 | Base Channel 4 | 4-1 | 4-2 | | | | | | | | | | | | | | |
| P23 | Base Channel 5 | 5-1 | 5-2 | | | | | | | | | | | | | | |
| P23 | Base Channel 6 | 6-1 | 6-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 7 | 7-1 | 7-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 8 | 8-1 | 8-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 9 | 9-1 | 9-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 10 | 10-1 | 10-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 11 | 11-1 | 11-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 12 | 12-1 | 12-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 13 | 13-1 | 13-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 14 | 14-1 | 14-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 15 | 15-1 | 15-2 | | | | | | | | | | | | | | |
| P24 | Base Channel 16 | 16-1 | 16-2 | | | | | | | | | | | | | | |

| | |
|---|---------------------|
|  | 8-Pair Full Channel |
|  | 4-Pair Base Channel |
|  | Unused |

ATCA BACKPLANES-DUAL STAR

LINE DRAWING



ORDER INFORMATION

| Total Slots | Fabric Slots | Node Slots | Width (in.) | Height (in.) | Part Number |
|-------------|--------------|------------|-------------|--------------|-------------|
| 14 | 2 | 12 | 17.55 | 9.35 | 109ATCA514 |

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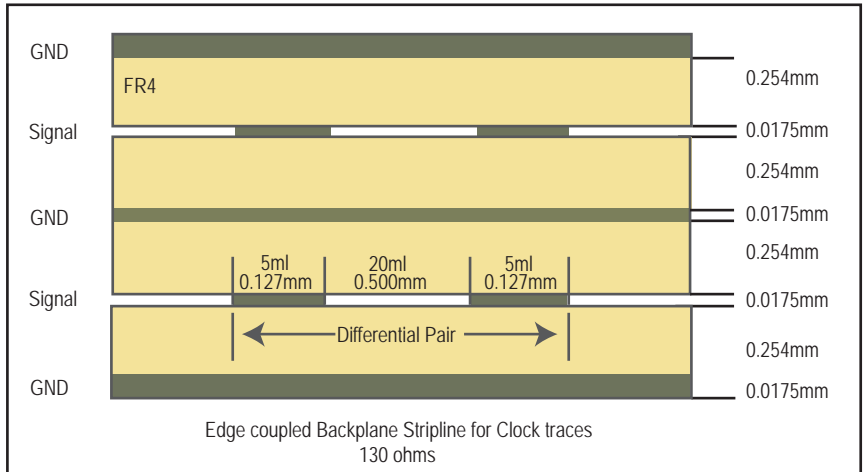
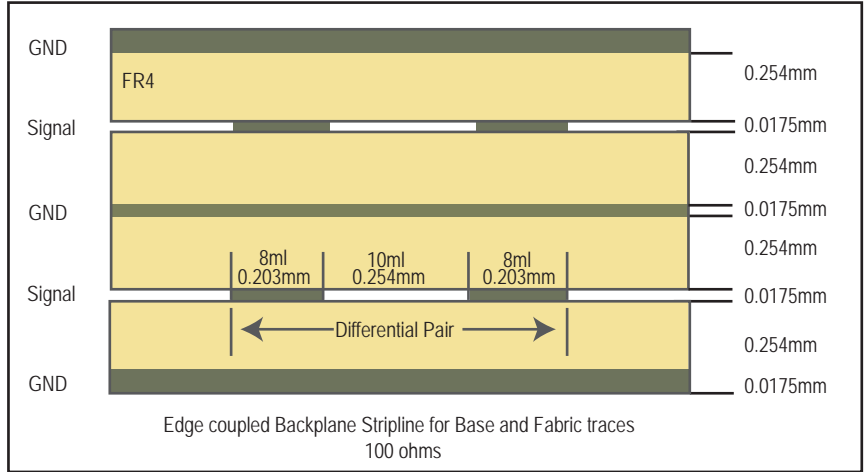
14-SLOT DUAL STAR ADVANCED TCA BACKPLANE INFORMATION

The serial links for Base Interface, Fabric Interface and Update Channel Interface are routed as edge coupled differential strip lines having an impedance of 100 ohms -10%.

- The Telephony Clock Interface is implemented as a MLVDS bused clock.
- The differential lines for Synchronization Clock Interface are terminated at each end with SMD resistors (case 0603) that are mounted directly to the backplane.

The serial links for Synchronization Clock Interface are routed as edge coupled differential strip lines having an impedance of 130 ohms -10%.

The Hardware Address pins of each physical slot are connected to GND or left open, depending on the logical slot related to each physical slot. In this stage, these connections are made by using a jumper field with 8 positions for each slot. The seven bits that determine the Hardware Address are configured as follows:



| Logical Slot | Hardware Address (7bit) | Logical Slot | Hardware Address (7bit) |
|--------------|-------------------------|--------------|-------------------------|
| 1 | 41h | 8 | 48h |
| 2 | 42h | 9 | 49h |
| 3 | 43h | 10 | 4Ah |
| 4 | 44h | 11 | 4Bh |
| 5 | 45h | 12 | 4Ch |
| 6 | 46h | 13 | 4Dh |
| 7 | 47h | 14 | 50h |

ATCA BACKPLANES-DUAL STAR

DESIGN ELEMENTS



Power Studs

POWER DISTRIBUTION

The Elma Bustronic ATCA backplane family uses the Positronic VPB series, part number VPB30W8F9300A1. Adequate numbers of 48V 6/32 studs are distributed throughout the backplane.

Materials and Finishes - VPB

Insulator: Glass-filled polyester, UL 94V-0, blue color.

Contacts: Precision-machined copper alloy with gold flash over nickel plate.

Electrical Characteristics -VPB

Contact Current Ratings, per UL 1977

Size 16 Power Contacts: 30 amperes continuous, all contacts under load.

Size 22 Signal Contacts: 2 amperes nominal rating.

Initial Contact Resistance;

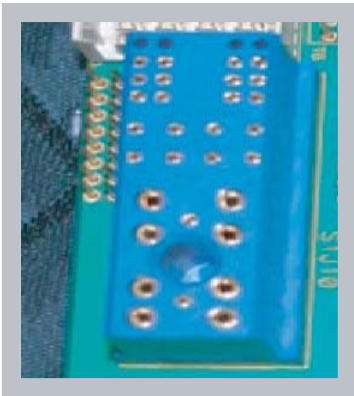
Termination to termination:

Size 16 Contacts: 0.0022 ohms maximum,

Size 22 Contacts: 0.0085 ohms maximum,

Per IEC 512-2, Test 2b.

Working Temperature: -55°C to +125°C.



VPB Power Connector

Common Contact Position Function - VPB

1-16 Low Speed Hardware Management

17-24 High Voltage Metallic Test and Ringing Generator Signals

25 Shelf Ground

26 Logic Ground

27/32 Enables for A and B power

28 A Return

29 B Return

30 A Early

31 B Early

33 A Voltage

34 B Voltage

SIGNAL CONNECTORS

The ZD connector is designed to handle over 5 Gbps speeds over standard FR-4 PCB material. The design includes shielded differential pair signal pins for high-performance.

OTHER CONNECTORS

Shelf Management Connectors

Shmc1 connector goes to the Shmc port on slot 1.

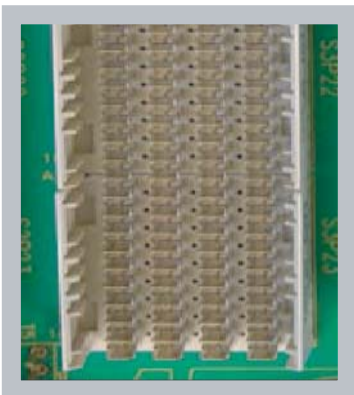
Shmc2 connector goes to the Shmc port on slot 2.

Metal and Ring Connectors

MT1 and MT2 are TYCO 880222-4. It mates to an EI Series receptacle with crimp termination, such as 172142-4. There is also an MT EI Series with IDC termination.

Ring Connector

The Ring connector is a Molex 71231-0005 which mates with the Molex 71694 and 5557 series.



ZD Signal Connectors