

ENGINEERING CHANGE NOTICE

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PART I

Brief description of the functional changes proposed:

This ECR describes changes in PCI Express graphics cards keepouts necessary to support card retention solutions.

Specification(s) this proposed change is against:

PCI Express Card Electromechanical Specification 1.0a

Benefits as a result of the proposed changes:

The proposed changes add additional keepouts on PCI Express add-in cards to enable the implementation of retention mechanisms to ensure system structural integrity.

An assessment of the impact to the existing revision and systems that currently conform to the PCI specification:

Impact is confined only to the PCI Express add-in cards, which do not exist yet, still under development.

An analysis of the hardware implications:

All PCI Express add-in cards are required to have the proposed feature/keepouts.

An analysis of the software implications:

None

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PART II

THE FOLLOWING CRITERIA APPLIES TO DEFINING A RESERVED PIN ON THE PCI CONNECTOR OR TO REQUEST A NEW COMMAND:

- The function is deemed to be important for the Continued growth and long-term well being of PCI. (A shot-term fixes to a problem does not merit consideration, i.e., IDEIRZ14.)
- There is no other effective way for the function to be implemented except using a reserved pin or new command. (Is there a solution that can be implemented in configuration space?)

Describe how the new function (on an Add-in Card) works with an existing system and other existing Add-in Cards?
N/A
Describe how existing Add-in Cards work when added into a system with the new function?
N/A
Are there any combinations not addressed by the previous two items? If yes, specify them and describe the interaction between new device and existing devices.
N/A

Why the proposed change is needed

The CEM spec (PCI Express Card Electromechanical Specification 1.0a) defines no feature and keepout on the PCI Express graphics (x16) cards for card retention, except for the full-length card. Thus, the specification does not provide any “hook up” point on the non-full-length graphics cards for people to implement card retention mechanisms.

Extensive shock and vibration tests done so far have shown that without an appropriate card retention mechanism, systems installed with PCI Express graphics cards that weigh more than ~250 grams will not pass the shock and vibration tests required by shipping. This ECR defines the feature and keepout on the PCI Express x16 graphics card to allow the implementation of card retention mechanisms with ensured interoperability. To avoid the potential problem of card component interference with the graphics card retention mechanism in the event of up-plugging, this ECR also defines the additional keepouts on I/O cards.

Description of the proposed change:

1. Add the following paragraphs right after the last paragraph on page 69:

Special attentions shall be given to graphics cards because of their potential high mass, driven by the high power allowed. This specification defines the additional feature and keepouts on the x16 graphics cards for card retention, as shown in Figure 6-3.

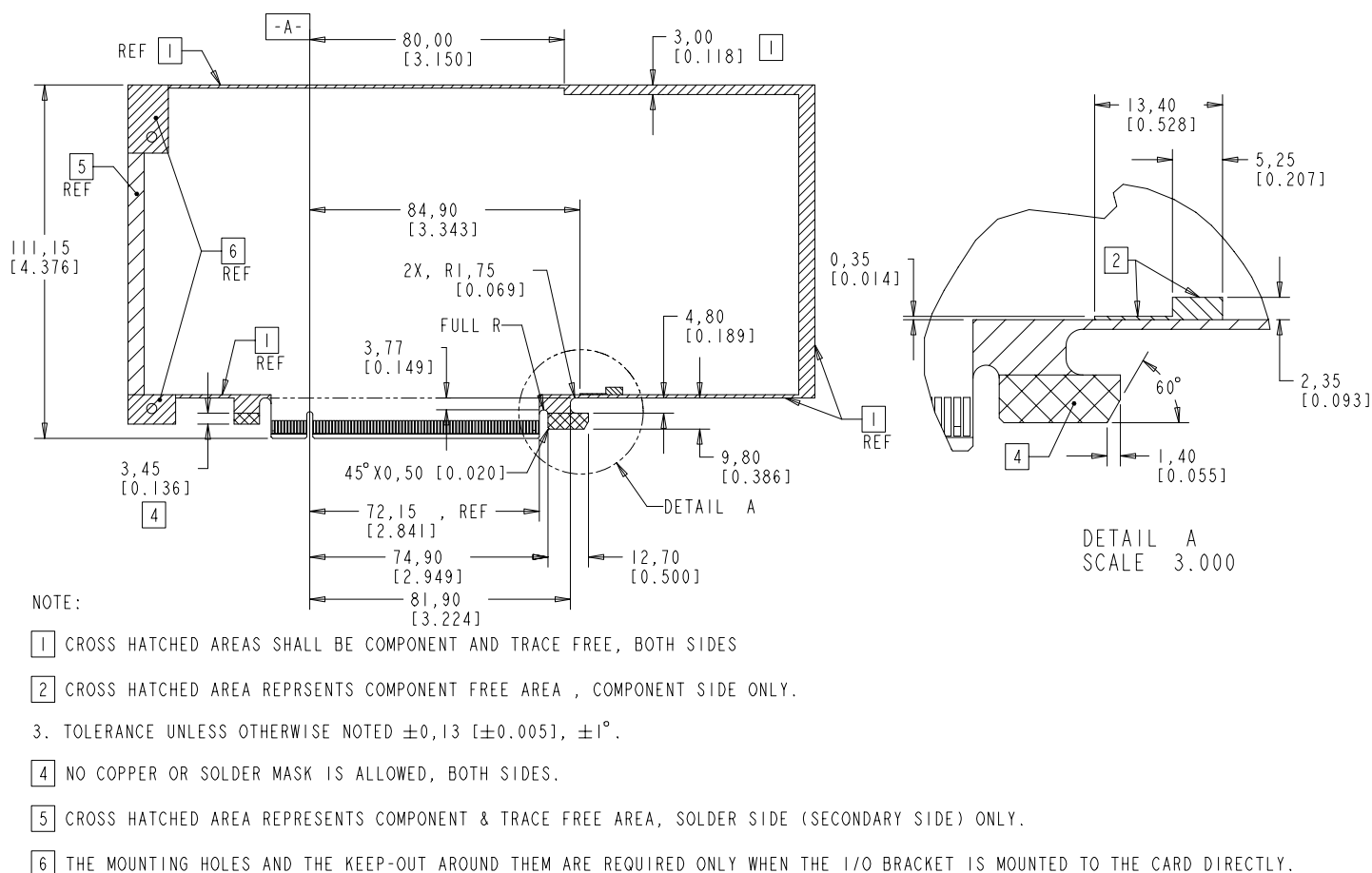


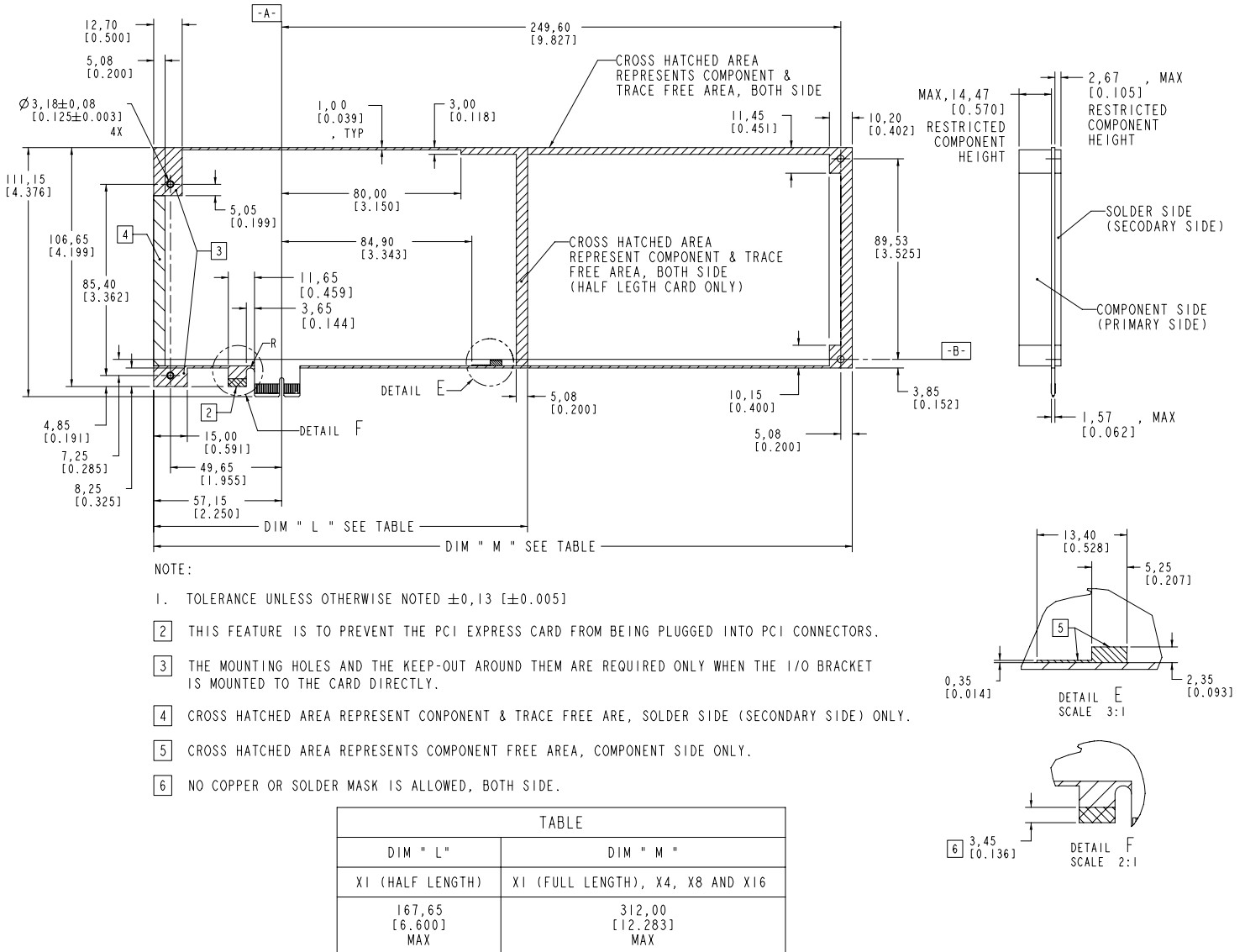
Figure 6-3: Additional feature and keepouts on x16 graphics card

The 3.0 mm keepout on the top of the card is to accommodate system or chassis level card retention solutions at each OEM's discretion. To facilitate a chassis level retention solution, the height of the standard height graphics card is required to be fixed: 111.15 +/-0.13 mm. Low profile graphics cards do not require the 3.00 mm keepout.

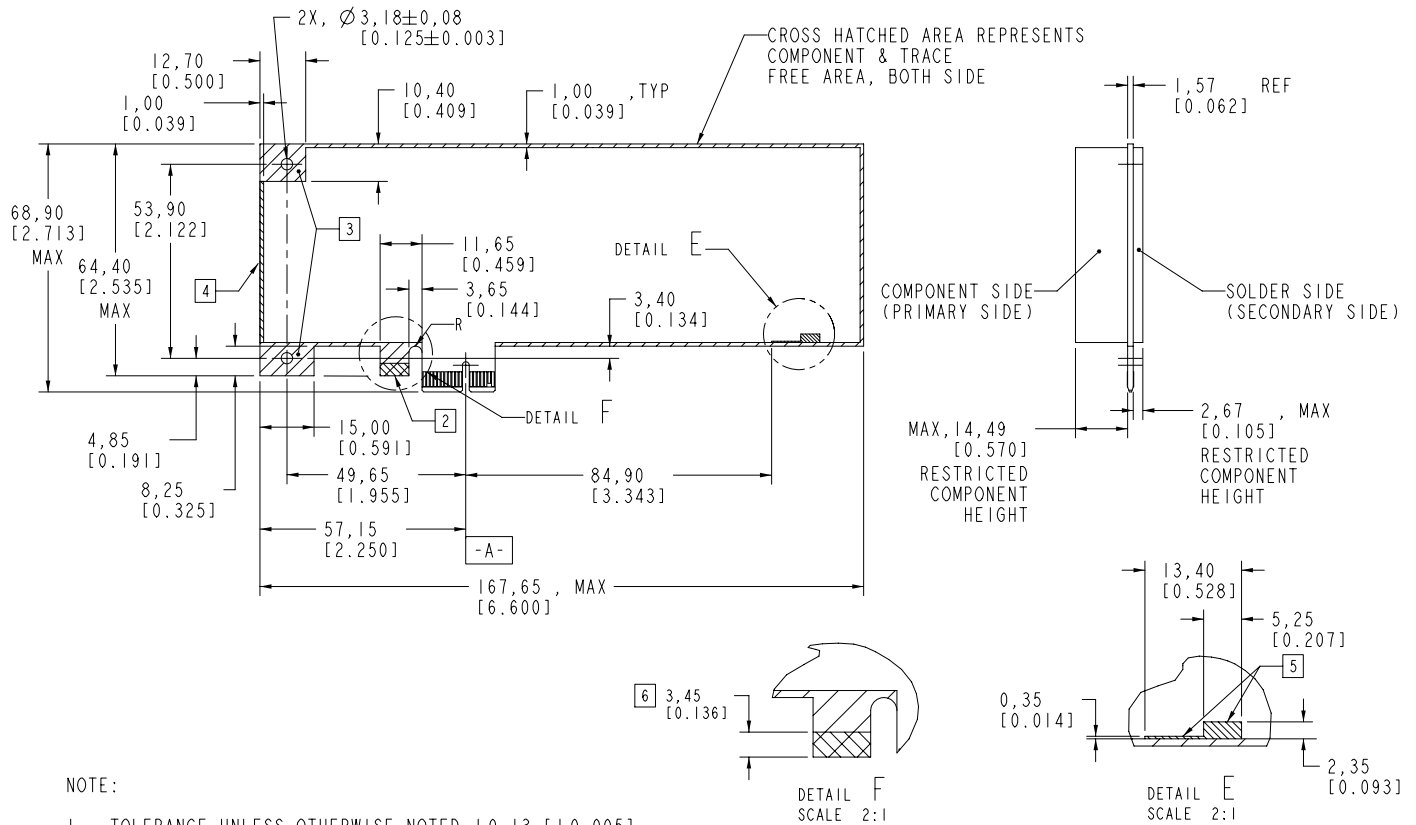
The “hockey stick” shaped feature and keepout defined on the bottom of the card is to allow retention mechanisms either mounted directly on the system board or integrated into the x16 connector. This feature and keepout are also required for the low profile graphics card.

All retention mechanisms that are intended for the x16 graphics cards must use the feature/keepout defined in Figure 6-3. But the specific retention mechanism design is system manufacturers’ choice. Reference retention mechanism designs are given in the PCI Express Graphics Card Thermal and Mechanical Design Guideline for Desktop Systems.

- Replace Figure 6-1 (standard height card) in Page 68 with (added a keepout marked in Detail E to avoid potential component interference with the graphics card retention mechanism when up-plugging; also, fixed the height to 111.15+/-0.13):



- Replace Figure 6-6 (low profile card) in Page 73 with (added a keepout in Detail E to avoid potential component interference with the graphics card retention mechanism when up-plugging):



NOTE:

1. TOLERANCE UNLESS OTHERWISE NOTED $\pm 0,13$ [± 0.005]
- 2 THIS FEATURE IS TO PREVENT THE PCI EXPRESS CARD FROM BEING PLUGGED INTO PCI CONNECTORS.
- 3 THE MOUNTING HOLES AND THE KEEP-OUT AROUND THEM ARE REQUIRED ONLY WHEN THE I/O BRACKET IS MOUNTED TO THE CARD DIRECTLY.
- 4 CROSS HATCHED AREA REPRESENT COMPONENT & TRACE FREE AREA, SOLDER SIDE (SECONDARY SIDE) ONLY.
- 5 CROSS HATCHED AREA REPRESENTS COMPONENT FREE AREA, COMPONENT SIDE ONLY.
- 6 NO COPPER OR SOLDER MASK IS ALLOWED, BOTH SIDE.

4. Adjust all figure numbers accordingly in Chapter 6.

Why the proposed change is adequate

Retention mechanism reference design, prototype, and validation have been done. It has proven that with the defined additional feature/keepouts on the x16 graphics card, we can develop retention mechanisms to meet the system shock and vibration requirements. Detailed discussions on the card retention requirements and reference design will be given in PCI Express Graphics Card Thermal and Mechanical Design Guideline for Desktop Systems.