Proposed Draft

Serial ATA International Organization

Version 1.0
10/25/2007

Serial ATA Revision 2.6 Design Guide # 003 Title : System Guideline for Slimline ODD Connector

Author Information

Author Name	Company	Email address
See Fan Leong	Tyco Electronics	sfleong@tycoelectronics.com
Yasuhiro Horiuchi	Lenovo	HORIUCY@jp.lenovo.com
David Cawthon	HP	david.cawthon@hp.com

Workgroup Chair Information

Workgroup	Chairperson Name	Email address
CabCon	Frank Chu	Frank.Chu@Hitachigst.com

Document History

Version	Date	Comments
0.1	10/17/2007	Initial release.
0.11	10/18/2007	Adding Design Guide number
0.12	10/19/2007	Editorial updates with placeholders for alignment requirements
1.0	10/25/2007	Added alignment requirement and additional technical background

1 Introduction

There is a potential of the Slimline Host Receptacle stubbing against the PCB of the Optical Disk Drive during blind mating in extreme tolerance situation. The area of potential stubbing is shown in Figure 1.

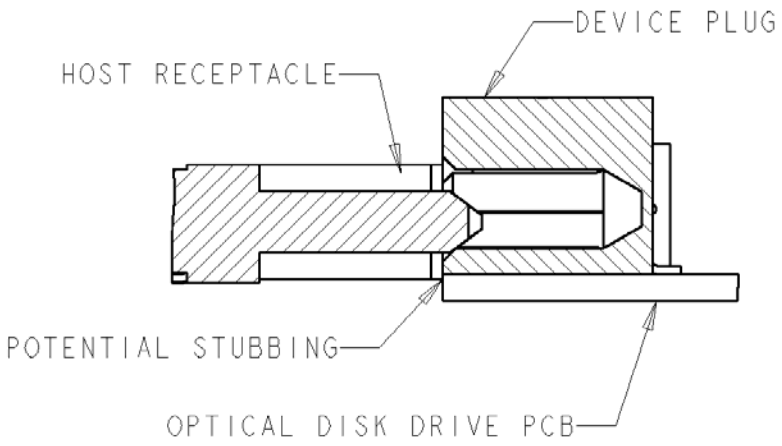

Figure 1

2 Supplemental Information

Two possible solutions for solving the system implementation problem.

2.1 Solution Option #1

One solution to eliminate the potential of stubbing is to provide a cut-out on the Optical Disk Drive PCB shown in Figure 2

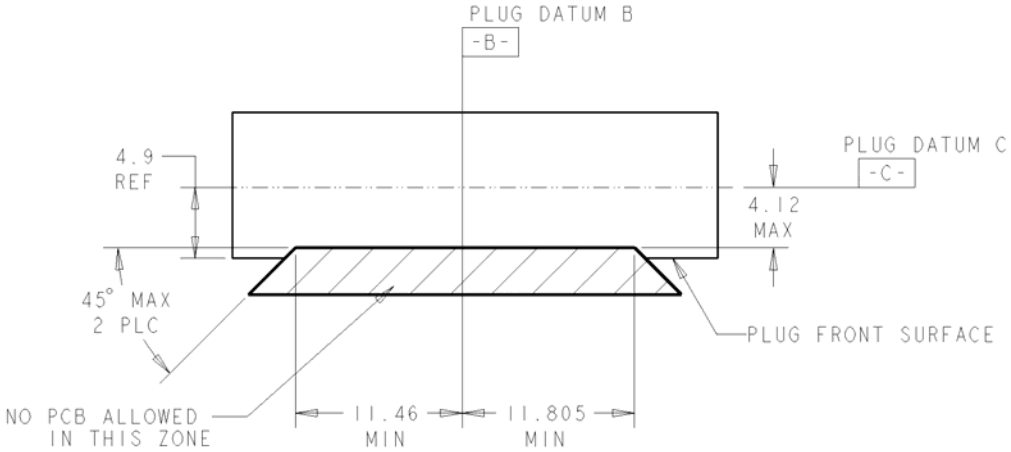

Figure 2 PCB Cut-out

2.2 Solution Option #2

Figure 1 indicates that there is a potential of the Slimline Host Receptacle stubbing against the PCB of the Optical Disk Drive during blind mating in extreme tolerance situation.

To prevent this stubbing problem if the PCB cut-out is not implemented, system should implement a mechanism to prevent this. During the initial blind mating phase, both the system and the device connectors are aligned such that the device connector Datum A relative to the host connector Datum A is at 0 mm (coincident) to -1.2 mm (below). See the following analysis for background inforrmation.

Figure 3 shows the system connector (left) and device connector (right) with datum A aligned:

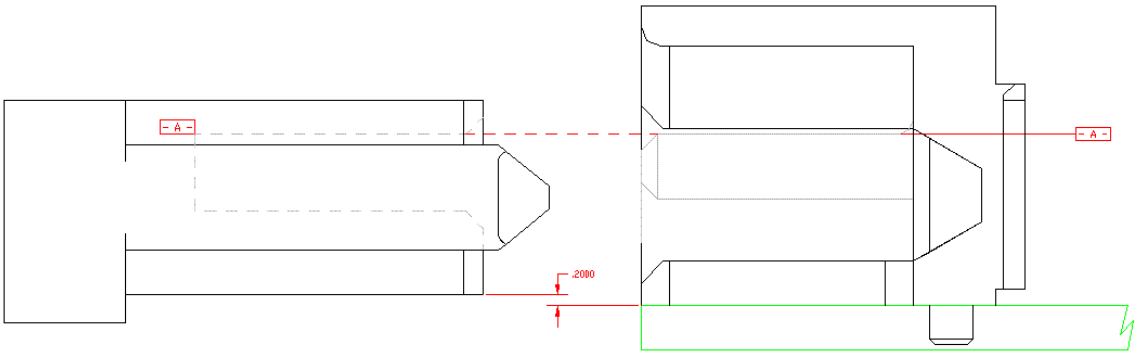

Figure 3 Connector datum A alignment

The nominal clearance between the two interfering parts is 0.2mm:

- Datum A is directly dimensioned as 3.1mm +/-0.08mm from the bottom of the connector in Fig 62 for the device
- Datum A to the bottom surface is indirectly obtained from Fig 72 as 2.9mm. The tolerance is a combination of the size and position tolerance. In this case it is half of the size tolerance (0.04mm) plus the allowable position tolerance of 0.15mm (or equivalently, +/-0.075mm)

The tolerance for the total gap is 0.2 +/- 0.195mm if using the total tolerance method. (It is 0.2 +/- .039mm for the RSS method.) Since even the total tolerance method results in a clearance there is no chance that in-spec parts will interfere based on the gap tolerances. The tolerance essentially uses up all of the nominal gap however (except for the .005mm on the low side; to me something looks wrong with saying you have a blind mate tolerance of +1.2/-.005mm).

Given this, if the connectors are not aligned at Datum A or with the device connector low relative to the host connector there is a potential for stubbing.

It is important to point out that the blind mate tolerance for this connector was originally listed as +/-1.2mm. This alignment restriction eliminates half of this total blind mate tolerance. The section of the SATA spec that shows the blind mate needs to have a footnote to refer to the design guide options.