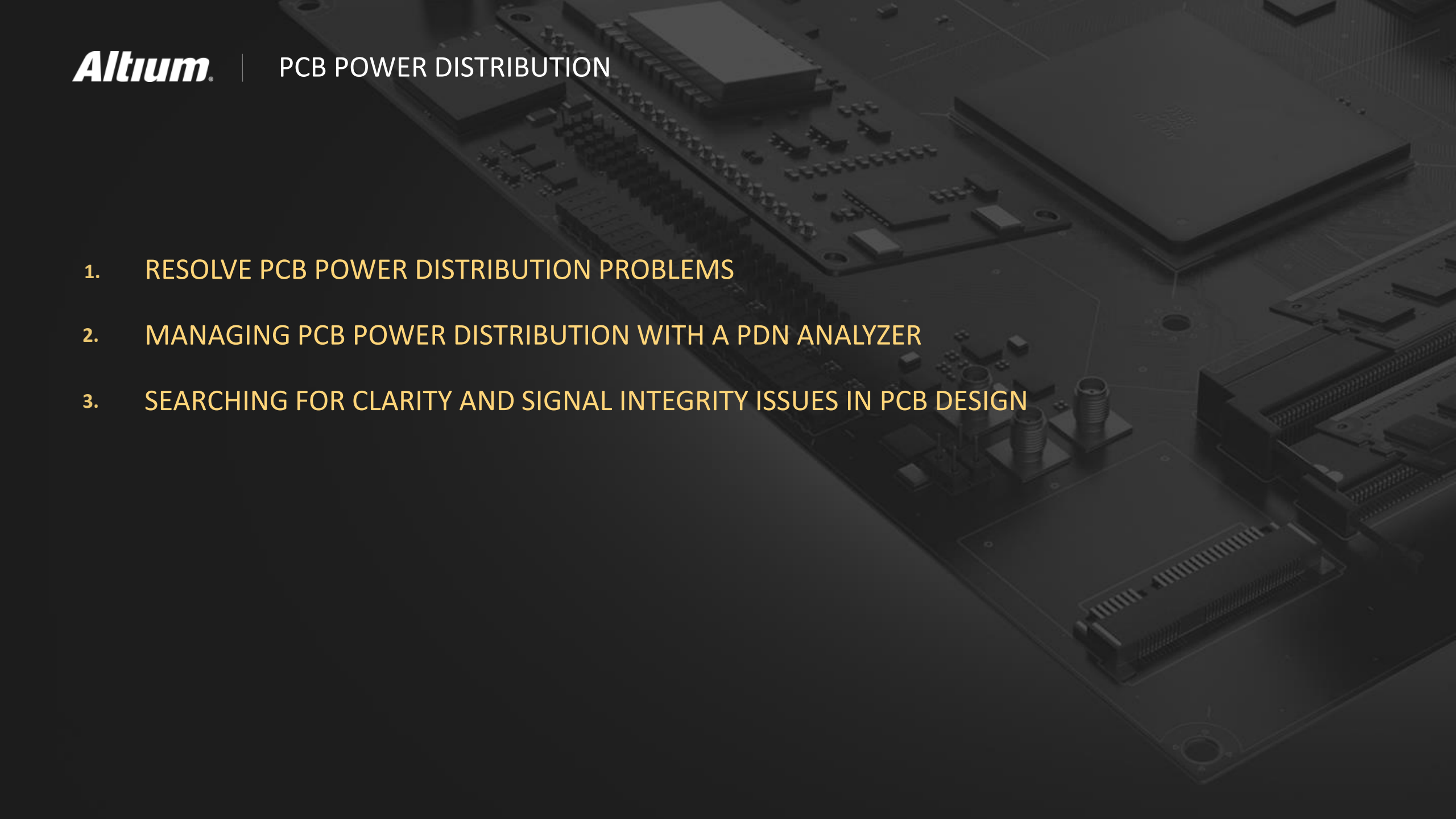
Altium

PCB Power Distribution

PCB POWER DISTRIBUTION



1. RESOLVE PCB POWER DISTRIBUTION PROBLEMS
2. MANAGING PCB POWER DISTRIBUTION WITH A PDN ANALYZER
3. SEARCHING FOR CLARITY AND SIGNAL INTEGRITY ISSUES IN PCB DESIGN

1

Resolve PCB Power Distribution Problems

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Placement methods are important. Here are some tips and strategies to consider for high speed designs.

High speed PCB design part placement - Avoid placing sensitive high speed devices close to the edge of the board. This is because the edge of the board has different impedance characteristics, and there is a greater chance of electromagnetic interference (EMI).

Thermal effects are another aspect of high speed design placement to consider. This is because high speed devices may run at higher temperatures than standard components.

Preparing for placement by floor planning your parts - Create a floor-plan of your parts placement. By planning ahead, you can account for small parts like termination resistors and bypass capacitors.

Placement Tips and Strategies

Consider the placement of your termination resistors.

Although there are various schemes for placing termination resistors based on the needs of the circuit, the following two examples are the most widely used:

Simple Parallel Termination- This scheme puts one side of a termination resistor on the end of the circuit closest to the receiver while the other side is tied to power or ground.

Series Termination - With this scheme, the resistor is placed inline immediately after the driver pin of the circuit.

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2

Software Performance and the Layout of Planes

Creating Power and Ground Planes

There are two ways that we create power and ground planes in PCB design tools, as a positive image and as a negative image.

Positive Planes- A positive plane is usually created by designating a polygon shape on the board, and the layout tool will fill it in giving you a solid plane image. Positive planes require higher performance.

Negative Planes- A negative plane is a reverse image of a positive plane.

Challenges with Positive Planes

In today's PCB design tools we don't have to worry about D-code assignments, or how our design will affect the photoplotter.

Early photo plotters used a bright lamp that was focused through a physical aperture in order to create an image on the film.

Early photo plotters used the original Gerber format for their input, and the apertures were assigned to "D-codes".

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3

Tips for Using Optocouplers in PCB Layout

Basic Principles of An Optocoupler

Optocouplers are electronic components that isolate input signals through an optical interface.

The most basic form of optocoupler consists of an infrared LED and a photo-transistor within a single integrated circuit. The infrared LED and the phototransistor are often separated by glass or air.

Optocouplers are also used to keep low voltage and high voltage systems apart. This eliminates the risk of circuitry faults that can cause damage to the microcontroller and its accompanying components.

Common Mistakes With Optocouplers

The optocoupler is a simple passive component that most designers encounter. There are a couple of design mistakes that defeat the purpose of using one or that causes unstable input signals.

Failing To Separate Optocoupler Ground Connections - The integrated circuit (IC) consists of two ground pins. One is connected to the infrared LED and the other connected to the photo-transistor.

Using The Wrong Value For The Current Limiting Resistor - The optocoupler's infrared LED require adequate current to function properly. The value of the minimum forward current can be referred from the Current Transfer Ratio chart of the respective optocoupler.

Choosing The Wrong Optocoupler - Not all optocouplers are built the same. For example, the opto-triac is used for controlling an AC load and opto-Darlington is ideal for situations where only a small amount of input current is generated

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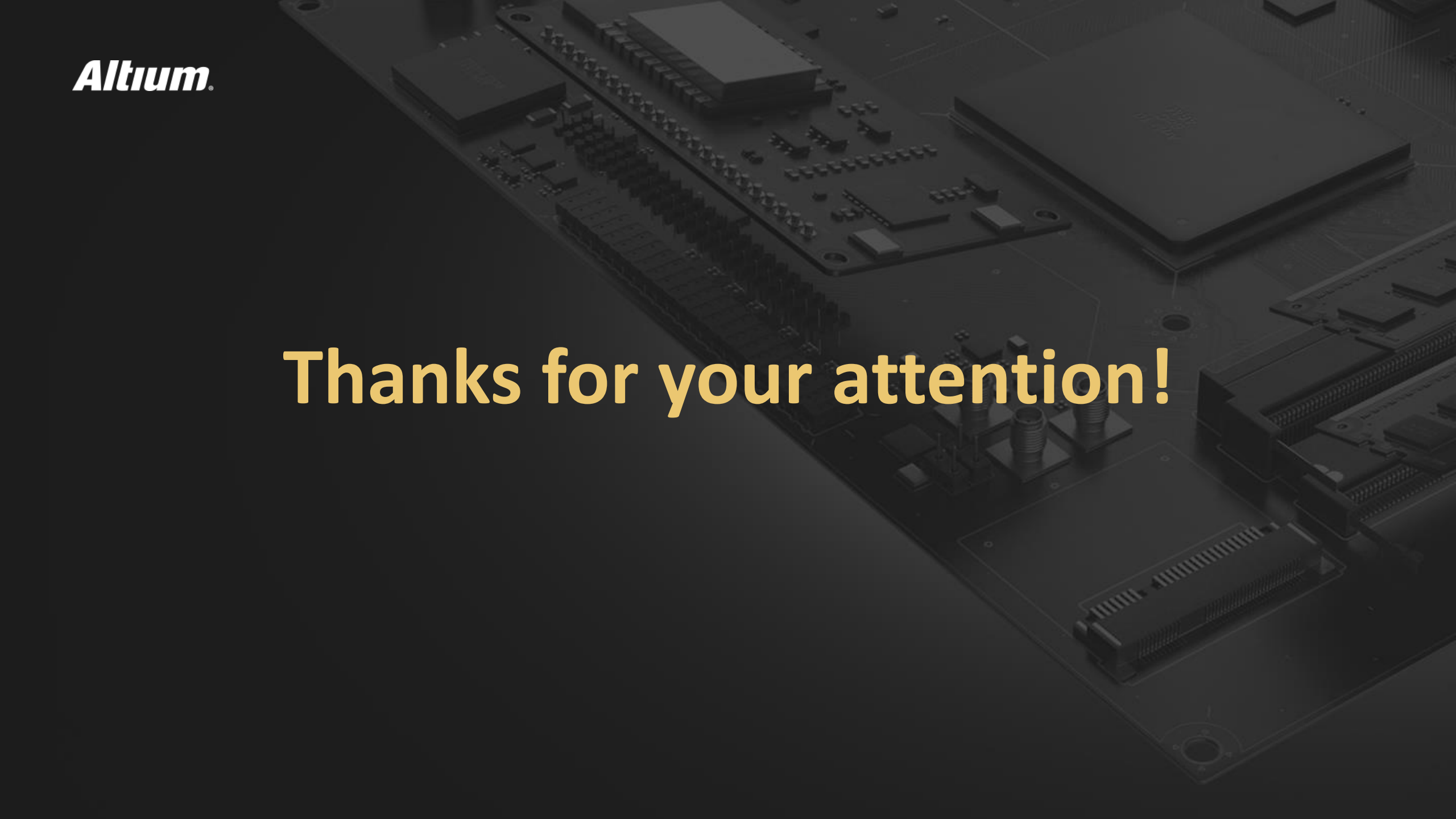

Thanks for your attention!