



Reference Cases



Application boards





Theme

- This section will show samples from our application board design experience with brief information.
- This will help to convey our experience in handling some of the standard interfaces/protocols like
 - DDR
 - PCIe
 - Ethernet
 - USB
- It will show our experience in handling the layout of FPGA, DSP, JTAG, ADCs and so on.
- Also this document will show the level of complexity which we are used to in Application Boards.



Project 1 : EX-DA-120

- Notable Technologies/concepts used:
 - DDR
 - Ethernet
 - USB
 - FPGA
 - ADC
- Total components : 4115
- Total net count : 3069
- Total connections : 12988
- Total layer count (stack) : 16



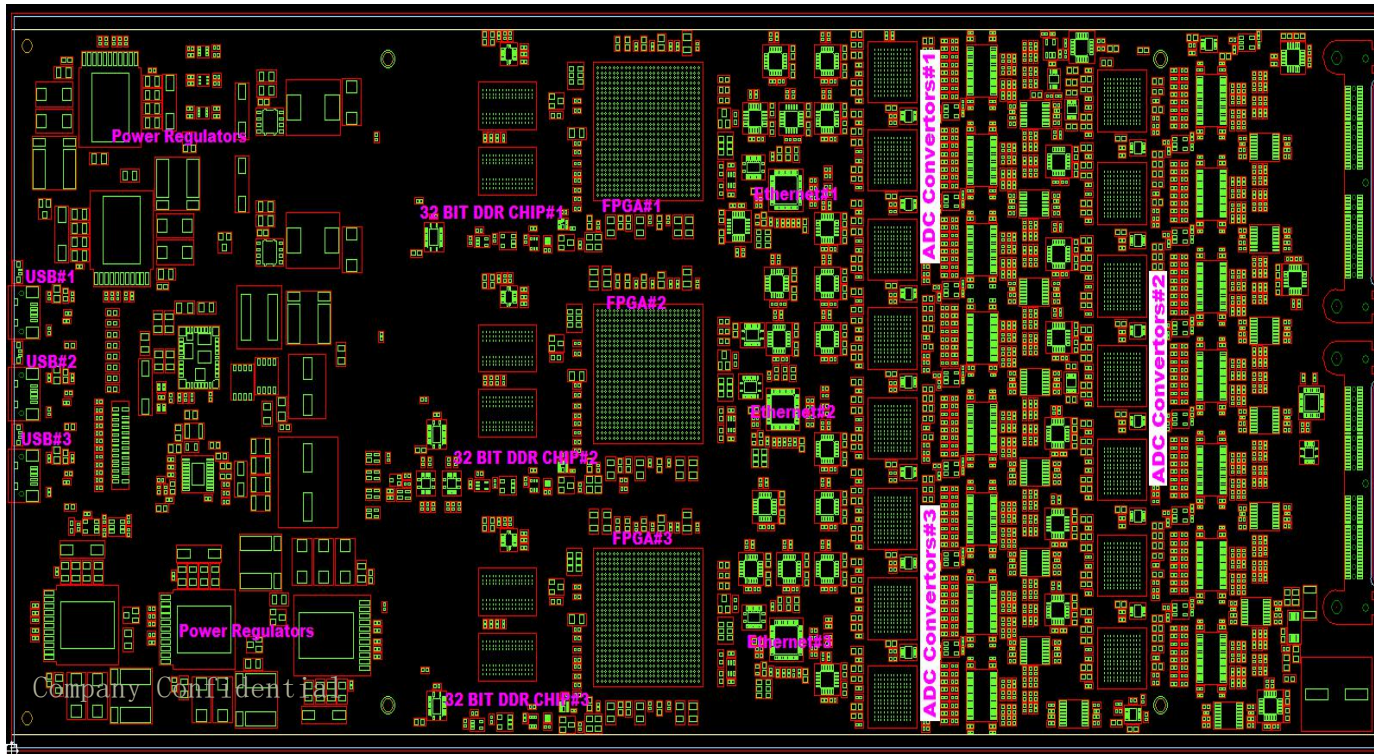
Project 1 : Scope

- Scope :
 - Library validation/creation
 - Customer sent out their existing library collections and we created the other parts which were not in that collection.
 - And validation is done for the entire Library against BOM.
 - Placement to Gerbers
 - Complete placement, constraint settings, routing and all non-electrical works were done in house.
 - Complete set of Manufacturing files (Validated by internal CAM team) was delivered to FAB.



Project 1 : EX-DA-120

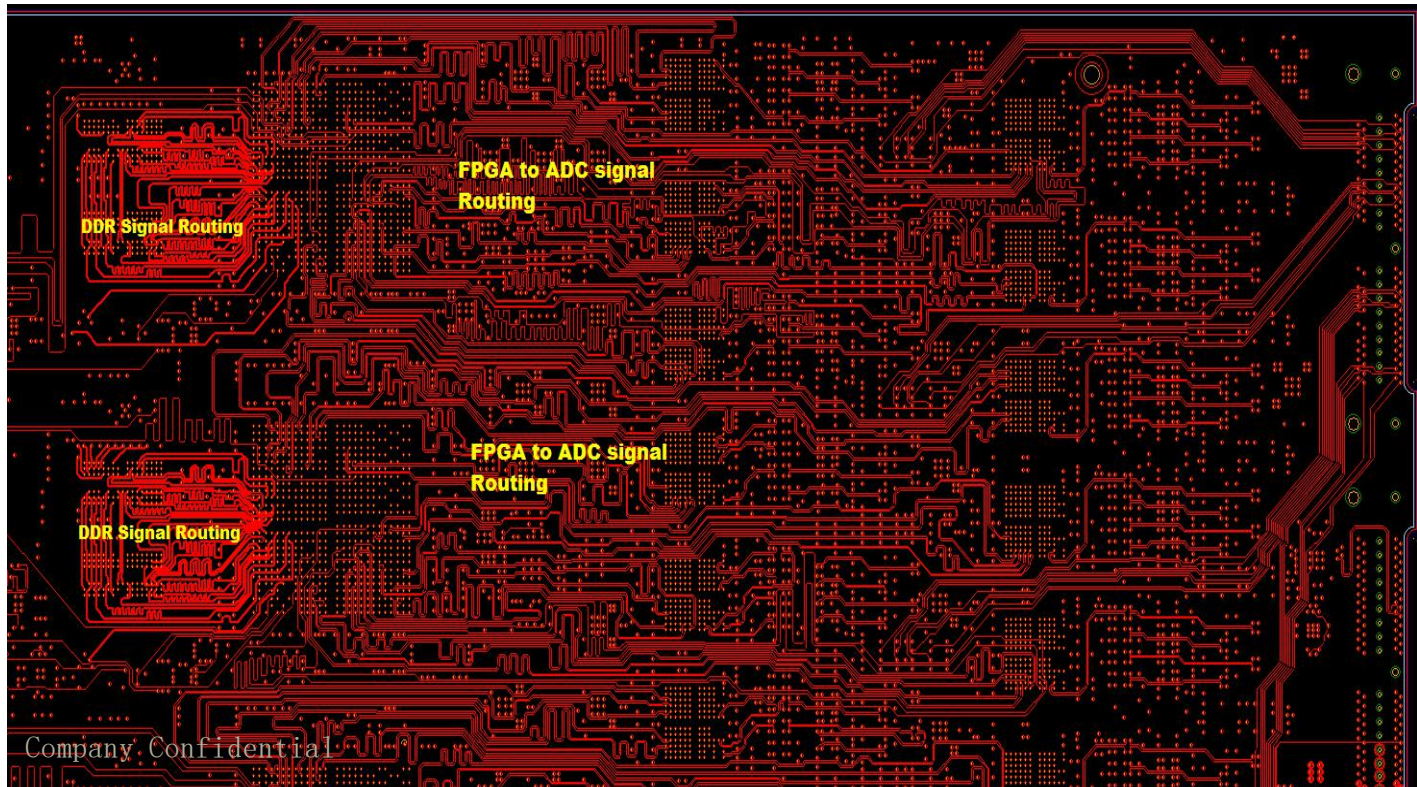
This is a high end medical application board implemented with perfect noise isolation techniques using multiple Grounds.





Project 1 : Routing layer

This is an sample layer from this project.





Project 2 : GX-D

- Notable Technologies used:
 - HSSI
 - Ethernet
 - USB
 - CFP2 / QSFP+ / SFP+
 - Amphenol backplane connector(14Gbps) / Bulls eye high density connectors(12.5Gbps)
- Total components :1673
- Total net count :1332
- Total connections :6075
- Total layer count (stack) : 24 (all high speed / EMC standards implemented)



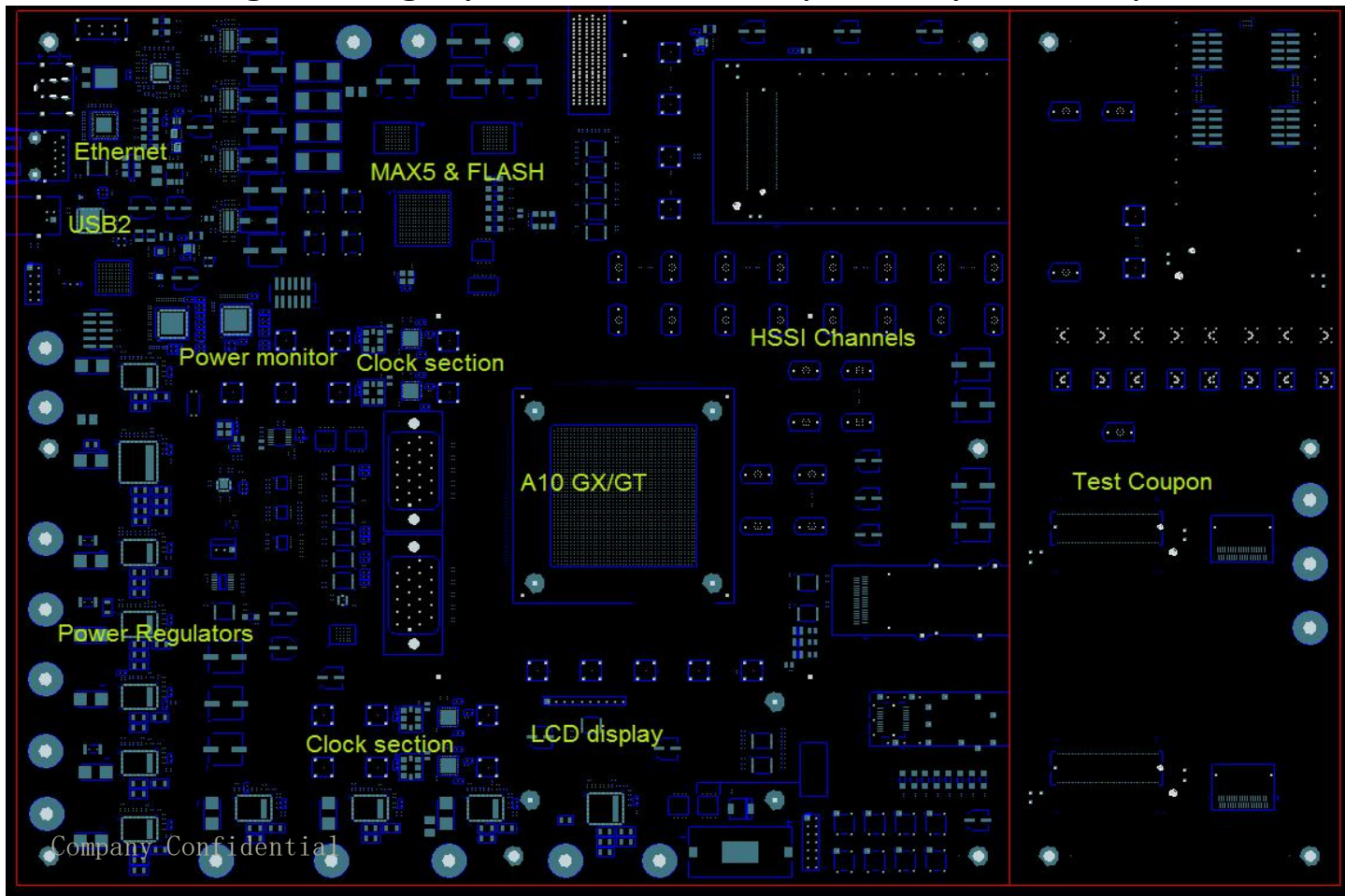
Project 2 : Scope

- Scope :
 - Library validation/creation
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 - And validation is done for the entire Library against BOM.
 - Placement to Gerbers
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Project 2 : GX-D

This is a development board which enables a thorough evaluation of transceiver signal integrity and device interoperability @ 14 Gbps.

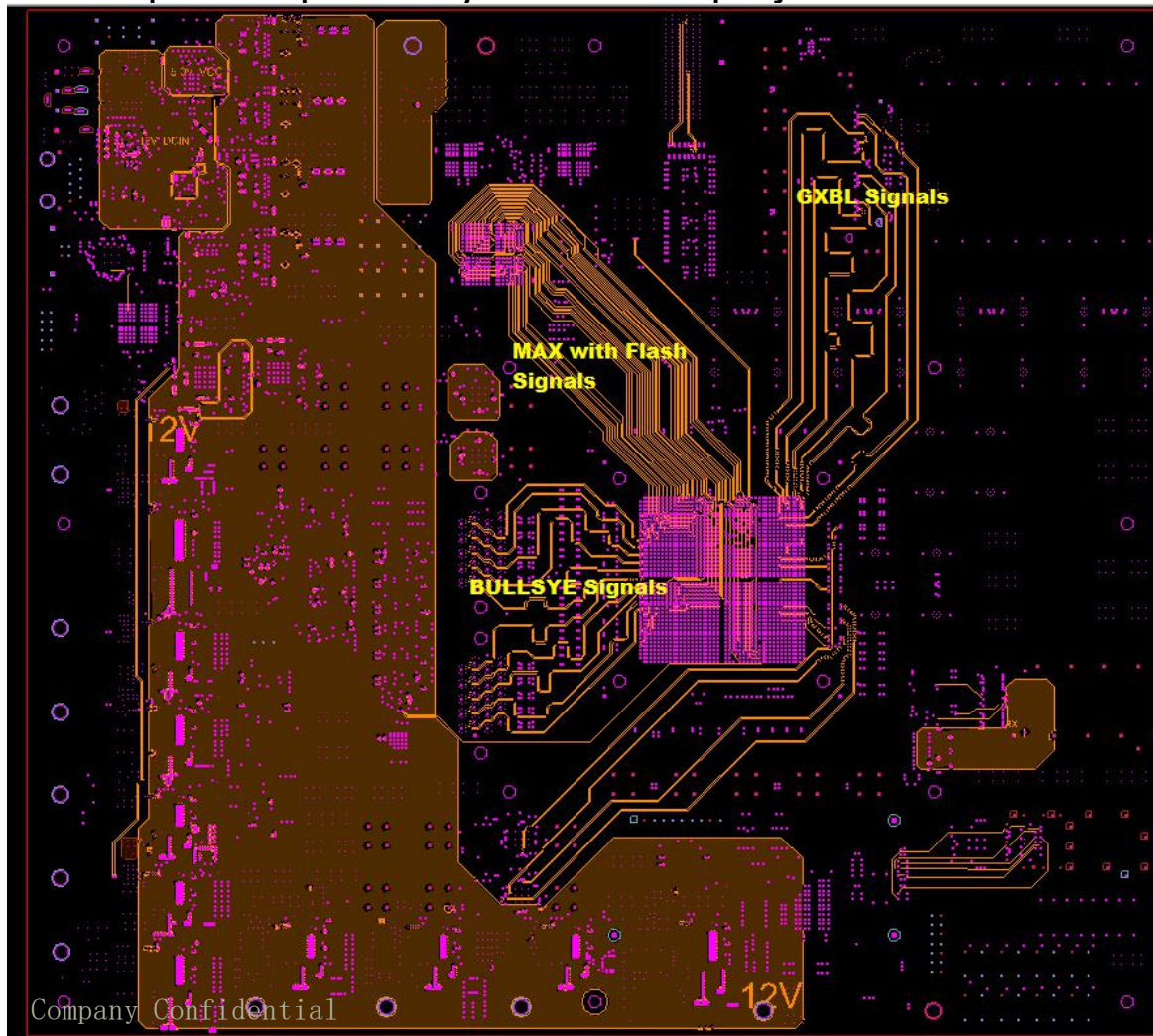


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Project 2 : GX-D

This is an sample composite layer from this project.





Project 3 : PC-02

- Notable Technologies used:
 - DDR
 - PCIe
 - Ethernet
 - JTAG
 - FPGA & DSP
- Total components : 1128
- Total net count : 1429
- Total connections : 5178
- Total layer count (stack) : 14



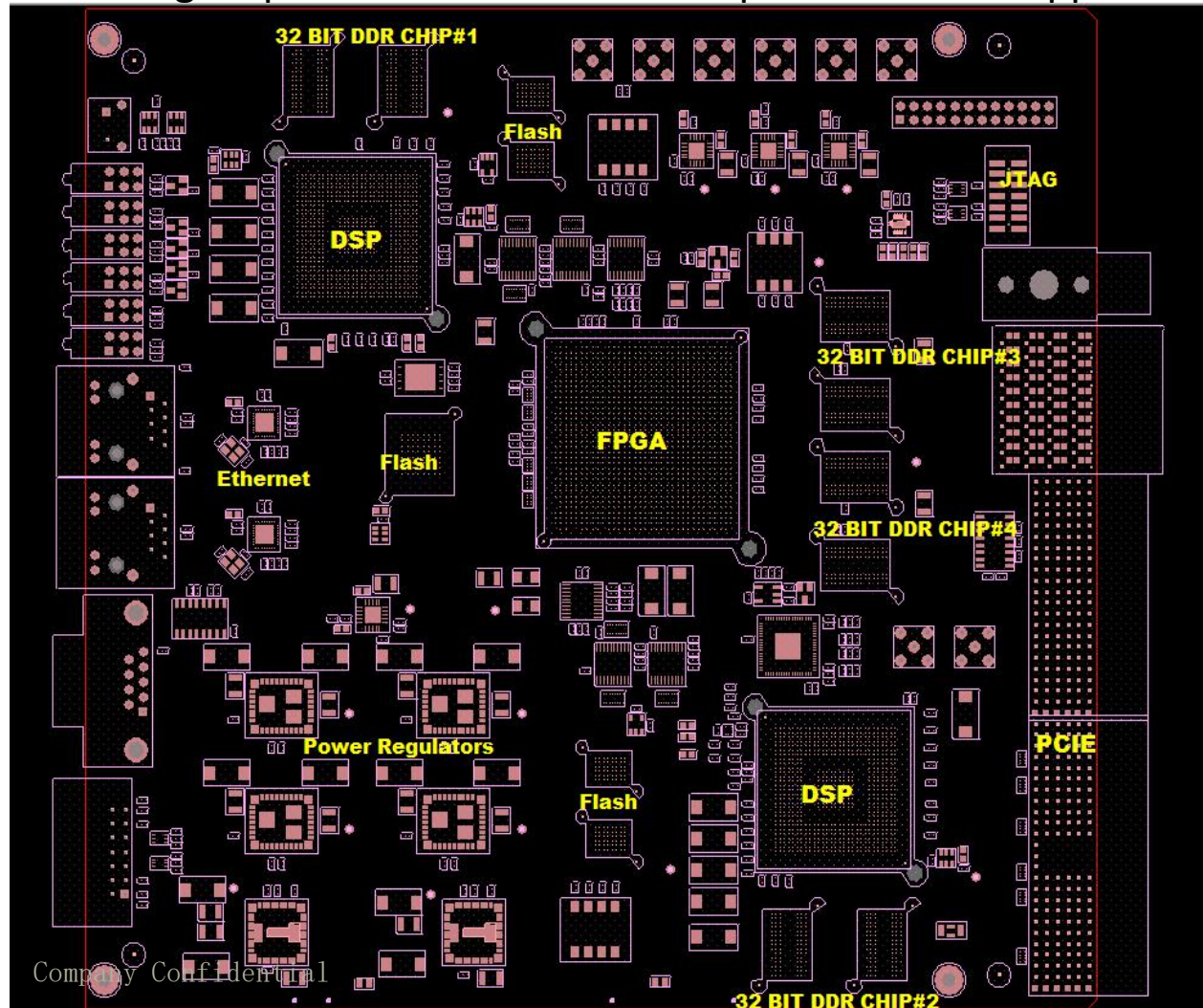
Project 3 : Scope

- Scope :
 - Library validation
 - Customer sent out their existing library collections and we did validation for the entire Library against BOM.
 - Placement to Gerbers
 - Partial placement (customer placed FPGA, DSP and connector), constraint settings, routing and all non-electrical works were done in house.
 - Complete set of Manufacturing files (Validated by internal CAM team) was delivered to FAB.



Project 3 : PC-02

This is a signal processor card made as a part of a Radar application

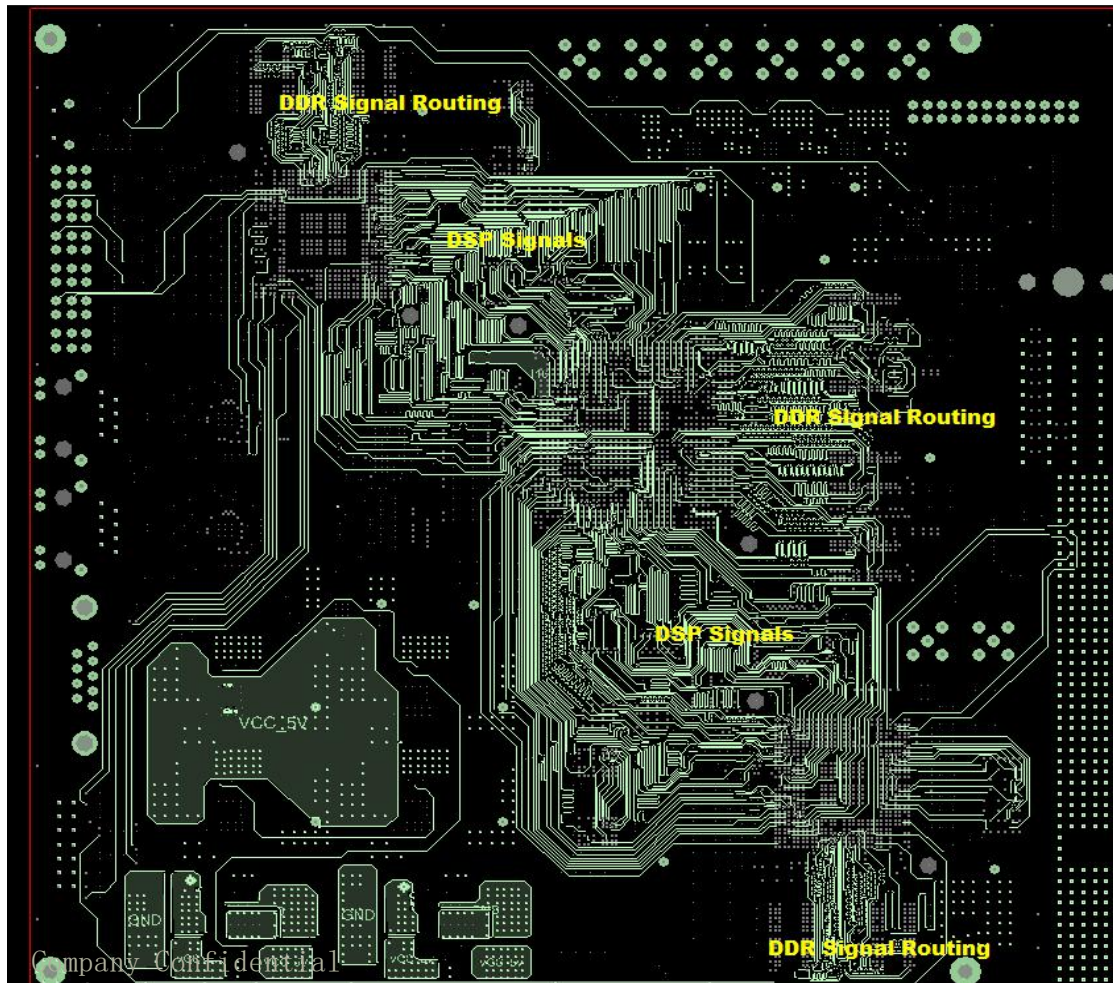


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Project 3 : PC-02

An sample composite layer consisting DDR and DSP routing with tight tunings.



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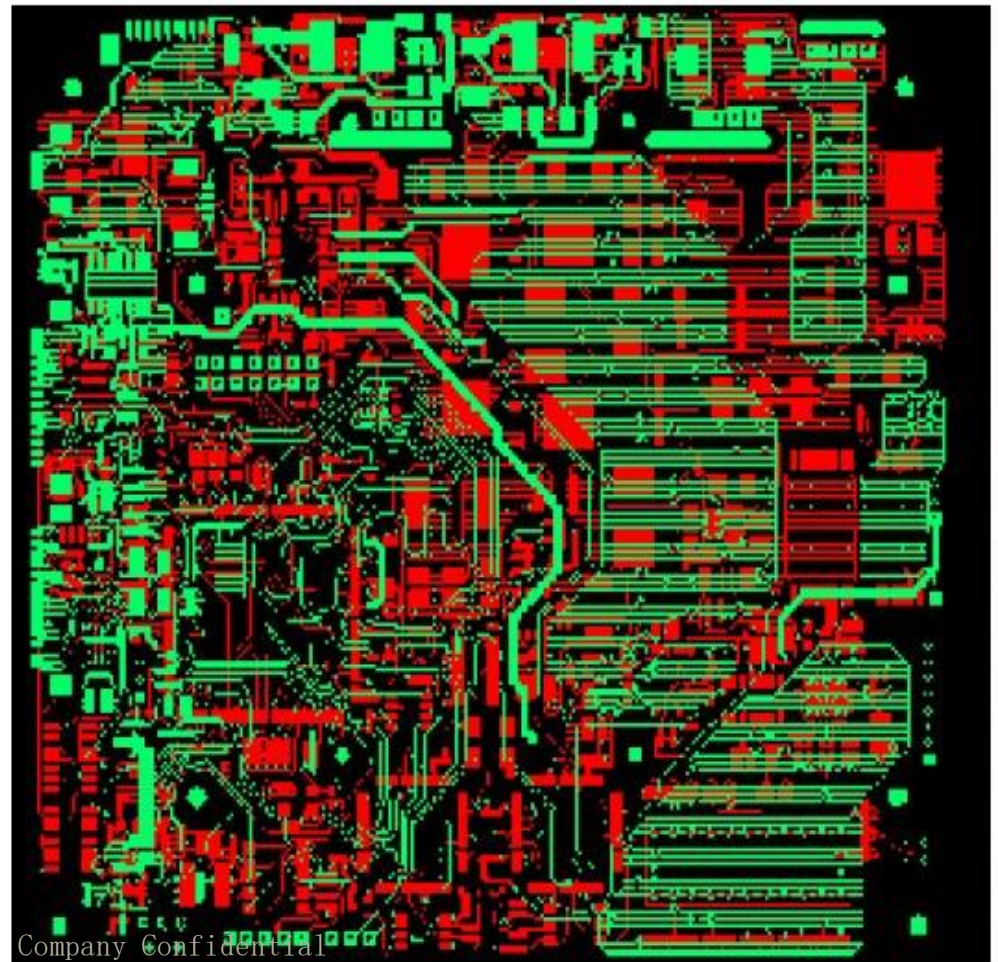


Quick Summaries



Speed Box Interface card

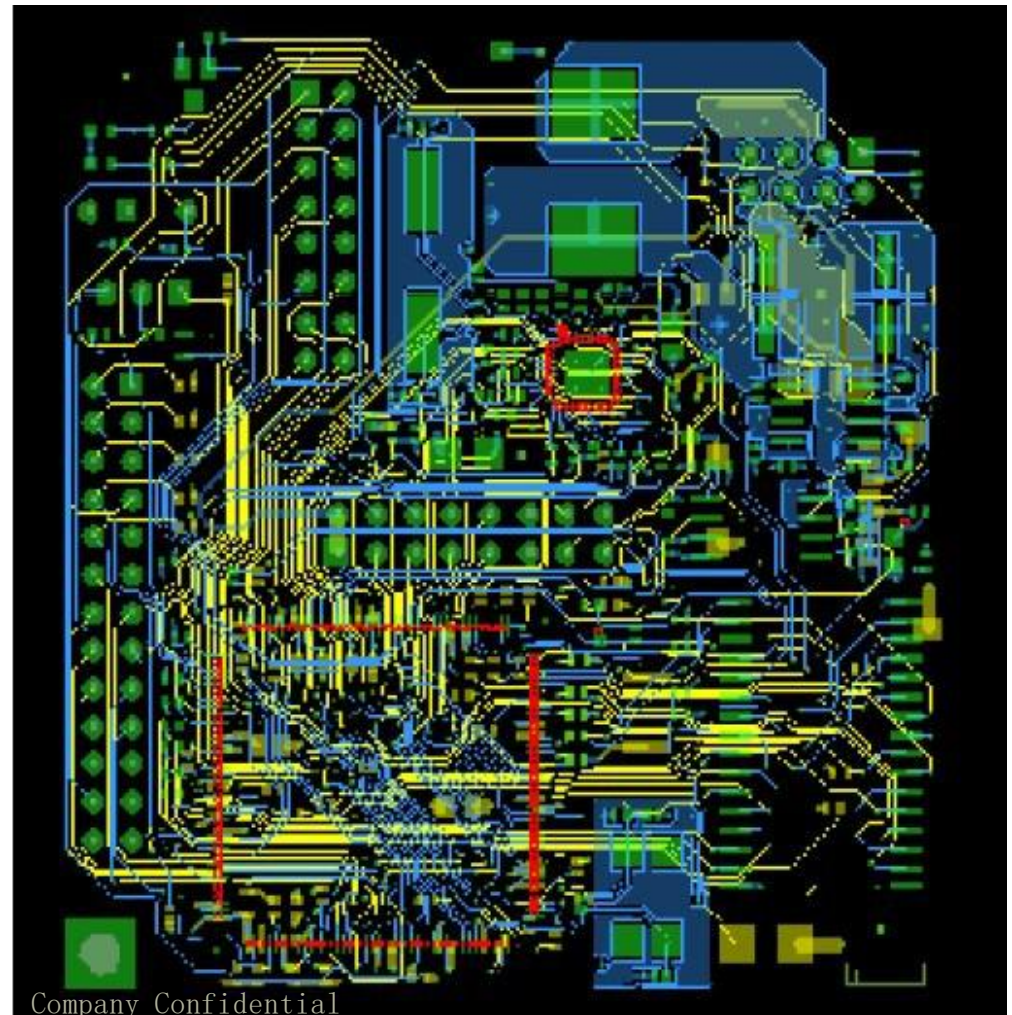
Application : Automobile
Speed Sensor
Key Component : Digital Signal
Processor,
RF connector, GPS
module, ADC,
USB UART,
Radio Module
Technology : GPS, USB,
RAM
Frequency : 4 GHz
Board Size : 4.96x4.7
inches
Layer Count : 6 layers
Total Components : 370
Design Complexity : 0.765 mm
pitch BGA pins





ICUBE card

Application : Network
Key Component : Digital Signal Processor,
Ethernet Transceiver,
Power Module, RJ45 connector
Technology : Ethernet
Board Size : 2.39x2.64 inches
Layer Count : 4 layers
Total Components : 322
Design Complexity : 0.5 mm pitch
144 LQFP

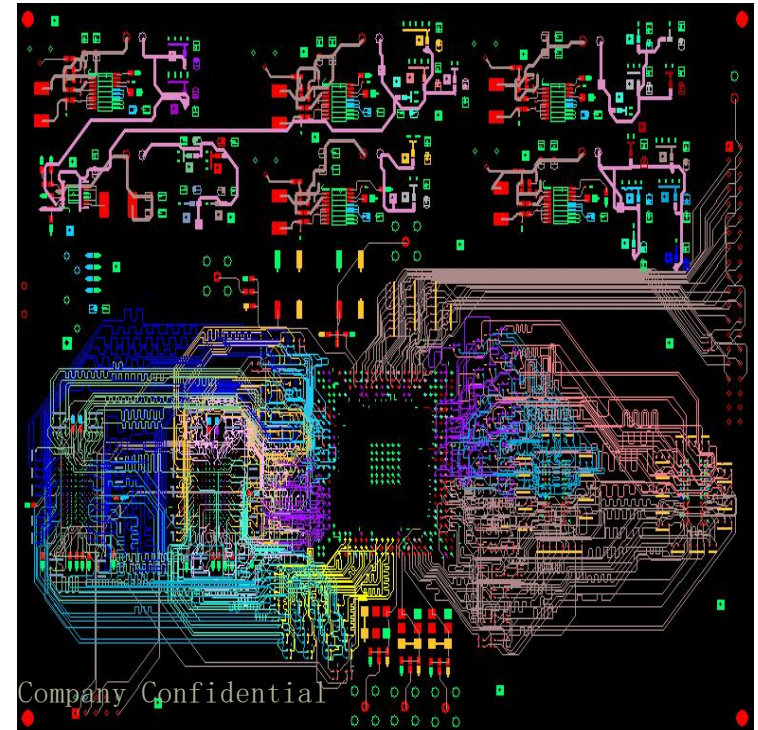


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Embedded Board

Application	: Embedded board
Key Component	: MIPS processor
Technology	: DDR-II & QDR
Frequency Board	: 400 MHz
Size Layer Count	: 7.00X5.10 inch
Total Components	: 14 Layers
Design Complexity	: 838
BGA pins	: 1.27mm pitch 388
EDA Tool Set	: Allegro PCB Editor

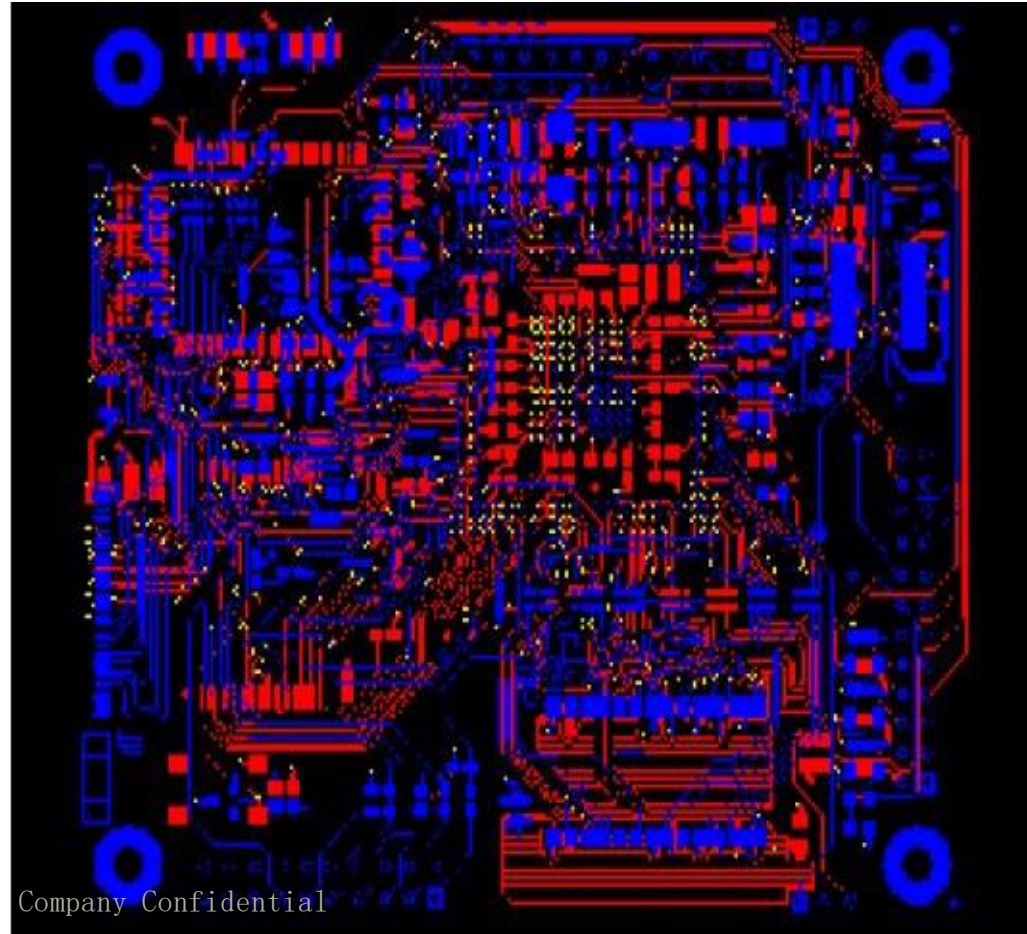


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DRVC Board Design

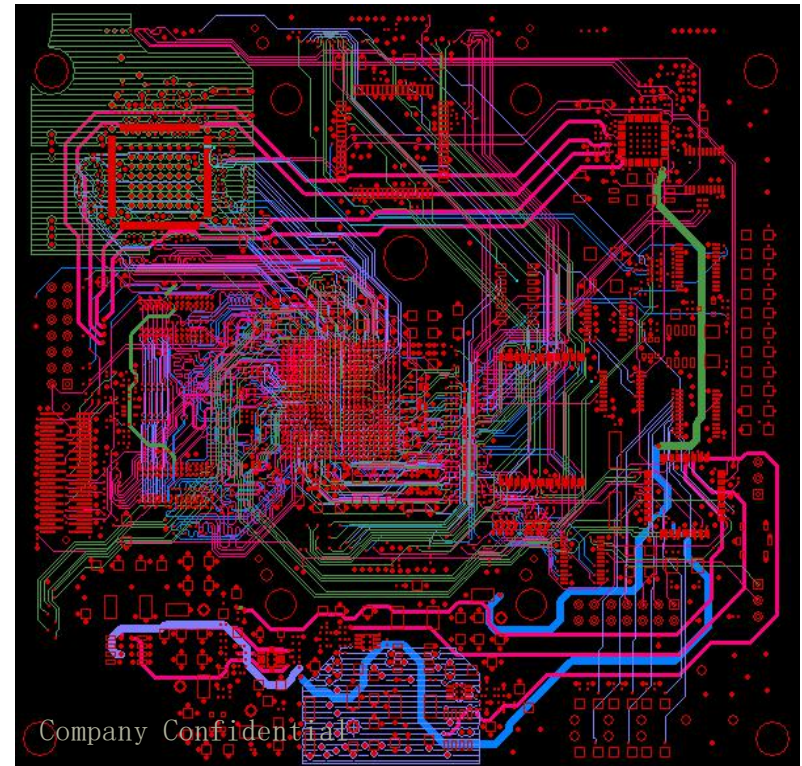
Application	: Set-Top Box
Key Component	: Digital Signal Processor
Technology	: SDRAM, Flash, Audio and Video signals
Board Size	: 90x80 mm
Layer Count	: 4 layers
Total Components	: 287
Design Complexity	: 1mm pitch 376 BGA pins





Video card for Automobile

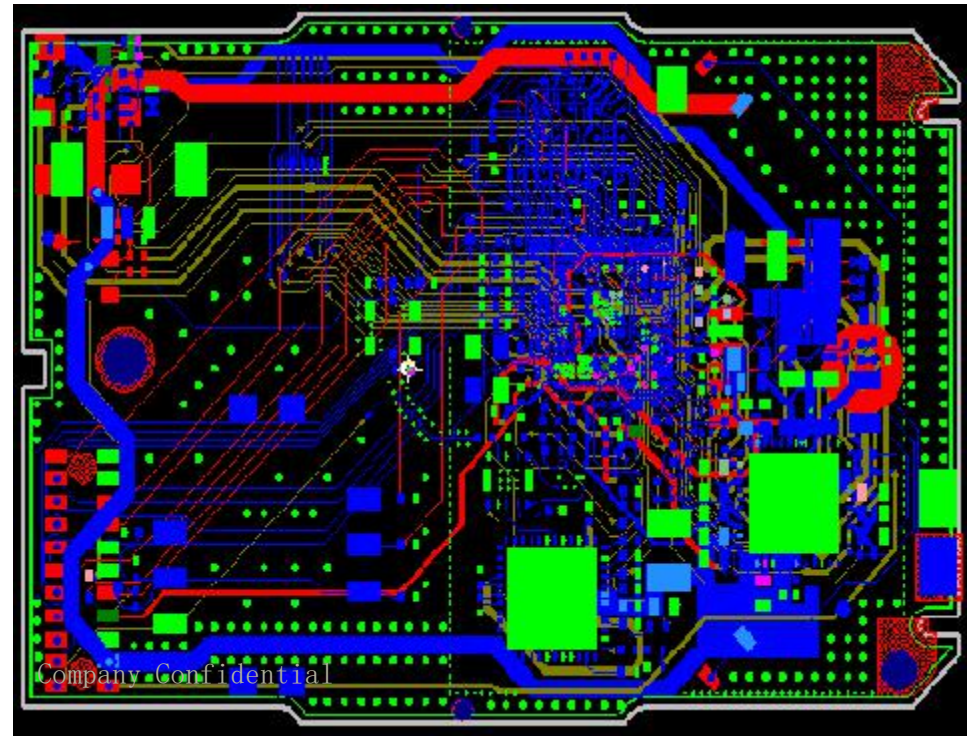
Application : Video card
KeyComponent : Digital signal processor
Technology : DDR-II,SGMII
and video signals.
Frequency BoardSize : 533 MHz
Layer Count : 14Layers : 4.61 X 4.56inches
Total Components
Design Complexity : 732
: 0.8mm pitch 529 BGA pins.
EDA Tool Set: Orcad Schematic, Allegro
PCB Editor, Allegro PCB SI





Mobile phone Board

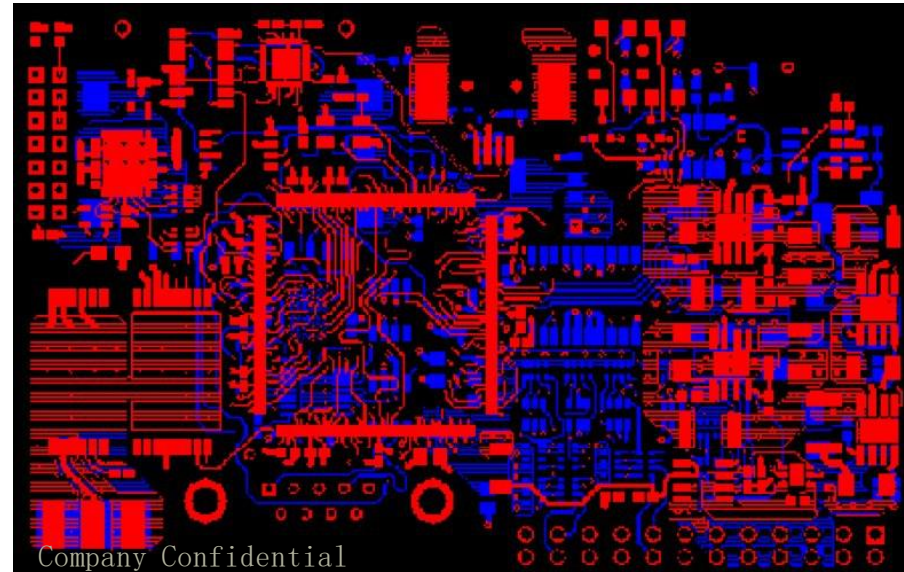
Application : Mobile GSM application
KeyComponent : GSM chip
Technology : FLASH and Multimedia.
Board Size LayerCount : 39.30 X 57.80 m m
Total Components : 6 Layers
Design Complexity : 185
: 0.508mm pitch
BGA pins
Blind/buried via design (HDI)
EDA Tool Set: PADSLayout





DL CARD Design

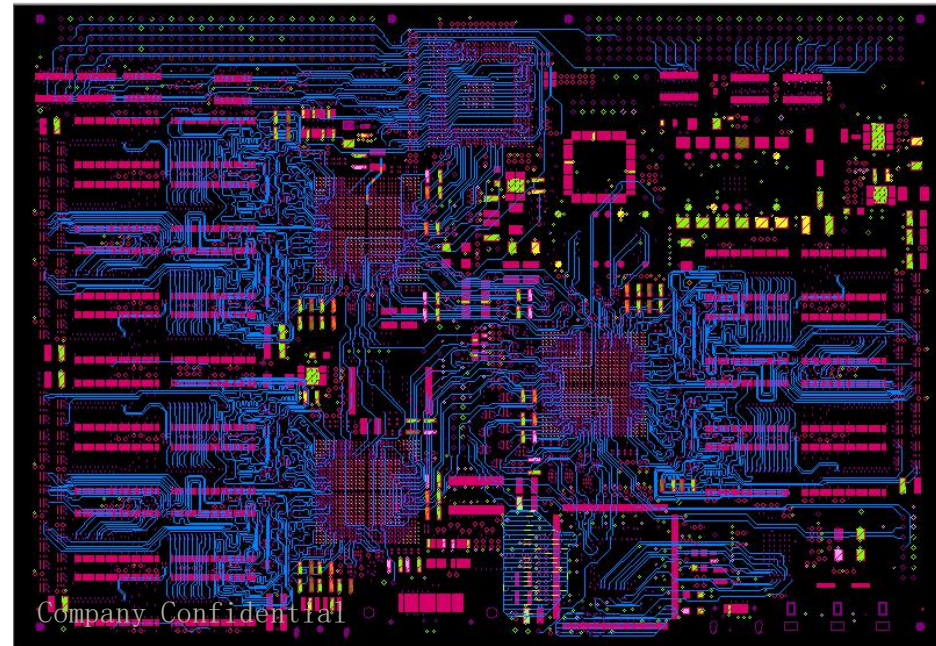
Application	: Automobiles
Key Component	: Digital Signal Processor, GPS module, USB Connector, SD card
Technology Board	: GPS, USB
Size Layer Count	: 3.9x2.4 inches
Total Components	: 8 layers
Design Complexity	: 165
EDA Tool	: 0.8 mm pitch BGA pins : Mentor Expedition PCB





Add-on card to VME bus master

Application	: Defense Video
Surveillance	
Key Component	: Multi-core CPU (3
nos.)	and PCI-VME
Controller Technology	
VME bus Frequency	: PCI, DDR, Firewire&
Board Size	
Layer Count : 14 Layers	: 333 MHz
Total Components	: 6.29 X 9.18 inches
Design Complexity	
Chips	: 1588
	: On board 16 RAM
	Dual Rank foreach
CPU	
EDA Tool Set: Orcad Schematic, Allegro	
PCB Editor, Allegro	
PCB SI	

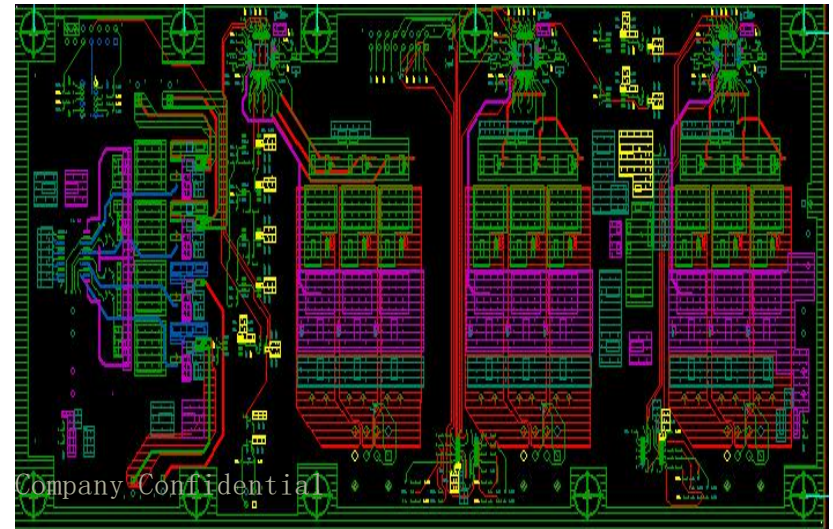




EMD CARD

Application in Industry : High Current Application
KeyComponent : MOSFET drivers, 3 Phase
BLDC controller and Power MOSFET
Current Board : 18A and more
Size LayerCount : 12 X 4.8 inches
Total Components : 10 Layers
Design Complexity : 620
: Layout designed to avoid
Large transient
current pulses in return
path and to reduce trace
inductance.

EDA Tool Set: Allegro PCB Editor16.3





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Thank You

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