



## Overview

The convergence of IP and telephony carriers has caused service providers and corporations to continually scale their networks to keep up with the increasing demand fuelled by data, voice and video services. This bandwidth explosion is creating more emphasis to be placed on scalability, security and reliability with cost, high speed design and power constraints remaining paramount. Fidus' world-class team of engineers has extensive experience in helping the world's leading communications equipment providers to meet their stringent performance and time-to-market needs.

## Our Experience

Our breadth of experience and depth of knowledge in the Communications Industry means you can rely on Fidus to provide the skill sets and technical bench strength to implement leading-edge technology into your products. Our expertise includes:

- **Wireline and Optical:** OC-3/12/192, 1/10GbE, 10/100 Base-T Ethernet, ATM, TDM, xDSL, T1/E1, IP, DS1
- **Wireless and RF:** DC to 24 GHz, WiMAX®, WiFi/WLAN (802.11b/g), Software Defined Radio (SDR), CDMA, OFDM, RFID, Zigbee®, AIS
- **Backplane:** PCI/PCI-X, PCIe, XAUI, HyperTransport, Infiniband, RapidIO®
- **High Speed Signaling (up to 20Gbps):** LVDS, ECL/PECL/LVPECL, CML HSTL, SSTL
- **High Speed Memory:** DDR/2/3, SDR, QDR
- **Computing Architectures:** ATCA, VME, HP, IBM

## Our Capabilities

As a full-service product development partner, Fidus can accelerate transforming your concepts to revenue-generating products. Our strengths include:

### High Speed Design

- High Speed Backplanes up to 10Gbps
- DDR 2/3
- 10/40G Ethernet
- 75Gbps parallel optical module
- XAUI
- XFI
- PCIe

### FPGA/ASIC/CPLD

- Design with Xilinx, Altera, and Lattice
- Architecture design, analysis, and device selection
- Interfaces timing budget calculation
- FPGA design in Verilog, SystemVerilog or VHDL
- Test bench development
- Functional and timing simulations and regression
- Bank and pin assignments
- Power consumption and fitting analysis
- ASIC to FPGA conversion
- FPGA/ASIC verification

### Software and Firmware Development

- RTOS and non-RTOS embedded system development
- Computer and embedded application and device driver development
- Board support package (BSP) and boot loader integration
- Board and system level diagnostics development
- Windows and Linux Graphical User Interfaces (GUI) development
- Protocol stack development and integration
- SNMP agent and target development
- System BIOS porting
- Software and Firmware integration testing

### Signal Integrity

- Pre-layout and post-route high speed
- RF signal analysis and simulation
- Power integrity analysis and simulation
- EMI, EMC and Specific Absorption Rate (SAR) analysis
- PCB Stack-up design and analysis
- 3D RF component modeling and simulation

### Hardware and PCB Layout Design

- System and Board-level Architecture design
- Analog/Digital/Optical and RF Design
- Electronic circuit design and schematic capture
- Circuit analysis and simulation
- Timing budget calculation
- Component selection and fitting analysis
- PCB Layout
- ROHS compliance analysis
- Component obsolescence analysis and re-design
- Cost reduction redesign
- Power and Thermal analysis and simulation
- Cost analysis and second sourcing

### PCB Layout and Design

- High complexity and high density PCB layout
- Mixed material PCBs, blind/buried vias, controlled impedance, buried capacitance
- Footprint and symbol library management
- Design for Fabrication (DFF) analysis
- Design for Manufacturing (DFM) analysis
- Design for Test (DFT) analysis
- RF and mmWave printed components
- Rigid or Flex PCB design



## Design Support Services

- Project Management
- PCB Fabrication and Assembly
- Design Verification Testing
- Reliability Engineering
- Environmental Engineering
- Regulatory Compliance Testing and Certification

## Our Communications Customers

Alcatel Lucent	IPG Photonics
Mitel Networks	Nortel Networks
Octiga Bay	ShieldTech Systems
Sprint Communications	Stratelight Communications

## Our Project Examples

### 40G Reference Design for Line Cards

Fidus developed a series of high speed optical line cards for a next generation DWDM transport product. These boards use 75 Gigabit parallel optical modules interconnected with high speed DDR parallel buses and multi-gigabit (>6Gbps) serial links to achieve datapath throughput in excess of 300 Gbps. In addition, extensive analog and mixed signal design was required to provide control and monitoring of optical modulators, lasers, APDs and EDFAs.

### 40G Optical Line Cards

Fidus developed a hardware platform to facilitate verification of IP cores for an optical line card utilizing FPGAs in the data path. This reference design provides a 40Gb/sec optical transponder compliant with the OC-768 SONET and STM-256 standards, and interfaces this to a XAUI based backplane running multiple 3.125Gbits/sec links. For this project, Fidus delivered an initial architectural analysis for customer approval before proceeding with schematic capture, PCB layout design and signal integrity analysis. Fidus managed the PCB fabrication and build process, and then tested the final products to ensure they met the customer's requirements.

### xDSL SYSTEM

Fidus was responsible for the design of an xDSL system for installation in Central Office (CO) and Outside Plant Cabinets (OSP) locations. The system included 48-192 xDSL ports and dual GigE/2.5GigE uplinks. Deliverable included all design files, tested systems, support for client network integration testing and compliance requirements (product safety, EMC, NEBS).

### WiMAX® Antenna Array Interface

Fidus developed a number of PCBs for a WiMAX Beamforming product. These PCBs included an Analog IF Modem Interface, baseband processor, a calibration module, and the RF front end with antenna array interface.

### 24 GHz Point-to-Point Radio Link

Fidus developed the architecture, hardware, software, mechanical, and factory test station for a Point-to-Point IP radio operating in the 24 GHz unlicensed portion of the K-band. This involved mmWave circuit design using both monolithic and discrete ICs and a custom waveguide filter for the antenna interface. In addition, Fidus carried the product through all necessary regulatory compliance testing and managed the pre-production builds.

## About Fidus

Fidus Systems Inc. develops high-speed electronic products for a wide range of industries including aerospace & defence, consumer, medical, industrial, semiconductors and telecommunications. Fidus has extensive design experience in turnkey product development and technical knowledge in System Design & Architecture, RF/Wireless, Signal Integrity/EMC, Hardware, PCB Layout, DSP/FPGA/ASIC, Software and Mechanical design. As a design partner, Fidus offers companies greater flexibility and capability in their product development with access to the expertise, process and tools to successfully move their products to market. Fidus has delivered on more than 750 products and projects for 180 customers across North America.

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