LHC2 Inc.

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Wireless Equipment Design Engineering Services

LHC2 Development Engineering Overview

Contract Design, Test and Certification Engineering Services

Background

LHC2 offers wireless network equipment and component developers a unique set of engineering skills to assist in product development.

Specific focus end markets include high coverage networks supporting strategic workforces:

- Military
    - Bases
    - Proving grounds
- Natural Resources
    - Mining
    - Forestry
    - Gas and Oil
- Utilities
- Public Works
- First Responders
- Homeland Security

LHC2 offers highly skilled wireless engineering services to assist the client in designing, characterizing and certifying their WLAN and WMAN equipment.

A Unique Set of Skills

Multi Disciplined Team

Product Life Cycle

LHC2 skills can be applied throughout the product and system life cycle.

- Requirements Capture
- Initial technology Investigation
- Make/Buy Investigation
- Design Capture and/or Analysis
- Prototype Fabrication and Software System Integration
- DVT (Design Verification Test)
- DFT (Design For Test)
- DFM (Design For Manufacturability)
- SQA (System Quality Assurance)
- Customer Support Structure and Training
- Network Management Integration
- Deployment Engineering
- Manufacturing Engineering Support
- EOL (End of Life) component and subsystem management

Summary of Wireless Development Engineering Services

Software Engineering:--

1. Embedded Platform Development
   - Linux
   - NetBSD
   - Windows XP/CE/Mobile
   - BSP
     - Xscale
     - Power PC
     - MIPS
2. Device Driver Development
   - 802.11 a/b/g/n
   - 802.16 d/e
   - Radio Chip Sets
     - Atheros
     - Prism
     - Agere
     - Marvell
     - Broadcom
     - Intel

3. Base Station Platform
   - Tx Power Control
   - Dynamic Frequency Selection
   - Clear Channel Assessment
   - Mesh Protocol
   - QoS/WMM/802.11e
   - WPA2/802.11i
4. Client Development
   - WPA Supplicant
   - Scanning/Roaming
5. Network Management Software
   - Command Line Interface
   - SNMP Agent/MIBs/Traps
   - EMS
   - Java/XML/SNMP
   - NMS Integration

Hardware Engineering:--

1. System Design and Integration
- Applications Requirements Capture
- System Requirements Document
- Radio Performance Characterization
   - Receiver Sensitivity
   - Power & Modulation Accuracy
   - Antenna Pattern Measurements
   - Interference Rejection
   - Network Bandwidth
   - Roaming Characteristics
2. Hardware Design
- Extended Environmental Range Design and Packaging
- Low Power Budget Design
- Surge Suppression
- RF Circuit Design
   - 802.11 and 802.16 Physical Layer Design
   - Microwave Amplifiers
   - PLL and Direct Digital
     - Low Noise
     - Fast Tuning
   - Noise Figure Analysis
   - Sensitivity Analysis
- Digital Circuit Design
   - FPGA and ASIC design
   - VHDL Verilog and Schematic
   - Processor and Memory System
   - Baseband processing
   - Digital Baseband Beamforming

3. Electro Magnetic Design
- Antenna Array Design
   - Reduced Wind Loading
   - Beamforming
     - Fine resolution
     - Fixed and Dynamic
     - Lens
     - Butler Matrix
     - Multi Polarization
- Antenna Design
   - Embedded Antennas
     - Reduced Electrical Size
     - PCB Integration
     - MIMO arrays
   - Frequency Independent
   - Reflectors
   - Low Profile
   - Diversity
4. Mechanical Design
- 3D Solids Modeling
- Sheet Metal
- Castings
- Plastics
- Modern Fabrication Techniques
- Thermal Analysis and Management
- Radomes
- Anti Icing Techniques
- Reduced Wind Loading

SQA (System Quality Assurance):---

- Test Requirements
- Test Planning and Execution
- Automation
- Regression
- Pre-certification Testing
- Certifications
   - WECA
   - FCC
   - UL
   - CSA
- Bug Tracking
- Release Process