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Design ,Systhesis and Implementation of Ofdm on An Fpga

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ABSTRACT

Growth In Technology Has Led To Unmatched Demand For High Speed Architectures For Complex Signal Processing Applications. In Wireless And Mobile Communications, Multipath Fading Severely Degrades The Quality Of Information Exchange. The Orthogonal Frequency Division Multiplexing (OFDM) Technology Is Able To Provide A High Transmission Data Rate With Enhanced Communication Performance At A Relatively Small Bandwidth Cost, Together With Proper Estimation And Compensation Of Channel Effects. Orthogonal Frequency Division Multiplexing (OFDM) Is Used. It Will Be A Hard Core Technology Used In The Future Mobile Communications. 4G Wireless Communication Systems, Bandwidth Is A Precious Thing, And Service Providers Are Continuously Trying To Accommodate More No Of Users Within A Limited Available Bandwidth. To Increase Data Rate Of Wireless Medium With Higher Performance And To Overcome The Frequency Selective Fading, Inter-Symbol Interference (ISI) Effectively, The Basic Principle Of OFDM Is Studied In This Paper And Modeling Was Carried Out In MATLAB SIMULINK AND XILINX 14.2.

Keywords: Research Paper, Technical Writing, Science, Engineering And Technology

I. INTRODUCTION

Orthogonal Frequency Division Multiplexing Or OFDM Is A Modulation Format That Is Being Used For Many Of The Latest Wireless And Telecommunications Standards. Orthogonal Frequency Division Multiplexing Has Also Been Adopted For A Number Of Broadcast Standards From DAB Digital Radio To The Digital Video Broadcast Standards, DVB. It Has Also Been Adopted For Other Broadcast Systems As Well Including Digital Radio Mondiale Used For The Long Medium And Short Wave Bands.

Although OFDM, Orthogonal Frequency Division Multiplexing Is More Complicated Than Earlier Forms Of Signal Format, It Provides Some Distinct

Advantages In Terms Of Data Transmission, Especially Where High Data Rates Are Needed Along With Relatively Wide Bandwidths.

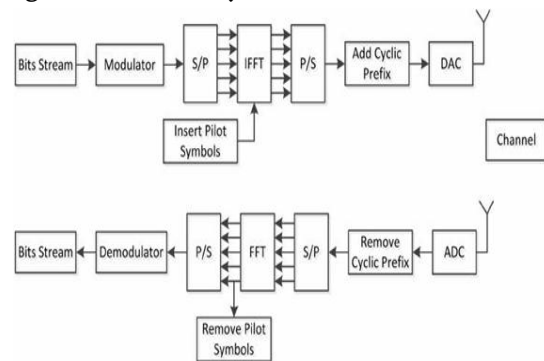


Figure 1. Block Diagram Of Ofdm

II. WHAT IS OFDM?

Ofdm Is A Form Of Multicarrier Modulation. An Ofdm Signal Consists Of A Number Of Closely Spaced Modulated Carriers. When Modulation Of Any Form - Voice, Data, Etc. Is Applied To A Carrier, Then Sidebands Spread Out Either Side. It Is Necessary For A Receiver To Be Able To Receive The Whole Signal To Be Able To Successfully Demodulate The Data. As A Result When Signals Are Transmitted Close To One Another They Must Be Spaced So That The Receiver Can Separate Them Using A Filter And There Must Be A Guard Band Between Them. This Is Not The Case With OFDM,

III. GENERAL DESIGN AND IMPLEMENTATION METHODOLOGY

The Proposed System Is Designed Using A Top-Down System Design Approach And Targeted To The IEEE 802.11a Standard. System Performance Will Be Presented And Compared Between Different Channel Models

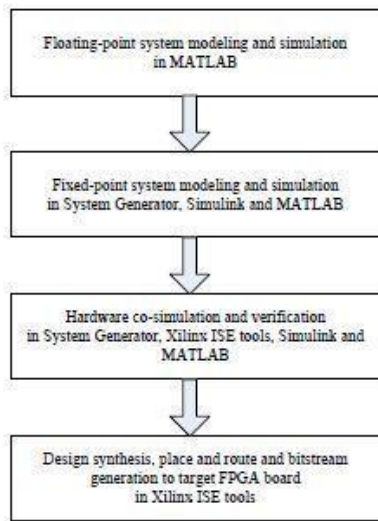


Figure 1. Shows The Design Flow, Which Includes Four Major Steps

1) Floating-Point System Modeling And Simulation :-

The Physical Layer (Phy) Specification Of The Ieee 802.11a, The Information To Be Transmitted Is Modulated Using A Quadrature Phase Shift Keying (Qpsk) Scheme.

2) Fix-Point System Modeling And Simulation :-

After Matlab Simulation, The Ofdm System Is Converted Into Hardware Models With Fixed-Point Representation. This Step Is Completed Within A Visualized Platform Embedded In The Simulink, Namely The Xilinx's System Generator For Dsp (Xsg). The System Modeling Starts From A General System Architect

3) Hardware Co-Simulation And Verification

4) Design Synthesis, Place And Route And Bitstream Generation

IV. IMPLEMENTATION OF OFDM USING SIMULINK

Simulink, Technologically Advanced By Math Works, Which Is A Data Flow Graphical Programming Language Which Consists Of In Built Tools For Modeling, Simulating And Analyzing Multi Domain Dynamic Systems. It Offers Tight Integration With The Rest Of The MATLAB Environment And Can Either Drive MATLAB Or Be Scripted From It. Simulink Is Widely Used In Digital Signal Processing For Multi Domain Simulation And Model-Based Design

V. CONCLUSION

The Modern Programmable Devices In Combination With Appropriate Software Packages For Synthesis And Simulation Give A Significantly Accelerated Design Process Of Electronic Systems. The Conclusion That Can Be Made Is This

Approach Is Suitable For Hardware Generation By Model Based Design In Simulink. It Also Gives Potentiality For Simultaneous Design, Simulation, Analysis And Visualisation By Matlab Simulink And XILINX 14.2. All This Gives Contribution To The Development Of The Hardware Based System Design.

VI. REFERENCES

The Heading Of The References Section Must Not Be Numbered. All Reference Items Must Be In 8 Pt Font. Please Use Regular And Italic Styles To Distinguish Different Fields As Shown In The References Section. Number The Reference Items Consecutively In Square Brackets (E.G. [1]).

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