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H.D.L Design for Ultra High Multi Frequency Rate P.R.B.S Generator for Identification of Property of Different P.R.B.S Pattern Sequences for Ultra High Speed Wireless Communication Products /Applications

Prof P.N.V.M Sastry[1], Prof Dr.D.N.Rao[2], Dr.SVathsal[3]
[1]*Dean- IT EDA Software M.N.C Industry CELL, R&D CELL & ECE,J.B.R.E.C.,Moinabad,Hyderabad-75, India*
[2] *Former Principal-J.B.I.E.T & Dean -R&D, J.B.I.E.T, Moinabad, Hyderabad-75, India*
[3]*Professor I.A.R.E Dundigal, Hyderabad.*

----------**ABSTRACT**----------
The Aim is to H.D.L Design for Multi Frequency Rate like Giga/Tera/Peta/Exa/Zetta Hertz/Bits Per Second (Baud Rate) Speed .P.R.B.S Carrier Generator ASIC for Ultra High Speed Long Distance Communication Hi-tech Smart Computing Products like Cloud & Internet Computing, L.T.E A.S.I.C, Wi-Fi,Gi-Fi, O.F.D.M.A W.C.D.M.A, Q.C.D.M.A, G.P.S, and Wi-MAX Technologies etc. Basically This Design Contains P.R.B.S Generators of Different Tapped Sequences $2e^7$-1, $2e^{10}$-1, $2e^{15}$-1, $2e^{23}$-1, $2e^{31}$-1 etc and Multiplexer. These different pattern sequences are Designated as per C.C.I.T.T I.T.U Standards. This Soft I.P Core Designed by V.H.D.L & Verilog H.D.L Languages. Design flow Implemented by Xilinx ISE 9.2i IDE Software. This P.R.B.S Generator Mainly suit for latest coming generation New Innovative Low Power Portable Smart Computing Products like I phones, Tablets, Note Book, Pocket Multimedia SOC Computing, GPS Mobile phone Cards, GPRS, and Handheld Instruments etc.

Keywords: *L.T.E A.S.I.C – Long Terminal Equipment Application Specific Integrated Circuit, C.D.M.A- Code Division Multiple Access ,G.P.S – Global Position System, P.R.BS – Pseudo Random Binary Sequence , V.H.D.L – Very High Speed Integrated Circuit Hardware Description Language.*

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I. INTRODUCTION

In the latest Modern Hi-tech Information Technology & Communication Engineering world, I speed is a major constraint factor for V.L.S.I Chip Designs. Now Giga Hertz speed (G.b.p.s) based wireless &communication products came to the market. Now I Designed New Tera Hertz Speed (Tbps Rate) P.R.B.S Carrier Generator for All Latest new Innovative & future generative Hi-tech Wireless Portable Smart Computing Products & Cards. In Modern Hi-tech Communication Engineering world, High Speed based Portable Communication System Hardware & Software Products Came to the market, speed is an important factor and is in terms of Giga bits per second for all Hi-tech Real time Smart Computing Portable wireless Communication System Software products like Cloud Computing ,wireless Internet Data Packets Transceivers Computing, Tablets, Pocket Mobile Multimedia Systems, Note Book Computers, Wireless Routers, N.O.C.s, Network Cards/Racks, Wi-FI, Gi-Fi, Wi-max, G.P.S, G.S.M, Q.C.D.M.A Transceivers. For that purpose ,I Designed Giga Bits Per Second ,Tera Bits Per Second & Peta Bits Per Second High Speed PRBS is Pseudo Random Binary Sequence Frequency Generators, Generate & Received Random Frequency Data in the form of Random frequency numbers of different speed w.r.t specific data tapping sequence points for both signal & carrier wave generation. PRBS Generators, Receivers, Transceivers Designed for HiFi Wireless Internet Data Packets Computing and Cloud Computing etc. Transmission, Reception of Data is in the RANDOM Sense, This P.R.B.S Generator, Receiver is Designed for Identification property of Different Tapped P.R.B.S Sequences like 7, 10,15,23,31 at a Clock carrier frequency speed of G.b.p.s/T.b.p.s/P.b.p.s. the Length of P.R.B.S sequence is 2^L-1. 2^L-1 times repeated the sequences. this is mainly suit for multiple users to transmit and received data in accurate time for very long distance communications like G.P.S Data Acquisition, G.S.M Communication Systems, Wi-FI, Gi-Fi, L.T.E, Wireless O.F.D.M.A , C.D.M.A,Q.C.D.M.A Computing, wireless internet computing, cloud computing etc because of Ultra High speed Communication Rate in terms G.b.p.s, T.b.p.s, P.b.p.s . All these P.R.B.S L.F.S.R Sequences are designed by tapping different points according to ITU O.150, O.151, and O.152 Standards. This P.R.B.S Design Consists of Multiplexer, P.R.B.S Registers of different tapped sequence points, Clock Frequency Generators of G.b.p.s/T.b.p.s/P.b.p.s Speed. The Advantages of these P.R.B.S Generators having In

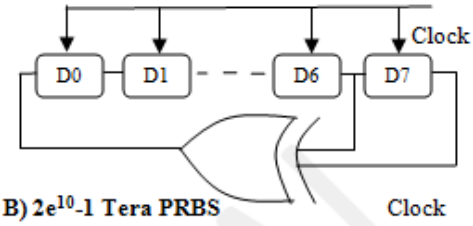
Built Checkers, Bit Error Rate Detection & Correction by using P.R.B.S Checkers. these are simply Linear Polynomial Checkers & C.R.C .

P.R.B.S TYPE	STANDARD	SUGGESTED DATA RATE(Kilo Bits Per Second)	FEED BACK TAP
2^7-1	ITU-T O.150	14.4	7,6
2^{10}-1	ITU-T O.150	64	10,3
2^{15}-1	ITU-T O.150	1544, 2048, 6312, 8448, 32064, 44736	14,15
2^{23}-1	ITU-T O.150	34368, 44736, 139264	18,23
2^{31}-1	ITU-T O.150		28,31
2^{48}-1	ITU-T O.150/151/152		48,42
2^{52}-1	ITU-T O.150/151/152		52,47
2^{63}-1	ITU-T O.150/151/152/153		48,63

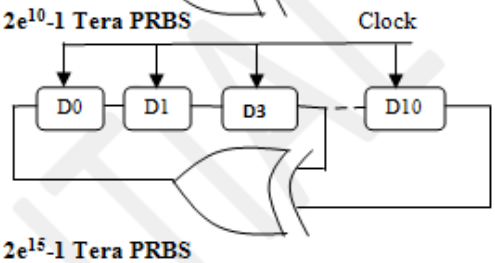
Table (1): PRBS bit-pattern are generated in a linear feed-back shift-register. This is a shift-register with a XORed feedback of the output-values of specific flip-flops to the input of the first flip-flop.

II. P.R.B.S DESIGN ARCHITECTURES

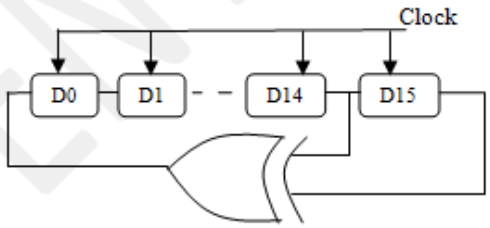
A) $2e^7$-1 Tera PRBS



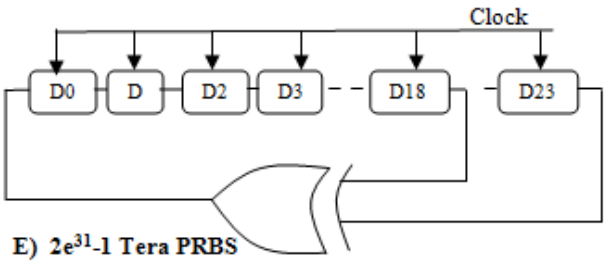
B) $2e^{10}$-1 Tera PRBS



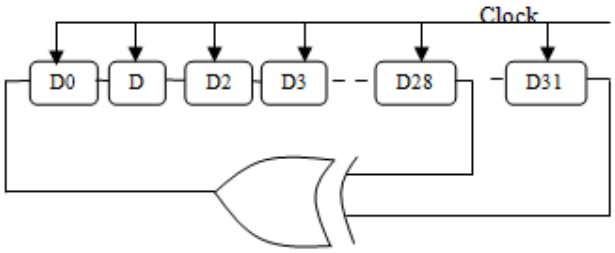
C) $2e^{15}$-1 Tera PRBS



D) $2e^{23}$-1 Tera PRBS



E) $2e^{31}$-1 Tera PRBS



NOTE: SIMILARLY FOR 2^{48}-1,2^{52}-1,2^{63}-1 P.R.B.S DESIGN SEQUENCES

III. HIGH SPEED MULTI CHANNEL MULTI SPEED P.R.B.S DATA SERDES/TRANSCEIVER ARCHITECTURE.

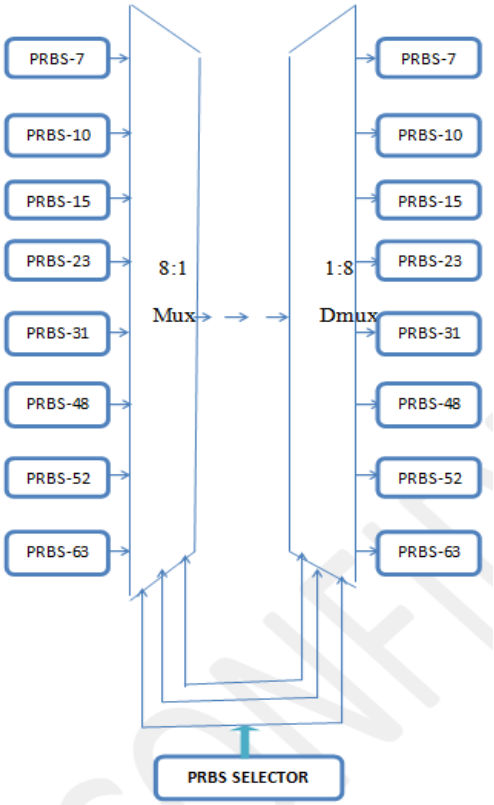


Figure1. PRBSDATASERIALIZER De-SERIALIZER TRANSCEIVER

A) Description:

The P.R.B.S Transmitter Consists of 8:1 Multiplexer , D-FF Register , Different P.R.B.S Pattern Generators - (2^{7}-1,2^{10}-1,2^{15}-1,2^{23}-1,2^{31}-1 etc),the multiplexer select the one of the different P.R.B.S Pattern Sequence and feed the same to D-FF Register and send the same in serial output/ parallel output form

IV. MULTI FREQUENCY P.R.B.S

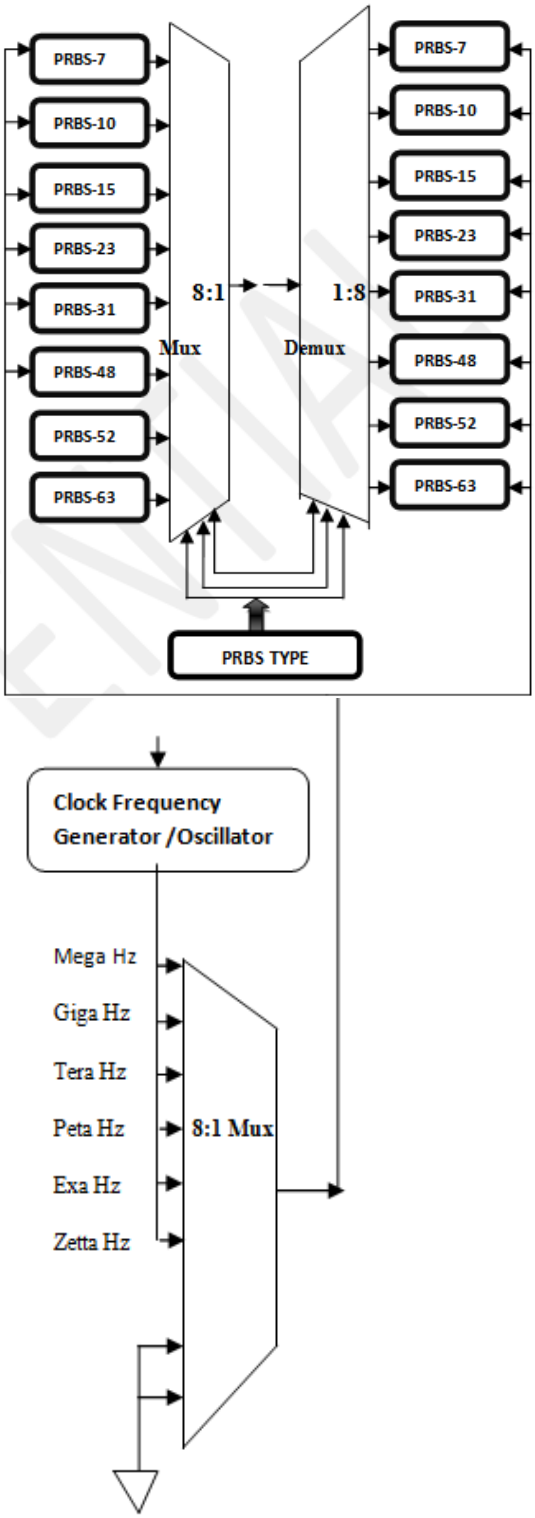


Figure2. Multi Frequency Multi Channel P.R.B.S

V. EDA SOFTWARE – V.L.S.I I.C DESIGN FLOW

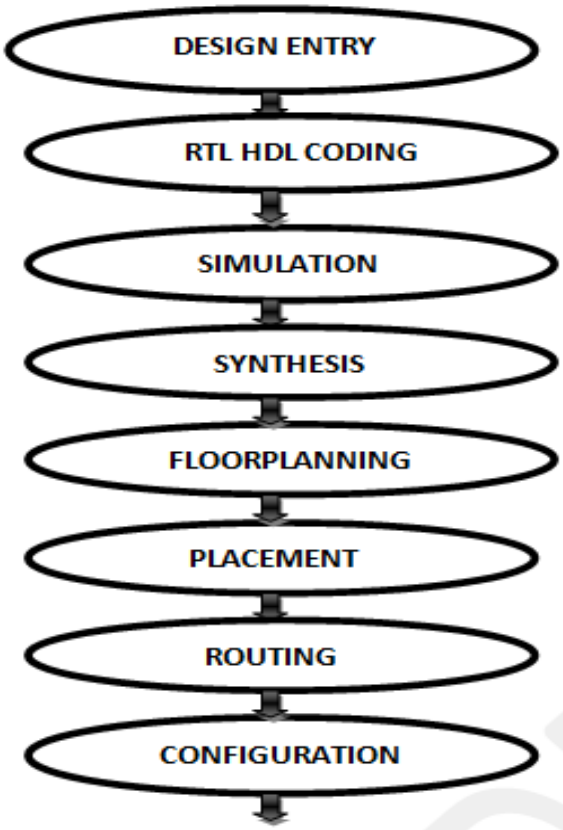


Figure 3.V.L.S.I I.C DESIGN FLOW

VI. SIMULATION RESULTS-MULTI FREQUENCY RATE P.R.B.S OF DIFFERENT TAPPED SEQUENCE PATTERNS

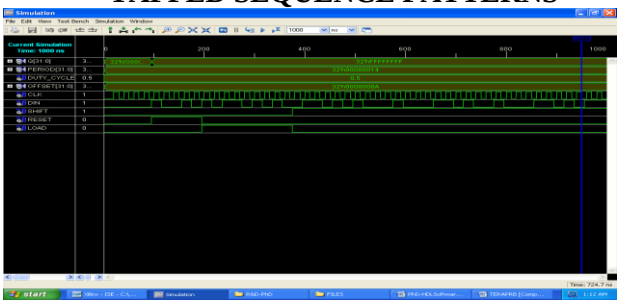


Figure 4. Multi Speed P.R.B.S of Different Tapped Sequences

VII. MULTI FREQUENCY P.R.B.S

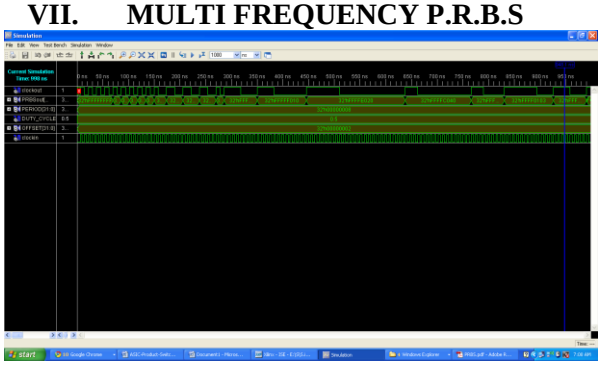


Figure 5. Simulation Waveform – Multi frequency P.R.B.S

VIII. F.P.G.A DESIGN FLOW REPORTS

A) R.T.L Design Architecture

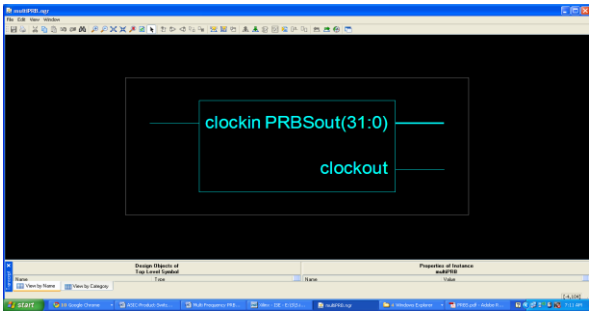


Figure 6. Multi Frequency P.R.B.S R.T.L

B) R.T.L-Design-Schematic

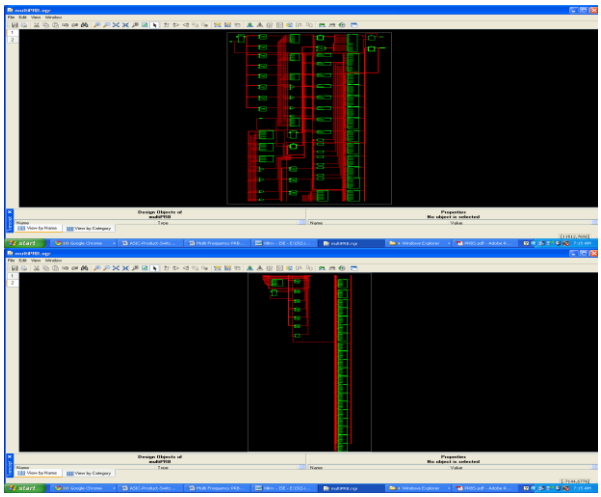


Figure 7. Multi Frequency P.R.B.S R.T.L Schematic

C) F.P.G.A Placed Design Layout

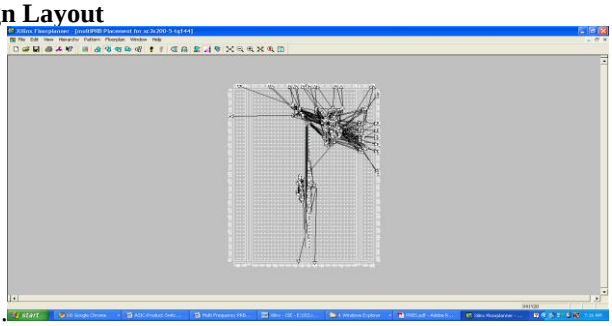


Figure 8. Multi Frequency P.R.B.S Placed Design Layout

D) F.P.G.A Routed Design Report

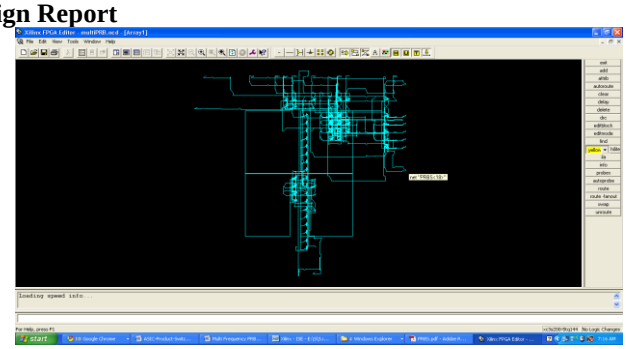


Figure 9. Multi frequency P.R.B.S Routed Design Layout

IX. CONCLUSION

HDL Design for Ultra High Multi Frequency Rate P.R.B.S Generator for Identification Of Property Of Different P.R.B.S Pattern Sequences for Ultra High Speed Wireless Communication Products /Applications like 3G,4G-Wireless WI-FI,GI-FI,C.D.M.A,G.P.S,Q.C.D.M.A and other advanced wireless applications.

Note: No References

Bibliography

Prof. P. N. V. M Sastry Currently working with a Capacity of **Dean- I.T E.D.A Software Industry CELL & R&D CELL & ECE** DEPARTMENT, He Did Master Degree In Science- **M.S Electronics**, Under Department Of Sciences, College Of Science & Technology AU -1998.Did PG Diploma In V.L.S.I Design ,I.S.O.U.K.A.S Certified From V3 Logic Pvt Ltd, Bangalore-2001, Did **M.Tech (ECE)** From I.A.S.E Deemed University-2005. Currently Pursuing **(Ph.D)-E.C.E(V.L.S.I)** , **J.N.T.U Hyderabad -2012** , Over **Past 17 years of Rich Professional** Experience with Reputed IT Software Industrial MNC's, Corporate –**CYIENT (INFOTECH), ISiTECH** as a **world top keen IT Industrial Software Specialist – World Top Software Engineering Team Leader(Level 6) Eng-Eng- HCM Electronics Vertical & Sr. Program Manager –EDS,BT,NON BT Embedded Software ,Avionics & Automotive Hi-tech Software Engineering Verticals & Departments & I/C M.F.G Hi-tech Eng.Software Vertical , Program Lead – Embedded & VLSI & Engineering Delivery Manager – IT Semiconductor Software Engineering Vertical ,at ISiTECH** , also worked with **Govt R&D, Industrial Organizations, Academic Institutions** of Comparative Designations & Rolls . His Areas Of Interest are V.L.S.I –V.H.D.L, Veirilog H.D.L, A.S.I.C, F.P.G.A & Embedded Software Product Architectures Design & Coding Development .He mentored & Architecting Various Real Time, R&D, Industrial Projects/Products related to VLSI & Embedded System Software & Hardware**..** His Key Achievements are Participated Various Top Class International IT MNC Delegates Board Meetings, I.T Software M.N.C Board Meetings(Tier1/2 Level MRM-V.P,C.O.O Level) , Guided R&D ,Industrial , Academic Projects /Products –VLSI-ASIC,FPGA & Embedded & Embedded, V.L.S.I Software Project &/ Program Management & Also Coordinated Various In House & External IT Project Workshops & Trainings At **CYIENT(INFOTECH)** as a I/C- MFG Eng Software Vertical , Also Participated Various National R&D Workshops, FESTS, FDP's &Seminars. Recently He Published Various 40 International Journals of Reputed Journals and Conferences also **Certified Conference Chairs - ,I.T.C. I.D.E.S- MC GRAWHILL EDUCATION-Chennai & and Published 4 Journals at IEEE Computer Society and &I.E.E.E & I.E.E.E –C.S.N.T.-Gwalior & Best Paper Award** On behalf of Exa Hertz Wi-Fi Router A.S.I.C Paper at I**.S.S.R.D-I.C.S.C.D SANDIEGO, U.S.A.,** Accepted Journal at High Reputed Journal – **Mitteilungen-Klosternburg** Weiner Strasse, **AUSTRIA, Europe** etc.), and also J.M.E.S.T – Germany .

Dr. D.N Rao B.Tech, M.E, Ph.D, principal of JBREC, Hyderabad. His carrier spans nearly three decades in the field of teaching, administration,R&D, and other diversified in-depth experience in academics and administration. He has actively involved in organizing various conferences and workshops. He has published over 11 international journal papers out of his research work. He presented more than 15 research papers at various national and international conferences. He is Currently approved reviewer of IASTED International journals and conferences from the year 2006. He is also guiding the projects of PG/Ph.D students of various universities

Dr.Vathsal Currently working as a Professor & Dean- R&D & EEE,JBIET,He Obtained PhD from I.I.S.C,Bangalore,also Did Post Doctoral Research in DFVLR,Germany and NASA Goddard Space Flight Centre,USA,and also he worked with keen Designations Scientist E,F,G from Reputed Govt R&D Industry Organizations over past years and closely worked with Dr.A.P.J Abdul Kalam He Published lot of various national, international journals & conferences, He guiding 5 PhD Students from Various universities. He Got Prestigious awarded as a Noble Son of India.