# Nonlinear Dynamics in the 21<sup>st</sup> Century The FPGA Approach

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#### Muthuswamy, Bharathwaj

Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Preloader Preloader

Configure and compile U-boot (boot loader)

Configuring and compiling Linux kernel (OS)

Compile device tree required by Linux ernel)

noose linux distro

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### Organization

Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compile Preloader

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Configuring and compiling Linux kernel (OS)

Compile device tree (required by Linux kernel)

Choose linux distro

Burn micro SD card

Coding Software for HPS

(Optional) Implement FPGA hardware as .rbf

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and co Preloader

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### Project Block Diagram

Show the block diagram and explain. Throughout the process obviously document, simulate, timing-close and perform modular debugging! Recommended that you have a linux box (on a virtual machine?) handy for cross compilation

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Configure and compile Preloader

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noose linux distro

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### Specifying FPGA Hardware

Refer to European documentation; talk about LWAXI, HWAXI buses; DDR3 SDRAM pin constraints; use pin planner reports to confirm proper pin assignments for HPS

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compile Preloader

U-boot (boot loader)

Configuring and compiling Linux kernel (OS)

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noose linux distro

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### The Cyclone V Boot Process

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

### Configure and compile

Preloader

Configure and compil J-boot (boot loader)

Configuring and ompiling Linux kern

required by Linux ernel)

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(Optional) Implement FPGA hardware as .rbi

### Configure and compiling Preloader

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

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Configure and compil J-boot (boot loader)

Configuring and compiling Linux kern

Compile device tre required by Linux

Choose linux distro

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### Configuring U-boot

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compile Preloader

### Configure and compile U-boot (boot loader)

compiling Linux kerne (OS)

ernel)

Choose linux distro

urn micro SD card

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### Compiling U-boot

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#### Muthuswamy, Bharathwaj

Introduction: Bloc Diagram

Specifying hardware (FPGA) subsystem

Configure and compile Preloader

### Configure and compile U-boot (boot loader)

Configuring and compiling Linux kerne (OS)

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Choose linux distro

urn micro SD card

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### Configuring Linux kernel

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and comp

Configure and co J-boot (boot loa

## Configuring and compiling Linux kernel (OS)

(required by Linux kernel)

Choose linux distro

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### Compiling Linux kernel

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compile Preloader

Configure and compile I-boot (boot loader)

# Configuring and compiling Linux kernel (OS)

required by Linu: kernel)

Choose linux distro

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### The Device Tree Binary (.DTB) file

obtained from .DTS file

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compile Preloader

Configure and compile J-boot (boot loader)

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#### Compile device tree (required by Linux kernel)

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### Which distro?

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compi

Configure and compile J-boot (boot loader)

Configuring and compiling Linux kern OS)

Compile device tree required by Linux

#### Choose linux distro

Burn micro SD card

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### Commands for configuring SD card

Recommended that you use 8 GB and dd

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Specifying hardware (FPGA) subsystem

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Configuring and compiling Linux kerne (OS)

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Burn micro SD card

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### **Understanding API**

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compile Preloader

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Choose linux distro

urn micro SD card

### Coding Software for HPS

### Loading .rbf from U-boot

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Introduction: Block Diagram

Specifying hardware (FPGA) subsystem

Configure and compile

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Choose linux distro

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### Initializing your code as a .init process

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Specifying hardware (FPGA) subsystem

Configure and compile

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