# 32 BIT ARM TRAINING

## 1. Refreshing 8 bit microcontrollers.

Limitations of 8 bit microcontrollers
Why we need 32 bit microcontrollers.
ARM market Overview.

## 2. Introduction to ARM

Comparison between 8/16/32 bit microcontrollers
The ARM Architecture,
The Acorn RISC Machine,
Architectural Inheritance,
RISC/CISC and Harvard/Princeton Architectures
ARM's approach towards RISC
The ARM Programmer's Model
ARM Development Tools.

## 3. ARM Processor architecture

Block Diagram
Introduction to ARM 7 / ARM 9 and ARM extensions.
ARM processor architecture
ARM Organization and Implementation, 3-Stage Pipeline ARM Organization, 5- Stage Pipeline ARM Organization, ARM Instruction Execution, ARM Implementation, The ARM Coprocessor Interface.
Architectural Support for High- Level Languages.
Abstraction in Software Design

## 4. ARM Memory architecture

Memory Hierarchy, Memory Size and Speed. On-Chip Memory Caches Memory Management.

## 5. ARM Data types

Architectural Support for High -Level Languages. Abstraction in Software Design. Data Types. Floating - Point Data Types. The ARM Floating - Point Architecture. Expressions, Conditional Statements. Loops Functions and Procedures.

## 6. ARM instruction set

The ARM Instruction Set, Introduction, Exceptions, Conditional Execution. Branch and Branch with Link (B, BL). Branch, Branch with Link and Exchange BX, BLX). Software Interrupt (SWI). Data Processing Instructions. Multiply Instructions. Count Leading Zeros (CLZ - Architecture V5t Only). Single Word and Unsigned Byte Data Transfer Instructions. Half -Word and Signed Byte Data Transfer Instructions. Multiple Register Transfer Instructions. Swap Memory and Register Instructions (SWP).
Status Register to General Register Transfer Instructions. General Register to Status

Register Transfer Instructions. Coprocessor Data Transfers. Coprocessor Register Transfers. Breakpoint Instruction (BRK - Architecture V5t only). Unused Instruction Space. Memory Faults. ARM Architecture Variants.

7. Use of ARM based IDE

Writing efficient C programs for ARM
Project creation, Compilation, Debugging, Linking.
Break point insertion, Memory modeling
Evaluation and comparison of various ARM based IDE's

8. Microcontroller specific programming

Simulators, In circuit Debuggers, Emulators, Cross compilers Keil, IAR, RD 51
Project creation, Compilation, Debugging, Linking.
Downloading code hex file into the ARM based Philips microcontrollers
Use of port and serial interface provided into the chip

9. Hands on interfacing

LED interfacing with port
4 x 4 Matrix keyboard interface.
7 segment LED display interface
128 x 64 Graphic LCD interface
SPI interface
I2C bus interface with EEPROM IC
Port 2-channel AD sampling input through POT
2-channel PWM output, one is output to a buzzer,
CAN interface out put

**An Investment in Knowledge Pays Best Returns.** Benjamin Franklin

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