

Contents

1	Number Systems and Data Communication	1
1.1	Introduction	1
1.2	Analog Signals	1
1.3	Digital Signals.....	4
1.4	Number System.....	4
1.5	Coding Schemes.....	10
1.6	Clock	12
1.7	Transmission Modes.....	13
1.8	Transmission Methods	14
2	Logic Gates and Introduction to Computer Architecture.....	17
2.1	Introduction.....	17
2.2	Logic Gates	17
2.3	Integrated Circuit (IC) Classification.....	21
2.4	Registers.....	22
2.5	Introduction to Computer Architecture	22
2.6	Memory	27
2.7	Multiplexer and Decoder.....	30
3	ARM Instructions Part I	35
3.1	Introduction.....	35
3.2	Instruction Set Architecture (ISA)	38
3.3	ARM Instructions.....	39
3.4	Register Swap Instructions (MOV and MVN).....	42
3.5	Shift and Rotate Instructions.....	43
3.6	ARM Unconditional Instructions and Conditional Instructions.....	46
3.7	ARM Data Processing Instruction Format	47
3.8	Stack Operation and Instructions	49
3.9	Branch (B) and Branch with Link Instruction (BL).....	51
3.10	Multiply (MUL) and Multiply-Accumulate (MLA) Instructions	53

4	ARM Instructions and Part II	57
4.1	ARM Data Transfer Instructions	57
4.2	ARM Addressing Mode	59
4.3	Data Transfer Instruction Format	61
4.4	Block Transfer Instruction and Instruction Format	62
4.5	Swap Memory and Register (SWAP)	62
4.6	Bits Field Instructions	63
4.7	Data Representation and Memory	65
5	ARM Assembly Language Programming Using Keil	
	Development Tools Introduction	71
5.1	Introduction	71
5.2	Keil Development Tools for ARM Assembly	71
5.3	Program Template	78
5.4	Programming Rules	78
5.5	Directives	79
6	ARM Cortex-M3 Processor and MBED NXP LPC1768	85
6.1	Introduction	85
6.2	MBED NXP LPC1768	88
6.3	Basic GPIO Programming	89
6.4	Flashing the NXP LPC1768	96
7	Lab Experiments	99
7.1	Introduction	99
7.2	Lab#1 Binary Counter Using Onboard LEDs	99
7.3	Lab2: Configuring the Real-Time Clock (RTC)	102
7.4	Lab#3 Configuring Analog-To-Digital Converter (ADC)	106
7.5	Lab #4: Digital to Analog Converter (DAC)	115
7.6	Experiment #5: Binary to Hexadecimal Display	118
7.7	Universal Asynchronous Receiver/Transmitter (UART)	120
	Solution to the Problems and Questions	125
	References	157

ARM Assembly Language with Hardware Experiments

Elahi, A.; Arjeski, T.

2015, VIII, 139 p. 113 illus., 57 illus. in color., Hardcover

ISBN: 978-3-319-11703-4