

Index

6

64-bit addition, 203
64-bit logic shift left, 206
64-bit multiplication, 208
64-bit operations, 203
64-bit shifted right, 207
64-bit sign extension, 205
64-bit signed division, 211
64-bit subtraction, 204

A

ABI, 167
access C variables, 231
accumulator-based instruction set, 61, 62
ACK, 50, 547, 550, 552
active high, 377
active low, 377
ADC, 481
 continuous mode, 488
 data alignment, 490
 digital quantization, 482
 DMA, 501
 external trigger, 493
 freeze mode, 493
 input channels, 491
 quantization error, 486
 sample-and-hold amplifier, 484
 sampling error, 485
 sampling time, 484
 scan mode, 489
 single mode, 488
 trigger, 493
ADC calibration, 505
add, 80
add with carry, 67, 80
ADSR, 521
advanced high-performance bus, 58
advanced peripheral bus, 58
AHB, 58, 255, 470, 471
ALIGN, 72, 218
aligned memory accesses, 221

alignment, 217
 double-word alignment, 217
 halfword alignment, 217
 word alignment, 217
alternate function, 698
alternate functions, 341
ALU, 20, 24, 25, 59, 61, 62, 75, 78
always, 112
AMBA, 470
analog watchdog, 488
APB, 59, 470
application binary interface, 173, 191, 215
application program status register, 75, 111
APSR, 75, 92, 93, 111
AREA, 70
arithmetic
 add, 80
 add with carry, 80
 multiply and subtract, 80
 reverse subtract, 80
 subtract, 80
 subtract with carry, 80
arithmetic logic unit, 59
ARM EABI, 169
ARM state, 57
ARM32, 55, 56, 57, 73
ARM64, 55, 56, 73
Armstrong numbers, 151
ASB, 470
ASCII, 49
assembly function in C programs, 228
assembly instruction, 66
assembly program, 2
asynchronous transmission, 527
AT commands, 544
atoi, 154
audio, 592
AVRCP, 544

B

Barrel shifter, 64, 78, 83
base, 29, 269

- BASEPRI, 14, 92, 253
 - baud rate, 530
 - biased exponent*, 281
 - big endian, 100
 - binary coded decimal (BCD), 457
 - binary executable, 2
 - binary interface, 167
 - binary numbers, 29, 31
 - binary search, 155
 - bipolar, 415
 - bit*, 27
 - bit mask, 86
 - check a bit, 86
 - clear a bit, 87
 - set a bit, 87
 - toggle a bit, 87
 - bit mask, 86
 - bit order, 89
 - bit stuffing**, 580
 - bitwise logic
 - AND, 85
 - bit clear, 85
 - move not, 85
 - BL, 116
 - Bluetooth, 543
 - address, 543
 - AT commands, 544
 - HC-05, 544
 - HC-06, 544
 - paring, 544
 - BLX, 116
 - boot loader, 19
 - booting process, 241
 - branch
 - branch if equal, 114, 671
 - branch if negative, 114, 671
 - branch if not equal, 114, 671
 - branch if overflow set, 114, 671
 - branch if positive or zero, 114, 671
 - branch if signed greater or equal, 114, 671
 - branch if signed greater than, 114, 671
 - branch if signed less than, 114, 671
 - branch if signed less than or equal, 114, 671
 - branch if unsigned higher, 114, 671
 - branch if unsigned higher or same, 114, 671
 - branch if unsigned lower, 114, 671
 - branch if unsigned lower or same, 114, 671
 - branch label, 114
 - table branch byte, 127
 - table branch halfword, 128
 - branch and exchange, 68, 116, 162
 - branch and link, 68, 116, 162
 - branch indirect with link, 116
 - branch instruction, 114
 - branch with link and exchange, 68
 - break statement, 126
 - bubble sort, 157
 - buffered output, 511
 - bulk transfers*, 581
 - bus, 4, 59
 - bus arbitration, 470
 - bus matrix, 58
 - BX, 116
 - byte, 27
 - byte order, 89
- ## C
- calendar time, 453
 - call a C function from assembly, 232
 - call an assembly subroutine from C, 230
 - caller, 9, 162, 166, 173, 175, 190
 - calloc*, 8
 - carry flag, 36, 37, 42, 75
 - CBNZ, 116
 - CBZ, 116
 - CDC, 592
 - change processor state, 253
 - change-on-zero, 580
 - check a bit, 86
 - circular right rotate, 98
 - clear a bit, 87
 - clock accuracy, 456
 - clock arbitration, 549
 - clock stretching, 548
 - clock synchronization, 549
 - CMAR, 476
 - CNDTR, 476
 - collector, 346
 - comment, 3, 21, 63, 64, 65, 668
 - compare and branch on non-zero, 116
 - compare and branch on zero, 116
 - compare negative, 68, 77, 91
 - compound Boolean expression, 119
 - compound logical expression, 120
 - compwithnd Boolean expression, 119

condition flags, 111, 117
 conditional branch instruction, 114
 conditional execution, 117
 context switch, 608, 611, 612, 614
 continue statement, 125
 control register, 510, 602
 control structures, 133
Cortex-A, 56
Cortex-M, 56
Cortex-M0, 57, 323
Cortex-M1, 57
Cortex-M4, 57, 73, 323
Cortex-R, 56
 count digits, 146
 counter overflow, 412
 counter underflow, 412
 CPACR, 299, 301
 CPAR, 476
 CPS, 253
 CPSID, 253
 CPSIE, 68, 253, 605, 606, 614
 CRC, 583

D

DAC, 507

- buffered output, 511
- control register, 511
- data output register, 510
- resolution, 508
- sampling rate, 508
- trigger, 510

 Darlington array, 426
 data alignment, 217
 data comparison, 91
 data memory, 5, 6, 7, 8, 9, 18, 19, 20, 21, 22, 23, 24, 25, 58, 74, 138, 139, 171, 202, 223, 435, 526
 data memory barrier, 68
 data minus, 579
 data plus, 579
 data structure padding, 219
 data symbols, 2
 data synchronization barrier, 68
DCB, 71
DCD, 71
DCQ, 71
DCW, 71
 De Morgan's laws, 120
 debouncing, 360
 decimal, 29, 269
 decode, 330
 default NaN, 303
 deformatted, 286
 delay, 260
 differential signaling, 531
 differential signals, 579
 digital quantization, 482
 direct memory access, 469
 directive, 668
 directives, 3, 65, 66, 69, 70, 73
 dividing by zero, 266
 DMA, 469, 501, 540

- channel, 474
- circular mode, 478
- data memory, 379
- flow-through, 471
- fly-by*, 471
- interrupt, 479

 DMA and interrupt enable register, 399
 DMA priority, 475
 double buffering, 436, 503
double precision, 281
double-word, 27
 do-while loop, 124
 DSP, 617

- digital filtering, 637
- extension and add, 631
- finite impulse response, 638
- fixed-point DSP*, 617, 618
- floating-point DSP, 617
- multiply, 635
- multiply and accumulate, 638, 642, 643, 644
- overflow, 619
- Q flag, 621
- saturation, 619
- vector absolute value, 651
- vector dot product, 660
- vector mean, 656
- vector min and max, 661
- vector negate, 650
- vector offset with saturation, 653
- vector shift with saturation, 655
- wrap-around, 619

 duty cycle, 385
 duty ratio, 429

E

eabi, 667
 EABI, 178, 230, 232
 electromagnetic interference, 350
 ELF, 3, 4, 25, 665, 706
 embedded assembly in C programs, 229
 EMI, 350
 END, 70
 end of packet, 583
 endian, 89, 129, 247
 ENDP, 70
 endpoint, 578, 581, 583, 584, 585, 587, 590, 593
 ENTRY, 70
 enumeration, 588
 EOP, 582, 583, 584
 EPSR, 75, 92, 93
 EQU, 71, 358
 equal, 112
 even parity, 529
 event generation register, 382
 EXC_RETURN, 601
 exception, 238, 243
 exception handling, 266
 executable and linkable format, 3
 executable file, 1
 executable interface, 3
 execution program status register, 75
 execution view, 4
 export, 175, 230
 EXPORT, 73
 extern, 231, 233
 external voltage reference, 487

F

factorial numbers, 141, 194
 FAULTMASK, 14, 92, 253
 FHSS, 543
FILL, 71
 find maximum, 144
 fixed-point numbers, 270

- accuracy, 274
- addition, 276
- division, 278
- multiplication, 277
- Qm.n format, 271
- range, 274

- resolution*, 274
- subtraction, 276

flash memory, 7
 floating-point numbers, 279

- addition, 293
- biased exponent*, 281
- double precision, 281
- fraction field, 281
- half precision, 281
- IEEE 754, 279
- normalized notation, 279
- overflow*, 285
- range, 287
- rounding rules, 289
- rounding to even, 290
- sign bit*, 281
- single precision, 281
- special values, 284
- subnormal numbers, 286
- underflow*, 285

floating-point register, 299
 floating-point unit, 270
 flowcharts, 136
 for loop, 122
 FPCAR, 299, 304, 305, 316, 321
 FPCCR, 299, 306, 307, 316
 FPSCR, 299, 302, 303, 304, 309, 311, 312, 314, 315, 316, 680
 FPU, 299, 512

- alternative half-precision, 303
- arithmetic instructions, 310
- comparison, 311
- copy, 309
- CPACR, 301
- default NaN mode, 303
- divide-by-zero exception, 304
- exception handling, 314
- exceptions, 304, 314
- flushing-to-zero, 303
- FPCA, 305
- FPCAR, 304
- FPCCR, 306
- FPSCR, 302
- inexact exception, 304
- input denormal cumulative exception, 304
- invalid operation exception, 304
- lazy stacking, 307
- load and store, 308

- N, Z, C, V flags, 302
- overflow exception, 304
- precision conversion, 312
- registers, 299
- rounding mode, 303
- stack frame, 305
- underflow exception, 304
- fraction field, 281
- freeze mode, 493
- frequency hopping, 543
- FT232R, 532
- full stepping, 417, 418, 419, 420, 421, 423
- full-duplex, 528
- function, 161

G

- GAVDP, 544
- GCD, 177
- gdb, 665
- GE flags, 648
- general-purpose integer registers, 13
- get, 73
- global, 230
- global static variable, 222
- goto, 133
- goto statement, 135
- GPIO, 341
 - data input register, 357
 - data output register, 357
 - input data register, 342
 - open drain, 348
 - output data register, 342
 - pull down, 342
 - pull up, 342
 - push pull, 346
 - slew rate, 350
 - strong pull down, 343
 - strong pull up*, 343
 - weak pull down, 343
 - weak pull up*, 343
- greatest common divisor, 177
- gyro, 572

H

- half precision, 281
- half stepping, 421

- half-duplex, 528
- halfword*, 27
- Hamming distance, 142
- harmonics, 350, 520
- Harvard architecture, 4, 7, 10, 18, 24
- HD44780, 444
- heap, 8, 158, 171, 223
- hexadecimal, 29
- HID, 592, 593
- HID descriptor, 594, 596

I

- I²C, 546
 - ACK, 547
 - clock stretching, 548
 - data hold time*, 555
 - data setup time*, 556
 - DMA, 566
 - frame, 549
 - NACK, 547
 - open drain, 546
 - polling, 559, 560
 - rise time, 553
 - SCL, 546
 - SDA, 546
 - start, 547
 - stop, 547
 - TC74, 551, 561
 - temperature sensor, 551
- ICPSC, 398
- if-then statement, 118
- if-then-else statement, 121
- immediate number, 61, 64, 81, 93, 97, 98, 99, 325, 330, 331, 332, 333, 604
- import, 175, 231
- IMPORT, 73
- include, 73
- initialized data segment, 8
- injected channel, 492
- inline assembly, 228, 672
- input capture, 395
 - prescaler, 398
- instruction memory, 5, 6, 7, 8, 14, 15, 19, 20, 25, 56, 58, 59, 324
- instruction synchronization barrier, 68
- interface class, 585
- internal reference voltage, 487

interrupt, 237

- active bit register, 246
- clear pending register, 246
- controller type register, 246
- enable and disable, 246
- external interrupt, 243, 262
- interrupt levels, 250
- interrupt number, 246
- pending bit, 246
- preemption priority, 249
- priority*, 243
- set enable register, 246
- set pending register, 246
- software interrupts, 266
- software trigger, 246
- stacking, 243
- unstacking, 243

interrupt clear enable register, 246

interrupt number, 238

interrupt priority, 249

interrupt priority register, 249

interrupt program status register, 75

interrupt service routine, 237

interrupt stacking, 244

interrupt transfers, 581

interrupt unstacking, 244

interrupt vector table, 241, 243

intra-procedure-call register, 167, 168

Inverting Schmitt trigger, 344

IP, 249

IPSR, 75, 92, 93

ISER, 246, 247, 248, 249, 464

isochronous transfers, 581, 587, 592

IT, 670

itoa, 182

J

J state, 580

Java virtual machine, 1

JEOC, 497

K

K state, 580

keypad reverse scanning, 370

keypad scanning algorithm, 365

L

L3GD20, 572

label, 2, 64, 65, 127, 136, 668

last-in-first-out, 164

lazy stacking, 307

LCD

- 4-bit bus mode, 445
- 8-bit bus mode, 445
- bias, 429, 430
- commands, 448
- data bus, 445
- data memory, 439
- display memory, 436
- double buffering, 436
- duty ratio, 429
- encoding, 440, 447
- function set, 449
- initialization, 449
- nibble, 445
- programming fonts, 451
- register select, 445
- size, 447

LDM

- LDMDA, 106, 165
- LDMDB, 68, 106, 165
- LDMIA, 106, 108, 165, 166
- LDMIB, 106, 165

LDR, 98

LDRB, 68, 103, 109, 126, 152, 153, 154, 176, 179, 180, 183, 186, 196, 216, 217, 229, 230, 236, 667, 687, 688

LDRSB, 68, 103, 104, 109, 216, 217, 687

leap second, 454

LIFO, 164

linkable interface, 3

linker script, 674

little endian, 100, 247

load

- load byte, 103
- load halfword, 103
- load multiple words, 103
- load signed byte, 103
- load signed halfword, 103
- load word, 103

load constant into registers, 97

load register exclusive, 68

load register with byte, 109, 216, 217

- load register with double-word, 217
- load register with signed byte, 109, 216
- load register with signed halfword, 109, 217
- load view, 4
- loading effects, 511
- load-store instruction set, 61, 62
- local static variable, 222, 224
- logic shift left, 67, 327
- logic shift right, 67, 207
- lookup table, 512
- loop structure, 134

M

- machine program, 1, 2, 3, 4, 18
- main stack, 14, 241, 245, 267, 321, 600, 612, 615
- major opcode, 327
- malloc*, 8
- mask, 86
- matrix transpose, 184
- memory
 - data memory, 5
 - instruction memory, 5
 - main memory, 4
- memory address modes, 101
- memory addressing modes, 101
 - pre-index, 102
- memory mapped I/O, 10
- Memory-mapped I/O, 351
- micro-stepping, 423
- minor opcode, 326, 327
- MISO, 568
- mnemonic, 2, 63, 64, 77
- MOSI, 568
- move 16-bit immediate value to bottom halfword, 97
- move 16-bit immediate value to top, 97
- move from general register to special register, 93
- move from special register to general register, 93
- move not, 92
- move the bitwise inverse of 8-bit immediate value, 97
- MSC, 592
- MSP, 241
- multiply and accumulate, 638, 642, 643, 644
- multiply and subtract, 80
- multiply-accumulate, 67
- multiply-subtract, 67

- musical
 - ADSR, 521
 - amplitude, 520
 - duration, 521
 - pitch, 520
 - timbre, 520
 - tone, 520

N

- NACK, 547, 552
- NaN, 284
- negative, 112
- negative flag, 75
- nibble, 445
- NMI, 14, 253
- non-preemptive, 237
- non-return-to-zero inverted*, 580
- non-static variable, 223
- non-system interrupts, 246
- non-volatile, 4, 7, 227
- normalized presentation, 286
- NOT, 93
- not any number, 284
- note equal, 112
- NRZI, 580
- NULL, 49, 50, 51, 54, 153, 159, 180, 183, 235, 543, 667
- NULL terminator, 50
- NVIC, 59, 242, 244, 245, 247, 248, 249, 251, 253, 255, 612
- Nyquist frequency, 617

O

- object code, 3
- OCM, 377
- OCREF, 377
- octal, 29
- odd parity, 529
- one's complement, 34
- opcode, 63, 325, 326, 327, 331, 332, 333
- open collector, 546
- open drain, 346, 347, 348, 349, 357, 370, 546
- OpenOCD, 676
- operands, 2, 11, 24, 33, 39, 45, 46, 47, 49, 55, 59, 61, 62, 63, 64, 65, 81, 83, 92, 99, 203, 271, 278, 298, 324, 325, 326, 331

over-capture flag, 398
 overflow, 39, 42
 overflow on subtraction, 40
 overflow clear, 112, 114, 671
 overflow flag, 36, 75
 overflow set, 112
 oversampling, 529

P

pack two halfwords, 646
 packed, 221
packed data structure, 219
 padding, 219
 palindrome string, 152
 parasitic capacitors, 553
 parity, 147
 even parity, 147
 odd parity, 147
 parity bit, 529
 part per million, 579
 parts per million, 456
 pass arguments, 169
 pass by reference, 171
 pass by value, 171, 176
 PC-relative addressing, 99, 104, 105, 338
 perfect number, 149
 peripheral interrupt, 246, 247, 248, 249, 251, 252
 permutation, 197
 PHDC, 592
 piconet, 543
 ping-pong buffering, 503
 pipeline, 16
 pitch, 572
 plus, 112, 114, 671
 polling, 238, 243, 363, 371
 Port-mapped I/O, 351
 positive or zero, 112
 post-index format, 101
 pot, 496
 potentiometer, 496
power dissipation, 481
 PPM, 456, 579
 preempt priority, 249, 250
 preemptive, 237
 prescaler, 376
 PRIMASK, 14, 92, 253
 privileged state, 599, 603, 604

PROC, 70
 procedure, 161
 process stack, 14, 245, 600, 612, 615
 processor exception, 246
 program counter, 15
 program status register, 75
 pseudo instruction, 19, 66, 98, 99, 153
 PSR, 75, 92, 93, 244, 267, 321, 610, 615
 pull down, 342, 343
 pull up, 342
 push button, 360
 push pull, 346, 347, 349, 355, 370, 403
 PWM, 384
 alignment, 389
 center-aligned, 389
 control register, 382
 edge-aligned, 389
 mode, 386

Q

Q15, 618
 Q31, 618
 Q7, 618
 QNaN, 284
 quantization error, 486
 Quiet NaN, 284

R

radio frequency interference, 350
 radix, 269
 read-only section, 4
 read-write section, 4
 real number, 27, 269, 274, 282, 319
 real-time clock, 453
recursive function, 192
register allocation, 13
 registers, 11
 general purpose registers, 11
 live range, 138
 register reuse, 138
 scratch registers, 167, 173
 special purpose registers, 11
 virtual registers, 229
 regular channel, 492
 Reset_Handler, 675
 resolution, 481

- reverse bits, 89
- reverse byte order, 89
- reverse subtract, 67, 80
- RFCOMM, 544
- RFI, 350
- roll, 572
- ROR, 215
- rotate
 - rotate right, 67, 79
 - rotate right with extend, 79
- rotate right with extend, 67
- round to even, 290
- round to the nearest, 289
- round toward negative infinity, 289
- round toward zero, 289
- round-robin scheduler, 607, 615
- routine, 161
- RRX, 215
- RS-232, 531
- RS-422, 531
- RTC, 438, 453, 455, 456, 459, 460, 461, 462, 463, 464, 468
- RTC alarm, 462

S

- S suffix, 77, 88, 330, 333
- sample-and-hold amplifier, 482, 484
- sampling rate*, 481
- sampling time, 484
- saturation, 83
- saturation flag, 75
- scanning algorithm, 366
- SCB, 250, 252, 266
- Schmitt trigger, 343, 346
- SCLK, 568
- SE0, 580
- SE1, 580
- selection structure, 134
- Separated Operand Scanning, 644
- sequence structure, 134
- servo motor, 415
- set a bit, 87
- shift
 - arithmetic shift right, 67, 79
 - logical shift left, 78
 - logical shift right, 79
- shift and rotate, 78
- SHP, 250
- sign and magnitude, 33
- sign and zero extension, 90
- sign extension, 216, 490
- Signaling NaN, 284
- signed division, 48, 79
- signed greater or equal, 112
- signed greater than, 112
- signed integer, 31
- signed less than, 112
- signed less than or equal, 112
- signed long multiply-accumulate, 67
- signed saturate, 80, 83
- SIMD, 618, 621, 622, 623, 625, 629, 646, 648, 653, 659
 - add, 623, 624
 - byte selection, 649
 - GE flags, 648
 - saturating add, 626
 - saturating subtract, 626
 - signed extension, 647
 - subtract, 623
 - unsigned extension, 647
- single precision*, 281
- single-ended signal, 580
- single-ended signaling, 531
- sinusoidal, 520
- slave select line, 568
- Sleep-on-Exit, 467
- slew rate, 350
- SNaN, 284
- SOF, 583
- softfp, 666
- software trigger, 493
- software trigger interrupt register, 246
- SPACE**, 71
- SPI, 568
 - clock mode, 571
 - clock phase, 571
 - clock polarity, 571
 - gyro, 572
- SSAT, 68, 75, 80, 83
- stack, 7, 8, 9, 13, 61, 68, 162, 163, 164, 166, 167, 168, 169, 173, 178, 190, 191, 194, 201, 202, 215, 228, 229, 244, 254, 267, 268, 322, 514, 600, 602, 604, 605, 606, 608, 610, 611, 612, 613, 614, 615
 - ascending stack, 164
 - descending stack, 164

- full stack, 164
 - stack frame pointer, 610
 - stack-based instruction set, 61, 62
 - start-of-frame, 583
 - static variable, 222
 - statically-allocated, 4
 - step angle, 417
 - stepper motor, 415
 - full stepping*, 419
 - half stepping, 421
 - micro-stepping, 423
 - wave stepping, 419
 - stepwise refinement, 135
 - STIR, 246
 - STM
 - STMDA, 106, 165
 - STMDB, 68, 106, 108, 165, 166, 614
 - STMIA, 106, 108, 165
 - STMIB, 106, 165
 - store
 - store lower byte, 104
 - store lower halfword, 104
 - store multiple words, 104
 - store register byte, 217
 - store register halfword, 217
 - store word, 104
 - strcat, 179, 197, 198, 234
 - strcmp, 180
 - string
 - isDigit, 51
 - isLower, 52
 - isUpper, 52
 - isWhitespace, 52
 - itoa, 182
 - remove a character, 186
 - reverse a string, 196
 - string comparison, 51, 180
 - string concatenation, 179
 - string permutation, 197
 - strlen, 52, 230, 232
 - toLowerCase, 53
 - toUpperCase, 52
 - strong pull down, 343, 365
 - strong pull up*, 343, 365
 - strchr, 54
 - strstr, 54
 - structured programming, 133, 134, 135
 - subroutine, 161
 - pass arguments through stack, 190
 - pass by reference, 171
 - pass by value, 171
 - passing arguments, 169
 - subtract, 80
 - subtract with carry, 67, 80
 - successive-approximation, 481
 - suffix S, 117
 - supervisor call, 266
 - swap, 176, 196
 - switch statement, 126
 - synchronous protocol, 569
 - system control block, 250
 - system exception, 245, 246
 - system handler priority, 250
 - system interrupt, 246
 - system tick timer, 254
 - SysTick, 71, 226, 227, 254, 255, 256, 259, 261, 267, 268, 321, 612
- ## T
- table branch halfword, 128
 - TBB, 127
 - TBH, 128
 - TC74, 551, 561
 - temporal locality, 12
 - test, 91
 - test equivalence, 91
 - test equivalent, 68
 - Thumb, 55, 56, 57, 73, 323, 324, 325, 326, 687, 689
 - Thumb state, 57
 - Thumb-2, 55, 73, 323, 324
 - time division duplex, 543
 - timer, 373
 - center-aligned counting, 374
 - compare output, 376
 - complementary output, 378, 392
 - digital input filter, 397
 - DMA, 400
 - downcounting, 374
 - input capture, 395, 404
 - main output, 378
 - mode, 377
 - noise filtering, 398
 - overflow, 375
 - polarity, 378
 - prescaler, 376, 400

- PWM, 384, 386
- underflow, 375
- upcounting, 374
- toggle a bit, 87
- token packet, 583
- transmission bus, 4, 7
- trap, 266
- trap handler, 315
- two's complement, 35

U

- UAL, 668
- UART, 527
 - DMA, 540
 - frame, 528
 - full-duplex, 528
 - half-duplex, 528
 - interrupt, 537
 - polling, 533
- UEV, 382
- ULN2803, 426
- ultrasonic distance sensor, 407
- ultrasonic waves, 407
- unaligned memory accesses, 221
- unaligned memory layout, 221
- unconditional branch instruction, 114
- Unified Assembly Language, 668
- uninitialized data segment, 8
- uninitialized variables, 4
- unipolar, 416
- unique numbers, 187
- Unix Epoch, 454, 468
- unprivileged state, 599, 603, 604
- unsigned decimal, 31
- unsigned division, 48, 79
- unsigned higher, 112
- unsigned higher or same, 112
- unsigned long multiply-subtract, 67
- unsigned lower, 112
- unsigned lower or same, 112
- unsigned numbers, 30
- unsigned saturate, 80, 83
- update event, 382, 412
- update interrupt flag bit, 382
- USAT, 68, 75, 80, 83
- USB, 578
 - address field, 582

- bulk transfers*, 581
- bus layer, 579
- class layer, 592
- CRC, 583
- data field, 582
- descriptors, 584
- device layer, 581
- differential signals, 579
- endpoint, 581, 587
- enumeration, 588
- functions layer, 584
- GET_DESCRIPTOR requests, 590
- HID, 593
- interrupt transfers, 581
- isochronous transfers*, 581
- J state, 580
- K state, 580
- NRZI, 580
- packet identification field, 582
- power supply, 585
- product ID, 585
- SET_ADDRESS request, 590
- speed, 579
- start-of-frame, 583
- SYNC, 582
- transfer type, 581
- vendor ID, 585
- UTC, 453, 454

V

- variable live range, 13
- video, 592
- virtual decimal place, 270
- volatile, 4, 5, 7, 222, 226, 227
- volatile variable, 226
- von Neumann, 4, 24

W

- wait for event, 68, 466
- wait for interrupt, 68, 466
- wave stepping, 418, 419
- weak, 231, 233
- weak pull down, 343
- weak pull up*, 343
- WFE, 466
- WFI, 466

while loop, 123
wired-AND, 349
wired-OR, 349
word, 27

X

xPSR, 14

Y

yaw, 572
year 2038 problem, 454

Z

zero flag, 75
zero-initialized data section, 5, 7