



INDEX

–A–

- A(0
 - 31), 9-4
- ACKERR 16-31
- Acknowledge error (ACKERR) 16-31
- Address
 - mark wakeup 14-58
 - space 13-7
- address type (AT0-AT3), 9-37
- ALE 21-54
- ALEE 21-56
- alignment exception, 3-46
- ALU–BFU 3-5
- AN 13-3, 13-5
- Analog
 - front-end multiplexer 13-14
 - input
 - multiplexed 13-5
 - port A 13-3
 - port B 13-4
 - section contents 13-1
 - submodule block diagram 13-12
 - supply pins 13-5
- arbitration, 9-30
- AT(0
 - 3), 9-4
- atomic update primitives, 3-42
- atomic, 9-31

–B–

- BAR 3-52
- Base ID mask bits 16-30
- Baud
 - clock 14-51
- BB, 9-7
- BDIP, 9-5
- BE bit 3-21
- Beginning of queue 2 (BQ2) 13-39
- BG, 9-7
- BI, 9-6
- Binary
 - divider 13-25
 - weighted capacitors 13-14
- Bit stuff error (STUFFERR) 16-31
- BITERR 16-31
- BITS 14-17
- Bits per transfer
 - enable (BITSE) 14-23
 - field (BITS) 14-17
- BITSE 14-23, 14-38

- Bit-time 14-50
- BKPT (TPU asserted) 17-14
- BLC 17-13
- BOFFINT 16-31
- Boundary conditions 13-17
- Boundary scan
 - cells 22-1
 - descriptor language 22-7
 - register 22-1
- BPU 3-5
- BQ2 13-17, 13-39
- BR, 9-7
- Branch
 - prediction 3-5
 - processing unit 3-5
 - trace enable 3-21
- Branch latch control (BLC) 17-13
- Branch processing unit 3-5
- Break frame 14-51
- Breakpoint
 - asserted flag (BKPT) 17-14
 - flag (PCBK) 17-14
- Breakpoint counter A value and control register 21-52
- Breakpoint counter B value and control register 21-53
- BRKNOMSK 21-51
- BSC 22-1
- BSR 22-1
- burst indicator (BURST), 9-36
- burst inhibit (BI), 9-39
- burst read cycle (illustration), 9-18
- burst transfer, 9-15
- burst write cycle (illustration), 9-23
- BURST, 9-4
- Bus
 - monitor 6-12
 - off interrupt
 - (BOFFINT) 16-31
- bus busy (BB), 9-32
- bus exception control cycles, 9-43
- bus grant (BG), 9-32
- bus interface
 - bus control signals, 9-2
 - bus operation
 - address transfer phase related signals, 9-35
 - arbitration phase, 9-30
 - basic transfer protocol, 9-8
 - burst mechanism, 9-16
 - burst transfer, 9-15
 - bus exception control cycles, 9-43
 - single beat transfer
 - single beat read flow, 9-8



- single beat write flow, 9-8, 9-11
- single beat transfer, 9-8
- storage reservation, 9-40
- termination signals, 9-38
- bus operations, 9-7
- bus transfer signals, 9-1
- features, 9-1
- signal descriptions, 9-3
- bus request (BR), 9-31
- bus signals (illustration), 9-3
- BUSY 16-5, 16-15
- BYP 13-13, 13-47
- Bypass mode 13-13
- BYTES field 3-18

-C-

- C bit 3-14
- CA bit 3-18
- cache control instructions, 3-42
- CAN2.0B
 - system 16-3
- CANCTRL0 16-25
- CANCTRL1 16-26
- CANCTRL2 16-28
- CANICR 16-24
- Carry 3-18
- CCL 17-13
- CCW 13-1, 13-46
- CF1 13-41
- CF2 13-41
- CFSR 17-15
- CGBMSK 21-50
- CH 17-15, 17-18, 17-19
- CHAN 13-47
- CHANNEL 17-16
- Channel
 - assignments
 - multiplexed 13-48
 - nonmultiplexed 13-48
 - conditions latch (CCL) 17-13
 - interrupt
 - enable
 - /disable field (CH) 17-15
 - request level (CIRL) 17-15
 - status (CH) 17-19
 - invalid 13-47
 - number (CHAN) 13-47
 - orthogonality 17-3
 - priority registers 17-18
 - register breakpoint flag (CHBK) 17-14
 - reserved 13-47
- CHBK 17-14
- CHBMSK 21-50
- checkstop state, 3-45
- CHSTP bit 21-54
- CHSTPE 21-55
- CIE1 13-37
- CIE2 13-39
- CIER 17-15, 17-19
- CIRL 17-15

- CISR 17-8, 17-19
- class, instruction, 3-38
- CLKOUT to TA, BI assertion (when driven by the Memory Controller) G-18
- CLKOUT, 9-7
- CLKS 17-13
- Clock
 - block diagram 13-26
 - frequency 13-26
 - generation 13-24
 - phase (CPHA) 14-17
 - polarity (CPOL) 14-17
- CMPA–CMPD 21-45
- CMPE–CMPF 21-46
- CMPG–CMPH 21-46
- CNRX/TX pins 16-2
- CNTC 21-52
- CNTV 21-52
- Code 16-5
- Coherency 13-6, 13-22, 17-4
- COMM D-18
- Command
 - RAM 14-22
 - word pointer (CWP) 13-42
- Comparator 13-14
- Comparator A–D value registers 21-45
- Comparator E–F value registers 21-46
- Comparator G–H value registers 21-46
- Compare instructions 3-17
- Compare size 21-50
- Compare type 21-48, 21-50
- Completed queue pointer (CPTQP) 14-21
- Condition register 3-15, 3-17
- CONT 14-23
- contention, 9-36
- Continue (CONT) 14-23
- Continuous transfer mode 14-15
- Control registers
 - 1 (QACR1) 13-36
 - 2 (QACR2) 13-38
- controlling termination of a bus cycle for a bus error, 9-43
- Conversion
 - command word table (CCW) 13-1, 13-14
 - cycle times 13-12
 - stages 13-45
- Count register 3-19
- COUNTA 21-52
- COUNTB 21-53
- CPHA 14-17, 14-34
- CPOL 14-17, 14-34
- CPR 17-18
- CPTQP 14-21, 14-24
- CR 3-5, 3-15, 3-19
 - and compare instructions 3-17
- CR, 9-5
- CR0 field 3-16
- CR1 field 3-16
- CRCERR 16-31
- CRWE 21-50
- CRWF 21-50



CSG 21-50
CSH 21-50
CTA 21-48
CTB 21-48
CTC 21-48
CTD 21-48
CTE 21-50
CTF 21-50
CTG 21-50
CTH 21-50
CTR 3-5
CWP 13-42
Cyclic redundancy check error (CRCERR) 16-31

-D-

D(0
 31), 9-6
D0 20-3
DAC 13-1
DAE/source instruction service register 3-22
DAR 3-22, 3-46, 3-51, 3-52
DAR, 3-46, 3-51
Data
 field for RX/TX frames (TOUCAN) 16-5
 frame 14-50
Data address register 3-22
Data space only 20-3
data storage interrupt, 3-45
DCNR 17-19
DDRQA 13-33, 13-35
DDRQS 14-9, 14-33, 14-37
Debug enable register 21-55
debug mode disable, 3-45
DEC 3-23
DECE 21-54
DECEE 21-56
Decrementer
 register 3-23
Delay
 after transfer (DT) 14-23, 14-35
 before SCK (DSCKL) 14-18
DER 21-55
Development Port
 trap enable selection 21-48
Digital
 control section
 contents 13-1, 13-14–13-29
 input
 /output port (PQA) 13-3
 port (PQB) 13-4
 to analog converter (DAC) 13-14
DIO D-38
DIS 20-3
Disable TPU2 pins field (DTPU) 17-20
Disabled mode 13-18
Discrete input/output (DIO) D-38
DIV2 17-20
DIV8 clock 17-7
Divide by two control field (DIV2) 17-20
DIW0EN 21-48

DIW1EN 21-48
DIW2EN 21-48
DIW3EN 21-48
DLW0EN 21-52
DLW1EN 21-52
Double
 -buffered 14-52, 14-56
DPI 21-55
DPTRAM 18-4
DSCK 14-23
DSCKL 14-18
DSCR 17-12
DSISR 3-22, 3-46, 3-51, 3-52
DSSR 17-14
DT 14-23
DTL 14-18
DTPU 17-20

-E-

EA 3-33
EBRK 21-55
ECR 21-53
EE bit 3-21, 3-26
Effective address 3-33
EID 3-26
EIE 3-26
eieio, 3-43
ELE bit 3-21
EMPTY 16-5
EMU 17-4, 17-11
Emulation
 control (EMU) 17-11
 support 17-4
Encoded
 one of three channel priority levels (CH) 17-18
 time function for each channel (CHANNEL) 17-16
 type of host service (CH) 17-18
Ending queue pointer (ENDQP) 14-19
End-of-
 frame (EOF) 16-16
End-of-queue condition 13-45
ENDQP 14-19, 14-24
Entry
 table bank select field (ETBANK) 17-20
EOF 16-16
EOQ 13-17
EP bit 3-21
ERRINT 16-32
Error
 conditions 14-56
 counters 16-9
 interrupt (ERRINT) 16-32
ESTAT 16-30
ETBANK 17-20
ETRIG 13-4
Event timing 17-3
Exception cause register 21-53
Exception prefix 3-21
Exceptions 3-34
 classes 3-34



- little endian mode 3-21
- ordered 3-34
- precise 3-35
- unordered 3-34
- vector table 3-35, 3-36
- Execution units 3-4
- Extended message format 16-1
 - frames 16-5
- External
 - digital supply pin 13-5
 - interrupt
 - disable 3-26
 - enable 3-26
 - multiplexing 13-9
 - trigger pins 13-4
 - trigger single-scan mode 13-20
- External interrupt
 - enable 3-21, 3-26
- Externally
 - multiplexed mode (MUX) 13-36
- EXTTEST 22-5
- EXTI 21-54
- EXTIE 21-56

–F–

- Fast quadrature decode TPU function (FQD) D-29
- Fault confinement state (FCS) 16-10, 16-31
- FCS 16-10, 16-31
- FE 14-49, 14-56
- FE bits 3-21, 3-22
- FE flag 3-14
- features
 - bus interface, 9-1
- Fetch serialized 21-1
- FEX bit 3-14
- FG bit 3-14
- FI bit 3-14
- Final sample time 13-12
- FL bit 3-14
- Floating-point
 - available 3-21
 - condition code 3-14
 - enabled exception summary 3-14
 - equal or zero 3-14
 - exception mode 3-21, 3-22
 - exception summary 3-14
 - fraction inexact 3-14
 - fraction rounded 3-14
 - greater than or positive 3-14
 - inexact exception 3-14
 - enable 3-15
 - invalid operation exception
 - enable 3-15
 - for $\times 0$ 3-14
 - for \times/\times 3-14
 - for $\times-\times$ 3-14
 - for $0/0$ 3-14
 - for invalid compare 3-14
 - for invalid integer convert 3-15
 - for invalid square root 3-15

- for SNaN 3-14
- for software request 3-15
- summary 3-14
- less than or negative 3-14
- overflow exception 3-14
 - enable 3-15
- registers 3-12
- result class descriptor 3-14
- result flags 3-14
- rounding control 3-15
- status and control register 3-12
- underflow exception 3-14
- unit 3-5
- unordered or NaN 3-14
- zero divide exception 3-14
 - enable 3-15
- floating-point unavailable interrupt, 3-47
- FORMERR 16-31
- FP bit 3-21
- FPCC bit 3-14
- FPRF field 3-14
- FPRs 3-12
- FPSCCK 17-20
- FPSCR 3-12
- FPU 3-5
- FPUVE 21-54
- FPUVEE 21-56
- F_{QCLK} 13-25
- FQD D-29
- FQM D-11
- FR 3-14
- Frame 14-50
 - size 14-57
- Frames
 - overload 16-16
 - remote 16-15
- Framing error (FE) flag 14-49, 14-56
- FREEZ ACK 16-17
- FREEZE
 - assertion response (FRZ)
 - QADC 13-6, 13-33
 - QSM 14-5
 - TPU 17-13
- FREEZE (internal signal) 13-46
- Frequency measurement (FQM) D-11
- FRZ 13-7, 13-33, 16-11, 17-13
- FRZACK 16-11
- FU bit 3-14
- FULL 16-5
- Function
 - library for TPU 17-4
- FX bit 3-14

–G–

- General SPRs 3-25
- General-purpose registers (GPRs) 3-12
- Global registers 13-32



-H-

Hall effect decode (HALLD) D-20
HALLD D-20
HALT 14-20, 16-11
Halt
 acknowledge flag (HALTA) 14-21
 QSPI (HALT) 14-20
HALTA 14-21
HALTA and MODF Interrupt Enable (HMIE) 14-41
HALTA/MODF interrupt enable (HMIE) bit 14-20
Hang on T4 (HOT4) 17-13
HMIE 14-20
HOT4 17-13
HSQR 17-16
HSSR 17-17

-I-

I/O port operation 13-7
IBRK 21-55
I-bus
 watchpoint programming 21-48
I-bus support
 control register 21-47
ICTRL 21-47
ID
 Extended (IDE) field 16-6
 HIGH field 16-6
 LOW field 16-6
IDE 16-6
Identifier (ID) 16-1
 bit field 16-6
IDLE 14-48, 14-57, 16-31
Idle
 CAN status (IDLE) 16-31
 frame 14-50
 -line
 detect type (ILT) 14-46
 detected (IDLE) 14-48, 14-57
 detection process 14-57
 interrupt enable (ILIE) 14-46, 14-57
 type (ILT) bit 14-57
IEEE 1149.1-1990 standard. See JTAG
IFLAG 16-33
Ignore first match 21-48
IIFM 21-48
ILIE 14-46, 14-57
illegal and reserved instructions, 3-38
ILSCI 14-8, 14-9
ILT 14-46, 14-57
IMASK 16-32
IMB 13-1, 13-24
implementation dependent software emulation interrupt,
 3-48
implementation specific data TLB error interrupt, 3-50
implementation specific debug interrupt, 3-51
implementation specific instruction TLB error interrupt,
 3-49
IMUL-IDIV 3-5
Information processing time (IPT) 16-9

Initial sample time 13-12
Input
 sample time (IST) 13-28, 13-47
Instruction
 pipeline 3-36
 sequencer 3-3
 set summary 3-29
 timing 3-36
Instruction fetch
 show cycle control 21-1
instruction storage interrupt, 3-46
instructions
 cache control, 3-42
 storage control, 3-44
instructions, partially executed, 3-52
Integer exception register 3-17
Integer unit 3-5
Interchannel communication 17-4
Intermission 16-16
Intermodule bus (IMB) 13-1
Interrupt
 sources 13-30
Interrupt Level of SCI (ILSCI) 14-8, 14-9
Interrupts
 QADC 13-29
 TOUCAN 16-19
 TPU 17-5
interrupts, 3-44
Inter-transfer delay 14-14
invalid and preferred instructions, 3-39
Invalid channel number 13-47
IPT 16-9
IRQ 17-5
ISCTL 21-1
IST 13-28, 13-47
isync, 3-42
IU 3-5
IW 21-48

-J-

Joint test action group. See JTAG
JTAG 22-1
 instruction register 22-4
 non-IEEE 1149.1-1990 operation 22-7
 signals 22-1, 22-2

-K-

KR/RETRY, 9-5

-L-

LBRK 21-55
LBUF 16-27
L-bus support
 control register 1 21-49
 control register 2 21-50
LCK 20-3
LCTRL1 21-49
LCTRL2 21-50



LE bit 3-22
Least significant bit (LSB) 13-14
Left justified
 signed result word table (LJSRR) 13-49
 unsigned result word table (LJURR) 13-49
Length of delay after transfer (DTL) 14-18
Link register 3-18
Little endian mode 3-22
LJSRR 13-49
LJURR 13-49
Load/store unit 3-5, 3-6
Lock
 /release/busy mechanism 16-15
Loop
 mode
 (LOOPS) 14-46
LOOPQ 14-20
LOOPS 14-46
Low power stop (LPSTOP)
 QADC 13-6
 QSM 14-5
Lowest buffer transmitted first (LBUF) 16-27
Low-power
 stop mode enable (STOP)
 QADC 13-33
 TPU 17-11
LR 3-5, 3-18, 17-19
LSB 13-14
LSU 3-5, 3-6
LW0EN 21-51
LW0IA 21-51
LW0IADC 21-51
LW0LA 21-51
LW0LADC 21-51
LW0LD 21-51
LW0LDDC 21-51
LW1EN 21-51
LW1IA 21-51
LW1IADC 21-51
LW1LA 21-51
LW1LADC 21-51
LW1LD 21-51
LW1LDDC 21-51

—M—

M 14-46, 14-51
Machine
 check enable 3-21
 state register 3-20
 status save/restore register 0 3-24
 status save/restore register 1 3-24
machine check interrupt, 3-45
Machine status save/restore register 1 3-24
Mask
 examples for normal/extended messages 16-8
 registers (RX) 16-7
Master
 /slave mode select (MSTR) 14-17
master
 external

 arbitration phase, 9-30
MCE 21-54
MCEE 21-55
MCPWM D-22
ME bit 3-21
Message
 buffer
 address map 16-22
 code for RX/TX buffers 16-5
 deactivation 16-13
 structure 16-3
 format error (FORMERR) 16-31
Mid-analog supply voltage 13-14
MISO 14-33, 14-37
Mode
 fault flag (MODF) 14-21, 14-26
 select (M) 14-46
Mode Fault Flag (MODF) 14-41
Modes
 disabled 13-18
 reserved 13-18
 scan. See Scan modes
MODF 14-21, 14-26, 14-41
Modulus
 counter 14-51
MOSI 14-33, 14-37
Most significant bit (MSB) 13-14
MQ1 13-37
MQ2 13-39
MSB 13-14
MSR 3-20, 3-45, 3-47, 3-48, 3-49, 3-50, 3-51, 3-52
MSR, 3-44
MSTR 14-17
Multichannel pulse-width modulation (MCPWM) D-22
 parameters
 slave channel A
 non-inverted center aligned mode D-25,
 D-41
 slave edge-aligned mode D-24
Multimaster operation 14-26
Multiphase motor commutation (COMM) D-18
 parameters D-19
Multiple end-of-queue 13-17
Multiplexed analog inputs 13-5
MUX 13-8, 13-36

—N—

New
 queue pointer value (NEWQP) 14-19
New input capture/transistion counter (NITC) D-16
 parameters D-17
NEWQP 14-19, 14-24
NF 14-49, 14-56
NI bit 3-15
NITC D-16
Noise
 error flag (NF) 14-49
 errors 14-56
 flag (NF) 14-56
Non-IEEE 1149.1-1990 operation 22-7



Non-IEEE floating-point operation 3-15
nonoptional instructions, 3-38
Non-recoverable interrupt 3-26
NOT ACTIVE 16-5
Not ready (NOTRDY) 16-20
NOTRDY 16-16, 16-20
NRI 3-26

—O—

OC D-34
OE bit 3-15
OP0, 9-28
OP1, 9-28
OP2, 9-28
OP3, 9-28
operand placement (effects), 3-42
operand representation (illustration), 9-28
optional instructions, 3-38
OR 14-48
Ordered exceptions 3-34
Output compare (OC) D-34
OV (overflow) bit 3-18
Overload frames 16-16
OVERRUN 16-5
Overrun error (OR) 14-48
OX bit 3-14

—P—

P 13-47
Parity
 (PF) flag 14-56
 checking 14-52
 enable (PE) 14-46
 error (PF) bit 14-49
 errors 14-56
 type (PT) 14-46
 type (PT) bit 14-52
Pause (P) 13-15, 13-47
PCBK 17-14
PCS 14-23
 to SCK delay (DSCK) 14-23
PCS0/SS 14-38
PCS3-PCS0/SS 14-41
PE 14-46
Period
 /pulse-width accumulator (PPWA) D-32
Periodic
 /interval timer 13-29
Periodic interrupt
 timer 6-14
Peripheral
 chip-selects (PCS) 14-23, 14-36
Peripheral Chip-Select 3-0/Slave Select (PCS3-PCS0/SS) 14-41
PF 14-49, 14-56
PF1 13-41
PF2 13-41
Phase buffer segment 1/2 (PSEG1/2) bit field 16-28
phase-lock loop, 9-7

PIE1 13-37
PIE2 13-39
PIT 6-14
PLL, 9-7
Pointer 14-15
port size device interfaces (illustration), 9-29
port width, 9-1
PORTQA 13-33, 13-34
PORTQB 13-33, 13-34
PORTQS 14-10
PowerPC standards
 PowerPC Operating Environment Architecture (Book 3)
 branch processor, 3-43
 fixed-point processor
 special purpose registers, 3-43
 fixed-point processor, 3-43
 interrupts, 3-44
 optional facilities and instructions, 3-53
 storage control instructions, 3-44
 timer facilities, 3-53
 PowerPC Operating Environment Architecture (Book 3), 3-43
 PowerPC User Instruction Set Architecture (Book 1)
 branch instructions, 3-39
 branch processor, 3-39
 computation modes, 3-38
 exceptions, 3-39
 fixed point-processor, 3-39
 instruction classes, 3-38
 load/store processor, 3-40
 reserved fields, 3-38
 PowerPC User Instruction Set Architecture (Book 1), 3-38
 PowerPC Virtual Environment Architecture (Book 2)
 operand placement effects, 3-42
 storage control instructions, 3-42
 timebase, 3-43
 PowerPC Virtual Environment Architecture (Book 2), 3-42
PowerPC User Instruction Set Architecture
 Book 1
 instruction fetching, 3-39
PPWA D-32
PQA 13-8
PQB 13-4, 13-8
QSPAR 14-9, 14-33, 14-37
PR bit 3-7, 3-21
PRE 21-54
Precise exceptions 3-35
PREE 21-56
Prescaler 13-26
 clock
 (PSC) 17-11
 high time (PSH) 13-36
 low time (PSL) 13-36
 clock high time (PSH) 13-26
 control
 for TCR1 17-5
 for TCR2 17-7



- divide
 - factor field 16-28
 - register (PRESDIV) 16-8, 16-27
- PRES DIV (bit field) 16-28
- PRES DIV (register) 16-8, 16-9, 16-27
- Privilege level 3-7, 3-21
- Processor version register 3-25
- Programmable
 - channel service priority 17-4
 - transfer length 14-14
- Programmable time accumulator (PTA) D-4
 - parameters D-5, D-44, D-46
- Propagation segment time (PROPSEG) 16-27
- PROPSEG 16-11, 16-27
- PSCK 17-11
- PSEG1 16-28
- PSEG2 16-9, 16-11, 16-28
- PSEGS1 16-11
- PSH 13-26, 13-36
- PSL 13-36
- PT 14-46, 14-52
- PTA D-4
- PTR, 9-4, 9-37
- Pulse-width modulation (PWM) D-36
 - parameters D-37
- PVR 3-25
- PWM D-36

-Q-

- QACR0 13-35
- QACR1 13-36
- QACR2 13-38, 13-39
- QADC
 - features 13-2
 - pin functions diagram 13-2
 - registers
 - control register 0 (QACR0) 13-35
 - control register 1 (QACR1) 13-36
 - control register 2 (QACR2) 13-39
 - conversion command word table (CCW) 13-46
 - interrupt register (QADCINT) 13-32, 13-33
 - module configuration register (QADCMCR) 13-6, 13-32, 13-33
 - port
 - A data register (PORTQA) 13-33
 - B data register (PORTQB) 13-33
 - data direction register (DDRQA) 13-33
 - QA data direction register (DDRQA) 13-35
 - QA data register (PORTQA) 13-34
 - QB data register (PORTQB) 13-34
 - status register (QASR) 13-41, 13-42
 - test register (QADCTEST) 13-32, 13-33
- QADCINT 13-32, 13-33
- QADCMCR 13-6, 13-32, 13-33
- QADCTEST 13-32, 13-33
- QASR 13-40
- QASR0 13-41
- QASR1 13-42
- QCLK 13-21, 13-24
 - frequency 13-25

- QDDR 14-12, 14-41
- QILR 14-8
- QOM D-6
- QPAR 14-11
- QPDR 14-10, 14-41
- QS 13-42
- QSM
 - pin function 14-10
- QSPI 14-13
 - operating modes 14-26
 - operation 14-24
 - RAM 14-21
- registers
 - pin control registers 14-9
 - port QS
 - data direction register (DDRQS) 14-9
 - data register (PORTQS) 14-10
- QSPI
 - control register 0 (SPCR0) 14-16
 - control register 1 (SPCR1) 14-18
 - control register 2 (SPCR2) 14-18
 - control register 3 (SPCR3) 14-19
 - status register (SPSR) 14-19
- SCI
 - control register 0 (SCCR0) 14-45
 - control register 1 (SCCR1) 14-45
 - data register (SCDR) 14-49
 - status register (SCSR) 14-47
- SCI 14-41
 - operation 14-50
 - pins 14-50
 - registers 14-44
- QSM Data Direction Register (QDDR) 14-12, 14-41
- QSM Interrupt Level Register (QILR) 14-8
- QSM Pin Assignment Register (QPAR) 14-11
- QSM Port Data Register (QPDR) 14-10, 14-41
- QSPI 14-13
 - block diagram 14-14
 - enable (SPE) 14-18
 - finished flag (SPIF) 14-21
 - initialization operation 14-27
 - loop mode (LOOPQ) 14-20
 - master operation flow 14-28
 - operating modes 14-26
 - master mode 14-26, 14-33
 - wraparound mode 14-37
 - slave mode 14-26, 14-37
 - operation 14-24
 - peripheral chip-selects 14-36
 - RAM 14-21, 14-22
 - command RAM 14-22
 - receive RAM 14-22
 - transmit RAM 14-22
- QSPI Enable (SPE) 14-41
- QSPI Status Register (SPSR) 14-41
- Queue 13-14
 - pointers
 - completed queue pointer (CPTQP) 14-24
 - end queue pointer (ENDQP) 14-24
 - new queue pointer (NEWQP) 14-24



- status (QS) 13-42
- Queue 1
 - completion
 - flag (CF1) 13-41
 - interrupt enable (CIE1) 13-37
 - operating mode (MQ1) 13-37
 - pause
 - flag (PF1) 13-41
 - interrupt enable (PIE1) 13-37
 - single-scan enable (SSE1) 13-37
 - trigger overrun (TOR1) 13-41
- Queue 2
 - completion
 - flag (CF2) 13-41
 - interrupt enable (CIE2) 13-39
 - operating mode (MQ2) 13-39
 - pause
 - flag (PF2) 13-41
 - interrupt enable (PIE2) 13-39
 - resume (RES) 13-39
 - single-scan enable bit (SSE2) 13-39
 - trigger overrun (TOR2) 13-41
- Queued
 - analog-to-digital converter. See QADC 13-1
 - serial
 - peripheral interface (QSPI) 14-13
- Queued output match TPU function (QOM) D-6

-R-

- R0 20-3
- RAF 14-48
- RD/WR, 9-4
- RDRF 14-48, 14-56
- RE 14-44, 14-46, 14-56
- RE bit 3-22, 3-26
- read cycle, data bus requirements, 9-30
- Read only, SRAM 20-3
- read/write (RD/WR), 9-36
- Receive
 - data
 - register full (RDRF) 14-48
 - error status flag (RXWARN) 16-31
 - RAM 14-22
 - time sample clock (RT) 14-52, 14-56
- Receiver
 - active (RAF) 14-48
 - data register (RDRF) flag 14-56
 - enable (RE) 14-46, 14-56
 - interrupt enable (RIE) 14-46
 - wakeup (RWU) 14-47, 14-58
- Receiver Enable (RE) 14-44
- Reception of transmitted frames 16-13
- Recoverable exception 3-22, 3-26
- Registers
 - CMPA-CMPD 21-45
 - CMPE-CMPF 21-46
 - CMPG-CMPH 21-46
 - COUNTA 21-52
 - COUNTB 21-53
 - DER 21-55

- ECR 21-53
- ICTRL 21-47
- LCTRL1 21-49
- LCTRL2 21-50
- MI_RA 0-3 region attribute register 4-21
- supervisor level 3-20
- test (RAMTST) 18-4
- user level 3-11
- registers
 - special purpose
 - added registers, 3-44
 - unsupported registers, 3-43
 - special purpose, 3-43
- Remote
 - frames 16-15
 - transmission request (RTR) 16-5, 16-6
- RES 13-39
- reservation protocol for a multi-level (local) bus, 9-41
- Reserved
 - channel number 13-47
 - mode 13-18
- Reset
 - status register 7-5
- Resistor-divider chain 13-14
- Resolution time 13-12
- Result word table 13-1, 13-15, 13-49
- Resynchronization jump width (RJW) bit field 16-28
- RETRY, 9-43
- RIE 14-46
- Right justified, unsigned result word table (RJURR) 13-49
- RJURR 13-49
- RJW 16-11, 16-28
- RN field 3-15
- RSR 7-5
- RSV, 9-37
- RT 14-56
- RTR 16-5, 16-6, 16-15
- RWU 14-47, 14-58
- RX
 - Length 16-5
- RX14MSKHI 16-30
- RX14MSKLO 16-30
- RX15MSKHI 16-30
- RX15MSKLO 16-30
- RXECTR 16-33
- RXGMSKHI 16-29
- RXGMSKLO 16-29
- RXWARN 16-31

-S-

- S0 14-8, 20-3
- SAMP 16-27
- Sample amplifier bypass (BYP) 13-47
- Sampling mode (SAMP) 16-27
- SAR 13-14
- SBK 14-47, 14-53
- Scan modes
 - single-scan modes
 - external trigger 13-20
- SCBR 14-45



SCCR0 14-45
SCCR1 14-45
SCDR 14-49
SCI 14-33, 14-41
 baud
 clock 14-51
 rate (SCBR) 14-45
 equation 14-45
 idle-line detection 14-57
 internal loop 14-58
 operation 14-50
 parity checking 14-52
 pins 14-50
 receiver
 block diagram 14-43
 operation 14-56
 wakeup 14-58
 registers 14-44
 SCCR0 14-44
 SCCR1 14-44
 SCI Baud Rates 14-52
 SCI SUBMODULE 14-12
 SCSR 14-44
 transmitter
 block diagram 14-42
 operation 14-52
SCI Control Register 0 (SCCR0) 14-44
SCI Control Register 1 (SCCR1) 14-44
SCI Status Register (SCSR) 14-44
SCK 14-11, 14-32, 14-37
 actual delay before SCK (equation) 14-35
 baud rate (equation) 14-34
S-clock 16-9
SCSR 14-47
SE bit 3-21
SEE 21-54
Send break (SBK) 14-47, 14-53
Sequencer, instruction 3-3
Serial
 clock baud rate (SPBR) 14-17
 communication interface (SCI) 14-41
 formats 14-51
 mode (M) bit 14-51
 shifter 14-52
Serial Clock (SCK) 14-11
Serialization
 fetch 21-1
Service
 request breakpoint flag (SRBK) 17-14
SGLR 17-19
Simplified mnemonics 3-33
Single-step trace enable 3-21
SIU
 module configuration register 6-18
SIU signals, 9-4
SIUMCR 6-18
SIW0EN 21-48
SIW1EN 21-48
SIW2EN 21-48
SIW3EN 21-48
Slave Select (SS) 14-41
Slave select signal (SS) 14-37, 14-38
SLW0EN 21-52
SLW1EN 21-52
snooping external bus activity, 3-42
SO bit 3-18
SOF 16-9
Soft reset control field (SOFT_RST) 17-20
SOFT_RST 17-20
SOFT_RST 16-11
Software trap enable selection 21-48
SPBR 14-17
SPCR0 14-16
SPCR1 14-18
SPCR2 14-18
SPCR3 14-19
SPE 14-18, 14-41
Special-purpose registers, general 3-25
SPI
 finished interrupt enable (SPIFIE) 14-19
 TSBD 14-8
SPI Test Scan Path Select (TSBD) 14-8
SPIF 14-21
SPIFIE 14-19
SPRG0–SPRG3 3-25
SPRGs 3-25
SPRs
 general 3-25
SPSR 14-19, 14-41
SPWM D-40
SRAM
 data space only 20-3
 disabling 20-3
 locking 20-3
 read only 20-3
 registers 20-2
 supervisor space only 14-8, 20-3
 two-cycle mode 20-3
SRAMMCR 20-3
SRBK 17-14
SRR 16-6
SRR0 3-24, 3-44, 3-45, 3-47, 3-48, 3-49, 3-50, 3-51, 3-52
SRR1 3-24, 3-44, 3-45, 3-47, 3-48, 3-49, 3-50, 3-51, 3-52
SS 14-41
SS 14-37, 14-38
SSE1 13-37
SSE2 13-39
Standard
 message format 16-1
 frames 16-5
Start
 bit (beginning of data frame) 14-50
 -of-frame (SOF) symbol 16-9
State machine 13-25, 14-56
Status register (QASR) 13-40
STF 17-11
STOP 13-33, 16-17, 17-11
Stop
 clocks to TCRs (CLKS) 17-13
 enable (STOP) bit



- QADC 13-6
- QSM 14-5
- TOUCAN 16-17
- TPU 17-11
 - flag (STF) 17-11
- SCI end of data frame bit 14-50
- storage control instructions, 3-44
- storage reservation, 9-40
- STS, 9-5
- STUFFERR 16-31
- Subqueue 13-15
- Substitute remote request (SRR) 16-6
- Successive approximation register (SAR) 13-14
- Summary overflow 3-18
- Supervisor
 - /unrestricted data space (SUPV)
 - QADC 13-33
 - TPU 17-11
- Supervisor mode 3-20
 - and SRAM 14-8, 20-3
- SUPV 13-7, 13-33
- SUSG 21-50
- SUSH 21-50
- Synchronized pulse-width modulation (SPWM) D-40
- SYSE 21-54
- SYSEE 21-56
- system clock output, 9-7
- system reset interrupt, 3-44

–T–

- T2CFILTER 17-20
- T2CG 17-7, 17-11
- T2CLK pin filter control (T2CFILTER) 17-20
- T2CSL 17-11
- TA, 9-6
- Table stepper motor (TSM) D-8
- TAP controller 22-3
- TB 3-19
- TBL 3-19, 3-23
- TBU 3-19, 3-23
- TC 14-48, 14-53
- TCIE 14-46, 14-54
- TCK 22-3
- TCNMCR 16-22
- TCR 17-12
- TCR1P 17-11
- TCR2 clock/gate control (T2CG) 17-11
- TDI 22-3
- TDO 22-3
- TDRE 14-48
- TE 14-44, 14-46
- TEA, 9-6
- termination signals, 9-38
- Test
 - access port controller. See TAP controller
 - clock 22-3
 - data input 22-3
 - data output 22-3
 - mode select 22-3
 - reset 22-3

- test register (RAMTST) 18-4
- TICR 17-14, 17-21
- TIE 14-46, 14-54
- Time
 - quanta clock 16-9
 - stamp 16-5, 16-10
- Time base 3-19
- timebase, 3-43
- TIMER 16-29
- Timer
 - count register
 - 1 prescaler control (TCR1P) 17-11
 - synchronize mode (TSYNC) 16-27
- Timing, instruction 3-36
- TMS 22-3
- TOR1 13-41
- TOR2 13-41
- TOUCAN
 - address
 - map 16-20
 - bit timing configuration 16-8
 - operation 16-9
 - external pins 16-2
 - initialization sequence 16-11
 - interrupts 16-19
 - message buffer address map 16-22
 - operation 16-3
 - receive process 16-13
 - registers
 - control register 0 (CANCTRL0) 16-25
 - control register 1 (CTRL1) 16-8
 - control register 1 (CANCTRL1) 16-26
 - control register 2 (CANCTRL2) 16-28
 - control register 2 (CTRL2) 16-8
 - error and status register (ESTAT) 16-30
 - free running timer register (TIMER) 16-29
 - interrupt
 - configuration register (CANICR) 16-24
 - flag register (IFLAG) 16-33
 - mask register (IMASK) 16-32
 - module configuration register (TCNMCR) 16-22
 - receive
 - buffer 14 mask registers (RX14MSKHI/LO) 16-30
 - buffer 15 mask registers (RX15MSKHI/LO) 16-30
 - global mask registers (RXGMSKLO/HI) 16-29
 - RX/TX error counter registers (RXECTR/TXECTR) 16-33
 - test configuration register (CANTCR) 16-24
 - special operating modes 16-16
 - auto power save mode 16-18
 - debug mode 16-16
 - low-power stop mode 16-17
 - transmit process 16-12
- TPU
 - address map 17-8
 - components 17-2
 - FREEZE flag (TPUF) 17-14



- function library 17-4
 - host interface 17-2
 - interrupts 17-5
 - microengine 17-2
 - operation 17-3
 - coherency 17-4
 - emulation support 17-4
 - event timing 17-3
 - interchannel communication 17-4
 - programmable channel service priority 17-4
 - parameter RAM 17-2, 17-22
 - address map 17-22
 - registers
 - channel
 - function select registers (CFSR) 17-15
 - interrupt
 - enable register (CIER) 17-5, 17-15
 - status register (CISR) 17-5, 17-19
 - priority registers (CPR) 17-18
 - decoded channel number register (DCNR) 17-19
 - development
 - support control register (DSCR) 17-12
 - support status register (DSSR) 17-14
 - host
 - sequence registers (HSQR) 17-16
 - service request registers (HSSR) 17-17
 - link register (LR) 17-19
 - module configuration register (TPUMCR) 17-10
 - service grant latch register (SGLR) 17-19
 - test configuration register (TCR) 17-12
 - TPU interrupt configuration register (TICR) 17-14, 17-21
 - scheduler 17-2
 - time
 - bases 17-2
 - timer channels 17-2
 - TPU Reference Manual 17-3, 17-17
 - TPU2
 - module configuration register 2 (TPUMCR2) 17-20
 - TPUF 17-14
 - TPUMCR 17-10
 - TPUMCR2 17-20
 - TR 21-54
 - trace interrupt, 3-47
 - transaction (bus), 9-8
 - Transfer
 - length options 14-36
 - transfer acknowledge (TA), 9-38
 - transfer error acknowledge (TEA), 9-39
 - transfer size (TSIZ), 9-37
 - transfer start (TS), 9-36
 - transfers, alignment and packaging, 9-28
 - transfers, burst-inhibited, 9-16
 - transfers, termination signals, 9-39
 - Transmission
 - complete
 - (TC) flag 14-53
 - interrupt enable (TCIE) 14-54
 - Transmit
 - /receive status (TX/RX) 16-31
 - bit error (BITERR) 16-31
 - complete
 - bit (TC) 14-48
 - interrupt enable (TCIE) 14-46
 - data
 - register empty (TDRE) flag 14-48
 - error status flag (TXWARN) 16-31
 - interrupt enable (TIE) 14-46, 14-54
 - pin configuration control (TXMODE) 16-25
 - RAM 14-22
 - Transmitter Enable (TE) 14-44
 - Transmitter enable (TE) 14-46, 14-52
 - TRE 21-56
 - Trigger
 - event 13-44
 - TRST 22-3
 - TS, 9-5
 - TSIZ(0
 - 1), 9-4
 - TSIZ0, 9-1
 - TSIZ1, 9-1
 - TSM D-8
 - T_{SR} 13-6
 - TSYNC 16-27
 - Two-cycle mode, SRAM 20-3
 - TX
 - Length 16-5
 - TX/RX 16-31
 - TXECTR 16-33
 - TXMODE 16-25
 - TXWARN 16-31
- U-
- UART D-13
 - UISA register set 3-11
 - Universal asynchronous receiver/transmitter (UART) D-13
 - parameters
 - receiver parameters D-15
 - transmitter parameters D-14
 - Unordered exceptions 3-34
 - User level registers 3-11
 - Using the TPU Function Library and TPU Emulation Mode 17-4
 - UX bit 3-14
- V-
- V_{DD} 13-5
 - V_{DDA} 13-5
 - V_{DDA/2} 13-14
 - VE bit 3-15
 - Vector table, exception 3-36
 - Vector table, exceptions 3-35
 - V_{IH} 13-8
 - V_{IL} 13-8
 - Voltage
 - reference pins 13-5
 - V_{RH} 13-5, 13-14, 13-47
 - V_{RL} 13-5, 13-14, 13-47



V_{SS} 13-5
V_{SSA} 13-5
VX bit 3-14
VXCVI bit 3-15
VXIDI 3-14
VXIMZ bit 3-14
VXISI 3-14
VXSNAN 3-14
VXSOFT bit 3-15
VXSQRT bit 3-15
VXVC bit 3-14
VXZDZ bit 3-14

–W–

WAKE 14-46, 14-58
Wake interrupt (WAKEINT) 16-32
WAKEINT 16-17, 16-32
WAKEMSK 16-17
Wakeup
 address mark (WAKE) 14-46, 14-58
Wired-OR
 mode
 for QSPI pins (WOMQ) 14-17
 for SCI pins (WOMS) 14-46, 14-53
WOMQ 14-17
WOMS 14-46, 14-53
Wrap
 enable (WREN) 14-19
 to (WRTO) 14-19
Wraparound mode 14-15
 master 14-37
WREN 14-19
write cycle data bus contents, 9-30
WRTO 14-19

–X–

XE bit 3-15
XER 3-17
XX bit 3-14

–Z–

ZE bit 3-15
ZX bit 3-14

