

LIST OF FIGURES



| Figure | Title | Page |
|--------|--|------|
| 1-1 | RCPU-Based Microcontroller | 1-2 |
| 1-2 | RCPU Block Diagram | 1-4 |
| 1-3 | RCPU Instruction Flow | 1-6 |
| 1-4 | Basic Instruction Pipeline | 1-10 |
| 2-1 | RCPU Programming Model | 2-2 |
| 3-1 | Big-Endian Byte Ordering | 3-2 |
| 3-2 | Big-Endian Mapping of Structure <i>S</i> | 3-4 |
| 3-3 | Little-Endian Mapping of Structure <i>S</i> | 3-4 |
| 3-4 | PowerPC Little-Endian Structure <i>S</i> in Memory | 3-5 |
| 3-5 | PowerPC Little-Endian Structure <i>S</i> as Seen by Processor | 3-6 |
| 3-6 | PowerPC Little-Endian Mode, Word Stored at Address 5 | 3-6 |
| 3-7 | Word Stored at Little-Endian Address 5 as Seen by Big-Endian Addressing | 3-7 |
| 3-8 | PowerPC Big-Endian Instruction Sequence as Seen by Processor | 3-9 |
| 3-9 | PowerPC Little-Endian Instruction Sequence as Seen by Processor | 3-9 |
| 3-10 | Floating-Point Single-Precision Format | 3-10 |
| 3-11 | Floating-Point Double-Precision Format | 3-11 |
| 3-12 | Biased Exponent Format | 3-12 |
| 3-13 | Approximation to Real Numbers | 3-13 |
| 3-14 | Format for Normalized Numbers | 3-14 |
| 3-15 | Format for Zero Numbers | 3-14 |
| 3-16 | Format for Denormalized Numbers | 3-14 |
| 3-17 | Format for Positive and Negative Infinities | 3-15 |
| 3-18 | Format for NaNs | 3-15 |
| 3-19 | Representation of QNaN | 3-16 |
| 3-20 | Single-Precision Representation in an FPR | 3-19 |
| 3-21 | Rounding Flow Diagram | 3-20 |
| 3-22 | Relation of Z1 and Z2 | 3-21 |
| 4-1 | Register Indirect with Immediate Index Addressing | 4-31 |
| 4-2 | Register Indirect with Index Addressing | 4-32 |
| 4-3 | Register Indirect Addressing | 4-33 |
| 4-4 | Register Indirect with Immediate Index Addressing | 4-41 |
| 4-5 | Register Indirect with Index Addressing | 4-42 |
| 4-6 | Branch Relative Addressing | 4-50 |
| 4-7 | Branch Conditional Relative Addressing | 4-51 |
| 4-8 | Branch to Absolute Addressing | 4-51 |



| Figure | Title | Page |
|--------|--|------|
| 4-9 | Branch Conditional to Absolute Addressing | 4-52 |
| 4-10 | Branch Conditional to Link Register Addressing | 4-53 |
| 4-11 | Branch Conditional to Count Register Addressing | 4-54 |
| 5-1 | Instruction Cache Organization | 5-2 |
| 5-2 | Instruction Cache Data Path | 5-3 |
| 6-1 | History Buffer Queue | 6-8 |
| 6-2 | RCPU Floating-Point Architecture | 6-32 |
| 6-3 | Real Numbers Axis for Denormalized Operands | 6-33 |
| 7-1 | Instruction Flow | 7-2 |
| 7-2 | Instruction Sequencer Data Path | 7-3 |
| 7-3 | Basic Instruction Pipeline | 7-5 |
| 7-4 | Number of Bus Cycles Needed for String Instruction Execution | 7-8 |
| 7-5 | Load from Internal Memory Example | 7-17 |
| 7-6 | Write-Back Arbitration Example I | 7-17 |
| 7-7 | Write-Back Arbitration Example II | 7-18 |
| 7-8 | Load with Private Write-Back Bus Example | 7-19 |
| 7-9 | External Load Example | 7-20 |
| 7-10 | History Buffer Full Example | 7-21 |
| 7-11 | Store and Floating-Point Example | 7-22 |
| 7-12 | Branch Folding Example | 7-23 |
| 7-13 | Branch Prediction Example | 7-24 |
| 8-1 | Watchpoint and Breakpoint Support in the RCPU | 8-12 |
| 8-2 | Partially Supported Watchpoint/Breakpoint Example | 8-15 |
| 8-3 | I-Bus Support General Structure | 8-16 |
| 8-4 | L-Bus Support General Structure | 8-18 |
| 8-5 | Development Port Support Logic | 8-23 |
| 8-6 | Development Port Registers and Data Paths | 8-25 |
| 8-7 | Enabling Clock Mode Following Reset | 8-28 |
| 8-8 | Asynchronous Clocked Serial Communications | 8-29 |
| 8-9 | Synchronous Clocked Serial Communications | 8-30 |
| 8-10 | Synchronous Self-Clocked Serial Communications | 8-31 |
| 8-11 | Enabling Debug Mode at Reset | 8-37 |
| 8-12 | Entering Debug Mode Following Reset | 8-38 |
| 8-13 | General Port Usage Sequence Diagram | 8-43 |
| 8-14 | Debug Mode Logic | 8-47 |
| 9-1 | Instruction Description | 9-6 |