



Developing Applications with QP™ Frameworks and QM™ Modeling Tool

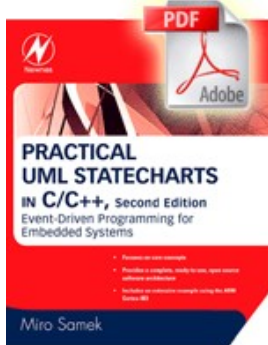
This two- to three-day training uses hands-on exercises combined with instruction to illustrate the concepts underlying the QP™ state machine frameworks and how they are applied in embedded application development requiring hard real-time performance. Upon completion of the two-day training, participants have a working knowledge of the QP™ frameworks, good understanding of event-driven systems, skills in designing and implementing UML state machines in C or C++, and the ability to build their own QP™ applications. Additionally, upon completion of the three-day training, participants gain proficiency in using the QM™ modeling tool to build effective models and auto-generate code.

Each attendee gets:

- ✓ ARM Cortex-M3 development kit
EKI-LM3S811



- ✓ A searchable PDF of the class textbook
Practical UML Statecharts in C/C++



- ✓ CD with QP™, QM™, book PDF, tools, and handouts



Day 1

Session 1A — Event-driven programming: This session is designed to help engineers through the paradigm shift from the traditional sequential programming to the modern event-driven programming and framework-based software development. The session covers inversion of control, blocking versus non-blocking code, run-to-completion (RTC) execution, asynchronous event passing, event queues, and the role of state machines.

Session 1B — UML state machines: This session explains state machine concepts, the UML notation and the semantics, including hierarchical state nesting, entry/exit actions, internal transitions, etc. The session culminates with the design of a hierarchical state machine followed by the implementation in C based on the QEP event processor.

Day 2

Session 2A — QP internals: This session examines the inner workings of the QP framework, which due to the inversion of control can offer benefits that no traditional RTOS can. The session covers direct event passing, publish-subscribe, time events, zero-copy event management, and automatic garbage collection for events. Attendees also learn how to combine the QP framework with the cooperative "vanilla" kernel, traditional RTOS, and the preemptive, run-to-completion QK kernel.

Session 2B — QP application example: This session uses the fun "Fly 'n' Shoot" game to explain all the steps necessary to design and hand-code a real-time QP application.

Session 2C — State design patterns: This session presents four state machine design patterns. Every pattern is illustrated with executable code, which allows attendees to fully understand the pattern and gives them a good starting point for their own implementations.

Day 3 (optional)

Session 3A — Modeling with QM™: This hands-on session introduces the QM™ graphical modeling tool. Attendees build the complete model of the "Fly 'n' Shoot" game.

Session 3B — Auto-generating code with QM™: In this session attendees learn how to auto-generate code from the model and how to incorporate QM™ in the full software development lifecycle to work with the third-party tools, such as compilers and debuggers to test and refine the QM model.

Session 3C — Testing and debugging QP applications: This session discusses the Design by Contract philosophy used in QP and the powerful software tracing facility (Q-SPY) built into the framework that allows unprecedented visibility into a running application.



Prerequisites

In order to get the best results participants should have a working knowledge of C, as well as basic knowledge of real-time embedded programming. Previous QP™ or UML experience is not required.

Each attendee needs to bring a laptop running Windows (Windows 7, Vista, or XP) with a free USB port.



Instructor

Dr. Miro Samek is the creator of the QP™ frameworks and the author of the book [Practical UML Statecharts in C/C++, 2nd Edition: Event-Driven Programming for Embedded Systems](#). He has published over 20 technical articles including a column for C/C++ Users Journal, is a regular speaker at the Embedded Systems Conferences since 2003, and serves on the editorial review board of the Embedded Systems Design magazine. His extensive industry experience ranges from safety-critical software development at GE Medical Systems through hard real-time embedded system design at two Silicon Valley companies. Dr. Samek earned his Ph.D. in nuclear physics at GSI (Darmstadt, Germany).



Price, Availability, and Contact Information

The price of the 2-day QP™ training is **\$11,000.-** and the 3-day training is **\$14,000.-** for up to 10 attendees. The price includes all training materials for each attendee (EK-LM3S811 development kit, course textbook in PDF, and the CD-ROM) as well as the instructor's time and travel expenses. Each additional attendee beyond the first 10 can be enrolled for **\$500.-**. The training is delivered on-site at your location throughout the U.S. Training outside the U.S. can be arranged for additional fee depending on the destination to cover the extra time and travel expenses. Please [contact Quantum Leaps](#) to reserve the dates or to request more information about the QP™ Training.

