



## XE166xM Series – Base Line Real-Time Signal Controller

The XE162xM (LQFP-64), XE164xM (LQFP-100) and XE167xM (LQFP-144) microcontroller series are based on Infineon's popular and well-established C166SV2 architecture. The devices offer new safety features for safety integrity level (SIL) 2 and 3 applications such as an MPU (Memory Protection Unit), MCHK (Memory Checker) and ECC (Error Correction) for flash memory and SRAM.

### Applications

- Servo drives
- Appliance motors
- HVAC compressors and blowers
- Stepper motors
- Industrial pumps
- Advanced sensing
- Power supplies
- Transportations

### Main Features

- Suited for Safety applications with Memory Protection Unit (MPU), Memory Checker (MCHK), Error Correction (ECC) for Flash and SRAMs
- C166 Family opcode compatible
- High performance 16-bit C166SV2 CPU with 5-stage pipeline
- Single clock cycle instruction execution with 12.5ns instruction time
- 80 MIPS peak performance @ 80MHz CPU clock
- 12.5ns multiplication (16 x 16-bit), background division (32/16bit) and multiply-and-accumulate (MAC) instructions
- Fast context switching support with two additional local register banks
- 16Mbytes total linear address space for code and data
- 16-priority-level interrupt system with up to 96 sources
- 8-channel interrupt-driven data transfer facilities via peripheral event controller (PEC)
- Clock generation from internal or external clock sources
- 2Kbytes on-chip dual-port RAM (DPRAM)
- Up to 16Kbytes on-chip data SRAM (DSRAM)

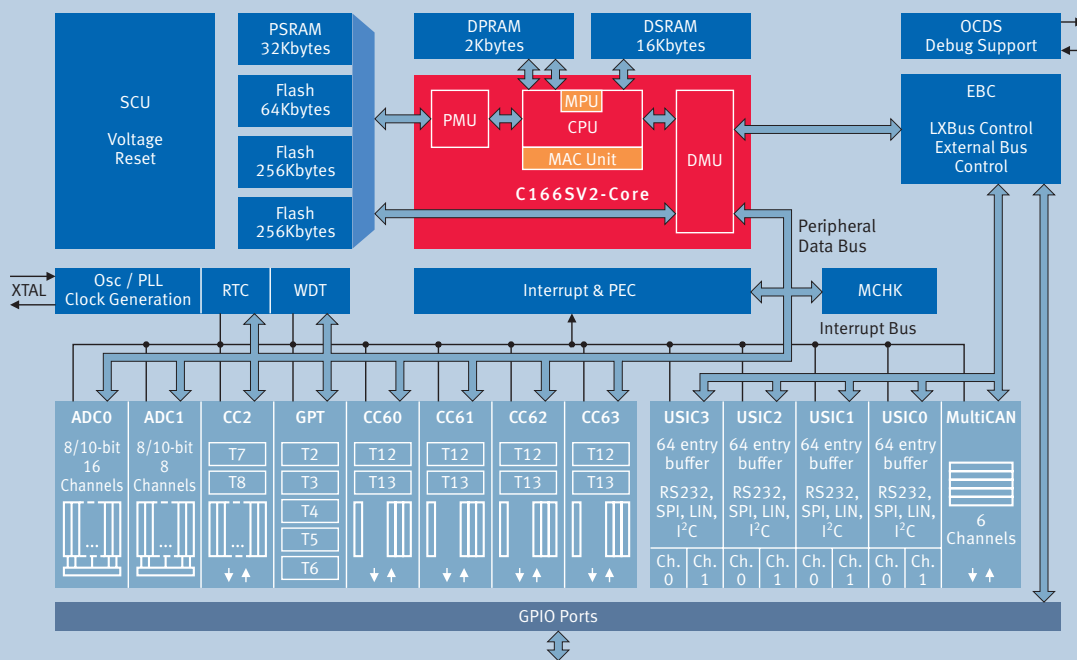
### Main Features (cont'd)

- Up to 32Kbytes on-chip program/data SRAM (PSRAM)
- Up to 576Kbytes on-chip program memory on three banks
- EEPROM Emulation
- Up to 16+8-channel dual A/D converter with optional concurrent sampling and a conversion time down to 0.675µs
- 16-channel general purpose capture/compare units
- Up to 4 capture/compare units (CCU6) for flexible PWM signal generation for any kind of motor control
- Multi-functional general purpose timer unit with 5 timers
- Up to 8 serial interface channels to be used as UART, LIN, SPI, I<sup>2</sup>C Bus Interface, I<sup>2</sup>S Interface
- On-chip MultiCAN interface (Rev. 2.0B active) with 128 message objects, up to 6 CAN nodes and gateway functionality
- On-chip real time clock
- Programmable watchdog timer and oscillator watchdog
- Up to 118 general purpose I/O lines with flexible pin assignment
- On-chip bootstrap loader
- Supported by a large range of development tools
- On-chip debug support via 2-wire DAP interface
- 64/100/144-pin green LQFP package, 0.5mm (19.7mil) pitch
- Temperature range: -40 to +125°C (not for 64-pin)
- Embedded voltage regulator for single power supply incl. brown-out detection
- Two I/O power domains for 5V analog inputs and 3.3V logic signals

# XE166xM Series – Base Line

## Real-Time Signal Controller

Block Diagram



### Product Types

| Series  | Device               | MIPS | Flash [KB] | RAM [KB] | I/O pins | ADC Channels | CapCom2 Channels | CapCom6 I/O Channels | USIC Channels (SSC, ASC, I <sup>2</sup> C, I <sup>2</sup> S, LIN) | CAN Nodes | EBC | Power Supply [V] | Ambient <sup>1)</sup> Temp. Range [°C] | Package     |
|---------|----------------------|------|------------|----------|----------|--------------|------------------|----------------------|---|-----------|-----|------------------|--|-------------|
| XE162xM | SAF-XE162HM-24F80L   | 80   | 192        | 26       | 40       | 7 + 2        | 16               | 3/7                  | 6   | 0         | N   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-64  |
|         | SAF-XE162HM-48F80L   | 80   | 384        | 34       | 40       | 7 + 2        | 16               | 3/7                  | 6   | 0         | N   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-64  |
|         | SAF-XE162HM-72F80L   | 80   | 576        | 50       | 40       | 7 + 2        | 16               | 3/7                  | 6   | 0         | N   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-64  |
|         | SAF-XE162FM-24F80L   | 80   | 192        | 26       | 40       | 7 + 2        | 16               | 3/7                  | 6   | 2         | N   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-64  |
|         | SAF-XE162FM-48F80L   | 80   | 384        | 34       | 40       | 7 + 2        | 16               | 3/7                  | 6   | 2         | N   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-64  |
| XE164xM | SAF-XE162FM-72F80L   | 80   | 576        | 50       | 40       | 7 + 2        | 16               | 3/7                  | 6   | 2         | N   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-64  |
|         | SAF/K-XE164KM-24F80L | 80   | 192        | 26       | 75       | 6 + 5        | 16               | 6/14                 | 4   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164KM-48F80L | 80   | 384        | 34       | 75       | 6 + 5        | 16               | 6/14                 | 4   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164KM-72F80L | 80   | 576        | 50       | 75       | 6 + 5        | 16               | 6/14                 | 4   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164HM-24F80L | 80   | 192        | 26       | 75       | 11 + 5       | 16               | 9/21                 | 6   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164HM-48F80L | 80   | 384        | 34       | 75       | 11 + 5       | 16               | 9/21                 | 6   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164HM-72F80L | 80   | 576        | 50       | 75       | 11 + 5       | 16               | 9/21                 | 6   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164GM-24F80L | 80   | 192        | 26       | 75       | 6 + 5        | 16               | 6/14                 | 4   | 2         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164GM-48F80L | 80   | 384        | 34       | 75       | 6 + 5        | 16               | 6/14                 | 4   | 2         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164GM-72F80L | 80   | 576        | 50       | 75       | 6 + 5        | 16               | 6/14                 | 4   | 2         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164FM-24F80L | 80   | 192        | 26       | 75       | 11 + 5       | 16               | 9/21                 | 6   | 4         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164FM-48F80L | 80   | 384        | 34       | 75       | 11 + 5       | 16               | 9/21                 | 6   | 4         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
|         | SAF/K-XE164FM-72F80L | 80   | 576        | 50       | 75       | 11 + 5       | 16               | 9/21                 | 6   | 4         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-100 |
| XE167xM | SAF/K-XE167KM-48F80L | 80   | 384        | 34       | 118      | 8 + 8        | 16               | 6/14                 | 4   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |
|         | SAF/K-XE167KM-72F80L | 80   | 576        | 50       | 118      | 8 + 8        | 16               | 6/14                 | 4   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |
|         | SAF/K-XE167HM-48F80L | 80   | 384        | 34       | 118      | 16 + 8       | 16               | 12/28                | 8   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |
|         | SAF/K-XE167HM-72F80L | 80   | 576        | 50       | 118      | 16 + 8       | 16               | 12/28                | 8   | 0         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |
|         | SAF/K-XE167GM-48F80L | 80   | 384        | 34       | 118      | 8 + 8        | 16               | 6/14                 | 4   | 2         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |
|         | SAF/K-XE167GM-72F80L | 80   | 576        | 50       | 118      | 8 + 8        | 16               | 6/14                 | 4   | 2         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |
|         | SAF/K-XE167FM-48F80L | 80   | 384        | 34       | 118      | 16 + 8       | 16               | 12/28                | 8   | 6         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |
|         | SAF/K-XE167FM-72F80L | 80   | 576        | 50       | 118      | 16 + 8       | 16               | 12/28                | 8   | 6         | Y   | 3.0 ... 5.5      | F, K                                   | PG-LQFP-144 |

1) F: T<sub>s</sub> = -40 – 85°C; K: T<sub>s</sub> = -40 – 125°C

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