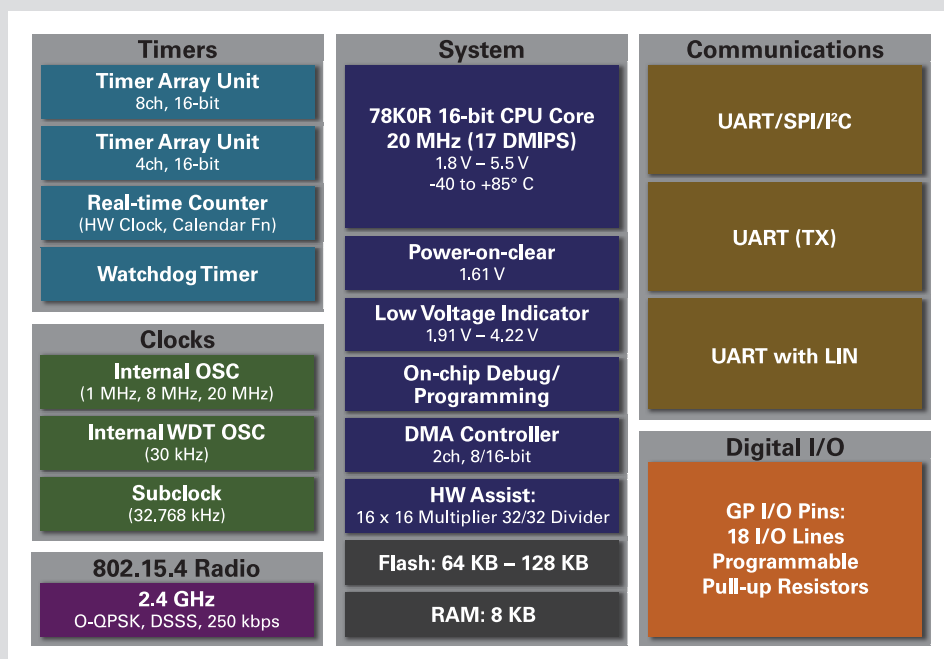# Single Chip RF4CE Solution

16-bit Low Power 78K0R MCU with Embedded 802.15.4 Radio

This series of 16-bit microcontrollers with embedded IEEE compliant 802.15.4 radio simplifies RF4CE and 802.15.4 networking. The majority of RF4CE and 802.15.4 networking applications are battery operated and require low power components to maximize the battery life time. This solution combines a low power, high performance 16-bit micro-controller with a low power 802.15.4 radio. Moreover, the operating voltage can be as low as 1.8 V, extending the battery life time.

Key Features

- High performance 16-bit 78K0R flash microcontroller
  - » 17 DMIPS at 20 MHz
  - » Up to 128 KB flash memory with 8 KB SRAM
- Embedded IEEE compliant 802.15.4 radio
  - » 12.4 GHz, O-QPSK, DSSS
  - » 250 kbps baud rate
  - » Enhanced hardware to reduce software requirement
- **Low power operation**
  - » Tx 18.9 mA @ 4 MHz (when radio and MCU are on)
  - » Rx 17.4 mA @ 4 MHz (when radio and MCU are on)
  - » 0.47 µA @ 3 V (when radio and MCU are off)

- Extended operating range from 1.8 – 3.6 V
- Real-time counter with hardware calibration
  - » Dedicated second, minute, hour, day, month, etc. registers
  - » Possible to put MCU to sleep up to a month in a wireless sensor application
- Multiple 16-bit timers
- Various CSI and UART interfaces
- 8 mm x 8 mm 56-pin QFN package

Timers
- **Timer Array Unit** 8ch, 16-bit
- **Timer Array Unit** 4ch, 16-bit
- **Real-time Counter** (HW Clock, Calendar Fn)
- **Watchdog Timer**

Clocks
- **Internal OSC** (1 MHz, 8 MHz, 20 MHz)
- **Internal WDT OSC** (30 kHz)
- **Subclock** (32,768 kHz)

802.15.4 Radio
- **2.4 GHz** O-QPSK, DSSS, 250 kbps

System
- **78K0R 16-bit CPU Core 20 MHz (17 DMIPS)** 1.8 V – 5.5 V -40 to +85° C
- **Power-on-clear** 1.61 V
- **Low Voltage Indicator** 1.91 V – 4.22 V
- **On-chip Debug/ Programming**
- **DMA Controller** 2ch, 8/16-bit
- **HW Assist:** 16 x 16 Multiplier 32/32 Divider
- **Flash: 64 KB – 128 KB**
- **RAM: 8 KB**

Communications
- **UART/SPI/I²C**
- **UART (TX)**
- **UART with LIN**

Digital I/O
- **GP I/O Pins: 18 I/O Lines Programmable Pull-up Resistors**

Single Chip RF4CE Solution

Key Benefits

- Industry leading low power consumption
- Wide operating voltage range extends battery life
- High performance 16-bit MCU for processing sophisticated applications

Target Applications

- RF4CE
- 802.15.4 wireless networking

Development Tools

- Comprehensive software development tools
  - » Compiler, linker, assembler and debugger
- Comprehensive hardware development tools
  - » Low cost debugger (MINICUBE2)
    - Flash programming during development
    - System debugging during development
  - » Stand-alone flash programmer (PG-FP5)
    - Production flash programming
- Complete ZigBee® RF4CE and 802.15.4 networking software support

Ordering Information (µPD78FxxxxK8-9B4-AX)

Flash Memory	xxxx Body Part Number	RAM	Package	RoHS Plating NiPdAu
56 KB	8056			
96 KB	8057	8 KB	56-pin (8 x 8 mm)	-AX
128 KB	8058			

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