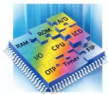


8-bit Solutions

Microcomputers



Ultra-low power consumption

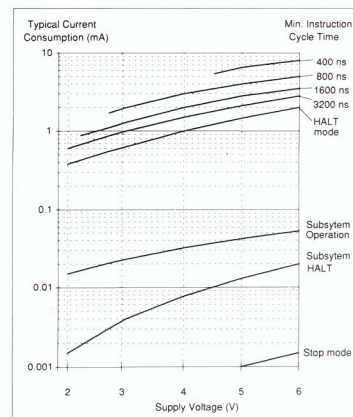
Telecommunications and automotive
Industrial and consumer markets

A modular range of microcontrollers for advanced 8-bit applications

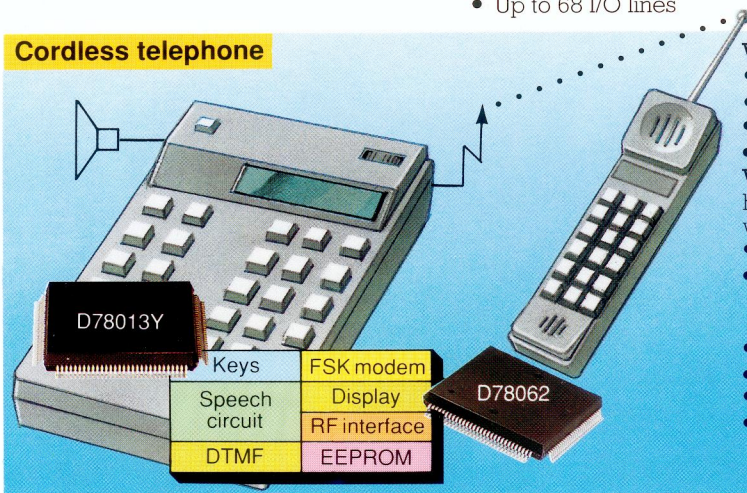
With the new 78K/0 family, NEC provides a powerful series of 8-bit microcomputers which meet today's market requirements on functionality, performance and power consumption. Flexibility derives from a CPU core as base for more highly integrated products as required by customers or their applications. The devices in the new family fall into different categories depending on the integrated peripherals which equip them to serve specialized application areas.

8-bit 78K/0 features:

- 8 to 60 Kbyte ROM
- 256 to 2048 byte RAM
- 0.4 μ s instruction cycle time
- 32 kHz subsystem clock for low-power operation
- 2.0 to 6.0 V supply voltage
- 8-channel 8-bit A/D converter
- 2-channel 8-bit D/A converter
- 3 to 4 timers plus watchdog
- 2 to 3 serial interfaces (I²C)
- LCD controller/driver with up to 40 x 4 segments
- FIP controller/driver for up to 24 segments
- Up to 68 I/O lines



Cordless telephone



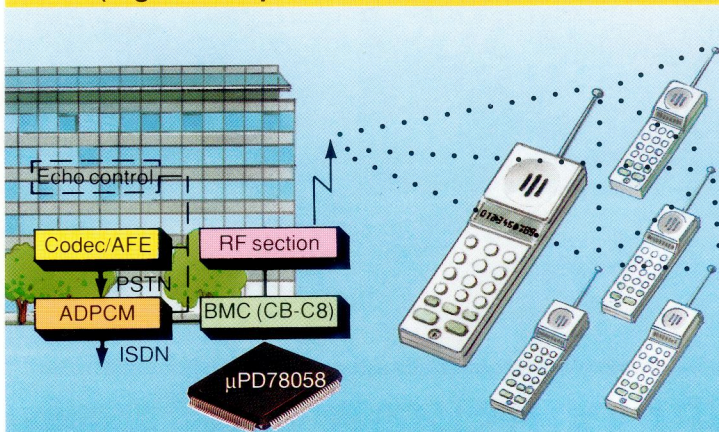
What is required:

- low power consumption, especially for handset
- high-speed operation at low voltage
- software compatibility for base station and handset
- adequate number of I/O lines

What NEC recommends:

- high-speed μ PD78013Y for base station and μ PD7806x with LCD for handset
- 1 μ s instruction cycle operation at 2.7 V
- low power consumption:
 - $I_{DD1} = 700 \mu$ A at 2.7 V and 8 μ s instruction cycle time
 - $I_{DD3} = 30 \mu$ A at 2.7 V and 122 μ s instruction cycle time
- up to 57 I/O lines
- battery voltage detection with on-chip A/D converter
- 14-bit PWM to generate sine wave for MSK signal
- I²C bus interface

DECT (Digital European Cordless Telecommunication)



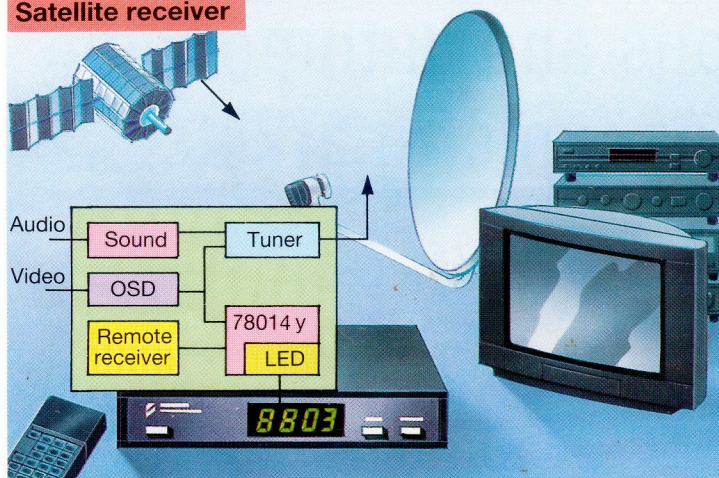
What is required:

- low-power and low-voltage operation
- large memory address space
- echo control function
- ADPCM speech transcoder (per G.721)

What NEC recommends:

- μ PD78058 as standard microcomputer
- 2 Kbyte RAM, 60 Kbyte ROM
- 2.0 V operation
- Advanced ASIC technology (0.5 μ m) for baseband controller (BMC)
- μ PD77C25 for echo control
- μ PD9935 as ADPCM transcoder

Satellite receiver



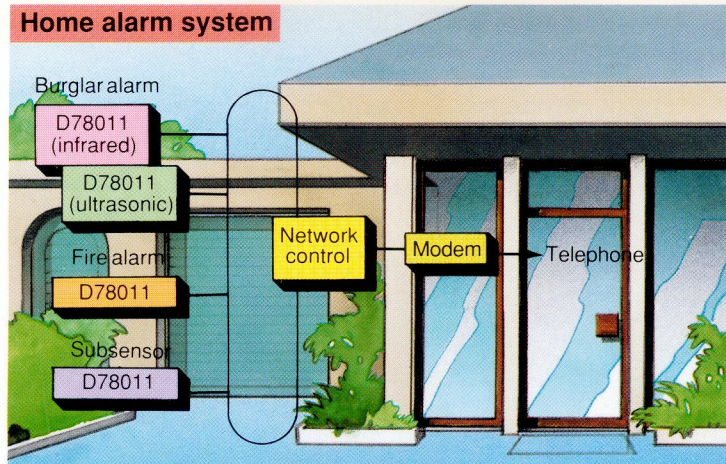
What is required:

- large ROM capacity
- I²C interface
- on-screen display (OSD)
- high fidelity sound and special sound effects
- remote control

What NEC recommends:

- 78K/0 (μ PD78014Y) with 1 Kbyte RAM, 32 Kbyte ROM, 8-channel 8-bit A/D, I²C interface and OTP support
- OSD (μ PD645x): CVBS and integrated synchro separator
- μ PD1853 for matrix surround sound

Home alarm system



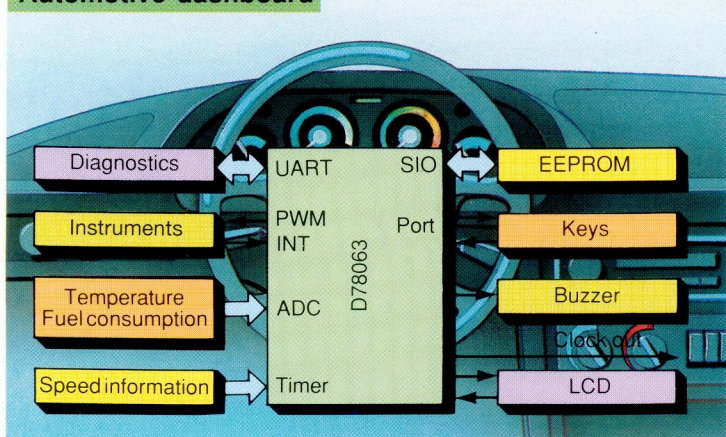
What is required:

- low-power and low-voltage operation - supply via communication network
- system permanently active or on standby
- operation of different types of alarm sensors on one network
- each sensor as standalone module with serial connection to network
- remote control via modem link to telephone system

What NEC recommends:

- 78K/0 family with devices for each type of sensor
- low-voltage operation very low power consumption (typical $35 \mu\text{A}$ @ 3.0 V) and subsystem clock mode
- serial interface for network connection
- $\mu\text{PD78011}$ with high timer resolution for ultrasonic and infrared sensors
- $\mu\text{PD78054}$ with good CPU performance, large memory and UART to connect a modem, for diagnostics and remote control

Automotive dashboard



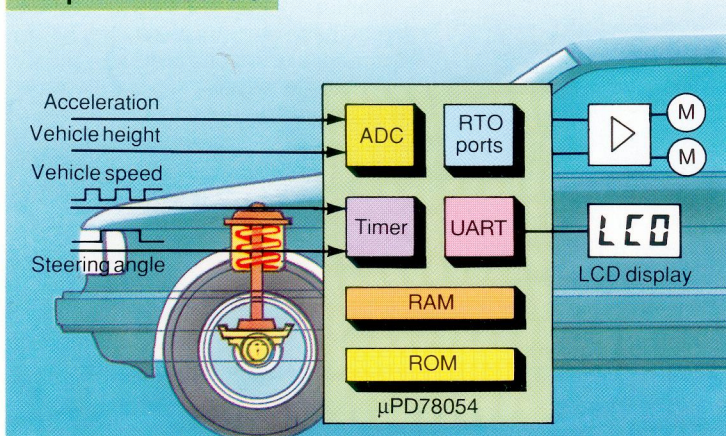
What is required:

- high-speed operation and fast interrupt response
- integrated display controller/driver
- low power consumption for permanent clock operation
- diagnostic functions and low EMR (electromagnetic radiation)
- PWM output to control coils or motors

What NEC recommends:

- $\mu\text{PD7806x}$ with 400 ns instruction cycle at 5 MHz (for low EMR) and built-in LCD controller (up to 160 segments)
- subsystem clock for low-power operation
- UART with up to 38.4 kbit/s data transfer rate
- up to 57 I/O lines

Suspension control



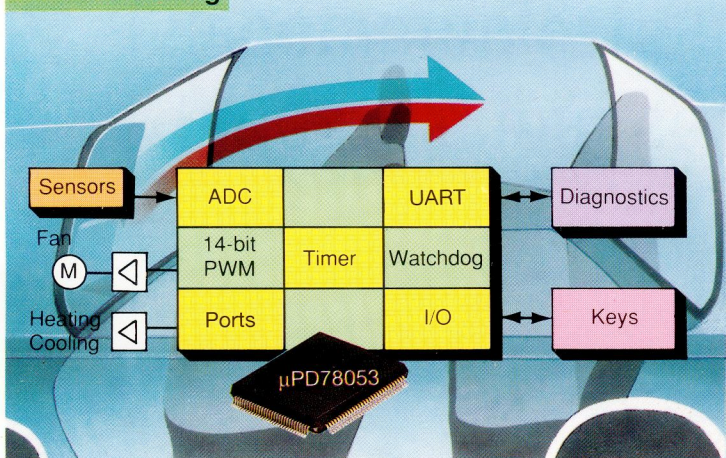
What is required:

- adaptive shock absorber
- measurement of analog signals, eg, acceleration and vehicle height
- ability to count pulse signals representing vehicle speed and steering angle
- diagnostic interface meeting ISO standards

What NEC recommends:

- $\mu\text{PD78054}$ with 1 Kbyte RAM and 32 Kbyte ROM
- realtime output port to control stepper motors at shock absorbers
- flexible timer unit with 16-bit capture register for pulse measurement
- 8-channel 8-bit A/D converter for the various analog inputs
- UART with built-in baud rate generator for diagnostics

Air conditioning



What is required:

- measurement of temperature and air flow at various locations and shutter positions
- control of heating, cooling, shutters and fan motors
- display for temperature and operating mode
- low power consumption in standby mode
- direct key input

What NEC recommends:

- $\mu\text{PD7805x}$ with up to 1 Kbyte RAM and 32 Kbyte ROM
- fast operation with 0.4 μs instruction cycle at 5 MHz (for low EMI)
- 8-channel 8-bit A/D converter for analog values, eg, temperature, air flow
- flexible timers for 14-bit PWM to control fan motors and shutters
- low power consumption and watchdog for reliable, unattended operation

