

# S3F82NB Product Brief

PB025303-1013

# From Zilog's New S3 Family of Microcontrollers: the S3F82NB 8-Bit MCUs

#### Overview

The S3F82NB is a 128-pin member of Zilog's S3 Family of MCUs, which offer a fast and efficient Z8-compatible CPU, 64KB of Flash memory, and a wide range of integrated peripherals. The S3 Family CPU features an efficient register-oriented architecture and a sophisticated interrupt controller, allowing for fast context switching. The Flash memory is CPU-programmable and offers a 128-byte sector size. The large 16/80 LCD controller makes the device ideal for controlling large displays in consumer and home appliance applications.

#### **Features**

- SAM88 Z8-Compatible CPU Core
- Flash Memory
  - 64 KB internal Flash program memory
    - Sector size: 128 bytes
    - CPU programmable with LDC instruction
    - Fast 25 µs byte programming time
    - Endurance: 10,000 erase/program cycles
    - 10 years data retention
- RAM
  - 4112-byte general-purpose register RAM area (including LCD)
- Instruction Set
  - o 78 CISC instructions
  - Idle and Stop instructions for power-down modes
  - LDC for reading and writing Flash memory
- Interrupts
  - o 19 interrupt sources with 8 programmable priorities
- General-Purpose I/O
  - 83 programmable GPIO pins (including 64 shared with LCD)
  - Bit-programmable ports
  - o Programmable pull-up on ports 1 and 2
- LCD Controller
  - 16 common and 80 segment pins
  - o LCD Bias voltage generator
  - Programmable contrast
- Timers
  - o One 8-bit timer for watchdog or periodic interrupt generation
  - One 8-bit timer with input capture, event and PWM
  - One 16-bit timer with PWM capability (or can be used as two 8-bit counters)
  - Low-power wake-up timer
- Communications
  - 8-bit serial I/O with internal/external clock

ADVANTAGES

- 16/80 LCD controller for controlling large displays
- 10-bit ADC for temperature, current, or voltage measurement
- Small Flash sector size allows Flash to be used as EEPROM

# **APPLICATIONS**

- Vending Machines
- Security Panels
- Thermostats
- Home Automation User Interface
- Washing Machines
- Dryer Controller
- Oven Controller

## **Features (continued)**

- Low-Voltage Reset Controller (LVR)
  - o 1.9V
- Analog Peripherals
  - 10-bit SAR A/D Converter with 8 analog inputs
- Clock Sources
  - External RC oscillator: 4 MHz max. (capacitor is integrated on-chip)
  - o External crystal oscillator: 12 MHz max.
  - Low-power ring oscillator: 32 kHz

## **Block Diagram**

XIN XOUT XTIN XTOUT Main OSC Sub OSC Watchdoo Basic Timer Port 10 ◆► P10.0-P10.7/SEG24-SEG31 Low Voltage ► P9.0-P9.7/SEG32-SEG39 Port 9 Reset Port I/O and Interrupt Control T0CLK/AD1/P0.1 -8-Bit T0OUT/T0PWM/T0CAP/AD3/P0.3 imer/Count → P8.0-P8.7/SEG40-SEG47 T1CLK/AD0/P0.0 -8-Bit Timer T1OUT/T1PWM/T1CAP/AD2/P0.2 8-Bit TimerE ► P7.0-P7.7/SEG48-SEG55 Port 7 BUZ/INT4/P1.4 ◀ Watch Timer Port 6 ► P6.0-P6.2/CIN1-CIN2 SAMBBRC CPU AD0-AD7/P0.0-P0.7 -10-bit ADC ► P5.0/SEG80 AVREF/INTO/P1.0 -+> P5.1/SEG81 +► P5,2/SEG82 → P5.3/SEG83 → P5.4/SEG84/INT8 CINO/P6.0 -Port 5 CIN1/P6.1-Comparator ◆► P5.5/SEG85/INT9 ◆► P5.6/SEG86/INT10 CIN2/P6.2 → P5.7/SEG87/INT11 SCK/INT7/P1.7 ◆▶ SO/INT6/P1.6 ← SIO SI/INT5/P1.5-←► P4.0-P4.7/SEG72-SEG79 Port 4 4,112 byte 64 K-byte ROM VLC0-VLC4 ◀▶ Port 3 P3.0-P3.7/SEG64-SEG71 COM0-COM7 ◀ LCD Controller/ COM8-COM15/SEG0-SEG7 ◀ Driver SEG8-SEG55 ◆ Port 2 ₱ P2.0-P2.7/SEG56-SEG63 SEG56-SEG87/P3.0-P5.7 ◀ P0.0/AD0/T1CLK P1.0/INTO/VREF → P1.1/INT1 P0.1/AD1/T0CLK ◆▶ P1.3/INT1
P1.2/INT2
P1.3/INT3
P1.4/INT4/BUZ
P1.5/INT5/SI P0.2/AD2/T1OUT/T1PWM/T1CAP ◆► P0.3/AD3/T0OUT/T0PWM/T0CAP ◆► Port 0 Port 1 P0.4/AD4 ◆► P0.5/AD5 ◀► P0.6/AD6 ₱1.6/INT6/SO VDD VSS nRESET TEST P0.7/AD7 ◆▶ P1.7/INT7/SCK

S3F82NB Block Diagram

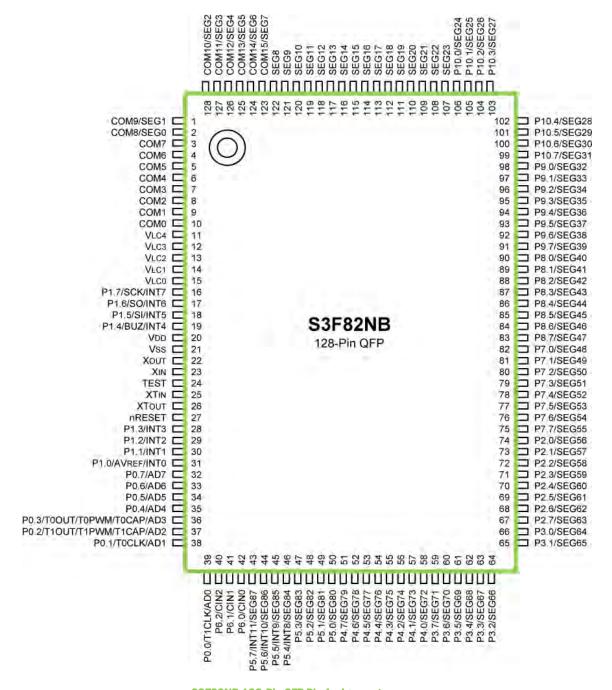
# **ADVANTAGES**

- 16/80 LCD controller for controlling large displays
- 10-bit ADC for temperature, current, or voltage measurement
- Small Flash sector size allows Flash to be used as EEPROM

# **Pin Signals**

#### **APPLICATIONS**

- Vending Machines
- Security Panels
- Thermostats
- Home Automation User Interface
- Washing Machines
- Dryer Controller
- Oven Controller



S3F82NB 128-Pin QFP Pin Assignments

### **Operating Characteristics**

- Operating Voltage Range
  - o 1.8V to 5.5V up to 4 MHz (LVR disable)
  - o 2.7V to 5.5V up to 12 MHz
- Operating Temperature Range: -40°C to 85°C

# **Development Tools**

A complete line of development tools are available for Zilog's S3 Microcontroller Family. The development environment is composed of your application board, a target board, an emulator, and a host PC running the IDE. Production programmers are also available from third party sources. Zilog's in-circuit emulator solution provides a wide range of capabilities and prices to suite most budgets and system complexities.

In-Circuit Emulators that support the S3 Family

- OpenICE-i500
- OpenICE-i2000
- SmartKit SK-1200

Target Boards for the S3F82NBand S3F94C4 MCUs

TB94C8 and TB94C4

# **Programmers**

- SPW-uni: single-device programmer
- GW-uni: 8-device gang programmer
- AS-pro

**Development Tools Suppliers** 

Please contact your local Zilog Sales Office, or contact your Third Party Tools supplier directly.

# **Ordering Information**

Order your S3 Family parts from your local Zilog distributor using the part numbers listed below. For more information, or to download product collateral and software, please visit us at <a href="www.zilog.com">www.zilog.com</a>.

| Part Number     | Package Type | Flash Program<br>Memory | GPIO |  |  |
|-----------------|--------------|-------------------------|------|--|--|
| S3F82NBXZZ-QA8B | 128-Pin QFP  | 64 KB                   | 83   |  |  |

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