

## ADVANCE INFORMATION

All information in this data sheet is preliminary and subject to change.

## UC21 PRELIMINARY DATA SHEET



# **+5V(+3V), 16-bit RISC Microcontroller-Based Data Acquisition System, CAN2.0B Interface, 32/64/128kB FLASH, 12-bit ADC, 12-bit DACs, Op Amp, Voltage Reference, Temperature Sensor, 4 16-bit PWM/Timers**

## General Description

The UC21 is a smart data acquisition system centered around a 16-bit, low-power, MAXQ20, RISC microcontroller, a 12-bit, 500ksps, SAR ADC, and a Controller Area Network (CAN) Bus interface. Analog functions operate from a +4.75V to +5.25V (or +2.7V to +3.6V) AVDD supply, digital I/Os from a +4.75V to +5.25V (or +2.7V to +3.6V) VDDIO supply, and internal digital core functions from a +2.7V/+3.0V to +3.6V DVDD/FVDD supplies that can be driven by an on-chip, +3.3V, linear regulator in the 5V versions. There is also a DVDD power supply supervisor for brownout reset control, and brownout detection interrupts for DVDD, VDDIO, and AVDD.

The ADC can measure up to 16, external, single-ended signals relative to AGND, or up to 8 differential signals. The ADC can also be used to measure the AVDD analog supply voltage without external connections. Other analog functions include dual, 12-bit, buffered, voltage-output, force/sense DACs, an uncommitted, low-power op amp, a bandgap-based voltage reference with independent DAC and ADC output buffers, local (die) temperature measurement, and remote temperature sensing with a low-cost transistor.

The 16-bit, MAXQ20, RISC microcontroller has 32kBytes, 64kBytes, or 128kBytes of FLASH program memory which can be converted to mask-programmable ROM for high-volume applications\*. There is a CAN2.0B interface, as well as a 4-wire, SPI interface for access to external peripherals such as serial EEPROMs. There is also a JTAG interface for program download and on-chip, in-circuit emulation and debug. There are four 16-bit (or eight 8-bit) timers that can be used for general capture or timing functions, or as PWM outputs. There is also an internal watchdog timer. A crystal, ceramic resonator, internal FLL, or external clock up to 8MHz can be used as a high-frequency clock source by the microcontroller, ADC, and timers. Each of these functions has independent, frequency pre-scaling. A 32k, watch crystal can be added to allow periodic wakeup or low-power, microcontroller operation. There are 22, general-purpose digital I/Os, most are multiplexed with other functions. Each of these digital pins can be used as an interrupt or wakeup and can have logic I/O levels as high as +5.25V (or +3.6V).

\* Contact Factory

## Applications

Automotive Battery Monitoring Systems

CAN-based Automotive Applications

Industrial Control

Building Automation Door and Elevator Control

## Features

- ◆ +4.75V to +5.25V (or +2.7V to +3.6V) AVDD Analog Supply
- ◆ +4.75 to +5.25V (or +2.7V to +3.6V) VDDIO Supply
- ◆ +2.7V/+3.0V to +3.6V DVDD / FVDD Internal Core Supply
- ◆ +3.3V, 50mA Linear Regulator (5V parts only)
- ◆ High Performance, 16-bit RISC Microcontroller
  - 32kByte to 128kByte FLASH (MASK ROM available)
  - 1kByte / 2kByte Internal Data RAM
  - 8.0MHz Max Clock (DVDD / FVDD = +3.3V )
  - Low Power (< 2.5mA / MIPS, DVDD=+3.3V)
  - 16-Bit Instruction Word, 16-Bit Data Bus
  - 32 Total Instructions Simplify Programming
  - Most Instructions use 1 Clock Cycle
  - JTAG Download / Emulation / Debug Support
- ◆ CAN2.0B Interface (up to 1Mbps)
- ◆ Low-Power, 16-Channel, 12-bit, 500ksps ADC
  - +/-1.0LSB max INL and DNL
  - 2.2uA (typ) Average Supply Current at 1ksps
  - Built-In AVDD Measurement Capability
- ◆ Bandgap-based DAC and ADC Voltage References
- ◆ Dual 12-bit Force / Sense DACs with Buffered Output
- ◆ Low-Power Op Amp
- ◆ Local (Die) / Remote Transistor Temperature Sensing
- ◆ Power Supply Supervisor / Brownout Detection
- ◆ 4-Wire SPI™ Serial Interface
- ◆ Four 16-bit (or eight 8-bit) Timer / Counter / PWMs
- ◆ 17 or 22 General-Purpose, Digital I/O Pins with Interrupt & Wakeup; Most have Alternate Muxed Functions
- ◆ -40°C to +85°C / +125°C Operating Temperature Range
- ◆ Space-Saving, 56-Pin and (Future) 68-Pin QFN Packages

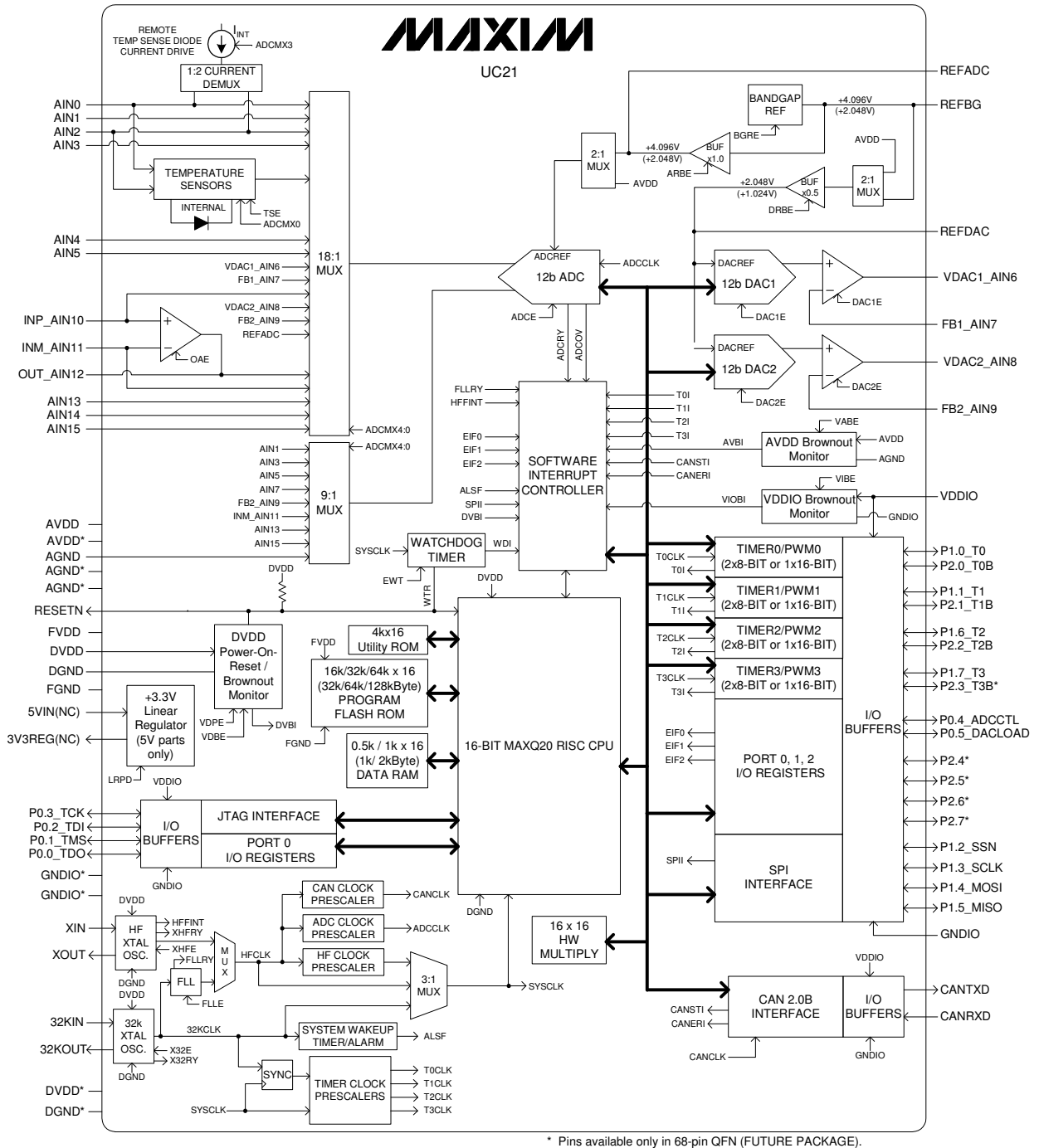
## Ordering Information

Part Number	Pkg	FLASH	RAM	I/O
MAXQ7654BAGN	56QFN	64kBytes	2kBytes	+5V
MAXQ7654AAGK	68QFN	128kBytes	2kBytes	+5V

See Extended Part Numbering System at end of data sheet for more detailed ordering information and related future products.

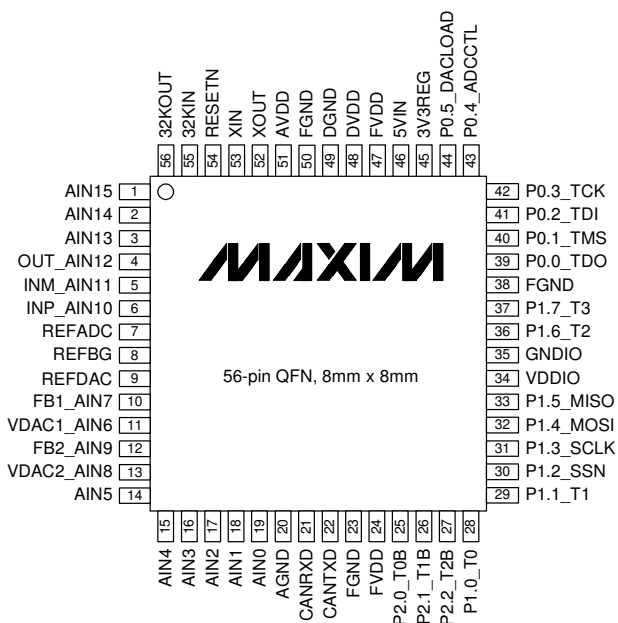
SPI is a trademark of Motorola, Inc.

## Block Diagram



## Pin Configurations

### 56-PIN QFN PACKAGE, 8mm x 8mm



### 68-PIN QFN PACKAGE, 10mm x 10mm (FUTURE PACKAGE)

