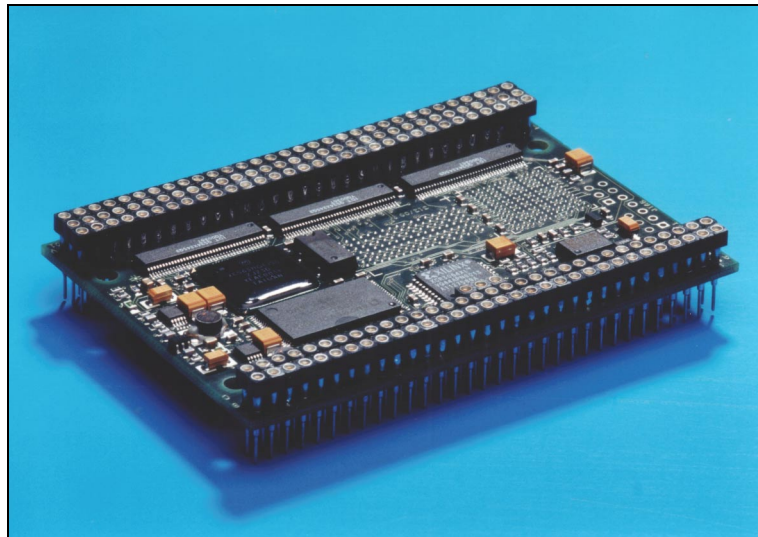




**S.Module 563**  
**DSP Computer Module with DSP56311**



**Technical Data Sheet V 1.1**

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This data sheet gives only S.Module 563 specific information and can not replace Motorola's manuals about DSP563xx programming. It is advisable to read Motorola's "DSP56300 Family Manual", "DSP56311 User's Manual" and "DSP56311 Technical Data" for a deeper understanding.

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## 1. Overview

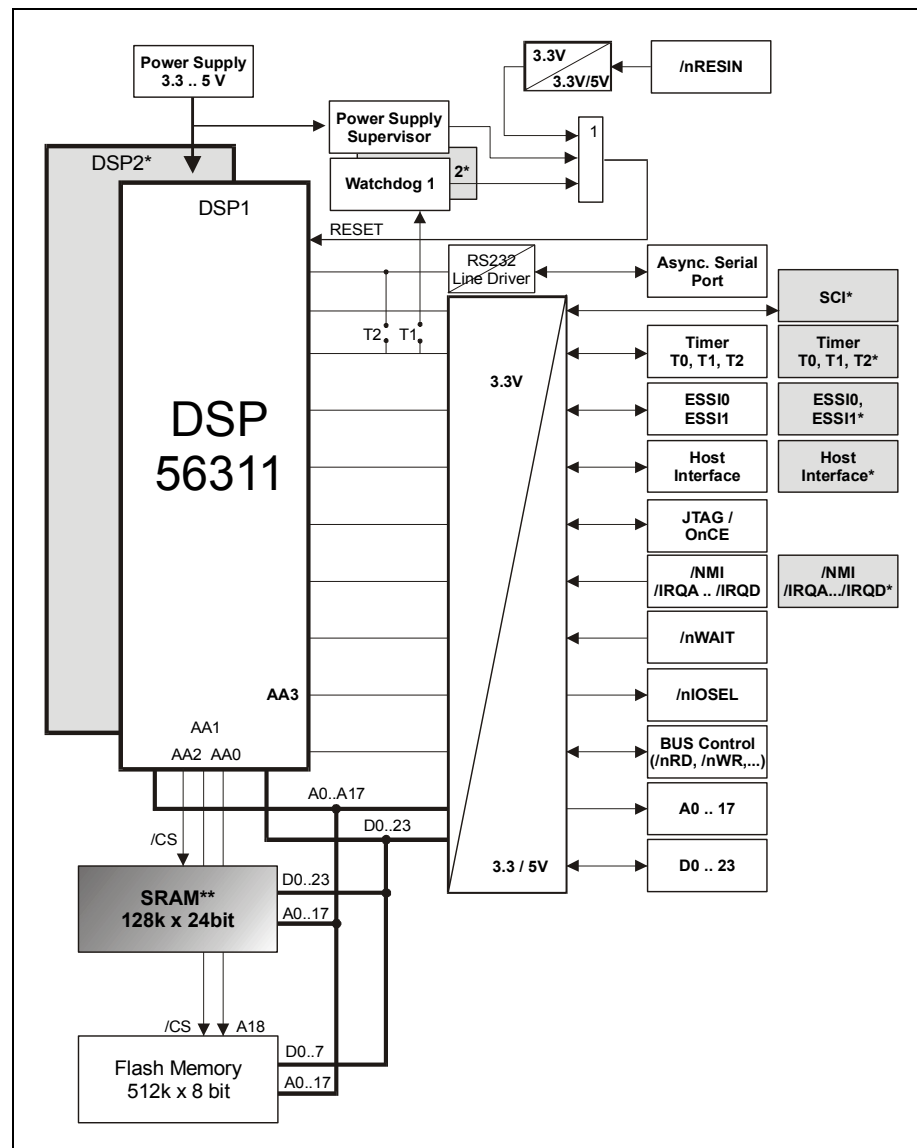


Figure 1 Functional Block Diagram of S.Module 563 (\*DSP2 and \*\*SRAM by Special Order)

The S.Module 563 is a complete high performance signal processing system with the dimensions of a credit card. The module supplies processing power of Motorola's DSP56311, interfaces, memory and non-volatile storage. It is suited for stand-alone application, prototypes and software development. The S.Module 563 comes with compatible mechanic and pinout to the D.Module processor board series, easy to expanded with different existing peripheral devices for data acquisition/data output and easy to integrate in custom designs.

### 1.1. Processor

The S.Module 563 is available as single processor system or dual processor system. The Motorola DSP56311 supports a wide range of applications. The on-chip enhanced filter coprocessor (EFCOP) processes filter algorithms in parallel with core operations. The peak performance of the DSP core is 150 MIPS at 150 MHz internal clock, during parallel work of core and EFCOP up to 255 MIPS.

The second processor is a good choice for applications with high requirements on DSP power or to increase existing system performance. Both DSPs work with a common external bus, with common address lines, data lines and some common interrupt lines to share memory and external extensions. Access to external bus is controlled by on-board arbiter hardware and affects not on-chip accesses of the other processor.

## 1.2. Memory

### 1.2.1. Internal Memory

The large on-chip RAM of 128k words is sufficient for the most of applications. The memory can be accessed without additional waitstates and is the ideal place for storage of topical program code, coefficients and data. The on-chip RAM is partitioned - the DSP supports several modes to allocate on-chip memory between program, X data and Y data memory.

### 1.2.2. SRAM

If there are applications with higher requirements on memory space, the S.Module 563 can be equipped as an optional extra with 128k x 24 bit SRAM. The SRAM is configurable to program, X data or Y data memory. In dual processor systems both DSP can communicate via the external SRAM.

### 1.2.3. Flash Memory

512k x 8 bit Flash Memory can be used for non-volatile storage in 11 sectors, such as storage of:

- boot loader program
- custom programs
- parameters
- look-up tables
- data.

The S.Module 563 boots every time after reset from the first sector of the Flash Memory.

## 1.3. Peripherals

The DSP56311 provides a reach set of peripherals:

- HI08 interface to external hosts
- dual enhanced synchronous serial interface (ESSI)
- serial communication interface (SCI), on S.Module 563 extended with CTS/RTS handshake lines
- triple timer module
- four external interrupt/mode control lines

These peripherals are available on the module for DSP1 as for DSP2 in dual processor systems. In dual processor systems both DSP shares interrupt lines /nINT0 and /nINT1 (/INTA and /INTD). On-board bus switches made the 3.3V interface of peripherals 5V CMOS/TTL tolerant.

The SCI interface of DSP1 is equipped with RS232 line drivers to use the port for standard asynchronous communication including handshake by software or RTS/CTS lines.

## 1.4. External Bus

S.Module 563 owns an external bus interface containing all address, all data, some bus control and all interrupt lines of the DSP56311.

A sub-set of available signals is the miniBus with 16 bit data and 6 bit address bus, an I/O enable, a read, a write and two interrupt lines. Some existing data acquisition and output boards provide the miniBus interface and enable simple connection without additional hardware.

As with the peripherals interface the external 3.3V bus was extended with bus switches to work in 5V CMOS/TTL environments.

## 1.5. Watchdog

Every DSP owns a separate external watchdog to reset the module if program execution fails. Once activated the watchdog can supervise the program execution and will only time out on software errors, causing on programming or hardware errors.

## 1.6. Real-time Debugging

The S.Module 563 provides an interface to the DSP56311 test access port. The on-chip emulation (OnCE) allows the examination of registers, memories and on-chip peripherals.

## 1.7. Power Supply

The S.Module 563 operates on a single power supply in the range between 3.3V and 5V. All secondary voltages are generated on-board. A supervisory circuit monitors the supply voltage and resets the board if a power-fail condition occurs.

## 1.8. Software Support

The S.Module 563 is very flexible and many settings, e.g. the partition and location of memory space, are under software control. SEMATEC assist the user with a boot loader program that sets the module after reset in a default state. This state may be a good starting point for own programs.

Additional basic software routines come with the DSP module to facilitate the rapid integration of the module in specific applications. The routines are placed in the Flash Memory and can be used by assembler language.

The following figure shows the location of some parts:

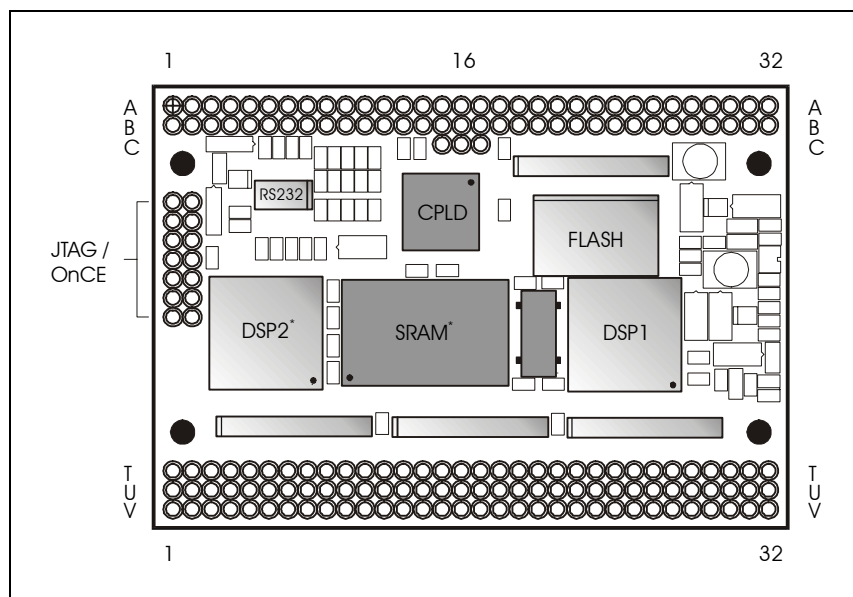


Figure 2 Overview over S.Module 563 (Top Side, \*DSP2 and SRAM optional)

## 2. Power Supply

The S.Module 563 runs from a single power supply in the range between 3.3 and 5 Volt DC. All secondary voltages, e.g. for processor core and RS232 line driver are generated on-board.

The table shows the pins of digital power supply. There are multiple power supply pins provided but only one pair of adjacent pins should be used to avoid current loops.

Pin	Signal	Description
A1	VCC	3.3 .. 5V DC Supply
B32	VCC	3.3 .. 5V DC Supply
A32	GND	Ground Supply
B1	GND	Ground Supply

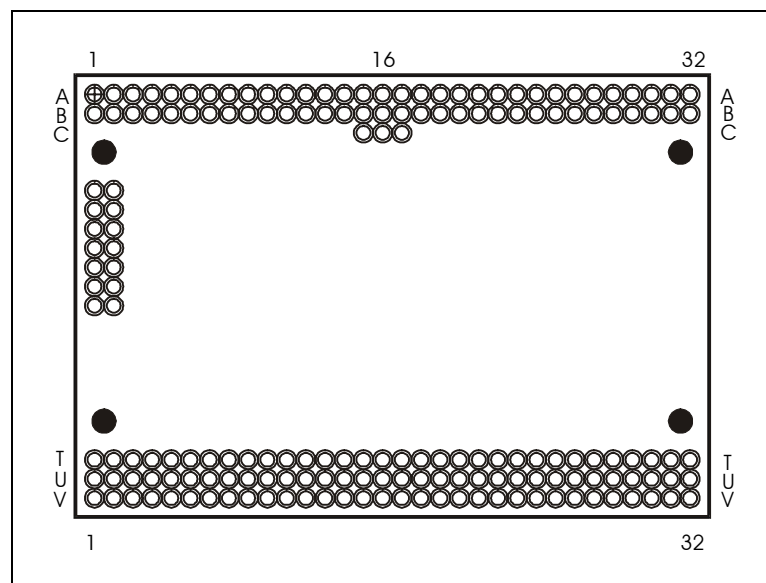
*Table 1 Signals of Digital Power Supply*

The following table describes the three pins of analogous supply voltages, used by daughter boards mounted piggy-pack on the module. These power signals are not used on the module itself and are not connected on the S.Module 563.

Pin	Signal	S.Module 563	Description
C15	AVCC-	not connected	negative analog voltage
C16	AGND	not connected	analog ground
C17	AVCC+	not connected	positive analog voltage

*Table 2 Signals of Analogous Power Supply*

The following figure shows the location of pins:



*Figure 3 Pinout of the S.Module 563 (Top Side)*

### 3. Mechanical Dimensions

All dimensions in mm.

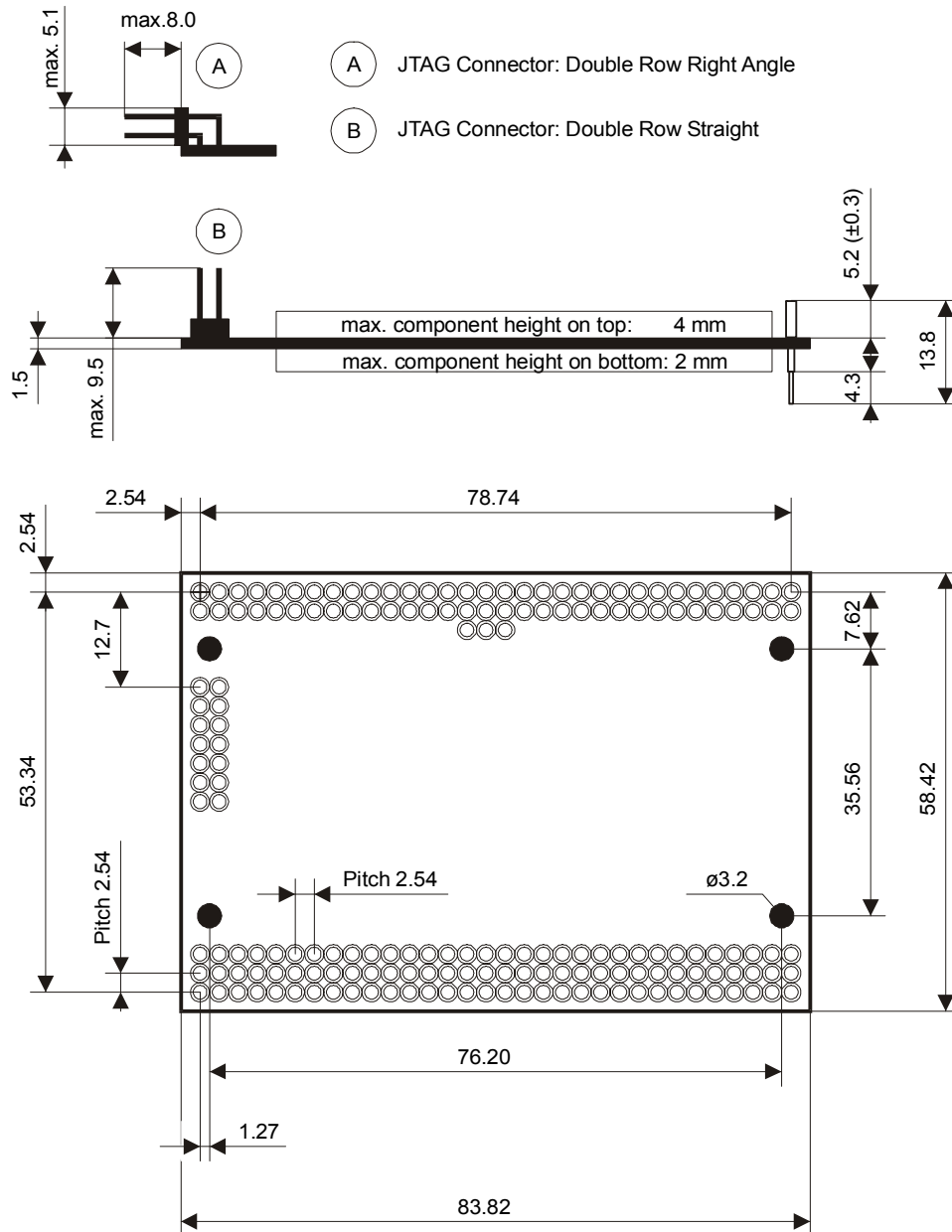


Figure 4 Dimensions of the S.Module 563