

FIBULA

Frequently Asked Questions

MuPsi DSP card

What are the AD1,AD2 input levels, what are DA1,DA2 output levels ?

When the "Gain 10" jumper is off:

AD1 or AD2 range is [-2.5V .. +2.5V] corresponding to [-1.0 .. +1.0] internal DSP units

When the "Gain 10" jumper is on:

AD1 or AD2 range is [-0.25V .. +0.25V] corresponding to [-1.0 .. +1.0] internal DSP units

DA1 or DA2 output range is [-4.096V .. +4.096V] corresponding to [-1.0 .. +1.0] internal DSP units.

How much memory is available for user ?

P: RAM 16K 24 bit words \$0...\$3FFF

P: FLASH 240KB, sectors 1-6

X: RAM 7K 24 bit words \$0...\$1BFF

Y: RAM 7K 24 bit words \$0...\$1BFF

Can I connect more AD converters to MuPsi ?

Yes. Use one or two Enhanced Synchronous Serial Interfaces (ESSI) available on connectors J2 and J4. For a "no glue" connection, choose AD converters or codecs with serial interfaces having following signals: Clock, TxD, RxD, FrameSync

Can I change the processor clock frequency ?

Yes. By default, the DSP clock frequency is 65.536MHz. If you want another frequency, use the macro "clock" at begin of your program; e.g. to run the DSP at 100MHz, just type: " **clock 1e8**"
Possible frequencies go from 12.8kHz to 140MHz, but chip specifications aren't guaranteed above 100MHz.

Can I precisely tune the DSP clock ?

Not exactly. But you can modify the oscillator frequency definition on which every absolute frequency calculation is based. This only affects blocks compiled with the **abs** option for which time is expressed in seconds and frequencies in Hertz. Two methods:

Measure directly the oscillator frequency (IC12, pin 1) which should be 19.6608MHz. If the measured value is different, just modify the value of parameter **text** in the file "FIBULA\Syslib\begap.asm".

You can also write an oscillator program which theoretically generates a 1000.0Hz sine wave on DA1, and measure precisely this frequency. If it happens to be 1002.3Hz, then modify **text** to $1.0023 \times 19.6608 = 19.70602\text{MHz}$

FIBULA environment

Some buttons from the FIBULA toolbar are missing.

This happens if the FIBULA window is too narrow.

Resize (enlarge) the FIBULA window.

When I type characters, nothing appears on the editor page although the cursor displaces

You might have the same color for the foreground and the background (e.g. white characters on a white background).

Do one of following commands:

Settings | Font | Editor *and choose a different color for the characters*

Or

Settings | Colors | Editor *and choose a different color for the background*

I cannot edit the file "xxx.asm"

You are trying to edit a write-protected library file (red icon) or a demo file.

If you want to create a modified version of this file, first press the «Save as ..» button (blue diskette) and save it into a different directory. Never save copies into the FIBULA library directories.

Functional blocks library

Why aren't there blocks to add or subtract ?

Addition and subtraction are performed by the blocks **wsum2** (2 inputs) or **wsum3** (3 inputs). Choose for arguments +1.0 and +1.0 for an addition or +1.0 and -1.0 for a subtraction. However, keep in mind that the result absolute value shouldn't exceed 1.0.

Why isn't there a block "FFT" ?

The block library only contains functions which process *continuous* data flows in real time such as signal generators, filters etc. ... The Fast Fourier Transform is a discontinuous process which can't simply be connected to other blocks. If you want to see the spectrum of a signal, use **specan** (spectrum analyzer block) which continuously performs FFT on overlapping windowed buffers.

*I used the **ada** block within a loop, but I can't find the variable **ad1**.*

You omitted to connect the **ad1** variable somewhere. FIBULA is optimized: a not connected block output doesn't generate a variable. If you want to see **ad1** on virtual oscilloscope, connect it to a dummy input, or create a variable named **ad1** prior **ada** invocation:

*Insert before **ada** either*

```
cn      ad1,nihil
```

or

```
var     ad1
```

In which unit are angles represented ?

The DSP handles data which are constrained in the interval $[-1.0 .. +1.0[$, thus neither degrees or radians can be used as angle unit. Angles are expressed in **half turns**: $[-1.0 .. +1.0[$ is equivalent to $[-\pi .. +\pi[$ radians or $[-180^\circ .. +180^\circ[$.

What is a complex signal ?

A complex signal "*name*" is a couple of 2 real signals called "*name_re*" and "*name_im*". When used as an entity, complex arithmetic is used to handle the real and imaginary parts. A complex signal can be written $m \cdot \exp(j\omega t)$. The major interest to use complex data in Signal Theory is that angular frequency ω gets signed. Signal "turns right" or "turns left". See the block **hilbert** which transforms a real signal into a complex one.

Common compilation errors

When I try to compile, I get a message "Impossible to open ..." or "Impossible to write ..."

This happens on Win NT, 2000, XP, if you didn't get access rights to FIBULA.

Ask to your administrator to get full rights on FIBULA.

When I try to compile, I get a message "FATAL ERROR: ASM56300 crash ..."

This happens when you utilize a reserved word such as «a» or «r0» which are also internal DSP register names (see **Help| Fibula | Reserved words**).

Choose another identifier.

This may also happen if you inserted a **blank space** within an argument list (xxx, yyy).

Never insert blank spaces within a list of arguments. The only separator is the comma (xxx,yyy)

When I compile "cn p,q_in", I get the error message "Unrecognized mnemonic p,q_in"

You certainly forgot to insert a blank space or tabulation in front of **cn**. FIBULA follows the Assembly Language Syntax which considers the leftmost field as the label field, and the second one as the operator.

Insert a tabulation character at left of cn: " cn p,q_in "

When I compile " `cn p,q_in`", I get the error message "Unrecognized mnemonic cn"

You are probably running in the **ASM compiler mode**. When in this mode, FIBULA doesn't look into libraries for macros. Other possibilities: your library «lib» has been erased, displaced or renamed, or the FIBULA executable has been displaced.

*Do the command: **Settings | Compiler mode | Fibula***

If necessary, check the existence of the folder Fibula\lib.

When I compile " `move #buffer,r0`" I get the error "Only register direct addressing allowed"

You just used the "O" character in place of the "0" character in "r0"

I created a macro named fir.asm into my current directory. When I invoke fir, I get unexpected behavior or errors for this block.

The identifier **fir** refers to a macro from the library. The compiler at first searches the Fibula libraries which have therefore precedence.

*If you really want to redefine a block from the libraries, copy the new file into **userlib**. Otherwise, choose another identifier.*

Block "xxx" has an abnormal behavior, or produces unexpected errors

You may have **redefined** block "xxx" by creating a file named "xxx.asm" within the directory **userlib**

*Delete or displace the file "xxx.asm" from **userlib**.*

When I compile my program, the error window appears but the listing doesn't show any error

This happens when a linking error occurs. Unfortunately, the Motorola DSPLNK.EXE doesn't produce any mapping or error report when something goes wrong. Most linking errors are due to memory size overflow, usually when too large buffers are used for the virtual oscilloscope. For small programs, available memory for oscilloscope is about 8K words (e.g. 2000 samples on 4 channels).

Reduce buffer size.

Communication problems

There is no communication with the MuPsi card (Fibula status LED remains gray or orange)

Click on the status LED. If it doesn't turn green, then

Check that the MuPsi card's power is on

Check RS232 cable connection

Press on MuPsi Reset button

Check if FIBULA communicates through the connected port (see the title bar);

If not, do the command **Settings | Serial Port | Port | COM1** (if cable connected on COM1)

If the serial communication still doesn't respond, press 2 times the disconnect button (rightmost) This will initialize the Windows serial port driver programs and should resolve the problem.

When I use the Mu.Psi resident debugger to observe internal memory on virtual terminal, some received characters are missing.

This most happens on Win2000 and is machine and OS dependent. It comes because the MuPsi debugger doesn't use any protocol to control serial port data flow, and for some machines 38400 Baud might be too fast to handle in real time. *Try to get your computer less loaded, raise the priority of background tasks.*

When I switch off my computer, the program running on MuPsi card is halted.

This is because FIBULA uses a BREAK on serial line to remotely interrupt a running program. When you switch your computer off, the serial line goes in the break state, which halts MuPsi. You can inhibit this behavior by modifying the parameter "interruptible" within the Fibula header program:

"Fibula\syslib\begap.asm". If you set this parameter to 0, the program won't stop when a break or an overflow occurs, you will therefore have to press the reset button each time you want to stop it.