



# COM

9.3.2007



## Impressum

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These instructions correspond to the technical stand at printing.  
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## History

24.4.2005	Description and photos of power protection inserted
8.5.2005	pcb layout: correction of the LED symbols
9.3.2007	Text corrections



## Operating conditions

The operation of the assembly is provided for hobby applications in the interior.

All consumers attached directly at the FSBUS cable may not exceed a current consumption of altogether 2 amps (current load of the bus cable).

At all cables has to be paid attention on a sufficient crosscut.

The permitted environmental temperature may not exceed 0° degrees Celsius and 40° degrees Celsius.

The device is meant for the use in dry and clean rooms.

The assemblies may be taken only under supervision of an informed adult or an expert into operation!

## Safety

Tools only may be used if you guarantee that the equipment is separated from the supply tension and electrical charges which are stored in the components situated in the device were unloaded before.

I particularly hereby point out that FSBUS components only should be after built or operated by experienced electronics technicians. I dissociate myself from possible damages which can arise by after-making or business.

The after-construction and the operation of the wirings is carried out at its own risk.

The user has to check and to accept for the responsibility the suitability for his application case himself. I don't assume any liability for damages which arise during or as result of the after-making or business.

The FSBUS wirings are freely available for the private use.

A commercial use of the wirings, software or parts of it requires the express written approval.



## Schematic

The COM interface amplifies the serial signals from and to the PC and converts her for the FSBUS cable. In addition, a reset logic is contained around T1 and the control for programming the ATMEL microcontrollers.

A switched mode power supply provides this module and the logic part of all attached FSBUS modules with regulated 5V. To the protection from possible overload which can be carried out from inattentiveness at the use of wrong power supplies an optional combination of an overload protective diode and a semiconductor protection (F1, D1) is recommended. If these components aren't available, you also can leave these out.

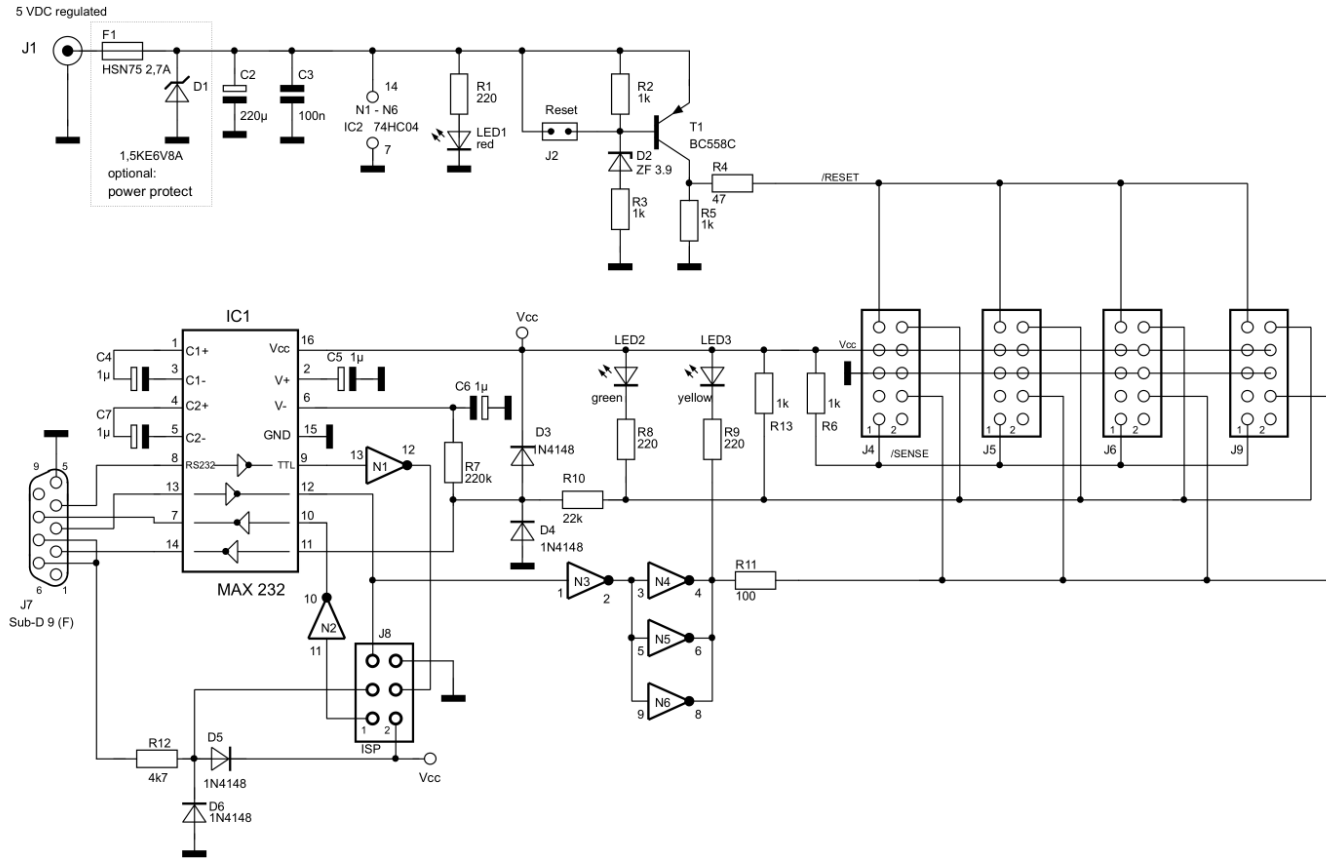
A Max 232 serves for the level conversion of the FSBUS system and RS232 interface . Take care of C6. It serves as a loading pump for the negative supply caused in the MAX232, the positive pole has to be connected with GND.

For control of the data traffic 2 light-emitting diodes are contained. The green light-emitting diode shows data traffic of the FSBUS to the PC and the yellow LED data traffic of the PC to the FSBUS.

N3 N6 (74 HC04) are used for the reinforcements of the bus signal. N1, N2 form the ISP connection together with J8 to the Flash of the Microcontroller.

The components providing an early Reset signal when switching the supply off, are around T1. J2 can optionally be fitted with a press button, which executes a manual Reset of the attached controllers.

If the supply tension exceeds 3,9V, T1 conducts and puts the reset signal on ~ 5 V.



## Power Supply

The power supply required for the fsbus system logic, must be a regulated 5V switched power supply.

Please pay attention, only to attach 5V since otherwise a destruction of all components is a possible consequence.

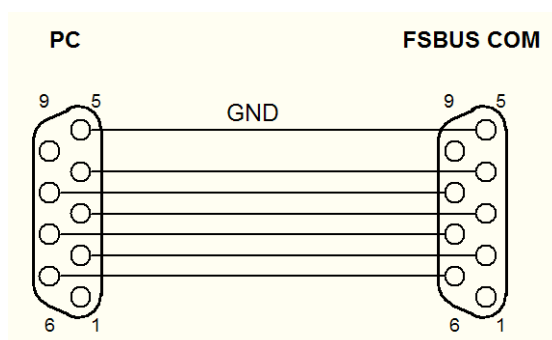
D1 and F1 are optional protection parts. D1 shortcuts if a powersupply with more than 6,8V is used or the power is wrongly attached (+ and – mixed up). F1 will break the power consumption to avoid damage of D1. One may use an ordinary fuse (2A) if a semiconductor fuse is not available.



## RS232 Cable

The COM board is connected to PC with a serial 1:1 cable. For ordinary use, only lines 2.3 and 5 (GND, Tx and Rx) are needed.

The other lines are needed for flash mode.



## USB

If you like to connect to a PC's USB interface, you may use one of the available USB/RS232 converters.

## DIY Production of the printed circuit boards

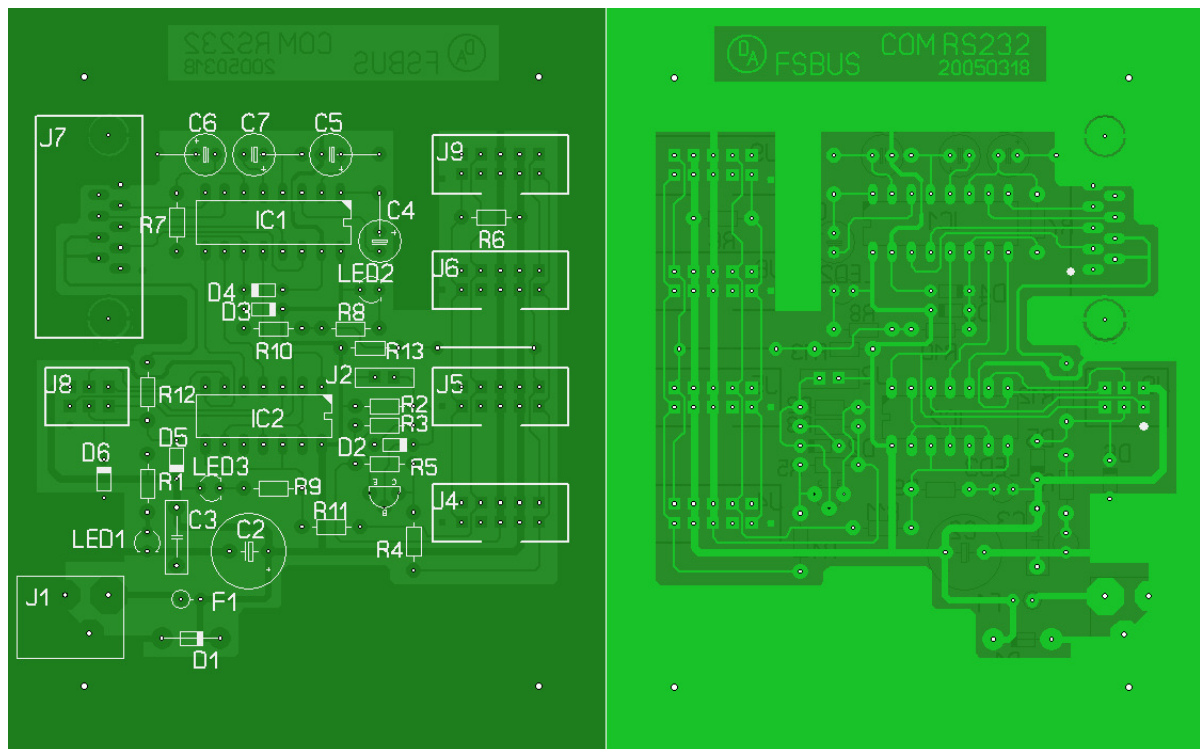
The layout of PCB was made with "sprint layout version 4.0". For the exact reproduction the original layout is provided. The company ABACOM makes a free Viewer available with which an exposure capable foil can be printed for making the circuit board.

You get the Viewer via Internet: [www.abacom-online.de](http://www.abacom-online.de)

## Building PCB

The construction of the FSBUS COM module is carried out in the steps:

1. Fitting and soldering the circuit board
2. Control of the construction elements
3. Test business with FSBUS fsadmin.exe



Equipment side and solder side of the FSBUS COM module

Fit the circuit board using the layout plan. You start with the perhaps available wire links and fit after that the little components first and for the end the great one.  
Solder the components directly after the installation.

Since soldering is an important process which must be executed cleanly and decides decisively on the functioning of the wiring, the basic principles are summarized here once again:

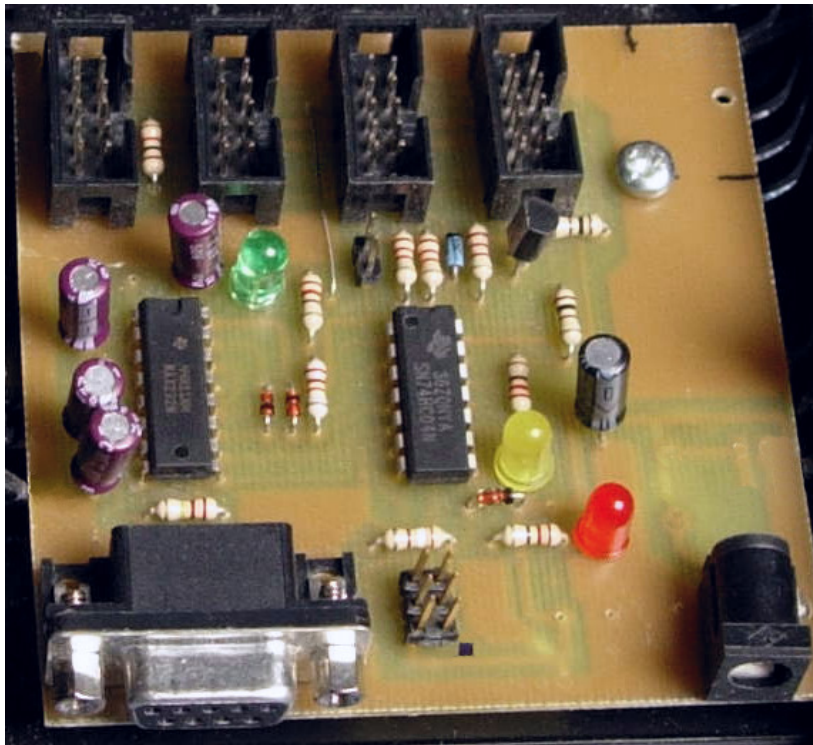
- In principle, use soldering water or soldering grease when soldering electronic wirings never. The acid contained in it destroys the components and track conductors.
- Use electronic tin SN 60 Pb (e.g. 60% tin, 40% lead) as soldering fluxes with Kolophonium.
- Use a small soldering iron with not more than 30 watts of performance.
- The soldering process of a soldering point should be speedily but not too briefly carried out. For soldering the well tin-coated soldering tip is held so on the soldering point that component wire and track conductor are touched at the same time. (Not too much) becomes soldering tin supplied at the same time which is on heated. As soon as the soldering tin starts to flow, you take it of the soldering point away. You then still wait for a moment have gone to the retarded plumb line well and soldering irons from the soldering point then take this one.
- Take care that, approx. 5 sec., the just soldered component isn't moved after you have removed the piston. A silver shiny, faultless soldering point then remains back.
- Prerequisite for a faultless soldering point and soldering well is a soldering tip which is clean and not oxidized. You relieve after everybody solder superfluous soldering tin and dirt with an a damp sponge or a silicone Abstreifer.
- After soldering the connection wires are cut off directly over the soldering point with side cutting pliers.

## **Controlling the parts**

The possibility is always given to it that something doesn't work after the assembly. By visual, conscientious control, the danger of destroying construction elements can be prevented.

A frequent reason for a not function is an equipping fault. Pay attention to the right components and the direction of the electronic components.





Equipment side of COM Board (without D1/F1)



## Partlist

### Diodes

D1\* = 1,5KE6V8A (Überspannungsschutz für Spannungen > 6,8V)  
D2 = ZF 3.9  
D3,4,5,6 = 1N4148

### Semiconductors

IC1 = MAX 232  
IC2(N1-N6)= 74HC04  
T1 = BC558C  
LED1 = red  
LED2 = green  
LED3 = yellow

### Capacitors

C2 = 220μ  
C3 = 100n  
C4,5,6,7 = 1μ

### Resistors

R1,8,9 = 220  
R2,3,5,6,13 = 1k  
R4 = 47  
R7 = 220k  
R10 = 22k  
R11 = 100  
R12 = 4k7

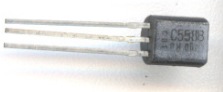
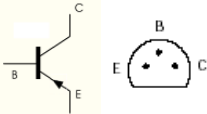
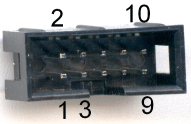
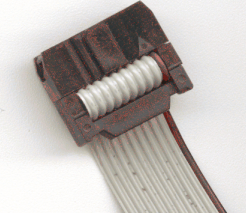
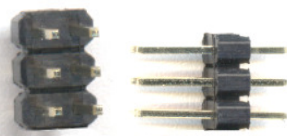


### Connections

J4,5,6,9 = 10 pol. Wannenstecker (FSBUS)  
J1 = BNC-Stecker (5V Netzteil)  
J7 = Sub-D 9 (F) (RS232)  
J8 = 6 pol. Pfostenstecker (ISP)  
J2 = 2 pol. Pfostenstecker (Reset)

F1\* = HSN75 2,7A (fuse for load > 2,7A)

\* optional parts for power protection

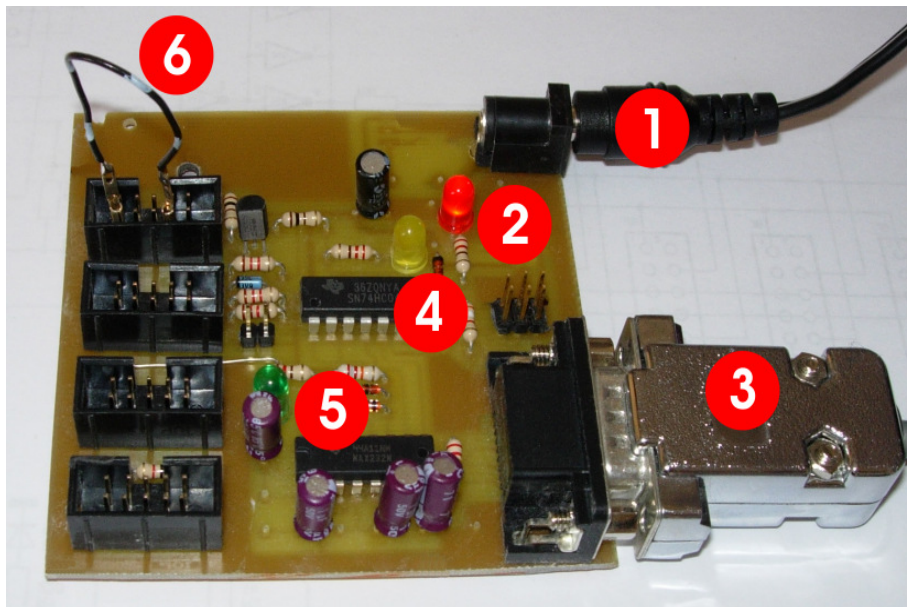
## Components

T1	BC558C		 <p>Ansicht von unten</p>
J4 J5 J6 J9	10 pin Wannenstecker		 <p>Stecker mit Flachbandkabel für FSBUS</p>
J8	6 pin Pfostenstecker		
F1	HSN75 2,7A semiconductor fuse (optional)		HSN75 2,7A (fuse for load > 2,7A)
D1	1,5KE6V8A power protection diode (optional)		power protection diode. The white ring points to + pole.

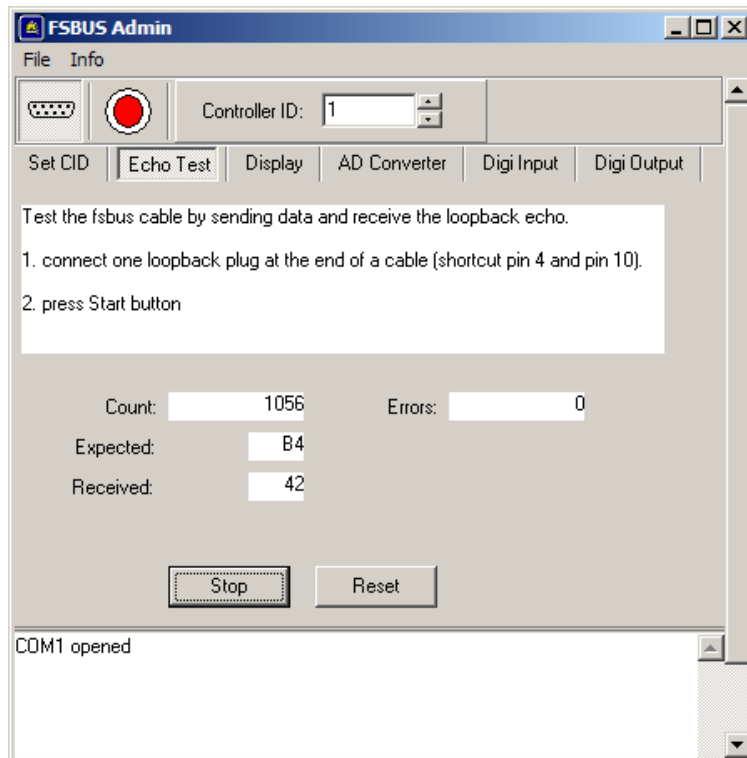
## Test

In Fsbus CDK the [Fsbus Setup] menu helps to test the FSBUS modules.

- Connect 5 V power supply (1). The red LED (2) must shine now.
- Connect the RS232 cable (3).
- Put a bridge (6) of pin 4 to pin 10 on one of the FSBUS sockets.
- Select [Echo Test] and [Start]
- Flickering impulses are shown on LED 4 and 5 (not very bright).



Fsbus CDK sends RS232 signals on the bus. The bridge (6) echoes data back. Fsbus CDK compares the sent and returned bytes.



The maximum cable length for all fsbus cables should not exceed 30m. On longer cables, you may see more and more errors due to electromagnetic disturbances.