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FKG-1

User Manual

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Contents

1 In General

The FKG-1 is a compact *crosshair generator*. It is available as a printed circuit board designed for O.E.M. costumers, or inside a small case. It generates a single crosshair and insert it into a video signal. This video signal must be an externally connected video source. In most cases, this will be a video camera. Figure 1 outlines a typical application.

All functions of the FKG-1 are controlled either by external potentiometers, or with PC connected to the RS232 / V.24. This allows the user the full adaption to his task. The configuration is done by simple solder jumpers (printed circuit pads).

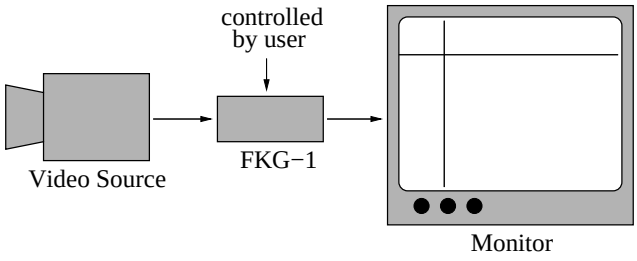

Figure 1: Outline of a possible application.

1.1 Features

The following enumeration gives you an short overview of the available features of the FKG-1.

- insertion of a crosshair into an external video signal.
- processing of BAS, FBAS or Y/C possible.
- free positioning of the crosshair.
- free adjustment of the brightness of the crosshair.
- width adjustable in four steps.
- height adjustable in two steps.
- controlled by potentiometers or by RS232 / V.24.

See section 6 on page 15 for an overview of more technical details of the device.

2 Connecting The FKG-1

This member of the FKG product family is delivered inside a compact case. All connectors can be found on the back side of the case. The operation mode can be selected with the small switch on the right side. If the serial operation mode is disabled, the potentiometers on the top of the case are active. See figure 2 for an overview of the case.

The elements shown in figure 2 have the following meaning:

(1) “Power” – connection for the power supply.

(2) “Out” – output of the video signal.

(3) “In” – input of the video source.

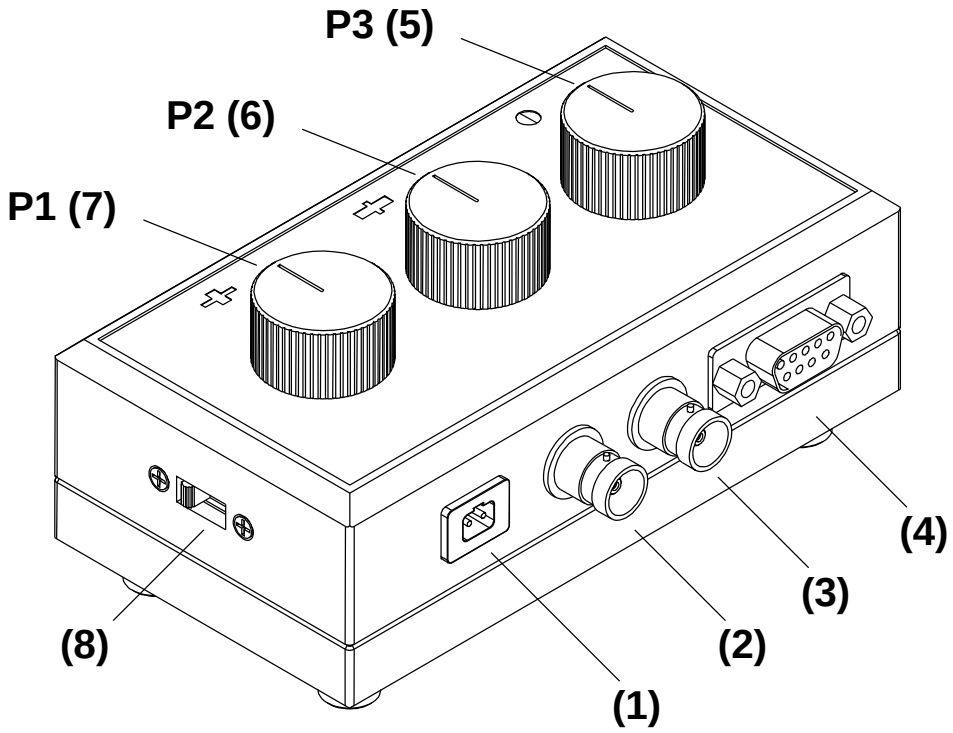

Figure 2: Overview of the connectors and control elements of the FKG-1 for BAS/FBAS.

(4) "RS232" – D-SUB connector (female) for RS232 / V.24 interface.

(5) "Helligkeit" – controlling the brightness of the crosshair.

(6) "Horizontal" – the horizontal position of the crosshair.

(7) "Vertikal" – the vertical position of the crosshair.

(8) "Poti/Seriell" – select the operation mode.

2.1 The Back Side Of The Case

The BAS / FBAS video signals can be connected to BNC connectors. For the usage of Y/C video signals, SVHS connectors are used.

The serial interface of the `FKG-1` is implemented as RS232 / V.24. The default baudrate is 9600[bps]. See Table 4 on page 8 for other configurations. The wiring is limited to three signals. Only RxD, TxD and SG are used. All these signals are available at the 9-pole D-SUB connector. The pinout of this connector is shown in table 1. It is designed for the use of standard 1:1 cable.

Table 1: Pinout of the D-Sub connector.

Pin	Signal
2	transmission signal TxD
3	reception signal RxD
5	signal ground

3 Connecting The Printed Circuit Board

The printed circuit board of the `FKG-1` is a member of the FKG product family too. For this variant, all the signals must be plugged into on-board connectors. Figure 3 shows the position and the orientation of these connectors. The bevelled edge marks pin-1!

The following overview is a description of the available connectors. The names are equal to figure 3. All the connectors below are *screw clamp connectors*[1]!

ST1 is a five-pole connector. The three potentiometers are connected here.

ST2 is a two-pole connector for the supply voltage.

ST3 is a four-pole connector. All three video types are connected here.

ST4 is a four-pole connector. This is the output of the video signal with the inserted crosshair.

ST5 is a four-pole connector for the RS232 / V.24 communication cable.

[1] Starting with revision 1.1 of the board, these connectors are used!

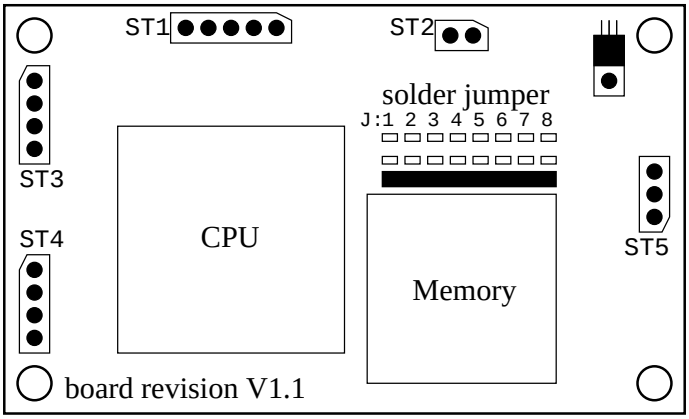

Figure 3: Position and the orientation of all connectors and solder jumpers.

3.1 The Potentiometers

The default operation mode is the usage of potentiometers. It is important to use higher quality potentiometers, because the cheaper ones could lead to a jittering crosshair! The dimension of these devices must be between 4.7 kΩ and 10 kΩ.

The pin assignment of ST1 and a sample wiring plan for the potentiometers is shown in figure 4.

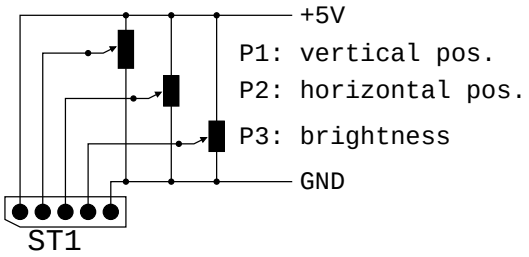

Figure 4: Connecting the potentiometers to ST1.

3.2 The Video Signals

The original video source must be connected to ST3. After the processing, the resulting video signal is available at ST4. The whole signal path can process one of the signal forms BAS, FBAS or Y/C. The signal form of the output is equal to the signal form of the connected video source. In the case of BAS or FBAS, the component C (of Y/C) isn't used neither at ST3 nor at ST4. See Table 2 for the complete pin assignment of the both connectors.

Table 2: Pin assignment of ST3 and ST4.

Pin	Signal
1	BAS, FBAS or Y
2	signal ground
3	C or unused
4	signal ground (video)

3.3 The Serial Communication Port

The serial communication port of the FKG-1 is implemented as a RS232 / V.24. The baud rate (transmission speed) is adjustable. Only three signals are used for the communication. These are the transmission signal TxD, the reception signal RxD and the signal ground. All of these signals are connected to connector ST5. Table 3 shows the pin assignment.

Table 3: Pin assignment of ST5.

Pin	Signal
1	transmission signal TxD
2	signal ground
3	reception signal RxD

3.4 The Supply Voltage

The supply voltage has to be connected to ST2. The FKG-1 needs a DC voltage between 8 V and 12 V. The maximum current consumption is less then 80 mA. ST2 pin-1 is positive and pin-2 is ground.

3.5 Device Configuration

The configuration of the FKG-1 is done with eight solder jumpers. An opened jumper represents the state *Off*, and a closed (shortened) jumper is equal to *On*.

The configuration comprises the width of the crosshairs, the communication speed and the mode of operation. Details of the setup and the factory defaults are described in table 4.

A *binary* value of two bits[2] allows the configuration of four different values assignable to the line width. Table 5 shows all possible combinations and there meaning.

[2] the solder jumpers J1 and J2 represents the two bits.

Table 4: Usage of the solder jumpers.

jumper	default	function
2,1	Off,On	width of the vertical line as binary value.
3	Off	toggle height between one (off) and two (on) pixels.
4	Off	toggle baud rate between 9600bps (off) and 19200bps (on).
7	Off	operation mode: potentiometer (off) or serial (on).
5,6,8	Off	reserved.

Table 5: Configuration values of the line width

J2	J1	assignment
Off	Off	line width 1 pixel.
Off	On	line width 2 pixel.
On	Off	line width 3 pixel.
On	On	line width 4 pixel.

4 Operation Modes

4.1 Controlled by Potentiometers

This operation mode is only active, if the solder jumper J7 is *not shortened*. If you select this mode, the crosshair and the brightness is controlled by three potentiometers. The Potentiometer P1 controls the horizontal position, while P2 controls the vertical position. With P3, the level of the brightness is adjustable in 255 steps. The value of white is hereby 0 Ω!

It isn't necessary to save any data in this operation mode. All settings are controlled by potentiometers or solder jumpers.

4.2 Controlled by RS232

As an alternative to the previously mentioned *potentiometer mode*, the *serial mode* gives the user full control over all functions of the device. The communication protocol[3] is the same for all members of the FKG family. This allows the usage of a common graphical front-end called `FKG-GUI`. This program is available for Microsoft Windows (TM). The latest release of the program is always available at our Internet homepage (see cover page).

This operation mode is only active, if the solder jumper J7 is *shortened*!

[3]The serial protocol is a ASCII based character oriented protocol. The documentation for this protocol is only available in German. For more information call our support team.

5 Controlling the FKG-1 running Windows

Included in delivery of the FKG-1 is the Microsoft Windows executable FKG-GUI. This applications works with Windows-2000 and above.

5.1 Installation and application start

The applications simply consists of one executable and two DLL's. There is no need for an installation step. You are able to start the application directly from the CD-Rom. To use it from the local harddisc, it is enough to copy the file into a directory of your choose.

FKG-GUI doesn't write any data to your harddisc, nor does it write into the windows registry.

Important: In order to use the FKG-1 together with FKG-GUI, you have to configure 9600 bps! Ensure that the corresponding solder jumper is setup correctly.

5.2 Configuration of the application

After program start, the configuration dialog box as shown in figure 5 appears.

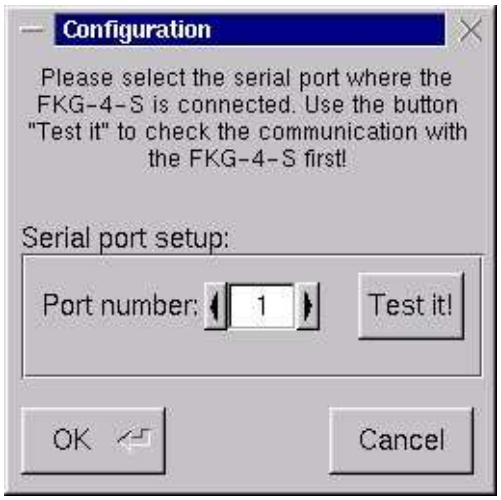

Figure 5: The configuration dialog.

Here you can select the serial port used for the FKG-1 connection. It is important, that the device has been switched on.

Click the button "Test it!" to check your current selection. This test includes several steps. First, the interface connection is established and configured. If the interface is already used by another program, a mouse driver e.g., the error message shown in figure 6 appears.

In this case another serial port should be selected. The FKG-GUI is suitable for the use of up to four interfaces. Since many usual PCs are provided with only two interfaces, a connection

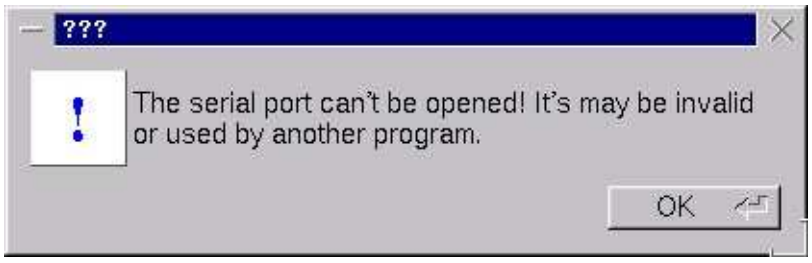

Figure 6: Error message if the serial port is not accessible.

may be requested for an serial port which is actually not available. In this case, the same error message as shown in figure 6 will appear also.

The second step is performed, after the connection with the interface could be established. This step is used to check the general communication function by sending a command to the FKG-1 which requires an acknowledge for response. If this test fails, the error message shown in figure 7 appears.

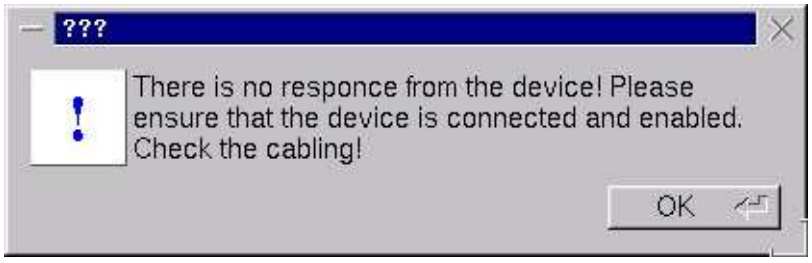

Figure 7: Error message, if communication fails.

This message means that the command has either not been received by the FKG-1 or that a free interface has been identified but no device is connected. In this case you should check the cable connection. If you are sure that the cable is OK and the connector is properly plugged, repeat this test. If the same error message appears again, you should select another interface.

The last step is used to query the device ID of the FKG-1. Apart from the device name, a dialog box as in figure 8 reports the version of the firmware and the maximum number of supported crosshairs.

If this message box appears, the configuration procedure has been successfully completed. Click the button “OK” to close the message box. While closing the configuration dialog box, also by clicking the button “OK”, the program will query the current settings of the connected FKG-1.

The main window shows the settings found. Figure 9 shows an example of such an initialized main window.

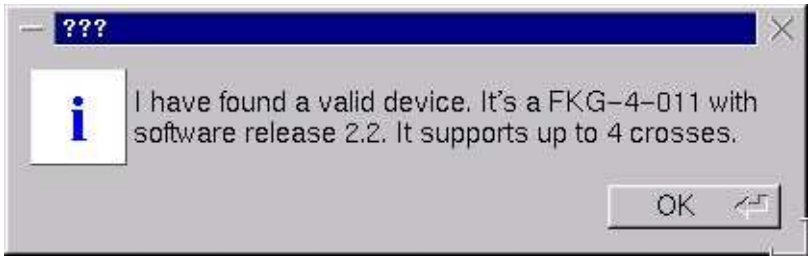

Figure 8: Informations queried from connected device.

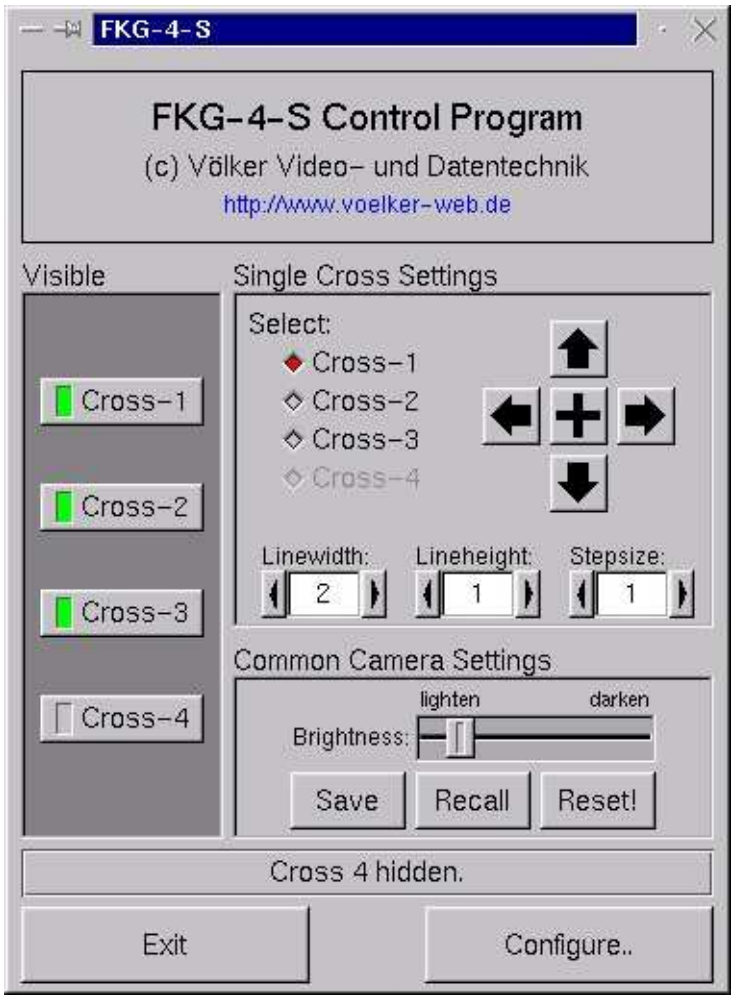

Figure 9: A sample main window. In the case shown, the crosshair 2 is selected for modification. Crosshair number 4 is disabled.

Note: Since the program is suitable for the use of up to four crosshairs, the buttons “Cross-2” up to “Cross-4” for the FKG-1 always remain inactive.

5.3 Mode of operation

After program configuration, the main window is shown and active. This window is used for all parameter settings. Each change will be transferred immediately to the FKG-1. For this reason, the device must remain connected and activated.

The main window consists of three areas which are marked by 3D frames. The three window areas are designated as follows:

- "‘Visible"’
- "‘Single Cross Settings"’
- "‘Common Camera Settings"’

Apart from these three areas, the main window includes the buttons "‘Exit"’ and “Configure..”. Use the “Exit” button to close the program and the “Configure..” button if you wish to open the configuration window again.

Note: When closing the program, the last crosshair selected will always be deselected.

5.3.1 The area “Visible”

This part of the window includes four buttons which are provided with LED symbols. These buttons are used to activate or deactivate the individual crosshairs. The lit or unlit LEDs shows the current status of the corresponding crosshair. If an LED is unlit, the crosshairs are not activated, i.e. not visible. If the same button is clicked again, the crosshairs will become visible again. This is also indicated by the green LED symbol in this button.

Invisible crosshairs can not be edited and the corresponding selection buttons are not active. If the crosshair currently selected for modification shall be deactivated, the selection will be revoked. In this case no crosshairs are selected.

5.3.2 The area “Single Cross Settings”

This area groups all elements which affect an individual crosshair. To modify it’s setup, a crosshair must be selected by pressing the corresponding radio button inside the frame labeled with “Select:”. The active selection is indicated by an red rhombus. Inside the FKG-1, the selection is represented by changing the shading of the crosshair. To deselect the crosshair, simply click the radio button again. Now none of the crosshairs will be selected.

Note: The shading of the selected crosshairs diverge from the unselected crosshairs. If the shading of the unselected crosshairs (the normal display mode) is dark, than the selected crosshairs are brighter. In the case of bright crosshairs, a darker shading is used to represent the selection.

Apart from the position functions, the line width and height can be changed. Using the counter controls “Lineheight” and “Linewidth”, it is possible to select two different line heights and four different line widths. Positioning is available through the arrow buttons. Each click on these buttons will move the selected crosshair in the corresponding direction. The pitch of the move can be set with the counter “Stepsize”. As default after the application start up, this value is set to the smallest pitch.

The button labeled with a cross symbol is used to move the selected crosshairs to the middle of the screen. With this function, you can quickly return to a basic position.

5.3.3 The area "‘Persistent Camera Settings"’

This area includes functions which affects the whole device, i.e. no crosshairs must have been selected beforehand. With the slider “Brightness” you can set the general brightness of all crosshairs displayed (normal operation mode). Changes are realized while the slider is moved, so that all changes can be instantly monitored on the screen.

The buttons “Save”, “Recall” and “Reset” are of particular importance. With the “Save” button you can save the current settings in the EEPROM of the FKG-1. These settings will then be available next time, when the FKG-1 is powered on. No PC must be connected then.

The “Recall” button is used to undo all manual changes since the last program start or the last saving process. This is effected by reading the values saved in the EEPROM, which are then taken over as new settings. This might be advised, if the user has made unintended changes.

With the “Reset” button you can return to the factory setting as delivered. Because this procedure will cause the deletion of all data stored in the EEPROM, the user will be asked if he really wants to continue. Figure 10 shows the dialog box.

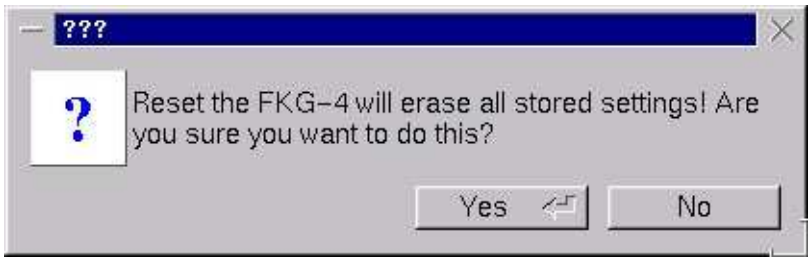

Figure 10: Confirmation of the reset demand.

The user now has got the option to run the reset or to cancel. Click “Yes” to confirm the reset process. All available crosshairs will then be visible and grouped around the middle of the

picture. If you select “No”, the reset process will be cancelled without causing any data loss.

6 Appendix

6.1 Technical Data

video signal:	CCIR/PAL: BAS, FBAS or Y/C possible
horizontal frequency:	15,652 kHz
vertical frequency:	50 Hz interlaced 2:1
signal bandwidth:	> 10 MHz (-1 dB)
supply power:	8 V to 12 V
current consumption:	ca. 80 mA
weight:	ca. 40 g
resolution:	horizontal 785 vertical 585
brightness:	255 levels
line width:	4 values
line height:	2 values

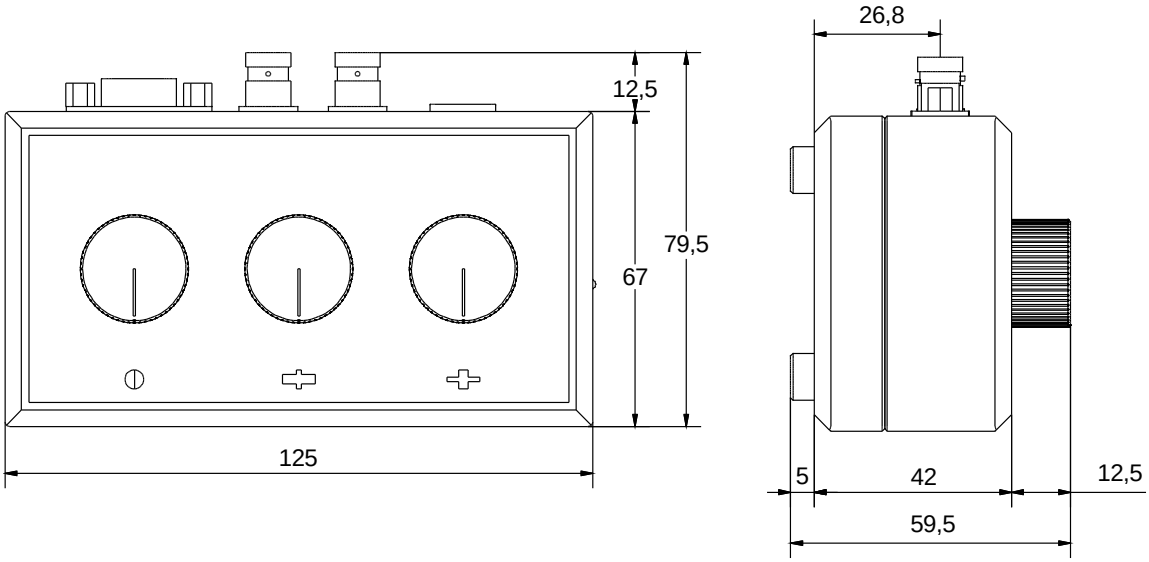

Figure 11: Dimensioning of the case. All values are mm!

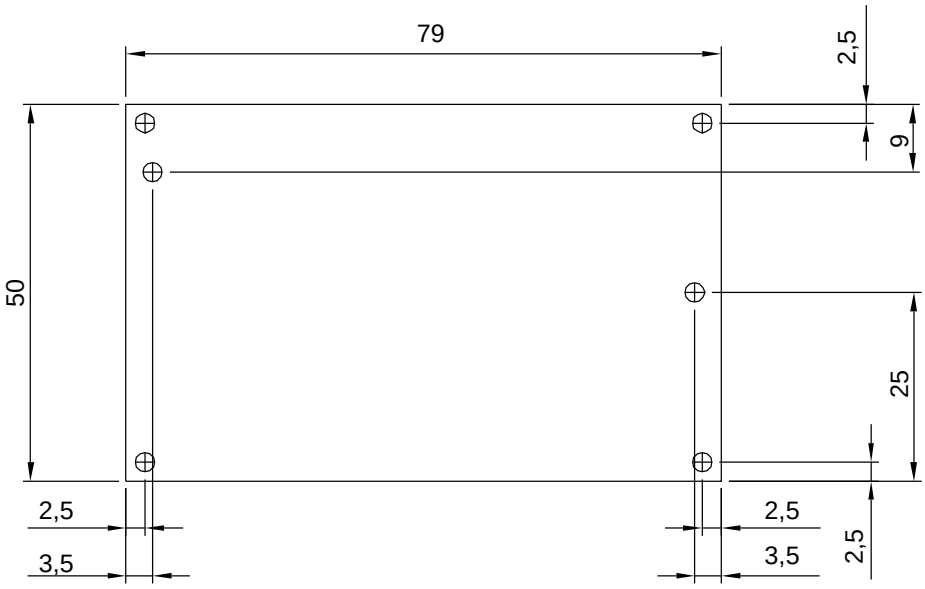

Figure 12: Dimensioning of the printed circuit board. All values are mm!