



**PICOLINK** is a common name for Picowatt's optical fibre connections to the **AVS-47B** Resistance Bridge. It is the safest way to bring remote control of the bridge from noisy environment into the shielded experimental space, where electromagnetic silence can be a prerequisite for reaching very low temperatures. Even if the cryostat is not inside a Faraday cage, the new optional 10-meter length of the opto cable still allows a long physical distance from the computer.

**AVS47-Picolink** is a simple optical link between an AVS-47B and a Windows-PC running LabView. It does not contain any programming, and it is completely transparent in operation.

### OLD PICOLINK

In the past, optical fibre connection was possible *only* between the AVS-47B bridge and the AVS47-IB GPIB interface option. It required installation of transmitter/receiver cards into both units, and therefore the old Picolink was mostly ordered factory-installed in the bridge and in the GPIB option. Later field-installation was possible but not encouraged.

In other words, a fibre link required the GPIB interface box, it was not possible to use directly between an AVS-47B and a computer.

### NEW PICOLINK

**PICOLINK** has been changed to a range of independent products, which can be used to enhance many old and new instrument configurations. Fibre links are now available for a direct bridge-PC connection (AVS47-Picolink) and for the GPIB interface box (AVS47IB-Picolink). The Serial/USB converter is available with or without a fibre link (AVS47-Serial/USB-F and AVS47-Serial/USB-W). Your software programs, that currently use the standard wire cable, will need no modifications. No changes in hardware or jumper settings are neither required.

### AVS47-Picolink

AVS47-Picolink consists of two 130x105x55mm aluminum boxes which are connected together by a 5- or (optionally) 10-meter optical all plastic cable. This cable consists of four 2mm fibres inside a heat shrunk tube. A drill hole of 8mm in the wall is sufficient for bringing this cable into the shielded cryostat room. The cable has no connectors in the ends – the fibres are simply pushed and tightened into the optical transmitters and receivers.

The first one of the two boxes is connected to the AVS-47B by a short wire cable. Box1 is powered by the bridge and contains only an optical receiver/transmitter board without any digital electronics.

Box2 should be located outside the experimental space. It contains another optical receiver/transmitter board. Power is obtained from a regulated +5V wall adapter.

### AVS47-Picolink is for the simplest connection

This model is for direct interfacing between AVS-47B and a PC-type computer running Windows and LabView. Direct interfacing uses a very low-level "Picobus" protocol. Therefore it is supported by freely downloadable LabView VIs ("USB-Picobus"). A **USB-232 adapter lead** is additionally required, if the PC has no physical COM port.

AVS47-Picolink can be used with the GPIB interface option by changing the DE9P/DE9S cable to a DE9P/DB25S cable (type PB9P25S7W1.5M).

## Installation

1. Connect the AVS-47B to Box1 using the 1.5m cable with DB25P and DA15P connectors (cable type PB25P15P6W1.5M). Keep Box1 near to the bridge inside the space to be protected against RF.
2. Connect Box1 to Box2 using the 5- or 10-meter long all plastic optical fibre cable. The cable consists of four fibres, which have been marked with colors black, red, yellow and blue. The optical transmitters (white) and receivers (black) are marked with numbers 1..4. Connect the fibres to *corresponding numbers* of boxes 1 and 2. Recommended use of colors: 1=black, 2=red, 3=yellow and 4=blue.

Push the ends of the fibres into the receivers/transmitters as deep as they go and tighten the screws. Be extremely careful not to tighten the screws too much: they are quite weak and it is more convenient to repeat insertion and tightening than to replace the opto board because of a broken component. **USE ONLY FINGERS!**

The fibre ends can be renewed by cutting a millimeter or two using sharp end cutters, if they seem not to be in good condition.

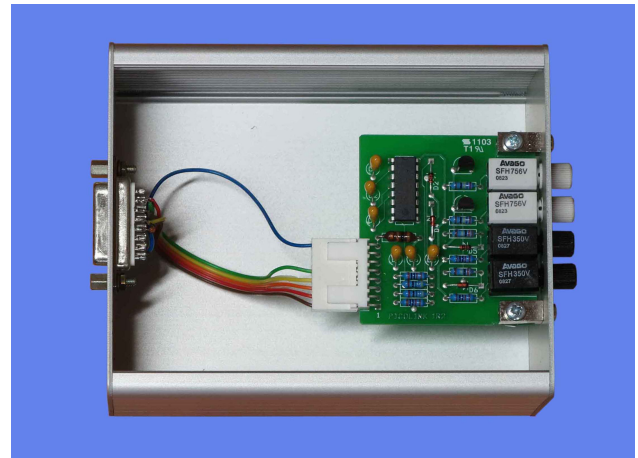
Do not bend the cable too much - bending radius must remain below 20mm.

3. *Case A: Computer has a physical RS232 port.*

Connect Box2 to the RS232 port of your computer using the supplied 1.5m cable with male and female 9-pin D-connectors (cable type PB9P9S7W1.5).

*Case B: Computer has only USB ports.*

You need a *USB-232 adapter* plugged into your computer's USB port and its software installed. Connect Box2 to the USB-232 adapter using the supplied 1.5m DE9P/DE9S cable type PB9P9S7W1.5. The USB-232 adapter from National Instruments (NI part number 778472-01) is known to work well, but it is expensive. Cheaper converters may be available from other manufacturers. Check the compatibility with your



Inside Box1 of the AVS47-Picolink. The cable from the bridge comes to the connector to the left. The circuit card has two transmitters and two receivers of visible light. Box2 has additionally an input for the +5V DC wall adapter.

platform before buying one.

4. Check that the input voltage of the supplied 5V DC wall transformer corresponds to your local mains voltage and that the plug is of correct type. Most of our supplied wall transformers are specified for 100-240 Volts but their plugs differ and it is possible that the plug type does not match your mains socket. If you have to obtain a new wall transformer:

- it must deliver regulated +5 Volts
- the plug must be center positive 2.1mm \* 5.5mm \* 12mm

### Included in AVS47-Picolink order:

AVS47-Picolink Box1 and Box2,  
1.5m cable PB25P15P6W1.5M (bridge - Box1),  
5m Picolink Optical Fibre Cable,  
1.5m cable PB9P9S7W1.5 with DE9P and DE9S connectors (Box2 - computer or USB-232 adapter),  
regulated +5V wall adapter.

### Options:

Picolink cable length increased to 10m  
USB-232 adapter (National Instruments part No. 778472-01). Use for a Windows-PC running LabView.

## CABLE SPECIFICATIONS

The AVS47-Picolink comes with two 1.5m long wire cables, one for connecting the bridge to Box1 and the other for connecting Box2 to a PC computer or to USB-232 adapter. The circuit inside Box1 is grounded to and powered by the bridge, whereas Box2 is grounded to the computer and gets power from a regulated +5V DC wall adapter. The cables cannot be mixed because they have different numbers of connector pins.

### Cable from Bridge to Box1 (PB25P15P6W1.5M)

DB25P	DA15P	Description
1	-	braid grounded at both ends
4	4	CP clock from box to bridge
5	5	DI data from bridge to box
6	6	AL alarm line from bridge to box
7	7	Isolated ground
20	15	DC data from box to bridge
9	9	Isolated +5V (referred to pin 7)
Other pins are unused.		

The male DB25P and male DA15P are connected by a braided (shielded) cable with 6 conductors (e.g. Tasker C6015). Length: 1.5 meters.

Note that the shielding braid must be grounded to the connector shell at both ends. The braid is not connected to pin 7.

### Cable from Box2 to PC or USB-232 Adapter (RS9P9S7W1.5M)

DE9S	RS232	Description
DE9P		
1	-	-
6	DSR	AL for Picobus applications
2	RXD	RS232 output box=>computer
7	RTS	CP for Picobus applications
3	TXD	RS232 input computer=>box
8	CTS	DI for Picobus applications
4	DTR	DC for Picobus applications
9	-	-
5		Computer ground = shielding braid

The male DE9P and female DE9S are connected by a braided 1:1 cable of 6 conductors (e.g. Tasker C6015). Length: 1.5 meters.

Shielding braid is connected, in addition to pins 5, also to **both** connector shells.

## AVS47-PICOLINK TROUBLE SHOOTING IDEAS

Operation of the **USB-Picobus** LabView programs is exactly the same regardless of whether connection to the bridge is made via a wire cable or via Picolink optical fibres. How to use those programs is instructed in the USB-Picobus User Guide.

If, however, the programs do not work, you can try to locate the problem with the following procedure. If you get results that differ from what is described below, please contact us via e-mail for more advice. It is of no use to continue the test after the first error.

- 1) Remove the AVS47-Picolink and use the original Picobus Cable that was supplied with the AVS-47B. If communication still fails, the problem cannot be in AVS47-Picolink. Check that the port number used by the LV programs is correct - if not, use the "Manage Configuration File.vi" for changing the default VISA resource (=COM: number). This information is stored in the con-

figuration file, which many VIs read at start.

- 2) Remove the wire cable, if it works, and connect Box1 to the bridge. Connect the opto cable to Box1 but **not** to Box2. Turn on the bridge. Fibre #4 should light.
- 3) Connect power to Box2 from the 5V DC wall adapter. None of the optos should light.
- 4) Connect Box2 to your LabView computer directly (if it has an RS232 port) or via a USB-232 adapter (if you have only USB ports). Use cable RS9P9S7W1.5M with male and female DE9 connectors.
- 5) Load the program “Avs47ave.vi” from the USB-Picobus package. Check the port number. Start the program. The “AL ERROR” indicator should light and the reading should be zero.
- 6) Insert fibre #4 into Box2 and tighten. The “AL ERROR” light should blank. Reading remains at zero.
- 7) Look at optos #1 and #2. Both should show some fast blinking when the computer tries to send data to the the bridge.
- 8) Insert fibres #1 and #2 into the white optos. The bridge is now receiving commands from the computer and you can test this by selecting remote mode and changing some settings. The yellow indicator on the AVS-47B front panel should light while you are in remote. The reading should stay at zero. Select local mode.
- 9) View fibre #3. It should show some blinking as the bridge tries to send data to the PC.
- 10) Set the bridge to 200 $\Omega$  range, 3mV excitation and ADJ REF display. Turn the front panel potentiometer so that the reading is not zero.
- 11) Insert fibre #3. The program should now show the selected range, excitation and value displayed correctly by the bridge.

IF THIS TEST ENDED UP SUCCESFULLY, EVERYTHING SEEMS TO WORK!