



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 possibly noisy GPIB bus.

AVS47IB-Picolink is a simple optical link between an AVS-47B and the Model **AVS47-IB Computer Interface**. It does not contain any programming, and it is completely transparent in operation.

OLD PICOLINK

In the past, Picolink was available only between AVS-47B and AVS47-IB, whereas now two other configurations are also possible. The old Picolink required installation of transmitter/receiver cards into both the bridge and the interface, and therefore it was mostly ordered as a factory-installed option. Later field-installation was possible but not encouraged.

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 or AVS47-Serial/USB-W, respectively). Your software programs, that currently use the standard wire cable, will need no modifications. No changes in hardware or jumper settings are neither required.

AVS47IB-Picolink

AVS47IB-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, which would need a bigger hole – 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 1.5m wire cable. Box1 is powered by the bridge and contains only an optical receiver/transmitter board without any digital electronics.

Box2 is connected to the AVS47-IB GPIB Interface. It should be located outside the experimental space. Box2 contains also an optical receiver/transmitter board. Power is obtained from a regulated +5V wall adapter.

The *AVS47-Picolink* can be used also with the GPIB interface option by changing the DE9S sub-D socket to DB25P or by building or by purchasing cable PB9P25S7W1.5M.

Installation

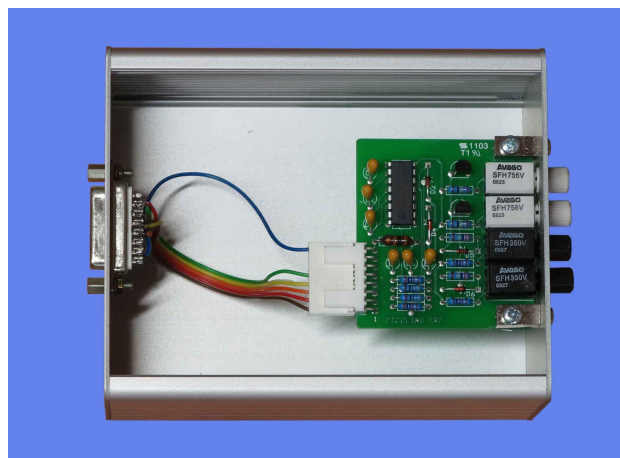
1. Connect the AVS-47B to Box1 by using the cable with DB25P and DA15P connectors (type PB25P25S5W5M). Keep Box1 near to the bridge inside the space to be protected against RF.
2. Connect Box1 and Box2 together. The 5- or 10-meter all-plastic optical cable consists of four fibres, which have been marked 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. Connect Box2 to the AVS47-IB unit by using cable with a male 9-pin and female 25-pin connectors (type PB9P25S7W1.5M). Keep Box2 and its power supply outside the space to be protected against RF.
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



Inside Box1 of the AVS47IB-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.

Included in AVS47IB-Picolink order:

AVS47IB-Picolink Box1 and Box2,
1.5m cable PB25P15P6W1.5M (bridge - Box1),
5m Picolink Optical Fibre Cable,
1.5m cable PB9P25S7W1.5 with DE9P and DB25S connectors (Box2 -AVS47-IB Interface Unit),
regulated +5V wall adapter.

Options:

Picolink cable length increased to 10m

CABLE SPECIFICATIONS

The AVS47IB-Picolink comes with two 1.5m long wire cables, one for connecting the bridge to Box1 and the other for connecting Box2 to the AVS47-IB GPIB Interface unit. The circuit inside Box1 is grounded to and powered by the bridge, whereas Box2 is grounded to the interface unit 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 (also to both shells)
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 connected to pin 1/DB25P and to connector shells at both ends. The braid is not connected to pins 7 - these pins are the isolated ground.

Cable from Box2 to AVS47-IB (PB9P25S7W1.5M)

DE9P	DB25S	Description
-	-	-
2	3	RxD (=> PC, reserved, not used)
3	2	TxD (<=PC, reserved, not used)
4	20	DC (data from IB box)
5	1&7	braid=gnd is used for this sig.
6	6	AL (al line from AVS)
7	4	CP (clock from IB box)
8	5	DI (data from AVS)
9	-	-

The male DE9P and female DB25S are connected by a braided cable with 6 conductors (e.g. Tasker C6015). Length: 1.5 meters.

The braid from pin 5/DE9P is divided in parts that go to pins 1 and 7 /DB25S. The braid is also connected to the bodies of both connector shells.

WARRANTY

Picowatt warrants the **AVS47IB-Picolink** to be free from defects in materials and workmanship. Our liability under this warranty is limited to repairing or replacing any instrument or part thereof which, within three (3) years after the shipment to the original purchaser, proves defective. This warranty is void if the instrument has not been used according to the instruction manual, or if it has been used under exceptional environmental conditions.

In need of warranty repair, contact Picowatt for detailed shipping instructions. We can possibly suggest simple tests or component replacements so that unnecessary shipments may be avoided.

The name, address and e-mail address of a person who is able to give supplementary information should be included whenever possible. If the repair was covered by warranty, **Picowatt** will return the instrument on our cost using an economical shipping method.

If no fault is found, or if there is a strong indication that the warranty is void, the purchaser is charged for the return freight and costs in addition to the repair.

AVS47IB-Picolink is designed only for optically isolated communication between AVS-47B Resistance Bridge and the **AVS47-IB Computer Interface**. Use for another purpose will void the warranty.

AVS47IB-PICOLINK TROUBLE SHOOTING IDEAS

Operation of the **AVS47-IB Computer Interface** is exactly the same regardless of whether connection to the bridge is made via a wire cable or via optical fibres. Refer to the AVS47-IB User Guide for how to use the interface and its commands. If, however, the interface does not work after you have installed the optical fibre link, 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.

Before starting to suspect the optical link, verify that the AVS47-IB works with the original wire cable. Such a cable (PB25P25S5W5M) was included in the AVS-47B shipment, or in the AVS47-IB shipment, if it was purchased alone.

The interface box should not be powered in the beginning, but connect it to the computer via GPIB. You need a computer program for sending and reading via the bus. If you have LabView, use Measurement & Automation Explorer's "Communicate with the instrument".

The CPU in the AVS47-IB (later just "GPIB box") is not as fast as today's computers. Therefore you must take care, that you don't try to read before a response is available in the output queue. If you try to read too early, the bus may hang until timeout, and the response may remain unread in the output of the GPIB box. Instead of using a QUERY for sending a query message like "AVE10?", first WRITE "AVE10?" and then READ.

- 1) Remove the wire cable with 25-way connectors. It is no longer needed.
- 2) Connect the bridge to Box1 by the 1.5m cable with DB25P and DE9P connectors (PB25P15P6W1.5M) Connect fibres 1-4 of the opto cable to Box1, **but not to Box2**. Turn on the bridge. Fibre #4 should light. This indicates that the AL signal from bridge is converted to light.

- 3) Connect power to Box2 from the +5V DC wall adapter. None of the optos should light yet.
- 4) Connect Box2 to the AVS47-IB interface box the 1.5m long cable PB9P25S7W1.5M (it has a 9 pin male and a 25 pin female connector).
- 5) Start the interface by plugging in the mains power cord. Opto #2 of Box2 should blink three times and finally stay on lighted. Data from the GPIB box (DC) is converted to light.
- 6) Write "DFS" from the computer to the GPIB box. Nothing should happen. The interface tries to take readings for its digital filter, but it fails as no AL signal is available.
- 7) Insert fibre #4 into Box2 and tighten. In addition to #2, also opto #1 should now show activity. The AL signal from bridge is received by the GPIB box. The clock signal from the GPIB box is converted to light.
- 8) Insert and tighten fibres #1 and 2 into Box2. The bridge should now get clock and data signals. If fibre #3 now shows activity, it tells that the bridge responds to the digital filter's requests. Insert and tighten also fibre #3.
- 9) Write "STP" for stopping the digital filter. Write "REM1" for enabling remote control. The yellow REMOTE light on the AVS front panel should light.
- 10) Write "INP2;RAN3;EXC7;DIS2" . The bridge should assume CAL, 200Ω, 3mV and display=ADJ REF.
- 11) Write "AVE10". The READY light should blink 10-11 times. Write "AVE?" and read. The reading should correspond to AVS front panel display.

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