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PPC-1000

Wireless 1 Gigabit Bridge

Technical Description and Operation Manual



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1 of 29

User Manual

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This publication has been prepared for professional and properly trained personnel, and the customer assumes full responsibility when using the information herein.

Revision History

Issue	Date	Main changes
1.0	17/02/06	First release

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Product Compatibility

While every effort has been made to verify operation of this product with many different communications products and networks, Elva-1 Millimeter Wave Division makes no claim of compatibility between its products and other vendors' equipment. It is assumed that users have thoroughly evaluated this product's performance in the communications environment in which it will be used.

Safety and usability

ATTENTION, CAUTION, WARNING, and DANGER statements have been placed in the text to catch attention of the personnel to important information and alert them of possible hazards. These statements must be closely observed.

ATTENTION!

Indicates important information to be considered when operating PPC-100 link and its modification.

DANGER!

Indicates that personal injury can result if the user does not comply with the given instruction. A DANGER statement will describe the potential hazard, its possible consequences, and the steps to perform to avoid personal injury.

WARNING!

Indicates that serious damage to the equipment can result if the user does not comply with the given instruction. A WARNING statement will describe the potential hazard, its possible consequences, and the steps to perform to avoid serious equipment damage.

CAUTION!

Indicates that equipment damage, process failure, and/or loss of data can result if the user does not comply with the given instruction. A CAUTION statement will describe the potential hazard, its possible consequences, and the steps to perform to avoid equipment damage, process failure, and/or loss of data.

The following general safety precautions must be observed during all phases of operation and service of the products covered in this manual. Failure to comply with these precautions or with specific warnings elsewhere in this manual willfully violates standards of design, manufacture, and intended use of the product. Elva-1 Millimeter Wave Division assumes no liability for the customer's failure to comply with these requirements.

- Do not operate wireless equipment without an appropriate termination
- Do not work directly in front of an energized antenna. Prior to working on the antenna or RF assembly, ensure that the RF assembly is not radiating energy. When power is applied to the RF assembly and antenna, proper precautions must be taken to avoid placing any part of the human body in front of the antenna.
- The outdoor equipment must be properly grounded to provide protection against voltage surges and built-up static charges. In the event of a short circuit, grounding reduces the risk of electrical shock.

For installations in the USA, refer to Articles 810830 of the National Electrical Code, ANSI/NFPA #70, for information with respect to proper grounding and applicable lightning protection for DC cables.

For installations in all other countries, implement protection in accordance with the safety standards and regulatory requirements of the country where the equipment is to be installed.

- Do not install or operate this equipment in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
- Do not install substitute parts or perform any unauthorized modification to the equipment. Changes or modifications not expressly approved by Elva-1 Millimeter Wave Division void the Elva-1 Millimeter Wave Division Warranty on the equipment.

Equipment Precautions

CAUTION!

This product is designed to withstand moisture conditions typically encountered when installed outdoors. This is not designed for operation under water.

This product is not designed to withstand direct thunderbolt. It should be operated only under protection of external lightning rod.

This product should be operated only from the type of power source indicated on the unit or in manual.

1 Introduction

1.1 Purpose of Manual

The information in this manual is directed to persons who must perform or coordinate the tasks associated with the process of installing wireless communication devices, and planning communication network applications.

1.2 Prior Knowledge

This manual assumes the operator has at least basic experience with and understanding of the concepts underlying telecommunications systems, as well as some familiarity with configuring and operating networking equipment. Preferably, the installer/operator fully understands the information covered in this manual prior to attempting these procedures.

While this manual summarizes the considerations and tasks involved in path analysis and site planning for radio systems, it does not provide an in-depth treatment of such issues. A professional agency specializing in this area should be consulted for additional information and services of this type.

1.3 Contact information

Elva-1 Millimeter Wave Division distributors are authorized local service providers and are responsible for immediate customer support. If problems are not resolved, contact Elva-1 Millimeter Wave Division Customer Service for assistance:

ELVA-1 Millimeter Wave Division

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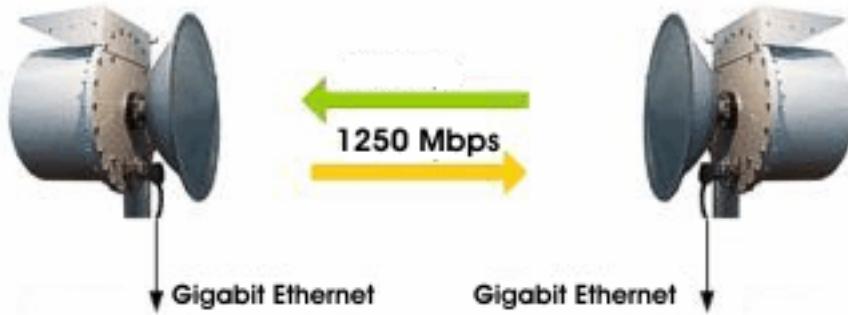
Email: support@elva-1.com

2 Product Description

Wireless Bridge PPC-1000 is intended for full duplex 1Gigabit communication between two remote points. It is composed of two subscriber transceivers which are operated within line-of-sight conditions at working frequencies within mm-wave range.

Two different central frequencies are used for the duplex operation. One Radio (High) transmits data at a frequency of upper part of the frequency range and the second one (Low) uses a frequency from the lower part. The label on the radio indicates whether it is a High-band (HI index in the end of serial #) or Low-band one (LO index in the end of serial #).

Thus, PPC-1000 provides 1.25Gbps capacity in each way.



Each Radio is "all outdoor" unit. The only things operator to do for installation are to mount both radios on vertical pipes, connect them to data cables and power, ground them, and point one radio to another one.

As both Radios operates in a full duplex mode, they should be connected to an equipment, operating in a full duplex mode.

3 Site planning

3.1 General

Before the start of an installation a survey should be conducted of the proposed area of the site(s). The survey personnel should be familiar with the details required to install the radio system.

3.2 Equipment Checklist

The survey team may need the following equipment:

- Binoculars or spyglass
- Range-finder or GPS Navigation Device (to determine the exact link distance)
- Mobile phones or walkie-talkie radios

3.3 Line of Sight (LOS)

The mm-wave wireless link requires Line-of-Sight for proper operation. It implies that no obstacles like trees, buildings, chimneys have to be between the station sites. Moreover, no obstacles should be situated in the vicinity of the signal propagation line (inside the first Fresnel region).

Because the link distances are usually within 10 km so obstructions in the path can easily be identified using binoculars.

The planning should include an investigation into future building plans that could block the LOS path, and other long-term incremental obstructions such as growing trees. Intermittent but regular obstructions such as flying aircrafts at a nearby airport should also be considered.

It is required to have absolutely no obstructions in front of the antenna in so called first Fresnel zone. The minimum required clearance from obstacles is 60% of the first Fresnel zone. Fresnel zones are a series of concentric ellipsoid areas surrounding the straight-line path between two antennas. The first Fresnel zone is the area containing every point of which the distance from the transmitter to any reflection point on the area and on to the receiver is half a wavelength longer than the path of the direct signal. The radius of the Fresnel zone is greatest at midpoint in the signal path.

Minimum Clearance for various bands is listed below (in meters):

Path Length (km)	Minimum Clearance (meters)			
	Q-band 40.5-43.5 GHz	V-band 57-64 GHz	E-band 71-76/ 81-86 GHz	W-band 92-95 GHz
1 km	1,4 m	1,1 m	1,0 m	0,9 m
2 km	2,0 m	1,6 m	1,4 m	1,2 m
5 km	3,2 m	2,5 m	2,3 m	1,9 m
10 km	4,5 m	3,5 m	3,1 m	2,7 m

4 Installation

4.1 General

It is recommended that installation personnel read this section in its entirety prior to installing the System. During a particular phase of installation, the user may refer directly to the applicable subsection.

4.2 Equipment Unpacking

The radio system equipment will arrive in two to four wooden boxes depending on antenna diameter. For small antennas it's usually 2 boxes in the shipping —one box for the low band radio and one box for the high band radio. It is recommended that the shipping boxes and packing materials be retained in the event that it is necessary to return equipment.

Open the top cover of the box, and take out the antenna first (for small antennas link only). Large antennas come in separate boxes and have to be unpacked accordingly.

The radio case with alignment mechanics and cable pack is fastened to a wooden plate within the shipping box to prevent damage during transportation. When unpacking the radio, remove metallic straps, and then take the radio out of the box, lifting the right side first (see photos below).



Unscrew the shipping bolts and detach the wooden plate to fully unpack the radio case.

The paper boxes with accessories are fastened to a bottom of the shipping box. Remove their shipping straps and take out the boxes with accessories.

4.3 Equipment Inventory

Each box is accompanied by a packing list. Verify the contents of the box against the packing list. Following are inventory lists for a typical system (30 cm antennas).

Each STM-1 Radio is completed in:

<i>Description</i>	<i>Qty</i>
1 Radio case	1
2 Antenna (packed with the radio case only for diameter 30 cm and smaller size one)	1
3 Outdoor cross-box (to connect radio to stationary wiring)	1
4 Cable to connect power supply unit to Indoor cross-box	1
5 Indoor cross-box (to connect power supply unit to stationary wiring)	1
6 TP/Power cable to connect Radio to Outdoor cross-box	1
7 Grounding wire	1
8 Hose clip, 50-70 mm	1
9 Power cord to power supply unit	1
10 Tuning panel	1
11 Power supply unit	1
12 Ethernet connector boxes for SNMP twisted pair cable (one box to be installed into Outdoor cross-box, second one – somewhere indoor to connect SNMP cable to office Ethernet LAN)	2
13 Terminal block to be installed into Outdoor and Indoor cross-box	2
14 Complete set of 5 bolts, nuts, washers and tightening washers to replace shipping bolts	1
15 Complete set of grounding bolt, nuts, washers, contact strips and tightening washer to replace shipping bolt	1
16 * Optical cable patch (optional, to test the link indoor)	1
17 Wrench 8 mm & 17 mm	2
18 * Media converter (optional, to convert STM-1 to Fast Ethernet)	1
*) The item is supplied on demand only	



4.4 Alignment Tools

The following tools should be on hand when running the alignment of the radio system:

- Wrench 8 mm & 17 mm (item 17)
- Hose clip, 50-70 mm (item 8)

4.5 Equipment assembling

Both radios equipped with 6¹ long shipping bolts (see photos from part 4.2 Equipment Unpacking).

Replace the shipping bolt placed near the "Ground" mark with a set #15, observing the items order. The Radio flanges should be placed between contact strips. Connect the grounding wire to the bolt as shown on the photo.

Replace the rest 5 shipping bolts with bolts, nuts, washers and tightening washers (set #14).



¹ The exact number of the bolts used for shipping purpose may differ.

4.6 Diam. 60 cm antennas assembling

60 cm antennas come in separate box. To assemble antennas, do the following:

- Set included joint scaling strip into the flange seal groove
- Remove top covers from antenna and the Radio flanges
- Match antenna and radio flanges, according to waveguide orientation
- Fix an antenna on the radio with 6 bolts, washers and tightening washers, included in the complete set

CAUTION!

Fixing 60 cm antennas, observe waveguide orientation, paying attention that wave-guide-fed slot orientation on antenna matches the orientation of the waveguide on radio case. Otherwise the Bridge will not operate properly.

CAUTION!

During antenna assembling, take precautions against ingress of dirt, dust and moisture into antenna and Radio waveguides.

4.7 Radio on-table testing after unpacking (optional)

After the unpacking and antenna assembling of the radios, you could test the radios on-table before installing them at their principal location (mast; tower; roof of the building). This is an optional operation but after the test you will be sure that radios works OK and there are no malfunction because of the damage during transportation. The test includes only parameter diagnostics. The main data communication channel will not be tested at this moment.

You will need a stand-alone notebook or desktop PC with installed LAN card to display test results through SNMP. The following software has to be installed at this computer:

1. Moxa NE SDK Manager
2. ELVA PPC Monitor

The Moxa NE SDK Manager is third-party software which you can use in accordance with End User License. You are provided with your copy of this software because of partnership between ELVA-1 and Moxa.

ELVA PPC Monitor is ELVA-developed SNMP monitor apps.

Please do not distribute these software applications outside your organization without written permission of ELVA-1.

You can download both software apps from the following location

http://www.elva-1.com/download/PPC/NE_Cdrom.zip (8M)

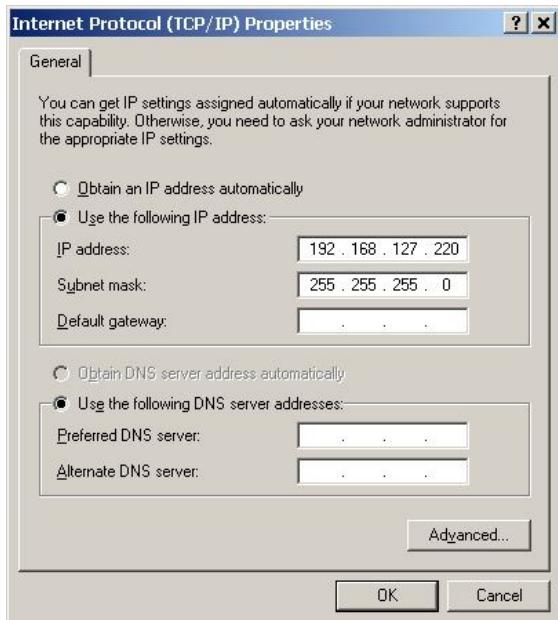
<http://www.elva-1.com/download/PPC/PPC.zip> (150K)

By default, both radios have the same IP-address: 192.168.127.254

- Click *Network Connection – Properties – IP protocol – Properties* on your stand-alone computer to set up a temporal IP address for this computer from the same subnet as radio default IP address.

It's doesn't matter the actual IP address number you choose, the only important thing is to choose the IP address from the same subnet and differ from IP address, allocated for radios by default. It could be someone from this range: 192.168.127.0-253. For example, 192.168.127.220.

Use the default subnet mask 255.255.255.0.

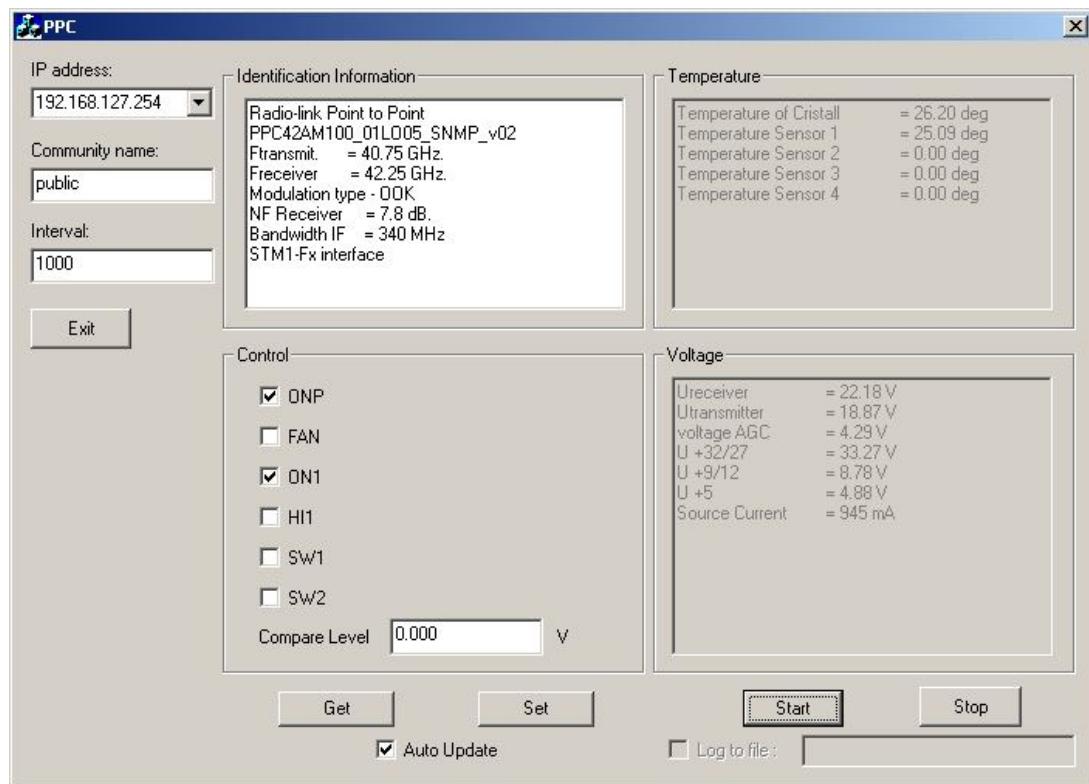


- Connect SNMP cable (item #6 from inventory) to radio one end, and to Power supply (item #11) and RJ-45 LANcard socket of the computer other end (see photo below). Use "straight" UTP cable extension cord, if needed.



- Switch the power supply of the radio ON and test connection between radio and your computer with Windows PING application (click *Start – Run*, then type *Ping 192.168.127.254*).
- Run *PPC Monitor* application your computer. Then click *START* and *GET* buttons.
- You have to get a reply from the transceiver, similar to the following one.

- Check Identification window, you will see detailed info about allocated frequencies and bandwidth (these parameters are factory preset, cannot be adjusted by customer).



If you see reply which is similar to illustrated above one, your radio works OK. The detailed explanation of PPC Monitor displayed parameters you will find below in "7. Installing and running SNMP software" chapter.

After this optional on-table testing of the reply from transceivers you can continue with radio mounting.

4.8 Radio mounting

The station should be fastened on a vertical tube of 40..80 mm diameter and not less than 500 mm height.

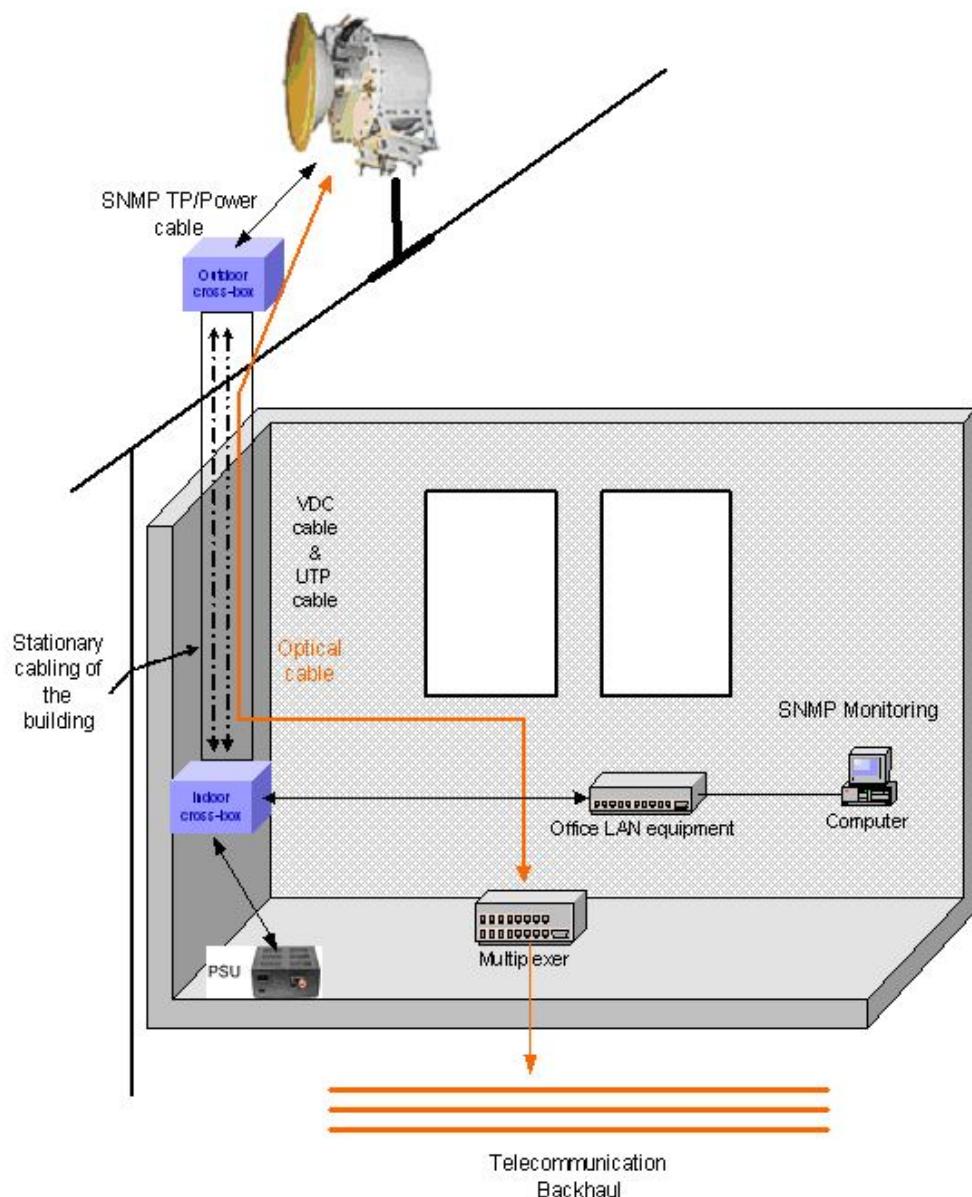
Bending and torsion rigidity of the support leg has to be enough to prevent angular swing of the antenna in both the azimuth and elevation

Use the hose clip #8 to prevent the Radio from shipping down when run the alignment of the radio.



Connections

Total communication chart looks like this. Detailed instructions are given below.



WARNING!

To avoid EMI noise, when installing the radios, the power supply and data transmission cables have to be laid away of building power cables.

4.9 Stationary Cabling

- Fix Outdoor cross-box near the Radio (for example, on the same supporting leg)
- Select indoor location, with easy cable routing to the radio, for the Indoor Cross box. Normally it is convenient to place it near the network termination equipment and the main. Fix Indoor cross-box.
- Install the stationary DC power cable from the Outdoor Cross-box to Indoor one.

CAUTION!

The normal PSU output voltage is 54 VDC. The voltage in DC cable at the point of Outdoor Cross-box end because of voltdrop should be not less than 48 VDC .

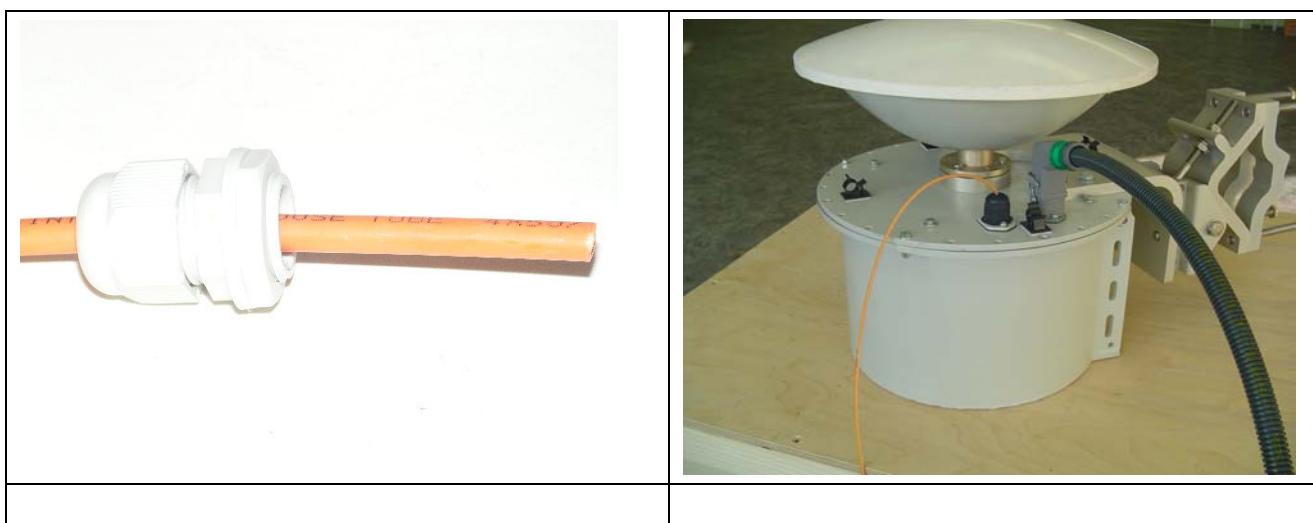
- Install a 4-pair Twisted Pair cat.5 cable from the Outdoor to Indoor Cross-box

CAUTION!

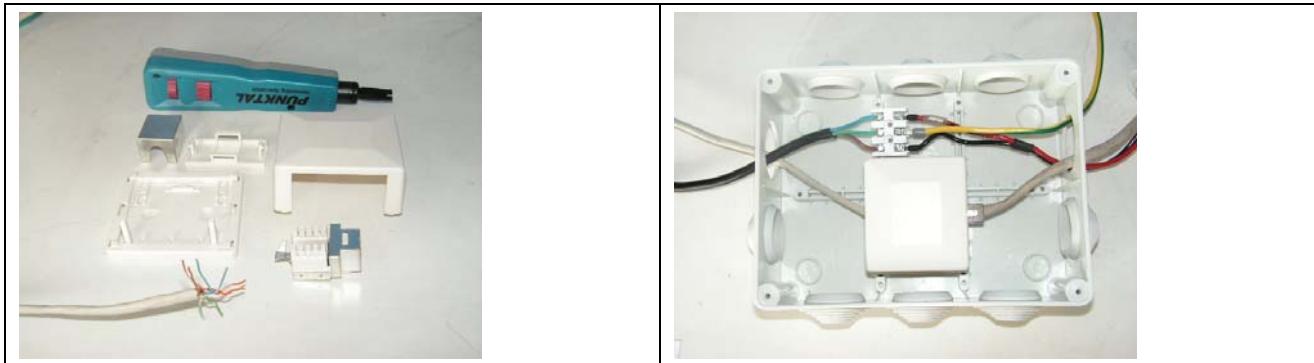
Be sure that the UTP cable length is less than 100 m

- Install fiber optics cable from indoor host equipment directly to the radio. It is recommended not to have any cross-connection in this cable between radio and indoor host equipment. The optics cable welding equipment will require at this step.

1. Open optical connection box at radio case using screwdriver with star bit.
2. Put one of gland (item #18) on fiber optics cable.
3. Insert cable into optical connection box at radio case and weld optical connector.
4. Insert optical connectors to relevant socket at the adapter in optical connection box.
5. Close optical connection box using screwdriver with star bit .

**4.10 Outdoor cross-end connections and Grounding**

- Connect the stationary TP cable to Outdoor cross-box with Ethernet connector (to 110 type connector), special push tool may required (not included to the shipment, it's very common tool and can be obtained at your network administration department).
- Connect stationary DC cable to outdoor cross-box with terminal block.
- Connect TP/Power cable (#6) to Outdoor cross-box RJ45 and power connectors.
- Connect grounding cable (#7) to outdoor cross-box with terminal block. Instead of connection to the outdoor box, it's allowed to connect grounding cable to a nearest grounding point at the roof, if such connection available. The grounding cable at radio side has to be connected to earth connector, marked with the earth symbol (bolt M5, see photo on page 12).



- Plug TP/Power cable (#6) to the Tuning panel and the TP/Power cable from Tuning panel – to the relevant connector on radio case. Using Tuning Panel as intermediate device between Outdoor cross-box and radio is required for alignment purpose only. After completing of alignment procedure, the TP/Power cable from Outdoor cross-box has to be connected to relevant connector at radio case.



WARNING!

Grounding of both Radios is a mandatory requirement

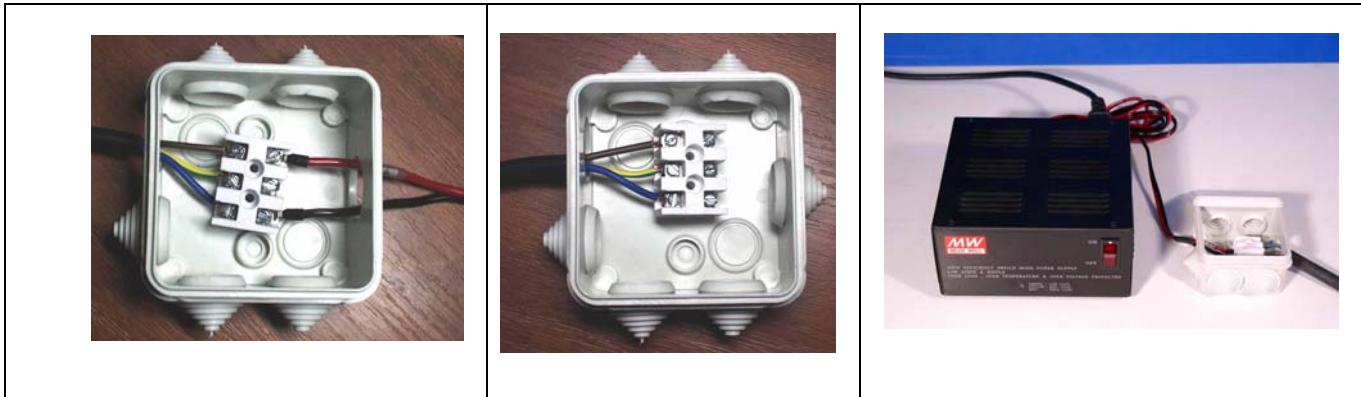
DANGER!

This product is not designed to withstand direct thunderbolt. It should be operated only under protection of external lightning rod.

4.11 Power connection indoor

- Connect stationary DC cable to Indoor cross-box with terminal block

- Connect cable #5 to Indoor cross-box with terminal block
- Connect Power supply unit to Indoor cross-box with cable #4.



4.12 Connection to Network Equipment indoor for SNMP administration

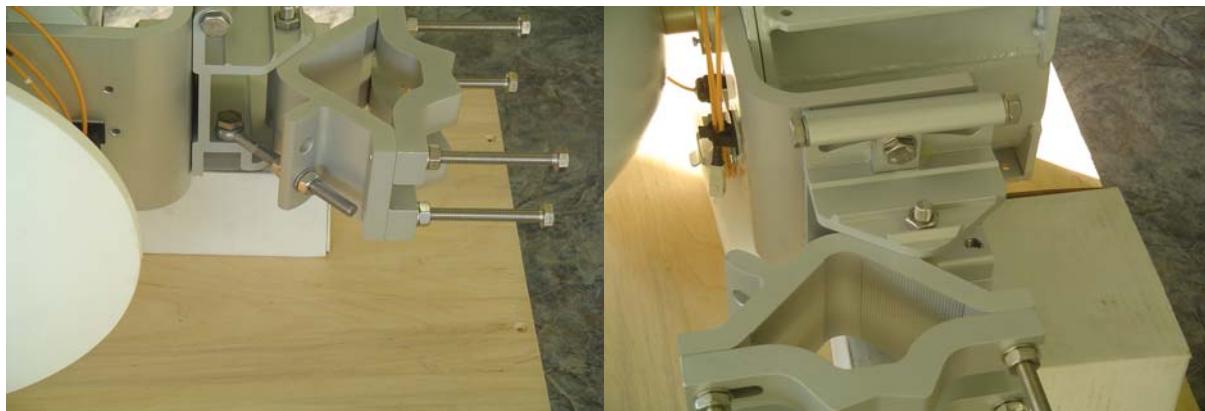
- Connect Ethernet connection box #12 to the stationary TP cable in much the same way as for outdoor TP connection
- Plug-in UTP cable from office LAN equipment to indoor Ethernet connection. With the link power switched on, and installed SNMP software you can use link SNMP administration from one of the office PC.

5 Station alignment

Before the alignment procedure:

- Tighten 4 mounting bolts just enough to allow radio to pivot up/down and right/left with minimal effort.
- Tilt the radio so that it is roughly point towards the other end of the link
- Fix the mounting bolts again

5.1 Preliminary Alignment



- Using the bolt "Horizontal", direct the Radio to the other end of the link in horizontal plane more precisely
- Using the bolt "Vertical" (top), direct the Radio to the other end of the link in vertical plane

5.2 Precise Alignment

Precise alignment should be performed at fair weather and good visibility. For precise alignment it's recommended to have people at each point of the link. The two-way communication like mobile phones or walkie-talkie radios required to coordinate their efforts.

The precise alignment is carried out after both the stations have been installed, connected to the power supply source and tuning panel.

Precise aligning is carrying out according to AGC (Automatic Gain Control) level of the station under alignment. To measure AGC do the following:

- Have all cables connected and power switched on, with Tuning panel #10 inserted between cable #6 and Radio (see photo below).

ATTENTION!

Check the color of Power supply LED when using the link in transmitting/receiving mode. The normal LED color has to be YELLOW. Green LED – no load, Red LED – overload.

- Push Tuning panel button until it shows AGC level (the value marked with A symbol). There are 5 indications at Tunning panel:
 - A = AGC
 - C = Temperature at controller inside radio case
 - c = General temperature inside radio case
 - U = Tx voltage
 - u = Rx voltage



An antenna pattern has mainlobe and at least two sidelobes (first harmonic sidelobes). The big antennas (60 cm) could have more sidelobes (second and third harmonics), but their intensity are very small.

In 3D projection the mainlobe and sidelobes are like two cones, one inserted to another. Your goal is to align both antennas for mainlobes.

How to be sure you get to mainlobe, not to sidelobes? First check the AGC voltage at Tuning panel and compare with value, provided at Passport of the radio for your distance. These AGC voltage values in Passport are provided for mainlobe. You need to know exact distance between two radios of the link. Use GPS navigator or range-finder to calculate exact distance of the link path.

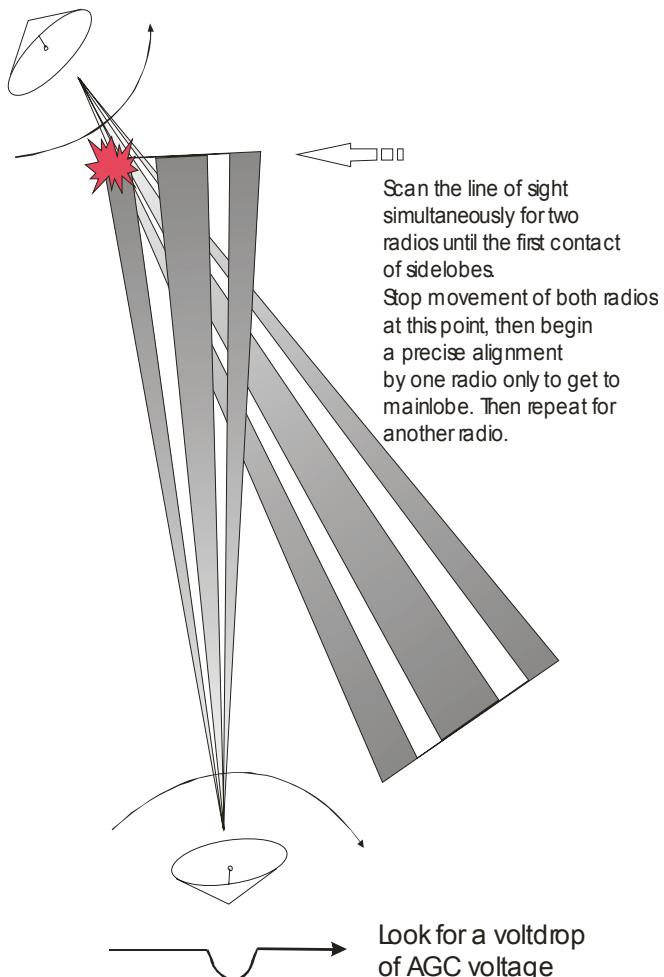
For mainlobe, the AGC voltage at Tuning panel has to be closely to the value in Passport for such distance. For sidelobe, the AGC voltage at Tuning panel will differ (will be higher) compare to the value in Passport for such distance for a value of about 1 Volt.

Second, as result of the successful alignment you have three minimums of AGC voltage when scan the line of sight horizontally (see schemas below). If you have only two minimums, it means you missed the mainlobe.

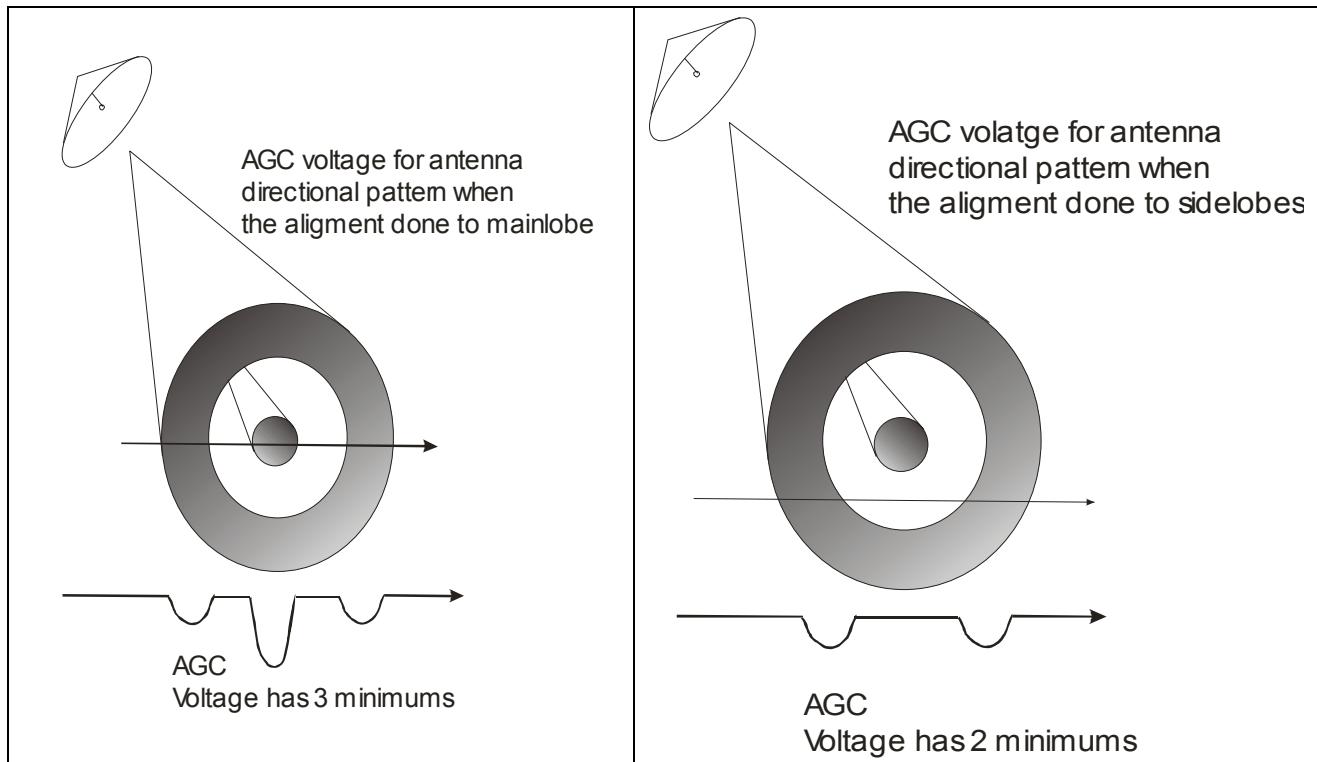
The alignment procedure is as following:

1. Start slowly moving both radios within a line of sight, trying to get a first contact of at least sidelobes.

Pay attention to AGC voltage, and look for a voltdrop.



- When got a voltdrop of AGC voltage, immediately stop moving of both radios (say "STOP" to your partner, working at another radio).
- Have another radio static; very slowly scan your radio horizontally closely to the point of first contact.
- Check how many voltdrops you will get when do scanning horizontally. If this will be 3 minimums, the central one is mainlobe. If you got only two minimums, it means you missed the mainlobe. Try to stop the antenna horizontally at center of the virtual arc between two AGC voltage minimums, then slowly scan the antenna vertically to find mainlobe.



- Do the same procedures (vertical and horizontal alignment) at another Radio (on other side of the link).
- Having the alignment completed, tighten internal nuts and external bolts of the adjusting plate. Remove the Tuning panel, plug the cable #6 into the Radio.
- Test the quality of the data transmission via the radio-channel.

CAUTION!

The alignment can be considered as completed if the AGC voltages on both the stations **agree with values for the given distance, mentioned in the Passport.**

CAUTION!

AGC voltage instability or/and no expressed maximum of the received signal indicate substantial reflections within the directional diagrams of the transceivers. In turn, this implies existence of obstacles in the vicinity of the signal propagation line. In such a case you advised to change the location of the radios.

6 Installing and using SNMP software

Each of the PPC-100 links is shipped as SNMP enabled and could be monitored online. The SNMP feature is optional, it does not directly affect to link ability to transmit and receive data through main channel. Without SNMP enabled, the link will still work, likely as unmonitored piece of cable.

To use SNMP monitoring, you have to install two software applications

1. Moxa NE SDK Manager
2. ELVA PPC Monitor

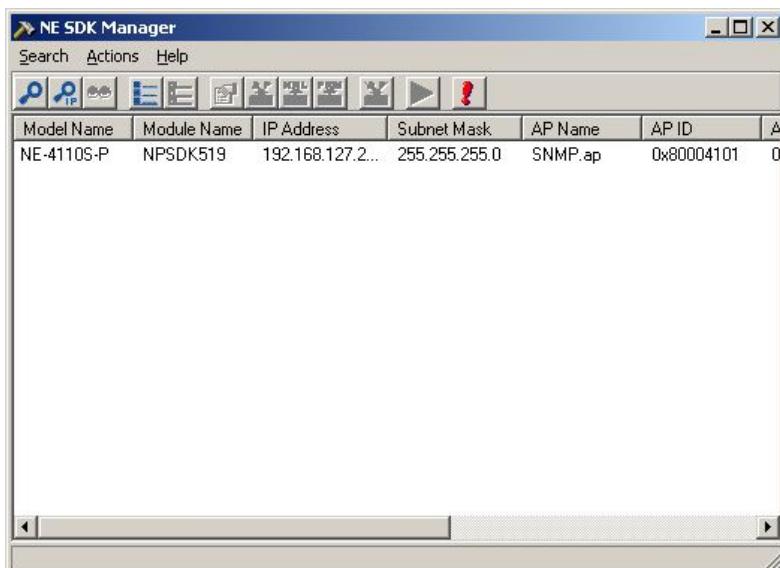
Each radios contains built-in MOXA switch IC. To manage switch IP address, you need to use this software. The Moxa NE SDK Manager is third-party software which you can use in accordance with End User License. You are provided with your copy of this software because of partnership between ELVA-1 and Moxa.

ELVA PPC Monitor is ELVA-developed SNMP monitor apps.

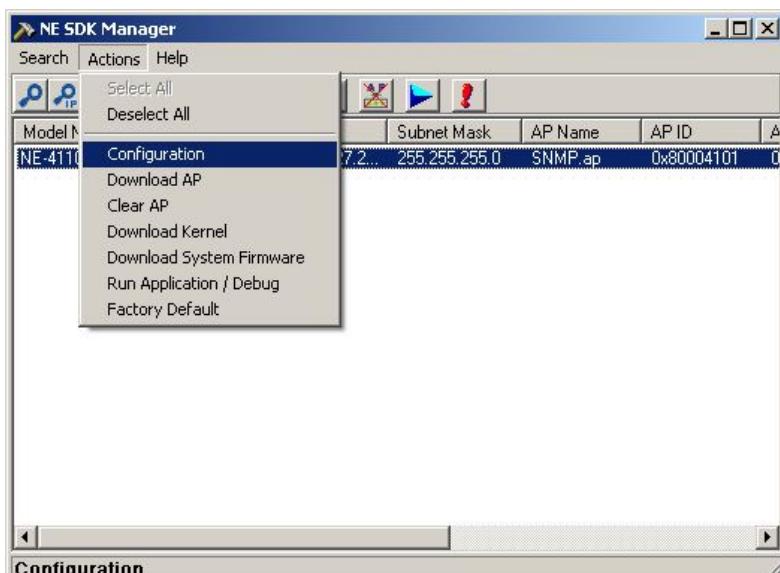
Please do not distribute these software applications outside your organization without written permission of ELVA-1.

6.1 Installing and running NE SDK Manager. Changing IP-address of the transceivers

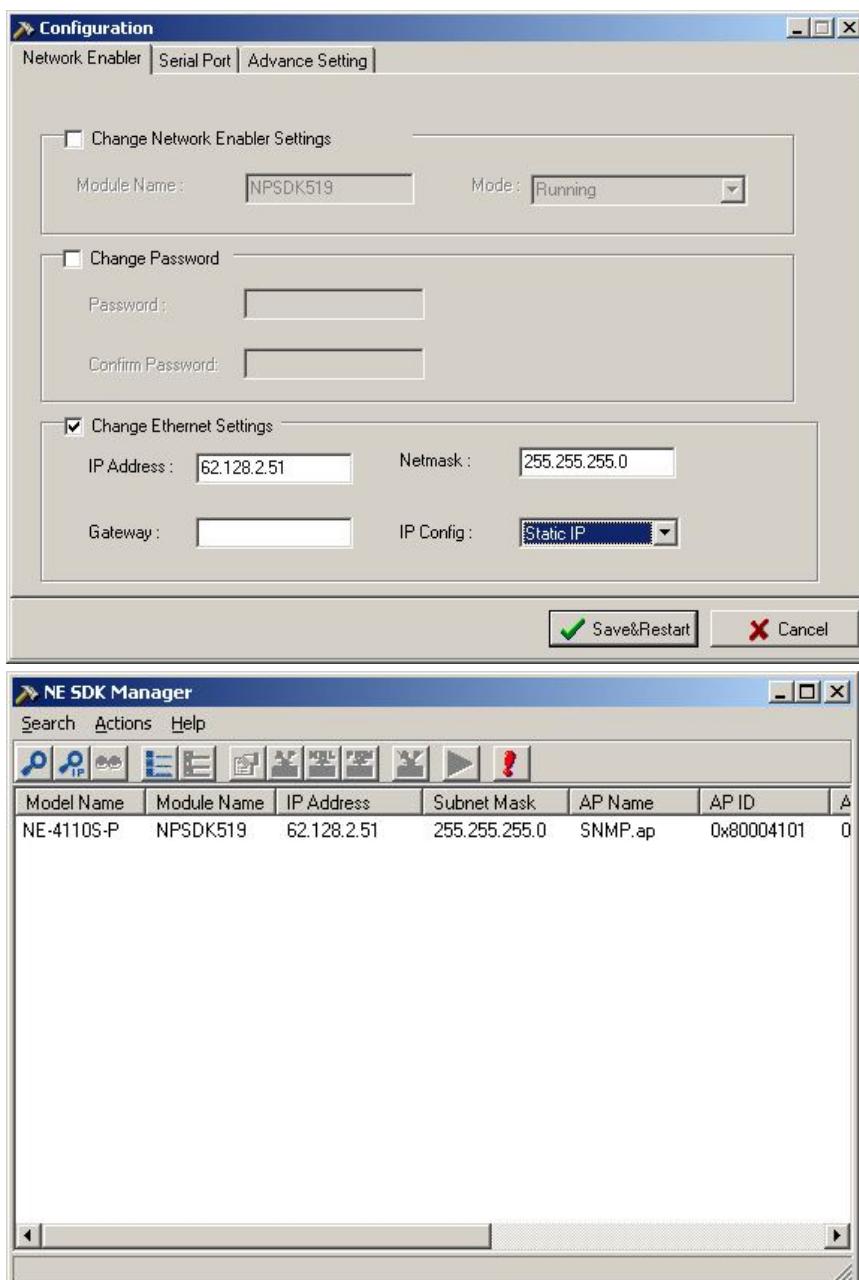
1. Install Moxa NE SDK Manager on the computer which you intended for PPC-100/STM1 SNMP administration (run Setup.exe). While NE SDK Manager is quite complicated software you will use the only one its feature – how to change IP address of each radio of the link from default IP address to an address which is provided to you by your network administrator.
2. Run Moxa NE SDK Manager. Use 'Network Enabler SDK 2 Programmer Guide1.pdf' as your reference how to work with NE SDK Manager.
3. Scroll down the reference file to page 3-5 to understand how to find a switch inside radio case in this manager.
4. Click to *Search* button in main window of NE SDK Manager (most left button at toolbar). The NE SDK Manager will find MOXA switch, which is build-in to transceiver.



5. Choose NE module found and click *Actions-Configuration*. The Configuration window will be open.



6. Enable “*Change Ethernet Settings*” Checkbox and enter IP-address which was provided to you by your Network administrator instead of link default IP-address (see screenshot below).
7. Click *Save&Restart* button to save new IP-address and close this window.
8. Click again to *Search* button in main window of NE SDK Manager. When MOXA switch will be found, be sure that it has new IP-address you just entered.
9. Repeat steps 4-8 for changing IP-address to second transceiver.
10. Close NE SDK Manager.

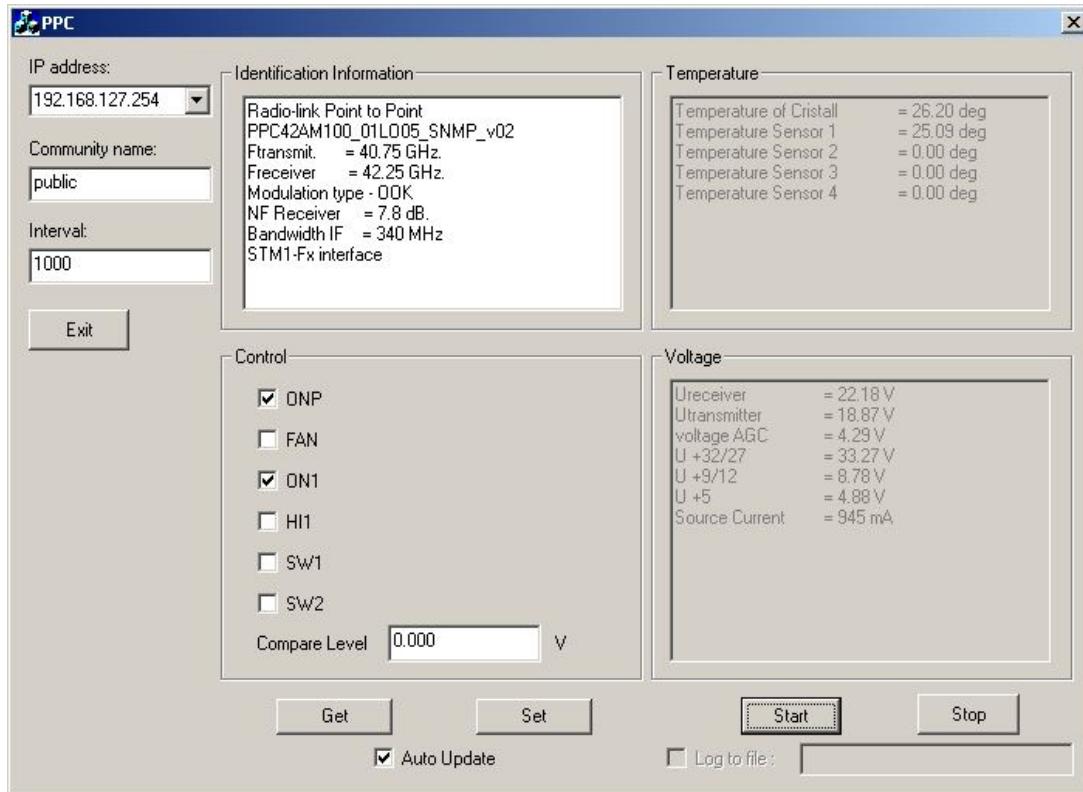


6.2 Installing and running PPC Monitor. Using this application for transceiver parameter monitoring

1. Run *PPC.exe* application from hard disk of the computer, intended for SNMP parameter monitoring. The main window of PPC application will be open.
2. Enter the IP-address of the transceiver you would like to check. Next time you start the PPC monitor, this IP address will be saved in drop-down list.
3. Enable *Auto Update* checkbox and click *Start* button.

ATTENTION!

The main mode for all components of the transceiver is automatic. All manual changing of the transceiver parameters like power on/off, heater and fan on/off which made in PPC Monitor are active for 30 Seconds only. After 30 sec the transceiver will return to internal automatic microprocessor control. This is to prevent damage of the equipment.



ONP – power ON for internal power supply adapter of the radio (always ON by default). Please mind each radio has external Power supply and internal power supply adapter. When you disabling ONP checkbox, you make dead circuit for radio electronic adapters, but not for external Power supply. To switch off the link completely, you need switch off external power supply (item #11).

ATTENTION!

ONP parameter can be used for link restart. Click STOP button, disable this checkbox and click SET button, then *START* button.

Checkboxes:

FAN – internal fan switch on/off (built-in fan is optional feature)

ON1 – internal heater on (standard mode)

HI1 - internal heater on (boost mode)

SW1, SW2 – reserved for future use

Compare level – special parameter for service technician only. Please do not change this parameter.

Community name – “public” by default.

Interval – indicates how often the link parameters will be renewed at PPC monitor in milliseconds.

GET button – to get link parameters displayed in PPC Monitor window

SET button – to make active changes which made for power on/off, heater and fan on/off.

START – starts PPC Monitor application.

STOP - stops PPC Monitor application

Auto Update – enable this checkbox for automatic update of link parameters in PPC monitor window.

EXIT – exit from PPC Monitor application

Temperature box parameters:

Temperature Crystal – microcontroller chip temperature

Temperature sensor 1 – temperature inside radio case

Temperature sensor 2/3/4 – reserved for future use (=0.00)

Voltage box parameters:

U receiver – receiver heterodyne voltage (service parameter to be send to service)

U transmitter - voltage (service parameter to be send to service)

AGS voltage – Voltage of AGC parameter

U +32/27, U +9/12, U +5 – voltages for internal power supply adaptor. Check them to be sure that displayed values are close to ideal one. For doubled numbers like 9/12 check the value to be close to one of the pair.

Source current – the total value of the current consumed from external power supply.

Log to file (.txt) – you can write displayed parameters to the file. Enter file name with .txt extention. This data could be further exported to Microsoft Excel.

ATTENTION!

To see transceiver parameters by the Internet, you have to use for transceivers real Internet static IP-addresses, obtained from ISP (Internet Service Provider). Please carefully discuss this possibility with your network administrator as the link will be open to hackers in this case.

7 Maintenance and Troubleshooting

The PPC-100/STM1 Bridge has been designed such that it requires no user configuration.

The PPC-100/STM1 Bridge itself does not require periodic maintenance. However, each end of the link should be periodically inspected for visible damage or excessive accumulation of dirt.

In a case of communication disturbance, it is necessary:

1. Make sure of integrity of the stations and the antenna, of that the cable joints are reliable and no strange, unauthorized objects are on the antennas. Remove dust, snow from antennas if necessary.

2. Check the signal propagation line visually and make sure that no obstacles like buildings, cranes, electric lines, trees have appeared on it or in its vicinity. In a case of necessity remove the obstacle or change the radio position.

3. Make sure of that the radio is properly fed with the power supply:

Measure the voltage on Outdoor cross-box terminal block while Radio is on. The power supply voltage should be within the 38 to 60 V range. If it is not so, clear the fault of the power supply source or cable.

4. Make sure of that the data arrive properly to Radio via the twisted-pair/optics cable.

5. Check the AGC voltage. The AGC voltage should correspond to a value, given in the Passport for actual distance. If it is not so, discover and remove the cause. Possible causes:

- Precipitation along the signal propagation line. Wait until the good weather and repeat the measurements.

- Obstacles on the signal propagation line. Remove them or change the position of the radio.
- Alignment disturbance. Re-align the stations.
- Response transmitter failure.

If nevertheless the Radio does not operate properly, measure and write down AGC voltage, make PPC monitor screenshot or write the parameters to the file, then contact to Service Center.

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8 Specifications

Antenna parameters:

Diameter, cm	Gain, dB			Beam angle, deg		
	<i>Q</i>	<i>V</i>	<i>W</i>	<i>Q</i>	<i>V</i>	<i>W</i>
10	28.3	34.0	35.7	4.8	3.1	2.1
20	34.6	39.7	41.7	2.3	1.5	1.0
30	38.5	42.4	45.0	1.6	1.0	0.7
45	42.9	45.4	-	1.0	0.7	-
60	44.9	47.5	-	0.7	0.5	-