Limited Liability Company
“NPK Morsvyazavtomatica”

NMEA 0183 SIGNAL MULTIPLICATOR WITH AN INTEGRATED COMBINER ADU-202

Operating manual

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CONTENTS

This operating manual describes how to ensure correct and safe operation of the NMEA 0183 signal multiplicator with an integrated combiner ADU-202 (hereinafter – the Product) and covers its structure, specifications and function principle.

Only those who have had the supporting education and special training in the area of occupational safety, read and understood this document shall be permitted to operate with the Product according to the applicable regulations.

Terms and abbreviations

CD – Compact disk
CL – Check list
PC – Personal computer
TS – Technical service
VDC – Volts of direct current
NMEA 0183 – Standard of communication protocol of marine equipment

1 DESCRIPTION AND OPERATION OF THE PRODUCT

1.1 THE PRODUCT'S PURPOSE

The Product is designed to combine and distribute signals received via RS-232 and RS-422 interfaces including NMEA 0183 standard, versions 1 and 2.

1.2 TECHNICAL SPECIFICATIONS

Table 1 describes the technical specifications of the Product.

Table 1 – Technical specifications of the Product

Parameter	Value
Electrical specifications	
Input voltage, VDC	12 or 24
Max. power consumption, W	5
Galvanic isolation from the supply mains	yes
Reverse polarity protection	yes
Optoisolation	yes
General specifications	
Number of input channels, pcs.	2
Number of output channels, pcs.	8
Supported interfaces	RS-232, RS-422
Max. receive rate, bit/s	230400
Weight, kg	1.1
Protection degree	IP22
Operating temperature, °C	– 25 to + 55
Mounting	wall

1.3 STRUCTURE AND OPERATION OF THE PRODUCT

The function principle: the Product receives data, distributes the data to the independent channels A (main) and B (standby) and sends them in compliance with the preset operation mode (see figures 1–5).

The Product includes the relay with NO contacts to connect an alarm unit. The relay acts when the data is automatically switched from the main channel to the standby one and returns to the initial position once the data returns to the main channel.

Annex A describes outline and installation dimensions of the Product, Annex B describes the general arrangement diagram, Annex C – the exterior of the board.

The Product's modes:

a) **Independent multiplication mode** – the Product receives data on the input channels A and B and transmits them to the corresponding output channels;

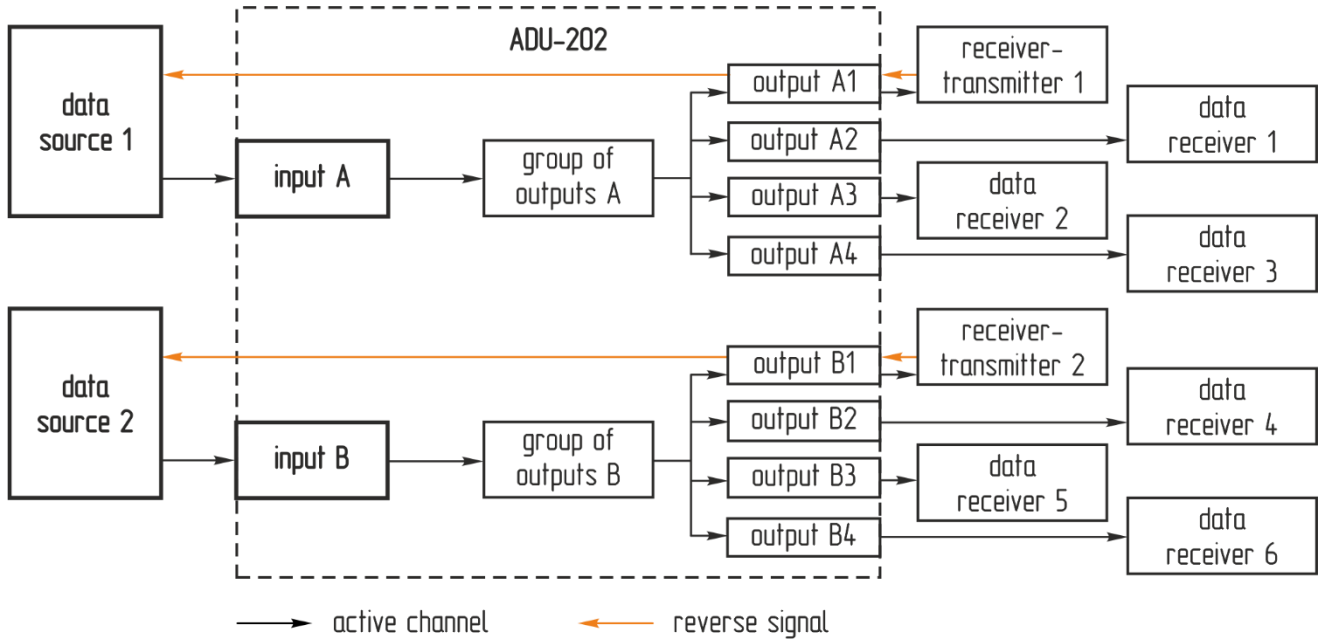


Figure 1 – The mode of independent multiplication

b) **Multiplication mode with the select of active channel** – the Product receives data on the main channel A and transmits it to all output channels; the Product automatically switches to the standby channel B once there is no data on the main channel and automatically returns to the channel A when the data reception is restored;

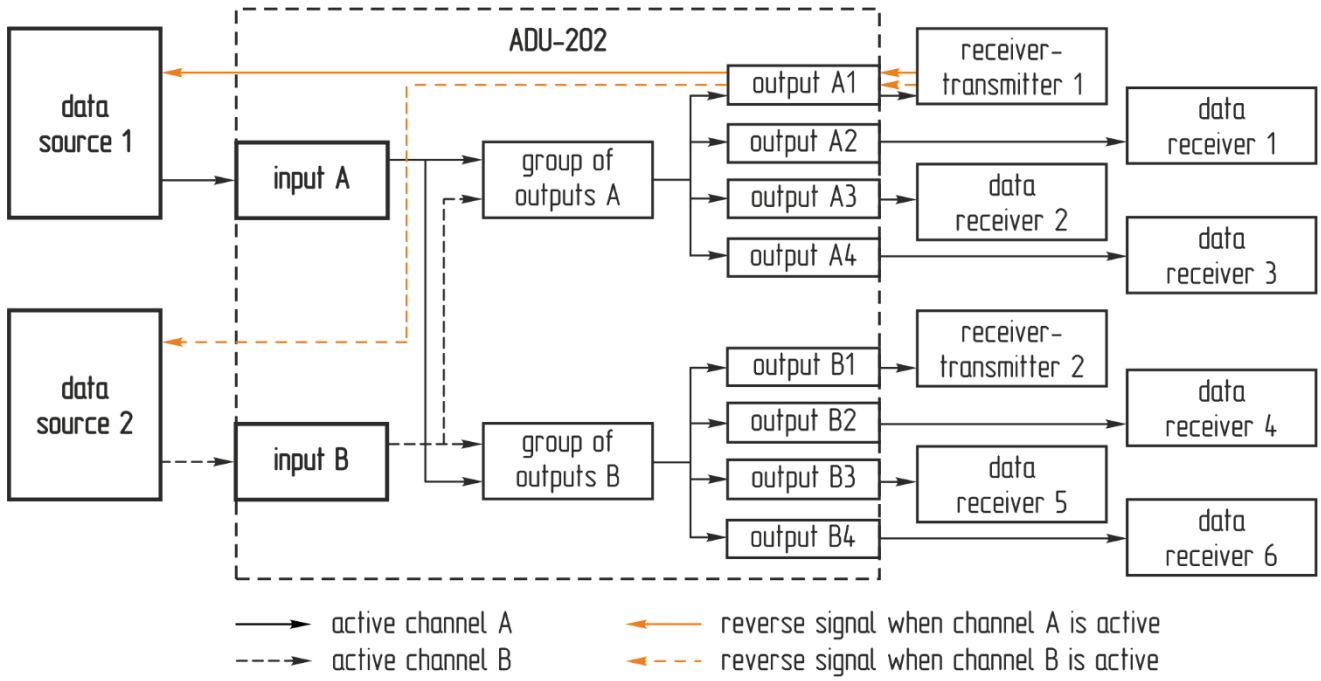


Figure 2 – Multiplication mode with the select of active channel

c) **Multiplication mode with the manual select of active channel** – the Product receives data on the one preset input channel and transmits it to all output channels;

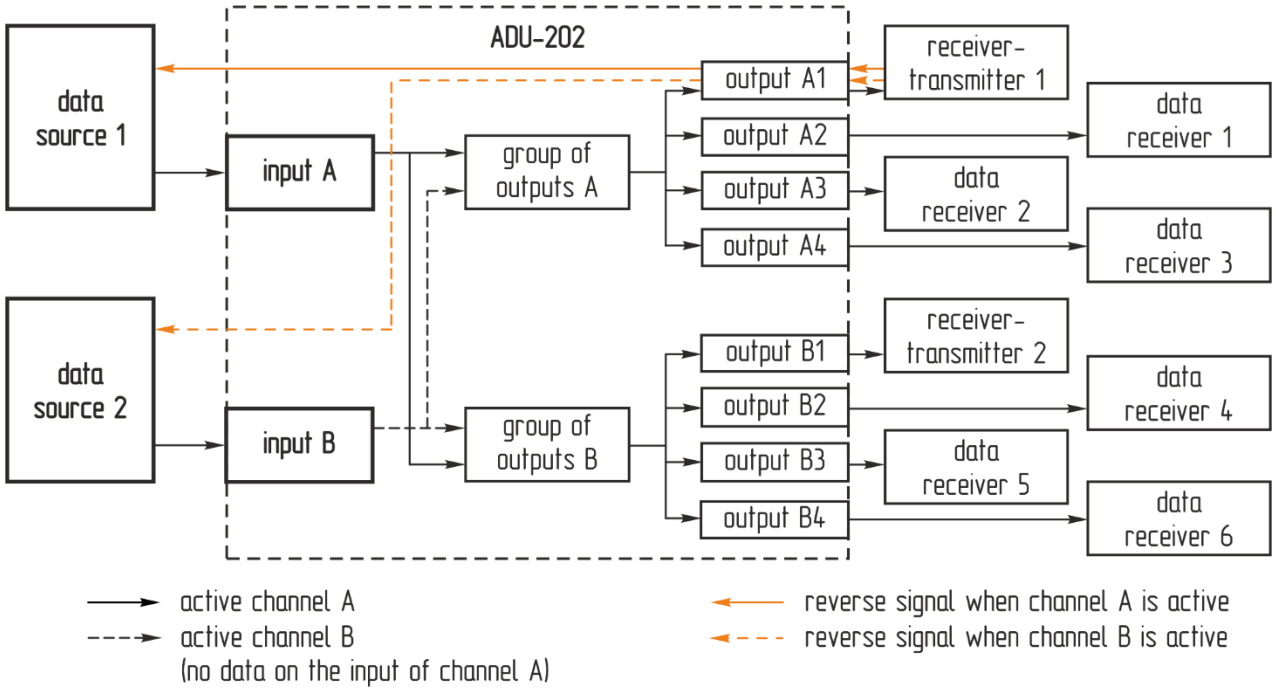


Figure 3 – Multiplication mode with the manual select of active channel

d) **CRC Multiplication mode** – the Product receives data on the main channel A, provides checksum test and transmits the data to all output channels; the Product automatically switches to the standby channel B when the checksum is incorrect on the main channel;

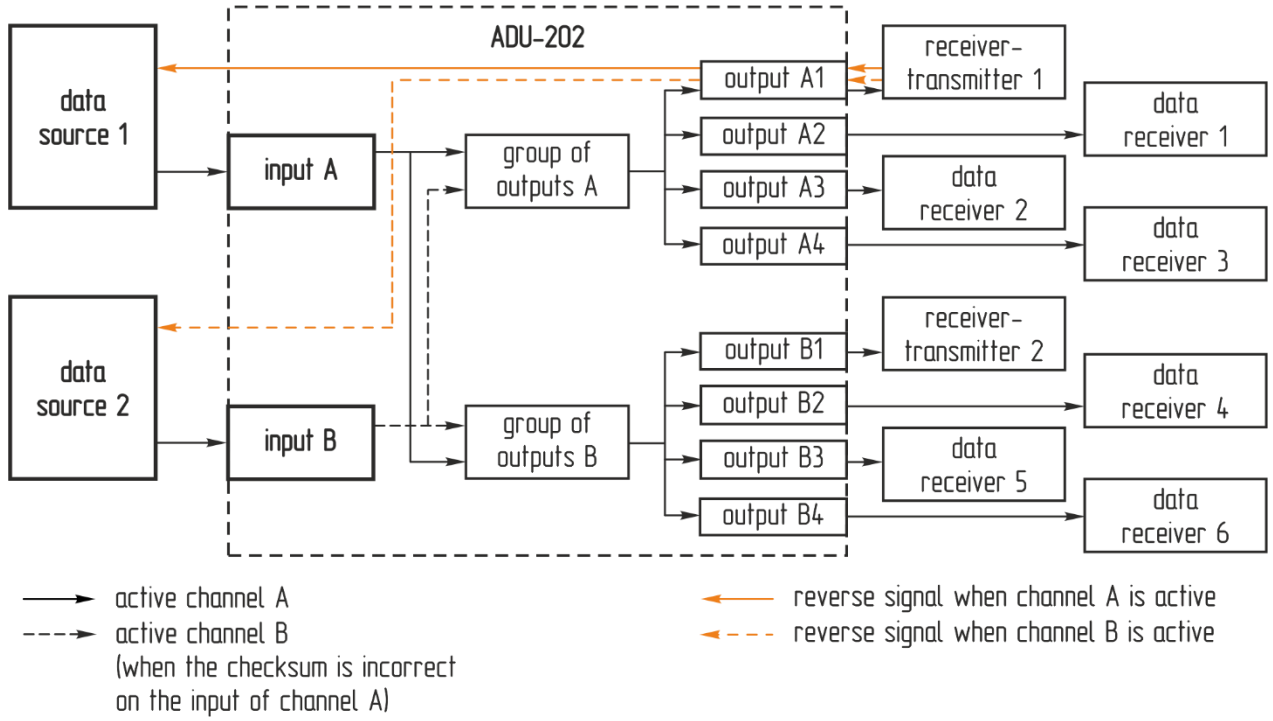


Figure 4 – CRC Multiplication mode

e) **Data combining mode** – the Product receives data on the input channels A and B, combines the data and transmits it to the output channels.

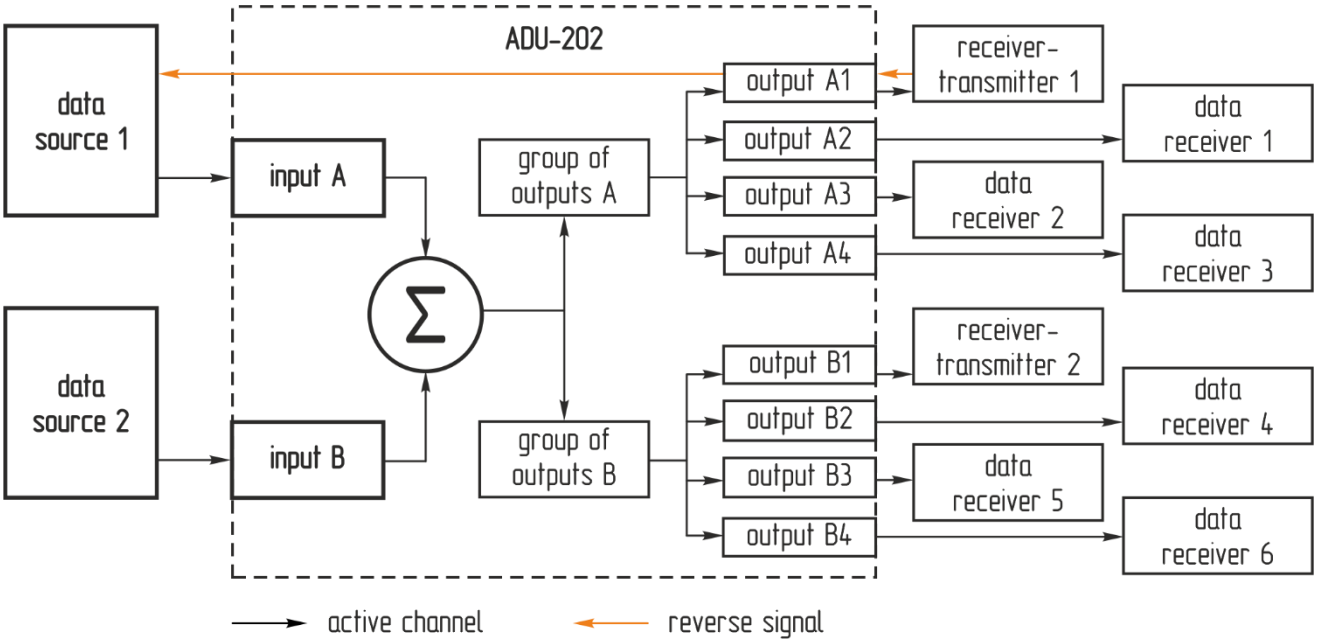


Figure 5 – Data combining mode

1.4 MEASUREMENT INSTRUMENTS, TOOLS AND APPLIANCES

Table 2 describes the list, purpose and main specifications of the materials to carry out TS and current repair of the Product.

1.5 MARKING AND SEALING

The Product has a nameplate indicating the Product's name, rated input voltage, power consumption, protection degree, weight, serial number, date and place of production, type of disposal.

The sealing of the Product is not provided.

1.6 PACKAGING

At the time of delivery the Product is packed in polyethylene air bubble film and corrugated board box ensuring its transportation and storage at the warehouse.

Transport packaging is also used as a returnable packaging for transportation of the Product to the repair location and back.

The sealing of transport packaging is not provided.

Table 2 – Consumables to carry out TS

Name and identifier of consumables	Amount of consumables	Note
Cleaning cloth	0.10 kg	1 To clean the Product's surface – use clean cloth. 2 To remove severe contamination – use cloth soaked in alcohol
Rectified hydrolytic technical ethyl alcohol	0.01 l	To soak cloth and remove severe contamination
Abrasive cloth	0.06 x 0.06 m	To polish surfaces of the Product in case of paint coating damage
Varnish	0.05 kg	To restore paint coating damage

2 INTENDED USE OF THE PRODUCT

2.1 OPERATIONAL LIMITATIONS

Select the installation site in compliance with operational limitations: operating temperature and protection degree – IP.

Caution! Distance between the installation site and magnetic compass shall not be less than *1 m*!

2.2 USAGE PREPARATIONS

2.2.1 Safety features

Ground the Product before external power supply.

Connect the Product to power supply network in compliance with input voltage, see table 1.

2.2.2 Visual check procedure

Before switching the Product on:

a) check integrity and initial position of the controls;

b) check that there is no dust and dirt on the Product;

c) check reliable grounding.

2.3 USAGE OF THE PRODUCT

2.3.1 Connection

Connect the Product in the following order:

– unscrew the crews and take off the cover;

– connect de-energized power cables to *12/24 VDC* terminal;

– connect cables of external devices according to the connection diagrams, see figures 6–12;

– select data transmission interface (see 2.3.2);

– set an operation mode (see 2.3.3);

– put the cover back, draw screws up tight;

– supply power to the Product.

The Product is ready for operation in *5 sec* after power supply.

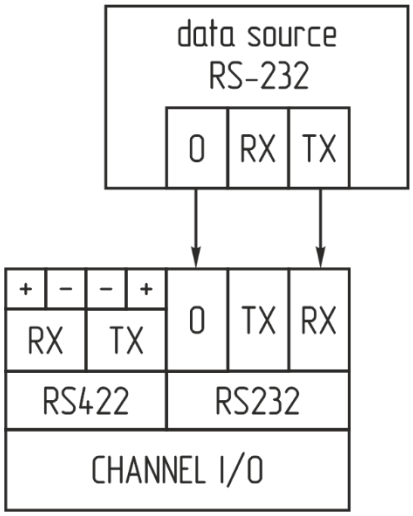


Figure 6 – Connection of data source via RS-232 interface

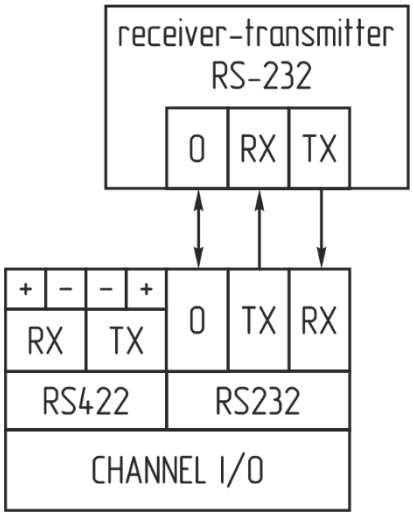


Figure 7 – Connection of receiver-transmitter via RS-232 interface

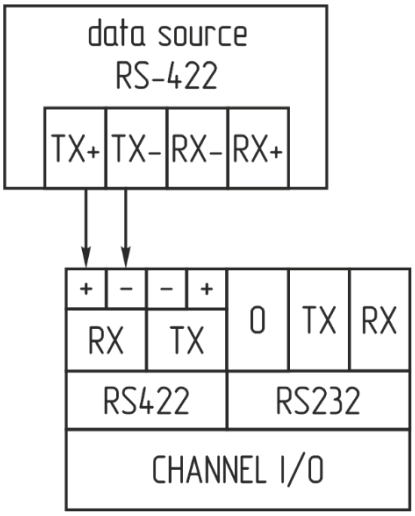


Figure 8 – Connection of data source via RS-422 interface

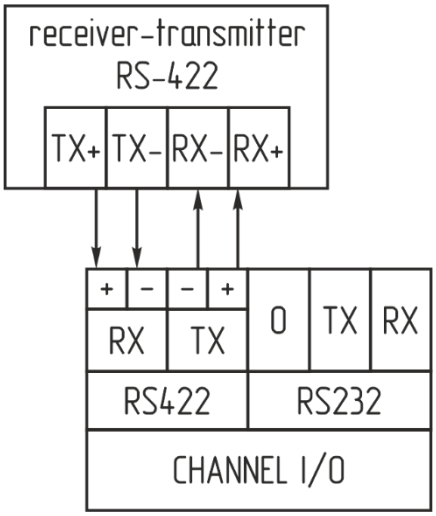


Figure 9 – Connection of receiver-transmitter via RS-422 interface

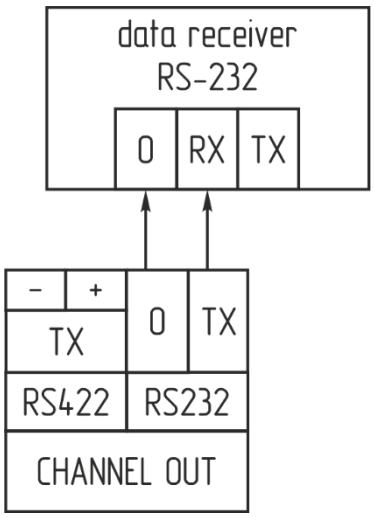


Figure 10 – Connection of data receiver via RS-232 interface

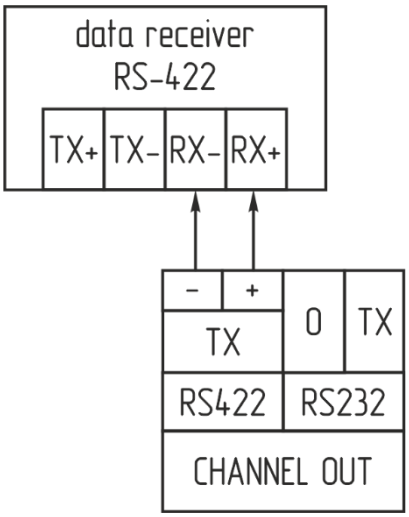


Figure 11 – Connection of data receiver via RS-422 interface

Note – The Product may transmit data simultaneously via RS-422 and RS-232 interfaces.

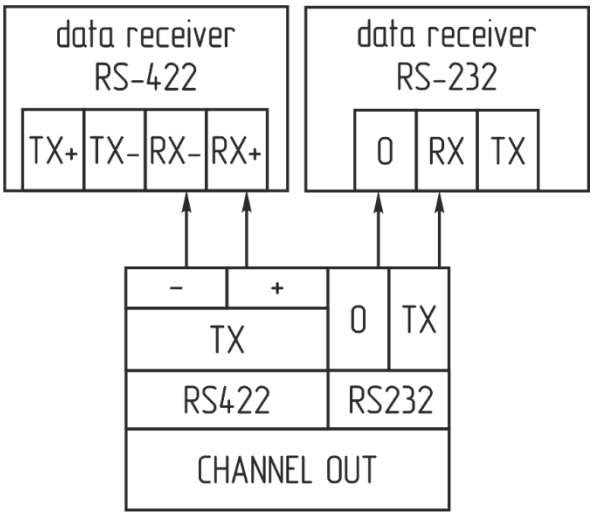
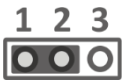
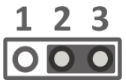


Figure 12 – Connection via RS-422 and RS-232 interfaces

2.3.2 Select of data transmission interface

Set the data transmission interface by closing jumpers on terminals JP5, JP6, JP14 and JP1 according to table 3.

Table 3 – Position of jumpers

Data transmission interface	Input	Terminal	Jumper position
RS-422	A	JP5	
	A1	JP14	
	B	JP6	
	B1	JP1	
RS-232	A	JP5	
	A1	JP14	
	B	JP6	
	B1	JP1	

2.3.3 Settings of operation modes

Set an operation mode by closing jumpers on terminals JP8–JP12 according to table 4.

Caution! Restart the Product after every alternation of jumpers' position.

Table 4 – Settings of jumpers

Operation mode	Jumper settings
Independent multiplication	
Multiplication with manual select of active input, active input A	
Multiplication with manual select of active input, active input B	
Multiplication with automatic select of active input	Jumper settings are not required

Operation mode	Jumper settings
CRC multiplication mode	
Combining	

2.3.4 Settings of combining mode

In order to set the combining mode install an application delivered on a CD together with the Product, connect the Product to a PC and set parameters of input and output channels on the application (data transmission mode, stop-bits, parity, etc.).

Follow recommendations of an installer to install the application.

Connect the Product to the PC as follows:

– turn off the power supply of the Product;

– unscrew the screws and take off the cover;

– set the jumpers on terminals JP12, JP5, JP14, see figure 13;

– connect the Product to the PC by connecting COM-port contacts with the terminals, see figure 14;

– supply power to the Product.

If the connections have been carried out correctly, data configuration of the Product will appear on the panel *Current settings* of the main window during *2 sec*.

Follow the instructions of the application to set parameters of the Product.

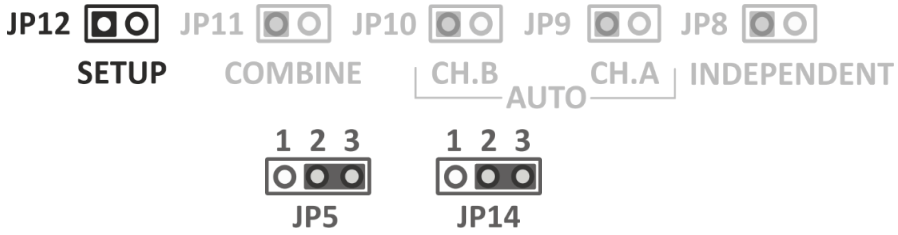


Figure 13 – Position of jumpers in the combining mode

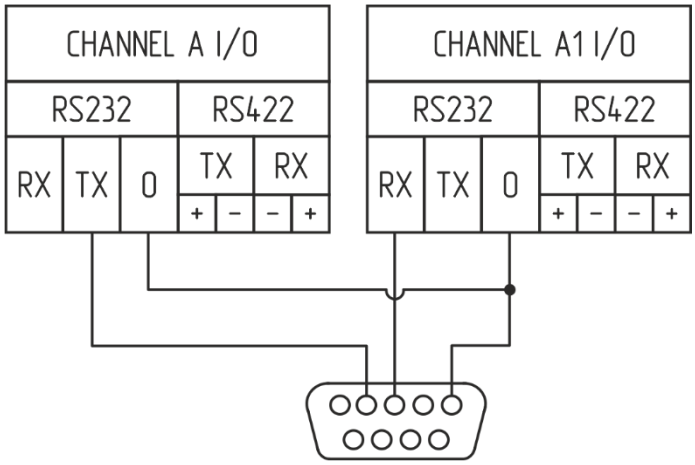


Figure 14 – Connection to a PC

Notes

1 Connect a data source NMEA 0183 with higher speed parameters to input A in order to avoid overflow of the output buffer of the data combiner.

2 Outputs' specifications (speed, stop-bits, parity, etc.) will be the same as specifications of input A.

Caution! Once you set the working parameters and disconnect the PC, set the jumpers according to the combining mode (see table 4) and restart the Product.

3 TECHNICAL SERVICE OF THE PRODUCT

3.1 General instructions

The Product's TS shall be performed by the staff familiarized with its composition, structure and function principle.

In order to provide safe and reliable operation of the Product, the staff shall maintain semi-annual TS.

TS shall be provided by the staff on the running equipment.

3.2 Safety features

While maintaining TS, observe 4.2.

3.3 Maintenance routine

Table 5 describes the list of works by TS types. Maintenance routine is given in checklists, see tables 6, 7.

Table 2 describes consumables to carry out TS.

Table 5 – TS works

CL No.	Work	TS type
1	Visual check of the Product	+
2	Output data test	+
Note: "+" – work is obligatory.		

Table 6 – CL No.1. Visual check of the Product

To be done	Routine	Man-hours per 1 Product
Visually examine the Product	1 Examine the exterior of the Product, mechanical damage, paint defects must be absent, legends must be read easily. 2 Clean up the Product surfaces with a clean cloth. 3 Remove severe contamination, parts of corrosion, oil spots with soap suds avoiding their penetration inside the Product; then clean the surfaces with a clean cloth and dry up. 4 If varnish paint coating is damaged polish it with sand paper, then clean with alcohol-soaked cloth, cover with varnish and dry up	1 person 5 mins
Check reliability of cable and bus connection to the Product	1 Check that connectors and attaching screws are fastened tight; provide further fastening if needed. 2 Check the cable integrity (no mechanical damage) within visibility	1 person 5 mins

Table 7 – CL No.2. Output data test

To be done	Routine	Man-hours per 1 Product
Output data test	1 Provide necessary settings of the channels by jumpers according to 2.3. 2 Supply power to the Product. 3 Provide input data. 4 Collate output and input data	1 person 15 mins

3.4 PRESERVATION

The Product and set of operational documents are stored in preserved condition in Manufacturer's packaging boxes.

Represervation time – *2 years* from the packaging of the Product at the Manufacturer's facilities.

The preservation is done in full terms, for *2 years*, applying protection and packaging according to the relevant regulatory documents.

The represervation is done in heated rooms in the same order as the preservation.

The Product and documents after represervation are placed in package.

4 CURRENT REPAIR OF THE PRODUCT

4.1 GENERAL INSTRUCTIONS

To diagnose the problem, see table 8.

If you cannot diagnose the problem, contact the Manufacturer's service centre.

4.2 SAFETY FEATURES

Any repair works must be provided by the personnel examined and received proper qualifications in the area of the occupational safety.

Check grounding of the Product before repair works.

Put a poster "DO NOT switch on! Under Operation!" when power supply switch is in OFF position.

It is prohibited to replace damaged parts, boards, modules if power supply of the Product is on.

It is prohibited to carry out repair works in the room where less than *2 people* are present.

4.3 CURRENT REPAIR

Table 8 describes the list of malfunctions that can be eliminated by own employees.

Table 8 – The list of potential malfunctions and troubleshooting

Malfunction	Potential reasons	To be done
The Product does not switch on	Power cable is not connected	Connect power cable
	No supply mains	Restore supply mains
	Fuse malfunction	Replace fuse
No output data	Input data source is not connected	Connect input data source
	Incorrect channels' settings	Check the Product's settings according to 2.3

5 STORAGE

The Product must be stored in packaging inside areas complying with the required storage conditions (*+ 5 °C* to *+ 40 °C*) with the concentration of dust, oil, moisture and aggressive impurities in the air within the required limits for the working areas of production facilities.

After storage or transportation of the device below *+ 10 °C*, it must be un-packed only in heated premises and left in normal climate conditions for *12 hours* beforehand.

6 TRANSPORTATION

The Product must be transported in the Manufacturer's transportation package in closed means of transport.

Types of shipment:

– motor vehicle and railroad transportation in closed means of transport (covered cars, multipurpose containers);

– air transportation (in sealed and heated compartments);

– sea transportation (in dry service premises).

The Product must be transported in compliance with transportation rules applicable for each means of transport.

During loading, unloading operations and transportation, the requirements indicated on warning labels on the boxes and packaging must be observed, and no impacts are permitted since they can affect the safety and performance of the Product.

Inside the means of transport, the packed device must be firmly secured or fastened.

7 DISPOSAL

New equipment, the parts of the Product damaged during operation, and any overage equipment must not be disposed as standard household wastes, since they contain the materials suitable for re-use.

Decommissioned and non-used components of the Product must be delivered to a special waste disposal center licensed by local authorities. You can also send an over-age equipment or unit to the manufacturer for its further disposal.

Proper disposal of Product components allows avoiding possible negative environmental and health impacts, and it also allows for proper restoration of components with substantial energy and resources saving.

During operation and upon completion of its service life, the equipment is not hazardous for health and environment.

This unit must be disposed according to the rules applied to electronic devices.

Any products marked with a crossed trash bin must be disposed separately from standard household wastes.

8 WARRANTY OBLIGATION

Manufacturer is under the warranty obligations in case of correct Product use according to the operating manual. In case of operation abuse the Manufacturer does not accept any damage claims.

For more warranty details visit our website www.unicont.com section Support.

Address and contacts of Manufacturer's service centre:

NPK MSA LLC

26E, Kibalchicha St., St Petersburg, Russia, 192174

Tel.: + 7 (812) 602-02-64, 8-800-100-67-19

fax: +7 (812) 362-76-36

e-mail: service@unicont.com

ANNEX A
(REFERENCE)
OUTLINE AND INSTALLATION DIMENSIONS

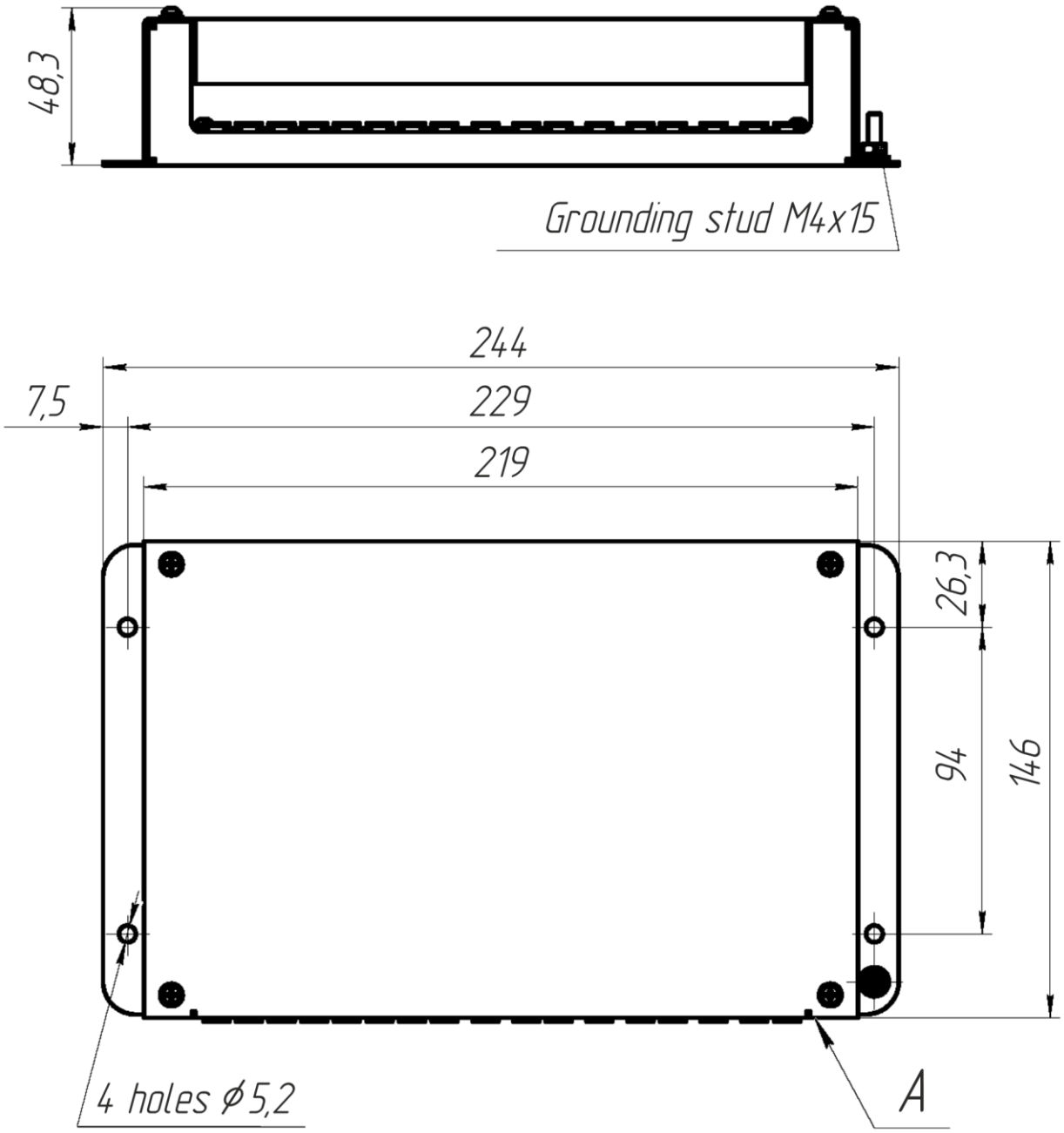


Figure A.1 – Outline and installation dimensions

Note – During mounting, leave *60 mm* space from the surface A to connect the Product.

ANNEX B
(MANDATORY)
CONNECTION DIAGRAM

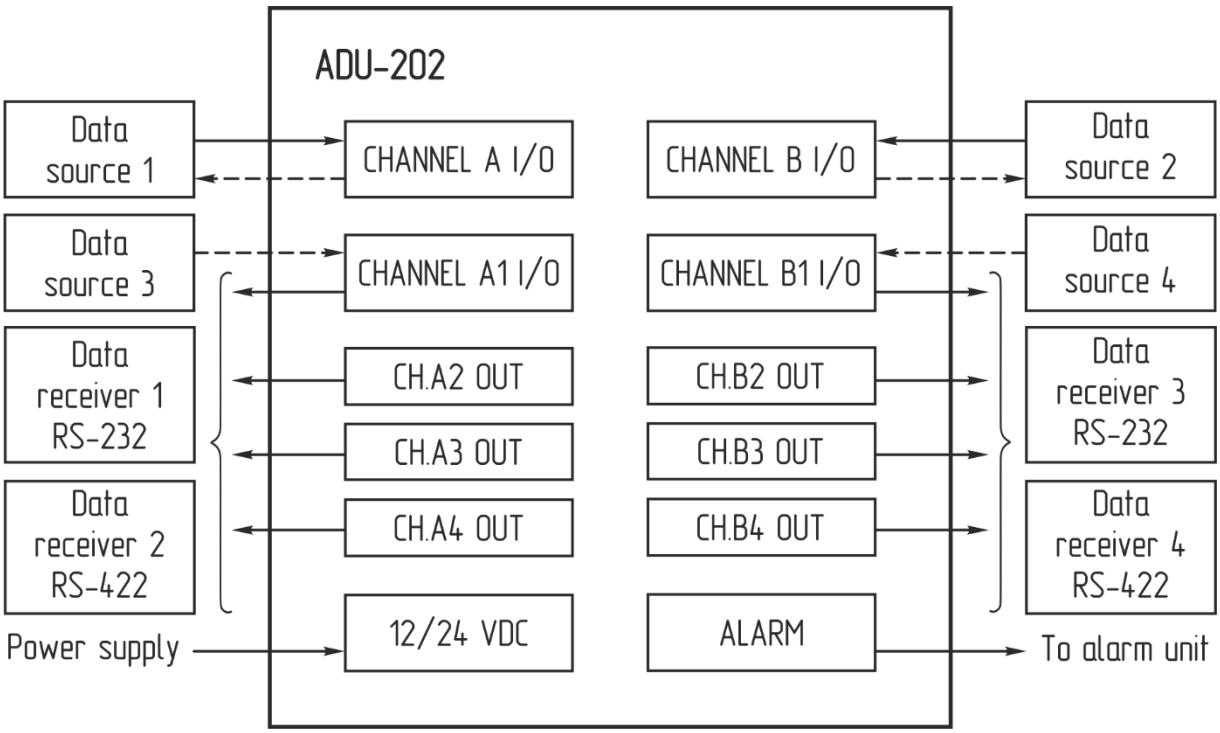


Figure B.1 – Connection diagram

ANNEX C
(REFERENCE)
PRINTED CIRCUIT BOARD

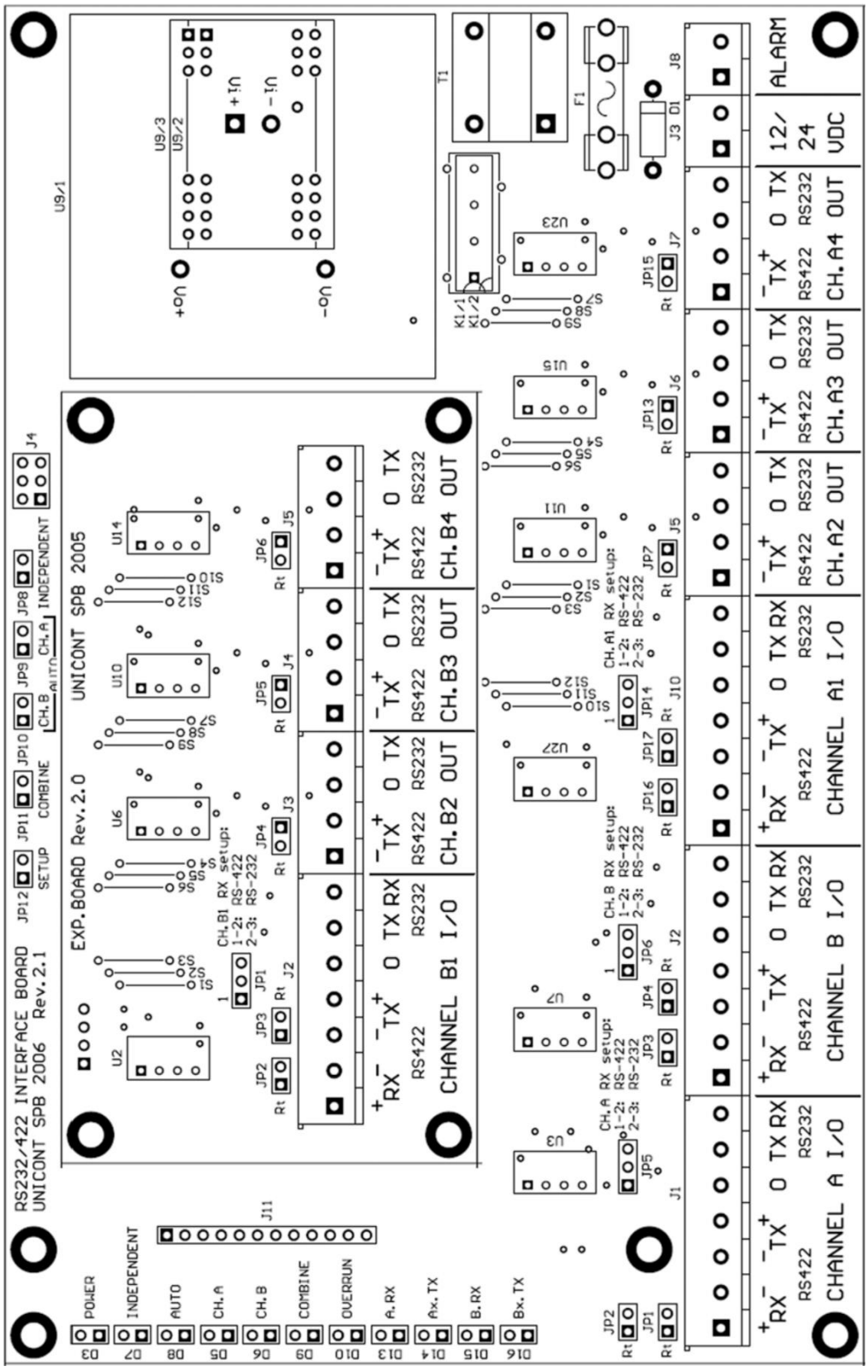


Figure C.1 – Printed circuit board

FOR NOTES