MultiCOM 302

Modbus card
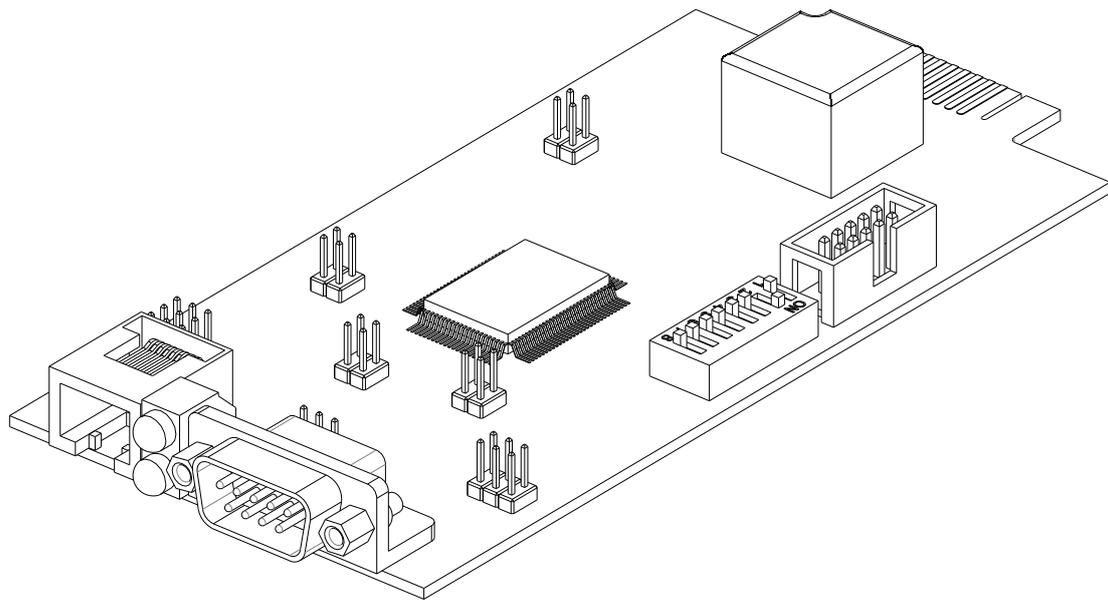
User manual

INTRODUCTION

Thank you for choosing our product.

The accessories described in this manual are of the highest quality, carefully designed and built in order to ensure excellent performance.

This manual contains detailed instructions on how to install and use the product.

This manual must be stored in a safe place and <u>CONSULTED BEFORE USING THE DEVICE</u> for proper usage instructions as well as maximum performance from the device itself.

NOTE: Some images contained in this document are for informational purposes only and may not faithfully demonstrate the parts of the product they represent.

Symbols used in this manual:

	Danger	Indicates the possible presence of dangerous voltages and the risk of electric shock.
	Warning	Indicates important information that must not be ignored.
	Information	Provides notes and useful suggestions for the User.

SAFETY

This part of the manual contains SAFETY precautions that must be followed scrupulously.

Ensure that the connectors subjected to high voltages are correctly isolated.

❖ The device has been designed for professional use and is therefore not suitable for use in the home.

❖ The device has been designed to operate only in closed environments. It should be installed in rooms where there are no inflammable liquids, gas or other harmful substances.

❖ Take care that no water or liquids and/or foreign bodies fall into the device.

❖ In the event of a fault and/or impaired operation of the device, do not attempt to repair it but contact the authorized service centre.

❖ The device must be used exclusively for the purpose for which it was designed. Any other use is to be considered improper and as such dangerous. The manufacturer declines all responsibility for damage caused by improper, wrong and unreasonable use.

ENVIRONMENTAL PROTECTION

Our company devotes abundant resources to analysing environmental aspects in the development of its products. All our products pursue the objectives defined in the environmental management system developed by the company in compliance with applicable standards.

Hazardous materials such as CFCs, HCFCs or asbestos have not been used in this product.

When evaluating packaging, the choice of material has been made favouring recyclable materials.
Please separate the different material of which the packaging is made and dispose of all material in compliance with applicable standards in the country in which the product is used.

DISPOSING OF THE PRODUCT

The device contains internal material which (in case of dismantling/disposal) are considered TOXIC, such as electronic circuit boards. Treat these materials according to the laws in force, contacting qualified centres. Proper disposal contributes to respect for the environment and human health.

CONTENTS

DESCRIPTION

MultiCOM 302 is a device that, inserted in the proper slot, allows monitoring of UPS and Transfer Switch using standard communication protocol MODBUS and proprietary protocols.
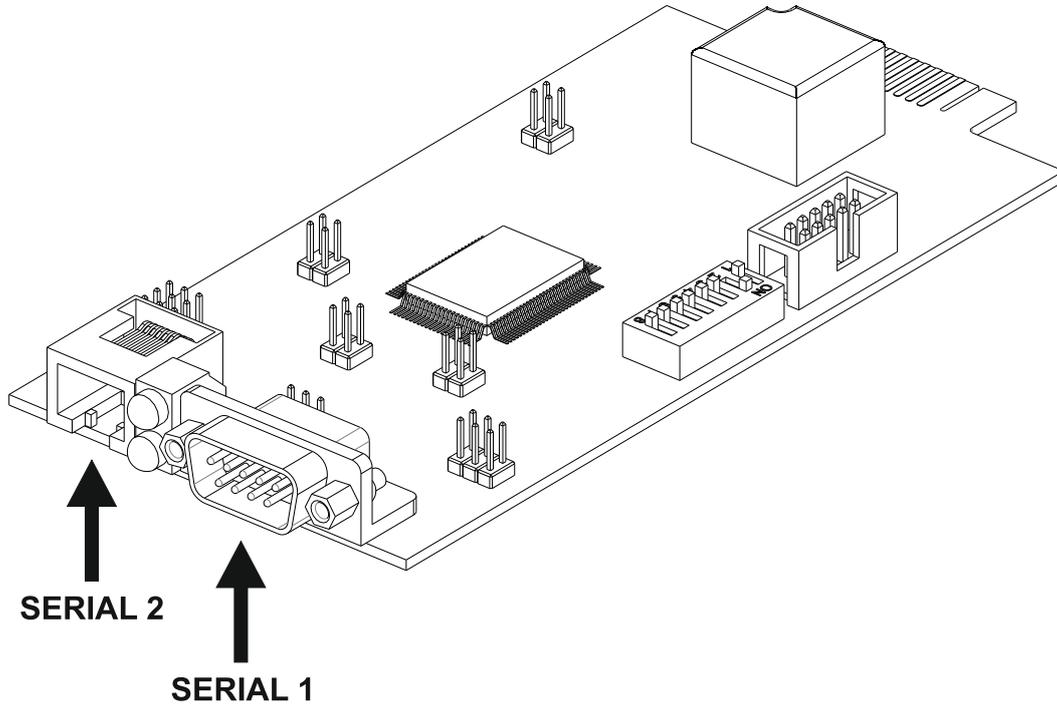
SERIAL 2

SERIAL 1

ℹ️ The LEDs, which normally are on, flash at irregular intervals to indicate the flow of data on the serial line.
Green led: "SERIAL 1" line activity.
Yellow led: "SERIAL 2" line activity.

IN THE BOX
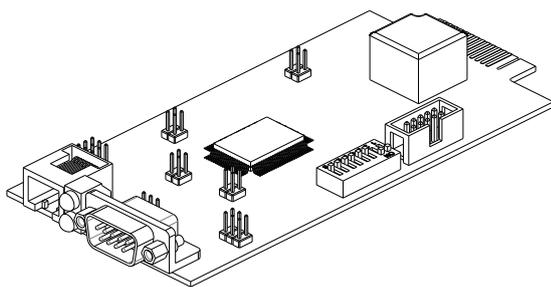
MultiCOM 302
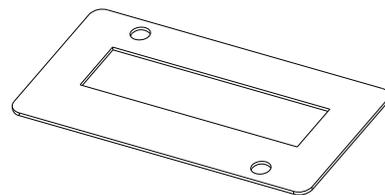
Fixing cover
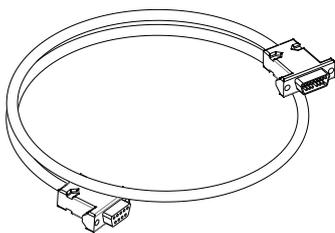
Serial cable DB9-DB9
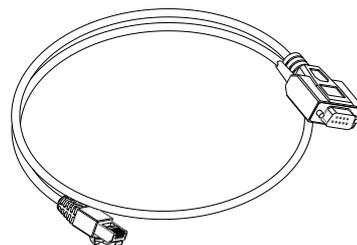
Serial cable RJ45-DB9

COMMUNICATION PORT *SERIAL 1*

The SERIAL 1 port offers an RS-232 serial line through which the UPS can be monitored using the following proprietary protocol:

Protocol	Baud Rate [bps]	Parity	Stop bit
GPSER	**1200**	**Nessuna**	**1**

COMMUNICATION PORT *SERIAL 2*

The SERIAL 2 port offers an RS-485 Half-Duplex serial line or an RS-232 serial line through which the UPS can be monitored using the following protocols:

Protocol	GPSER				MODBUS / JBUS RTU [2]		
Baud Rate [bps]	1200	2400	4800	**9600** [2]	19200	38400	57600
Parity	**Nessuna** [2]		Pari		Dispari		
Stop bit	**1** [2]			2			

[2] The values in bold type indicate the default configuration.

Where it is the GPSER protocol that is used on the SERIAL 2 port:
  ➢ In RS-232 configuration, the device address must obligatorily be set to zero.
  ➢ In RS-485 configuration, the device address must NOT be set to zero (see slave address configuration).

CONFIGURATION

Multicom 301/302 is able to automatically recognize the communication protocol used by the UPS or the Transfer Switch. To do this, it is necessary to leave the baud rate of the UPS and/or of the Transfer Switch to the default value (1200 or 9600 bps according to the type of UPS or Transfer Switch).

If the baud rate of the UPS or of the Transfer Switch is set to different values, the serial port "UPS SERIAL" of Multicom 302 has to be properly configured using the software MultiSetup.exe (refer to ADVANCED CONFIGURATION)

JUMPER SETTINGS

The SERIAL 2 port can be set as RS-485 Half Duplex port (default) or as RS-232 port by setting appropriately the jumpers JP10, JP11, JP12 and JP13 as indicated in the following table.

JP1	OPEN
JP2	
JP3	CLOSED
JP4	
JP5	OPEN
JP6	
JP7	
JP8	
JP9	
JP10	SERIAL 2 **RS-485**: The 2 low pins closed (232 silk-screen print side) **[DEFAULT]** RS-232: The 2 high pins closed (232 silk-screen print side)
JP11	
JP12	
JP13	
JP14	OPEN
JP15	
JP16	
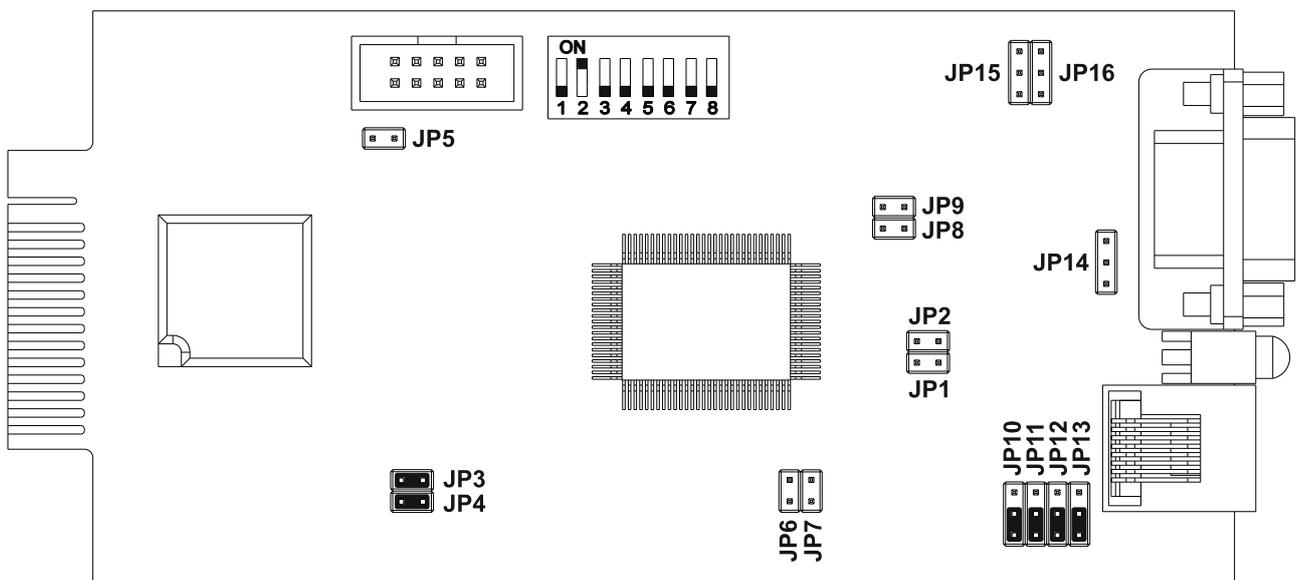
JUMPER DEFAULT CONFIGURATION

MODBUS ADDRESS CONFIGURATION

To choose the device address from 1 (default value) to 31, set the DIP-switch as indicated in the following table.

ADDRESS	DIP 1	DIP 2	DIP 3	DIP 4	DIP 5
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF
11	ON	ON	OFF	ON	OFF
12	OFF	OFF	ON	ON	OFF
13	ON	OFF	ON	ON	OFF
14	OFF	ON	ON	ON	OFF
15	ON	ON	ON	ON	OFF
16	OFF	OFF	OFF	OFF	ON
17	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON
19	ON	ON	OFF	OFF	ON
20	OFF	OFF	ON	OFF	ON
21	ON	OFF	ON	OFF	ON
22	OFF	ON	ON	OFF	ON
23	ON	ON	ON	OFF	ON
24	OFF	OFF	OFF	ON	ON
25	ON	OFF	OFF	ON	ON
26	OFF	ON	OFF	ON	ON
27	ON	ON	OFF	ON	ON
28	OFF	OFF	ON	ON	ON
29	ON	OFF	ON	ON	ON
30	OFF	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

To choose a value greater than 31, you have to select a **Base Address** (0-default-, 32, 64, 96, 128, 160, 192, 224) using the software MultiSetup.exe (refer to **ADVANCED CONFIGURATION**).
Slave Address = Base Address + [DIP-switch configuration]

SERIAL 2 *LINE BAUD RATE CONFIGURATION*

The baud rate of SERIAL 2 line can be configured setting the dip-switch 7 and 8 as described in the following table.

BAUD RATE	DIP 7	DIP 8
9600	ON	ON
19200	OFF	ON
38400	ON	OFF
Software configuration [1]	OFF	OFF

(1): The baud rate can be set also using the software MultiSetup.exe (refer to ADVANCED CONFIGURATION). In this case, leave DIP-switch no. 7 and no. 8 in the OFF position (default software configuration: 9600).

RS-485 *TERMINAL RESISTOR*

The device is supplied with embedded terminal resistor for RS485 bus (Rt=120Ω). In order to insert the resistor take action on the DIP-switch no. 6 as shown in the following table

Rt (120Ω)	DIP 6
INSERTED	ON
NOT INSERTED	OFF

ADVANCED CONFIGURATION

Through the MultiSetup.exe program, which can be downloaded from the manufacturer's website, you can configure all the communication parameters of the SERIAL 2 port (protocol, baud rate, parity and stop bit) and set the protocol used by the UPS. To use the program, connect the SERIAL 1 port to any serial port of the PC by means of the null-modem cable provided. To make the chosen configuration effective, the accessory must be powered down and then powered up.

INSTALLATION

- Remove the cover of the UPS Communication Slot by removing the two retaining screws.

- Insert MultiCOM 302 in the slot.

- Fix the cover provided with MultiCOM 302 using the screws previously removed.
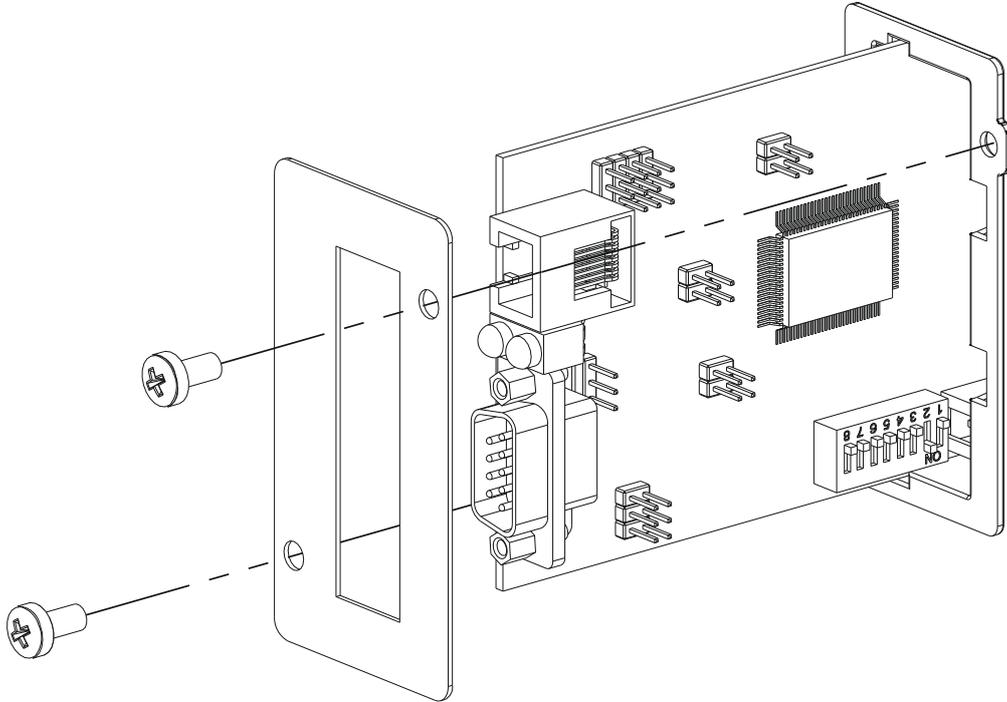
CONNECTORS PINOUT

SERIAL 1
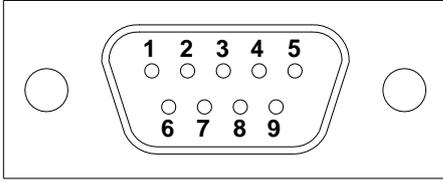
PIN #	SIGNAL
1	n.c.
2	RXD
3	TXD
4	DTR
5	GND
6	n.c.
7	RTS
8	n.c.
9	n.c.

n.c.: not connected
≡ : equivalent

SERIAL 2
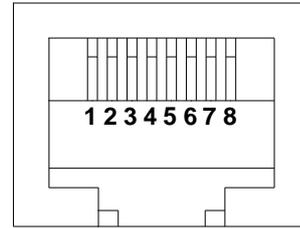
PIN #	SIGNAL	
	RS485	RS232
1	n.c.	
2	GND	
3	RXTX- (B)	RXD
4	RXTX+ (A)	TXD
5	GND	
6	≡ PIN 3	
7	≡ PIN 4	
8	n.c.	

MODBUS TABLE

Below are the basic modbus tables reporting main alarms and measurements compatible with all UPS families.
For more information about alarms and measurements available on your UPS, refer to the specific extended modbus table of the product family that can be downloaded from the manufacturer's website.

SUPPORTED FUNCTION	FUNCTION DESCRIPTION	ACCESSIBLE TABLES
1 (0x01) 2 (0x02)	BIT READING	STATES/ALARMS
3 (0x03) 4 (0x04)	REGISTERS READING	ALL
6 (0x06)	SINGLE REGISTER WRITING	COMMANDS
16 (0x10)	MULTIPLE REGISTERS WRITING	COMMANDS

REGISTER [1]		STATES/ALARMS		BIT [2]	
Number	Address			Number	Address
1	0			1	0
		Test in progress	[0=NO / 1=YES]	2	1
				3	2
		Shutdown active	[0=NO / 1=YES]	4	3
				5	4
		Battery charged	[0=NO / 1=YES]	6	5
		Battery charging	[0=NO / 1=YES]	7	6
		Bypass bad	[0=NO / 1=YES]	8	7
				9	8
		Normal operation	[0=NO / 1=YES]	10	9
				11	10
		On bypass	[0=NO / 1=YES]	12	11
		Battery low	[0=NO / 1=YES]	13	12
		Battery working	[0=NO / 1=YES]	14	13
		UPS locked	[0=NO / 1=YES]	15	14
		Output powered	[0=NO / 1=YES]	16	15
2	1			17	16
				…	…
				28	27
		Input Mains present	[0=NO / 1=YES]	29	28
		Alarm temperature	[0=NO / 1=YES]	30	29
		Alarm overload	[0=NO / 1=YES]	31	30
		UPS failure	[0=NO / 1=YES]	32	31
3	2			33	32
				…	…
				48	47
4	3			49	48
				…	…
				63	62
		Communication lost with UPS	[0=NO / 1=YES]	64	63

[1] *The register number **n** must be addressed **n-1** in the data packet.*

[2] *The bit number **n** must be addressed **n-1** in the data packet.*

REGISTER [1]		MEASUREMENTS	UNIT
Number	Address		
9	8		
10	9		
11	10		
12	11	Input voltage (Ph-N) V1	V
13	12	Input voltage (Ph-N) V2	V
14	13	Input voltage (Ph-N) V3	V
15	14		
16	15		
17	16		
18	17	Input frequency	Hz/10
19	18		
20	19		
21	20		
22	21	Bypass voltage (Ph-N) V1	V
23	22	Bypass voltage (Ph-N) V2	V
24	23	Bypass voltage (Ph-N) V3	V
25	24	Bypass frequency	Hz/10
26	25	Output voltage (Ph-N) V1	V
27	26	Output voltage (Ph-N) V2	V
28	27	Output voltage (Ph-N) V3	V
29	28		
…	…		
37	36		
38	37	Load phase L1	%
39	38	Load phase L2	%
40	39	Load phase L3	%
41	40		
42	41		
43	42		
44	43	Output frequency	Hz/10
45	44		
46	45		
47	46		
48	47	Battery voltage	V/10
49	48		
50	49		
51	50		
52	51	Charge%	%
53	52		
54	53	Autonomy	Minutes
55	54		
…	…		
61	60		
62	61	Internal UPS temperature	°C
63	62		
…	…		
72	71		

[1] *The register number **n** must be addressed **n-1** in the data packet.*

ℹ️ For single-phase systems, the value 0xFFFF is reported in the registers relating to L2 and L3.

REGISTER [1]		NOMINAL DATA	UNIT
Number	Address		
73	72		
…	…		
77	76		
78	77	Output nominal voltage	V
79	78	Output nominal frequency	Hz/10
80	79	Output nominal power	kVA/10
81	80	Output nominal power	kW/10
82	81		
83	82		
84	83	Battery nominal capacity (battery expansion included)	Ah
85	84	Battery benches	(1 or 2)
86	85		
…	…		
112	111		

REGISTER [1]		COMMANDS	UNIT
Number	Address		

113	112	Command Code:
		  1 (0x0001) UPS Shutdown (see also register 114)
		  2 (0x0002) UPS Shutdown & Restore
		                          (see also register 114/115)
		  3 (0x0003) Delete Command (code 1 – 2)
		  20 (0x0014) Test Battery
			Integer

114	113	Shutdown delay time	Seconds
115	114	Restore delay time	Minutes
116	115	RESERVED	
117	116	Command result: = Command code if command is handled from the UPS = Command code + 100 if command is NOT handled from the UPS = 0 if Command code is wrong	Integer
118	117	RESERVED	

REGISTER [1]		MultiCOM 302 DIAGNOSTIC	UNIT
Number	Address		
119	118	Counter of processed correct messages	Integer
120	119	Counter of processed not correct messages	Integer

REGISTER [1]		STATUS FLAGS	UNIT
Number	Address		
121	120		
…	…		
128	127		

REGISTER [1]		MultiCOM 302 DATA	UNIT
Number	Address		
129	128	Firmware version	Integer*100
130	129		
…	…		
140	139		

[1] *The register number **n** must be addressed **n-1** in the data packet.*