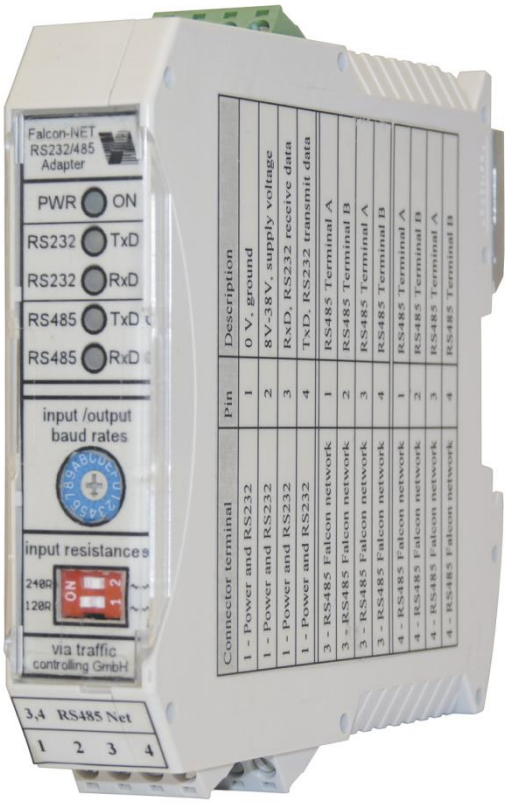
FALCON NET

- Isolated RS485-RS232 Adapter -

User manual*)



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*) Subject to technical change

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1 Overview

The Falcon Net RS485-RS232 Adapter with electrical (galvanic) isolated RS485 driver side is used to connect a RS485 network of Falcon Net radar detectors to a traffic controller by a RS232 serial interface.

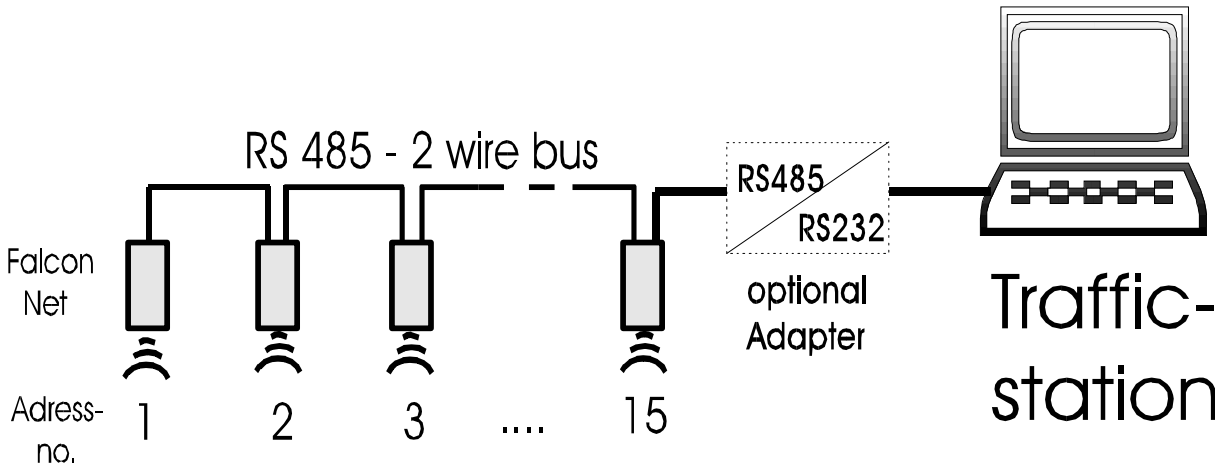

Illustration 1: Falcon Net RS485 network bus

The single duties of the adapter from the view of data communication are:

- to convert the electrical standard RS485 data signal to RS232 data signals and vice versa.
- to check and buffer binary and ASCII data messages and handle the needed network handshake on the RS485 side.
- to convert the network binary data protocol in a terminal readable ASCII text data protocol and vice versa.
- to work as a simple line oriented editor with character echo for a manual setting of the Falcon Net detector parameters with a connected terminal.
- to decouple the data transmission speed (baudrate) on RS232 and RS485 side.

The optional use of the isolated RS485-RS232 adapter makes sense if the user needs a quick and easy solution for the further data processing. Particularly if the traffic controller (host) has no RS485 port or is not able to run interrupt based RS485 port service routines collecting the data, calculating the checksum and serve the binary protocol handshake of the network detectors for e. g. performance reasons.

On the other hand is the RS485-RS232 Adapter a „bottleneck“ in the data transmission for two reasons

- the data transfer rate on the RS232 side of the adapter is limited to 57,6 kbaud
- to transmit the same information of a binary data block, a ASCII data block of more than double byte length in average is needed, what means double data transmission time

Therefore the adapter should not be used on nets with many detectors above very busy roads at low baudrate settings, where maximum data transmission performance would be needed..

The earlier not isolated adapter versions were mainly designed for development purposes or small applications in more or less protected environments (e.g. tunnels).

Although the RS485 driver lines of the earlier adapters were protected against transient surges by suppressor diodes they had no electrical isolated RS485 driver. Transient surges (over-voltage pulses) can result from lightning discharge, switching operations or any capacitive, inductive or resistive coupling in an electric systems. Transient surges have fast rise times of a few µs and endure till 100 µs.

At maximum RS485 baudrate of 115.2 kbaud the cable length of the RS485 bus could be extended till 1 km, or much more at lower data transmission rates. The potential ground difference between the not isolated adapter host ground and the detector client ground was limited to +/- 15 Volt. Otherwise the RS485 driver would have been damaged. For the new isolated adapter less care must be taken because the isolations withstands 2,75 kV DC potential difference.

If the suppressor diodes (600W) were thermally destructed at the earlier not isolated adapter, (e.g. by permanent current flow due to too high potential differences between the RS485 drivers connected to the net) transients or over-voltages could damage the adapter, maybe also over the power supply or the RS232 interface other electrical systems. For the new adapter this kind of damages can be excluded.

The new isolated adapter features isolated potential free RS485 communication lines, over-voltage protected power input as well as transient surge protected RS232 data interface. Additionally the adapter configuration parameters are now non-volatile EEPROM based.

2 Adapter elements, LEDs, connectors and switches

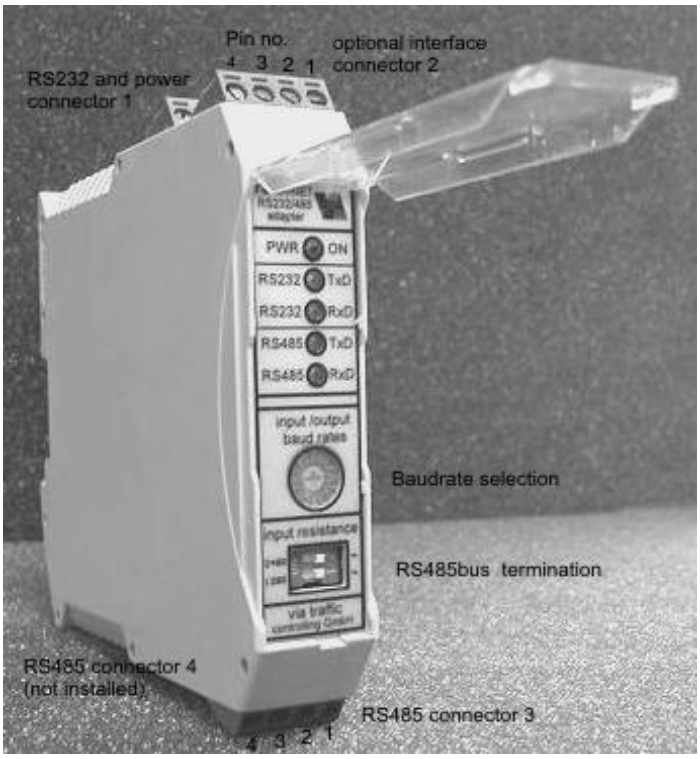

Illustration 2: Isolated Falcon Net RS485-R232 Adapter

An operation control of the adapter is possible with the 5 status LEDs visible on the front side.

The green power (PWR) LED is lit as soon the microcontroller (cpu) of the adapter is started.

The two groups of LEDs labelled RS232 and RS485 indicate data transmission (Tx) or reception (Rx) on either communication side.

All LEDs are directly controlled by the cpu. Therefore if the cpu is broken where will be also no indication of data reception anymore.

The adapter has 4 male connector sockets, which allow to plug-in 4 vibration safe female connectors.

The transparent front clap window should be kept closed for humidity and dust protection of the switches.

2.1 Connectors and pin connection

Illustration 2 shows 3 out of 4 possible mounted connectors, their numbers and labels and the pin numbers. The description of the pin connections follows in Table 1.

Connector terminal	Pin	Description
1 - Power and RS232	1	0 V, ground
1 - Power and RS232	2	8V-38V, supply voltage
1 - Power and RS232	3	RxD, RS232 receive data
1 - Power and RS232	4	TxD, RS232 transmit data
2 - RS485 and USB Controller	1	Data-, USB, yet not supported, do not use
2 - RS485 and USB Controller	2	Data+, USB, yet not supported, do not use
2 - RS485 and USB Controller	3	RS485 Terminal A, yet not supported, do not use
2 - RS485 and USB Controller	4	RS485 Terminal B, yet not supported, do not use
3 - RS485 Falcon network	1	RS485 Terminal A
3 - RS485 Falcon network	2	RS485 Terminal B
3 - RS485 Falcon network	3	RS485 Terminal A
3 - RS485 Falcon network	4	RS485 Terminal B
4 - RS485 Falcon network	1	RS485 Terminal A
4 - RS485 Falcon network	2	RS485 Terminal B
4 - RS485 Falcon network	3	RS485 Terminal A
4 - RS485 Falcon network	4	RS485 Terminal B

Table 1: Isolated network adapter pin connections

The adapter will be delivered in general with 3 female screw-cage plug in connectors.

Connector 1 (Power and RS232) is for the power supply and the RS232 serial interface.

Connector 3 and 4 offer the possibility to connect up to 4 RS485 bus cables to the Pins Terminal A and B. If this is done the network has no proper bus topology anymore (4 parallel) buses, what results in impedance mismatch, but works in practice with short cables.

Proper bus topology means one cable connected and the adapter is located at one bus end. Still proper is to have the adapter at any point of the bus with two cables of two network parts connected. For proper RS485 network design and more information see for example the application note „Guidelines for Proper Wiring of an RS-485 (TIA/EIA-485-A) Network“ from the website „www.maxim-ic.com“.

Connector 2 of the adapter is covered and reserved for future interface designs.

2.2 Baudrate switch settings

The position of hexadecimal coded turn switch with marked positions 0 ... F determines the data transmission speeds (baudrates[1]) on the RS485 Falcon network side and on the RS232 side. For each side a choice of 4 selections can be made. The meaning of the single switch positions follows in Table 2.

Baudrate switch position	RS485 network side [Baud]	Baudrate RS232 interface [Baud]
0	9600	4800
1	19200	4800
2	57600	4800
3	115200	4800
4	9600	9600
5	19200	9600
6	57600	9600
7	115200	9600
8	9600	19200
9	19200	19200
A	57600	19200
B	115200	19200
C	9600	57600
D	19200	57600
E	57600	57600
F	115200	57600

Table 2: Baudrate switch settings

The baudrate switch is labelled „input/output baudrates“ on the adapter front view, see also Illustration 2.

The Baudrates of receiver and transmitter in a communication connection must be set equal. On the RS485 Falcon network side equal to the baudrate of the Falcon Net detectors, as determined by their baudrate setting switch. On the RS232 side equal to the terminal or traffic controller baudrate setting.

2.3 Bus termination resistors

Illustration 2 shows a 2 pole dip switch labelled „input resistance“.

If the upper switch labelled 240 Ohm is in „On“ position, a resistor of 240 Ohm is connected between „Terminal A and B“. The lower switch connects a 120 Ohm resistor between pins „Terminal A and B“. Therefore moving both switches in „On“ position results in 80 Ohm.

A proper network bus should be ended at each bus end with a termination resistor of 120 Ohm, resulting in the maximal allowed load of 60 Ohm between Terminal A and B wire. The 120 Ohm line termination (=R/2) relates to the impedance of a 24AWG RS485 cable. The proper bus cable termination avoids signal reflections and in consequence signal deformations.

[1] bits per second

For proper RS485 network design and more information about bus termination see for example the application note „Guidelines for Proper Wiring of an RS-485 (TIA/EIA-485-A) Network“ from the website „www.maxim-ic.com“.

3 Adapter RS232 serial data communication

3.1 Cable connection to a terminal or a traffic controller

The table aside shows how to connect the *Falcon RS485-RS232 Adapter* to a traffic controller or a terminal.

9-pole DSUB connector		Adapter connector1 - Power and RS232	
Signal	Pin	Signal	Pin
RxD	2	TxD	4
TxD	3	RxD	5
GND	5	GND	1

This is a so-called null modem connection with crossed RxD and TxD wires.

For the connection a shielded 3-wire cable is needed. Further data transmission control wires need not be connected, because the *Falcon RS485-RS232 Adapter* does not support a hardware handshake.

The critical maximum cable length for a RS232/V24 data transmission can be estimated according following formula: cable length = 10^6 / Baudrate = 10^6 / 9600 ≈ 100 meter

3.2 Data transmission and software

For configuration, maintenance or data logging purposes of the RS485-RS232 adapter or the Falcon Net detectors you may wish to connect a PC or laptop. The data transmission is a pure text transmission with printable ASCII - characters. For the reception, to display and insert characters on your PC or laptop you may use a so-called terminal software. A specific data transmission program is not needed.

You may use the "Hyper Terminal" program from Microsoft Windows, which is part of all Windows operating systems from Windows 95/NT till Windows XP. Under Windows 3.1 or Windows 3.11 for workgroups exists the program "Terminal". For DOS countless terminal programs like "Norton Terminal", "Telix", "XCOM" and so on, are available.

How to start and configure the „Hyper Terminal program“, see chapter 7.

3.3 Getting started with a PC or Laptop

When the wiring is done and the baudrate switch is set the RS485-RS232 adapter sends following start message:

!Isolated RS485-RS232 Falcon Net Adapter
!Version: 1.01 07/29/04
!by via traffic controlling

!Adapter ready

All adapter messages start with a quotation mark, so they can be easily filtered out. All messages send by the adapter end with a carriage return, line feed (0A 0D hex).

The following chapters shall be read and understood together with the manuals of the used Falcon Net detector type.

If there are connected network detectors, powered up at the same time, you should get the detector startup messages as well:

M;1;01
M;2;01
M;3;01
|
M;n;01

If you get garbled messages or nothing on your terminal, check the baudrates and other data transmission parameters (8 data , No parity, 1 stop bit).

3.4 Adapter detector data output

Falcon Net detector data are delivered by the adapter as follows:

data type; detector address; data

Data block							Meaning[1]
M	;	d	;	d			general message no. 0-255
F	;	d	;	d			error message no. 0-255
W	;	d	;	d			warning no. 0-255
P	;	d	;	A	f		parameter ADJF_A 0.001-9.999
P	;	d	;	B	f		parameter ADJF_B 0.001-9.999
P	;	d	;	S	d		parameter SENS 1-16
P	;	d	;	R	d		parameter RSEG 5 - 80 cm
P	;	d	;	M	d		parameter MSEG 5 - 40 cm
P	;	d	;	G	d		parameter GAPL 5-255 in 10 ms units
P	;	d	;	D	d		parameter DETE, 0/1, detection off/on
P	;	d	;	C	d		parameter CRC checksum, 0/1/2 for LRC/CRC setting
P	;	d	;	I	d		parameter DIR, 1/2/3 oncoming/leaving/bi-directional traffic detection
P	;	d	;	U	N	d	parameter detector network address[2], range 1-15
P	;	d	;	U	S	d	parameter „send still alive message“[2], 0/1, off/on
P	;	d	;	T	d		detector self test report, correct result must be 45
P	;	d	;	V	f		detector software version, e. g. 3.11, read only
D	;	d	;	d	;	f	measure data unidirectional modes (oncoming or leaving) - speed in km/h, reflection value, net gap 0.00-655.35 s
O	;	d	;	d	;	f	measure data bi-directional modes, oncoming vehicle - data see above
L	;	d	;	d	;	f	measure data bi-directional modes, leaving vehicle - data see above

with d - decimal ASCII integer value, f - decimal ASCII float value

[1] listed parameters and their value range refer to the detector Falcon Net II and III, for the Falcon Net I see its manual

[2] see list of yet undocumented functions in chapter 8 for description

All binary detector data values are reformatted by the adapter and delivered as ASCII decimal or float values, the variable length of the ASCII strings depends on the data and address values (1-15).

The LRC or CRC checksums for binary data blocks on the RS485 network is tested and the receipt (detector address handshake) is given. For the RS 232 side no checksum is supported.

For the description of the parameters refer to the Falcon Net I, II or III manual, chapter „program parameter set“. For the description of Falcon Net detector error and message numbers refer also to manual of the used Falcon Net type.

3.5 Adapter detector parameter input or request

The command line input to initialise or change the Falcon Net detector parameter set is as follows:

Start letter ‘A’, detector address, ‘P’, parameter type, parameter value

The command line request to get the data of the detector parameter set is as follows:

Start letter ‘A’, detector address, ‘?’, parameter type

For the parameter type the first letter of the detector parameter name for example ‘D’ for DETE (Detection on/off) has to be used, see also Falcon Net manuals. One exception is the parameter DIR where the letter ‘I’ must be used.

- Example 1:

Set the parameter SENS = 2 for detector no. 8: ‘A8PS2’

- Example 2:

Request the parameter setting of ADJF_A for all detectors: ‘A0?A’

All lowercase input letters are automatically converted to uppercase by the adapter. The backspace character can be used to delete wrong characters in the adapter input line buffer. Input lines must be completed with carriage return or line feed (<Enter> key). There is no time limit for the completion of an input string.

Data messages from the detectors may split an command insertion on a connected terminal.

3.6 Adapter configuration and parameters

In contrary to earlier adapter versions the isolated RS485-RS232 Falcon net adapter parameter are EEPROM based and therefore non-volatile. The parameter set integrity is checked after power-on and after parameter changes with a 16 Bit CRC checksum.
When receiving an *ESC (1B hex)* character a short menu with the current parameter setting is send from the adapter to a connected terminal

! Parameters

!<C> Checksum: CRC 1021h
!<D> Delimiter: ‘;’
!<E> Echo: on
!<G> Gap units: 10 ms
!<H> Handshake: on
!<R> Return
!Select:

Inserting *‘C, D, E, G or H’* selects the options prescribed in the following chapters. Automatic programming sequences may send <*ESC*> and selection character without delay and ignore the menus.

Inserting *'R'* returns from menu selection and *<ESC> 'R'* can be used to have the current parameter setting listed.

3.6.1 Checksum selection for the network binary protocol

Several data block checksum types for the RS485 network communication are supported. The escape sequence *ESC C* (1B 43 hex) sends a menu, where the checksums can be chosen:

! Select Checksum:
!<0> LRC
!<1> CRC 1021 hex
!<2> CRC-CCITT[1]
! Choose 0,1 or 2? 2
! CRC-CCITT set

After selection the current active checksum for the adapter is changed as well as the checksums for all detectors in the network.

All data blocks from the detectors to the adapter are ended at the last byte position(s) with a communication error checksum.

The one byte LRC checksum is calculated from all data block bytes with the bitwise logical antivalenz function as follows:

LRC-byte = Byte 1 xor Byte 2 xor Byte 3 xor..... Byte n

Name	CRC 1021h	CRC-CCITT
Width	16 Bit	16 Bit
Poly	1021 hex	1021 hex
Init	0x0000 hex	0xffff hex
RefIn	False	False
RefOut	False	False
XorOut	0x0000 hex	0x0000 hex
Check	0x31c3	0x29b1

Table 3: CRC parameter model

The aside 16 Bit CRC checksums are generated with a serial bitwise modulo-2 division by the polynomial: $x^{16}+x^{12}+x^5+1$. Despite the fact that the generator polynomial is defined exist many different ways to calculate the checksum.

Therefore Table 3 states the CRC generation according the Ross Williams „Parameterized Model For CRC Algorithms". For more information check e.g. the websites www.ross.net/crc for the document „A painless guide to CRC error detection algorithms" or the site rcswww.urz.tu-dresden.de/~sr21/crc.html for sample checksum calculations.

The CRC-CCITT is the checksum build as recommended in the ITU (former CCITT) recommendations X.25 and T.30.

Preferably the CRC checksum 1021h should be chosen, because its error detection probability is with 99,9969% till 100% depending on the error type much higher than of the LRC and it is supported by all Falcon Net detector types.

3.6.2 Terminal echo

Every data input character from a connected terminal is echoed (start-up default). You can switch off the echo with the input sequence *ESC E (1B 45 hex)* and the adapter message *!Echo off* will appear. This is a toggle switch, therefore repeating the action switches the echo on again. The escape characters by themselves are never echoed.

[1] The 8408 generator polynomial is not supported anymore

3.6.3 Delimiter, output data field separation

The default delimiter (';', semicolon) for the data output can be changed. The escape sequence *ESC D 'delimiter'* will be prompted with 'Insert delimiter:'. The insertion of a new delimiter changes the so far delimiter to the new one. Following delimiters are possible: horizontal tab (0B hex), space (20 hex), colon (2C hex) and semicolon (hex 3B).

If the delimiter is changed, the new delimiter is stated, e.g. *!Delimiter: '\t'* for horizontal tab.

Especially for a tabular formatted data output the horizontal tab delimiter will be of interest.

3.6.4 Gap units

All Falcon Nets transfer a 2 byte counter for the inter vehicle net time gap. The Falcon Net I transfers the gap in 50 ms units, range 0 ... 3276,75 seconds, the Falcon Net II and III delivers the gap in 10 ms units, range 0 ... 655,35 seconds. The adapter delivers the gap in seconds as an ASCII floating point value. For the correct calculation the gap units must be selected. With <ESC> 'G' following menu appears:

!Select GAP units:
!<1> 50 ms (Falcon Net I)
!<2> 10 ms (Falcon Net II and III)
! Choose 1 or 2: 2

If '2' is chosen „*! 10 ms GAP units set*" is confirmed.

3.6.5 Handshake

With the insertion <ESC> 'H' the RS485 software handshake of the binary protocol can be switched off. If switched off the adapter sends „!Handshake off". This option is a toggle switch.

Data blocks send from the detectors to the adapter are then not confirmed with the detector address anymore. This option is useful when you operate more than one adapter in a Falcon network, e.g. for data logging or test purposes, to avoid that the handshake is done more than once, respectively the address byte is destroyed by synchronous adapter bus accesses.

3.7 Adapter error messages

Error messages	Meaning
! Adapter RS232 line too long	The input line length was more than 18 characters, for this reason the line was erased
! Adapter RS485 receive buffer overflow	Though the RS485 FIFO input buffer is 60 data blocks deep, an overrun occurred, you need to increase the RS232 data transmission speed or take out some detectors of the net
! Adapter watchdog failure	Watchdog message that a system „hang up“ occurred
! Adapter power failure	The microprocessor power supply sank below 4,5 Volt. Check the power supply.
! Adapter default parameter set	If the message appears after the first factory initialisation it indicates that the EEPROM CRC parameter checksum is wrong.

4 Adapter RS485 binary protocol (see Falcon Net manuals)

Please refer to the Falcon Net manuals for the description of the binary data protocol, parameters and values, handshake and timing.
A description of the not in the manuals documented functions are found in chapter 8.

5 Adapter housing, dimensions and mounting

The light grey polyamide adapter housing is designed for the fast plug-in mounting on 35 mm DIN mounting rails.

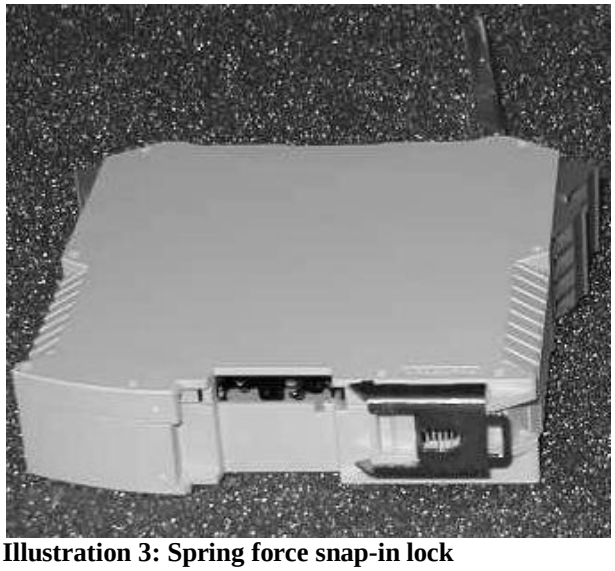

Illustration 3: Spring force snap-in lock

The adapter back is equipped with a spring-force snap-in lock. With a screw driver pulled against the spring-force the adapter can easily taken off the mounting rail.

The housing is designed for the use in protected cabinets. Therefore the protection class is just IP43 if mounted on the carrier rail.

5.1 Housing dimensions

The housing dimension are 99 x 22,5 x 113,6 mm. The total length mounted on the carrier rail

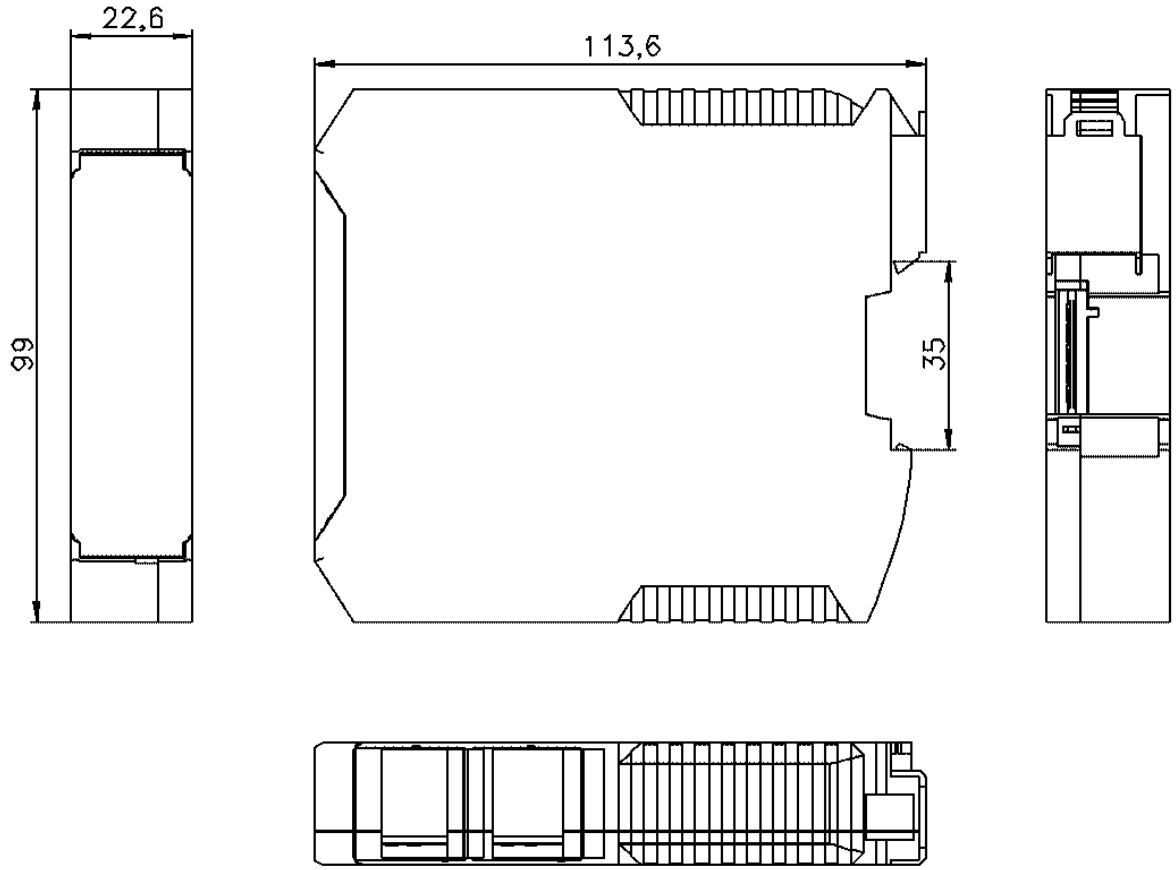

Illustration 4: Housing drawing

is 114,5 mm. Additional space of 20 till 30 mm must be foreseen below and above for the installation of the plug-in connectors with cable. The weight of the adapter is 125 gr without connectors.

5.2 Plug-in connector technical data

The used connector are Phoenix MC 1,5/-ST-5,08. Their data follow in Table 4.

Connector	Phoenix MC 1,5/-ST-5,08
Grid space	5,08 mm
Min/Max wire diameter (flexible or rigid)	0,14 - 2,5 mm², AWG 24-12
Wire sheath cutting length	7 mm
Max. operating voltage/current	250 V / 8 A

Table 4: connector technical data

6 Adapter technical data

6.1 Data processing and transmission

	RS232 side	RS485 side
Data format	8 data-, 1 stop-, no parity bit	8 data-, 1 stop-, no parity bit
Communication type	two-point	multi-point/network
Data transmission speed	4.8, 9.6, 19.2 or 57.6 kbaud	9.6, 19.2, 57.6 or 115,2 kbaud
Measurement data format	ASCII, decimal, 1 line per vehicle, default delimiter: ';' 'D';(address);(speed); (reflection); (gap)..CRLF	binary, 1 data block per vehicle with checksum and handshake
Data buffer size transmit	1 ASCII line	10 data blocks (LIFO)
Data buffer size receive	1 ASCII line	40 data blocks (FIFO)
Maximum cable length	100 m @ 9600 Baud	1300 m @ 115,2 kBaud
Transmission procedure	asynchronous full-duplex XON/XOFF supported	asynchronous half-duplex CSMA/CD with handshake

6.2 Power supply and interface electronic protection

Additionally the RS 232 driver lines are suppressor-diode (15 V, 600W) protected against ground. The Terminal A against B line is also protected with 15 V suppressor-diode.

Power supply protection against reverse connection:	Series-connected protective diode
Power supply EMC protection:	Varistor 38 V Suppressor-diode 39 V (600 W, 1 ns response time) Current compensated inductive coil filter
Power supply overload:	Miniature fuse 1 A on circuit board
EMC transient burst protection RS485 bus and RS232 drivers:	8 kV contact discharge 15 kV air gap discharge acc. IEC 1000-4-2
Isolation RS485 terminal lines:	2,75 kV DC

6.3 Power supply, interface and general ratings

Rating	Minimal	Typical	Maximal	Units
Power supply input voltage range:	10	12	38	V DC
Current consumption[1]:	-	60	80	mA DC
Input ripple voltage:	-	-	100	mVpp
RS485 driver	MAX481			
Number of transceiver on bus	-	-	32	
Driver output voltage (A, B)[2]	-8		12	V
Receiver input voltage (A,B)[2, 3]	-8		12	V
Differential driver output voltage	1,5	-	5	V
Receiver Input sensitivity	- 200	70	+ 200	mV
Driver short circuit current	35		250	mA
Input resistance	12			kOhm
Driver load	54	60		Ohm
RS232 driver	MAX202			
TxD output voltage swing[4]	+/- 5	+/- 8	-	V
RxD input voltage range	- 30		+ 30	V
RxD input hysteresis	low < 0,8		high > 2,4	V
RS232 input resistance	3	5	7	kOhm

Operating temperature range	- 40		+ 85	°C
Rel. humidity (non condensing)			95	%
MTBF (MILHDBK-217F)		239.000		Hours
Housing protection (EN60529)		IP50		

[1] RS232 and RS485 connected

[2] Against isolated ground, potential free

[3] Suppressor diode connected with +/- 15 Volt limitation

[4] with 3 kOhm load

7 Appendix A - Hyper Terminal configuration

To find the "Hyper Terminal" in the Microsoft Windows task bar, click on the start button in the task bar and then *Programs - Accessories - (Communication) - Hyperterminal.*

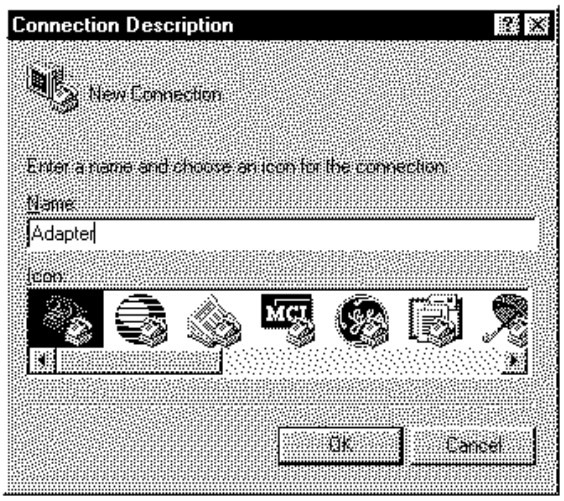

Illustration 5

Illustration 6

Start the program with a mouse click.

If you use the program the very first time a message prompt appears with the question if you want to define a modem connection. Quit with the "No" button.

Insert in the dialogue "*Connection description*" a name for the session and chose an icon, see also Illustration 5.

Confirm with the "OK" button.

In the next window you have to define the interface to which the connection shall be done.

Select a defined port designation in the selection field "*Connect using*", e.g. COM1 or COM2. The other input fields are shaded grey in consequence, because they are not needed for direct port connection, this fields are only used with modems, see Illustration 6.

Finally you have to insert or chose the data transmission parameters.

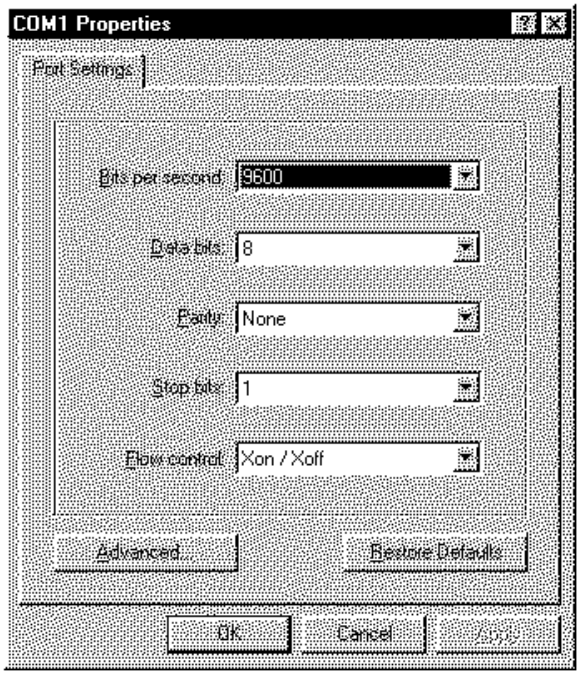

Illustration 7

Use the baudrate value as set by the baudrate switch for the RS232 communication, see chapter 2.2, the other data format parameters set as shown in Illustration 7 (8-N-1-Xon/Xoff).

After this is done and the "COM properties" dialogue is ended with the "OK" button the empty terminal screen appears.

Connect the Falcon net RS485-RS232 adapter with the prepared cable to the serial COM port of your PC and supply the adapter with power.

8 Appendix B - Yet undocumented Falcon Net functions

8.1 Binary data block format

Following functions and parameters are added to the one described in the digital Falcon Net reference guide:

Data block byte position													Meaning
1	2	3	4	5	6	7	8	9	10	11	12	13	
B													start byte uppercase ´B´ (hex 42)
	X												target address byte (0-15 detectors, 33-255 hosts)
		X											source address byte (0-15 detectors, 33-255 hosts)
			X										data block length, including LRC/CRC-checksum
				P									P - command set parameter or parameter report message
					U								U - undocumented function
						S	X	E	E				S-'send still alive message', 0/1 for de- / activated
						R	X	E	E				R-'message counter', 0/1 for de- / activated
						A	X	E	E				A-'suppress message repeat' , 0/1 for off/on
						N	X	E	E				N-'set detector address', range 0...15
				?									? - command parameter status requested
					U								U - undocumented function
						S							send status of 'send still alive message' function
						R							send status of 'message counter' function
						A							send status of 'suppress message repeat' function
						N							send programmed detector address

Following shortings are used:

X - hexadecimal number 0-255 (0-FF hex)
E - LRC (0-FF hex, 1 byte) or
CRC (0-FFFF hex, 2 byte) checksum

8.2 Function 'send still alive message'

Activated this function forces the digital Falcon Net II to send the result of the cyclic all 327,68 seconds done 'self test' to the host system. Self test and result report are described in the Falcon Net II reference guide.

Default setting: off

8.3 Function 'message counter'

Activated this function adds a 4-bit message upcounter (0,1,...15,0,1,...) for every new created message from the detector to the host in the upper nibble of the data block length byte (data block byte no.4).

Default setting: off

The LRC/CRC checksums are created over the send message including the message counter. The Falcon Net II Adapter version 3.01 ff ignores an added message counter.

8.4 Function 'suppress message repeat'

The suppress message repeat function forces the Falcon Net II detector not to wait for a response (send back detector address) of the connected host to his messages. Herewith he also does not repeat already send messages because he does not get the host response ('Acknowledge'). Messages are only repeated if the sending detector states a message collision when he reads back his message bytes from the data bus.

Default setting: off

8.5 Function 'set detector address'

The digital Falcon Net II detector can be programmed to a network detector address in a two point connection before installed in a network. If the address is set (not 0) the EEPROM based adress overrides the hex-switch set detector address on the interface socket. If this address is reset to 0 by the undocumented function 'N' then the set hex switch adress is valid again. This function cannot/shall not be used in the network.

Default setting: 0 (not valid/active = hex-switch setting active)

The address change gets valid with the parameter 'N' set response.

9 Appendix C - Declaration of conformity (CE)

Declaration of Conformity

The manufacturer: Via traffic controlling GmbH

Declares that the product: **Isolated RS485-RS232 Falcon Net Adapter**

Intended purpose: Network communication adapter

Complies with

- Health and safety requirements according low voltage directive 2006/95/EC

- Protection requirements concerning electromagnetic compatibility, according electromagnetic compatibility directive 2004/108/EC

Harmonised standards applied:

EN 60950-1: 2006-11+A1: 2007-11

EN 55022: 2007-04

EN 61000-6-4/-2 :2002-08/2006-03

Address: Via traffic controlling
Maybachstraße 39
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Place, date of issue: Leverkusen, 03 December 2008

Name and signature: Dipl.-Ing. (FH) J. Geßler