

V-Linx serial interface (FTI06002)

Hardware Installation Manual

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Table of contents

	Page #
Figures	4
Tables	4
References	6
Introduction	7
About the installation manual	7
Abbreviations list	8
Revision history	9
Safety instructions	10
1. Receiving, unpacking and checking	11
1.1 Procedure.....	11
2. Installation and mounting	12
2.1 Overview	12
2.2 ESR90x serial server	12
2.3 Modes	13
2.3.1 Direct IP mode	13
2.3.2 Virtual COM mode	13
2.3.3 Paired mode.....	13
2.3.4 Heart Beat.....	13
2.4 Hardware setup.....	14
2.5 Switches.....	14
2.5.1 Reset 14	
2.5.2 Run/Console switch	14
2.5.3 DB-9/Terminal switch (ESR901 only)	15
2.5.4 Connectors.....	15
2.5.5 Power connector	15
3. Technical specifications	16

Figures

Figure 2-1: V-LINX ESR90x serial server (typical)	12
Figure 2-2: Ethernet connection via LAN	14

Tables

Table 2-1: Connector types	15
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References

B&B Electronics website:

www.bb-elec.com

B&B Electronics documentation:

<http://mdm.kpno.noao.edu/td/PDFs/BB/ESR90x-1705m.pdf>

Introduction

The Installation manual provides instructions for installing and monitoring the interface as used within FT NavVision®. The chapters and sections are organized in chronological order in which the specific components must be installed and monitored (where applicable).

NOTE

This section provides only a summary of the most important safety requirements and notes, which will be mentioned in the individual sections. To protect your health and prevent damage to the devices, it is essential to read and carefully follow the safety instructions.

About the installation manual

The installation manual contains the following chapters:

- Chapter “Safety instructions” presents warning, caution and note information, which the user should pay attention to.
- Chapter “System configuration” gives an overview of the interface.
- Chapter “Receiving, unpacking and checking” contains instructions on how to receive, unpack or check the interface.
- Chapter “Installation and mounting” contains instructions on how to install and/or mount the interface.
- Chapter “Technical specifications” contains an overview of the main features and technical data.

Abbreviations list

AC	Alternating Current
ARP	Address Resolution Protocol
BaseT	Baseband Twisted-pair cable
CE	Conformité Européenne (European conformity)
COM	Communication
CPU	Central Processing Unit
CTS	Clear To Send
DC	Direct Current
DCD	Data Carrier Detect
DHCP	Dynamic Host Configuration Protocol
DIN	Deutsches Institut für Normung
DIP	Dual In-line Package
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
FCC	Fast Communications Controller
GND	Ground
HIM	Hardware Installation Manual
HTTP	Hypertext Transfer Protocol
ICMP	Internet Control Message Protocol
I/O	Input/Output
IP	Ingress Protection ¹ / Internet Protocol
LAN	Local Area Network
LED	Light Emitting Diode
Mbps	Megabit per second
MDIX	Medium-Dependent Interface Crossover
PLC	Programmable Logic Controller
RISC	Reduced Instruction Set Computer
RJ	Registered Jack
RTC	Real Time Clock
RTS	Request to Send
Rx	Receive
RxD	Received Data
TCP	Transmission Control Protocol
Tx	Transmit
TxD	Transmitted Data
UDP	User Datagram Protocol
WAN	Wide Area Network

¹ IPxx = International protection rating. Classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in electrical enclosures.

Revision history

Revisions issued since publication.

Issue	Date	Revision	Reason
1.0	April 28, 2010		First release

Safety instructions

The indications NOTE, CAUTION and WARNING have the following significance:

NOTE

An operating procedure, practice or condition etc., which it is essential to emphasize.

CAUTION

An operating procedure, practise or condition etc., which, if not strictly observed, may damage or destroy equipment.

WARNING

An operating procedure, practise or condition etc., which, if not carefully observed may result in personal injury or loss of life.

1. Receiving, unpacking and checking

1.1 Procedure

1. Remove transport casing
2. Visually inspect the respective parts
3. Check that all items are included in accordance with the delivery documents.
4. Check for transport damages.
In case of transport damage appropriate action must be taken against the latest carrier and the nearest certified dealer or representative should be informed.
5. Store the part in the original transport package in a dry and dust free place, if the unit is not to be installed immediately. Observe the environmental requirements stated in the specifications.

NOTE

Notify your sales representative if any of the above items is missing or damaged.

2. Installation and mounting

2.1 Overview

Allow connection of RS-232, RS-422 or RS-485 devices to an Ethernet network. The serial ports can be accessed over a LAN/WAN using Direct IP mode, Virtual COM port, or Paired mode connections. The 10/100 Mbps Ethernet connection auto-selects 10BaseT or 100BaseTX and indicates the type of connection with a bi-colour link light. ESR90x serial servers (see Figure 2-1) are built for use in industrial environments, featuring an IP30, approved slim line DIN rail mountable case. They operate from a range of AC or DC power supply voltages, support redundant DC power and feature terminal block power connectors.



Figure 2-1: V-LINX ESR90x serial server (typical)

2.2 ESR90x serial server

The ESR90x servers enable communication with serial devices over a LAN or WAN. Serial devices no longer are limited to a physical connection to the PC COM port. They can be installed anywhere on the LAN using TCP/IP or UDP/IP communications. This allows traditional Windows PC software access to serial devices anywhere on the LAN/WAN network.

2.3 Modes

2.3.1 Direct IP mode

Direct IP connections allow applications using TCP/IP or UDP/IP socket programs to communicate with the asynchronous serial ports on the serial server. In this type of application the serial server is configured as a TCP or UDP server.

The socket program running on the PC establishes a communication connection with the serial server. The data is sent directly to and from the serial port on the server. When using UDP protocol the server can be configured to broadcast data to and receive data from multiple IP addresses.

2.3.2 Virtual COM mode

Install "Virtual COM mode" allows the user to add a driver, to provide a virtual COM port on the computer. The new COM port shows up in the "Device manager".

Windows programs using standard Windows API calls are able to interface to virtual COM ports. When a program on the PC opens the new COM port, it communicates with the remote serial device connected to one of the ports on the serial server.

After connection, the LAN is transparent to the program and serial device. Applications are able to work just as if the serial device is connected directly to a physical COM port on the computer. The virtual COM port software converts the application's data into IP packets, sends it across the network to the serial server, which converts the IP packet back to serial data and sends the data out a serial port located on the serial server.

To use this mode, the serial server must be set to either TCP/server or UDP/server with a designated communication port number. The virtual COM driver is the TCP or UDP client.

2.3.3 Paired mode

"Paired mode" is also called serial tunneling. In this mode any two serial devices that can communicate with a serial link will be able to communicate using two serial servers and the LAN.

Two serial servers are connected to a network, one configured as a TCP or UDP client and the other as a TCP/UDP server. When setting up the server the remote IP address section must contain the address of the client. This will allow the client's IP address to pass the IP address-filtering feature of the server. Conversely, the Remote IP address of the client must contain the server's IP address. Both communication port numbers must be the same.

2.3.4 Heart Beat

The Heart Beat protocol connection provides a reliable communications connection in virtual COM port mode or with paired connection mode. This feature restores the connection if communications are temporarily lost at either end due to loss of power or Ethernet connection. Without this feature a device that loses a connection and stops communicating would not be able to reconnect without human intervention. A TCP data connection can be lost when there is a power failure or temporary loss of an Ethernet connection on either the client or server. If a loss occurs the "Heart Beat" feature will try to reconnect the TCP data connection every five seconds until communications is established again. The "Heart Beat" feature is available for use in "Virtual COM port mode" and "Paired connection mode". This is not available when using a UDP application.

2.4 Hardware setup

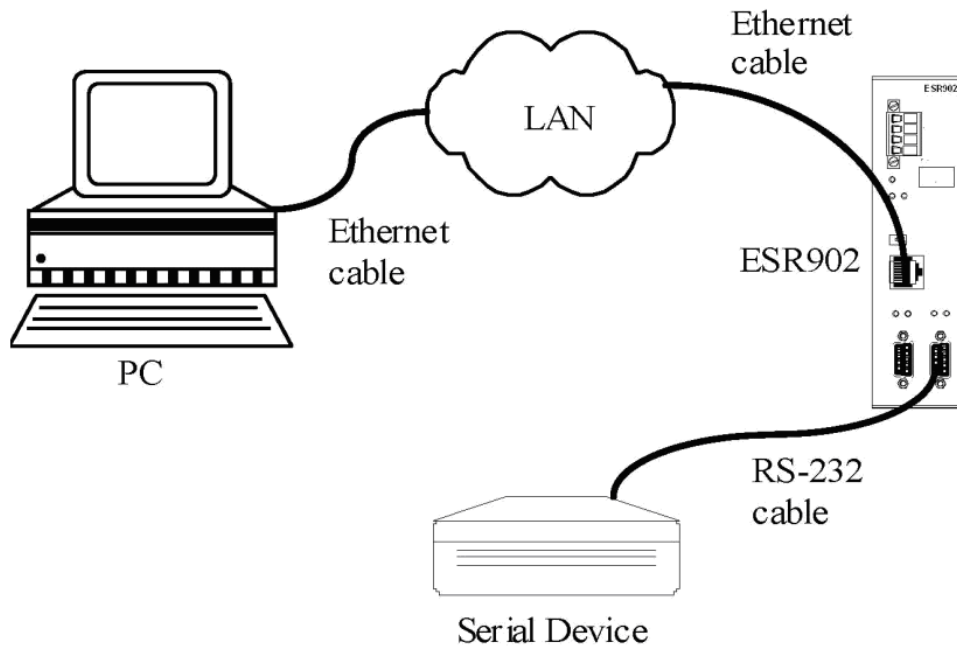


Figure 2-2: Ethernet connection via LAN

Step	Description
1	Connect the Serial server to the network using a standard (Cat5E) network cable.
2	Connect the Serial server to the RS-232 port on the serial device.
3	Set the Run/Console DIP switch to the "Run" position.
4	Apply power to the serial server.

2.5 Switches

2.5.1 Reset

A reset switch (recessed) that allows the unit to be reset. Insert a small plastic tool, press lightly and hold for three seconds. The "Link" and "Ready" LEDs will go out and then come back on.

2.5.2 Run/Console switch

A recessed single DIP (dual inline package) switch allows the serial server to be switched between "Run mode" and "Console mode".

When switched to the "Console position" the serial server enters the "Console mode". This allows you to configure the serial server from a PC running a terminal program such as HyperTerminal without connecting the server to the network. To communicate with the connected serial device the switch must be returned to "Run" position.

2.5.3 DB-9/Terminal switch (ESR901 only)

The DB-9 / Terminal switch allows connection to the serial port (RS-232, 422 or 485) via the DB-9M connector or the five-terminal removable terminal block.

2.5.4 Connectors

Connector type	Detail
Ethernet	One standard RJ-45 receptacle that allows the Serial server to be connected to an Ethernet hub, switch, or wall plate using a standard straight-through RJ-45 (male) Ethernet cable. To connect directly to an RJ-45 Ethernet port on a PC or laptop a crossover Ethernet cable must be used.
Serial port(s)	ESR901: One serial port with two connector options: one (DB-9M) or one five-terminal removable terminal block (DIP switch selectable)
	ESR902: Two serial port connectors (DB-9M)
	ESR904: Four serial port connectors (DB-9M)

Table 2-1: Connector types

2.5.5 Power connector

The "Power connector" is a removable terminal block with four terminals. The terminals are arranged as follows (from top to bottom):

Terminal	Connected to	Description
GND	Negative side of DC power supply (if DC power used). Also connects negative side of backup DC power supply (where applicable).	Internally, the chassis ground of the serial server is connected to this terminal.
AC IN	One side of AC power supply (if AC power used).	Either AC or DC power can be used to power ESR serial servers. Power supply can voltages range from 9 to 48 VDC or 8 to 24 VAC.
AC/DC + IN	The other side of AC power supply (if AC power used) or positive side of DC power supply (if DC power used).	
Backup DC+ IN	Positive side of backup DC power supply.	Backup power must be DC voltage and can be any voltage between 9 and 48 VDC.

3. Technical specifications

Detail	Description
Serial connections	<u>ESR901:</u> One (1) terminal block or DB-9 male <u>ESR902:</u> Two (2) DB-9 male <u>ESR904:</u> Four (4) DB9 male - DTE configuration
Serial - model ESR901	One RS-232, RS-422 or RS-485, half & full-duplex, software selectable
Serial - model ESR902	Two RS-232, RS-422 or RS-485, half & full-duplex, software selectable
Serial - model ESR904	Four RS-232, RS-422 or RS-485, half & full-duplex, software selectable
Ethernet connection	Single RJ-45 female
Serial connectors	<u>ESR901:</u> One 9-pin, D-type male (DB9m) and one removable terminal block , connector selectable using DB9/terminal switch, interface type software selectable as RS-232, RS-422, RS-485H or RS-485F <u>ESR902:</u> Two 9-pin D-type male (DB9m), interface type software selectable as RS-232, RS-422, RS-485H, RS485F <u>ESR904:</u> Four 9-pin D-type male (DB9m) DTE, interface type software selectable as RS-232, RS-422, RS485H, or RS-485F
LAN	10/100 Mbps auto-detecting - 10 Base T, 100 Base TX
RS-232	TX, RX, RTS, CTS, DTR, DSR, DCD, GND
RS-422	TX+, TX-, RX+, RX-, RTS+, RTS-, CTS+, CTS-, GND
RS-485H	Data+, Data-, GND
RS-485F	TX+, TX-, RX+, RX-, GND
Data rate	110 bps to 230.4 kbps
Protocols	TCP, IP, ARP, DHCP, Telnet, HTTP, UDP, ICMP
Management	V-Linx manager, Web server, Serial console, Telnet
Power requirements	8 VAC to 24 VAC or 9 VDC to 48 VDC
Power consumption	<u>ESR901:</u> 320 mA @ 12 VDC <u>ESR902:</u> 340 mA @ 12 VDC <u>ESR904:</u> 360 mA @ 12 VDC Power supply start-up time ≤ 24 ms
Power connector	Terminal block
Operating temperature	-10 to 80°C

Storage temperature	-20 to 85°C
Humidity	5 - 98% R.H.
Approvals	CE, FCC, IP30
Indicators	POWER LED → Red
	LINK LED → Yellow or green (10 BaseT or 100 BaseTX)
	READY LED → Flashing green
Dimensions	<u>ESR901/ESR902:</u>
	4.46 x 15.52 x 10.46 cm
	<u>ESR904:</u>
	4.46 x 18.03 x 10.46 cm