

# **Ethernet J1939 interface (FTI06026)**

## **Hardware Installation Manual**

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## References

ICP DAS i-7540D User's manual:

[http://ftp.icpdas.com/pub/cd/fieldbus\\_cd/can/converter/i-7540d/manual/i7540dmanual.pdf](http://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7540d/manual/i7540dmanual.pdf)

ICP DAS i-7540D Quick start user guide:

[http://ftp.icpdas.com/pub/cd/fieldbus\\_cd/can/converter/i-7540d/manual/i7540dquickstart.pdf](http://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7540d/manual/i7540dquickstart.pdf)

## Introduction

The Installation manual provides instructions for installing and configuring the CAN-Ethernet gateway as used within FT NavVision®. The chapters and sections are organized in chronological order in which the relevant component must be installed and configured (where applicable).

## 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 "Receiving, unpacking and checking" contains instructions on how to receive, unpack or check the I/O modules.
- Chapter "Overview" gives a general description of the gateway.
- Chapter "Installation and mounting" contains instructions on how to install and/or mount the gateway.
- Chapter "Technical specifications" contains an overview of the main features and technical data.

## Abbreviations list

AC	Alternating Current
API	Application Programming Interface
CAN	Controller Area Network
COM	Communication
CPU	Central Processing Unit
CTS	Clear To Send
DC	Direct Current
DHCP	Dynamic Host Configuration Protocol
DIN	Deutsches Institut für Normung
DIP	Dual In-line Package
DSR	Data Set Ready
ER	Error
GND	Ground
IM	Installation Manual
I/O	Input/Output
INIT	Initialize
LED	Light Emitting Diode
Mbps	Megabit per second
RJ	Registered Jack
RTC	Real Time Clock
RTS	Request To Send
Rx	Receive
RxD	Receive Data
SRAM	Static Random Access Memory
TCP/IP	Transmission Control Protocol/ Internet Protocol
Tx	Transmit
TxD	Transmit Data
Vrms	Voltage, root mean square

## Revision history

Revisions issued since publication.

Issue	Date	Revision	Reason
1.0	August 24, 2010		First release



## Safety instructions

**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.*

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

**NOTE:**

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

1. Remove the 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

## 2. Overview

### 2.1 General

The ICP DAS i-7540D CAN-Ethernet gateway is a solution that enables CAN networks to be coupled together over the Internet/Ethernet, whereby remote monitoring and control is possible. The CAN-Ethernet gateway controls networked communication and makes a transparent CAN-based application interface available to the user.

The device supports a transparent, protocol-independent transfer of the CAN messages, thus allowing its implementation into a wide range of possible applications. Furthermore, the CAN-Ethernet gateway can be used with various higher layer CAN protocols (e.g. CANopen, DeviceNet or other proprietary protocols).

Figure 2-1 shows the CAN-Ethernet gateway application architecture.

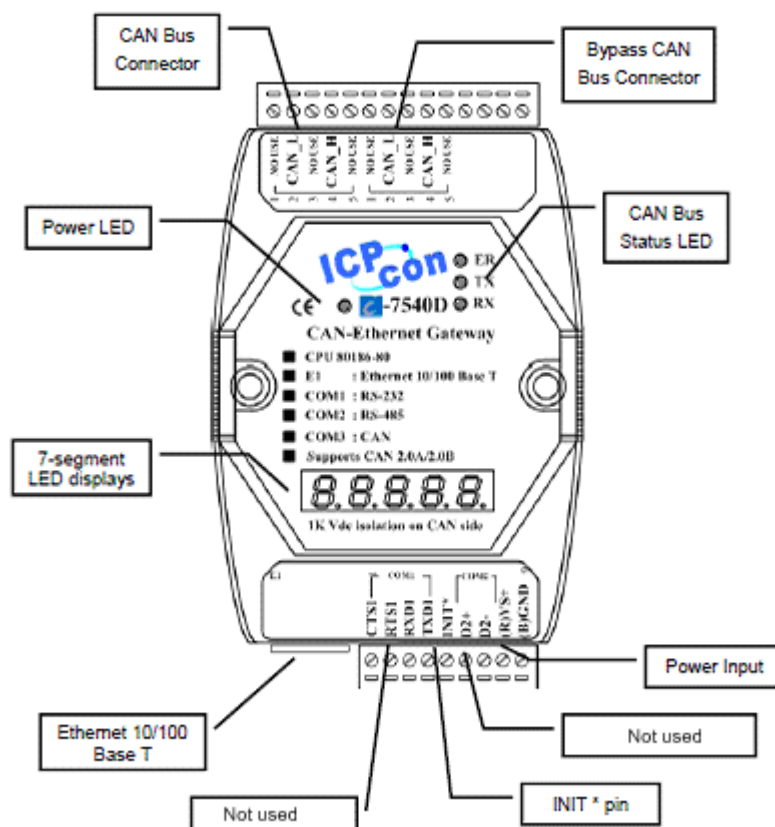


Figure 2-1: Pin assignment

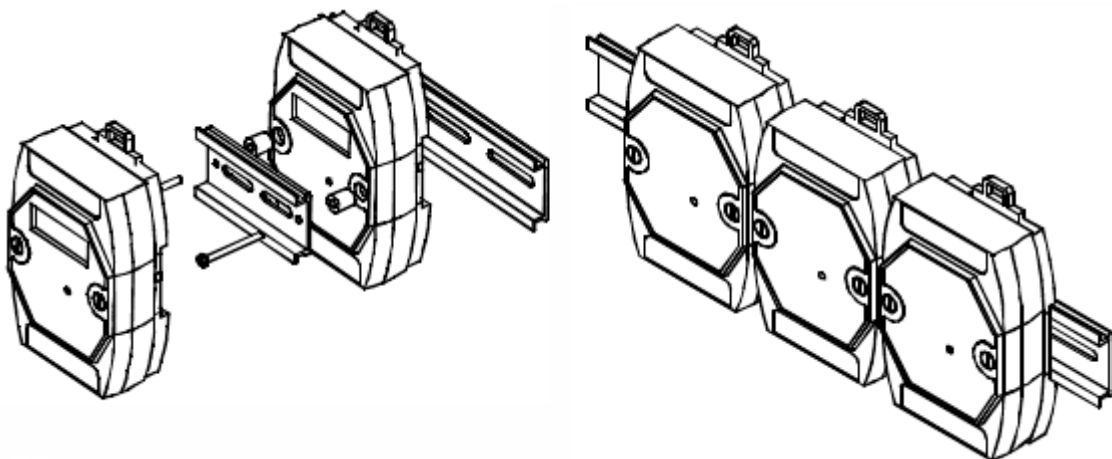
## 3. Installation and mounting

### 3.1 Mounting

**NOTE:**

*Be aware of the fact that the unit is correctly grounded onto the DIN-rail.*

The ICP DAS i-7540D can be easily mounted onto a DIN-rail by means of an orange clamp attachment.



**Figure 3-1: Stack and DIN-rail mounting**

### 3.2 Power supply connection

The ICP DAS i-7540D must be supplied with 10 – 30 VDC electrical power. The VS+ and GND are easily recognizable on the lower front of the gateway housing (see Figure 3-2).

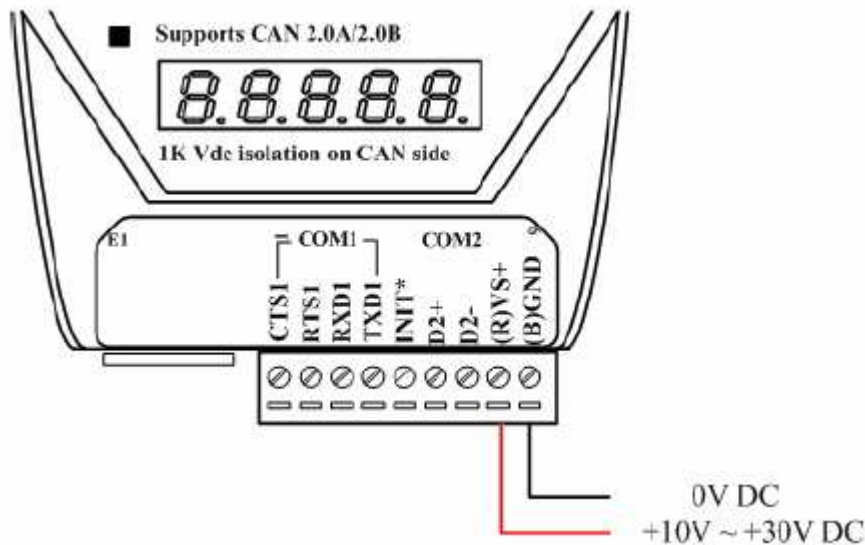


Figure 3-2: Power connection

### 3.3 Connection to CAN bus

In order to provide an easy CAN bus wiring, the I-7540D supplies one CAN port with two CAN bus connector interfaces. Each connector built on the I-7540D looks like Figure 3-3.

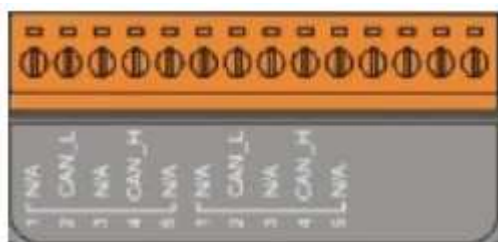


Figure 3-3: CAN bus connector

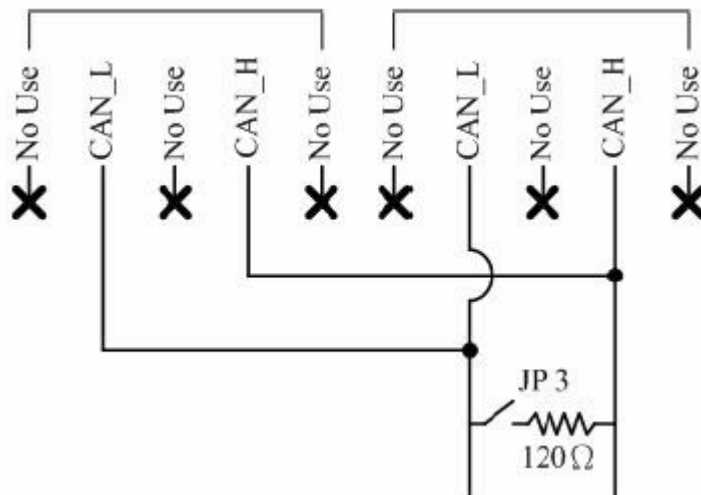
Pin	Signal	Description
1	N/A	Not connected
2	CAN_L	CAN_L bus line (dominant low)
3	N/A	Not connected
4	CAN_H	CAN_H bus line (dominant high)
5	N/A	Not connected

Table 3-1: Pin assignment (CAN bus)

**NOTE:**

The electronic circuit comprises of a 120  $\Omega$  resistor.

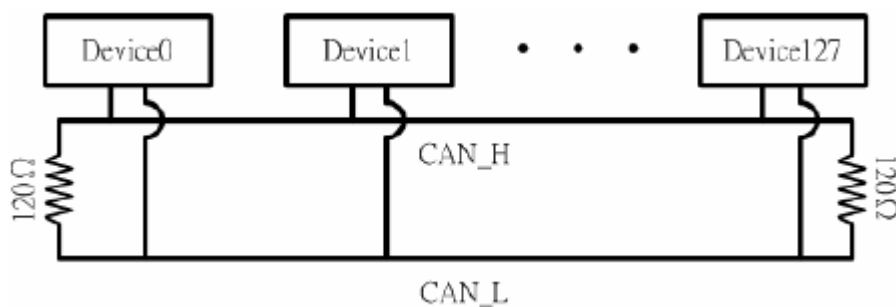
Note that the bypass CAN bus wiring, the I-7540D supplies one CAN port with two CAN bus connector interfaces. Each connector built on the I-7540D and looks like Figure 3-4.



**Figure 3-4: Electronic circuit CAN bus connector**

### 3.4 Resistance check

Users should check the resistances of their CAN bus, before installing a new network as shown in Figure 3-5.



**Figure 3-5: Terminator resistor**

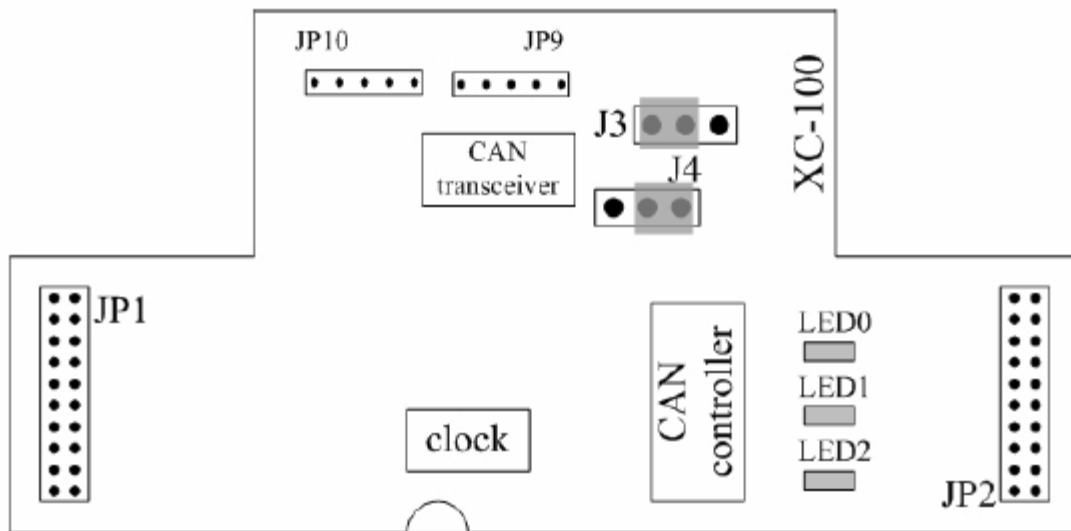
To minimize the voltage drop on long distance, the terminal resistance must be higher than the values defined in ISO 11898-1.

The table below must be used as a reference.

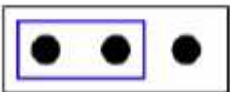

Bus length (m)	Bus cable parameters		Terminal resistance ( $\Omega$ )
	Length related resistance (m $\Omega$ /m)	Cross section (type)	
0 ~ 40	70	0.25 (23AWG) ~ 0.34 mm <sup>2</sup> (22AWG)	124 (0.1%)
40 ~ 300	< 60	0.34 (22AWG) ~ 0.6 mm <sup>2</sup> (20AWG)	127 (0.1%)
300 ~ 600	< 40	0.5 ~ 0.6 mm <sup>2</sup> (20AWG)	150 ~ 300
600 ~ 1000	< 20	0.75 ~ 0.8 mm <sup>2</sup> (18AWG)	150 ~ 300

**Table 3-2: Relation between bus cable and length**

Therefore, the I-7540D module supplies a jumper for users to connect the terminator resistor or not. If users want to use this terminator resistor, please open the I-7540D cover and use the JP3 jumper to activate the 120  $\Omega$  terminator resistor built in the system, as in the figure 2-5. Note that the default setting is active. And about the J3 jumper setting, please refer to Table 3-3.



**Figure 3-6: I/O expansion board**

Apply the termination resistor (120 $\Omega$ )	Don't apply the termination resistor (120 $\Omega$ )
J3 	J3 

**Table 3-3: Jumper selection**

The CAN-Ethernet gateway module supplies a jumper for users to connect the terminator resistor or not. If users want to use this terminator resistor, please open the CAN-Ethernet gateway cover and use the JP3 jumper to activate the 120  $\Omega$  terminator resistor built in the system, as in the Figure 3-6. Note that the default setting is active. And about the J3 jumper setting, please refer to Table 3-3.

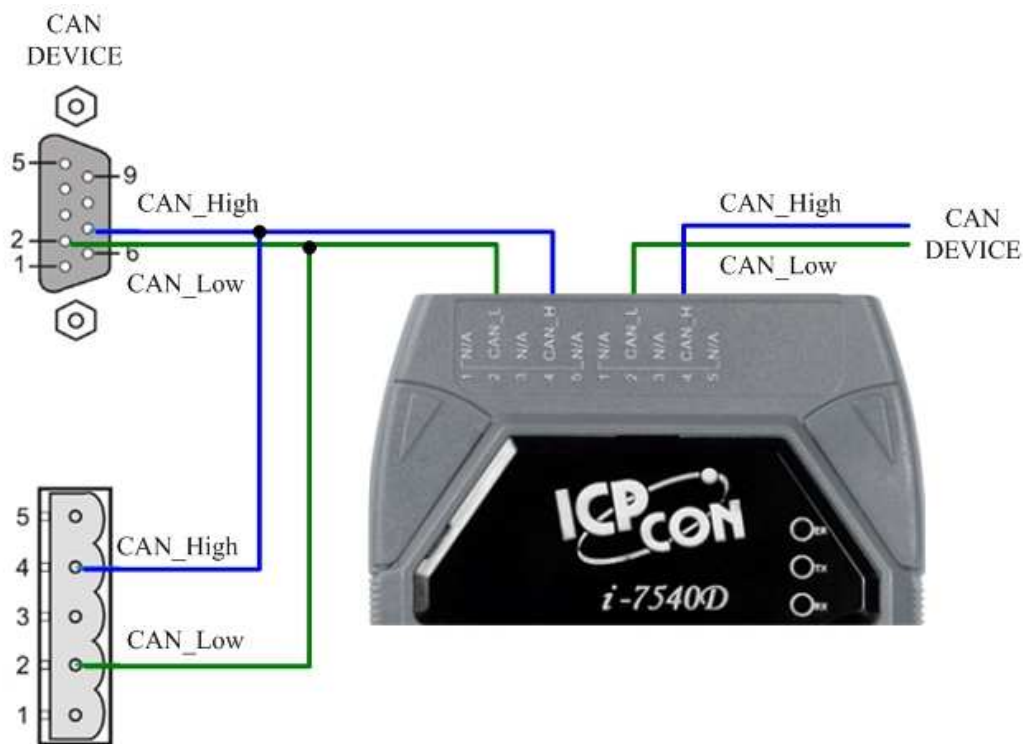


Figure 3-7: CAN connection

I-7540D comprises of a single CAN connection and can be addressed from two different pin connections i.e. pins 2 and 4

Whereas:

- Pin 2 is CAN\_Low
- Pin 4 is CAN\_High.

#### CAUTION

- **The CAN connection is isolated to 2500 V, therefore an additional auto coupler is not required**
- **Be aware of the fact that, the terminal block pin numbers are not conforming the unit numbering. In other words be careful with the wire connections**
- **On the rear side of the unit you will find a DIP-switch with positions “Init” and “Normal”. Set the switch to “Normal” to avoid communication problems.**



### 3.5 Ethernet connection

The Ethernet (10/100 Base-TX) signals are routed to an RJ45 socket for easy connection using a CAT 5E network cable. On power on of the gateway, it will auto-negotiate the network speed and connection.

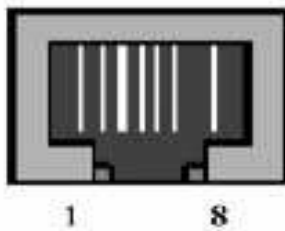


Figure 3-8: Ethernet connector

Pin	Name	Description
1	TX+	Transmit data +
2	TX-	Transmit -
3	RX+	Receive data +
4	N.C.	Not Connected
5	N.C.	Not Connected
6	RX-	Receive data -
7	N.C.	Not Connected
8	N.C.	Not Connected

Table 3-4: Pin assignment (Ethernet connector)

### 3.6 LED indication

The I-7540D provides the converter function between the Ethernet port and the RS-232 & RS-485 & CAN port. It can handle both 11-bits and 29-bits ID format according to whether it is a CAN 2.0A or 2.0B. It also provides some LEDs to indicate to users what situation the i-7540D is in.

#### 3.6.1 Power LED

The default shipping of i-7540D will be firmware inside, so the red indicator-LED of i-7540D will be ON 0.5 second then OFF 0.5 second periodically (see Figure 3-9).

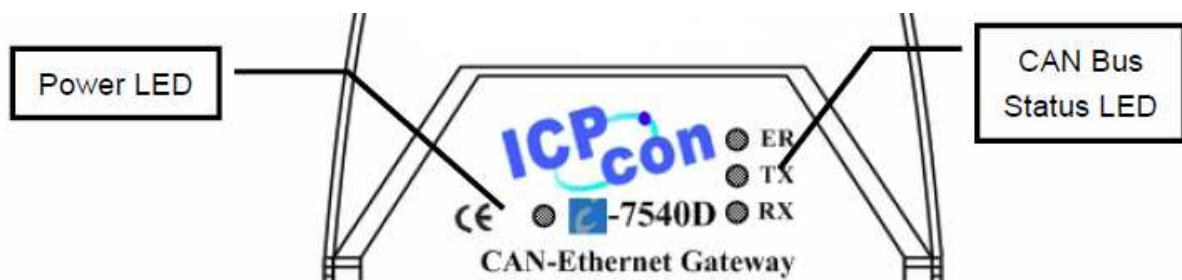


Figure 3-9: LED indications

### 3.6.2 CAN Bus Status LED

The i-7540D includes three single-color LED displays (see Figure 3-9) to indicate the status of module, network and I/O device. They are ER-LED (red), TX-LED (green) and RX-LED (red). The indicators assist maintenance personnel in quickly identifying a problem unit. The LED test is to be performed at power-up. When the CAN communication events occur, these indicators will be triggered to illuminate with different conditions.

- **ER (error) LED**

The ER-LED (Figure 3-9) provides device status and indicates whether or not the device is operating properly. Table 3-5 shows the conditions of ER status.

Therefore, when the device is operated normally, the ER-LED must be off. If the LED flashes red, users can use the “99S” command, to read the status of the i-7540D.

ER (error) LED	
Condition	Description
Off	Device is normal; no error occurs
Red	Device has unrecoverable fault
Flashing red	Device has recoverable fault. To recover: reset device or perform error recovery

Table 3-5: ER LED conditions

- **TX (transmit) LED**

The TX-LED (Figure 3-9) indicates the status of message transmitted. Table 3-6 shows the conditions of TX status. Therefore, when the device transmits messages to the CAN bus, the TX-LED is flashing green, which is normal.

TX (transmit) LED	
Condition	Description
Off	No data is being transmitted to the CAN side
Flashing green	Data are transmitting to the CAN side
Solid green	Transmit data error

Table 3-6: TX LED conditions

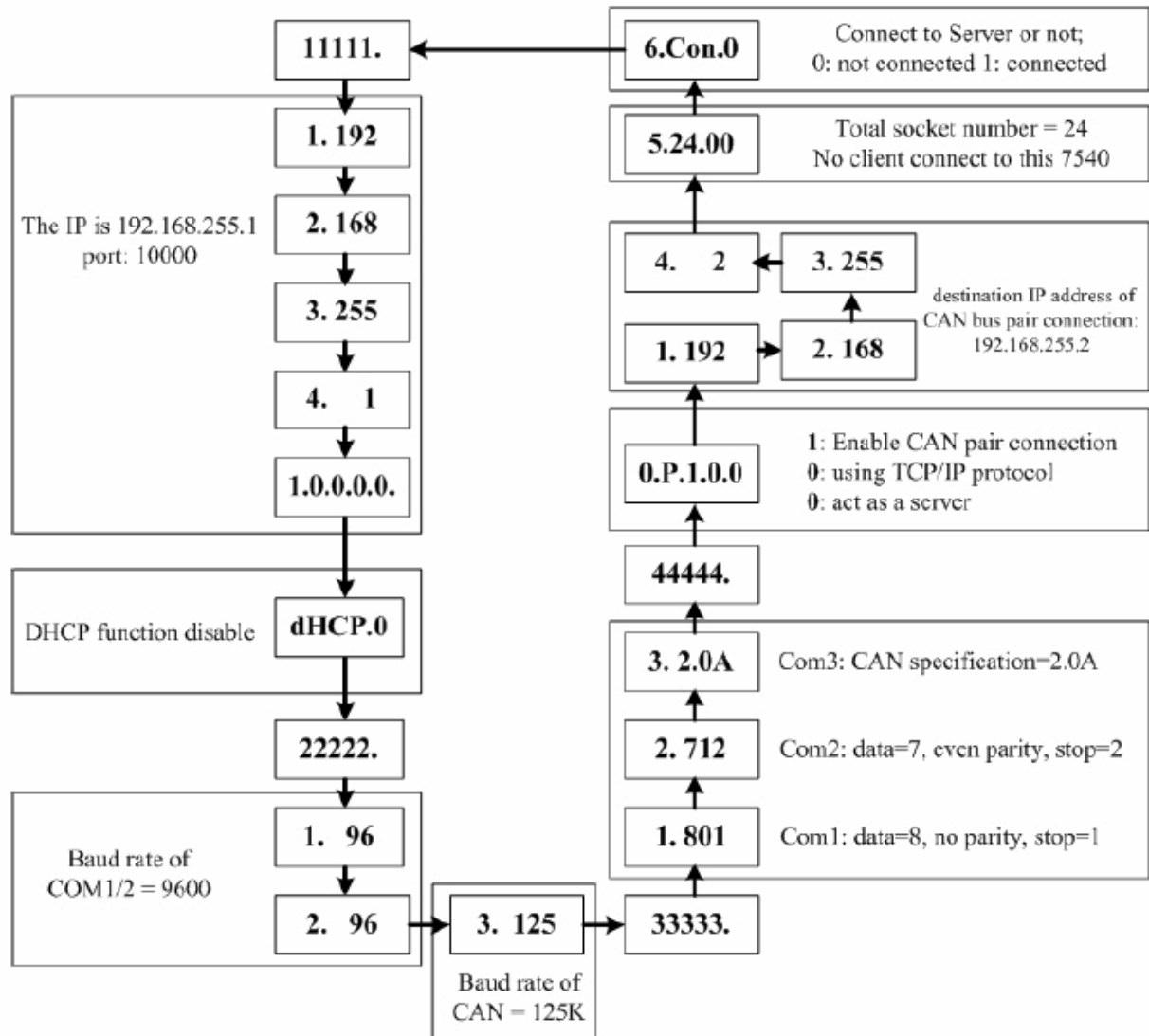
- **RX (receive) LED**

The RX-LED indicates the status of message received.

RX (receive) LED	
Condition	Description
Off	No data is being received
Flashing red	Data is being received
Solid red	Receive error messages

Table 3-7: RX LED conditions

### 3.6.3 5-digit 7-segments LED displays



**Figure 3-10: 7-segments LED displays**

The important information of i-7540D can be divided as follows:

- Group-ID 11111: IP information
- Group-ID 22222: Baud rate of all ports
- Group-ID 33333: Configuration of all ports
- Group-ID 44444: CAN bus pair connection information and client-connected information.

## 4. Technical specifications

Description	Detail
<b>CPU</b>	
CPU	80186, 80 MHz or compatible
SRAM	512K Bytes
Flash	512K Bytes
EEPROM	16K Bytes
NVRAM	31 Bytes (battery backup, data valid up to 10 years)
RTC (Real Time Clock)	Yes
64-bit hardware serial number	Yes
Build-in watchdog timer	Yes
<b>Communication interface</b>	
COM1	RS-232 (TxD, RxD, RTS, CTS, GND)
COM2	RS-485 (D2+, D2-)
CAN	One CAN port with two CAN bus connector interfaces (CAN_H and CAN_L)
Ethernet port	10/100 Base-TX Ethernet controller
<b>COM port formats</b>	
Data bit	7, 8
Parity	Even, Odd, None
Stop bit	1
Baud-rate	115.2 Kbps max.
<b>CAN port formats</b>	
CAN controller	Phillip SJA1000T
CAN Transceiver	Phillip 82C250
Isolated	2500 Vrms on CAN side
Baud-rate	1 Mbps max.
<b>Dimensions</b>	
i-7540D	123 x 72 x 33 mm
<b>Operating environment</b>	
Operating temperature	-25°C to +75°C
Storage temperature	-40°C to +80°C
<b>Power</b>	
Protection	Power reverse polarity protection
Frame ground for ESD protection	Yes
Required supply voltage	-10 to +30 VDC (non-regulated)
Power consumption	2.5 W

## 5. Outline drawing

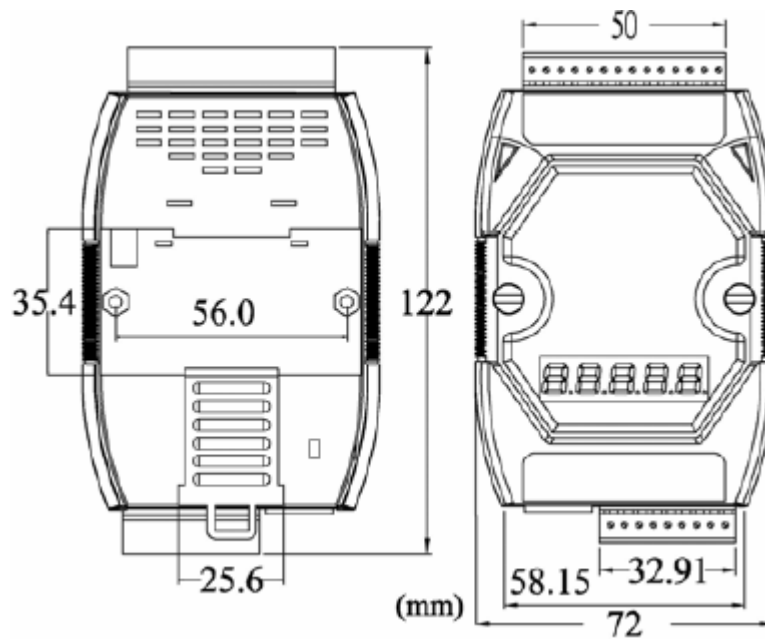


Figure 5-1: Outline drawing

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