Technical Data of the SensFloor® Receiver SE3P

Overview:

The SE3P is a transceiver which converts between wireless messages of the SensFloor® sensor underlay and RS232 messages on a PC's COM port. The device consists of a wireless module in a compartment that is equipped with an FTDI UART to USB adapter.

The SE3P is available in various versions which differ in the radio frequency they are tuned to: 868.3MHz for the European market, 920 MHz for the USA, Canada and Australia and 920.4 MHz for Japan.

When connecting the USB plug to Windows-, Linux- or IOs machines, usually the required drivers are loaded automatically.

Technical Data:

Radio frequency:	868.3 / 920.0 / 920.4 MHz (see label)	**Cable length:**	180cm
Voltage	5VDC (USB)	**Size of housing:**	50x39x14 mm³
Current:	20mA (max)	**Operating temperature:**	-10°C to +40°C
Radio range:	ca. 20m (open field)	**Serial interface:**	8N1, 115 kBaud
		Message format:	FD (hex) + 16Bytes

⚠ **Safety instructions:**
Before connecting and using the device, please also read the manual for the SensFloor® System! Have faulty units checked by the manufacturer! Do not open the unit housing, keep it away from moisture and do not change any parts of the device unauthorizedly!

Intended use:

Use the receiver in combination with SensFloor® products only. The device must be tested for proper function and a working wireless connection to the dedicated SensFloor® products on a regular basis. The manufacturer is not liable for damages caused by inappropriate or unintended usage.

General technical information

The SensFloor® receiver SE3 is used for the wireless reception and processing of messages from SensFloor® products. The version SE3-P (for PC-connection) is plugged into a PC-USB-socket from which it is powered and to which it transmits the sensor data. The SE3P can also be used to send configuration data from the PC to the SensFloor® products.

Connection

Please first install your purchased SensFloor®-products according to the respective user manual. By means of the SE2-P it is possible to stream the wireless SensFloor® sensor data to a computer for further processing. To communicate with the SE3-P, the computer needs a driver which is usually already provided by the computer's OS. If not, you can download and install a Virtual COM Port (VCP)-driver for your operating system from the website

www.ftdichip.com/Drivers/VCP.htm

Now plug the USB-plug of the SE3-P into a free USB-socket of your computer. After this, the operating system will recognize a new USB device, the VCP-driver will be installed, and a new serial COM-port will appear in the control panel of your computer. To this COM port the sensor data is streamed in real time. The data can be visualised, for instance, by means of a serial terminal programme such as HTerm (www.der-hammer.info).

Configure the terminal such that it uses the new COM-port with 115kBaud and 8N1 transmission format. In case this is supported by the terminal, configure the message display such that a carriage return is added every 17 bytes as every message from the SE3-P is 17 bytes long. To further improve the readability of the messages, switch the output to HEX-format.

Every serial message from the SE3-P starts with the frame-start-identifier 0xFD. It is also possible to send data from the terminal program to the SE3-P either to configure the SE3-P itself or to transmit data to any other SensFloor®-product. It is important to note that the SE3-P accepts only serial messages which have a length of exactly 17 Bytes and start with 0xFD.

It is also possible to read the streamed sensor data from the COM-port and process it by means of software self-developed or purchased from Future-Shape. In the latter case, please refer also to the user manual of the Future-Shape software.

Message format

Following the frame start indicator 0xFD, every SensFloor® message is encoded in 16 bytes. A typical message looks like

```
01 e4 01 02 fe 00 11 01 98 82 7f 7f 7f 7f 92 a3
===========       ==   =======================
  address        meaning        data block
```

in hexadecimal format. The first four bytes encode the address of the radio module the message originates from or is directed to. The seventh byte encodes the *meaning* of the message, and the last eight bytes contain payload data. All other bytes are for special purposes only and are not required for processing sensor data. A detailed description of the message format can be requested from the manufacturer. The following is a summary:

Address

The address consists of a two-byte *room ID* (rID) (**01 e4** in the example) which is the same for all SensFloor® devices in one installation. Only devices with the same rID can communicate with each other.

The following two bytes (**01 02**) enumerate the SensFloor® devices. For the radio modules in the SensFloor®, the values are usually the coordinates of the modules within the underlay. **01 02** is, therefore, the first module in the second row of the underlay. As the modules are arranged in a regular grid with given distance (usually 50cm), the location of the module in the room can be calculated from the coordinates.
The addresses of the SensFloor® transceivers are enumerated usually using the values **80 00**, **80 01**, etc. such that transceivers can be easily distinguished from the floor modules.

Meaning

The seventh byte (**11**) encodes the meaning of the message and needs to be interpreted bitwise. Starting with the lowest bit on the right, the bits have the following meaning when set:

bit 0: if the message stems from a sensor module this flag indicates a significant change of the capacitance values, and the data block contains these.
bit 1: message is a *master message* regularly sent out by a SensFloor® transceiver used to synchronize the sensor modules in an underlay
bit 2: message is a *status request* usually sent out by a SensFloor® transceiver to actively ask a SensFloor® device, identified by its address, for its status
bit 3: message is an *answer* to a status request
bit 4: if the message stems from a sensor module, this bit indicates that the capacitance values in the data block are interpreted such that the value **80** (=128 decimal) corresponds to the base capacitance of the sensor field. This way, in addition to positive capacitances (values **80** to **ff**) also "negative" capacitances (values **00** to **7f**) corresponding to the removal of a static object from a sensor field, can be expressed. If the bit is not set, the base capacitance is **00** and only positive capacitances can be expressed (values **00** to **ff**).
bit 5: the message is used to change the configuration parameters of a SensFloor® device. This is a higher-level function and not required for simple data processing.
bit 6: by setting this bit in a message to a sensor module, its capacitance measurement is recalibrated.
bit 7: message stems from a transceiver and not from a sensor module.

Sensor messages

As the seventh byte of the example message is **11** (bit 0 and 4 set), it is a sensor message and the 8 bytes in the data block are capacitance values with base capacitance **80**.

The eight sensor fields connected to each sensor module are enumerated in clockwise direction. Therefore, the sensor fields 1, 7 and 8 have a capacitance which is significantly higher than the base capacitance as the values **98**, **92** and **a3** indicate. The message can, therefore, be interpreted as an activation of these sensor fields on the floor, e.g., caused by a person stepping on that location in the room. Further messages will be received when the person leaves the location and moves somewhere else.

Warranty:

Within the statutory warranty period we undertake to rectify free of charge by repair or replacement any product defects arising from material or production faults. Any unauthorized tampering with, or modifications to, the product shall render this warranty null and void.

Disposal instructions:

Waste electrical products should not be disposed of with household waste!

Dispose of the waste product via a collection point for electronic scrap or via your specialist dealer. Put the packaging material into a container for cardboard and paper.

Conformity

This product complies with the essential requirements of DIN EN 60601-1-2; VDE 0750-1-2:2007-12 including IEC 60601-1-2:2007. It is in accordance with the Radio Equipment Directive 2014/53/EU and complies with the standards according to ETSI i.e.: EN 300 220-1 V3.1.1, EN 300 220-2 V3.1.1, EN 62479:2010 and EN 301 489-3 V1.4.1.

Under the unique identifier 2ARCY-FSSE10, this device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The declaration of conformity can be requested from your distributor or from Future-Shape.

Customer Service

If, despite correct handling, faults or malfunctions occur or if the product was damaged, please contact your dealer or Future-Shape at http://www.future-shape.com.