

Operational Description

Device operation

TYPE: SPTX-Vx (where x is the Software version of the module)

This 2.45 GHz Radio Transmitter is used to send wireless data to a flash unit wireless Receiver for flash triggering. The Transmitter can be used for triggering a flash unit by the Test push button or triggering by short circuit the Camera hot-shoe connector or by short circuit the 2mm Synchronisation Jack socket.

The wireless transmission is a true single chip GFSK transmitter. The maximum HF output power is limited to 0dBm and the data rate is fix and set to 250kbps. The Transmitter centre frequency can be changed by the user to eight different centre frequencies for parallel work of more than on wireless flash triggering systems (see also frequency channel table).

The wireless data transmission is only for a limited time period (Burst transmission mode of approx. 4ms) if the Test push button or one of the trigger inputs are pressed or short circuited, regardless if the push button is still pressed or not or if the triggering inputs are still short circuited or opened!

The Transmitter does only transmit radio data under the following conditions:

- Battery is correctly assembled
- The Transmitter module is switch in position/mode 'Grp' or 'All'
- The 'Test', '+' or '-' push button is pressed or the Camera triggers the Transmitter module via hot-shoe adapter or via Synchronization cable

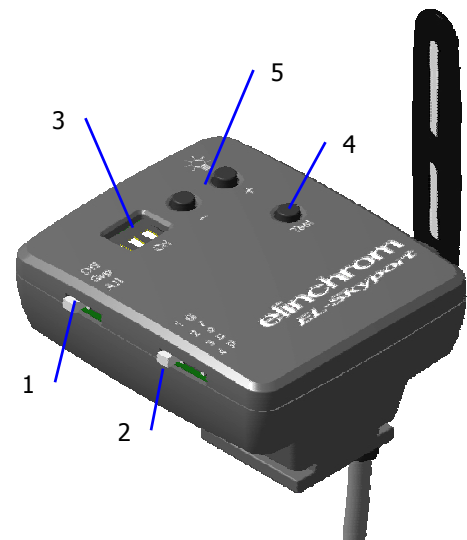
The HF-IC includes all necessary circuits for wireless transmission, only a band pass filter is connected between the HF-IC and the Antenna (fix, not exchangeable by the user).

Housing / Exchangeable Battery

The plastic housing is glued and can not opened by the customer. Only the battery drawer is removable for replacing the battery. The battery is a standard knob Lithium battery with 3V (i.e. type CR2430). The battery connection is polarized protected. If the battery is assembled in the wrong way, the Transmitter will not work and the battery is not connected correctly (no battery short circuit possible).

Push buttons and switches:

1. An ON/OFF slide switch with tree positions:
 - 'OFF' (the module is switched off from battery supply)
 - 'Grp/All' (the unit is in stand-by mode)
2. An 'Group' slide switch with four group positions (this switch changes only the transmitted software data word)
3. The Channel frequency selector (3-pol DIP switch) for centre frequency selection
 - The 3-pol DIP-switches are coded binary (8 different channels)
 - To change a different frequency channel, the module must be switched OFF and ON again to activate the new frequency setting. Changing the frequency channel selector will have no effect on the centre frequency.
 - The channel setting is set by software inside of the HF-IC (no switch of the HF-path outside of the HF-IC)!
 - The bandwidth is fix and set to +/- 250kbps!
4. A 'Test' push button for initiating the wireless data transmission
5. A '+' and '-' push button for sending a different data word via radio for special features setting of an Elinchrom RX studio flash unit receiver.



Operational Description

Inputs (hot-shoe housing connector and Synchronization socket)

1. The integrated Camera hot-shoe connector for direct connection of the Transmitter module on the Camera hot-shoe socket.
2. The integrated 2mm Synchronisation Jack socket for connection of the Transmitter to a camera by Synchronisation cable

All inputs are filtered by a low band pass filter.

IC description (Oscillator):

- The module has one HF-IC with all necessary HF circuits included. This HF-IC has a 16MHz Quartz Oscillator connected, which is switched OFF in Stand-by. The HF-IC needs a minimum power supply voltage of 1.9VDC, if lower, the IC switched off automatically. The power supply is filtered by a low band pass filter as specified by the HF-IC datasheet documentations. The Antenna is connected via a band pass filter as specified by the HF-IC datasheet. It is a true single chip GFSK transmitter. The maximum HF output power is limited to 0dBm and the data rate is fixed and set to 250kbps. The HF-IC is a single-chip radio transmitter for the world wide 2.4 – 2.5 GHz ISM band. The Transmitter consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator and a modulator. The HF-IC chip is programmable by use of the 3-wire interface. Current consumption is very low, only 11.5mA at an output power of 0dBm. The data encryption for flash triggering is 40 Bit + 8 Bit CRC.
- There is one Micro controller which is used as an interface circuit between all the Trigger Input's (hot-shoe adapter and 2mm Jack socket) and the push buttons and slide switches and DIP switch. The controller has an integrated 4 MHz RC-Oscillation circuit inside which is always running as long as the Transmitter is switched to 'Grp' or 'All' position and a battery is assembled. This Controller does also have a supply voltage supervisor circuit inside to switch OFF if the supply voltage is lower than 2VDC.



Antenna

The integrated special Elinchrom Antenna is fixed. The Antenna can not be replaced by another Antenna. The Antenna is mechanically locked to the housing! The housing is glued, and can not be opened by the user.

PCB and Ground system

The PCB is a double layer 1.5mm board with 35 microns copper on each side. The top and bottom side is mostly used as a ground shield, especially under the HF-IC and its Antenna network and band pass filter. The top and bottom Ground plane are connected by Via's around the board and also inside. The interconnections between the components and IC's are mostly on the top layer. The most components are SMD components for minimization. The HF-circuit is placed very close to the Antenna, and all HF components are placed as close as possible to the HF-IC to minimize interferences.

Frequency channel table

Channel	DIP switch positions			centre frequency for triggering
	1	2	3	
1	Off	Off	Off	2456 MHz
2	On	Off	Off	2458 MHz
3	Off	On	Off	2460 MHz
4	On	On	Off	2462 MHz
5	Off	Off	On	2469 MHz
6	On	Off	On	2471 MHz
7	Off	On	On	2473 MHz
8	On	On	On	2475 MHz

EL-Skyport Universal

Operational Description

Device operation

TYPE: SPUNI-Vx (where x is the Software version of the module)

This 2.45 GHz Radio Universal Receiver is used to receive wireless data and triggering information, and also send Status information (data) to a MASTER EL-Skyport module like EL-Skyport USB RX. The module can trigger a flash unit by a connected Synchronisation cord (3.5mm Synchronisation socket).

The module can send data on the selected frequency channel 1-8 on the data centre frequency only. The module can not send and receive data or triggering information at the same time.

The wireless transmission is a true single chip GFSK transceiver. The maximum HF output power is limited to 0dBm (=1mW) and the data rate is fix and set to 250kbps. The Transmitter centre frequency can be changed by the user to eight different centre frequencies for parallel work of more than on wireless flash triggering systems (see also frequency channel table). If the chip is in receive mode, two different receiver channels work parallel. Channel A on the set centre frequency for data communication and the other channel B for 8MHz higher for the triggering information.

The Universal module is configured as a SLAVE module and will only send data if the Master (EL-Skyport USB RX) will send a task word to the Universal module. If so, the Universal module will answer once with the Status information. The wireless data transmission is only for a limited time period (Burst transmission mode of approx. 4ms).

The Universal module will only transmit radio data under the following conditions:

- Battery supply is in range (4.1 – 3.3V)
- The module is switch ON (LED flashes or is ON)
- The MASTER module is sending Status data to this module (correct address)

The HF-IC includes all necessary circuits for wireless transmission and reception, only a band pass filter is connected between the HF-IC and the Antenna (fix, not exchangeable by the user).

Housing / Battery charging

The plastic housing is glued and can not opened by the customer. The battery is a standard Li-Ion battery with 3.7V (standard mobile batteries up to 1000mAh). The battery is polarized protected. The battery can be recharged by an external wall adapter over the charge connection socket. The battery charging is totally controlled by an integrated Charge circuit, with current control, temperature and voltage super visor circuit. The battery voltage is stabilised internally to 3.3VDC. The internal circuit will switch OFF the module automatically if not used for a time period longer than 4 hours. And the unit will switch off automatically if the battery voltage level is too low for standard and secure operation.

Push buttons and switches:

1. An ON/OFF push button:
 - 'ON' (the status LED is flashing)
2. An 'Group' slide switch with four group positions (this switch changes only the transmitted software data word)
3. The Channel frequency selector (3-pol DIP switch) for centre frequency selection
 - The 3-pol DIP-switches are coded binary (8 different channels)
 - To change a different frequency channel, the module must be switched OFF and ON again to activate the new frequency setting. Changing the frequency channel selector will have no effect on the centre frequency.
 - The channel setting is set by software inside of the HF-IC (no switch of the HF-path outside of the HF-IC)!
 - The bandwidth is fix and set to +/- 250kbps!



Inputs and Outputs

4. The integrated 3.5mm Synchronisation Jack socket for connection of the Universal module to a flash unit.
5. The integrated 2mm charge socket for recharging the internal Li-Ion battery.

All inputs are filtered by a low band pass filter.

EL-Skyport Universal

Operational Description

IC description (Oscillator):

- The module has one HF-IC with all necessary HF circuits included. This HF-IC has a 16MHz Quartz Oscillator connected, which is switched OFF in Stand-by mode. The HF-IC needs a minimum power supply voltage of 1.9VDC, if lower, the IC switches off automatically. The power supply is filtered by a low band pass filter as specified by the HF-IC datasheet documentation. The Antenna is connected via a band pass filter as specified by the HF-IC datasheet. It is a true single chip GFSK transceiver. The maximum HF output power is limited to 0dBm and the data rate is fixed and set to 250kbps. The HF-IC is a single-chip radio transmitter for the world wide 2.4 – 2.5 GHz ISM band. The Transmitter consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator and a modulator. The HF-IC chip is programmable by use of the 3-wire interface. Current consumption is very low, only 11.5mA at an output power of 0dBm. The data encryption for flash triggering is 40 Bit + 8 Bit CRC.
- There is one Micro controller which is used as an interface circuit between all the Trigger Output and the push buttons and slide switches and DIP switch. The controller has an integrated 4 MHz RC-Oscillation circuit inside which is always running as long as the Transmitter is switched to 'Grp' or 'All' position and a battery is assembled. This Controller does also have a supply voltage supervisor circuit inside to switch OFF if the supply voltage is lower than 2VDC.
- The internal circuit will charge the Li-Ion battery and does the complete charge control (voltage, current and temperature control, total battery overcharging protection). The module will switch off automatically if the battery voltage level is too low for standard and secure operation.

Antenna

The integrated special Elinchrom Antenna is fixed. The Antenna can not be replaced by another Antenna. The Antenna is mechanically locked to the housing! The housing is glued, and can not be opened by the user.

PCB and Ground system

The PCB is a double layer 1.5mm board with 35 microns copper on each side. The top and bottom side is mostly used as a ground shield, especially under the HF-IC and its Antenna network and band pass filter. The top and bottom Ground plane are connected by Via's around the board and also inside. The interconnections between the components and IC's are mostly on the top layer. The most components are SMD components for minimization. The HF-circuit is placed very close to the Antenna, and all HF components are placed as close as possible to the HF-IC to minimize interferences.

Frequency channel table

Channel	DIP switch positions			centre frequency for data transmission and reception	centre frequency for triggering reception only (+8MHz)
	1	2	3		
1	Off	Off	Off	2448 MHz	2456 MHz
2	On	Off	Off	2450 MHz	2458 MHz
3	Off	On	Off	2452 MHz	2460 MHz
4	On	On	Off	2454 MHz	2462 MHz
5	Off	Off	On	2461 MHz	2469 MHz
6	On	Off	On	2463 MHz	2471 MHz
7	Off	On	On	2465 MHz	2473 MHz
8	On	On	On	2467 MHz	2475 MHz

Operational Description

Device operation

TYPE: SPRX-Vx (where x is the Software version of the module)

This 2.45 GHz Radio Transceiver RX is used to receive wireless data and triggering information, and also send Status information (data) to a MASTER EL-Skyport module like EL-Skyport USB RX. This module is only for direct connection to an Elinchrom RX flash unit via the RX socket!

The module can send data on the selected frequency channel 1-8 at the data centre frequency only. The module can not send and receive data or triggering information at the same time.

The wireless transmission is a true single chip GFSK transceiver. The maximum HF output power is limited to 0dBm (=1mW) and the data rate is fix and set to 250kbps. The Transmitter centre frequency can be changed by the user to eight different centre frequencies for parallel work of more than on wireless flash triggering system without influence (see also frequency channel table). If the chip is in receive mode, two different receiver channels work parallel. Channel A on the set centre frequency for data communication and the other channel B for 8MHz higher for the triggering information.

The Transceiver RX module is configured as a SLAVE module and will only send data if the Master (EL-Skyport USB RX) will send a task word to the Transceiver RX module. If so, the Transceiver RX module will answer once with the Status information. The wireless data transmission is only for a limited time period (Burst transmission mode of approx. 4ms).

The Transceiver RX module will only transmit radio data under the following conditions:

- Transceiver module is connected to an Elinchrom RX flash unit via RX socket
- The Elinchrom RX flash unit is switch ON
- The MASTER module is sending Status data to this module (correct address)

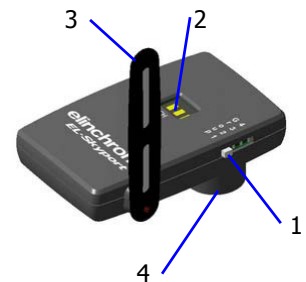
The HF-IC includes all necessary circuits for wireless transmission and reception, only a band pass filter is connected between the HF-IC and the Antenna (fix, not exchangeable by the user).

Housing / Supply

The plastic housing is glued and can not opened by the customer. The power supply comes from the Elinchrom RX flash unit with 5VDC and this voltage is stabilised inside of the Transceiver RX module to 3.3VDC.

Push buttons, switches and antenna:

1. An 'Group' slide switch with four group positions (this switch changes only the transmitted software data word)
2. The Channel frequency selector (3-pol DIP switch) for centre frequency selection
 - The 3-pol DIP-switches are coded binary (8 different channels)
 - To change a different frequency channel, the module must be switched OFF and ON again to activate the new frequency setting. Changing the frequency channel selector will have no effect on the centre frequency.
 - The channel setting is set by software inside of the HF-IC (no switch of the HF-path outside of the HF-IC)!
 - The bandwidth is fix and set to +/- 250kbps!
3. Fix swivel antenna



Inputs and Outputs

4. Elinchrom RX socket for direct connection to an Elinchrom RX flash unit (+5V, GND, serial interface 2-pins, Synchronisation)

All inputs are filtered by a low band pass filter.

Operational Description

IC description (Oscillator):

- The module has one HF-IC with all necessary HF circuits included. This HF-IC has a 16MHz Quartz Oscillator connected, which is switched OFF in Stand-by mode. The HF-IC needs a minimum power supply voltage of 1.9VDC, if lower, the IC switched off automatically. The power supply is filtered by a low band pass filter as specified by the HF-IC datasheet. The Antenna is connected via a band pass filter as specified by the HF-IC datasheet. It is a true single chip GFSK transceiver. The maximum HF output power is limited to 0dBm and the data rate is fixed and set to 250kbps. The HF-IC is a single-chip radio transceiver for the world wide 2.4 – 2.5 GHz ISM band. The Transceiver IC consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator and a modulator. The HF-IC chip is programmable by use of the 3-wire interface. Current consumption is very low, only 11.5mA at an output power of 0dBm. The data encryption for flash triggering is 40 Bit + 8 Bit CRC.
- There is one Micro controller which is used as an interface circuit between all the I/O's (RX connector) and slide switch and DIP switch. The controller has an integrated 4 MHz RC-Oscillation circuit inside which is always running as long as the Transceiver is plugged into a switched ON Elinchrom RX flash unit. This Controller does also have a supply voltage supervisor circuit inside to switch OFF if the supply voltage is lower than 2VDC.

Antenna

The integrated special Elinchrom Antenna is fixed. The Antenna can not be replaced by another Antenna. The Antenna is mechanically locked to the housing! The housing is glued, and can not be opened by the user.

PCB and Ground system

The PCB is a double layer 1.5mm board with 35 microns copper on each side. The top and bottom side is mostly used as a ground shield, especially under the HF-IC and its Antenna network and band pass filter. The top and bottom Ground plane are connected by Via's around the board and also inside. The interconnections between the components and IC's are mostly on the top layer. The most components are SMD components for minimization. The HF-circuit is placed very close to the Antenna, and all HF components are placed as close as possible to the HF-IC to minimize interferences.

Frequency channel table

Channel	DIP switch positions			centre frequency for transmission and reception	centre frequency for triggering reception only (+8MHz)
	1	2	3		
1	Off	Off	Off	2448 MHz	2456 MHz
2	On	Off	Off	2450 MHz	2458 MHz
3	Off	On	Off	2452 MHz	2460 MHz
4	On	On	Off	2454 MHz	2462 MHz
5	Off	Off	On	2461 MHz	2469 MHz
6	On	Off	On	2463 MHz	2471 MHz
7	Off	On	On	2465 MHz	2473 MHz
8	On	On	On	2467 MHz	2475 MHz

EL-Skyport USB RX

Operational Description

Device operation

TYPE: SPUSB-Vx (where x is the Software version of the module)

This 2.45 GHz Radio USB RX is used as a MASTER radio module to send data to other EL-Skyport Receivers and receive wireless data. This module is only for direct connection to an Personal Computer via the USB socket!

The module can send data on the EL-Skyport software selected frequency channel 1-8 on the data centre frequency only. The module can not send and receive data or triggering information at the same time.

The wireless transmission is a true single chip GFSK transceiver. The maximum HF output power is limited to 0dBm (=1mW) and the data rate is fix and set to 250kbps. The Transmitter centre frequency can be changed by the user to eight different centre frequencies for parallel work of more than on wireless flash triggering systems (see also frequency channel table). If the chip is in receive mode, two different receiver channels work parallel. Channel A on the centre frequency for data communication and the other channel B 8MHz higher for the triggering information.

The USB module is configured as a MASTER module. The EL-Skyport USB RX module will send a task word to the Universal module or a Transceiver RX module (EL-Skyport Receivers). If so, the EL-Skyport Receivers will answer once with the Status information. The wireless data transmission is only for a limited time period (Burst transmission mode of approx. 4ms). The delay time (no transmission) between the Master tasks is minimum 20msec.

The USB RX module will only transmit radio data under the following conditions:

- USB RX module is connected to an Personal computer via USB socket
- The Personal computer runs the Elinchrom EL-Skyport software

The HF-IC includes all necessary circuits for wireless transmission and reception, only a band pass filter is connected between the HF-IC and the Antenna (fix, not exchangeable by the user).

Housing / Supply

The plastic housing is glued and can not opened by the customer. The power supply comes from the USB socket out of the Personal computer with 5VDC and this voltage is stabilised inside of the USB RX module to 3.3VDC.

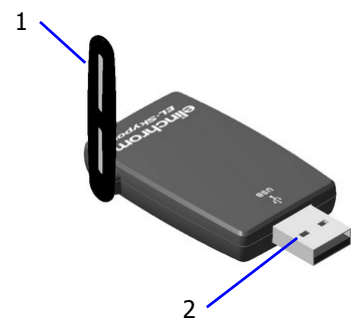
Antenna:

1. Fix swivel antenna

Inputs and Outputs

2. Standard USB socket for direct connection to Personal computer

All inputs are filtered by a low band pass filter.



EL-Skyport USB RX

Operational Description

IC description (Oscillator):

- The module has one HF-IC with all necessary HF circuits included. This HF-IC has a 16MHz Quartz Oscillator connected, which is switched OFF in Stand-by mode. The HF-IC needs a minimum power supply voltage of 1.9VDC, if lower, the IC switched off automatically. The power supply is filtered by a low band pass filter as specified by the HF-IC datasheet documentations. The Antenna is connected via a band pass filter as specified by the HF-IC datasheet. It is a true single chip GFSK transceiver. The maximum HF output power is limited to 0dBm and the data rate is fixed and set to 250kbps. The HF-IC is a single-chip radio transmitter for the world wide 2.4 – 2.5 GHz ISM band. The Transmitter consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator and a modulator. The HF-IC chip is programmable by use of the 3-wire interface. Current consumption is very low, only 11.5mA at an output power of 0dBm. The data encryption for flash triggering is 40 Bit + 8 Bit CRC.
- There is one Micro controller which is used as an interface circuit between the HF-IC and the I/Os. The controller has an integrated 4 MHz RC-Oscillation circuit inside which is always running as long as the Transmitter is switched to 'Grp' or 'All' position and a battery is assembled. This Controller does also have a supply voltage supervisor circuit inside to switch OFF if the supply voltage is lower than 2VDC.
- There is an USB controller for the USB connection to a Personal computer. This IC has a 6MHz resonator attached for USB interface.

Antenna

The integrated special Elinchrom Antenna is fixed. The Antenna can not be replaced by another Antenna. The Antenna is mechanically locked to the housing! The housing is glued, and can not be opened by the user.

PCB and Ground system

The PCB is a double layer 1.5mm board with 35 microns copper on each side. The top and bottom side is mostly used as a ground shield, especially under the HF-IC and its Antenna network and band pass filter. The top and bottom Ground plane are connected by Via's around the board and also inside. The interconnections between the components and IC's are mostly on the top layer. The most components are SMD components for minimization. The HF-circuit is placed very close to the Antenna, and all HF components are placed as close as possible to the HF-IC to minimize interferences.

Frequency channel table

These channels are configured by the EL-Skyport software only. There is no manual channel selection switch!

Channel	DIP switch positions			centre frequency for data transmission and reception	centre frequency for reception only (+8MHz)
	1	2	3		
1	Off	Off	Off	2448 MHz	2456 MHz
2	On	Off	Off	2450 MHz	2458 MHz
3	Off	On	Off	2452 MHz	2460 MHz
4	On	On	Off	2454 MHz	2462 MHz
5	Off	Off	On	2461 MHz	2469 MHz
6	On	Off	On	2463 MHz	2471 MHz
7	Off	On	On	2465 MHz	2473 MHz
8	On	On	On	2467 MHz	2475 MHz