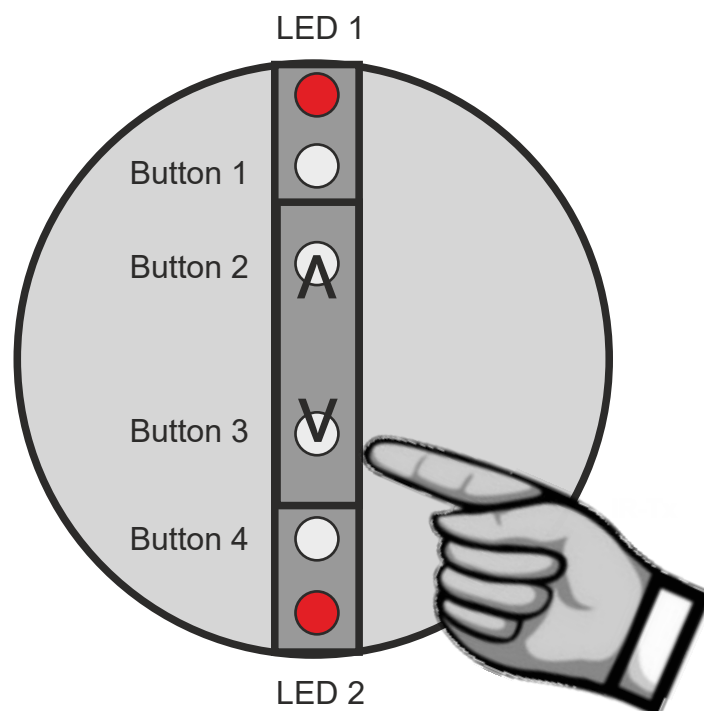# LinTronic
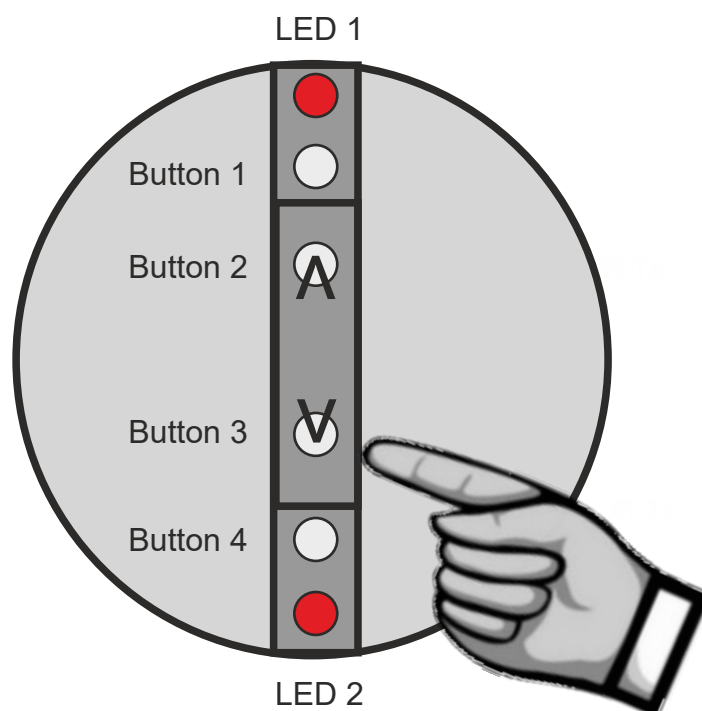
LED 1

Button 1

Button 2

Button 3

Button 4

LED 2

TT-IR-8087030

Updated: 201131

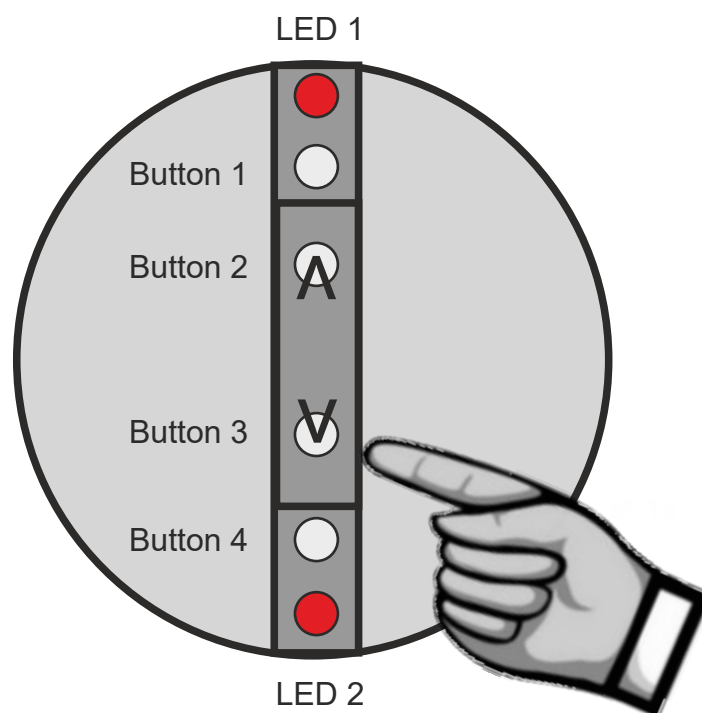# Bang&Olufsen introduced a new typenumber for the IR receiver: TT-IR-8089002 (new)

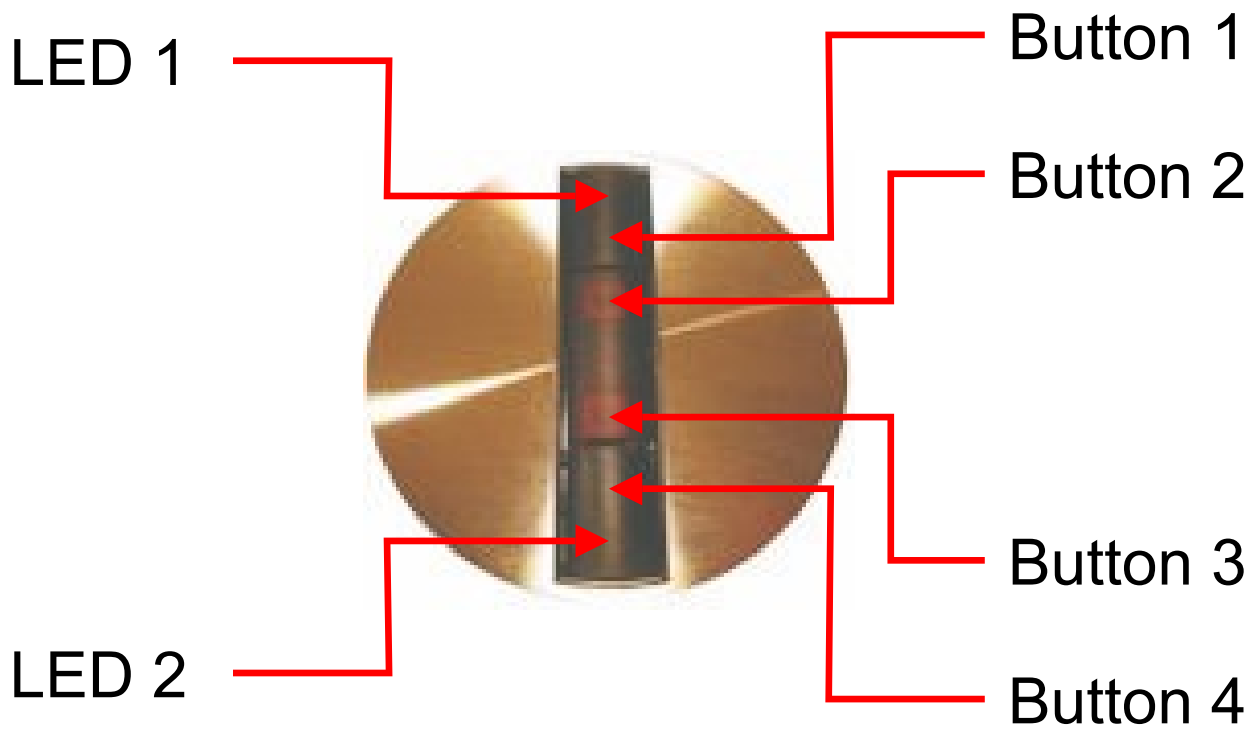# The interface and behaviour is the same as the old TT-IR-8087030

In the following pages we only refer to TT-IR-8087030

LED 1

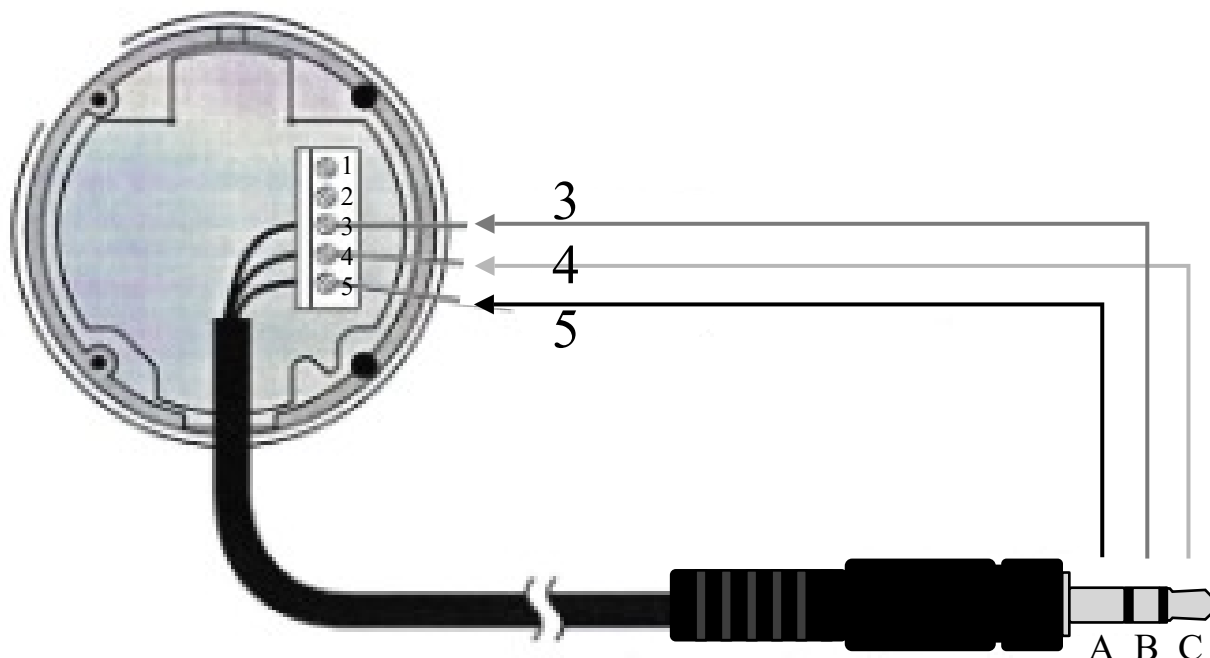Button 1

Button 2

Button 3

Button 4

LED 2

TT-IR-8087030 is a long-range IR receiver for Bang&Olufsen remote controls.

It also holds 4 buttons that can be used to control the TT455-RT-238 Memory Map and 2 LEDs that can be used as confirmation/feedback.

LED 1 — Button 1

Button 2

Button 3

LED 2 — Button 4

LED 1

Button 1

Button 2

Button 3

Button 4

LED 2

TT-IR-8087030 CABLES

3
4
5

A B C

NOTE:
The IR receiver (alu case) and the cable, are delivered to us separately.
Unfortunately the cable wires, often vary in colors.
Below we have listed the typical combinations.
If the cable you have received, is not included below, then please contact
LinTronic, or get some local help to measure how the cable is wired.

Cable type 1

Pin	Letter	Desc	Color
3	B	IR data	Green
4	C	5 Volt	Yellow
5	A	Ground	Brown

Cable type 2

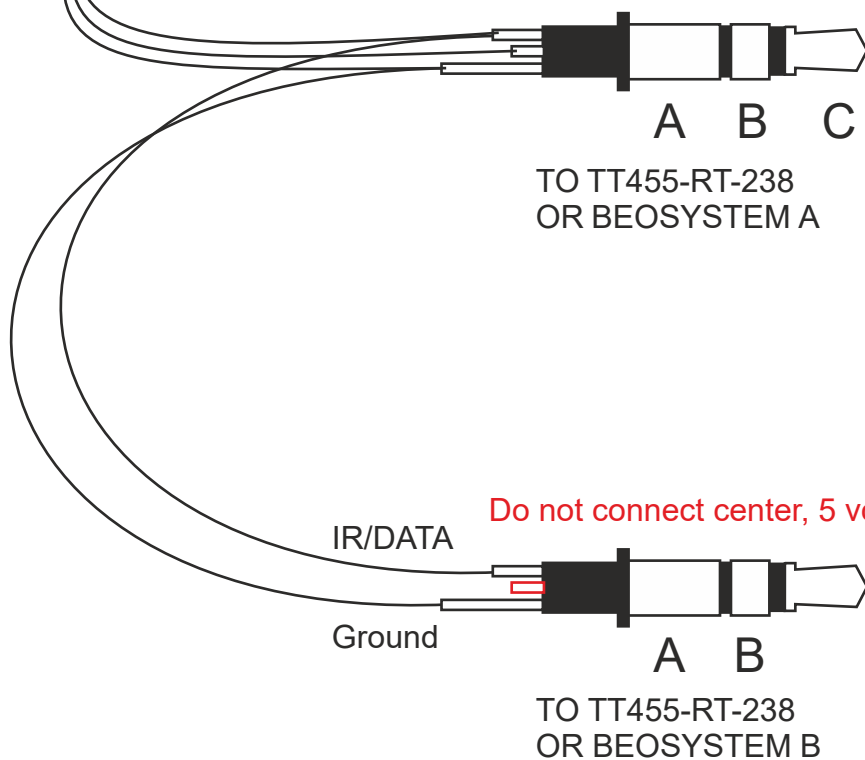| Pin	Letter	Desc	Color
3	B	IR data	Red
4	C	5 Volt	Black
5	A	Ground	unisolated

One TT-IR-8087030 - Two receivers

USING ONE RECIVER FOR TWO SYSTEMS

B&O
8087030
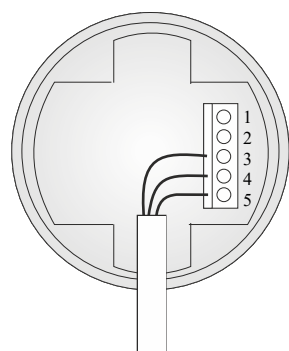
3 - B IR SIGNAL
4 - C 5 Volt
5 - A Ground

Jack connector seen
from solderside
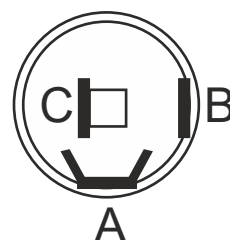
C B

A

A B C

TO TT455-RT-238
OR BEOSYSTEM A

Jack connector seen
from solderside

Do not connect center, 5 volt

IR/DATA

B

Ground

A

A B

TO TT455-RT-238
OR BEOSYSTEM B

Programmable jack-connector

IR LOW-POWER OUTPUT 2

IR BUTTONS/LED
FACTORY DEFAULT

IR RECEIVER

LED 1

Button 1

Button 2

Button 3

Button 4

LED 2
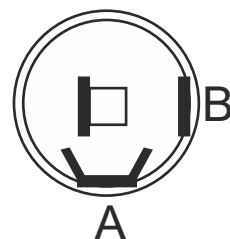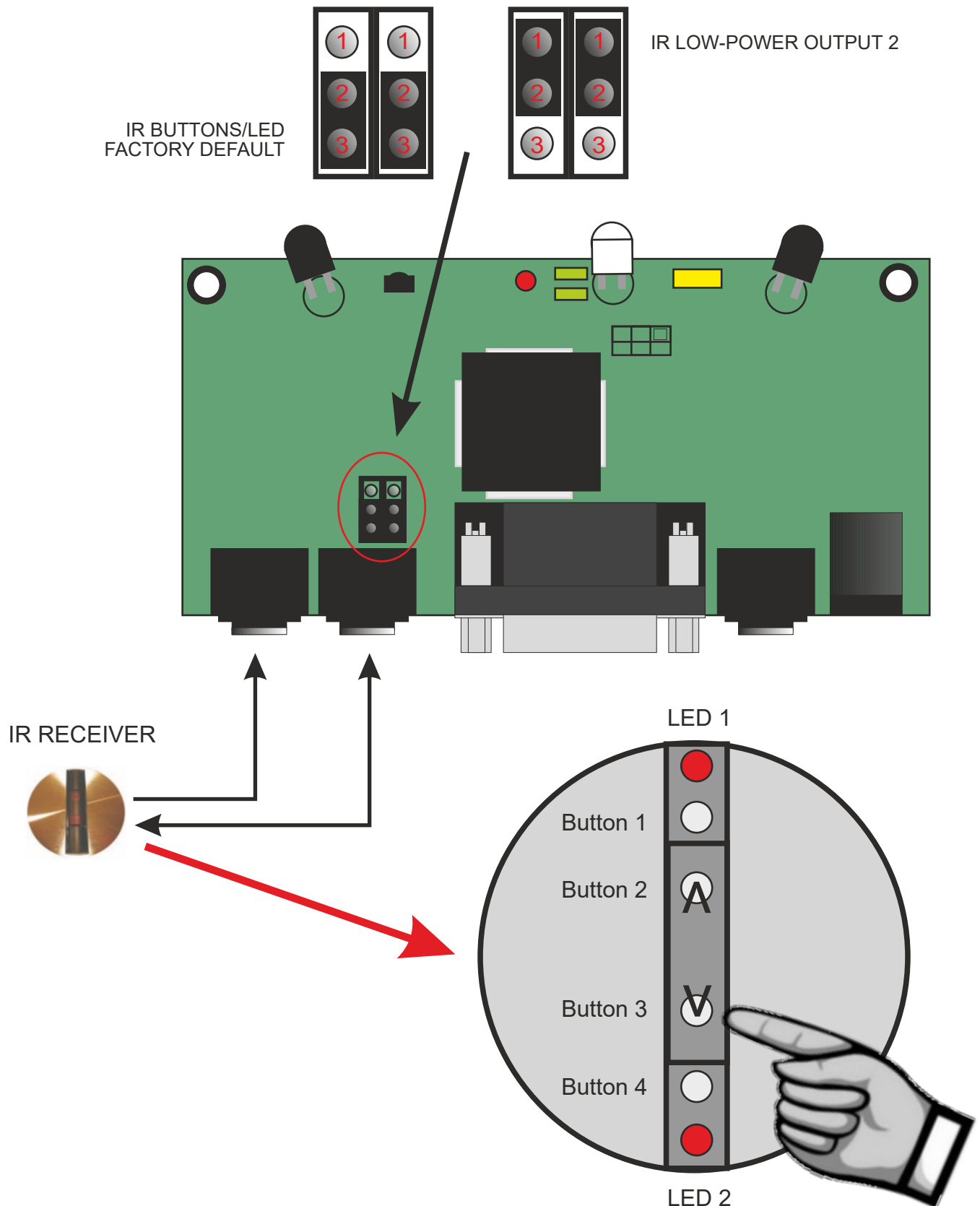
Programmable jack-connector

IR AND BUTTONS CONTROL

If you want to make use of the buttons or the LEDs of your external B&O receiver, the jumpers must be in this position (factory set).

You wire two 3.5 mm jack connectors as show below:
- one for the buttons/LEDs (2-wires, pin 1-2)
- one for the infrared signals (3-wires, pin 3-5)

For the buttons/LEDs you may optionally use a stereo connector or a mono-connector. It is easier to verify that connectors are correctly inserted if you use a mono-connector for the buttons.

TFIR-8087030

3 = IR signal
4 = 5 volt
5 = Ground

Infrared/power

Buttons/LEDs

5 3 4

1 - SCL - CLOCK
2 - SDA - DATA

2 1   Mono

2 1   Stereo
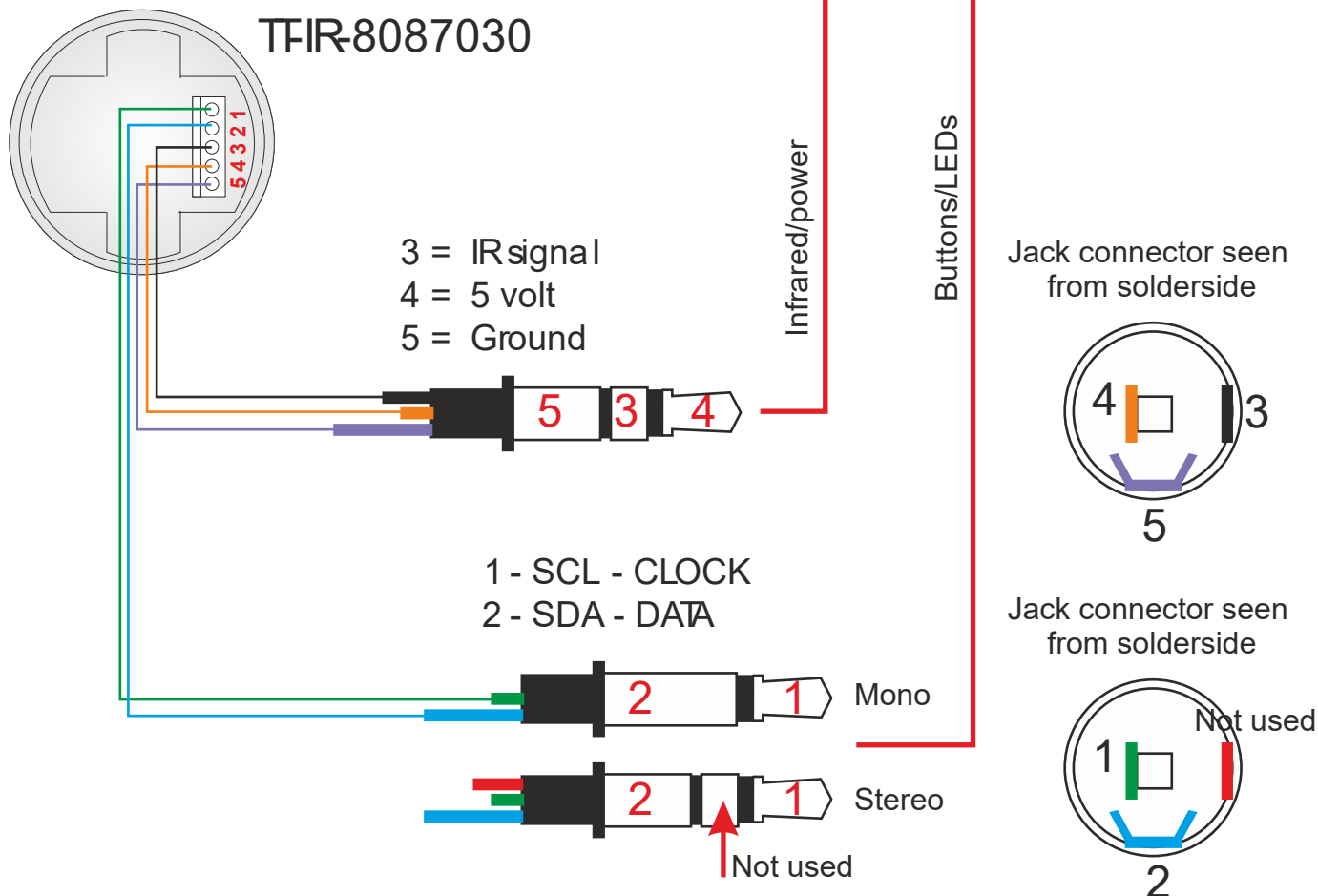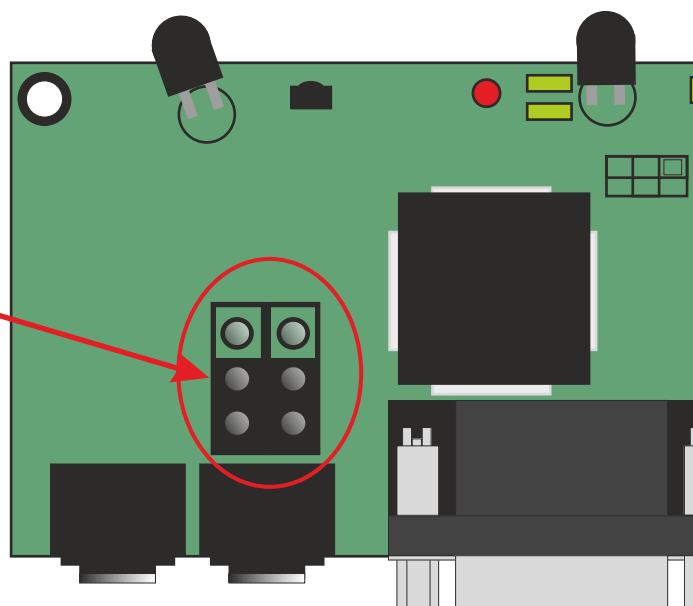
Not used

Jack connector seen from solderside

4 3
5

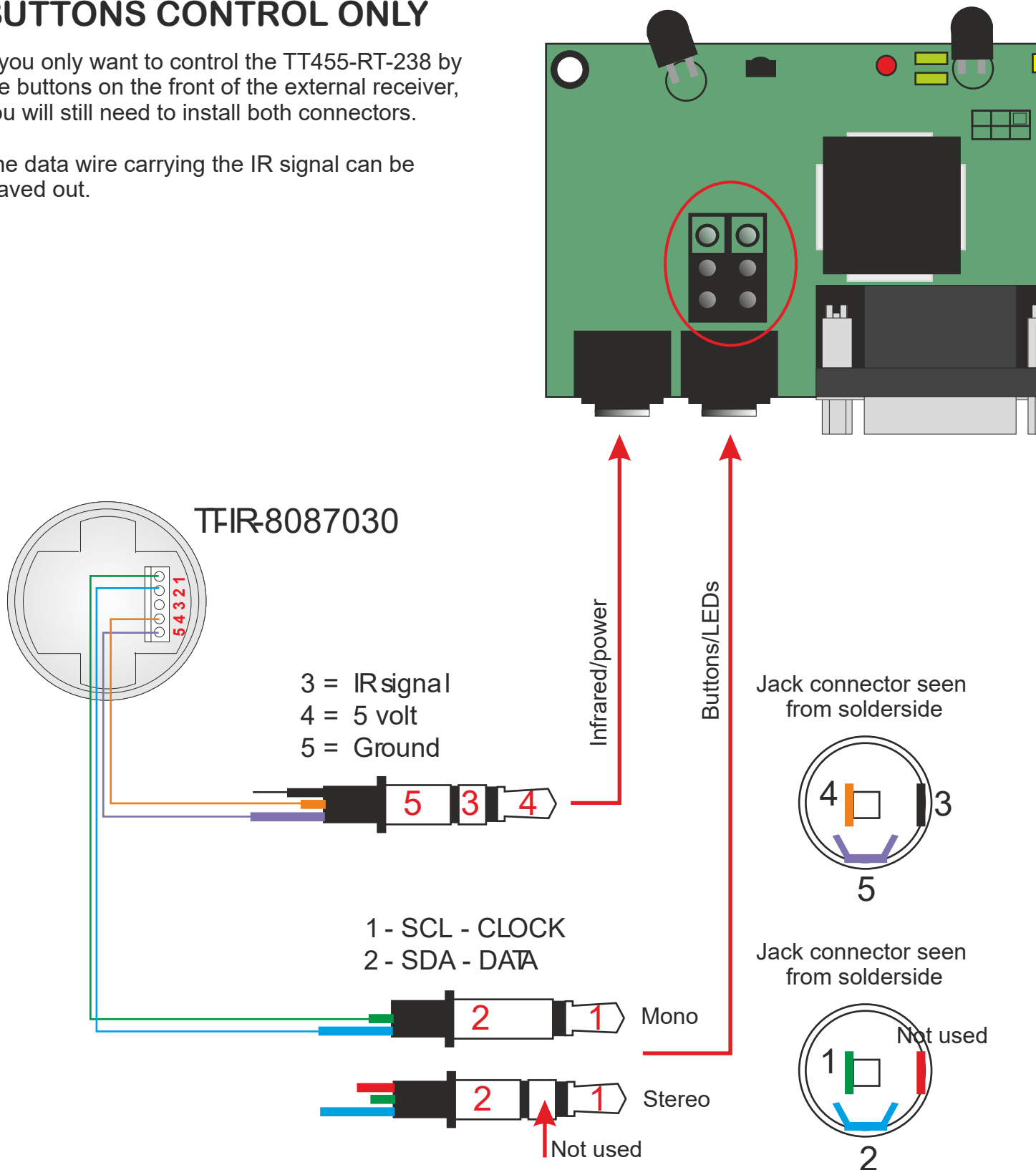Jack connector seen from solderside

Not used
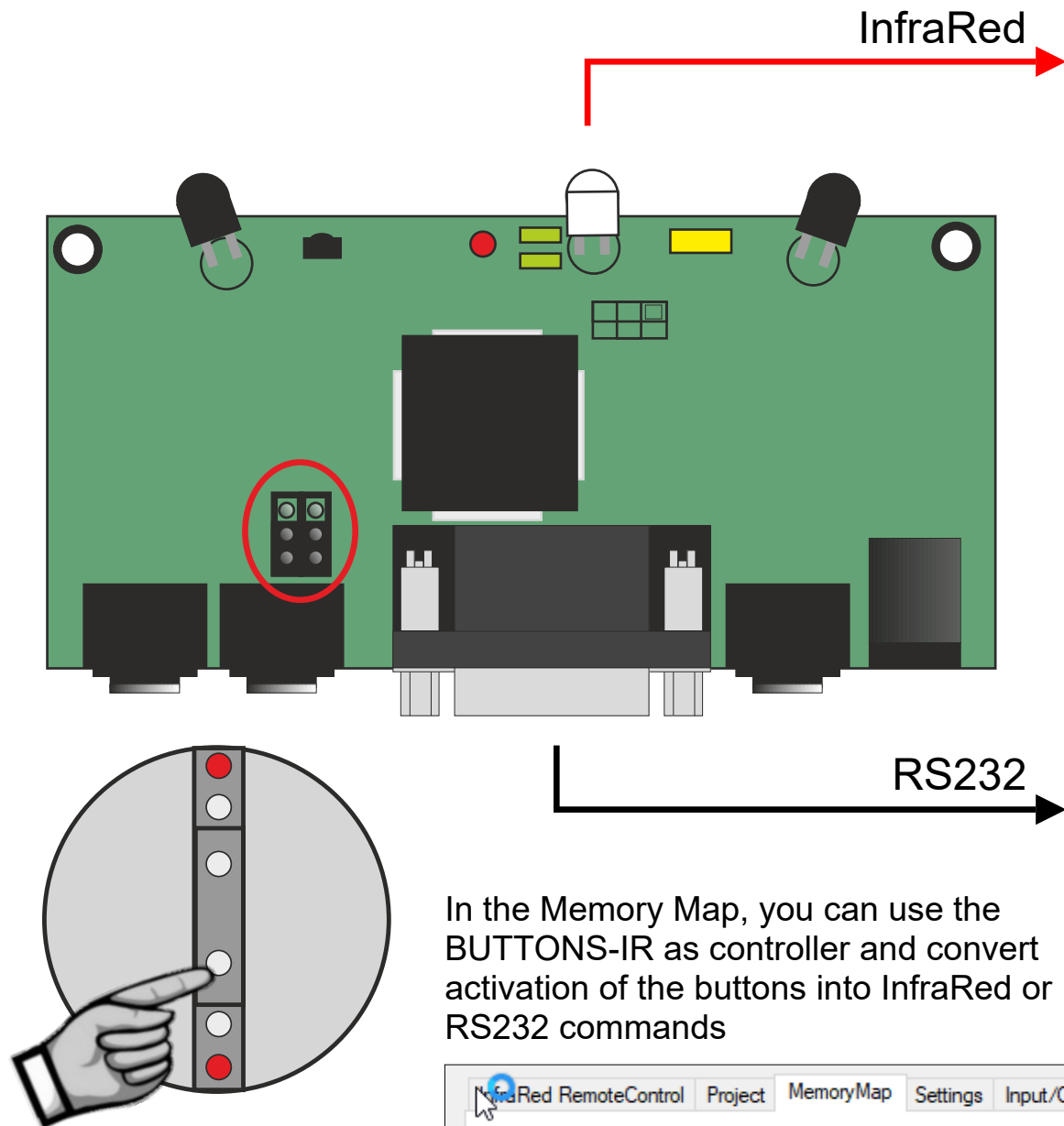
1

2

Programmable jack-connector

BUTTONS CONTROL ONLY

If you only want to control the TT455-RT-238 by the buttons on the front of the external receiver, you will still need to install both connectors.

The data wire carrying the IR signal can be leaved out.

TFIR-8087030

3 = IR signal
4 = 5 volt
5 = Ground

1 - SCL - CLOCK
2 - SDA - DATA

5 3 4

Infrared/power

Buttons/LEDs

2 1 Mono

2 1 Stereo

Not used

Jack connector seen from solderside

4 3
5

Jack connector seen from solderside

Not used
1
2

Triggers

InfraRed

RS232
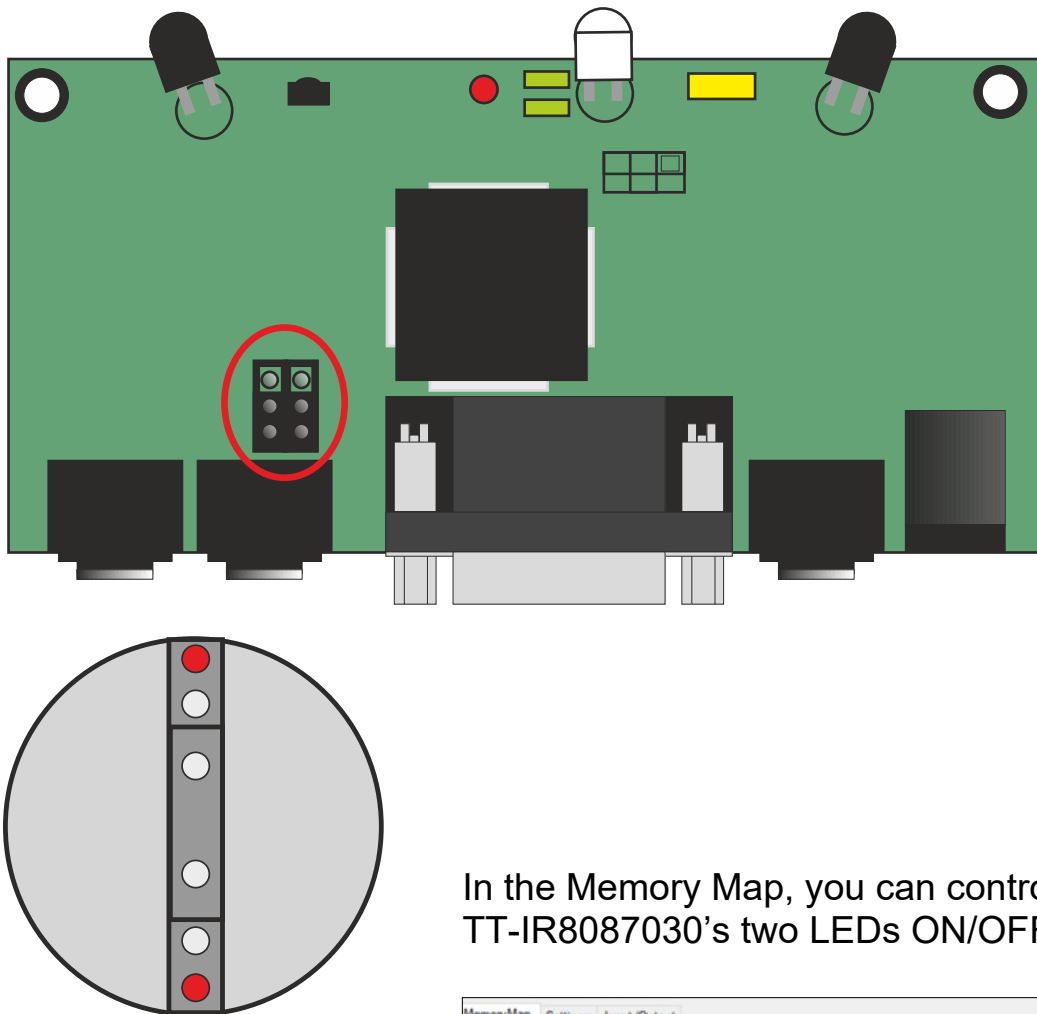
In the Memory Map, you can use the BUTTONS-IR as controller and convert activation of the buttons into InfraRed or RS232 commands

InfraRed RemoteControl	Project	MemoryMap	Settings	Input/Output

Controller
BUTTONS-IR

Convert to / control Action

	BrandName
▶	SONY

Mode
RX-8087030

Trigger
BUTTON 1 OFF
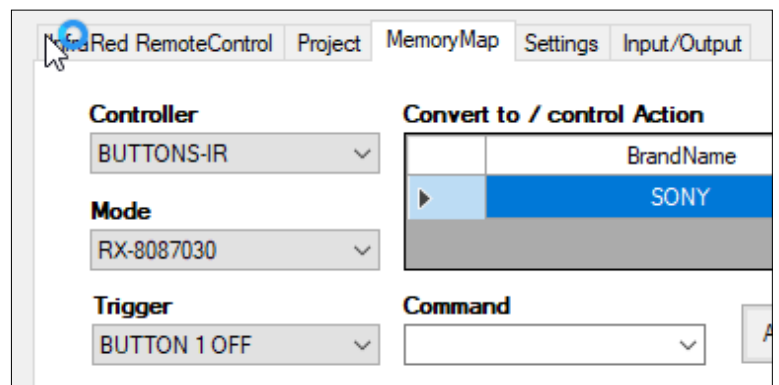
Command

Actions

In the Memory Map, you can control the TT-IR8087030's two LEDs ON/OFF.
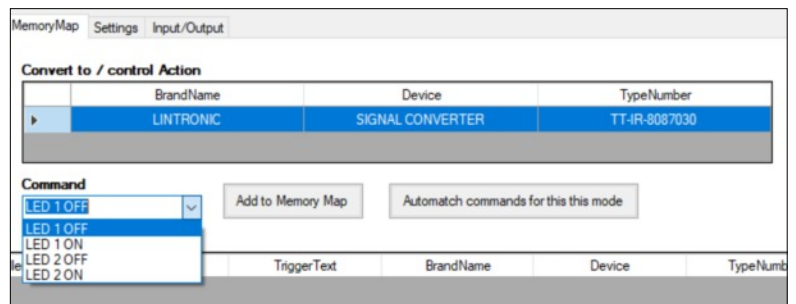
Command 904

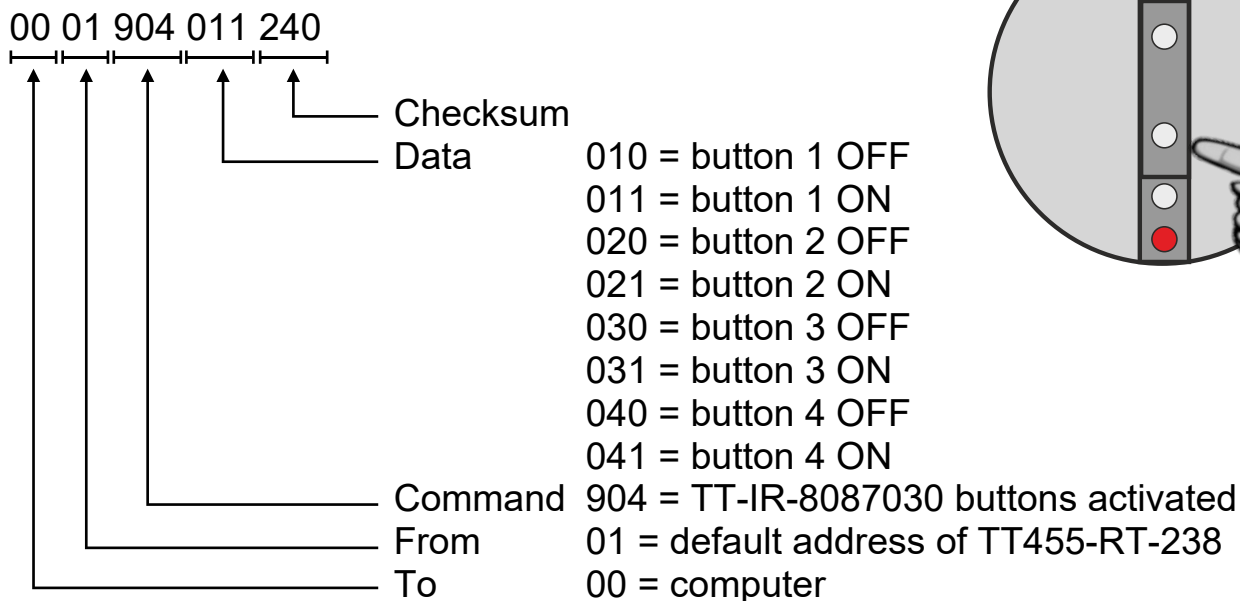When you activate one of the buttons on the TT-IR-8087030, a command is send to the computer, informing which button ws activated, and this command can optionally be used to trigger the Memory Map.

For example: 0001904011240

00 01 904 011 240

Checksum
Data   010 = button 1 OFF
            011 = button 1 ON
            020 = button 2 OFF
            021 = button 2 ON
            030 = button 3 OFF
            031 = button 3 ON
            040 = button 4 OFF
            041 = button 4 ON
Command 904 = TT-IR-8087030 buttons activated
From   01 = default address of TT455-RT-238
To   00 = computer

From Januar 2019 (Firmware 001.034.072), we added commands telling if any of the 4 button are continously activated (repeated).

Command is still 904.
Data is
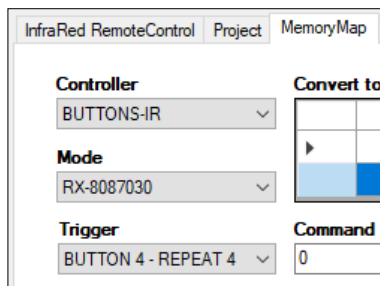
value 050 to 059 = button 1 repated 1 to 10
value 060 to 069 = button 2 repated 1 to 10
value 070 to 079 = button 3 repated 1 to 10
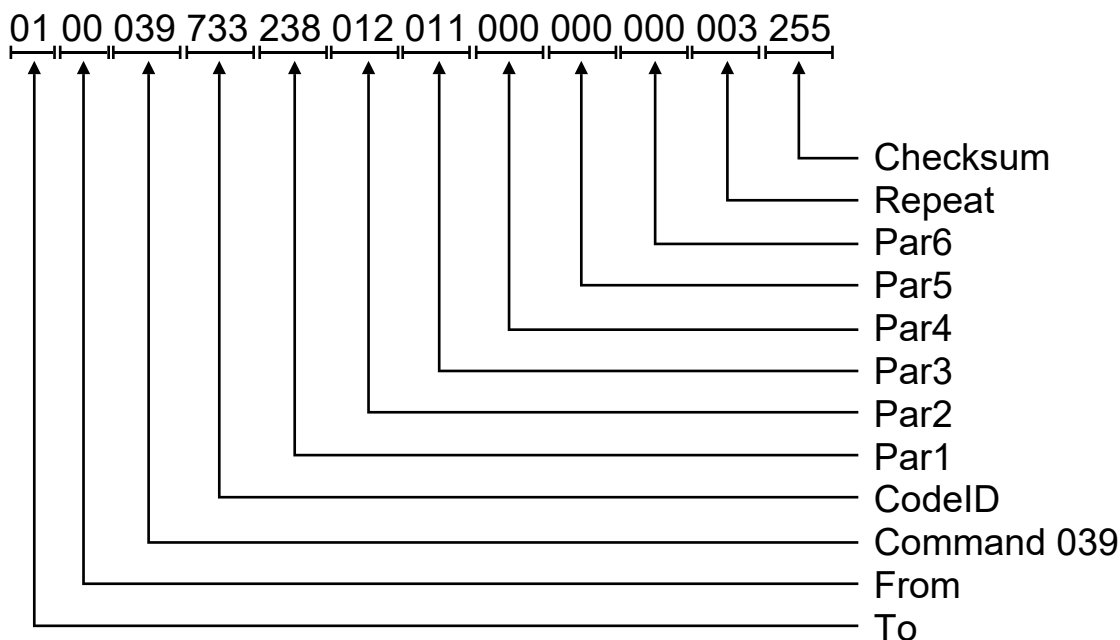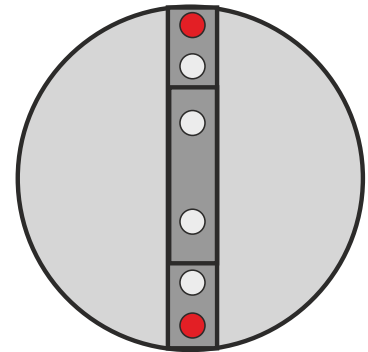value 080 to 089 = button 4 repated 1 to 10

For example you can use Button 4 - REPEAT 4 as a TURN ALL OFF.

OR you can use the REPEAT functions to turn volume or light up/down.

InfraRed RemoteControl	Project	MemoryMap

Controller   **Convert to**
BUTTONS-IR

Mode
RX-8087030

Trigger   **Command**
BUTTON 4 - REPEAT 4   0

Controlling the TT455-RT-238

If you want to control the LED's of the TT-IR-8087030
then you can add the product
LinTronic, Signal Converter, TT-IR-8087030
to the projects Memory Map.

If you want to send commands the TT455-RT-238
from a computer or an Arduino, then you simply use our
open protocol and insert the wanted parameters:

01 00 039 733 238 012 011 000 000 000 003 255

- Checksum
- Repeat
- Par6
- Par5
- Par4
- Par3
- Par2
- Par1
- CodeID
- Command 039
- From
- To

LINTRONIC, SIGNAL CONVERTER, TT-IR-8087030
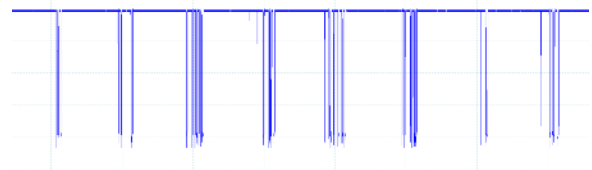**back**

CodeString	Command
733238012010000000000	LED 1 OFF
733238012011000000000	LED 1 ON
733238012020000000000	LED 2 OFF
733238012021000000000	LED 2 ON

# How the TT-IR-8087030 works

3 = IR signal
4 = 5 volt
5 = Ground
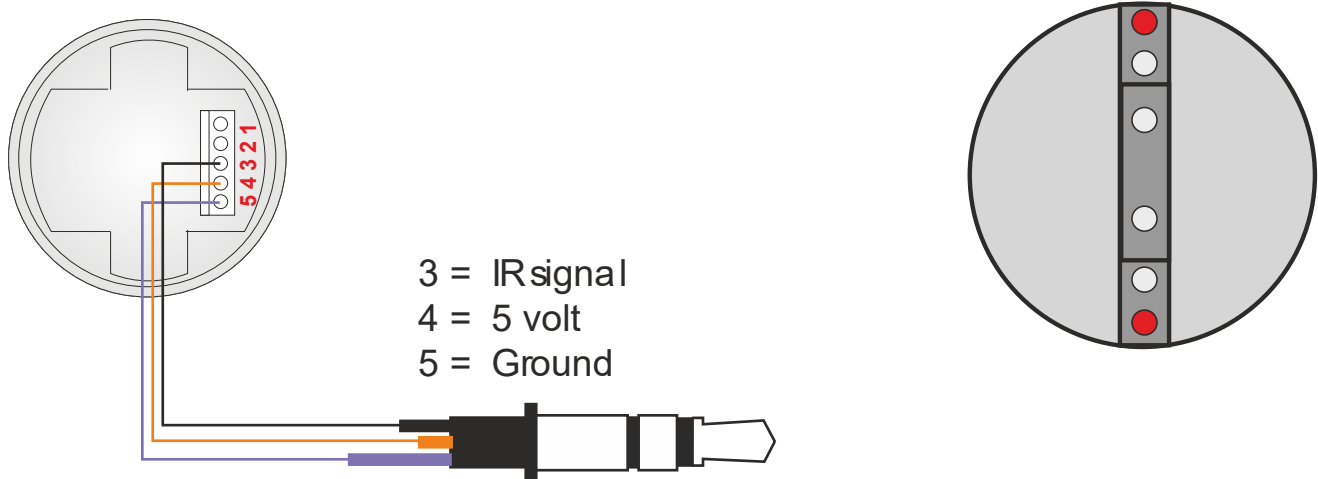
The receiver turns up its internal amplifier
untill back ground noise starts coming in.
This to make sure that the remote control
is detected when it starts sending.
The infrared noise comes from sources like
lamps, sun, etc.

When a B&O remote starts sending (the
remote signal is much stronger than the
background noise), then the receiver will
adjust its amplification down, in order to
read the remote control without interference
from the background noise. This is called Automatic Gain Control (AGC).
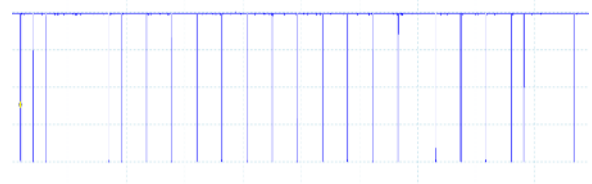
When the B&O code is received, the receiver will again adjust the amplifier for
maximum sensivity and be ready for the next code.

The TT455-RT-238 constantly monitors and filters the background noises and incoming
signals in order to detect when the user operates the remote control.

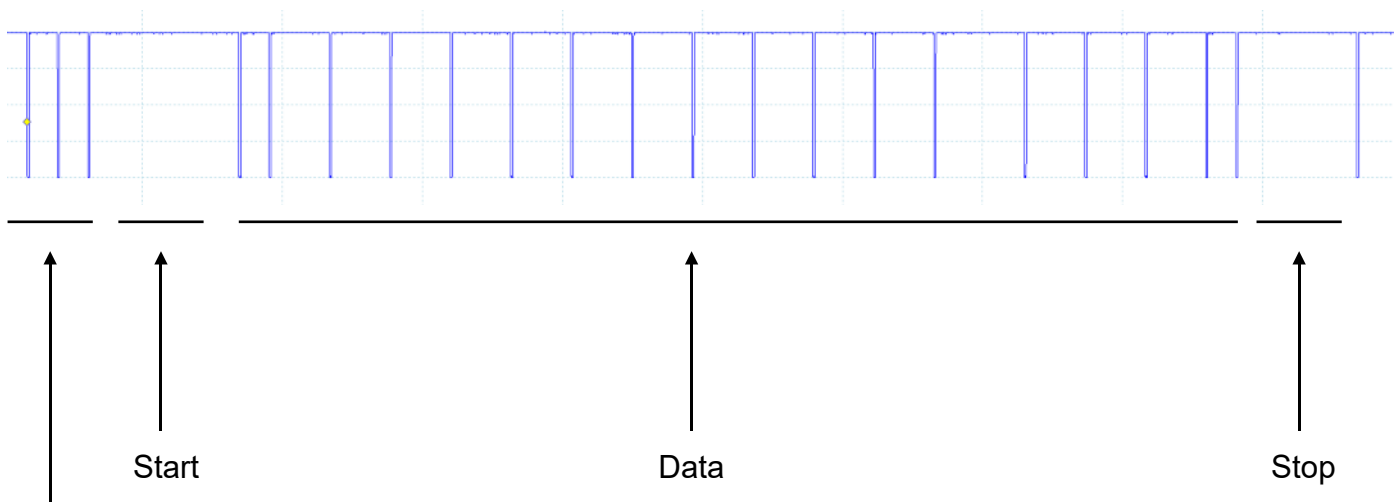IR signal - background noise

IR signal - B&O code

Decoding a B&O command

When detecting a Beo code, we monitor the preamble and start decoding, when start-bit is detected, followed by a certain number of data bits terminated by a stop-bit.

We verify that the timelength of each bit is within a specific time-range.
If one single bit fails, we drop the entire decoding and wait for a new start.

The time for one complete code, must be shorter than 180 ms, else we drop the entire decoding and wait for a new start.

The exact detection of start/stop and the time validation of each bit, ensures that we do not detect background noise as data bits, allowing us to have full control of the reading of the B&O remote controls.

Start   Data   Stop

Pre-amble (adjusts the AGC)

If you are interested in seeing how much background noise the TT455-RT-238 is fighting to filter out, then goto the Memory Map's Digital Inout/Output and set the RED LED to "IR test". Now watch the RED LED in the TT455-RT-238 blink to show the amount of background noise.