r-step

the standard engineering protocol

DATA SHEET

IR transmission protocol for

- Remote control
- Audio systems (CD, Tape, DVD, ...)
- Video systems (TV, VCR, SAT, STB, ...)
- Projectors
- ...

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Contents

1 Overview

r-step

(Ruwido Standard Engineering Protocol) – a very robust infrared transmission system for computer, TV's, set top boxes, digital broad casting systems, audio systems, video systems, play stations, home bus systems and additional IR applications, which are controlled by standard IR remote controls.

This document describes the unidirectional IR transmission format for use in standard IR remote controls.

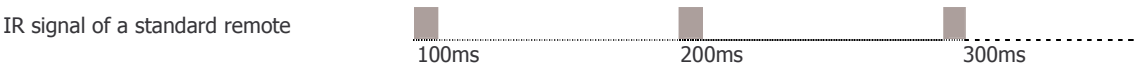
2 Features

- a fast and efficient IR transmission protocol
- it has almost no interference with light sources, especially the 56 KHz carried signal
- range of the IR signal up to 20 m
- low power consumption
- possibility for upgrade to r⇌map for gaming and bi-directional applications
- patent protocol

3 IR protocol

The necessary software to decode the correct IR information from the remote control is easy to implement with all standard 8/ 16 /…-bit microcontroller.

3.1 UNI-directional continuous IR transmission



3.2 IR frame structure for remote control unit

1	C5	C4	C3	C2	C1	C0	B0	D2	D1	D0	A2	A1	A0	R0	F7	F6	F5	F4	F3	F2	F1	F0
STA	custom ID						BAT	device			address			REP	function							

STA .....start bit, always Log '1'
C5-C0 .....custom ID: ***'001001'*** (=9 Telefonica ID)
BAT .....always ***"1"***
D2-D0.....device ID: ***"000"***
A2-A0 .....address : ***"000"***
REP .....repeat code: first frame = ***"0"***; repeated frame = ***"1"***
F7-F0.....function code

frame length ....23 Bit
repeat time .....100 ms

3.3 Frame characteristic

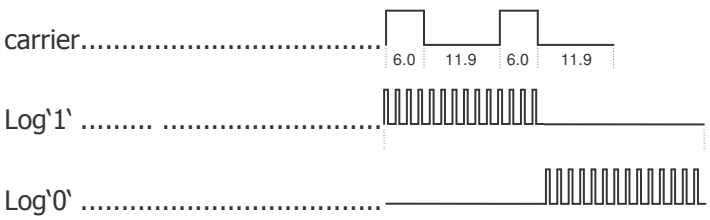
- The IR transmission is a carried biphase signal.
- The custom ID is "9" for Telefonica.
- The battery indication is an additional feature. Additional hardware would be necessary in the remote control to activate this bit, so that it is always 1 for the standard application.
- The device ID defines the device which is controlled with a remote control and is "000" for the standard application.

4 General Timing Specification

Description of the r-step IR format for a carrier frequency of 56 kHz. The IR signal is transmitted in a bi-phase format.

4.1 Bit coding of the IR transmission signal (56 kHz)

type of transmission.....bi-phase, carried
carrier frequency .....56 kHz / 17,9 µs
burst .....250 µs (14 carrier pulse)
pause .....250 µs
logic 1 .....|||||||||||||_____ 500 µs
logic 0 ....._____|||||||||||||| 500 µs



➔Tested for: Vishay TSOP1156, TSOP 1856, TSOP2156

5 Telefonica IR Codes

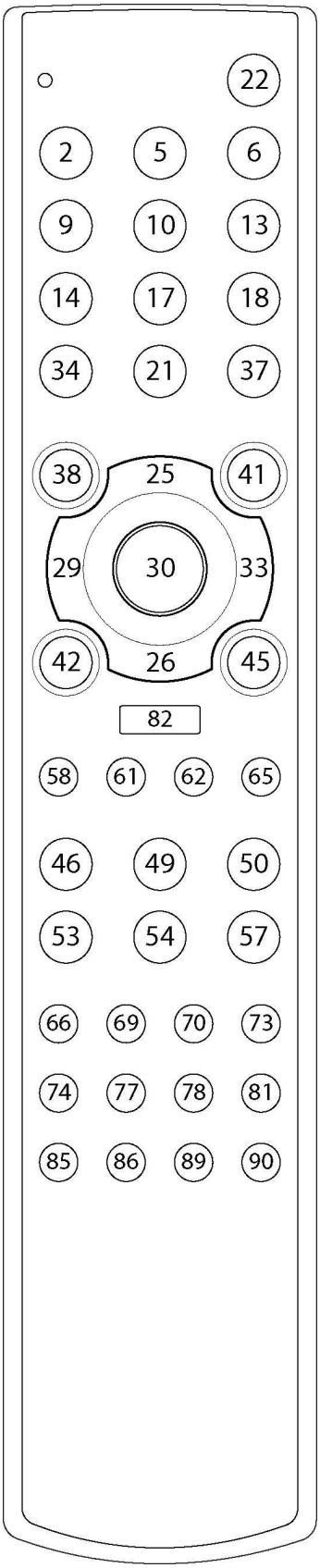


Figure 7: Function codes for ruwido 77