ZIRC-SD3502

Z-Wave & IR Remote Control
User's Manual

CONTENTS

1. INTRODUCTION

ZiRC is a low cost Remote Control reference design based on the SD3502 for dual-mode, Z-Wave and InfraRed (IR), control of Sigma Designs Internet Television (IPTV) Set Top Boxes (STB). User feedback is through a tricolor LED (red, green, amber) located next to the power button. As a Z-Wave device it can interwork with any other Z-Wave certified device from any vendor.

ZiRC can control the STB both in IR mode and in Z-Wave AV mode. The IR mode is using NEC format with a target address of 0xCB04. On first power up, the ZiRC is in Z-Wave AV (Audio Video) mode. While the IR mode can be used immediately, the ZiRC mode requires the remote to be included into the STB's Home Area Network first.

From time to time, this manual may refer to STB operations that are not covered in this document, but rather in the STB's manual.

Figure 1: ZiRC

2. USAGE

ZiRC is a low cost Remote Control reference design based on the SD3502 for dual-mode, Z-Wave and InfraRed (IR), control of Sigma Designs Internet Television (IPTV) Set Top Boxes (STB). User feedback is through a tricolor LED (red, green, amber) located next to the power button. As a Z-Wave device it can interwork with any other Z-Wave certified device from any vendor.

2.1 Z-Wave Network Overview

Z-Wave® is an interoperable, lightweight wireless technology that empowers both consumers and manufacturers with an ecosystem of products that work together.

This product can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All constantly powered nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

2.2 Initial Inclusion

To start using a newly acquired ZiRC, set the STB into inclusion mode. Insert 2 AAA batteries as indicated in the battery compartment of the ZiRC.

Any button press on the ZiRC will start learn mode. While in learn mode, the LED will blink amber every 3 seconds. After a few seconds, the LED should blink green 3 times on success or red on failure. Any button press would exit the inclusion mode with failure.

After successful inclusion, the ZiRC waits 10 seconds for any association to be set up during which time the LED should blink amber every 3 seconds. If any association was successfully set up during this time, it will blink green thrice. Otherwise any button press or timeout would exit the association mode with the LED blinking red thrice.

After this process the ZiRC goes to sleep and is now ready to control the STB. After any successful exclusion or reset operation, any button press will enter inclusion mode.

2.3 Audio Video control

To switch the ZiRC between Z-Wave AV and IR mode, press & hold SETUP+RED for 1 second. The ZiRC remembers the mode it is in even when its batteries are replaced.

On entering IR mode, the LED will blink amber once. All button presses are acknowledged by a single amber blink, as there is no feedback from the STB for IR. Note that while in IR mode, only the switch mode combo will work and all other combos are ignored.

On entering Z-Wave AV mode, the LED will blink green once. In this mode, successful AV commands sent to the STB are indicated by a single green LED blink. While the button is kept depressed, keep alive is sent every 200 milliseconds and the LED will continue to blink green accordingly.

Pressing SETUP+PLAY or SETUP+STOP will send a Basic ON or OFF respectively to turn on and off any Z-Wave equipment that is not AV capable.

In Z-Wave AV mode the buttons are mapped as in the table below.

Table 1: Button Mapping

Button / IR code	Z-Wave AV code
ON_OFF	0x0027
FILE_MODE	0x017E
SETUP	0x0115
SUSPEND	0x0194
PAGEUP	0x0022
USB_DVDROM_EJECT	0x0091
TV_MODE	0x017C
MUTE	0x0001
PAGE_DOWN	0x0023
BT_1	0x0007
BT_2	0x0008
BT_3	0x0009
BT_4	0x000A
BT_5	0x000B
BT_6	0x000C
BT_7	0x000D
BT_8	0x000E
BT_9	0x000F
DELETE	0x007D
BT_0	0x0006
CAPS_NUM	0x017B
RETURN	0x004B
UP	0x001E
SOURCE	0x017D
LEFT	0x0020
ENTER	0x0024
RIGHT	0x0021
INFO	0x017A
DOWN	0x001F
HOME	0x00AF
MENU	0x001D
PREV	0x011C
PLAY	0x0013
NEXT	0x011B
TITLE	0x0156

REV	0x0017
STOP	0x0014
FWD	0x0016
REPEAT	0x0107
ANGLE	0x003C
PAUSE	0x0015
SLOW	0x011E
TIME_SEEK	0x017F
AUDIO	0x0041
SUBTITLE	0x0130
ZOOM	0x0169
RED	0x009D
GREEN	0x009B
YELLOW	0x009F
BLUE	0x009A

2.4 Low battery

When battery is low, any key press will be immediately followed by 3 red LED blinks. This is an indication to replace batteries. This replaces the normal LED indications described in this document.

2.5 Subsequent Inclusion/Exclusion

Set the STB to add or remove the remote control as required. Press & hold SETUP+HOME for 5 seconds. The LED should blink green once to signal it has entered learn mode, at which point the use may release the buttons. The LED should blink 3 times green on success or red on failure.

2.6 Reset

Press & hold SETUP+RETURN for 10 seconds. The LED should blink green once on success. This will restore ZIRC to factory default setting.

2.7 Enable Over-The-Air firmware upgrade

Press & hold SETUP+ENTER for 5 seconds. The LED will start to blink amber and the firmware upgrade can start. If the firmware is transferred successfully the LED will blink GREEN 3 times. If the firmware upgrade fails the LED will blink RED 3 times and a retry must be done.

2.8 Send Node Info

Some devices set up automatic associations on receiving a Z-Wave Node Information Frame (NIF) from the target device. For this purpose, pressing & holding SETUP+INFO for 3 seconds will cause the LED to blink green once and send out the NIF once. This feature is also a requirement for Z-Wave certification.

2.9 Wake up

To conserve power, the ZiRC remains asleep until a key is pressed after which it goes back to sleep after 3 seconds.

To enable the ZiRC to stay awake for an extended period of time and to notify that it has woken up so as to carry out any configuration, press & hold SETUP+YELLOW for 5s. The LED should blink green once to signal it has woken up and notified the STB, at which point the user may release the buttons. The remote stays awake for 10 seconds only during which time the LED will blink amber every 3 seconds.

2.10 Update Associations

From time to time, the STB may create associations with other STBs to allow simultaneous control from one remote control. Wake the remote up as described in 2.7. Note that wake up time is extended only by association commands received from the STB. So quickly set the STB to update the associations. The LED should blink green thrice on successful association. The process is terminated by any button press or timeout with the LED blinking red thrice.

If no associations are set up, the ZiRC will control the controller that added it to the network. Otherwise it will target all the nodes in the group.

2.11 Test mode

This is not a normal user function but rather an advanced function used for testing. When the remote is in test mode the green led will keep flashing every second. The remote exits test mode after 60 seconds.

2.11.1 Carrier frequency

Press FILE+PGUP+ZOOM+PAUSE and hold for 10s.

2.11.2 Response to HomeID 0

Press FILE+PGUP+REV+MENU and hold for 10s.

3. FCC NOTICE TO USERS

Federal Communication Commission Interference Statement

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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

4. EU DECLARATION OF CONFORMITY

EU Declaration of Conformity

This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE Directive 1999/5/EC:

- **EN 60950-1: 2006/A12: 2011**
  Safety of Information Technology Equipment
- **EN 300 220-1/-2 V2.4.1 (2012-05)**
  Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD);
  Radio equipment to be used in the 25 MHz to 1 000 MHz frequency range with power levels
- **EN 301 489-1 V1.9.2 (2011-09)**
  Electromagnetic compatibility and Radio Spectrum Matters (ERM);
  ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
  Part 1: Common technical requirements
- **EN 301 489-3 V1.4.1: (2002)**
  Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range
- **EN 62479: 2010**
  Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz

CE0560

Česky [Czech]	*[Jméno výrobce]* tímto prohlašuje, že tento *[typ zařízení]* je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Dansk [Danish]	Undertegnede *[fabrikantens navn]* erklærer herved, at følgende udstyr *[udstyrets typebetegnelse]* overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]	Hiermit erklärt *[Name des Herstellers]*, dass sich das Gerät *[Gerätetyp]* in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.

et Eesti [Estonian]	Käesolevaga kinnitab *[tootja nimi = name of manufacturer]* seadme *[seadme tüüp = type of equipment]* vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
en English	Hereby, *[name of manufacturer]*, declares that this *[type of equipment]* is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
es Español [Spanish]	Por medio de la presente *[nombre del fabricante]* declara que el *[clase de equipo]* cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
el Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ *[name of manufacturer]* ΔΗΛΩΝΕΙ ΟΤΙ *[type of equipment]* ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
fr Français [French]	Par la présente *[nom du fabricant]* déclare que l'appareil *[type d'appareil]* est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
it Italiano [Italian]	Con la presente *[nome del costruttore]* dichiara che questo *[tipo di apparecchio]* è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar šo *[name of manufacturer / izgatavotāja nosaukums]* deklarē, ka *[type of equipment / iekārtas tips]* atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]	Šiuo *[manufacturer name]* deklaruoja, kad šis *[equipment type]* atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
nl Nederlands [Dutch]	Hierbij verklaart *[naam van de fabrikant]* dat het toestel *[type van toestel]* in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
mt Malti [Maltese]	Hawnhekk, *[isem tal-manifattur]*, jiddikjara li dan *[il-mudel tal-prodott]* jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
hu Magyar [Hungarian]	Alulírott, *[gyártó neve]* nyilatkozom, hogy a *[... típus]* megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.

Polski [Polish]	Niniejszym *[nazwa producenta]* oświadcza, że *[nazwa wyrobu]* jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português [Portuguese]	*[Nome do fabricante]* declara que este *[tipo de equipamento]* está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko [Slovenian]	*[Ime proizvajalca]* izjavlja, da je ta *[tip opreme]* v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak]	*[Meno výrobcu]* týmto vyhlasuje, že *[typ zariadenia]* spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]	*[Valmistaja = manufacturer]* vakuuttaa täten että *[type of equipment = laitteen tyyppimerkintä]* tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska [Swedish]	Härmed intygar *[företag]* att denna *[utrustningstyp]* står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.