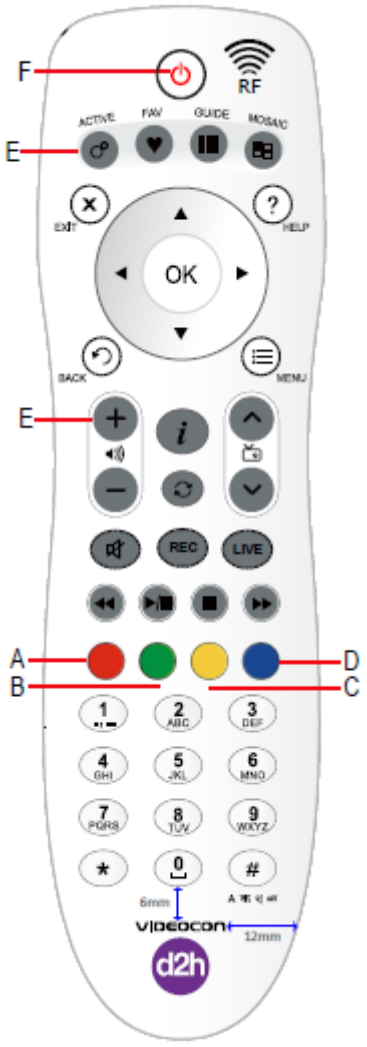
RF Remote Requirement Specifications

WR1843-RF Remote



Vesion:1.0

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Revision History

Date	Revision	Status	Description	Author
18.10.02	1.0	Draft	Initial revision.	

Table of Contents

1. Introduction

1.1 Purpose

The purpose of this document is to define and identify the software requirements for CUSTOMER, WR1843-RF remote control. This document should be understood by all people with sufficient knowledge of the application.

1.2 Scope

The document covers product descriptions and software requirement of WR1843-RF remote.

1.3 Definitions, Acronyms, andAbbreviations

SRS	Software Requirement Specifications
IC	Integrated circuit
MCU	Micro Controller Unit
RC	Remote Control
KB	Keyboard
RF	Radio Frequency
DB	Database
STB	Set Top Box
RF4CE	Radio Frequency for Consumer Electronics
MSO	RF4CE MSO Profile

1.4 DistributionList

Name	Organization	Function

1.5 References

[Docs]	Title:	WR1843-RF
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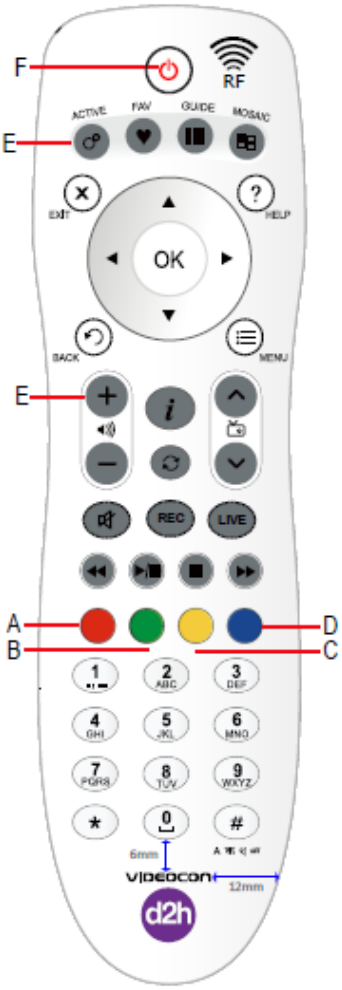
2. Passport

Note:*The passport maybe is not up to date; the key function map is up to date as per last received changes. Always refer to latest passport document.*



3. General ProductDescription

3.1 Overview

This RCU is transmitting RF.

The RCU should cover the technical specifications for RF4CE.RCU should control RC4CE without difference.

3.2 Control STB

The remote control can be set-up to control a RF STB (mutually exclusive).

3.2.1 Control STB – RF4CE

The RF platform is RF4CE, using the MSO profile.

Before the RC can control the STB, the RC must pair with the STB first. The STB shall implement the Target Node device type.

4. ProductRequirements

4.1 RC Default Settings (Out-of-BoxSettings)

1) The RC is not paired; the RF4CE pairing table isempty.
2) To reset RC to Default Settings, refer to chapter4.13.6.

4.2 DataRetention

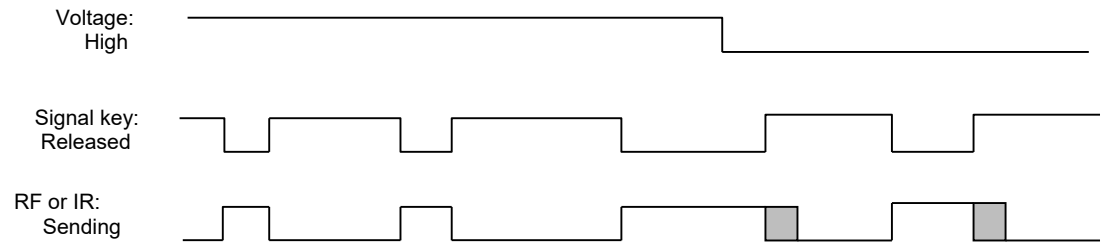
Data retention is required for the RC, to maintain all settings previously done when change of batteries. Below are the data that will be stored:

1) STB medium (RF)
2) RF pairing information.

4.3 Low VoltageDetection

Low voltage detection will be triggered after a signal key is released in normal mode. A code will be sent to the STB to indicate this. However, this will not stop the RC from operating. The RC will still be able to operate normally.

When the battery voltage is low, depending on the RC **STB Medium setup** the RC will send a **RF-VDCMD_BATTERY_LOW (Vendor Specific RF code)** or a [**IR-BatteryLow**] to STB after a signal key is released. A signal key means any key or key combo press which sends IR or RF. Also upon key-release when not in any set-up mode: the **battery-low** LED flashes 5 times. The flashing interval is 50ms on, 50ms off. The following diagram shows: the Grey area is the Low Voltage command **RF-VDCMD_BATTERY_LOW** or [**IR-BatteryLow**].



4.4 RF Requirements (Pairing andTransmission)

The RF feature in the RC requires to be paired with the STB to use.

For pairing, the STB needs to be put into pairing state in order for the RC to pair.

4.4.1 RF Pairing

There are situations where pairing of remote and STB device is required and they are listed below.

- Upon out of the box, the remote is not paired with any STB device. In order for the remote to control any STB device, it has to be paired with thedevice.
- If a paired remote has to work with a new STB device, they have to be paired again (forced-pairing).

The STB must be in the pair mode before it receive the pair request from the rc, A 3 digit validation will be prompt by the STB device. Once the correct validation code has been input from the remote, the pairing process is completed and the remote is ready to use.

4.4.2 General RF Parameters

For pairing, the RC has to be near to the STB.

If pairing was successful then the STB medium will automatically switch to RF.

If pairing was not successful with another STB (not current paired STB/Dongle), then the pairing table will not change; it will remain empty or an already paired STB will remain paired.

If pairing was not successful with current paired STB, then the pairing table maybe will be cleared or remain paired with current STB which depends on the errors during pairing.

At any one time, the RC can only pair with 1 STB. There is only one entry allowed in the pairing table. If the RC is paired with a second STB then the pairing with the first STB is cancelled; theRC will attempt to un-pair the firstSTB.

The RF4CE pairing parameter for RC is as below:

PARAMETER		**VALUE**	**REMARKS**
Node Capabilities	Node Type (Bit 0)	0b0	0 = Controller
	Power Source (Bit 1)	0b0	0 = Battery
	Security Capable (Bit 2)	0b1	1 = Secure
	Channel Normalization (Bit 3)	0b1	
Vendor Information	Vendor ID	0x1116	D2H
	Vendor String	D2H	D2H
Application Capabilities	User String Specified (Bit 0)	0b1	1 = Specified
	Number of Supported Device Type (Bit 1-2)	0b01	
	Number of Supported Profiles (Bit 4-6)	0b001	1 profile
Device Type List		0x01	Remote controller
Profile Identifier List	profileIdList[0]	0xC0	MSO profile
Requested Device Type		0x09	STB

4.5 KeyFunctions

Key number	Key name
K1	STB-Power
K2	ACTIVE
K3	FAV
K4	GUIDE
K5	MOSAIC
K6	EXIT
K7	?
K8	UP
K9	LEFT
K10	OK
K11	RIGHT
K12	DOWN
K13	BACK
K14	MENU
K15	VOL UP
K16	INFORMATION
K17	CH UP
K18	VOL DOWN
K19	CYCLE
K20	CH DOWN
K21	MUTE
K22	REC

Key number	Key name
K23	LIVE
K24	REW
K25	PLAY & PAUSE
K26	STOP
K27	FEW
K28	RED
K29	GREEN
K30	YELLOW
K31	BLUE
K32	Digit 1
K33	Digit 2
K34	Digit 3
K35	Digit 4
K36	Digit 5
K37	Digit 6
K38	Digit 7
K39	Digit 8
K40	Digit 9
K41	*
K42	Digit 0
K43	#

4.6 SleepMode

The RC enters Sleep Mode with the following:

i) All LEDs areoff.

ii) RF communications aredisabled

iii) Any key press will wake up theRC.

4.7 Stuck Key Timeout (RF)

Stuck Key Timeout is used to conserve battery life. When a key is being pressed continuously for **~30secs** (e.g. by placing something heavy on top of the remote), the RC will stop transmitting code automatically; and will resume operation when all keys are released. Typical Stuck Key Timeout is with **+/- 3secs tolerance**, except for IR with exceptional long repeat timings or RF long latency.

In TV Control Setup there are situations where a key is allowed to be pressed for longer than the stuck key timeout.

4.8 Multiple KeyPress

Except for the programming key-combination; if more than one key is pressed simultaneously, transmission will stop in order to conserve battery life.

4.9 Set-upfeatures

All TV setup features can be setup using **Standalone Setup,** a standalone version that does not require any interaction with the STB. The standalone version of the setup features requires no special software on the STB, a quick start guide or manual is essential however.

Setup includes the following features:

Setup feature	**Standalone Setup**	
Full search	Yes	TV setup Feature
Manual code-set entry	Yes	
Codeset-ID Blink out	Yes	
RF Pairing	No	STB-setup Feature
Toggle STB medium RF <-> IR	Yes	
Manufacturing Reset	Yes	Generic-setup Feature

4.10 Result Indications via LEDBlinking

The STB-LED lights while a STB-function is transmitted

The STB-LED blinking frequency is stated as below.

- Fast Blink: 200ms ON and 200msOFF
- Slow Blink: 500ms ON and 500msOFF
- Long Blink: 1000ms ON andOFF

This is used to indicate the results of the user setup performed.

4.11 Vendor Specific RFcodes

Depending on the RC medium selection for STB communication (RF), Vendor Specific RF code is used to send a message to the STB. Not to directly control the STB, but to signal a state-change in the remote control. The GUI of the STB can use this information to show messages, or drive setup wizards on the STB.

Vendor Specific RF code will be transmitted only when the RC is in RF mode and RC already paired with the STB.

Vendor Specific RF command	Function	vendor specific RF code
RF- VDCMD_BATTERY_LOW	Sent if the battery is getting low.	Refer to 5.2
RF-VDCMD_SW_VERSION	Send the SW version of Remote control to STB. After paired, RC will automatically send out this command to keep STB informed with the current RC software version.	Refer to 5.2

4.12 Set-upfeatures

4.12.1 RF Pairing

There are situations where pairing of remote and STB device is required and they are listed below.

- Upon out of the box, the remote is in the IR mode,it is not paired with any STB device. In order for the remote to control any STB device, it has to be paired with thedevice.
- If a paired remote has to work with a new STB device, they have to be paired again (forced-pairing).

The STB must be in the pair mode before it receive the pair request from the rc, A 3 digit validation will be prompt by the STB device. Once the correct validation code has been input from the remote, the pairing process is completed and the remote is ready to use.

If a remote is already paired, it's possible to perform a forced pairing on the remote.

This user interface allows user to pair 1 remote to 1 STB device (pairing up to 1 device) using MSO pairing method.

Below are the steps required for a successful ***forced*** pairing between remote and STB device.

Step	Description
1	Press and hold " * " key for 5 seconds.
2	The POWER-LED on the remote will turn on.
3	Press " OK " key .
4	The remote sends a pairing request to the STB.
5	The STB will respond by showing a random 3 digit code on the TV screen. On the RC, the user enters these 3 buttons. For each button, the code is sent to the STB that will show it on the screen (TV screen). When the 3 correct digits are sent, the STB will send a successful pairing event upon receiving, else it will send an error.
6	Remote will give a successful indication if pairing is successfully completed.
7	Remote exit from this setup interface and back to normal mode,The STB-LED turn off. Remote is able to control the STB device now.

Notes:

During RF pairing validation stage, all keys are enabled as single RF data transmission.

It is up to the STB application to filter unnecessary keys during this stage.

The followings are observed as incorrect actions in this setup interface.

Situation	Description

A	Keys are not released within 10 seconds after being held down. Remote will give invalid key input condition as indication.
B	STB device is not able to perform pairing with remote. Such situation may possibly arise due to the followings: • STB device is not poweredon. • RF interference from otherremotes Remote will give unsuccessful as indication.

Note:

1) In this case, it is not required to perform RF un-pairing prior to RF forced pairing

4.12.2 ManufacturingReset

This user setup interface allows user to reset the remote back to factory settings.
This will erase any prior RF pairing information stored in the remote.

Below are the steps required for a successful manufacturing reset.

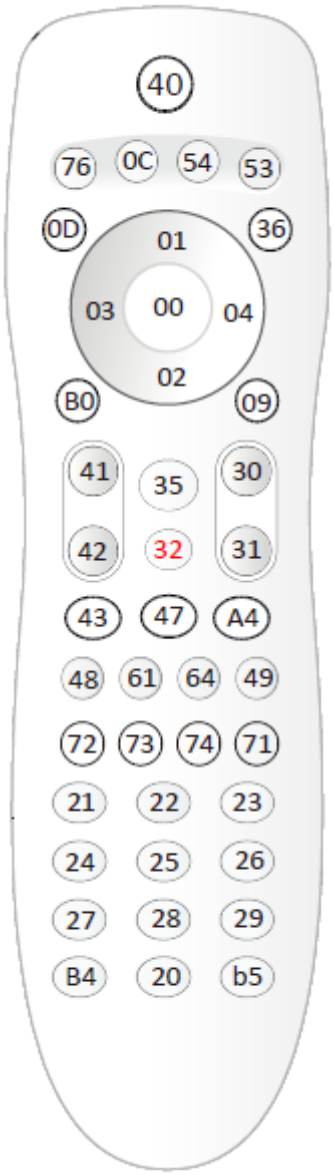
Step	Description
1	Press and hold “ * ” key for 5 seconds.
2	The POWER-LED on the remote will turn on.
3	Press “ < ” + “ < ” key .
4	The STB-LED on the remote will turn on for 3 times.
5	Remote is reset to factory settings.
6	Remote exit from this setup interface and back to normal mode.The STB-LED turn off.

5. RFSpecifications

5.1.1 STB RF CodeTable

By default the RF4CE codes will use the default ZRC profile. When indicated, YUWON OEM Manufacturer ID codes will be used. D2H OEM Manufacturer ID for these codes shall be 0x1116.

Codes are in hexadecimal.



FCC Information to User

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 con−nected.
- Consult the dealer or an experienced radio/TV technician for help

Caution

Modifications not expressly approved by the party responsible for compliance could void the user’ s authority to operate the equipment.

FCC Compliance Information : 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.