Manual of KWR101830/01B, KWR101830/01BS & KWR101830BU

FCC Statement

FCC Part 15.19
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.

NOTE:
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 or more 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.

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

No special accessory is required to enable the equipment to comply with the emission limits.

1. Product Description

1.1 Product Features

- Dual button entry RC and KWR.
- Number of keys: 38 for KEYBOARD, 18 for RC. Total 56 keys.
- 4 main functions: Remote Control, Mouse Cursor Control, Qwerty KEYBOARD for text entry and downstream data transfer.
- 128k Flash for handling RF functions.
- 6 axis motion pointing.
- IR Learn using Data Flash.
- IR Database.
- IR uses Flash chip.
- Low voltage alert through LED blinks.
- Works with USB Receiver dongle OVU810006.

1.2 Product

Picture for illustration only

2. RF Functions

2.1 RF Pairing

1) Make sure RC is within 1m distance from the STB and no other RF RCs are present.

2) Make sure the Qwerty keyboard faces upwards.

3) Press and hold ***Keyboard W*** and ***Keyboard O*** keys together for at least 5 seconds.

4) The KEYBOARD LED will start blinking, and RC is now in pairing mode.

5) Activate pairing mode on STB (STB sends activate command or reset dongle power).

6) Once the pairing is successful, the KEYBOARD LED will be turned off; otherwise, the KEYBOARD LED will stay lit till timeout.

There will be a 30 seconds timeout for RC to be in pairing mode. Previously paired receiver shall be retained as long as the STB did not initiate the pairing. See Note below on different pairing scenarios. User can start from Step 1 again if pairing failed.

Note:

When a previously paired RC starts pairing with

1. Different receiver
   - o Only upon successful pairing, the RC shall replace the previously paired receiver with the new receiver.
   - o If the pairing process fails or pairing timeout occurs, the previously paired receiver will be retained.
2. Same receiver
   - o Previously paired information of the same receiver shall first be erased from the RC before pairing process starts.
   - o If the pairing process fails or pairing timeout occurs, the previously paired receiver will not be retained.

At any one time,

- Only one RC is allowed to be in pairing mode, i.e. no concurrent pairing is allowed.
- Each RC can only work with one receiver, i.e. 1-to-1 pairing.

2.2 RF Un-Pairing

The following steps for un-pairing:

1) Make sure the Qwerty keyboard faces upwards.

2) Press and hold ***Keyboard X*** and ***Keyboard UP*** keys together for at least 5 seconds.

3) The KEYBOARD LED will start blinking slowly after 5 seconds.

4) Reset the power or battery and the RC is ready to pair again.

2.3 Remote Idling, RF Link Timeout with connection

When detected no activity, the RC will enter SLEEP mode. During SLEEP mode, RF link will be disconnected to preserve power. Pressing any key or any gesture action will resume the RC to ACTIVE mode almost immediately. The key-press that resumes the RC from SLEEP mode will be remembered and transmitted.

When the RC wakes up from SLEEP mode, there may be reconnection latency depending on the RF link condition with the receivers.

Once the RF (2.4G) link has been established, the RC will execute upon **ANY** key-press. Key presses prior to successful RF link connection will not be transmitted.

2.4 RF Broken Link

RF link is broken when the RF (2.4G) connection is lost or when the receivers sleep or during system shutdown states (S3, S4 or S5) or due to out-of-range.

2.5 RF ACTIVE / SLEEP

From RF ACTIVE >> SLEEP User action	Remote Control action
No key-press for less than 15 seconds.	RF goes to SLEEP. In SLEEP mode, all LEDs are OFF.
No motion senses for about 15 seconds.	RF goes to SLEEP. In SLEEP mode, all LEDs are OFF.

2.6 RF Auto Connection

When the RC wakes up or resumes from SLEEP mode or come back within range of a powered-on paired receiver, the RF link will be reconnected automatically. No RF re-pairing is needed.

2.7 RF Out-of-Range

When the RF link is broken or out-of-range and is stationary, the RC goes to SLEEP immediately to conserve power.

3. Operational Features

3.1 Mode Switch

3.1.1 RC to Keyboard

When in RC mode, KEYBOARD keys will be locked to prevent accidental presses. KEYBOARD keys can only be unlocked by tilting 90 degrees clockwise or anticlockwise. Once tilted more than 90 degrees, mouse cursor will stop moving if it is in Mouse mode.
If KEYBOARD keys are faced up upon power up, a command will be sent from the RC.

3.1.2 Keyboard to RC

When in KEYBOARD mode, user can change to RC mode by tilting 90 degrees clockwise or anticlockwise. When in KEYBOARD mode, RC keys will be locked to prevent accidental presses. Once tilted more than 90 degrees, mouse cursor will start moving if it is in Mouse mode.
If RC keys are faced up upon power up, a command will be sent from the RC.

3.2 Remote IR Keys

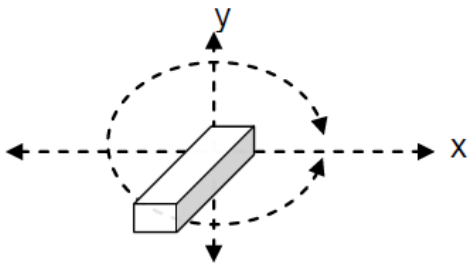
TV POWER, VOL+, VOL-, MUTE and AV are IR command keys. With RC side faced up and in a portrait orientation, pressing these buttons will fire the respective IR codes from the IR LED of the remote control.

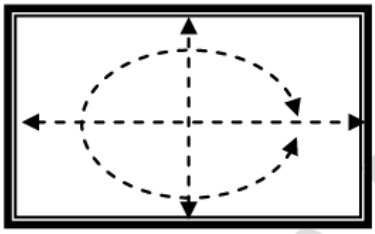
3.3 Remote RF keys

Remote RF keys will be sent in the form of HID Keyboard keys.

3.4 Motion Control Mouse Mode

Mouse mode allows user to use the 3-D gyroscope and accelerometer of the RC as a floating mouse or joystick. In this mode, user is also expected to operate the remote control in free air and not laid down and operating it in a stationary position.
The relative movement of panning and lifting (roll, yaw and pitch) will control the mouse cursor to move in the same relative direction on the screen.





For mouse cursor control, toggle motion sensor ON:
- Move remote control in the air to use motion mouse control
- Press OK key will be Mouse Left Click function only, press and hold Mouse Left Click is supported
- Provides RAW data for gesture processing, enable/disable with downstream command from host.

3.4.1 Mouse Mode

Default mode for mouse mode = OFF when first power up or upon a power recycle.
There will be LED indication on TV POWER button on the activation and deactivation of motion sensor.
Mouse mode will be disabled if user entered programming mode, i.e. IR Learning with mouse mode ON; user needs to press MOUSE key again if mouse function is needed after exiting programming mode.
Downstream command from host can also toggle Mouse mode ON/OFF. Both MOUSE (TOGGLE) key and downstream command have equal priority, hence the last trigger will supersede previous state.
- Mouse mode code will be sent upon a reset cycle either during power recycle or watchdog reset.
- Mouse mode code will be sent when user pressed the MOUSE key
- Mouse mode code will be sent after each downstream command
- Mouse mode code will be sent after any other feature (e.g. IR Learning mode) that changes Mouse ON/OFF state.

3.5 Keyboard Mode

The Qwerty keyboard will be held by both hands and used in landscape orientation.
The keyboard also supports secondary keys by using **FN, CAPS** or **Alt Gr**; this allows the keyboard to support uppercase characters, symbols and digits with the limited number of Qwerty keys.
There are 2 ways of activating secondary keys:

1. Press and release **FN** or **CAPS** or **Alt Gr** key followed by pressing another key. For example, press **FN** then Q will send „1" , press **CAPS** then Q will send „Q" . After Q is released and pressed again, „q" will be sent.

2. Press and hold FN or CAPS or Alt Gr key followed by pressing another key. For example, press and hold FN and then press Q will send „1" , press and hold CAPS and then Q will send „Q".

As long as the secondary key is pressed and held, the secondary character will have the same repeating behavior as the normal primary key „press and hold" .
To minimize accidental presses of the Qwerty keys while in RC or Mouse Cursor Control, the Qwerty keys will be deactivated. When not in SLEEP mode and the keyboard side is detected faced down, the Qwerty keys will be locked, key presses on the keyboard will be ignored. When device is not in SLEEP mode and the keyboard side is detected faced up, the Qwerty keys are unlocked.

3.5.1 Other Key Codes

When "**ALTGr**" + "Space" is pressed, F10 key code will be sent from the RC.

3.6 LED Indicator Behaviour

Total 3 backlit LED indicators:
1) RED colour, on TV POWER key, RC side, indicates all key-press events on RC side except for Mouse Left Click.
2) RED colour, on SYSTEM POWER key, RC side, for Mouse Left Click only.
3) AMBER colour, on TAB key, KEYBOARD side, indicates all key-press events on KEYBOARD side.

Location	Indication purpose	Status description
TV POWER	Indicates IR and RF code transmission	1 short blink in red each time a valid key is pressed.
TV POWER	Low battery warning	2 long blinks in red each time a RC key is pressed.
TAB	Low battery warning	2 long blinks in amber each time a KEYBOARD key is pressed.
SYSTEM POWER	Mouse Left Click	1 short blink in red each time Mouse Left Click is pressed.
SYSTEM POWER	Definition of Error (in setup mode): - Key-press and hold ≥ 30 seconds - Invalid key-press - Timeout	3 short blinks.
SYSTEM POWER	IR Learn / AutoSearch programming	As defined in Section 7.
TAB	Shows successful RF pairing	Flashes rapidly in amber for 2 s
TAB	Key stuck	3 short blinks
TAB	Indicates Qwerty KEYBOARD activated	2 blink in amber when KEYBOARD key is pressed except for: - ALTGr, CAPS and FN keys (No LED indication).

4. Infrared Function

The remote control has a default IR code table for 5 TV keys (TV POWER, VOL+, VOL-, MUTE and AV). These 5 keys also support IR Learning.

4.1 Infrared (IR) Learn

Following are the 5 IR functions keys for IR Learning: **Key Name**	**Key function**
TV POWER	TV Power On/Off
VOL+	TV Volume Up
VOL-	TV Volume Down
MUTE	TV Mute
AV	Source selection

Follow the key sequences below to invoke the infrared (IR) Learning feature for a key:

Step	**IR Learn Sequence**
1	Press and hold “VOL+” and “VOL-” Key for 3 seconds. Release the keys, SYSTEM POWER LED stays on; RC enters IR Learning mode.
2	Press and release a learnable key. The SYSTEM POWER LED indicator will reverse blink once and TV POWER LED will turn ON.
3	Hold the remote to be learned at an optimum distance (3cm to 6cm); aim directly at DUAL IR lens and press the key to be learned until SYSTEM POWER LED responds.
4	The SYSTEM POWER LED shall slow blink 2 times if learning is successful and the newly learned code will replace the previous one. The SYSTEM POWER LED shall fast blink 3 times if the learning fails. Previously learned code will be kept. TV POWER LED will turn OFF. Go back to Step 2 to select learnable key again.
5	User can learn other keys by repeating Steps 2 to 4.
6	Press “BACK” Key in IR Learning mode and will exit to normal mode.
	Error handling: 1. If a wrong key is pressed at Step 2, SYSTEM POWER LED will fast blink 3 times and go back to Step 2. 2. If any stuck key(s) occurs in any of the learning sequence, SYSTEM POWER will fast blink 3 times, exit IR Learning mode and enter Stuck Key mode.

Please take note of the following points when performing infrared (IR) Learning:

1.	The remote will NOT exit IR Learning mode, except for the following occurrences: 1. If no key is selected within 30 seconds after entering IR Learning mode. 2. If stuck key timed out. 3. If “BACK” Key is pressed.
2.	After pressing and releasing a learnable key and waiting for the signal to be learned: 1. If there is no signal received within 30 seconds, SYSTEM POWER LED shall fast blink 3 times to indicate learning had failed and exits IR Learning mode. 2. If the same key is pressed again (See Section 7.2), SYSTEM POWER LED will slow blink 2 times and wait for a new key-press (go back to Step 2 to select a learnable key again). 3. If any other key is pressed, SYSTEM POWER LED will fast blink 3 times and wait for a new key-press (go back to Step 2 to select learnable key again).
3.	The TV POWER LED will always be ON during IR Learning mode while waiting for a key input or signal to be learned.
4.	When IR learning is in progress, RF functions are disabled (e.g. keys on KEYBOARD side are locked). Only after exiting from IR Learning mode, the RF functions are resumed.

4.2 Infrared (IR) Learn Function – Reset

While in IR Learning mode, by pressing the same learnable key twice, the key will revert to default (i.e. no code).
The user shall also be able to reset all the 5 keys to the default setting.
This is done by pressing the "VOL-" key and "SCROLL-" key simultaneously for 3 seconds. SYSTEM POWER key will turn ON and user has to release all keys. The RC starts erasing all learned data and returns to its original settings; i.e. before any learning was performed. Upon successful erasure, SYSTEM POWER LED will give 2 slow blinks, otherwise 3 fast blinks to indicate failure.

4.3 Infrared (IR) Database

Follow the key sequences below to invoke the Database Programming feature to program a codeset for a particular brand of TV:

Step	Database Programming Sequence
1	Turn on the TV device.
2	Press and hold "SCROLL+" and "SCROLL-" keys for 3 seconds. SYSTEM POWER LED stays ON; RC enters Database Programming mode. Release the keys.
3	Database Scanning Aiming the remote control at the TV device IR receiving opening, press and hold "UP" key to transmit PowerToggle IR command for the (n+1) universal codeset in the codeset list, where n is the programmed TV codeset prior to Database Programming mode. If there is no TV codeset programmed, the first codeset in the list will be transmitted. During transmission of the IR command, the TV POWER LED will turn ON. When the IR transmission completes for the codeset under scan, the TV POWER LED will turn off and no new IR command will be sent over the next 1.5 seconds approximately. If the TV does not turn off, the user will need to keep pressing the "UP" key and the remote control will then try the next universal codeset in the list.
4	When the TV turns off, the user shall release the "UP" key to stop IR transmission. The user can now try pressing each of the 5 IR keys to check if the underlying IR codes works with the TV device. At this point, the user can select to proceed with the following steps: 1. Continue Database scanning – Step 3 2. Step codeset Forward – Step 5 3. Step codeset Backward – Step 6 4. Program codeset into RC and Exit – Step 7 5. Exit – Step 8
5	Step codeset Forward Press and hold "RIGHT" key. This will step to the next codeset where it has left off. The PowerToggle IR command will be transmitted as long as the key is pressed. When user release and press "RIGHT" key again, the PowerToggle IR command of the next codeset will be transmitted.
6	Step codeset Backward Press and hold "LEFT" key. This will step to the previous codeset where it has left off. The PowerToggle IR command will be transmitted as long as the key is pressed. When user release and press "LEFT" key again, the PowerToggle IR command of the previous codeset will be transmitted.
7	Program codeset into RC and Exit Press and release "OK" key. The codeset from the last transmitted IR commands will be programmed into RC. Upon completion, the SYSTEM POWER LED will give 2 slow blinks to indication success, otherwise, 3 fast blink to indicate failure and exits to normal mode.
8	Exit Press and release "BACK" key. No codeset will be programmed into RC. No LED indication will be given and the RC exits to normal mode.

Please take note of the following points when performing the Database Scanning function:

1.	The remote will NOT exit the Database Scanning mode, except for the following occurrence: 1. If no key selected within 30 seconds. 2. If stuck key timed out (not applicable for pressing “UP” key). 3. If “BACK” key is pressed. 4. If “LEFT” key is pressed after the 1st codeset in the search had last transmitted. 5. If “RIGHT” key is pressed after the last codeset in the search had last transmitted.
2.	If failed to program codeset in Step 7, the previous programmed codeset (if any) will be retained.
3.	If the PowerToggle IR command for all codesets in the list is transmitted in Step 3, the TV POWER LED will give 10 fast blinks to indicate “End-Of-Search”.
4.	When database scanning is in progress, RF functions are disabled (e.g. keys on KEYBOARD side are locked). Only after exiting from Database Programming mode, the RF functions are resumed.
5	The learn codes or default IR codes (RC6 Mode 6A) underlying each of IR keys will be replaced with the IR codes from the valid codeset ID being programmed into the RC.

4.4 Infrared (IR) Factory Reset

The user is able to reset all the IR keys back to factory default settings. These keys will transmit the default IR code (RC6 Mode 6A).
This is done by pressing the “MUTE” key and “AV” key simultaneously for 3 seconds. SYSTEM POWER key will turn ON and user has to release all keys. The RC starts erasing all learned data and programmed codeset ID and returns to its original settings; i.e. before any learning or autosearch was performed. Upon successful erasure, SYSTEM POWER LED will give 2 slow blinks, otherwise 3 fast blinks to indicate failure.

5. Non-Functional Requirements

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5.1 Simultaneous Key Press (RC)

If more than one key-press is detected, the remote control will stop sending IR/RF code.
Example:
i. When Key 1 is pressed, Key 1 code is transmitted. Pressing Key 2, with Key 1 still pressed, RC will stop transmitting Key 1 code. Then, releasing Key 2, with Key 1 still pressed, Key 1 code will be transmitted again.

ii. When Key 1 is pressed, Key 1 code is transmitted. Pressing Key 2, with Key 1 still pressed, RC will stop transmitting Key 1 code. Then, releasing Key 1, with Key 2 still pressed, Key 2 code will be transmitted.

5.2 Simultaneous Key Press (Keyboard)

The remote control supports multiple key-presses but only limited keys are able to do so. When two or more keyboard keys that do not support simultaneous press are pressed simultaneously, the remote will not send any code. When only one key remains pressed, the remote will restart and send the code of this key as per normal.
Workable 2-keys simultaneous key-presses are:
- **CAPS** with any alphabets (uppercase of the alphabets)
- **FN** with Blue option keys (numbers and symbols, etc.)
- **Alt Gr** with Orange option keys (special characters and other symbols, etc.)

5.3 Consecutive Key Press (Keyboard)

When **FN** key is pressed or still pressed, the RC will not transmit code or do any action. After release and then press any keys that have an alternate function on the same key, e.g. Q key shares the same as numeric „1" key, the RC will transmit numeric „1" code.
E.g. **FN** key + Q key = Numeric „1" key is transmitted
FN key + A key = Symbol „?" key is transmitted
The same is true for **CAPS** and **Alt Gr** keys. For example, after release of the **CAPS** key, an alphabet key is pressed; the RC will transmit the uppercase letter of the particular key.

5.4 LED Indicator

Blinking Definition
Fast Blink (IR Learn): approximately 50ms ON, then OFF.
Slow Blink (IR Learn): approximately 500ms ON, then OFF.
Short Blink: approximately 10ms ON, then OFF.
Long Blink: approximately 500ms ON, 500ms OFF.

5.5 Stuck Key Timeout

Stuck Key means that a button has been pressed for a very long time in normal operating mode.
To preserve battery power, the remote will stop sending code (**IR and RF**) and shut down at about **30** seconds after the last key transition to consume minimal power. After all keys are released, the remote resumes normal operation.
Exceptions: Mouse Left Click, navigation keys and "OK" key will not have Stuck Key timeout in normal operation mode. In setup/programming mode, these keys will have stuck key timeout.
Typical Stuck Key timeout is around +/- 20% tolerance, except for IR with exceptional long repeat timings or RF long latency.
The application will have some mechanism to stop mouse data transmission to save battery life.
In TV Control Setup, there are situations where a key is allowed to be pressed for longer than the Stuck Key timeout.

5.6 Auto-repeating

All the buttons have auto-repeat function, that is, when a key is continually pressed, the RC will transmit the corresponding code until the 30 seconds Stuck Key timeout.

5.7 Low Voltage Detection

The RC comes with three 1.5V batteries working in series to give a total maximum of 4.5V ~ 4.8V. The depletion of the battery power will be in 2 stages. LED blinking is dependent on the remote control side, red LED for RC side, amber LED for KEYBOARD side.

Note: The Remote will only check for low voltage after it goes to sleep and wakeup, OR every 3s interval while the Remote is active.

1) Stage 1, Working voltage (4.8V to 3.3V)

All keys and functions will work as normal.

2) Stage 2, Very Low voltage (3.3V and below)

Very Low voltage detection triggers from 3.3V and below.
RC LED gives 2 long blinks in red each time a valid RC key is pressed
KEYBOARD LED gives 2 long blinks in amber each time a keyboard key is pressed
No IR or RF codes will be sent from the RC.

Note: All the voltages have a 0.05V tolerance.