



APPENDIX H
: USER'S MANUAL

B702 Manual

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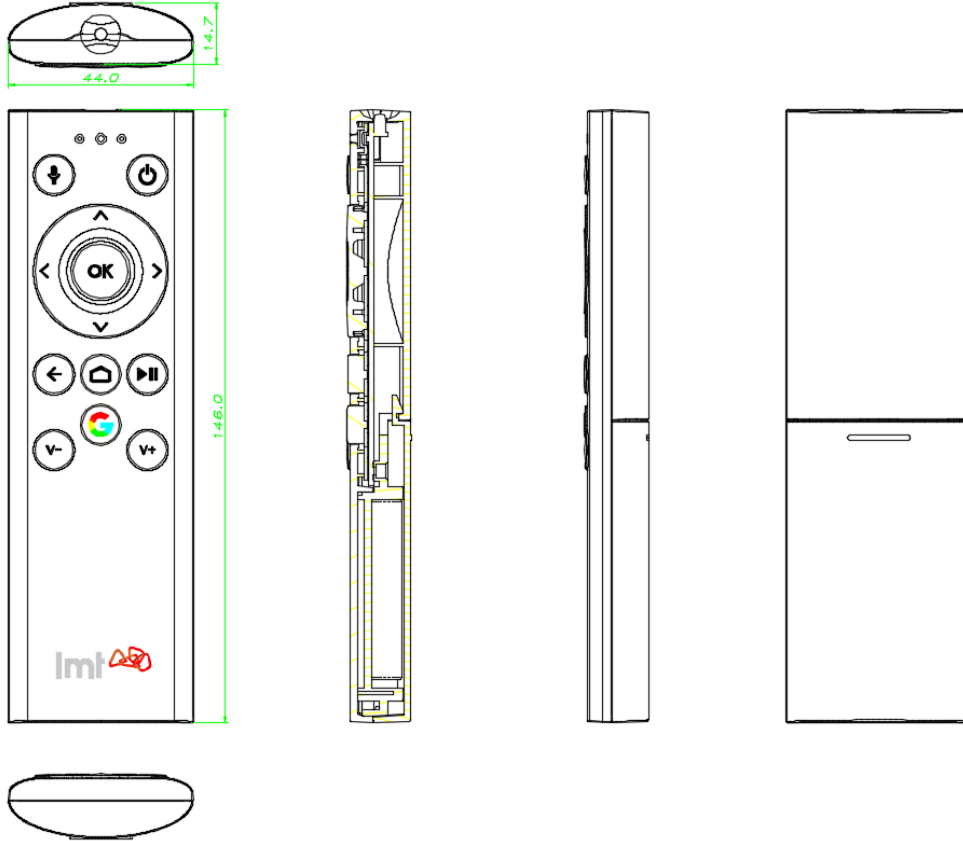
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1 - Mechanical Requirements

1.1 - Design

- Dimensions : 160 x 47 x 17.8mm



1.2 - Picture (for reference only)



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2 - Electrical Requirements

2.1 - Electrical Characteristic

Parameter		Condition	Spec	Unit
Frequency Range		Bluetooth Low Energy Specification	2.402 ~ 2.480	[GHz]
Channel			40	[Num]
RF Power			0	[dBm]
Test channel		TC-3000 (RF measuring instrument)	19	[Num]
RF Power	PAvg		0±5	[dBm]
	PMax		+5	[dBm]
	Pmin		-5	[dBm]
Modulation Characteristics	Δf1 avg		225~275	[KHz]
	Δf2 avg		225~275	[KHz]
	Δf2/Δf1		0.8	[KHz]
	Δf2min		185	[KHz]
	Δf2rate		99	[%]
Carrier Frequency Offset and Drift	fTx-fn		150	[KHz]
	Δf0-fn	50	[KHz]	
	f1-f0	20	[KHz]	
	Δfn-f(n-5)	20	[KHz]	
Operating Voltage		RF (Bluetooth)	2.0~3.6	[V]
LVI Voltage		Low Voltage Indicate	2.25 ± 0.2	[V]
Operating current (IR)		Power: 3V	35	[mA]
Operating current (RF KEY)		Power: 3V Non-directional distance	12	[mA]
Operating current (RF+Voice)			25	[mA]
Leakage current			10	[μA]
RF range (distance)			10	[m]
IR Range		Vertical & Horizontal	12(±30°),7 (±15°)	[m]
VOICE		300Hz	Voice Inspection JIG	-45 ~ -20
VOICE	2KHz	Voice Inspection JIG	-45 ~ -20	[dB]
	3.8KHz		-50 ~ -10	[dB]

3 - Software Requirements

3.1 - Bluetooth 4.0 LE identification

- a) Device Name: LMT Remote
- b) Vender ID: 0x02AF
- c) Product ID: 0x2008

3.2 - Pairing mode

- a) At first time pairing or after Factory Reset, RCU works only in IR.
- b) Press [OK] and Google [HOME] keys for longer than 4 seconds. LED stays ON while pressing [OK] and Google [HOME] keys.
- c) After 4 seconds, the LED starts blinking so that to confirm the remote has entered into pairing mode.
- d) After RCU has entered pairing mode, RCU can send the IR signal of Up, Down, Left, Right and OK keys.
- e) If pairing is successfully made, the LED goes OFF and remote starts working in Bluetooth.
- f) If the user presses any key during pairing mode, the remote stops pairing and goes back to IR mode, excepted Up, Down, Left, Right and OK keys.
- g) If pairing is not successfully made for 90 seconds, the LED goes ON for 4 seconds and then goes OFF. The remote stops pairing and goes back to IR mode if first time pairing and after Factory Reset.

3.3 - Re-pairing mode

- a) Press [OK] and Google [HOME] keys for longer than 4 seconds. LED stays ON while pressing [OK] and Google [HOME] keys.
- b) After 4 seconds, the LED starts blinking so that to confirm the remote has entered into pairing mode.
- c) After RCU has entered pairing mode, RCU can send the IR signal of Up, Down, Left, Right and OK keys.
- d) If pairing is successfully made, the existing pairing table is deleted, the LED goes OFF and the remote works in Bluetooth with the new device.

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- e) If the user presses any key during pairing mode, excepted Up, Down, Left, Right and OK keys, the remote stops pairing and the previous paired status is restored,
- f) If pairing with new device is not successfully made for 90 seconds, the LED goes ON for 4 seconds and then goes OFF. The previous paired status is restored.

3.4 - Factory Reset mode

- a) Press [Google] and [OK] keys for longer than 4 seconds. LED stays ON while pressing [Google] and [OK] keys.
- b) The remote blinks 3 times to confirm that it is deleting the existing pairing table.
- c) When Factory Reset is completed, LED goes OFF and the remote works in IR mode.

3.5 - IR backup in paired mode

- a) If, for any reason, the RF connexion is lost, the remote sends the IR code of the corresponding pressed key.
- b) The remote tries to reconnect for sending the RF code.

3.6 - Voice Search initiated by the remote

- a) For Voice function, it is recommended to be within 5 meters from the receiver.
- b) Distance between mouth and microphone should be within 40 cm (15~20cm recommended).
- c) Microphone key pressed and released, remote sends “key pressed event, key released event” to the STB and the STB sends back the START command to the remote.
- d) The LED starts blinking, the remote transmits the voice data for 10sec timeout duration.
- e) After timeout duration, the remote sends the END command to the STB and the LED is turned off.

Note: if any key is pressed within the timeout duration, the remote stops transmitting the voice data and activate the pressed key event.

3.7 - Voice Search initiated by the launcher

- a) For Voice function, it is recommended to be within 5 meters from the receiver.
- b) Distance between mouth and microphone should be within 40 cm (15~20cm

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recommended)

- c) User selects and validates the voice search on the launcher by using navigation and OK keys.
- d) STB sends the voice search START command to the remote.
- e) The LED starts blinking, the remote transmits the voice data for 10sec timeout duration.
- f) After timeout duration, the remote sends the END command to the STB and the LED is turned off.

Note: if any key is pressed within the timeout duration, the remote stops transmitting the voice data and activate the pressed key event.

3.8 - Couch mode

- a) If a key or multiple keys are pressed continuously for more than 30s, the remote stops transmission (except pairing combination) in order to protect the battery discharge.

3.9 - OAD mode

- a) OAD can be made in overwriting method.
- b) Image A device name: OAD BOOT
- c) Image A version: 0xFFFF (Fixed)
- d) After connection, the STB checks the version number of the software in the remote to confirm if this is the most updated one.
- e) If any software update is needed, STB sends the command to the remote to move to Image A. Commands are defined in the Appendix 1 - Attribute Table for OAD.
- f) After receiving the command from STB, RCU needs to re-boot in Image A.
- g) After finishing boot-up process and connecting to STB, the software update starts via OAD.
- h) If the software update is made successfully, the remote reboots in the image B.
- i) If the software update has failed, the remote reboots in Image A and retry it from step g).

3.10 - Key codes

- a) In Bluetooth mode, HID Profile is used.
- b) In IR Mode, NEC format is used

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- Structure of the NEC format: Custom1 - Custom2 – Data – Inverse data

For MUTE to be seen as 0x16-0x20-0x25. Another alternative is 0x1620-0x25

Custom1: 0x16

Custom2: 0x20

c) Code list is detailed in Table 1

Key Code Name	Event constant name	IR Code (Data)	HID	
			Usage Page	Usage ID
Microphone	KEYCODE_SEARCH	0x46	0x0C	0x0221
Power	KEYCODE_POWER	0x21	0x0C	0x0030
D-pad up	KEYCODE_DPAD_UP	0x15	0x0C	0x0042
D-pad down	KEYCODE_DPAD_DOWN	0x16	0x0C	0x0043
D-pad left	KEYCODE_DPAD_LEFT	0x17	0x0C	0x0044
D-pad right	KEYCODE_DPAD_RIGHT	0x18	0x0C	0x0045
D-pad center	KEYCODE_DPAD_CENTER	0x19	0x0C	0x0041
Back	KEYCODE_BACK	0x48	0x0C	0x0224
Home	KEYCODE_HOME	0x47	0x0C	0x0223
Play/Pause	KEYCODE_MEDIA_PLAY_PAUSE	0x52	0x0C	0x00CD
Google	KEYCODE_HELP	0x44	0x0C	0x0095
Volume -	KEY_VOLUMEDOWN	0x24	0x07	0x0081
Volume +	KEY_VOLUMEUP	0x23	0x07	0x0080

Table 1: Code list

3.11 - Battery level

- RCU sends the information for battery level using Bluetooth battery service.
- Level of LVD is $2.25V \pm 0.2V$ (recommended level).
- If the battery voltage as reached the LVD value, RCU cannot enter the pairing mode.
- If the battery voltage is under 2.0V, RCU does not operate.
- When the battery voltage is 2.1V or more, the RCU operates again.

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4 - RF Standard Conformity

Assesment of compliance of the product to the requirements relating to Electromagnetic Compatibility is based on the following standards:

- EN60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
- ETSI EN 301 489-1 V1.9.2:2011
- ETSI EN 301 489-17 V2.2.1:2012
- ETSI EN 300 328 V1.9.1
- FCC Part 15 subpart C

Federal Communication Commission Interference Statement

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 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.

Warning!

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Note: The manufacturer is not responsible for any Radio or TV interference caused by unauthorized modifications to operate the equipment.

FCC Caution

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
2. This device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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Federal Communication Commissions (FCC)

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.