

MX3-V

Product Requirement Document

Ron Sapir-Tchetchik

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1. Introduction

Following are the design requirements for an extended numeric keypad motion remote control to fit Viggo SNTV requirements.

2. Operational Setup and Transmission Modes

The viggo remote control has two operational setups and two transmission modes as described in the following:

The two operational setups, **Generic TV setup** and **Viggo TV setup** are selected once during the setup procedure.

It is performed by pressing and holding the OK + Menu buttons for 10 seconds. With every time the OK + Menu buttons are pressed for the 10 seconds duration, the Operational Setup will change to the other one.

Visual LED indication should be given when toggle process is complete:

- Double LED blink will indicate Generic TV setup has been selected.
- Triple LED blink will indicate Viggo TV setup has been selected.

Once toggled, the remote is not expected to change operational setup unless re-assigned to a different box.

1. **Generic TV setup**– In generic TV setup, all keys marked with” RF|IR” in the table below toggle between IR and RF transmission modes according to the following description.
 - a. Transmission modes
 - i. **IR mode** – RF|IR marked buttons send IR commands based on learned IR process or selected IR database, as explained below.
 - ii. **RF mode** – RF|IR marked buttons send RF commands as, as explained below.
 - b. Transmission mode selection
 - i. When pressing the TV button, remote transmission mode is set to IR mode.
 - ii. When pressing the SMART TV button, remote transmission mode is set to RF mode.
 - iii. When pressing the Power button, remote transmission mode is set to RF mode.

Viggo TV setup – In Viggo TV setup there is no transmission mode change. All keys are sending the RF or IR or RF+IR codes as stated in Viggo TV Setup Mode Key Layouttable.

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3. RC Keys Layout

The tables below relate to the keys layout of the remote control pictured in section 6 below for the two operational setup modes

Notations:

1. **IR** means either IR codes from built-in IR database of major manufacturers or IR codes learned from other remote control.
2. **IR1** is IR command assigned to Smart TV
3. **IR2** is IR command assigned to Power
4. **RF** mean only RF code is supported.
5. **RF|IR** means both capabilities should be supported and a single signal will be sent depending on the current transmission mode as described in the previous section. When transmission mode is RF, only RF codes are sent and when transmission mode is IR, only IR codes are sent.
6. **IR+RF** means both capabilities should be supported and both signals will be sent in sequence or simultaneously with each key press.
7. **IR1+IR2+RF** - The power button will send 2 different IR commands + RF command. First command IR1 is the IR command assigned to SMART TV button, second command IR2 is the Power Toggle command (IR setup is described in section 6 below). Delay between IR1 and IR2 should be 1 second by default but can be user configured. Finally also RF command is sent according to table below.

Delay setup in configured by pressing OK + Guide for 10 seconds after which a two digit input (XY) is expected in the range of 00 to 99:

i. 00 – means IR1 is not sent so only IR2 + RF needs to be sent.

ii. xy – means IR1 is sent and after delay of x.y seconds IR2 + RF is sent

Generic TV Setup Mode Key Layout

POWER (IR1+IR2 +RF) in IR mode (IR2 + RF) in RF mode			
INFO (RF)	ZOOM (RF)	ZOOM - (RF)	HELP (RF)
PREV TRACK (RF)	PLAY/PAUSE (RF)	STOP (RF)	NEXT TRACK (RF)
TV (IR+RF)	HOME (RF)	SMART TV (IR1+RF)	
	UP (RF IR)		
LEFT (RF IR)	OK/SELECT (RF IR)	RIGHT (RF IR)	
	DOWN (RF IR)		

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VOL+(IR)			CH+(IR)
VOL - (IR)	MUTE (IR)	BACK (RF IR)	CH- (IR)
1 (IR)	2 (IR)	3 (IR)	MENU (RF)
4 (IR)	5 (IR)	6 (IR)	
7 (IR)	8 (IR)	9 (IR)	CC (IR)
PREV (IR)	0 (IR)	BACKSPACE (IR)	GUIDE (IR)
RED (RF IR)	GREEN (RF IR)	YELLOW (RF IR)	BLUE (RF IR)

Viggo TV Setup Mode Key Layout

POWER (IR2 +RF)			
INFO (RF)	ZOOM (RF)	ZOOM - (RF)	HELP (RF)
PERV TRACK (RF)	PLAY/PAUSE (RF)	STOP (RF)	NEXT TRACK (RF)
TV (IR+RF)	HOME (RF)		SMART TV (IR1+RF)
	UP (RF)		
LEFT (RF)	OK/SELECT (RF)		RIGHT (RF)
	DOWN (RF)		
VOL+(IR)			CH+(RF)
VOL - (IR)	MUTE (IR)	BACK (RF)	CH - (RF)
1 (RF)	2 (RF)	3 (RF)	MENU (RF)
4 (RF)	5 (RF)	6 (RF)	
7 (RF)	8 (RF)	9 (RF)	CC (RF)
PREV (RF)	0 (RF)	BACKSPACE (RF)	GUIDE (RF)
RED (RF)	GREEN (RF)	YELLOW (RF)	BLUE (RF)

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4. RC Keycodes

Function	USB HID CODE (Usage Page/ ID)	USB HID FUNCTION
POWER	IR2 + IR1 + 0x07/0x42 OR (see tables above) IR2 + 0x07/0x42	F9
REWIND	0x0C/0xb4	
STOP	0x0C/0xb7	
PLAY/PAUSE	0x0C/0xcd	
FORWARD	0x0C/0xb3	
Smart TV	IR +0x07/0x69	F14
MIC TOGGLE		
ZOOM +	0x07/0x57	Keypad +
ZOOM -	0x07/0x56	Keypad -
TV	IR +0x07/0x68	F13
HOME	0x07/0x4a	Keyboard HOME
BACK	0x09/0x02	Mouse Right Click
UP	IR 0x07/0x52	Keyboard UpArrow
LEFT	IR 0x07/0x50	Keyboard LeftArrow
OK/SELECT	0x09/0x01 (cursor/motion on) 0x07/0x28 (cursor/motion off) IR (cursor/motion off)	LeftMouseClicked Keyboard Enter
RIGHT	IR 0x07/0x4F	Keyboard RightArrow
DOWN	IR 0x07/0x51	Keyboard DownArrow
VOL +	IR ONLY	
VOL -	IR ONLY	
MUTE	IR ONLY	
MENU	0x07/0x3a	Keyboard F1
CH +	IR 0x07/0x4b	PageUp
CH -	IR 0x07/0x4e	PageDown
1	IR 0x07/0x1e	
2	IR 0x07/0x1f	
3	IR 0x07/0x20	
4	IR 0x07/0x21	
5	IR 0x07/0x22	
6	IR 0x07/0x23	
7	IR 0x07/0x24	
8	IR 0x07/0x25	
9	IR 0x07/0x26	
0	IR 0x07/0x27	

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BACKSPACE	IR 0x07/0x2a	Keyboard Delete
PREV	IR 0x0C/0x83	
GUIDE	IR 0x0C/0x8d	Media Select Program Guide
CC	IR 0x0C/0x61	Closed Caption
INFO	IR 0x07/0x5a	Keypad 2
HELP	0x07/0x3c	Keyboard F3
RED	IR 0x0C/0x96	Reserved
GREEN	IR 0x0C/0x97	Reserved
YELLOW	IR 0x0C/0x98	Reserved
BLUE	IR 0x0C/0x9a	Reserved

5. OK/SELECT key modes

The OK/Select button has specific behavior as described below

1. When the remote control is in IR transmission mode, the OK/SELECT button will send the programmed IR command.
2. When the remote control is in RF transmission mode, pressing of any Arrow keys will set the OK/SELECT button to act as Keyboard Enter for period of 10 seconds or until the OK/SELECT button is pressed, the sooner of the two.
3. The functions of the OK/SELECT button can be summarized as per the table below.

Current Transmission Mode	Current Motion Status	Special Conditions	"OK/Select" Function
IR	N/A		IR command
RF	ON		Left Mouse Button RF command is sent
RF	OFF	Arrow keys pressed less than 10 seconds ago.	Turn Motion on (section 8). Keyboard Enter RF command is sent.
T RF	OFF	Arrow keys pressed more than 10 seconds ago.	Turn Motion on (section 8). No RF command is sent.

6. IR Command Sets & IR Learning

1. Where ever "IR" is noted in the document it relates to IR Database commands and IR Learned commands.
2. The remote control will include major brands IR command databases for easy configuration as well as IR Learning function to handle non supported TV brands or IR code modifications for specific keys.
3. When selecting IR database to use, a specific discrete Input HDMI1 IR command should be associated to the SMART TV key. This command typically exists and is supported for most TV brands, but it is rarely assigned to any button of original TV remote controls and must either be part of the built-in IR database, or learned from a universal remote control configured for this function.
4. There should be a mechanism to clone configuration from one master remote control to other remote controls in the field. **The cloning process needs to copy the IR database/learned commands AND the setup mode (viggo or generic tv setup mode).**
5. **To check – IR performance**

7. KB or RC side button disabling.

1. When the remote control is flipped from Remote Control (RC) side to Keyboard side (KB), RC side buttons should be deactivated so that accidental key presses do not send any command (RF or IR).
2. When the remote control is flipped from KB side to RC side, KB side buttons should be deactivated so that accidental key presses do not send any command (RF or IR).
3. **When switching from RC to KB side, send RF command 0x07/0x6b (F16).**
4. **When switching from KB to RC side, send RF command 0x07/0x6a (F15).**

8. Power Management

8.1 Definitions power consumption.

1. **“Air Mouse Off”** is a state in which mouse/cursor is not visible on screen, and all gyro mechanism is turned off to minimize power consumption.
2. **“Air Mouse On Keys”** are keys that if pressed will activate all Air Mouse related activities for a period of 15 seconds. If no “Air Mouse On Keys” are pressed for 15 seconds the remote should enter “Air Mouse Off” state.
3. There are 6 “Air Mouse On Keys”
 - a. OK/Select
Note: the OK/Select button on top of activating motion has a special behavior described in section 5 above.
 - b. Home
 - c. Back
 - d. Smart TV
 - e. Power
 - f. TV

8.2 Required behavior

Important Note: This described behavior and the “Air Mouse Off” state is a critical feature. If not implemented properly, battery lifespan may be too short. Please confirm consumption values for various remote states.

1. In “Air Mouse Off”, remote will not consume power even when moving.
2. In “Air Mouse Off”, power consumption as a result of any key press will be limited to the required power consumption needed to transmit IR/RF command, except when “Air Mouse On Keys” are pressed.
3. Remote will enter “Air Mouse Off” in any of the following events:
 - a. If no “Air Mouse On Keys” are pressed for 15 seconds.
 - b. If any non-“Air Mouse On Keys” is pressed except for Vol+/-/Mute.
 - c. If remote is flipped to KB side.
4. Remote will exit “Air Mouse Off” in any of the following events:
 - a. If “Air Mouse On Keys” are pressed.
 - b. If remote is flipped to RC side.
5. When power level reaches lower operational limit, indication should be sent from remote control to STB. Suggested code is 0x07/0x6c (Battery Strength).
6. When dongle RF receiver does not detect remote control, indication should be sent from the RF receiver to STB. Suggested code is 0x06/0x21 (Wireless Channel).

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9. RC Layout

For illustration purpose only – not to be used for silk print design



- Red – Pantone bright red C
- Blue RC side - Pantone 2925C
- Green – Pantone 361 C
- Yellow - Pantone 107 C
- Blue KB side – Pantone 630C
- Grey – Pantone cool grey 10C

Colors

Please note KB side blue color is different and lighter.

Material

Casing should be matte black on both sides

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10. Revision Tracking

Ver.	Change Description	Change Date	Name
1	Initial specifications	28 Feb 2014	Ron S.
2	Mode selection mechanism modifications	19 Mar 2015	Ron S.
3	Layout change and code corrections, Home/Prev/Power/red/yellow/blue/green buttons behavior change, section 8 inserted. Low battery and missing remote link RF codes added, merged comments and notes from other earlier versions	2 Apr 2015	Ron S.
4	Section 5 modifications and section 8 comment to OK/Select	5 Apr 2015	Ron S.
5	Power management modifications.	15 Apr 2015	Ron S.
6	Mode changes, media key changes	15 May 2015	Ron S.
7	Key layout changes, key code changes, viggo mode clarifications.	18 May 2015	Ron S.

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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.

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

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 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.