



Control Tips for YNC / YRSC

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Revision History

Ver.	Date	Creator	Revision Contents
0.1	Oct/27/2009	Hide Tomoda	Preliminary draft
0.2	Oct/28/2009	Hide Tomoda	Modified chaptering. Corrected some expressions.
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1 Preface

This is for giving developers who use YNC (Yamaha Network Command) or YRSC (Yamaha RS-232C Command) some tips that could be helpful or useful in creating control modules / drivers for their own products to work with Yamaha AV products.

2 Applicable Scope

This document is written with the intention of covering all Yamaha AV products that have external control interface working on YNC/YRSC protocol, but as of Oct. 2009, YNC/YRSC-enabled Yamaha AV receivers are only followings;

RX-Z11 (YNC / YRSC)

RX-Z7 (YNC / YRSC)

RX-V3900 (YNC / YRSC)

RX-V2065 (YNC only) **RS-232C protocol of RX-V2065 is legacy one, not compatible with YRSC.*

Unless otherwise specifically stated, the contexts are applicable to these AV receivers.

3 Definitions

The definitions or specifications of YNC / YRSC protocols are given in other documents. Please see the last chapter "References" for details.

4 Tips

4.1 Putting IR codes directly in YNC / YRSC

You have an alternative way of controlling Yamaha AV products via YNC and YRSC: putting IR codes directly in the YNC/YRSC by using "System > Remote_Signal > Receive > Code" command found in the function tree. The templates of such commands are shown below;

[Template for YNC]

```
<?xml version="1.0" encoding="utf-8"?>
<YAMAHA_AV cmd="PUT">
<System>
  <Remote_Signal>
    <Receive>
      <Code> WWWXXYYZZ</Code>
    </Receive>
  </Remote_Signal>
</System>
</YAMAHA_AV>
```

[Template for YRSC] (Note: This type of YRSC delimiters is only used in RX-Z11, RX-Z7 and RX-V3900)

0,1,* ,PUT,System(Remote_Signal(Receive(Code= *WWXXYYZZ*))),*

Here, "*WWXXYYZZ*" represents the 4-byte expression (in Hexadecimal) of Yamaha IR codes, which is based on NEC format.

Note: IR codes are specified and provided separately in other documents (usually on model-by-model basis, as PDF format). Please find it in the YNC/YRSC spec document package or ask Yamaha representatives for details.

You will see that each code has a different byte-length expression in the IR code list, which could be two-, three- or four-byte, even though you're required to put 4-byte IR code in the command. It means that you'll have to convert 2-byte or 3-byte length expression to the "full" 4-byte one by following the conversion rules as specified below;

[2-byte code]

A code "*XX-YY*" must be converted to the form of "*XX##YY##*"

[3-byte code]

A code "*XXYY-ZZ*" must be converted to the form of "*XXYYZZ##*"

Or

A code "*XX-YYZZ*" must be converted to the form of "*XX##YYZZ*"

[4-byte code]

You don't have to convert it at all (just ignore the "hyphen" between the former/latter 2-bytes)

Here, each *##* means "one's complement", in other words "simple bit-invert", of the former adjacent byte. Please find following examples of the conversion for your reference.

<Example of how to make "1's complement">

When a byte is given in Hex as	: 7	A
Which binary expression is	: 0111	1010
Bit invert of the binary is	: 1000	0101
1's complement of "7A" in Hex	: 8	5

<Example of actual conversions to 4-byte IR codes> (from RX-Z7/V3900 code list)

[Key Name]	[IR Code (as listed)]	[Converted to 4-byte expression]
XM Memory	7A-71	7A85718E ("85" and "8E" added)
HD Radio Preset B	7F01-F1	7F01F10E ("0E" added)
Sleep Off (Main Zone)	7E-1B64	7E811B64 ("81" added)
Sirius All Ch Search	7F01-0F70	7F010F70 (as is)

4.2 Saving tuner stations/channels to preset banks

There is no (official) tuner preset "store" command specified as YNC (on RX-Z11, RX-Z7, RX-V3900 and RX-V2065) or YRSC (on RX-Z11, RX-Z7 and RX-V3900) meanwhile the preset "recall" command is available. But using the IR code control method in YNC/YRSC explained in the previous chapter, you can store stations/channels of tuner related sources such as HD Radio, XM, Sirius (USA model) or Tuner (Other destination models) to the preset banks.

4.2.1 Four-step IR code command

You'll have to send four consecutive IR code commands within a few seconds in order to store a certain station/channel to a preset bank via YNC/YRSC. Those steps are followings;

<For RX-Z11, RX-Z7 and RX-V3900 (YNC/YRSC)>

Step1: Get into "Preset Memory Mode" by the IR code command of "Memory Key"

Step2: Specify "Preset Bank Page" by the IR code command of "Alphabetical (A - E) Key"

Step3: Specify "Preset Bank Number" by the IR code command of "Numerical (1 - 8) Key"

Setp4: And store the current playback station/channel to the specified preset bank by the IR code command of "Enter Key"

<For RX-V2065 (YNC only)>

Step1: Get into "Preset Memory Mode" by the IR code command of "Memory Key"

Step2: Specify "Preset Bank Number: 10th place digit" by "Numerical (0 - 4)* Key" IR code

Step3: Specify "Preset Bank Number: 1st place digit" by "Numerical (0 - 9)* Key" IR code

Setp4: And store the current station/channel to the specified preset bank by "Memory Key" again

**The range of preset bank is from 01 to 40. Out of range number will be ignored.*

Actually you can skip step 2 and 3 when you don't want to point out a specific preset bank page/number. In that case, the "empty" preset bank is automatically used for saving.

Note: IR codes are specified and provided separately in other documents (usually on model-by-model basis, as PDF format). Please find it in the YNC/YRSC spec document package or ask Yamaha representatives for details.

<Example of four-step IR code commands: HD Radio preset storing>

This is an example command sequence of YNC(*) when you're saving the current HD Radio station to the preset bank "B2" by using four-step IR code method. Again please refer to the model-specific IR code list to get the actual ones, and also see the previous chapter in regards to using IR codes in YNC/YRSC.

(*) For YRSC, you can just replace "WWXXYYZZ" of this template;

```
0,1,*,PUT,System(Remote_Signal(Receive(Code=WWXXYYZZ))),*
```

(as explained in the prev. chapter) with the actual IR code used in each step below.

***** Step 1: Send "HD Radio MEMORY" key code *****

```
<?xml version="1.0" encoding="utf-8"?>
<YAMAHA_AV cmd="PUT">
<System>
  <Remote_Signal>
    <Receive>
      <Code>7F012F50</Code>
    </Receive>
  </Remote_Signal>
</System>
</YAMAHA_AV>
```

***** Step 2: Send "HD Radio PAGE B" key code *****

```
<?xml version="1.0" encoding="utf-8"?>
<YAMAHA_AV cmd="PUT">
<System>
  <Remote_Signal>
    <Receive>
      <Code>7F01F10E</Code>
```

```
        </Receive>
    </Remote_Signal>
</System>
</YAMAHA_AV>
```

***** Step 3: Send "HD Radio NUMBER 2" key code *****

```
<?xml version="1.0" encoding="utf-8"?>
<YAMAHA_AV cmd="PUT">
<System>
    <Remote_Signal>
        <Receive>
            <Code>7F01225D</Code>
        </Receive>
    </Remote_Signal>
</System>
</YAMAHA_AV>
```

***** Step 4: Send "HD Radio ENTER" key code *****

```
<?xml version="1.0" encoding="utf-8"?>
<YAMAHA_AV cmd="PUT">
<System>
    <Remote_Signal>
        <Receive>
            <Code>7F012C53</Code>
        </Receive>
    </Remote_Signal>
</System>
</YAMAHA_AV>
```


4.3 Saving NET songs/stations/channels to preset banks

You can store songs/stations/channels played on Network related sources such as USB, PC, vTuner (Internet Radio) or Rhapsody to the preset banks via YNC/YRSC on RX-Z7 and RX-V3900(*).

() Note: This function is supported on and after the firmware version 1.09 of RX-Z7 / RX-V3900. Upgrading is necessary for older versions. As of Oct. 2009, there is no plan of adding this command to RX-Z11 or RX-V2065. Future YNC/YRSC compatible models being released in or after 2010 will be supposed to support this function, but which is to be determined.*

4.3.1 <Preset_Memory> YNC/YRSC commands

This is for storing a song/station/channel of NET related sources to a preset bank as a specific command of YNC/YRSC. Templates of this command are shown below;

[Template for YNC]

```
<?xml version="1.0" encoding="utf-8"?>
<YAMAHA_AV cmd="PUT">
<NET_USB>
  <Play_Control>
    <Preset>
      <Preset_Memory>#</Preset_Memory>
    </Preset>
  </Play_Control>
</NET_USB>
</YAMAHA_AV>
```

[Template for YRSC] (Note: This type of YRSC delimiters is only used in RX-Z11, RX-Z7 and RX-V3900)

```
0,1,*,PUT,NET_USB(Play_Control(Preset(Preset_Memory=#))),*
```

Here, # in each command means the variable to specify the preset number. It ranges differently in each model (please refer to the model-specific function tree or command lists). For example, RX-Z7 and RX-V3900 support preset numbers from 1 to 8 for each NET related sub-inputs (USB, PC, vTuner, Rhapsody). And also the variable *Auto* can be stated in case you don't have to/want to specify the preset number (the empty or first available number is automatically used for storing).

4.4 Realizing toggle command of Volume Mute

By “putting IR code in YNC/YRSC” as explained in the previous chapter, you can have controls that are only specified as IR codes but not as YNC/YRSC. For example, actually RX-Z11, RX-Z7 and RX-V3900 don't have the toggle (on/off) command of “Volume Mute” in their YNC / YRSC function tree. But it *is* available as IR command code.

These are toggle IR codes of “Volume Mute” for RX-Z11, RX-Z7 and RX-V3900 in common, which are defined as “Standard” IR codes available on keys of the bundled remote controller.

<Conversion to 4-byte IR codes of Volume Mute (Toggle)>

[Key Name]	[IR Code (ID1)]	[4-byte expression]
Volume Mute (Main)	7A-1C	7A851CE3
Volume Mute (Zone2)	7A-DC	7A85DC23
Volume Mute (Zone3)	7A-FF	7A85FF00
Volume Mute (Zone4)*	7A-2D	7A85D2

*Note: Zone 4 is not available on RX-V3900.

By putting these IR codes in the template commands shown in the previous chapter, you can now have toggle control of volume muting for each zone which is not defined in YNC/YRSC commands.

5 References

- Overview_of_YNC_YRSC.doc
...gives the overview of what YNC/YRSC protocols are.
- How_to_get_actual_YNC_YRSC_commands.doc
...explains methods of creating actual YNC/YRSC commands.
- ***_ETHERNET_IF_Spec_e.xls . (the Device name is assigned to ***)
...The detailed specification regarding YNC Protocol
- ***_RS232C_IF_Spec_e.xls . (the Device name is assigned to ***)
...The detailed specification regarding YRSC Protocol
- ***_EXT_CTRL_Function_Tree.xls (the Device name is assigned to ***)
...The tool to generate YNC or YRSC commands
- The entire dump list
...A list of YNC or YRSC commands of each model