

IAAIS STANDARDS FOR ACCESSIBLE HD RADIOS

StAR Project

Standards for Accessible Radios

By The International Association of Audio Information Services,
HD Radio Task Force

Acknowledgement

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Introduction

Our labor began in March 2008 with a statement from the IAAIS Board of Directors charging this committee with the creation of design standards for an HD radio that would be simple and easy to use by people who are blind or visually impaired world wide. It was expected that a manufacturer would use these standards to create units that not only sell well to people currently using radio reading services, but would sell well to the millions of seniors and others who do not want another consumer electronic device that is difficult to learn and or operate.

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In our early research we were shocked to learn that there are no design standards for a disabled person's use of consumer electronic equipment in publication anywhere to be found. We then discovered that the industry's standards setting systems are organized around how the inside of a product can work - or interact with the inside of yet some other device. In that system, the man-machine interface is not considered until the devices are so far down a design path that "reasonable accommodation" becomes an unreasonable expense.

The cross-over from analog to HD radio has the potential to end decades of discriminatory design practices. We have begun with our own field of expertise – radio for people with visual impairments. There is already progress. With a few manufacturers and willing designers we expect to see radios our constituents can use within a year's time – perhaps sooner. One prototype being reviewed now looks very promising.

In keeping with our charge to list "must have" and "nice to have" features and ensuring that at least half of the committee had to be representative of the "end user" we have created three tiers of design for our standard: Required, Desired, and Unacceptable. We applied these tiers to the categories of Controls, Displays and Feedback, Documentation, Other Considerations, Operation/ Functions, and IR Remotes. We strove to keep the language non-technical without losing the detail an engineer might need in order to produce the desired results. With no further comment, we give you the "StAR Project."

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To meet the IAAIS standards for accessibility an HD Radio must meet the following expectations:

1. Controls

The following are required characteristics of an IAAIS approved radio:

- 1.1 The radio must have speech feedback for all controls and functions. This essential accessibility feature obviates the need for many cumbersome alternatives and “work-a-rounds”. This is not to suggest that other ADDITIONAL accessibility features should not be developed and deployed.

In order to keep costs lower, manufacturers may use these same units for sale to the general public. This may mean providing a means for muting speech. Regardless, in order to obtain IAAIS approval, speech output must be enabled at system power on as the default.

- 1.2 Controls must be tactile, such as having a pointer on a rotating knob, or detents on a slide control.
- 1.2.1 When using BUTTONS as controls
- a. Buttons must be at least 1.5 cm (fingertip width) in diameter.
 - b. Buttons controlling several functions must speak the active function when pressed.

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- 1.2.2 When using TOGGLE SWITCHES as controls
 - a. Any toggle can have a maximum of 3 positions
 - 2 positions is preferential
- 1.2.3 When using KNOBS as controls
 - a. A knob may have a maximum of 3 positions if it is used as a selector.
 - b. Knobs must have a notch or pointer that is easily discerned by touch to indicate position.
 - c. Knobs used for tuning, must have detented, tactile feedback.

Desired but not required considerations for controls:

- 1.3 Buttons
 - a. Buttons can be shapes rather than labeled. (Left-right arrows to indicate forward or back, a circle to start/play, an “x” for stop, and a one and zero on a power switch.
 - b. Buttons should be grouped by function.
 - c. A telephone style keypad should be provided for tuning. A calculator format should not be used.
 - d. If buttons are marked, the mark should be tactile and not simply printed on the button
 - e. A mark on the button is preferred over any adjacent mark.
- 1.4 Knobs

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- a. Other than tuning knobs, rotating knobs should have a tactile stopping point and not spin indefinitely.

1.5 Sliders

- a. A slide control can be used for volume and tone and if the handle is large enough, can be very effective for people with impaired motor skills.

Controls that are unacceptable and which will likely make the unit ineligible for IAAIS approval.

1.6 Any touch screen control will make the unit ineligible for approval.

1.7 Softkeys

1.8 Sliders should not be used for changing functions, even with detents.

1.9 Recessed buttons

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2. Displays (feedback)

The following are required characteristics of an IAAIS approved radio:

- 2.1 Characters on displays must be 18pt or larger. (Bright orange on black is easiest to read by people with low-vision.)
- 2.2 Speech is required for all user-controlled displays and feedback that provides the user with directions or status i.e. station, mode.

Desired but not required considerations for displays (feedback):

- 2.3 The speed of scrolling text should be user adjustable.
- 2.4 The speed of text-to-speech output of scrolling text should be user adjustable.
- 2.5 If the station-specific crawl such as title and artist is spoken by the unit, in addition to its speed adjustments, this feature should be user controlled (on/off) with the default "on".
- 2.6 Tones may be used as indicators that something has changed. If used, tones must be few in number and distinctly different.

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Display characteristics that are unacceptable and which will likely make the unit ineligible for IAAIS approval.

- 2.7 LED or other lights as the only means of indicating mode/status.

3. Documentation

The following are required characteristics of an IAAIS approved radio:

- 3.1 Audio documentation is required.

Desired but not required considerations for documentation:

- 3.2 A built-in audible tutorial describing push button or other control functions is desirable. It can be implemented in one of two ways.
 - 3.2.1 The "tutor" button is depressed to activate the tutorial mode. Then, when any control is used, it speaks its function while not actually carrying out that function. This is very useful in learning the control functions from scratch without dealing with the frustration of changing settings accidentally. Pushing the "tutor" button again returns the radio to normal function.

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3.2.2 The "Tutor" button is pressed to activate speaking mode. The controls continue to operate normally, but first speak their function. The tutorial button is pressed again to stop the automatic speech and return to normal functioning. If this type of tutorial mode is used, it is essential that the radio default to the Tutorial Mode Function being active upon power on. Any user not wishing speech can then deactivate tutorial mode immediately by pressing the "tutor" button.

An alternative would be to have a "speech settings" section where the user could set preferences for speech or no speech for control functions. This methodology may minimize irritation of those who do not want speech. The receiver must default to active speech so that a blind user can navigate to the options mode.

3.2.3 In addition to audio, if printed documentation is provided, it should be in large-type (18pt). CD or cassette is acceptable, however, among blind people cassettes are still the more widely used medium. Braille should be available upon request.

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Documentation characteristics that are unacceptable and which will likely make the unit ineligible for IAAIS approval.

- 3.3 Web-only or print-only documentation
- 3.4 Providing a document in large type; but smaller than the required 18 point font size. (This document is 18 point Arial.)

4. Other Considerations

The following are required characteristics of an IAAIS approved radio:

- 4.1 A headphone jack must be included.
- 4.2 If power is provided with a detachable cord, the socket for the plug on the radio must be easily distinguished tactilely from recessed screws and other plugs.
- 4.3 Whip antennae must rotate a full 360 degrees and not be laterally fixed

Desired but not required considerations for other considerations:

- 4.4 Headphone jack should be on the face of the unit, preferably near the volume control.
- 4.5 A unit small enough to be portable is highly desirable.

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- 4.6 Unit has a low center of gravity to avoid accidental tip-over.
- 4.7 The face slants up toward user making buttons easier to feel.
- 4.8 When used as a power source batteries should be rechargeable.
- 4.9 A permanently attached power cord with in-the-unit storage compartment is highly desirable.

Other Considerations characteristics that are unacceptable and which will likely make the unit ineligible for IAAIS approval.

- 4.10 A fixed-position whip antenna

5. Operation/functions

The following are required characteristics of an IAAIS approved radio:

- 5.1 The radio must say that it is being turned on or off when the ON or OFF control is invoked.
- 5.2 A dedicated button to locate the RRS (radio reading service) is required.
- 5.3 This RRS button must also announce the ESN (electronic serial number) when the button is held down.
- 5.4 With speech feedback enabled by default, most scanning controls are acceptable subject to our section on “controls” above.

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- 5.5 When scanning or seeking the unit must announce the function and direction of the search. When the search is complete, it must announce the station information.
- 5.6 If a mute function is included, muting the audio program must not mute the speech output.
- 5.7 If a clock/alarm is provided on the unit all clock/alarm functions must be spoken so that the user need not see the display to set the time, alarm, or alarm mode.
- 5.8 Buttons to set clock functions must speak the intervals with each push.
- 5.9 Displays must default to the highest possible contrast and the user must be provided with a means of adjusting assisted by speech output.
- 5.10 Mode selection on a single button (multi-push) is only acceptable if the unit speaks the current mode with each push

Desired but not required considerations for operation/function:

- 5.11 The unit's settings such as currently tuned-in station, volume and speech settings should be retained when the device is turned off.
- 5.12 Displays should be yellow or bright orange on a black background (for low-vision users) and be 18 point or higher.
- 5.13 The speech volume is separate from the radio volume.

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- 5.14 On units with advanced functions, information on the display such as panning, fading, or EQ must be spoken. (“Bass plus 1”, “Left minus 2”)
- 5.15 When included on the unit, Tone/EQ functions are best controlled with sliders.

Operation/functions characteristics that are unacceptable and which will likely make the unit ineligible for IAAIS approval.

(None listed)

6. Infrared Remote (IR) Control

NOTE: Not all units will be manufactured with remote controls. This section applies to remote controls meant to work with IAAIS approved radios.

The following are required characteristics of an IAAIS approved IR unit:

- 6.1 The use of a remote must not impair speech output on the radio.
- 6.2 Unit must support basic IR codes
- 6.3 IR must use separate codes for ON and OFF
- 6.4 IR must support separate codes for MUTE and UN-MUTE

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Desired but not required considerations for operation/function:

- 6.5 Unit should support presets
- 6.6 IR unit should support codes for the digits 0 through 9, and ENTER for direct tuning
- 6.7 IR Unit should support IR codes for “#” and “*” to enable advanced commands such as tone/EQ controls
- 6.8 IR Unit should beep to indicate an IR code was sent – the user should be able to turn this function off if desired

Other Considerations characteristics that are unacceptable and which will likely make the IR unit ineligible for IAAIS approval.

- 6.9 Buttons that do not conform to buttons as described in “Controls” above

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