



AURA™

V 01.00



MOTODEV

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Aura™ Media Guide

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1 Display

This chapter describes the display characteristics for the Aura™.



Figure 1: Aura™ handset


Display Info

The physical internal display characteristics of the Aura™ are as follows:

Table 1 Display information

Item	Description
Screen resolution	1.55"/480 pixel diameter
Screen dimensions	47.6 x 96.9x18.6 mm
Pixel pitch	.300 mm square pitch
Color depth	18 bits
Maximum colors	16 million
Text area	Numeric


Figure 2: The Aura™ display

 **NOTE:** Screen shot may not reflect actual display size.

2 Graphics and Video

This chapter describes the graphic environment available in the Aura™. It includes information on picture and animation formats, size restrictions, pre-defined media, and more. Use this chapter as a reference when creating pictures or animations.

In general, file size is limited by available memory. All media (wallpaper, screensavers, ring tones, and themes), whether pre-loaded on the device or downloaded by the user, share the same storage area. The available memory for downloaded files varies based on the media pre-loaded into the device. This pre-loaded media varies from region to region and from carrier to carrier. Motorola recommends keeping all media files as small as possible to ensure the consumer has the ability to download and use a variety of files to enhance the user experience.

Supported Picture Formats

The Aura™ supports the following graphic and animation formats.

Table 2 Graphic and animation formats

Type	Description
GIF 87a	Graphics Interchange Format, a standard file format for lossless compression of still images. It is used to display static images and is the preferred format for pictures.
GIF 89a	The GIF 89a standard is a superset of the GIF 87a specification. It allows a sequence of GIF images to be displayed in succession, thus generating an animation.
BMP	File writing format, where the information is recorded using "bitmap".
JPEG	Joint Photography Expert Group standard. JPEG is designed for compressing either full-color or gray-scale images of natural, real-world scenes, not line art or lettering.
WBMP	Wireless Bitmap format described in the WAP specifications. It is an optimized bitmap format intended for use in portable devices with smaller screens and limited display capabilities.
PNG	Portable Network Graphics (PNG) format is intended to provide a portable, legally unencumbered, well-compressed, well-specified standard for lossless bit mapped image files.

Table 3 shows the maximum decode size and resolution for supported picture formats.

Table 3 Maximum decode size and resolution

Format	Maximum Decode Size
JPEG	Up to 640 X 480 pixels(VGA)
Progressive JPEG	
BMP	
PNG	
GIF 87a, 89a	
WBMP	

Video Playback

The Aura™ handset supports the following video formats.

Table 4 Video formats

Type	Description
MPEG-4	<p>The MPEG-4 format provides standardized technological elements that enable interactive multimedia (video/audio), interactive graphics, and digital television.</p> <p>Codec support includes:</p> <ul style="list-style-type: none"> • MPEG • H.263 Baseline
H.263	An International Telecommunication Union (ITU) standard for video compression.
H.264	A video compressed standard also known as AVC (Advanced Video Coding) and MPEG-4 part 10.
WMV	Windows Media Video.
RV8/RV9	Real Video format for Packet and Circuit Switched Streaming services and clip playback from local files.



NOTE: Maximum file sizes are determined by the handset's available memory.

Table 5 shows the bit rate, frame size, frame rate, and extension for all supported video playback formats.

Table 5 Bit rate, frame size, frame rate, and extension video playback supported

Format	Bit Rate	Frame Size	Frame Rate	Extension
MPEG4	Up to 320 kbps	QVGA	15 fps	.mp4,.3gp,.pvs,.pvp, .pvx
H.263				.3gp,.pvs,.pvp,.pvx
H.264	Up to 256k bps	QCIF		.mp4,.3gp
WMV 9	Up to 96kbps			.asf,.wmv
Real Video 8, 9	Up to 320 kbps	QVGA		.rv,.rm,.rmvb

Table 6 shows the specifications for all supported audio + video playback formats.

Table 6 Audio + video playback

Format	Total Bit Rate	Video			Audio		
		Size	Bit rate	Frame Rate	Bit Rate	Sampling Rate	Stereo/Mono
MPEG4 + AMR-NB	Up to 320 kbps	QVGA	Up to 296 kbps	15 fps	Up to 12.2 kbps	8 kHz	Mono
MPEG4 + AMR-WB					Up to 23.85 kbps	16 kHz	
MPEG4 + AAC / AAC+ / Enhanced AAC+	Up to 350 kbps				Up to 128 kbps	Up to 48 kHz	Stereo / Mono
H.263 + AMR-NB	Up to 320 kbps				Up to 12.2 kbps	8 kHz	Mono
H.263 + AMR-WB					Up to 23.85 kbps	16 kHz	
H.263 + AAC / AAC+ / Enhanced AAC+	Up to 350 kbps				Up to 128 kbps	Up to 48 kHz	Stereo / Mono
Real Audio + Video					Up to 64 kbps		
H264 + AMR-NB	Up to 280 kbps	QCIF	Up to 256 kbps	Up to 12.2 kbps	8 kHz	Mono	



H264 + AMR-WB					Up to 23.85 kbps	16 kHz	
H264 + AAC / AAC+ / Enhanced AAC+	Up to 350 kbps				Up to 128 kbps	Up to 48 kHz	Stereo / Mono
WMV 9 + WMA v9 L2 (also WMA v3, v7, v8)	Up to 224 kbps		Up to 96 kbps				

Table 7 shows the bit rate, frame size, frame rate, and extension for supported video streaming formats.

Table 7 Video streaming

Format	Bit Rate (kbps)	Frame Size	Frame Rate	Extension
MPEG4	Up to 96 kbps	QVGA	15 fps	.sdp
H.263				
Real Video 8 / Real Video 9				
H.264		QCIF		

Graphics and Video Capture

Table 8 shows the video quality, bit rates, frame size, frame rate, and maximum durations for video capture.



Table 8 Maximum durations for video capture

Format	Video Quality	Profile, Level	Bit Rate	Frame Size	Maximum Frame Rate	Maximum Capture Duration
H.263	Low	H.263 Baseline, L10	48 kbps	QCIF	15 fps	2 hours
	Medium		56 kbps			
	High		64 kbps			
	Low		32 kbps	SQCIF		
	Medium		40 kbps			
	High		48 kbps			
MPEG4	Low	MPEG SP, L0	48 kbps	QCIF	15 fps	2 hours
	Medium		56 kbps			
	High		64 kbps			
	Low		32 kbps	SQCIF		
	Medium		40 kbps			
	High		48 kbps			

Table 9 shows the video quality, bit rates, frame size, frame rate, and maximum durations for video + audio capture.

Table 9 Maximum durations for video + audio capture

Format	Total Bit rate	Video				Audio			Maximum Capture Duration
		Quality	Size	Bit rate	Frame Rate	Bit Rate	Sampling Rate	Stereo/ Mono	
H.263 + AMR-NB	Up to 128 kbps	Low	QCIF/ SQCIF	Up to 64kbps	15 fps	12.2 kbps	8 kHz	Mono	2 hours
		Medium							
		High							



MPEG4 + AMR-NB	Low								
	Medium								
	High								

Table 10 shows the still image capture resolution and size of the supported formats.

Table 10 Still image capture

Format	Resolution	Size	File Formats
JPEG	Large (2.0 M)	1600x1200 pixels	JFIF, EXIF
	Medium (1.3M)	1280x960 pixels	
	Small (VGA)	640x480 pixels	
	X-Small (QVGA)	320x240 pixels	

Table 11 shows the specifications for video + audio streaming.

Table 11 Video + audio streaming

Format	Total Bit Rate	Video			Audio		
		Size	Bit rate	Frame Rate	Bit Rate	Sampling Rate	Stereo/Mono
MPEG4 / H.263 + AMR-NB	96 kbps	QVGA	Up to 80 kbps	15 fps	Up to 12.2 kbps	8 KHz	Mono
MPEG4 / H.263 + AMR-WB			Up to 70 kbps		Up to 23.85 kbps	16 KHz	

H.264 + AMR-NB		QCIF	Up to 80 kbps		Up to 12.2 kbps	Up to 44.1 KHz	
H.264 + AMR-WB			Up to 70 kbps		Up to 23.85 kbps		
MPEG4 / H.263 + AAC		QVGA	Up to 64 kbps		Up to 32 kbps	Up to 44.1 KHz	Stereo/Mono
H.264 + AAC		QCIF					
Real Audio + Video		QVGA					

MMS/SMS Support

The Aura™ MMS/SMS applications support use of the following image formats:

- JPEG
- BMP
- WBMP
- PNG
- GIF 87a, 89a
- Progressive JPG

The Aura™ supports use of the following audio formats:

- AMR-NB
- AAC (MPEG4 AAC-LC)
- AAC +
- Enhanced AAC+
- MP3
- 8-bit Linear PCM
- 4-bit IMA ADPCM
- MIDI 1, 2 & 3
- iMelody

Screensaver Support

The Aura™ handset supports screensavers. **Screensavers** are animated or static images selected by the user that are shown full screen when the phone has been inactive for a period of time.

The recommended format for a screen saver is animated GIF (GIF 89a). Other file types supported are: static GIF (GIF 87a) and WBMP.

Technical Specifications for Screen Savers:

- Dimensions: internal: 480 x 480
- Recommended number of frames: Up to 15
- Colors: 256K (limit imposed by GIF format)
- Recommended file size: up to 90 KB

Screen savers are displayed using the entire screen. In the event an image is larger or smaller than the display, the following rules apply:

- **Image too small** – image is shown at actual size and centered on display.
- **Image too large** – image is resized to fill the display while keeping the original aspect ratio.



Image scaled to fit on the display

Original image

Image scaled to fill on the display

Figure 3: How large screensaver images are displayed on the screen



NOTE: Screen shot may not reflect actual display size. By default, bars may appear on the left/right or top/bottom of the image to fill the display.

If the screensaver is an animation, it plays for one minute and then halts at the first animation frame. This first frame, or key frame, then remains on the screen. Please note when creating the animation, the first frame must be a key frame.

Wallpaper Support

Wallpaper images are static images that are shown on both the idle screen and the main menu screen. Wallpaper images can be tiled or centered as selected by the user; centered is the default setting.

Technical Specifications for Wallpapers:

- Dimensions: internal: 480 x 480
- Colors: internal: 16m
- Recommended file size: up to 15 KB

Wallpaper images appear behind all screen elements on the idle screen and on the menu screen as shown in Figure 4.



Figure 4: How wallpaper is displayed on the idle screen and main menu screen

If the user has selected to tile the wallpaper, the image is tiled starting from the upper left hand corner of the working area. The image is tiled horizontally and vertically equal to the display size.

The user has the following options for wallpaper:

- **Center** – the image is resized to fit on the screen while keeping the aspect ratio.
- **Fit-to-screen** – the image is resized to fill the screen while keeping the original aspect ratio (refer to Figure 4).
- **Tile** – if the image is too large, it is resized to fit the display and tiled; if the image is too small, it tiles as displayed.

If the user selects an animated GIF image, the first frame of the animated GIF becomes the wallpaper image. It is important that the colors of the wallpaper image allow the text displayed on the screen to remain legible.

3 Sound

This chapter describes the sound environment available in the Aura™ handset. It includes information on sound formats and more. Use this chapter as a reference when creating sounds for your products.

In general, file size is limited by available memory. The available memory for downloaded files varies based on the media that is pre-loaded into the device. This pre-loaded media varies by region and carrier. We recommend keeping all media files as small as possible to ensure the consumer has the ability to download and use a variety of files to enhance the user experience.

Alert Tone Support

Downloaded audio files can be applied to a number of alert tones on the device including Ringtones for incoming calls, Text Message, and Date Book Alarms.

Ring Tones

Ring tones should not exceed 30 seconds because most voice mail systems pick up after four rings (16-25 seconds depending on the system).

Supported Sound Formats

The Aura™ supports the sound formats shown in the following table.

Table 12 Sound formats

Type	Description
AAC	Short for Advanced Audio Encoding (.aac, .adcs, .adif), one of the audio compression formats defined in the MPEG-2 standard. AAC boosts higher quality audio reproduction than MP3 and requires 30% less data to do so.
AMR-NB AMR-WB	Adaptive Multi Rate – Wideband (AMR-WB) and Adaptive Multi Rate – Narrowband (AMR-NB) offers a wide range of data rates. The philosophy behind AMR is to lower the data rate as the interference increases to enable better error correction.
iMelody	iMelody is the Infrared Data Association (IrDA) standard for the textual representation of a ring tone that can be used to transfer melodies between devices.
MIDI	The AURA™ handset is MIDI 1.0 compliant (.mid, .midi, .mmf, .smf), and supports any data format described in The Complete MIDI 1.0 Detailed Specification, including: - MIDI, Type 0 - MIDI, Type 1 Scalable Polyphonic MIDI (SP-MIDI)
PCM	Pulse Coding Modulation, a digital representation of an analog signal.

MP3	The MP3 format (.mp3) provides the coding of audio for digital storage.
Real Audio	Real Audio (.ra, .rm) is a compressed format suitable for streaming over the internet.
WAV	WAV (or WAVE), short for Waveform audio format for storing files (.wav). Linear pcm 8-bit and 16-bit, CCITT A-law and U-law.
XMF	Mobile XMF-MIDI: XMF (eXtensible Music Format) is an open standard file format that renders a MIDI note-based piece with consistent audio playback across all players and platforms. It gathers all media assets and their associated links into a single file. It is suited for interactivity, content protection, meta-data, and the Internet.
WMA	Windows Media Audio.

Table 13 shows the bit rate, sampling rate, extensions, and stereo/mono capabilities for each supported format.

Table 13 Bit rate, sampling rate, and stereo/mono capabilities (sound formats)

Format	Bit Rate	Sampling Rate	Stereo/Mono	Extensions
AMR-NB	4.75 kbps – 12.20 kbps (supports all 3GPP specified rates)	8 kHz	Mono	.amr, .3gp, .3ga, .mp4
AMR-WB	6.6 kbps - 23.85 Kbps (supports all 3GPP specified rates)	16 kHz		.awb .3ga, .3gp
AAC (MPEG4 AAC-LC)	Up to 192kbps CBR	Up to 48 kHz	Mono/Stereo	.mp4,.3gp,.m4a,.3ga, .3gp, .aac
AAC+	Up to 128 kbps		Mono/Stereo	.mp4, .3ga, .m4a, .aac

Enhanced AAC+			Parametric Stereo	.mp4,.3ga,.m4a,.aac
MP3	Up to 320kbps	Up to 16 kHz	Stereo / Mono	.wav
8-bit Linear PCM				
16-bit Linear PCM				
8-bit A-law PCM				
8-bit mu-law PCM				
WMA v9 L2 (also WMA v3, v7, v8)				
Real Audio LBR (Cook)	Up to 96 Kbps	Up to 44.1 kHz		
Real Audio Sipro (ACELP®.net)	5.0 Kbps (fixed rate) 8.5/6.5 Kbps (dual rate)	8 kHz	Mono	.rm, .ra
	16 Kbps (wide-band)	16 kHz		
Real Audio 10	Up to 192 kbps	Up to 48 kHz	Stereo/Mono	

Table 14 shows the bit rate, sampling rate, stereo/mono, and extension for supported streaming audio formats.

Table 14 Bit rate, sampling rate, and stereo/mono streaming

Format	Bit Rate	Sampling Rate	Stereo/Mono	Extensions
AMR-NB	4.75 kbps – 12.20 kbps (supports all 3GPP specified rates)	8 kHz	Mono	.pvx

AMR-WB	6.6 kbps - 23.85 Kbps (supports all 3GPP specified rates)	16 kHz		
AAC	32 (GPRS) 80 (EDGE)	Up to 48 kHz	Stereo/Mono	
AAC+		Up to 48 kHz(16, 22.05, 24, 32, 44.1, 48 kHz)		
AAC+ Enhanced				
MP3	Up to 96 kbps	Up to 48 kHz		
Real Audio		Up to 44.1 kHz		

MIDI Support

The Musical Instrument Digital Interface (MIDI) enables consumers to use multimedia computers and electronic musical instruments to create, enjoy, and learn about music.

The MIDI protocol is a music description language in which every word describes an action of musical performance. Each action is stored as a binary word, and when combined, stored as MIDI files. These files can then be replayed by any electronic device that can read the MIDI file and recreate the performance using its available sound system.

Technical Specifications for MIDI:

- Recommended file size: up to 15 Kb
- MIDI instruments: 128
- Maximum polyphony: 64 voices for SMF
- Minimum duration per note: 20ms
- Maximum duration: 16-30

Table 15 MIDI format specification

Format	File Type	Polyphony Channels	Instruments	Extensions		
Standard MIDI	Type 0	64	128 Melodic, 47 Percussion	.mid, .midi, .smf		
	Type 1					
	SP					
XMF MIDI	Type 0			64	128 Melodic, 47 Percussion	.xmf, .xmf0, .xmf1, .mmf, .mxmf
	Type 1					
	Type 2 (mobile DLS)					

MIDI Key Mapping

The AURA™ supports all 128 general MIDI instruments and the standard drum kit, but due to frequency limitations, not all MIDI notes are supported for all patches.

Table 16 MIDI key mapping

Patch Number	Patch Names	Valid MIDI Note Numbers
0	Acoustic Grand Piano	21-108
1	Bright Acoustic Piano	21-108
2	Electric Grand Piano	22-108
3	Honky-tonk Piano	21-108
4	Electric Piano 1	21-108
5	Electric Piano 2	24-103



6	Harpsichord	24-89
7	Clavinet	24-96
8	Celesta	48-108
9	Glockenspiel	65-108
10	Music Box	48-84
11	Vibraphone	48-96
12	Marimba	48-97
13	Xylophone	48-108
14	Tubular Bells	48-96
15	Dulcimer	48-96
16	Drawbar Organ	24-96
17	Percussive Organ	24-96
18	Rock Organ	24-96
19	Church Organ	21-96
20	Reed Organ	24-96
21	Accordion	48-89
22	Harmonica	48-84
23	Tango Accordion	48-89
24	Acoustic Guitar (nylon)	36-84
25	Acoustic Guitar (steel)	36-84
26	Electric Guitar (jazz)	36-86
27	Electric Guitar (clean)	36-86
28	Electric Guitar (muted)	36-86
29	Overdriven Guitar	36-96
30	Distortion Guitar	36-96

31	Guitar Harmonics	36-96
32	Acoustic Bass	24-72
33	Electric Bass (finger)	24-72
34	Electric Bass (pick)	24-72
35	Fretless Bass	24-72
36	Slap Bass 1	24-72
37	Slap Bass 2	24-72
38	Synth Bass 1	24-96
39	Synth Bass 2	24-96
40	Violin	48-96
41	Viola	48-96
42	Cello	36-96
43	Contrabass	24-96
44	Tremolo Strings	24-96
45	Pizzicato Strings	24-96
46	Orchestral Harp	21-103
47	Timpani	36-84
48	String Ensemble 1	24-96
49	String Ensemble 2	24-96
50	Synth Strings 1	24-96
51	Synth Strings 2	24-96
52	Choir Aahs	36-96
53	Voice Oohs	36-96
54	Synth Voice	36-96
55	Orchestra Hit	36-72

56	Trumpet	36-96
57	Trombone	36-96
58	Tuba	24-72
59	Muted Trumpet	48-84
60	French Horn	36-96
61	Brass Section	24-96
62	Synth Brass 1	24-96
63	Synth Brass 2	24-96
64	Soprano Sax	48-89
65	Alto Sax	48-84
66	Tenor Sax	36-84
67	Baritone Sax	24-84
68	Oboe	48-96
69	English Horn	48-96
70	Bassoon	24-84
71	Clarinet	48-96
72	Piccolo	60-108
73	Flute	48-96
74	Recorder	60-96
75	Pan Flute	48-96
76	Blown Bottle	48-96
77	Shakuhachi	48-96
78	Whistle	48-91
79	Ocarina	60-96
80	Lead 1 (square)	24-96



81	Lead 2 (sawtooth)	24-96
82	Lead 3 (calliope)	36-96
83	Lead 4 (chiff)	36-96
84	Lead 5 (charang)	36-96
85	Lead 6 (voice)	36-96
86	Lead 7 (fifths)	36-96
87	Lead 8 (bass+lead)	24-96
88	Pad 1 (new age)	36-96
89	Pad 2 (warm)	36-96
90	Pad 3 (polysynth)	36-96
91	Pad 4 (choir)	36-96
92	Pad 5 (bowed)	36-96
93	Pad 6 (metallic)	36-96
94	Pad 7 (halo)	36-96
95	Pad 8 (sweep)	36-96
96	FX 1 (rain)	36-96
97	FX 2 (soundtrack)	36-96
98	FX 3 (crystal)	36-108
99	FX 4 (atmosphere)	36-96
100	FX 5 (brightness)	36-96
101	FX 6 (goblins)	36-96
102	FX 7 (echoes)	36-96
103	FX 8 (sci-fi)	36-96
104	Sitar	48-77
105	Banjo	48-84

106	Shamisen	48-79
107	Koto	48-96
108	Kalimba	48-96
109	Bagpipe	36-77
110	Fiddle	48-96
111	Shanai	48-96
112	Tinkle Bell	60-96
113	Agogo	48-72
114	Steel Drums	48-88
115	Woodblock	48-72
116	Tailo Drum	48-72
117	Melodic Drum	36-84
118	Synth Drum	36-84
119	Reverse Cymbal	48-72
120	Guitar Fret Noise	48-72
121	Breath Noise	48-72
122	Seashore	48-72
123	Bird Tweet	48-72
124	Telephone Ring	48-72
125	Helicopter	48-72
126	Applause	48-72
127	Gunshot	48-72
none	Drums	35-81

MIDI Audio Guidelines

The following are suggested guidelines to maximize sound quality while reducing the overall file size of a MIDI Ring Tone file for use with the Aura™.

Tip 1: Use MIDI's running status feature

In the MIDI standard, a key-on or a key-off event uses, at most, three bytes each. However, when several key events occur on the same MIDI-channel, the running status feature can be used. In principle, running status means the first byte of a key-on event is omitted. In addition, the key-on event having a velocity of zero is equivalent to the key-off event. Thus, combining running status with key-on events that have zero velocity reduces the number of bytes needed to encode all key events.

EXAMPLE:

Without using the running status feature, the sequence

```
91 2E 23 8E, 91 2B 50 8E, 81 2E 64 00, 81 2B 64 00
```

represents "Key 2E ON" Velocity 23 MIDI Ch 1", "Key 2B ON Velocity 50 MIDI Ch 1", "Key 2E OFF Velocity 64 MIDI Ch 1", "Key 2B OFF Velocity 64 MIDI Ch 1". Using the running status feature reduces the sequence to:

```
91 2E 23 8E, 2B 50 8E, 2E 00 00, 2B 00 00,
```

That is, the command byte is omitted and velocity zero is used for key off.

Tip 2: Use Standard MIDI File (SMF) type 1

The MIDI content can be stored in a Standard MIDI File (SMF) of type 0 or type 1. In a type 0 SMF, the file format uses one header chunk with one-track chunk. In a type 1 SMF, the format uses one header chunk with several track chunks. SMF type 2 should not be used.

In general, it is more efficient to store the MIDI data as a type 1 file. The increased efficiency is achieved because each track contains only one MIDI channel and one instrument, as is often the case. The running status feature can be applied on each individual track, thereby reducing the track size. To reduce the size of the file even further, use one track for each MIDI channel. That is, if a temple/conductor track exists, merge it with the first instrument track and remove all unnecessary meta-events such as the "track name" and "lyric" meta-events.

To summarize, the following measures can be taken in order to reduce the SMF:

- 1** Use SMF type 1 (or verify that a type 1 file is smaller than a type 0 file and use the smallest file).
- 2** Use running status.
- 3** One and only one instrument per track. Try not to change channels.
- 4** Do not change tempo in the middle of the music. That is, set the tempo once.
- 5** Use beat, instead of SMPTE, to set the tempo.
- 6** Do not use Copyright Text Fields.
- 7** Limit the use of continuous controller information such as pitch-bend and volume.

8 Turn off the options below:

- Sequence Number - MIDI sequence ids
- Text - embedded text for any optional fields
- Sequence / Track Name
- Instrument Name
- Lyric
- Marker - for synchronization purposes
- Cue Point
- Midi Channel Presix - associate channels with all events following
- Sequencer-Specific settings

Items one through three above optimize the encoding of the notes, while items four to eight optimize the overall melody. The above measures provide an SMF file that is ready-made for compression. However, prior to compression, the composer/content author can add a few values for key velocity, thereby increasing the redundancy of the file.

Tip 3: Consider the frequency response

Even though the MIDI synthesizer is sampled at 22 KHz, the polyphonic speaker's frequency response is not as wide. Try to keep the majority of melodic information below 6000 Hz.



NOTE: The use of MIDI notes below 800 Hz may cause a decrease in volume when playing the note. Always test your audio on an actual device to ensure the accuracy of the sound you want to produce.

MP3 Audio Guidelines

MP3 (MPEG Audio Layer 3) is an audio compression technology that is part of the MPEG-1 and MPEG-2 specifications. Developed in Germany in 1991 by the Fraunhofer Institute, MP3 uses perceptual audio coding to compress CD-quality sound by a factor of 12, while providing almost the same fidelity. Because MP3 audio is digitized, not synthesized, reproduction (disregarding speaker quality) is identical on all devices. Therefore, MP3 ring tones provide a near-CD quality audio experience for listeners as opposed to their MIDI counterparts that differ greatly from device to device.

The following recommendations should be used when designing MP3 audio clips for use in the phone.

Technical Specifications for MP3

- Sample rates: up to 48 kHz
- Bit rate: up to 320 kbps, recommended bit rate 128 kbps or less
- Recommended file size: 100KB
- Maximum duration : there is no duration restriction

Available Sound Properties

Follow technical specifications outlined above.

Design Guidelines

Since ring tones need to be at a consistent audible level, compressing the original content to reduce the peak-to-average ratio is necessary. After the audio is compressed, it is advisable to re-normalize the audio to zero decibels before saving the compressed MP3 file.



NOTE: Ring tones are generally between 15-20 seconds in length. Based on the recommended bit rates, that duration would yield a file size of 75-150K per ring tone. It is advisable to keep file size less than 100K to allow the end-user to download multiple tones, but file size is limited only by the total free memory available on the device.

Appendix A DRM

Digital Rights Management

Digital Rights Management (DRM) is a method of protecting content from illegal distribution by embedding the content into an encrypted package along with rules dictating its use. Using a set of keys and a license for the specific file, a DRM application is required to decrypt the content for playback. The DRM application is transparent to the user except for the cases where the user acquires a file without a proper license. Applications that interact with DRM encoded files include the following:

- Media Center
- MMS
- EMS
- Browser
- Email
- KJava

For more information, refer to the following references found at <http://www.openmobilealliance.org>:

- OMA-Download-DRM-v1_0-20020905-C
- OMA-Download-DRMREL-v1_0-20030801-C
- OMA-Download-DRMCF-v1_0-20030801-C

Supported DRM Solutions

The following three DRM solutions are supported by Motorola handsets.

- Forward Locking – Forward locking construct defined by the OMA DRM specification. Similar to Network Driver Interface Specification (NDIS) implementation in MMS/EMS.
- Combined Delivery – The OMA Combined Delivery mechanism is an extension of OMA forward locking. The Combined Delivery mechanism differs by including a rights object within the DRM message that governs the consumption of the content included along with the rights object. A handset that supports Combined Delivery supports OMA forward locking.
- Separate Delivery – The OMA Separate Delivery mechanism is an extension of OMA Forward locking. The Separate Delivery mechanism differs by delivering the content and the rights object separately. The MOTOMING A1600 supports retrieving rights via WAP Push and via HTTP response.

Download

Forward Lock files are downloaded within a DRM message. The download manager recognizes the DRM message of MIME type 'application/vnd.oma.drm.message' as a valid file type.

The download manager discards any DRM message that contains more than one media object within the DRM message.

OMA Combined Delivery is downloaded within a DRM message and consists of a media object and a rights object. The download manager recognizes the DRM message MIME type and the MIME type 'application/vnd.oma.drm.rights+xml' as a valid file type. A single media object in the body of the DRM message, that is encoded in the following identity transfer encoding '7bit', '8 bit', and 'binary,' is accepted by the download manager.

Appendix B MIME Types

This appendix provides a list of common MIME types used on various Motorola handsets. The list is sorted by category and provides file type descriptions, as well as the MIME types used to download different media files.

Table 17 MIME types

Application	File type	MIME Type
Audio	AMR-NB	audio/amr, audio/mp4, audio/3gpp
	AMR-WB	audio/amr-wb, audio/3gpp
	AAC (MPEG4 AAC-LC)	audio/mp4, audio/3gpp, audio/m4a, audio/aac
	AAC+	audio/mp4, audio/3gpp, audio/m4a, audio/aac
	Enhanced AAC+	audio/mp4, audio/3gpp, audio/ m4a, audio/aac
	PCM	audio/L8, audio/wav, audio/L16, audio/pcma, audio/pcmu
	WMA	audio/x-ms-wma
	Real Audio	audio/x-pn-realaudio, audio/ vnd.rn-realaudio
	iMelody	audio/imelody
	MIDI	audio/midi, audio/mid, audio/x-mid, audio/x-midi, audio/xmf, audio/sp-midi, audio/mxmf, audio/xmf0, audio/xmf1
MP3	audio/mp3, audio/x-mp3, audio/mpeg3, audio/x-mpeg3, audio/mpeg, audio/mpg, audio/x-mpeg, audio/x-mpg	
Image	Progressive JPEG	image/jpeg
	PNG	image/png
	BMP	image/bmp
	GIF 87a, 89a	image/gif
	JPEG	image/jpeg
	WBMP	image/vnd, wap, wbmp, wbmp

Video	H.263	video/mp4, video/3gpp
	MPEG4	video/mp4, video/3gpp
	H.264	video/mp4, video/3gpp
	WMV 9	video/x-ms-wmv
	Real Video	video/x-pn-realvideo, video/vnd.rn-realvideo
Application	Audio Streaming	application/x-sdp, application/sdp, Audio/x-ms-wma
	Video Streaming	application/x-sdp, application/sdp, video/x-ms-wmv
	Audio + Video Streaming	application/x-sdp, application/sdp



NOTE: Tone Sequence as defined in JSR-135 is equal to the following: audio/x-tone-seq. Different strings in the same group are synonyms and are equally applicable for the corresponding media type.

Note the following when mapping MIME types to a server:

- A MIME type can be mapped to zero or more file extensions
- Extension mapping is case insensitive

For information on configuring servers to deploy programs or files over-the-air, or to determine which MIME types are supported by a particular handset, download the Basic Over-the-Air Server Configuration whitepaper from the MOTODEV web site (<http://developer.motorola.com>).

Appendix C Additional Information

Glossary

AAC	Advanced Audio Coding
AMR	Adaptive Multi Rate
EMS	Enhanced Messaging Service
GIF	Graphics Interchange Format
GSM	Global System for Mobile communications
iMelody	Infrared Data Association (IrDA) standard for the textual representation of a ring tone.
MIDI	Musical Instrument Digital Interface
MIDI Patch	One of the channels in a MIDI device, defined by the general MIDI standard.
MPEG	Moving Pictures Experts Group
NDIS	Network Driver Interface Specification
PCM	Pulse-Code Modulation
Pixel	One picture element on the display
PNG	Portable Network Graphics
QCIF	Quarter Common Intermediate Format
WAP	Wireless Application Protocol
WBMP	Wireless Bitmap
WMA	Windows Media Audio
WMV	Windows Media Video
XMF	Extensible Music Format

References

3GPP	http://www.3gpp.org
Infrared Data Association	http://www.irda.org
MIDI Manufacturers Association	http://www.midi.org
Motorola Developer Program	http://developer.motorola.com
Moving Pictures Experts Group	http://www.chiariglione.org/mpeg/
WAP Forum	http://www.wapforum.org
World Wide Web Consortium	http://www.w3.org

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