MOTODEV

W760R/VA76R

V 02.00

MEDIA GUIDE

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W760r/VA76r Media Guide

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1 Display

This chapter describes the display characteristics for the W760r/VA76r handset.

Figure 1: W760r/VA76r handset

Display Info

The physical internal display characteristics of the W760r/VA76r are as follows:

Table 1 Display information

Item	Description
Screen resolution	240 x 320 pixels
Screen dimensions	30.8 mm x 38.6 mm viewing area
Pixel pitch	.219 mm square pitch
Color depth	16 bits
Maximum colors	262K
Text area	7 lines, 2.5mm text height as a minimum 7 lines Chinese Character

Figure 2: The W760r/VA76r display

NOTE: Screen shot may not reflect actual display size.

2 Graphics and Video

This chapter describes the graphic environment available in the W760r/VA76r handset. 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 W760r/VA76r handset supports the following graphic and animation formats:

Table 2 Graphic and animation formats

Type	Description
Bitmaps	Enhanced Messaging Service bitmap
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.
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.
Progressive JPEG	It is a JPEG equivalent format that shows its content gradually.
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

NOTE: The maximum picture resolution is 640 x 480 (VGA) for no JPEG, 1600x1200 for JPEG. Any images with a higher resolution are not displayed.

Table 3 shows the still image capture resolution and size of the supported formats.

Table 3 Still image capture

Format	Maximum Decode Size	Maximum Display Resolution
JPEG	2.0 Mega Pixel	QVGA

Video Playback

The W760r/VA76r handset supports the following video formats.

Table 4 Video formats

Type	Description
MPEG-4	The MPEG-4 format provides standardized technological elements that enable interactive multimedia (video/audio), interactive graphics, and digital television.
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.
Real Video	Proprietary video format developed by RealNetworks.

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

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

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

Format	Bit Rate (kbps)	Frame Size	Frame Rate
MPEG4	Up to 350 kbps	QVGA	25 fps
H.263			
H.264	Up to 256 kbps	QCIF	15 fps
WMV v9 (also WMV v7, v8)	Up to 128 kbps		
Real Video 9 (also Real Video 8)	Up to 320 kbps	QVGA	

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

Table 6 Graphics and animation formats

Format	Total Bit Rate	Video			Audio		
		Size	Bit rate	Frame Rate	Bit Rate	Sampling Rate	Stereo/ Mono
MPEG4, H.263 and AMR-NB	Up to 350 kbps	QVGA	Up to 296 kbps	25 fps	Up to 12.2 kbps	8 kHz	Mono
MPEG4, H.263 and AMR-WB			Up to 296 kbps		Up to 23.85 kbps	16 kHz	
MPEG4, H.263 and AAC	Up to 256 kbps		Up to 220 kbps		Up to 128 kbps	Up to 48 kHz	Stereo/ Mono
MPEG4, H.263 and AAC+							
MPEG4, H.263 and Enhanced AAC+							
H.264 and AMR-NB	Up to 256 kbps	QCIF	Up to 230 kbps	15 fps	Up to 12.2 kbps	8 kHz	Mono
H.264 and AMR-WB					Up to 23.85 kbps	16 kHz	
H.264 and AAC	Up to 256 kbps		Up to 220 kbps		Up to 128 kbps	Up to 48 kHz	Stereo/ Mono
H.264 and AAC+							
H.264 and Enhanced AAC+							
WMV and WMA	Up to 224 Kbps		Up to 96 kbps		Up to 128 kbps	Up to 48 kHz	Stereo/ Mono
Real Audio and video	Up to 350 Kbps	QVGA	Up to 296 kbps		Up to 64 kbps	Up to 48 kHz	Stereo/ Mono

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

Table 7 Bit rate, frame size, and frame rate streaming supported

Format	Bit Rate (kbps)	Frame Size	Frame Rate
MPEG4	Up to 250 kbps	QVGA	25 fps
H.263			
WMV v9 (also WMV v7, v8)	Up to 128 kbps	QCIF	15 fps
Real Video 8, 9			
H.264			

Table 8 shows the specifications for video + audio streaming.

Table 8 Video + Audio streaming

Format	Total Bit Rate	Video			Audio		
		Size	Bit rate	Frame Rate	Bit Rate	Sampling Rate	Stereo/ Mono
MPEG4, H.263, H.264 and AMR-NB	350 kbps	QVGA	Up to 220 kbps	25 fps	Up to 12.2 kbps	8 kHz	Mono
MPEG4, H.263, H.264 and AMR-WB					Up to 23.85 kbps	16 kHz	
MPEG4, H.263, H.264 and AAC			Up to 210kbps		Up to 32 kbps	Up to 44.1 kHz	Stereo/ Mono
MPEG4, H.263, H.264 and AAC+							
MPEG4, H.263, H.264 and Enhanced AAC+							
H.264 and AMR-NB	128 kbps	QCIF	Up to 96 kbps	15 fps	Up to 12.2 kbps	8 kHz	Mono
H.264 and AMR-WB					Up to 23.85 kbps	16 kHz	
H.264 and AAC					Up to 32 kbps	Up to 44.1 kHz	Stereo / Mono
H.264 and AAC+							
H.264 and Enhanced AAC+							
WMV and WMA					Up to 48 kbps	Up to 44.1 kHz	
Real Audio and Video					Up to 32 kbps	Up to 48 kHz	

Graphics and Video Capture

Table 9 shows the image capture resolution and size of the supported formats.

Table 9 Image capture

Format	Resolution	Size
JPEG	Large (2.0 MPixel)	1600x1200 pixels
	Medium (1.3 M Pixel)	1280x960 pixels
	Small (VGA)	640x480 pixels
	X-Small (QVGA)	320x240 pixels

Table 10 shows the video quality, bit rates, frame size, frame rate, and maximum durations for video capture.

Table 10 Maximum durations for video capture

Format	Video Quality	Bit Rate (kbps)	Frame Size	Frame Rate
MPEG4 H.263	Low	64 kbps	QCIF	13~15fps
	Medium	96 kbps		
	High	128 kbps		

Table 11 shows the audio formats for audio capture.

Table 11 Audio capture

Format	Bit Rate (kbps)	Sampling Rate (kHz)	Stereo/Mono
AMR-NB	12.20 kbps	8 kHz	Mono

Table 12 shows the video quality, bit rates, frame size, frame rate, and maximum durations for video + audio capture.

Table 12 Maximum durations for video + audio capture

Format	Total Bit Rate	Video			Audio		
		Size	Bit rate	Frame Rate	Bit Rate	Sampling Rate	Stereo/Mono
MPEG4 H.263 and AMR-NB	Up to 128 kbps	QCIF	51 kbps	13~15fps	12.2 kbps	8 kHz	Mono
			83 kbps				
			115 kbps				

Table 13 describes the supported file formats for the video share functionality.

Table 13 Video share

Format	Total Bit Rate	Video		
		Size	Bit rate	Frame Rate
MPEG4 Simple Visual Profile Level 0 (packet switched video)	64 Kbps	QCIF	59 kbps	15 fps
H.263 Baseline Profile 0 Level 10 (packet switched video)				
MPEG4 Simple Visual Profile Level 0b (packet switched video)	128 Kbps		118 Kbps	
H.263 Baseline Profile 0 Level 45 (packet switched video)				

MMS /SMS Support

The W760r/VA76r MMS/SMS applications support use of the following image formats:

- JPEG
- GIF

- BMP

The W760r/VA76r handset supports use of the following audio formats:

- MP3
- MIDI

Enhanced Messaging Service (EMS) Support

The W760r/VA76r handset supports use of the following animation settings.

Table 14 EMS animation settings

Type	Description
Small	Color, 8 x 8 pixels (32 bytes = 256 bits)
Large	Color, 16 x 16 pixels (128 bytes = 1024 bits)
Frames	4 frames maximum (EMS animations only)
Rate	500 ms
Loop	Continuous

The W760r/VA76r handset supports use of the following picture settings.

Table 15 Picture settings

Type	Description
Small	16 x 16 pixels (32 bytes = 256 bits)
Large	32 x 32 pixels (128 bytes = 1024 bits)
Variable Size	255 x 255 pixels maximum

NOTE: All pictures are in .bmp format and can be received in black and white, 2-bit grey scale, and 6-bit color.

The W760r/VA76r handset supports use of the following audio settings.

Table 16 Audio settings

Type	Description
Predefined	Supported as per the EMS standard
User-defined	iMelody format (max size 128 bytes)

NOTE: EMS messages can support up to 3Kb of inserted objects and 450 characters when sending a message.

Screensaver Support

The W760r/VA76r 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 also supported are the following: static GIF (GIF 87a), WBMP, and EMS 5.0 bitmaps.

Technical Specifications for Screen Savers:

- Dimensions: Internal: 240 x 320
- Recommended number of frames: 9-15
- Colors: Internal: 262K
- Recommended file size: up to 30kb

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.

The recommended format for wallpaper images is a static GIF (GIF87a) file. Other file types that can be used as wallpaper images are WBMP, EMS 5.0 bitmaps, and JPEG.

Technical Specifications for Wallpapers:

- Dimensions: Internal: 240 X 320
- Colors: Internal: 262K
- Recommended file size: up to 15kb

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 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 is tiled.

3 Sound

This chapter describes the sound environment available in the W760r/VA76r 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 ring tones 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 W760r/VA76r handset supports the sound formats shown in the following table.

Table 17 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 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 W760R/VA76R 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	Format for storing files (.wav). Linear pcm 8-bit and 16-bit, CCITT A-law and U-law.
WMA	Windows Media Audio.

Table 18 shows the bit rate, sampling rate, and stereo/mono capabilities for each supported format.

Table 18 Bit rate, sampling rate, and stereo/mono capabilities (sound formats)

Format	Bit Rate (kbps)	Sampling Rate (kHz)	Stereo/Mono
AMR-NB	4.75 kbps – 12.20 kbps (supports all 3GPP specified rates)	8 kHz	Mono
AMR-WB	6.6 kbps - 23.85 kbps (supports all 3GPP specified rates)	16 kHz	
AAC (MPEG4 AAC-LC)	Up to 256 kbps (Up to 192kbps CBR)	48 kHz	Stereo/Mono
AAC+	Up to 128 kbps (16 to 128 kbps)	Up to 48 kHz (16, 22.05, 24, 32, 44.1, 48 kHz)	Stereo/Mono
Enhanced AAC+	Up to 128 kbps (16 to 128 kbps)	Up to 48 kHz (16, 22.05, 24, 32, 44.1, 48 kHz)	Parametric Stereo
MP3	Up to 320 kbps	48 kHz	Stereo/Mono
8-bit Linear PCM	64 kbps	8 kHz	Mono
16-bit Linear PCM	128 kbps		
8-bit A-law PCM	64 kbps		
8-bit mu-law PCM			
GSM Full Rate	12.20 kbps	8 kHz	Mono
WMA v9 L2 (also WMA v3, v7, v8)	Up to 320 Kbps	48 kHz	Stereo/Mono
Real Audio 8 - Supports LBR (Cook) formats.	Up to 96 Kbps	44.1 kHz	Stereo/Mono
Real Audio Sipro (ACELP®.net)	5.0 Kbps (fixed rate) 8.5/6.5 Kbps (dual rate)	8 kHz	Mono
	16 Kbps (wide-band)	16 kHz	
Real Audio 10	Up to 192 kbps	Up to 48 kHz (8, 11, 12, 16, 22.05, 24, 32, 44.1, 48 kHz)	Stereo/Mono

Table 19 shows the bit rate, sampling rate, stereo/mono, and extension for supported streaming audio formats.

Table 19 Bit rate, sampling rate, and stereo/mono streaming

Format	Bit Rate (kbps)	Sampling Rate (kHz)	Stereo/Mono
AMR-NB	4.75 kbps – 12.20 kbps (supports all 3GPP specified rates)	8 kHz	Mono
AMR-WB	6.6 kbps - 23.85 Kbps (supports all 3GPP specified rates)	16 kHz	
AAC	Up to 128 kbps	48 kHz	Stereo/Mono
AAC+	Up to 128 kbps (16 to 128 kbps)	Up to 48 kHz (16, 22.05, 24, 32, 44.1, 48 kHz)	
AAC+ Enhanced	Up to 128 kbps (16 to 128 kbps)	Up to 48 kHz(16, 22.05, 24, 32, 44.1, 48 kHz)	
WMA v9 (also WMA v3, v7, v8)	Up to 128 kbps	48 kHz	
Real Audio 8, 10 Supports LBR formats.	Up to 96 kbps	44.1 kHz	
Real Audio Sipro (ACELP®.net)	5.0 Kbps (fixed rate) 8.5/6.5 Kbps (dual rate)	8 kHz	Mono
	16 Kbps (wide-band)	16 kHz	

Progressive Download

Progressive download is a feature from Sun's JSR-135 specification that enables the user to play the media content while downloading it. The following table shows the supported formats supported by the W760r/VA76r handset:

Table 20 JSR 135 progressive download supported formats

Format	Bit Rate (kbps)	Sampling Rate (kHz)	Stereo/Mono
AMR-NB	4.75 kbps – 12.20 kbps (supports all 3GPP specified rates)	8 kHz	Mono
AMR-WB	6.6 kbps - 23.85 Kbps (supports all 3GPP specified rates)	16 kHz	Mono
AAC (MPEG4 AAC-LC)	Up to 192kbps CBR	Max: 48 kHz	Stereo/Mono
AAC+	Up to 128 kbps (16 to 128 kbps)	Up to 48 kHz	Stereo/Mono
Enhanced AAC+	Up to 128 kbps (16 to 128 kbps)	Up to 48 kHz	Parametric Stereo
WMA v9 L2 (also WMA v3, v7, v8)	Up to 320 Kbps	48 kHz	Stereo/Mono

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: 24 voices
- Minimum duration per note: 20ms
- Maximum duration (NW dependent): 16-30 secs

Table 21 MIDI format specification

Format	File Type	Polyphony Channels	Instruments
Standard MIDI	Type 0	64	128 Melodic, 47 Percussion
	Type 1		
	SP		
Mobile XMF MIDI	Type 0		
	Type 1		
	Type 2 (mobile DLS)		

iMelody functionality is provided by the Beatnik MIDI engine.

Table 22 iMelody

Format	Dynamic Range	Polyphony Channels	Feature
iMelody	1 – 3.5 kHz	Monophonic	Simple Wave Tone Generation
			Vibrator Control

MIDI Key Mapping

The W760r/VA76r handset 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 23 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
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66	Tenor Sax	36-84
67	Baritone Sax	24-84
68	Oboe	48-96
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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
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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 W760r/VA76r handset.

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 following 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:

- Bit Rate: 64kbps recommended
- Recommended file size: 30kb
- Maximum duration (NW dependent): 16-30 secs

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 0db 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 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 W760r/VA76r handset supports retrieving rights via WAP Push.

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 24 MIME types

Application	File type	MIME Type
Audio	AMR-NB	audio/amr
	AMR-WB	audio/amr-wb mp4 3gpp
	AAC (MPEG4 AAC-LC)	audio/mp4 3gpp m4a
	AAC+	audio/mp4 3gpp m4a
	Enhanced AAC+	audio/mp4 3gpp m4a
	PCM	audio/l8 l16 x-pn-wav pcma pcmu
	GSM Full Rate	audio/wav
	WMA	audio/asf x-ms-wma
	Real Audio	audio/x-pn-realaudio vnd.rn-realaudio
	iMelody	audio/imelody
	MIDI	audio/midi mid x-mid x-midi mobile-xmf
	WAV	audio/wav
	MP3	audio/mp3 x-mp3 mpeg3 x-mpeg3 mpeg x-mpeg

Image	Progressive JPEG	image/jpeg
	PNG	image/png
	BMP	image/bmp
	EMS BMP	image/ems.userdefined.picture ems.userdefined.animation ems.predefined.animation
	GIF 87a, 89a	image/gif
	JPEG	image/jpeg
	WBMP	image/vnd.wap.wbmp wbmp
Video	H.263	video/mp4 3gpp
	MPEG4	video/mp4 3gpp
	H.264	video/mp4 3gpp
	AMR-NB	video/mp4 3gpp
	AAC (MPEG4 AAC-LC)	video/mp4 3gpp
	WMA	video/asf x-ms-asf x-ms-wmv
	Real Video	video/x-pn-realvideo vnd.rn-realvideo
Application	Audio Streaming	application/x-rtsp x-sdp
	Video Streaming	application/x-rtsp x-sdp sdp video/rtsp
	Audio + Video Streaming	application/x-rtsp x-sdp sdp video/rtsp

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.

Please 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 website (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
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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