Motorola Applications Global Network, MAGNET

Graphical User Programmable Ringer Tone Format

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Graphical User Programmable Ringer Tone Format

By this feature the user can compose a Ringer Tone of his own, play, save and send the same to another mobile as SMS. The Maximum number of Notes in a musical tone is 35 notes.

The Music tone, which is sent as an SMS, has the following format:

|← Header ->|<-Tempo value->|←Musical Data ->|← Delimiter->|←Checksum->|

Breakup of the Music SMS,

Header*: L35&   This is a constant string for all musical tone SMS. [By using 'Send As SMS' option user can send composed Ringer Tone to other compatible Motorola phone. To differentiate Music SMS from Normal SMS, special header is attached.]*

Tempo Value: *This is either 1 or 2 or 3 or 4 followed by a space(e.g. "2 "). Default is 2.*

Musical Data : *It consists of 1 or more notes, subject to a maximum of 35 Notes , the format of which is given below.*

Delimiter : &&   This represents the end of musical notes in the tone.

Checksum : Two bytes. The algorithm for calculation of the checksum is given below.

Step1: Calculate one byte XOR sum of the all the bytes of the musical data starting after the space in the tempo value(not including space) till the && (not inclusive of &&). Let us say this is XY.

Step 2: Separate X and Y into two bytes X0 and 0Y.
Step 3: Take 0Y and add hex 30. This becomes 3Y. Call this byte 1.
Step 4: Take X0 and shift right by 4 bits. This becomes 0X.
Step 5: Add hex 30 to 0X. This becomes 3X. Call this byte 2.
Step 6: Two byte checksum is <byte 2><byte1>

More details……….
Musical Data:
There are a total of four attributes related to each note in the composed music. Namely,

1. Symbol of the note (alphabets from A .. G and a .. g)
2. Flatness or Sharpness of the note
3. Octave of the note (Lower, Mid, Higher)
4. Duration of the note (Value varies from 1 to 6)

Out of these four attributes, attribute 1 and 4 are compulsory and attribute 2 and 3 are optional. Once user enters in the GPRT feature, keypad will get converted into piano keys. Keymap will be as follow,

6 – 'A' , 'a'   7 – 'B' , 'b'   1 – 'C' , 'c'   2 – 'D' , 'd'   3 – 'E' , 'e'   4 – 'F' , 'f'
5 – 'G' , 'g'   0 – 'R' (Rest note)   and 9 – For toggle between Flat and Sharp(#)

By default the note will be flat until and unless user makes it as sharp intentionally. Once user changes this attribute, it will be applicable for all the further notes until he toggles

it again. The capital and small alphabets give visual indication for the flatness or sharpness of the note respectively.

User can see three horizontal lines corresponding to each octave. He can select the desired octave by using the side (volume) keys. If he doesn't select octave, by default, mid octave will be selected

Press and hold mechanism is implemented for calculating the note duration. It will give the effect of real time composition of the melody. The key press duration is mapped to the duration 1 to 6 internally.

All the things, which we have discussed so far, are for real time composition – on the handset. Apart from that, user can edit the composed music. Once the Music Tone Editor is entered, user will find a string of Alphabets and duration at the bottom. He can move the cursor to the desired position and edit the note and its duration as well.

Action list (see footnote) for this will provide following options for the user,

1. *Play Music*
2. *Save Music*
3. *Erase Music*
4. *Change Tempo*
5. *Send As SMS*

Play Music will play the composed music. Save Music will save the same on user's phone. Erase Music will not make it blank but it will overwrite 'Motorola Default Song' on user composed music. First time when user invokes Music Editor, he will see 'Motorola Default Song' Notes on display.
Tempo is the attribute which applies to the whole Tone and not to the single note. By option 'Change Tempo', user can change tempo of the whole melody from 1 to 4.

Here is one user composed note as a sample.

C#+4
   Here 'C' is note identifier.
   #   indicate it is sharp
   +   indicates higher Octave and
   4   indicates duration

As we see 'C' and '4' are compulsory attributes and '#' and '+' are optional attributes. So user can make it C+4 for Flat note (Sharpness not specified), C#4 for Mid octave (Octave not specified) or simply C4 for flat, mid-octave (Sharpness and Octave both are not specified)

Now let's see one full Tone composed by user,

D#+4C+3D#5F6A6B-3C#2D#-3G-2A4D#+4C+3D#5F6A6B-3C#2D#-3G-2A4D#+4C+3D#5F6A6B-3C#2D#-3G-2A4D#+4C+3D#5F6A6

If user wants to send it as Music SMS, header and trailer part will attach to it. Let's assume we have to send the Tone with tempo value 3. The Music SMS will appear as follows,

L35&3 D#+4C+3D#5F6A6B-3C#2D#-3G-2A4D#+4C+3D#5F6A6B-3C#2D#-3
   G-2A4D#+4C+3D#5F6A6B-3C#2D#-3G-2A4D#+4C+3D#5F6A6&&<checksum>

At the receiving end the contents between header L35&3 and trailer && will be treated as Music SMS. Its checksum is calculated, it is verified with that of sent checksum along with SMS. If it is matching then that is treated as Music SMS.

Note :   There are some constraints while composing the Music tone. Those are,
   1   A# is not available in Lower octave, it will be played as A# mid octave
   2   B# and E# are not available in all octave, they will be played as flat in all octaves
   3   F# and G# are not available in higher octave, they will be played in mid octave

Footnote * : This is the action list for normal operation. If user fills all rest notes another action list will appear and that contains only one action item that for erasing the Music

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END OF DOCUMENT