Ringtone Coding Flow

1. General Description

The W569X is wavetable-based MIDI synthesizer with GM1 compatibility to allow for the playback of any MIDI song. Besides, SFX (Sound Effect) can also be played alone or be inserted in the MIDI file for synchronized playback. Content providers (or musical professionals) can use the following stuffs to develop MIDI tunes:

- 3rd party tools
    - Cakewalk
    - Cool Edit
    - SoundForge
- W569 Ringtone Player
    - Preview the MIDI resources on W569 Sound Module. What you hear and what you get!
    - Map audio clips to those inserted events in Midi files, and convert Midi files into Winbond's proprietary formats. With Ringtone Player, users can designate the audio mapping inside the *.ini file.
    - Pack ringtone files into a single binary image file for playback @ demo kit.
    - Provide simple method to make midi event, like LED event and MTR event for general user.
- W569 Sound Module.

2. Ringtone Player Tool

The W569X ringtone coding can be done by ringtone player tool. At this user guide we will introduce how to use this tool by two connect interface. User could follow several simple step by figure 1. Starting from the sound editing with the popular Cakewalk sequencer (for MIDI editing), Cool Edit (for SFX editing) or SoundForge(for Wav editing), users focus on the manipulation of standard MIDI and Microsoft wave files to meet their ringtone requirements.

With several simple step, users can insert LED/MTR events to represent the interactivities of LED/MTR or audio clips easily. The standard MIDI file (*.mid) is then processed , to generate the SMF output after audio file mapping. Besides, ringtone player can also be used for format conversion, And then be used to compile ringtones to generate the *.bin file which is binary file for downloading into W569X demo kit.

For easier performance tuning at W569X demo kit, we provide a simple way to pack a bunch of MIDI, speech, and MIDI+speech files into a single binary file. Ringtone player is also be used for the packing along with the use of a *.ini file, which defines the ringtones along with LED/MTR patterns, if any. The following list is an example of the *.ini, which supports IMF, CMF, and APM formats. The *.ini was used to save the setting like LED. MTR. Speech…..etc.

Ringtone Player is a simple tool, which provide the convenient environment. For example with link was provide to connect the tool like the cool Edit or Cakewalk…etc to make the effect.

Besides mapping audio clips, the ringtone player also converts MIDI or WAVE files into Winbond's proprietary formats, like IMF (Intermediate MIDI Format), MBN (MIDI BuNdle, IMF+SFX), and APM (ADPCM, Adaptive Differential PCM).

Figure 1 Ringtone Coding Flow

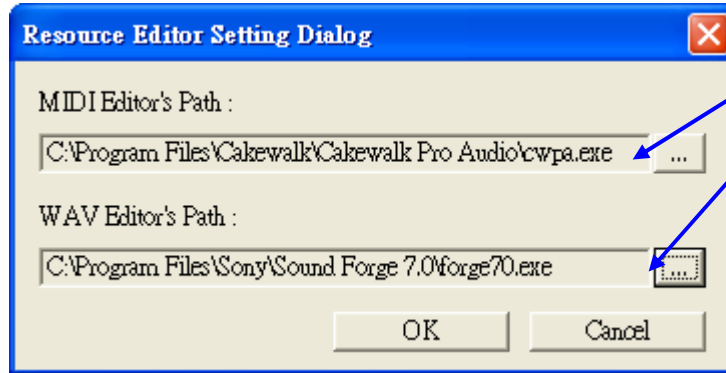## 2.1 Ringtone Player Using

2.1.1 Preparation Task :

0.1   Press the chip selection to select the chip item. Example If your chip is W5691, please choose the W569X item.

0.2   Press the midi devices button to select the midi device style which you used. The item is a device whom was used to connect the W569X and computer. Example like YAMAHA Midi port or USB cable.
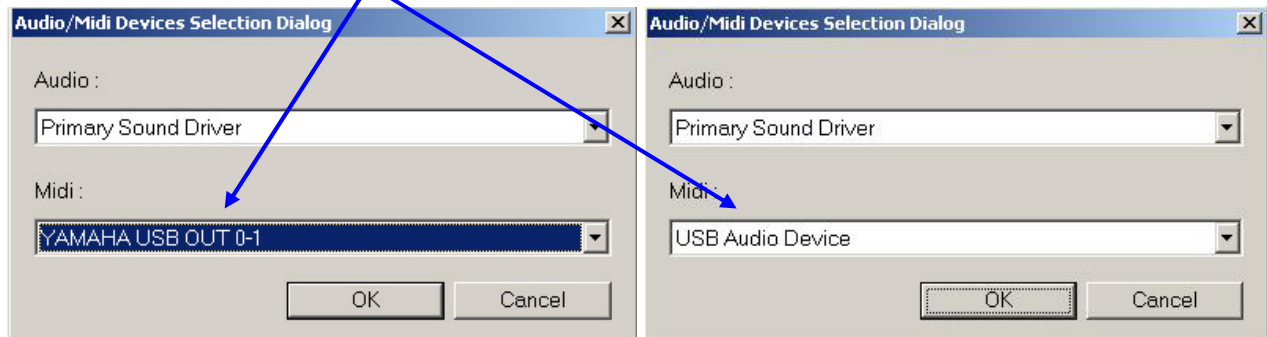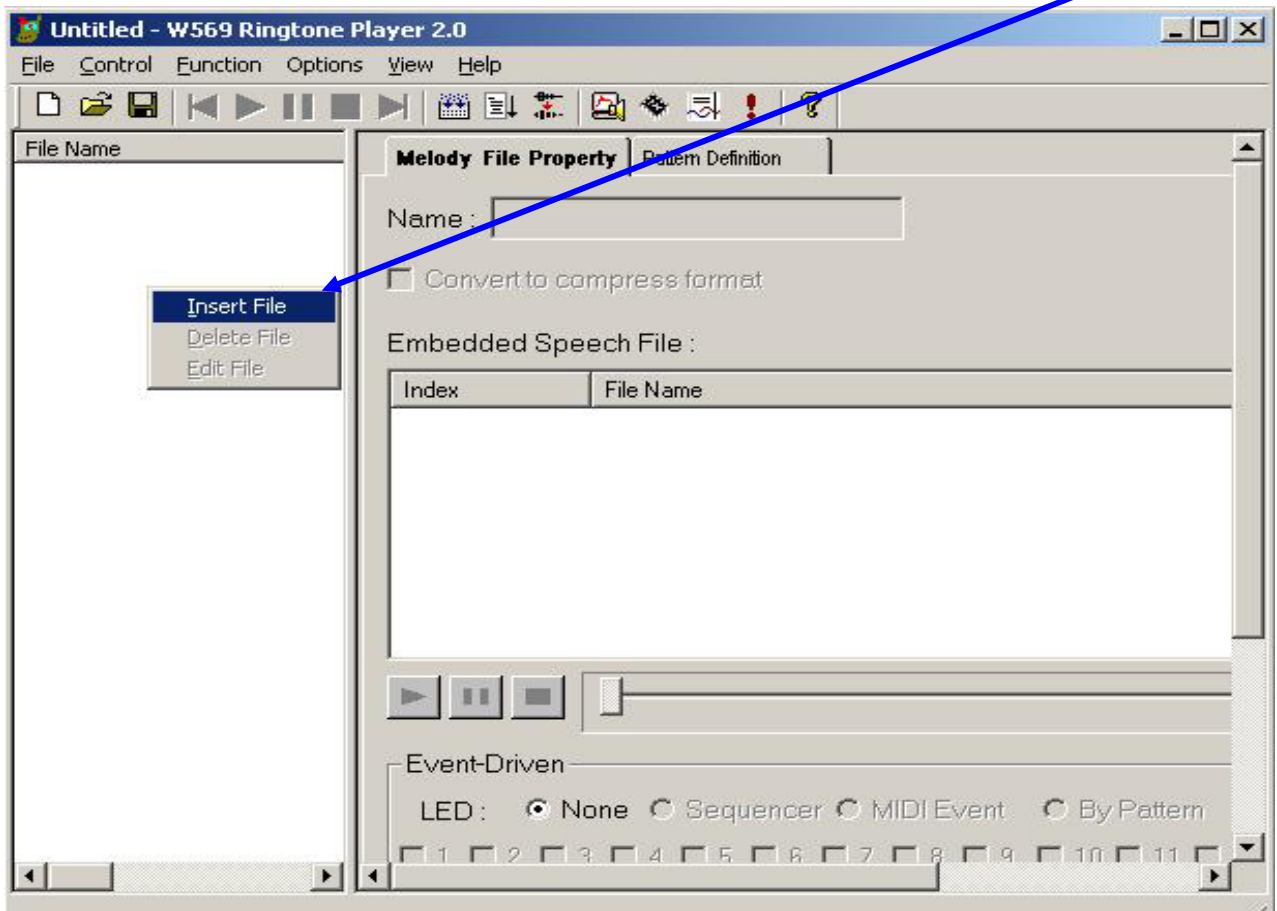
0.3   Press the editor setting button and select the software for making the effect. This step will let you direct to link software by double click left mouse in midi file or wav file. Cakewalk was use to make the midi effect, and sound forge was use to make the wav effect.
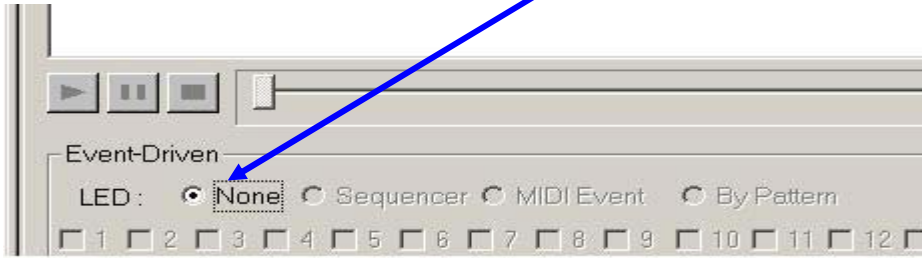
Resource Editor Setting Dialog

MIDI Editor's Path :

C:\Program Files\Cakewalk\Cakewalk Pro Audio\cwpa.exe   ...

WAV Editor's Path :

C:\Program Files\Sony\Sound Forge 7.0\forge70.exe   ...

OK   Cancel

2.1.2 Regular Step

Simple mode:

1.1   Insert the file which you want in "file name" field by click right mouse in "file name" field.

Untitled – W569 Ringtone Player 2.0

File   Control   Function   Options   View   Help

File Name

Melody File Property | Pattern Definition

Name :

☐ Convert to compress format

Embedded Speech File :

Index	File Name

Insert File
Delete File
Edit File

Event-Driven

LED :   ⦿ None   ○ Sequencer   ○ MIDI Event   ○ By Pattern

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11

1.2 Select the "None" button if customer want to download the midi file simply.

1.3 Press the "build" button , and then you should select a address to save. The ringtone would generate *.ini file and *.bin file. The *.ini file include the status which you set at the time. The *.bin file which is binary file woule be downloading into W569X demo kit
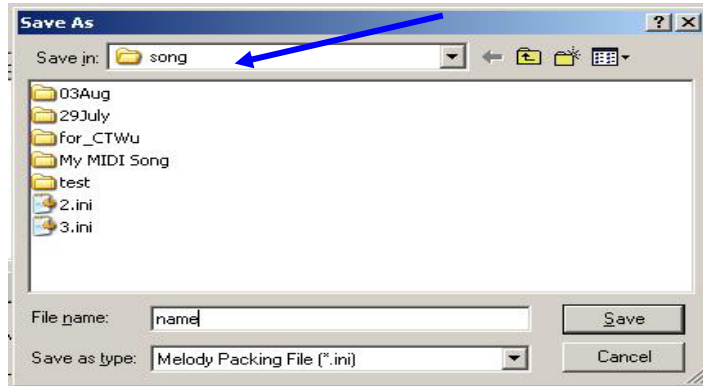
1.4 Press the "convert" button it would convert the mid or wav file. In midi format, this tool provide the choose which is XMF or IMF format you want convert. In wav format, this tool provide the choose which is ADPCM ,PCM(8 bit) ,PCM(16 bit) ,XMF format you want convert. After you have finish the choice ringtone player will generate the *.h file which could be include in arm function. You can select any address you want in Output Path field to save.
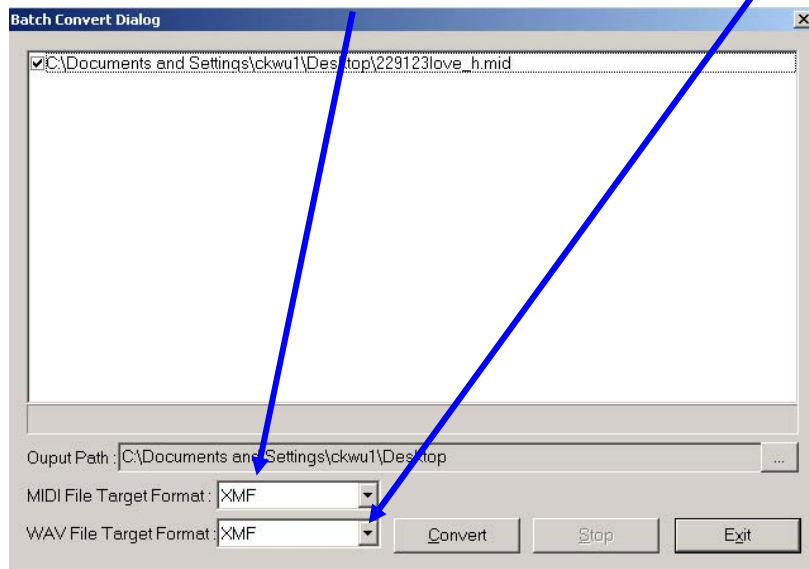
1.5   Final step press the "download" button to transfer the *.bin file to W569X. Because W569X demo kit has two connect interface. So you must choose the connect interface which you use. After you select the com Dialog. And then choose the button you want to download like demo code or midi file if you want to change the demo code or melody pack file which you want.
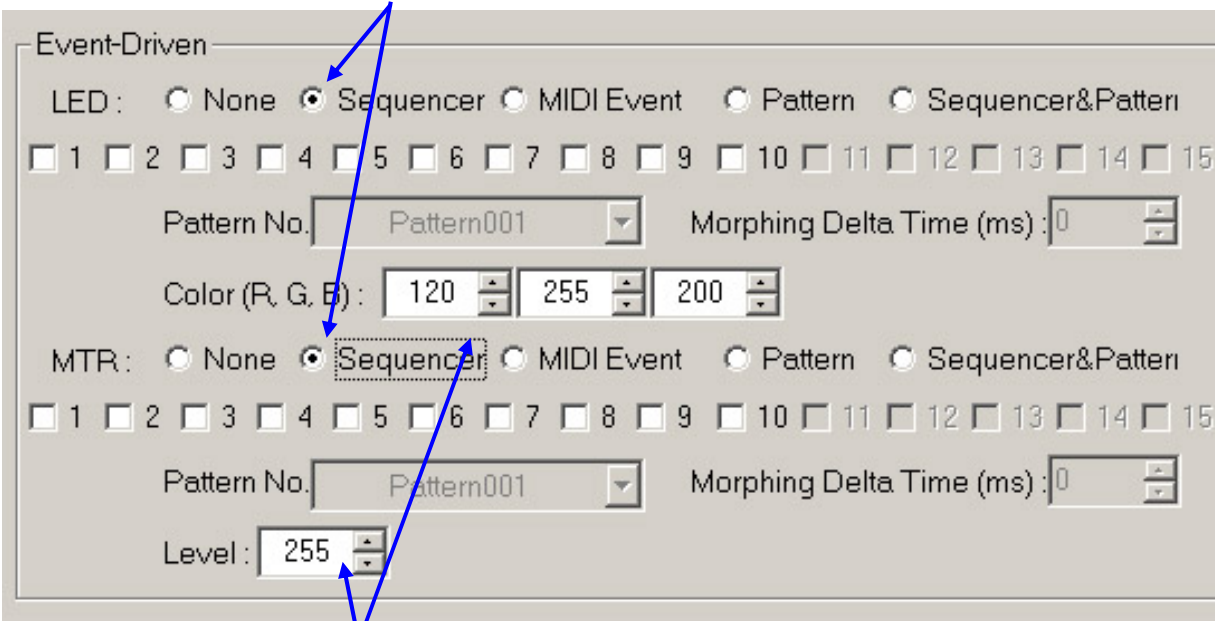
Open Com Dialog

- ⊙ COM1   ○ USB
- ○ COM2
- ○ COM3
- ○ COM4   [OK]

Download Option Dialog

☐ Wave Table File :

[   ] [...]

☑ Melody Pack File :   ⊙ Current Project   ○ Other

[   ] [...]

☐ Demo Code File :

[C:\resource code\V2.10.005\arm_bin\ArmHost_MIDI_Pla] [...]

[OK]   [Cancel]
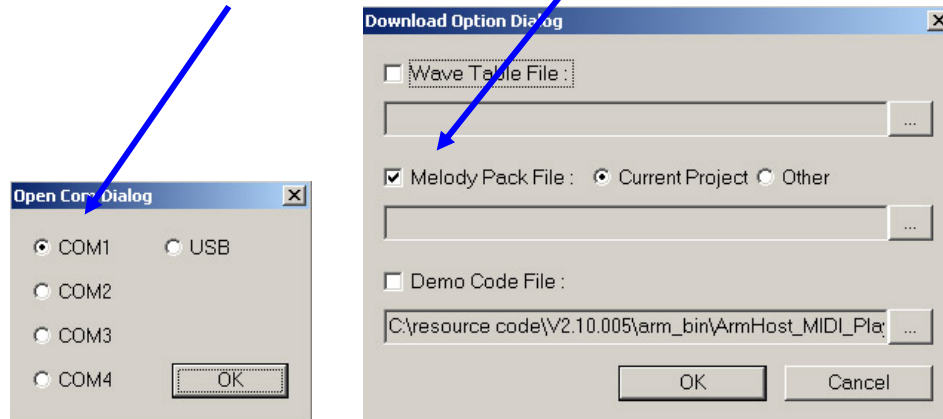
Advance step:

The ringtone provises several function to use like Sequencer ,MIDI Event ,Pattern ,Sequencer&Pattern.

Sequencer:

The "sequencer" button would add LED/MTR effect which go along with channel you select. Insert the file as forward step.

2.1   Select the "sequencer" button in LED/MTR field in event driven and then select the channel you want. Another note W5691 only can choose one channel, other chip can choose more than one.

Event-Driven

LED :   ○ None ⊙ Sequencer ○ MIDI Event   ○ Pattern   ○ Sequencer&Pattern

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15

Pattern No. [Pattern001 ▼]   Morphing Delta Time (ms) : [0 ⬍]

Color (R, G, B) : [120 ⬍] [255 ⬍] [200 ⬍]

MTR :   ○ None ⊙ Sequencer ○ MIDI Event   ○ Pattern   ○ Sequencer&Pattern

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15

Pattern No. [Pattern001 ▼]   Morphing Delta Time (ms) : [0 ⬍]

Level : [255 ⬍]

2.2   Next step set the LED/MOTOR twinkle or vibrator level whom be follow with LED/MOTOR in playing file.

2.3   Final step is the same with 1.3, 1.4, 1.5 step.

MIDI Event:

The "MIDI Event" button would add LED/MTR effect which go along with channel 10 whom have set. This function provide to develop MIDI tunes, after cope with at cakewalk. This task is setting by four notes in channel 10 which show under below in "Event Synchronization" and 2.1.2.
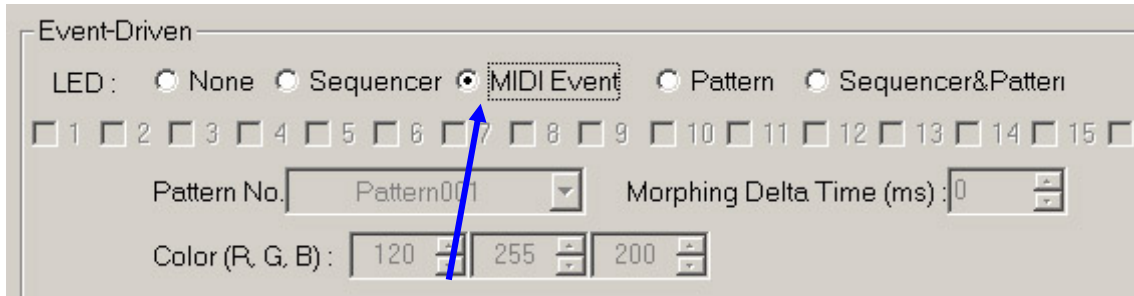

3.1   First step you must select the "MIDI Event" item.

3.2   Select the midi file which you want to process in "file name" field. Double click left mouse to link cakewalk, and then make effect by cakewalk.

3.3   Then you repeat the 1.3, 1.4, 1.5 step to download the file.

Pattern:

This effect will make the LED twinkle rhythm by set step by step.

4.1   In LED status:Select the "pattern definition" field, and add the pattern by click right mouse in "Pattern no" field in LED pattern field. Next add Phase by right click mouse in "Phase no" field.
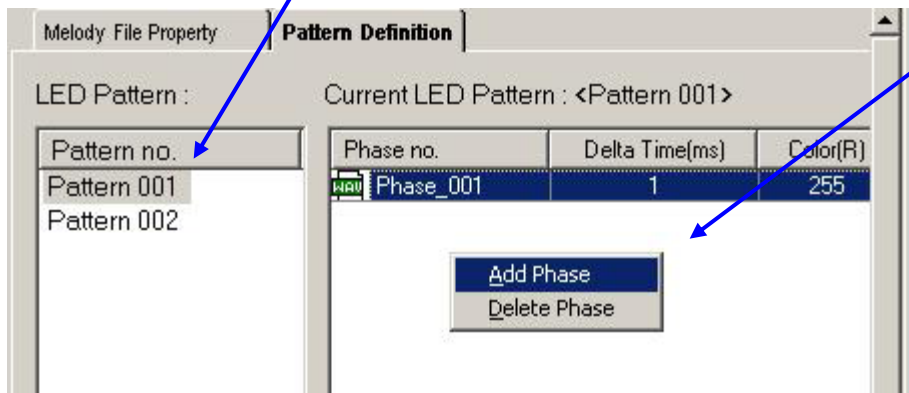

In MTR status: Select the "pattern definition" field, and add the pattern by click right mouse in "Pattern no" field in Motor Pattern field. Next add Phase by right click mouse in "Phase no" field.
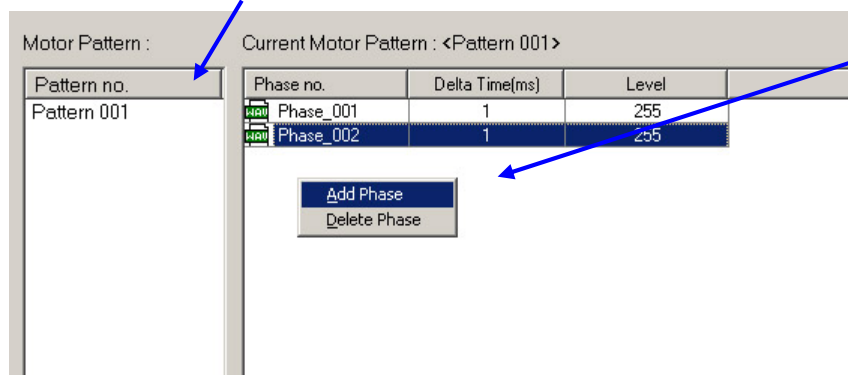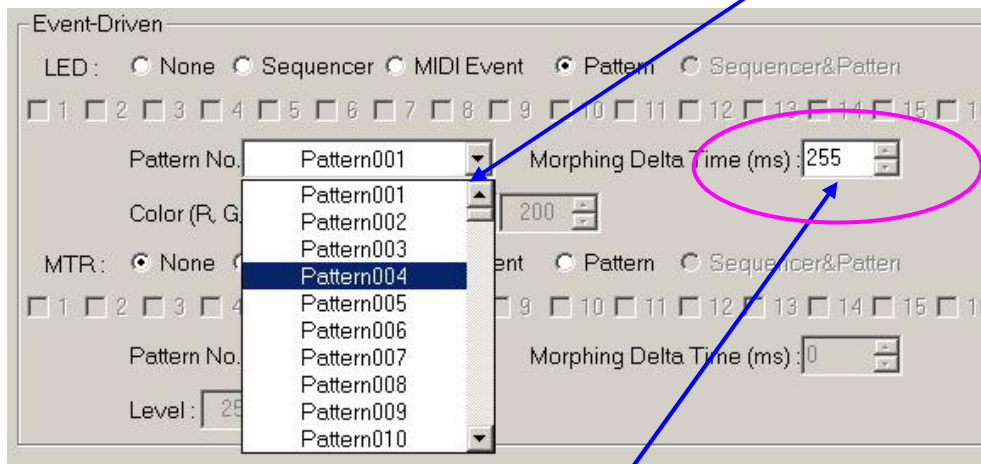
4.2   Setting the three value in "color" field which is Red, Green, Blue. The value range is 0 to 255. In Motor setting, the vibrator value is vary 0 to 255.
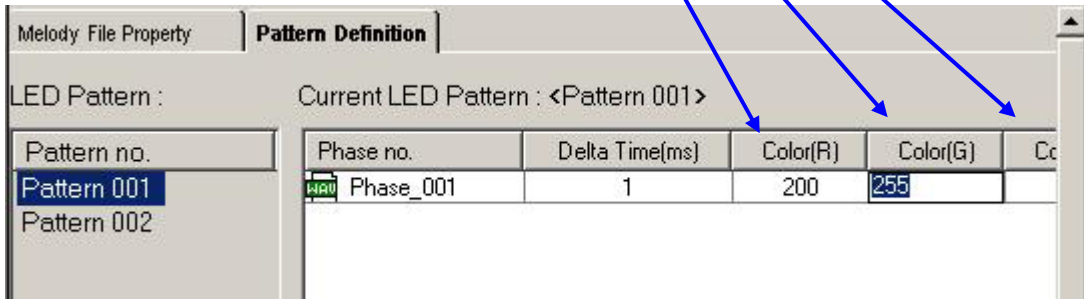
4.3   And then set delta time in "delta time" field. The value range is 1 to 65535.
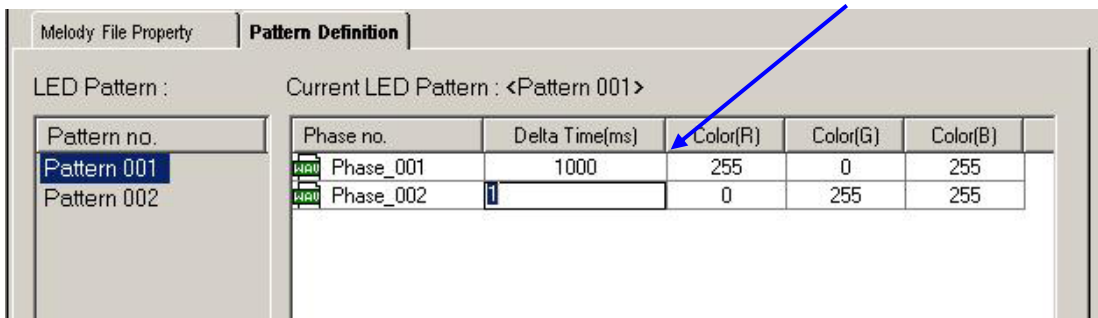
4.4   Choose pattern which you want to play in "Pattern No" button in Event-Driven field.

4.5   Setting the morphing delta time in "Event-Driven" field. It's range is vary 0 to 255.

4.6   One pattern could have many phase and many pattern, Both LED and Motor is the same. Repeat step by forward method like 1.3, 1.4, 1.5.
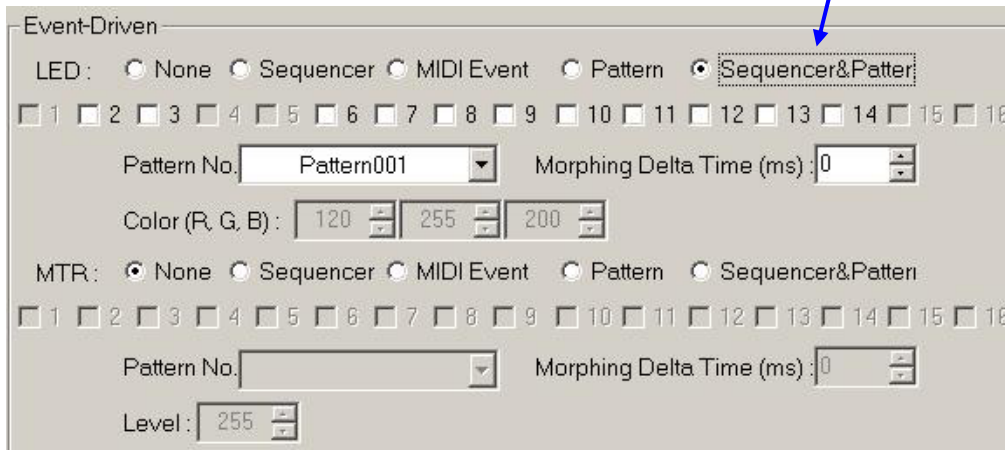
Sequencer&Pattern:

This mode is playing midi with LED/MTR variation which go alone with some channel and it's change rhythm fallow the pattern setting.

5.1 First user should select the Chip item. If user want to use the sequencer&patterm function, user could choose any chip besides W5691.

5.2 Press the "sequencer&patterm" button in "Event-Driven" field.

5.3 Another step is the same with patterm, user must set the Patterm phase and Patterm No…etc. Next step select channel which you want . final step is like with 1.3, 1.4, 1.5 step.

2.1.3 MIDI editing:

Add some note in midi file which provide LED/MTR variation or MIDI+Speech function.

LED/MTR variation:

The "midi event" button could add LED/MTR effect in midi file which must be made by cakewalk first. In LED, You could set the event in 90.91.92.93 note in channel 10 by cakewalk. If in Motor, the note is 94.95. The .detail explain is under below in 2.3.
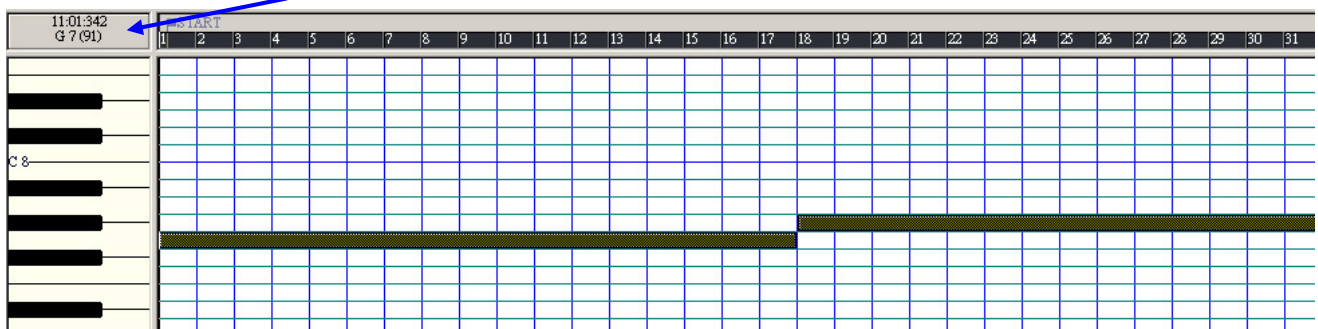
MIDI+Speech function:

If you would add the speech effect, First you must be insert some speech index file in some note. This note is vary in 96 to 127 notes in channel 10 by cakewalk. Second step user should open the ringtone player and insert the midi file which include the speech effect you want. Then select the speech index and click right mouse in "set file" item. Next select the Wav file you want.
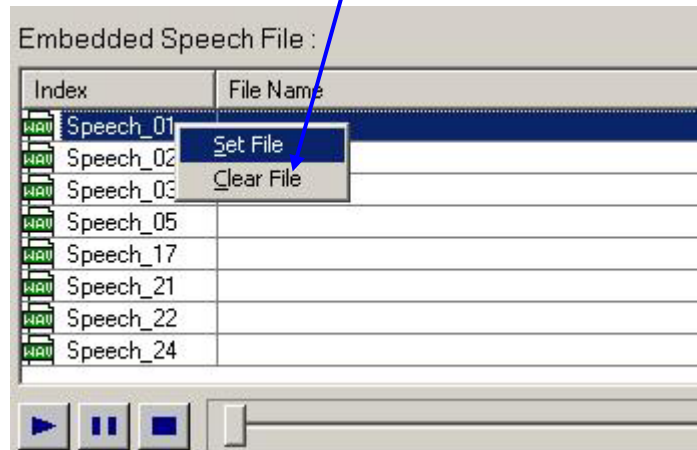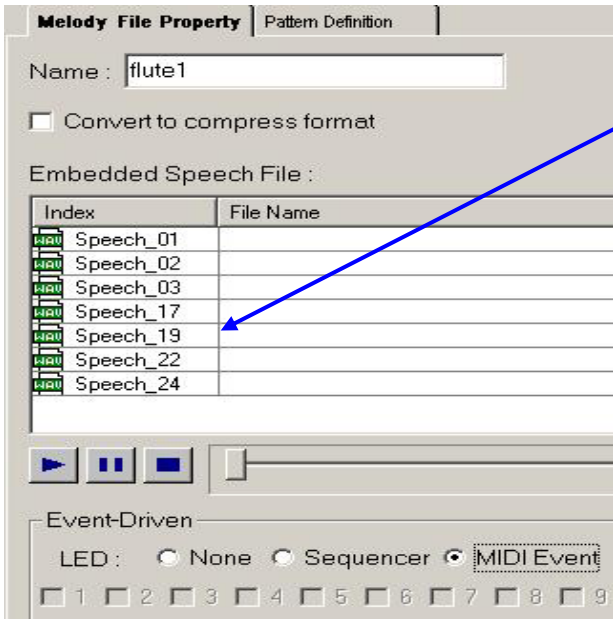
So we could follow the step above upper to make the LED/MTR event. Besides, We can know that the ringtone player provide easier way to gain simple effect which customer need, besides it also provide several method for more requirement no matter LED or MTR. LED have described. And then MTR setting could refer to detailed instruction is above upper section with LED.

2.2 Sound Editing

Cool Edit or SoundForge is recommended as the sound editing tool to prepare for the SFX clips, which can be used for playback alone or be inserted into MIDI for synchronized playback. The supported sound specification is:

- Sound: *.wav in PCM format

- Sample rate: < or = 44.1 KHz

- PCM: 16 bits, stereo.

Users need to process the sound clips offline @ PC according to the above-mentioned spec. in order to get similar quality as played by W56940. The wave file will be converted into Winbond's proprietary ADPCM format to save memory space automatically by ringtone player.

Cakewalk Express 8.0 is recommended for MIDI editing. The SMF (Standard MIDI File, format 0 or format 1) is normally used for the processing thereafter. First of all, users simply edit the MIDI tunes according to common practices. Then, they use channel 10 to insert unused notes to represent LED/MTR/Audio activities. The result is still saved in SMF format, with some additional MIDI events found in channel 10.

Figure 2 Audio clip insertion in channel 10

2.3 Event Synchronization

Since the GM1 defines notes only from 35 ~ 81 in channel 10 for percussive drums. The W56940 uses those undefined notes to represent LED/MTR and SFX clips. Please follow the summary table to have correct control over the LED/MTR and audio clips.

❑ LED

NOTE	DEC	HEX	FUNCTIONS	COLOR	DESCRIPTION
F#7	90	0x5A	LED FUNCTIONS ON/OFF		VELOCITY 0 is OFF, otherwise specify the channel no.
G 7	91	0x5B	LED	R	VELOCITY IS BRIGHTNESS of LED (0 ~ 127)
G#7	92	0x5C	LED	G	VELOCITY IS BRIGHTNESS of LED (0 ~ 127)
A 7	93	0x5D	LED	B	VELOCITY IS BRIGHTNESS of LED (0 ~ 127)

❑ MTR

NOTE	DEC	HEX	FUNCTIONS	DESCRIPTION
Bb7	94	0x5E	VIBRATION FUNCTIONS ON/OFF	VELOCITY 0 is OFF, otherwise ON
B 7	95	0x5F	VIBRATION	VELOCITY IS THE LEVEL OF VIBRATION (0~127)

❑ SFX (Maximum number in a midi file is 32)

NOTE	DEC	HEX	FUNCTIONS	NO	DESCRIPTION
C 8	96	0x60	SPEECH	1	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Db8	97	0x61	SPEECH	2	VELOCITY IS SPEECH VOLUME (0 ~ 127)
D 8	98	0x62	SPEECH	3	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Eb8	99	0x63	SPEECH	4	VELOCITY IS SPEECH VOLUME (0 ~ 127)

E 8	100	0x64	SPEECH	5	VELOCITY IS SPEECH VOLUME (0 ~ 127)
F 8	101	0x65	SPEECH	6	VELOCITY IS SPEECH VOLUME (0 ~ 127)
F#8	102	0x66	SPEECH	7	VELOCITY IS SPEECH VOLUME (0 ~ 127)
G 8	103	0x67	SPEECH	8	VELOCITY IS SPEECH VOLUME (0 ~ 127)
G#8	104	0x68	SPEECH	9	VELOCITY IS SPEECH VOLUME (0 ~ 127)
A 8	105	0x69	SPEECH	10	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Bb8	106	0x6A	SPEECH	11	VELOCITY IS SPEECH VOLUME (0 ~ 127)
B 8	107	0x6B	SPEECH	12	VELOCITY IS SPEECH VOLUME (0 ~ 127)
C 9	108	0x6C	SPEECH	13	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Db9	109	0x6D	SPEECH	14	VELOCITY IS SPEECH VOLUME (0 ~ 127)
D 9	110	0x6E	SPEECH	15	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Eb9	111	0x6F	SPEECH	16	VELOCITY IS SPEECH VOLUME (0 ~ 127)
E 9	112	0x70	SPEECH	17	VELOCITY IS SPEECH VOLUME (0 ~ 127)
F 9	113	0x71	SPEECH	18	VELOCITY IS SPEECH VOLUME (0 ~ 127)
F#9	114	0x72	SPEECH	19	VELOCITY IS SPEECH VOLUME (0 ~ 127)
G 9	115	0x73	SPEECH	20	VELOCITY IS SPEECH VOLUME (0 ~ 127)
G#9	116	0x74	SPEECH	21	VELOCITY IS SPEECH VOLUME (0 ~ 127)
A 9	117	0x75	SPEECH	22	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Bb9	118	0x76	SPEECH	23	VELOCITY IS SPEECH VOLUME (0 ~ 127)
B 9	119	0x77	SPEECH	24	VELOCITY IS SPEECH VOLUME (0 ~ 127)
C 10	120	0x78	SPEECH	25	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Db10	121	0x79	SPEECH	26	VELOCITY IS SPEECH VOLUME (0 ~ 127)
D 10	122	0x7A	SPEECH	27	VELOCITY IS SPEECH VOLUME (0 ~ 127)
Eb10	123	0X7B	SPEECH	28	VELOCITY IS SPEECH VOLUME (0 ~ 127)
E 10	124	0X7C	SPEECH	29	VELOCITY IS SPEECH VOLUME (0 ~ 127)
F 10	125	0X7D	SPEECH	30	VELOCITY IS SPEECH VOLUME (0 ~ 127)
F#10	126	0X7E	SPEECH	31	VELOCITY IS SPEECH VOLUME (0 ~ 127)
G 10	127	0x7F	SPEECH	32	VELOCITY IS SPEECH VOLUME (0 ~ 127)

Table 1 Representation of synchronized LED/MTR/Audio events

3. Revision History

Revision	Date	Modifications
A1	April 2004	• Initial release.
A2	April 2004	• Update MelodyPackTool and *.ini.
A3	February 2005	• Update convert format and function
A4	March 2005	• Add Disclaimer

Important Notice

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