Winbond Electronics Corp.

64-NOTE POLYPHONIC RINGTONE CHIP

DESCRIPTION

The W56964 is designed for the ringtone application of cell phones with 64-note MIDI plus ADPCM/PCM synthesis. This single chip consists of a CPU interface, FIFO buffering, a wavetable sound set, a MIDI sequencer, a wavetable synthesizer, DAC, and a power amplifier to drive an 8-ohm speaker directly.

With an on-chip, high-quality, GM-compliant sound set, the W56964 supports up to 128 instruments and 47 drums for playback of any MIDI songs with up to 64 notes simultaneously. MIDI songs in various formats can be downloaded and played back via the CPU interface between the baseband CPU and W56964.

The ADPCM/PCM synthesizer is designed to allow for customized SFX (sound effects), in addition to ordinary MIDI songs. The sound effects can be played along with the MIDI tunes for more fantastic sound experiences.
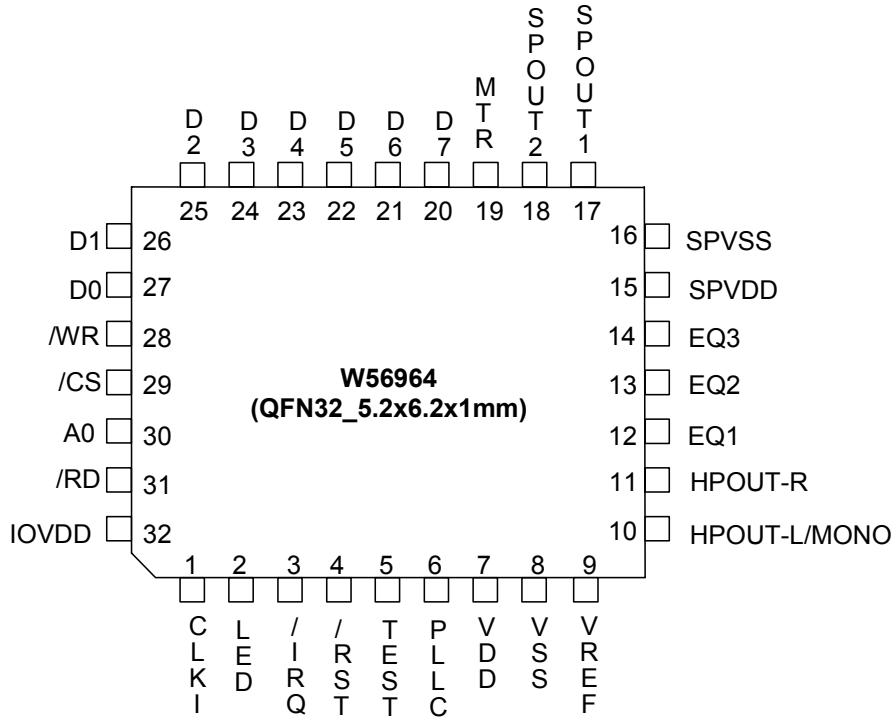
Synchronization among MIDI, SFX, LED, and MTR is done using embedded events in the MIDI file, which the W56964 would decode and process accordingly. The LED and MTR output pins with 256-level control output can be used for brightness and speed control, respectively.

In addition, API (Application Program Interface) source code is provided for the CPU to control the W56964 easily via the memory bus interface.

FEATURES

- General MIDI compliant sound set: 128 instruments + 47 drums
- 64-note, 100% wavetable MIDI synthesizer with ADPCM/PCM synthesis
- High quality sound
- Simultaneous playback of
    - Two MIDI song files,
    - Two ADPCM files, or
    - ADPCM + MIDI
- Karaoke feature support
- MIP support for SP-MIDI format
- Middleware API source code provided for function control and CPU interface
- Multiple Format Parser that supports
    - MIDI: SMF, SP-MIDI, i-Melody, RTTTL, etc.
    - Audio: stereo WAV @ 48 KHz
- Stereophonic DAC with 12-bit resolution per channel
- On-chip power amplifier to drive 8Ω speaker directly

- Equalizer embedded to meet speaker response
- Stereophonic headphone outputs available
- Line-In to receive external analog signals
- LED output with 256 levels of brightness
- MTR output with 256 levels of speed
- Harmonized synchronization between MIDI, SFX, LED, and MTR
- Embedded PLL operates on 1.7 ~ 36 MHz clock input
- Power supply
    - VDD: 2.7 ~ 3.3 volt
    - SPVDD: 2.7 ~ 4.5 volt
    - IOVDD: 1.65 ~ VDD
- Operating current: 20 mA (25°C at no load)
- Standby current: 1 uA @ 25°C
- Operating temperature: -20°C ~ 85°C
- Package
    - 32-pin plastic QFN (5.2mmx6.2mmx1mm)

Revision A2

PACKAGE CONFIGURATION

```
                    M   S   S
                    T   P   P
    D  D  D  D  D  D R   O   O
    2  3  4  5  6  7     U   U
                        T   T
                        2   1

    25 24 23 22 21 20 19 18 17

D1  26                        16  SPVSS

D0  27                        15  SPVDD

/WR 28                        14  EQ3
              W56964
/CS 29    (QFN32_5.2x6.2x1mm)  13  EQ2

A0  30                        12  EQ1

/RD 31                        11  HPOUT-R

IOVDD 32                      10  HPOUT-L/MONO

    1  2  3  4  5  6  7  8  9

    C  L  /  /  T  P  V  V  V
    L  E  I  R  E  L  D  S  R
    K  D  R  S  S  L  D  S  E
    I     Q  T  T  C        F
```

TYPICAL APPLICATION

Revision A2