8-CH SPEECH/MELODY/LCD CONTROLLER (*VIEWTALK* ™SERIES)

1. GENERAL DESCRIPTION

The W538A8xx, a member of the ***ViewTalk***™ family, is an 8-bit microprocessor (uP) with a speech and melody synthesizer and 64 seg x 16 com LCD driver unit, which includes an internal regulator, pump circuit and two pages of dedicated LCD RAM. The W538A8xx can synthesize 8 channels of melody or speech (up to 2 of these channels can be speech; the rest are melody) and drive an LCD display simultaneously. The W538A8xx accepts midi scores in MIDI format 0, and it has multiple power modes to minimize power dissipation, based on different speech, melody, and LCD needs.

The Serial-memory Interface Manager (**SIM**) is designated for cartridge applications. Using the SIM, the W538A8xx can access Winbond-proprietary, serial-memory chips W55Fxx and W551Cxxx.

It is also ideal for games, remote controllers, watches, clocks and other applications that incorporate both LCD display and speech or midi.

ITEM	W538A8XX	
CPU	8 bits µC	
ROM	W538A801	121 KB
	W538A802	249 KB
	W538A804	505 KB
	W538A806	761 KB
	W538A808	1017 KB
Working RAM	1 KBytes	
LCD RAM	2* **128**Bytes	
Dedicated I/O (1)	W538A802/1	20*
	W538A808/6/4	24

* (1). P0, BP1, BP2.4 ~ BP2.7

Voice duration calculation (Unit: Kbyte)

ITEM	ROM	TIMBRE AND F/W LIBRARY	LCD PICTURE (1)	USER PROGRAM	MIDI SONG (2)	VOICE DURATION (SEC) (3)
W538A802	249	64	62.5	40	20	16 sec
W538A804	505	64	62.5	40	20	84 sec
W538A806	761	64	62.5	40	20	153 sec
W538A808	1017	64	62.5	40	20	221 sec

(1). LCD picture = 62.5KB for 500 picture (based on 1 K dots [bits])

(2). 5 midi songs and 4 KB / song.

(3). Voice duration using 5-bit MDPCM, 6-KHz sample rate.

2. FEATURES

- [1]High performance 8-bit uP able to synthesize speech, melody and to draw pictures:
  - ❑ 4MHz @ 2.4V
  - ❑ 5MHz @ 2.7V
  - ❑ 6MHz @ 2.9V
  - ❑ 8MHz @ 3.2V
  - ❑ 10MHz @ 3.6V
- Two System clocks, main-clock and sub-clock, both configurable
  - ❑ The Main-clock can be X'tal or ring type (based on **pin option**)
  - ❑ The Sub-clock (32768Hz) can be X'tal or RC type (based on **mask option**)
- Sophisticated power management methodology: SLOW, HOLD and STOP modes
- Single ROM architecture to store program, user data/table, speech, timbre, score and picture
- 1 KB of Working RAM (**W-RAM**) for complicated application
- Dual-page, 2 x 128 bytes LCD RAM (**L-RAM**) for smooth animation
- LCD driver unit
  - ❑ 64 SEGs X 16 COMs
  - ❑ 1/4 or 1/5 bias and 1/8 or 1/16 duty cycle
  - ❑ Built-in LCD regulator for stable display quality while speech or melody is playing
  - ❑ Built-in drawing operators, such as PUT, INV, AND, OR, XOR, etc., to simplify programming
- Maximum 24 I/O pins (BP0 ~ 2) and 8 of them can sinking 8mA
  - ❑ 8 I/O pins can sink 8mA
  - ❑ Some LCD SEGMENT pins can be used as additional input or output pins
- 8 channels of simultaneous speech and melody synthesis
  - ❑ Unlimited kinds of instruments with pre-stored waveforms
  - ❑ Speech synthesis at programmable playback rates
  - ❑ 1-channel speech + 7-channel WinMelody
  - ❑ 1-channel voice-melody + 7-channel WinMelody
  - ❑ 1-channel speech + 1-channel percussion + 6-channel WinMelody
- Speaker driver
  - ❑ DAC current type: maximum output 3mA / 5mA (register option), 10 bit resolution
  - ❑ PWM direct drive: 10-bit resolution, maximum 128 KHz sampling rate @ 8MHz system clock

[1] The minimum operating voltage deviation is 0.2V.

- Automatic IR-carrier generation for interactive applications
- Low battery detector (**LVD**) for battery-life management application
- Low Voltage Reset (**LVR**)
- Serial-Memory Interface Manager (**SIM**) to interface with cartridge applications
- Built-in Watch-Dog Timer (**WDT**) that is activated by mask option only

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