



**Weltrend Semiconductor, Inc.**

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**WT6148/WT6160**  
**Digital Monitor Controller**  
(ROM Type)

**Preliminary Data Sheet**

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### GENERAL DESCRIPTION

The WT6148/ WT6160 is a microcontroller for digital controlled monitor. It contains an 8-bit CPU, 48K /60K bytes ROM, 1056 bytes RAM, 14 PWMs, parallel I/Os, SYNC signal processor, timer, DDC1/2B interface, master/slave I<sup>2</sup>C interface, 6-bit A/D converter and watch-dog timer.

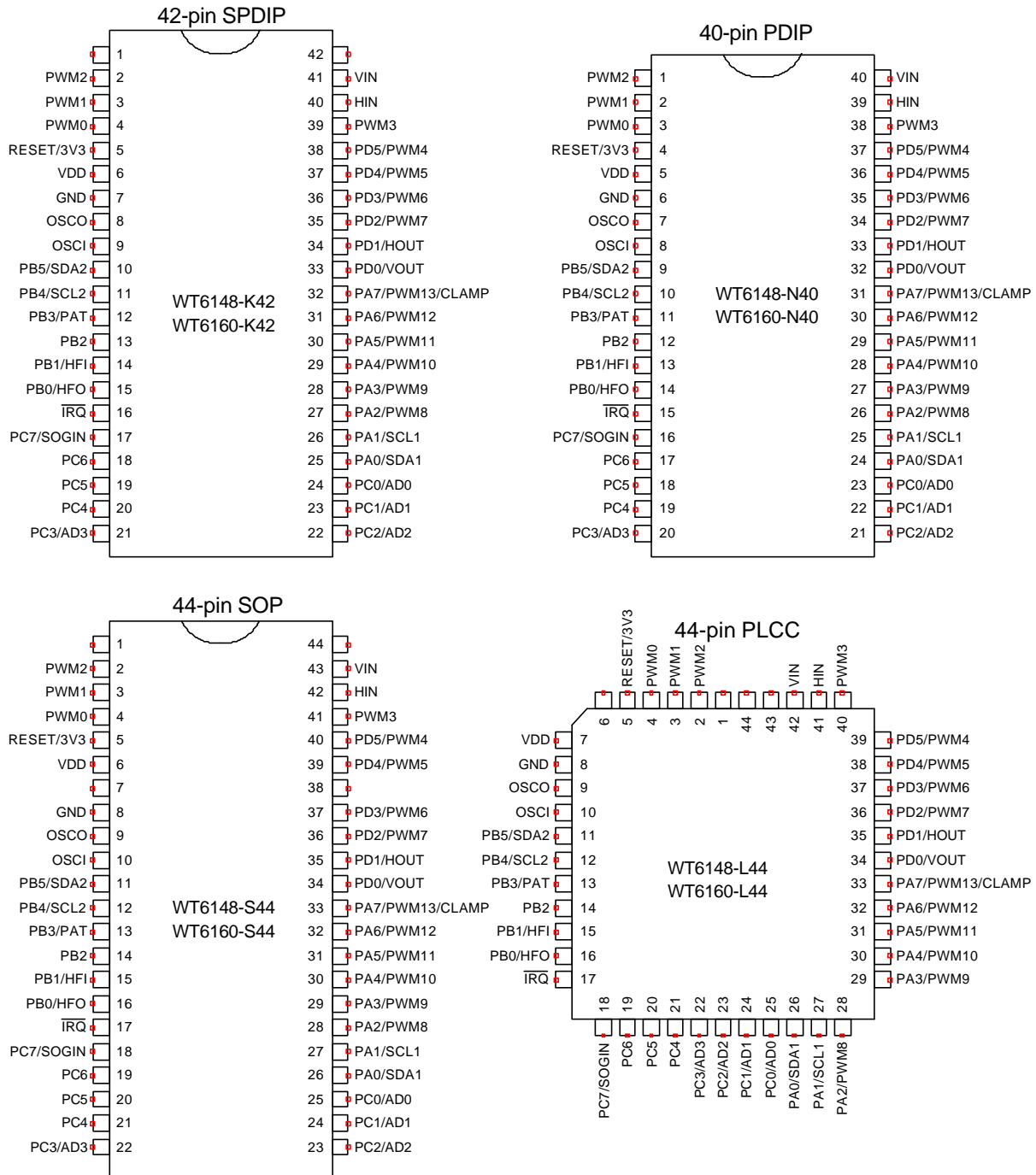
### FEATURES

- 8-bit 6502 compatible CPU with 6MHz operating frequency
- WT6148 : 48K bytes ROM,  
WT6160 : 60K bytes ROM,  
,1024 bytes SRAM+32 bytes bit addressable SRAM
- 12MHz crystal oscillator
- 14 channels 8-bit PWM outputs
- Sync signal processor with H+V separation, H/V frequency counter, H/V polarity detection/control and clamp pulse output
- Six free-running sync signal outputs (Horizontal frequency up to 106KHz 85Hz@1600x1200)
- Self-test pattern
- DDC1/2B module for EDID1.3, EDID2.0 and Enhance EDID
- Fast mode master/slave I<sup>2</sup>C interface (up to 400KHz)
- Watch-dog timer
- Maximum 28 programmable I/O pins
- One 8-bit programmable timer
- 6-bit A/D converter with 4 selectable inputs
- One external interrupt request input
- Low V<sub>DD</sub> reset

### ORDERING INFORMATION

Package Type	Part Number
42-pin PDIP	WT6148/ WT6160-N42
42-pin Shrink PDIP	WT6148/ WT6160-K42
40-pin PDIP	WT6148/ WT6160-N40
44-pin SOP	WT6148/ WT6160-S44
44-pin PLCC	WT6148/ WT6160-L44

### PIN ASSIGNMENT AND PACKAGE TYPE





**PIN DESCRIPTION**

Pin No.				Pin Name	I/O	Description
L44	S44	42	40			
1	1	1	-	NC		No Connection.
2	2	2	1	PWM2	O	PWM2 output (10V open-drain).
3	3	3	2	PWM1	O	PWM1 output (5V open-drain).
4	4	4	3	PWM0	O	PWM0 output (5V open-drain).
5	5	5	4	/RESET	I	Reset input
6	-	-	-	NC		No Connection.
7	6	6	5	VDD		+5V power supply.
-	7	-	-	NC		No Connection.
8	8	7	6	GND		Ground.
9	9	8	7	OSCO	I/O	12MHz oscillator output.
10	10	9	8	OSCI	I	12MHz oscillator input.
11	11	10	9	PB5/ SDA2	I/O	Port B5 or I <sup>2</sup> C interface data line.
12	12	11	10	PB4/ SCL2	I/O	Port B4 or I <sup>2</sup> C interface clock line.
13	13	12	11	PB3/PAT	I/O	Port B3 or test pattern output
14	14	13	12	PB2	I/O	Port B2.
15	15	14	13	PB1/HFI	I/O	Port B1 or half frequency divider input.
16	16	15	14	PB0/HFO	I/O	Port B0 or half frequency divider output.
17	17	16	15	/IRQ	I	Interrupt request input. A low level on this can generate interrupt.
18	18	17	6	PC7/SOGIN	I/O	Port C7 or Sync on Green input.
19	19	18	17	PC6	I/O	Port C6.
20	20	19	18	PC5	I/O	Port C5.
21	21	20	19	PC4	I/O	Port C4.
22	22	21	20	PC3/AD3	I/O	Port C3 or ADC input 3.
23	23	22	21	PC2/AD2	I/O	Port C2 or ADC input 2.
24	24	23	22	PC1/AD1	I/O	Port C1 or ADC input 1.
25	25	24	23	PC0/AD0	I/O	Port C0 or ADC input 0.
26	26	25	24	PA0/SDA1	I/O	Port A0 or DDC interface SDA pin.
27	27	26	25	PA1/SCL1	I/O	Port A1 or DDC interface SCL pin.
28	28	27	26	PA2/PWM8	I/O	Port A2 or PWM8 output.
29	29	28	27	PA3/PWM9	I/O	Port A3 or PWM9 output.
30	30	29	28	PA4/PWM10	I/O	Port A4 or PWM10 output.
31	31	30	29	PA5/PWM11	I/O	Port A5 or PWM11 output.
32	32	31	30	PA6/PWM12	I/O	Port A6 or PWM12 output.
33	33	32	31	PA7/PWM13/ CLAMP	I/O	Port A7 or PWM13 output or clamp pulse output.
34	34	33	32	PD0/VOUT	I/O	Port D0 or Vsync output.
35	35	34	33	PD1/HOUT	I/O	Port D1 or Hsync output.
36	36	35	34	PD2/PWM7	I/O	Port D2 or PWM7 output.
37	37	36	35	PD3/PWM6	I/O	Port D3 or PWM6 output.
-	38	-	-	NC		No Connection.
38	39	37	36	PD4/PWM5	I/O	Port D4 or PWM5 output.
39	40	38	37	PD5/PWM4	I/O	Port D5 or PWM4 output.
40	41	39	38	PWM3	I/O	PWM3 output (10V open-drain).
41	42	40	39	HIN	I	Hsync Input.
42	43	41	40	VIN	I	Vsync input.



43	-	-	-	NC	No Connection.
44	44	42	-	NC	No Connection.

## FUNCTIONAL DESCRIPTION

### CPU

8-bit 6502 compatible CPU operates at 6MHz. Address bus is 16-bit and data bus is 8-bit. The non-maskable interrupt (/NMI) of 6502 is modified to be maskable and is defined as INT0 with higher priority. The interrupt request (/IRQ) of 6502 is defined as INT1 with lower priority.

Please refer the 6502 reference menu for more detail.

### RAM

The 1024 bytes SRAM include :  
128 bytes SRAM are from \$0080H to \$00FFH  
256 bytes SRAM are from \$0100H to \$01FFH  
256 bytes SRAM are from \$0200H to \$02FFH  
256 bytes SRAM are from \$0300H to \$03FFH  
128 bytes SRAM are from \$0400H to \$047FH

The 32 bytes SRAM bit addressible are from \$0500H to \$05FFH

### ROM

For WT6148, ROM address is located from \$4000h to \$FFFFh.  
For WT6160, ROM address is located from \$1000h to \$FFFFh.

The following addresses are reserved for special purpose :  
\$FFFAh (low byte) and \$FFFBh (high byte) : INT0 interrupt vector.  
\$FFCh (low byte) and \$FFDh (high byte) : program reset interrupt vector.  
\$FFFEh (low byte) and \$FFFFh (high byte) : INT1 interrupt vector.