



A. HE84760 Introduction

HE84760 is a member of 8-bit Micro-controller series developed by King Billion Electronics Ltd, User can configure 32COM: 【3072 dot LCD driver + 16 Bit I/O Port】... 【2304 dot LCD driver + 40 Bit I/O Port】 LCD driver , or 48COM: 【3840 dot LCD driver + 16 Bit I/O Port】... 【2688 dot LCD driver + 40 Bit I/O Port】, or 64COM: 【4096 dot LCD driver + 16 Bit I/O Port】... 【2560 dot LCD driver + 40 Bit I/O Port】. Built-in power regulator circuit , make the LCD display more stable . The built-in OP comparator can be used with (light, voice, temperature, humidity) sensor or battery low detection. A 7-bit current type D/A converter and PWM device provide the complete speech output mechanism. The 512KB ROM and 4KB RAM can be used as the storage of large speech data, graphic, text etc. It can be used for Dictionary, Data Bank, Medium Level Educational Toy, Low duration Voice Recording System etc..

The instruction set are quite easy to learn and simple to use. There are only about thirty instructions with four-type addressing modes are provided. Most of instructions take only 3 oscillator clocks (machine cycles), which is the high efficiency and low power MCU.

B. HE84760 Features

- Operation Voltage: 2.4V – 3.6V
- System Clock: 4MHz ~ 8MHz
- Internal ROM: 512K Bytes(256K Program ROM+256K Data ROM)
- Internal RAM: 4K Bytes; Dedicated RAM VDD
- Dual Clock System: Normal(Fast) clock: 32.768K ~ 8MHz(No Internal Clock)
Slow clock: 32.768KHz
- Operation Mode: DUAL、FAST、SLOW、IDLE、and SLEEP mode。
- New RC type oscillator , accuracy at $\pm 5\%$, maximum frequency up to around 10 MHz。Please refer to the detail frequency table on section F。
- Internal Power on Reset circuit。
- With WDT (WATCH DOG TIMER) to prevent deadlock condition。。
- 16~40 bit Bi-directional I/O port. Mask Option can select PUSH-PULL or OPEN DRAIN output mode for each I/O pin.
- The new built-in hardware auto scan keyboard(4*20)(shared with LCD SEG pin) , not only reduce the hardware cost, but also reduce the firmware effort。
- Built-in OP comparator。
- User can select any one of three LCD configurations --- 32COM*96SEG LCD , 48COM*80SEG LCD , or 64COM*64SEG LCD。The LCD scan signal are Type B(please refer to HE80000 user's manual, section 4.3.9 LCD control register), It is built-in type-IV LCD driver. The highest LCD voltage LVP must be lower than 8.5Volt。
- Provide LFR and LDL output signal , which can be connected to KDS80 , as a LCD Segment extension。
- One 7-bit current type D/A。The new DAC output structure , which do not need to use capacitor to adjust the input current of 8050C。Provide Mask Option to select different output current
3mA=>4 Ω , 1.5mA=>8 Ω , 0.75mA=>16 Ω , 0.375mA=>16 Ω , to make sure there will be no signal



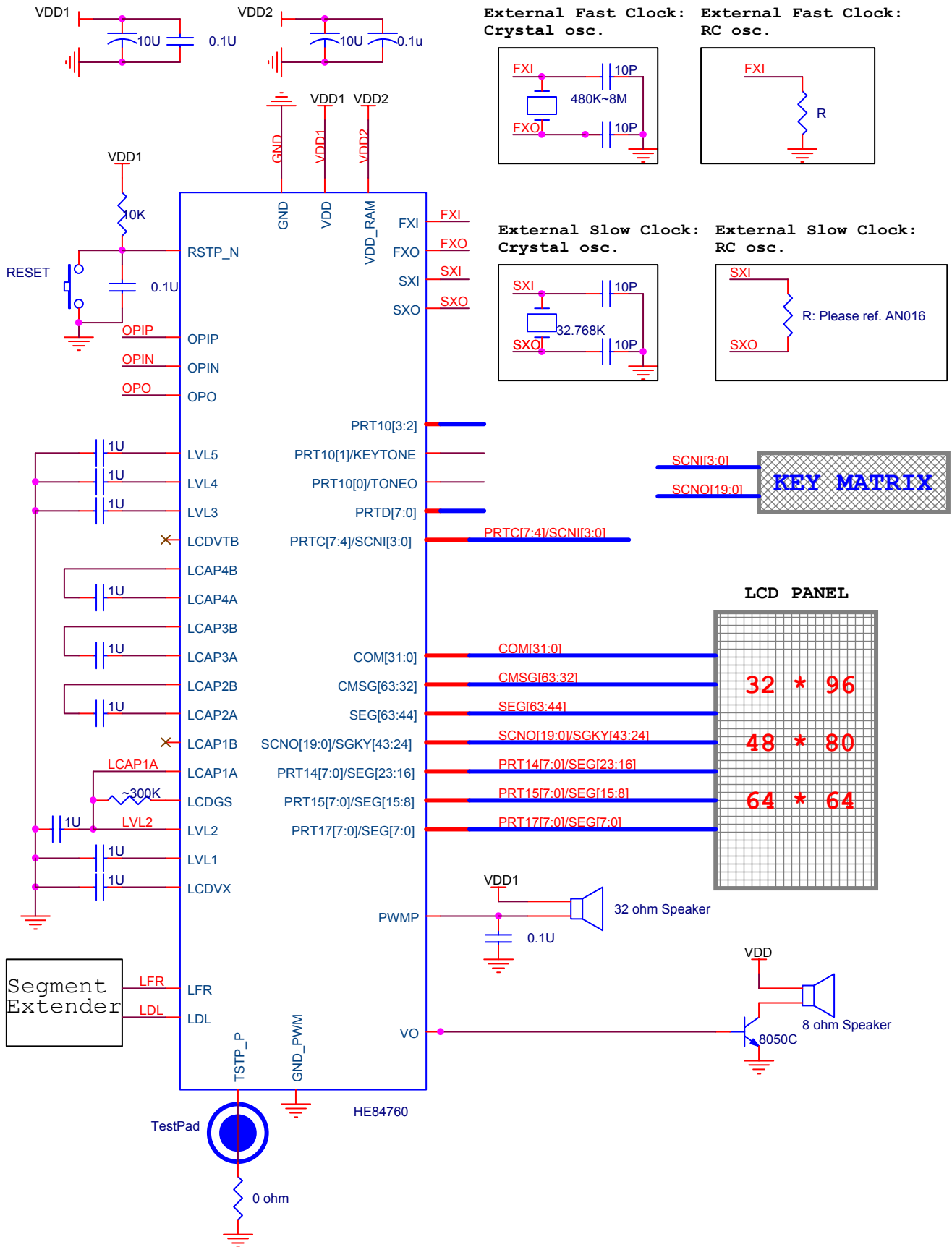
saturation °

- PWM device ° (No Rate Selection, connect with VDD & PWMP) ° Dedicated GND pin for PWM block °
- Two external interrupts and three internal timer interrupts °
- Two 16-bit timers and one Time-Base timer °
- Instruction set : 32 instructions, 4 addressing modes. 12-bit DATA POINTER for RAM and 19-bit TABLE POINTER for ROM °

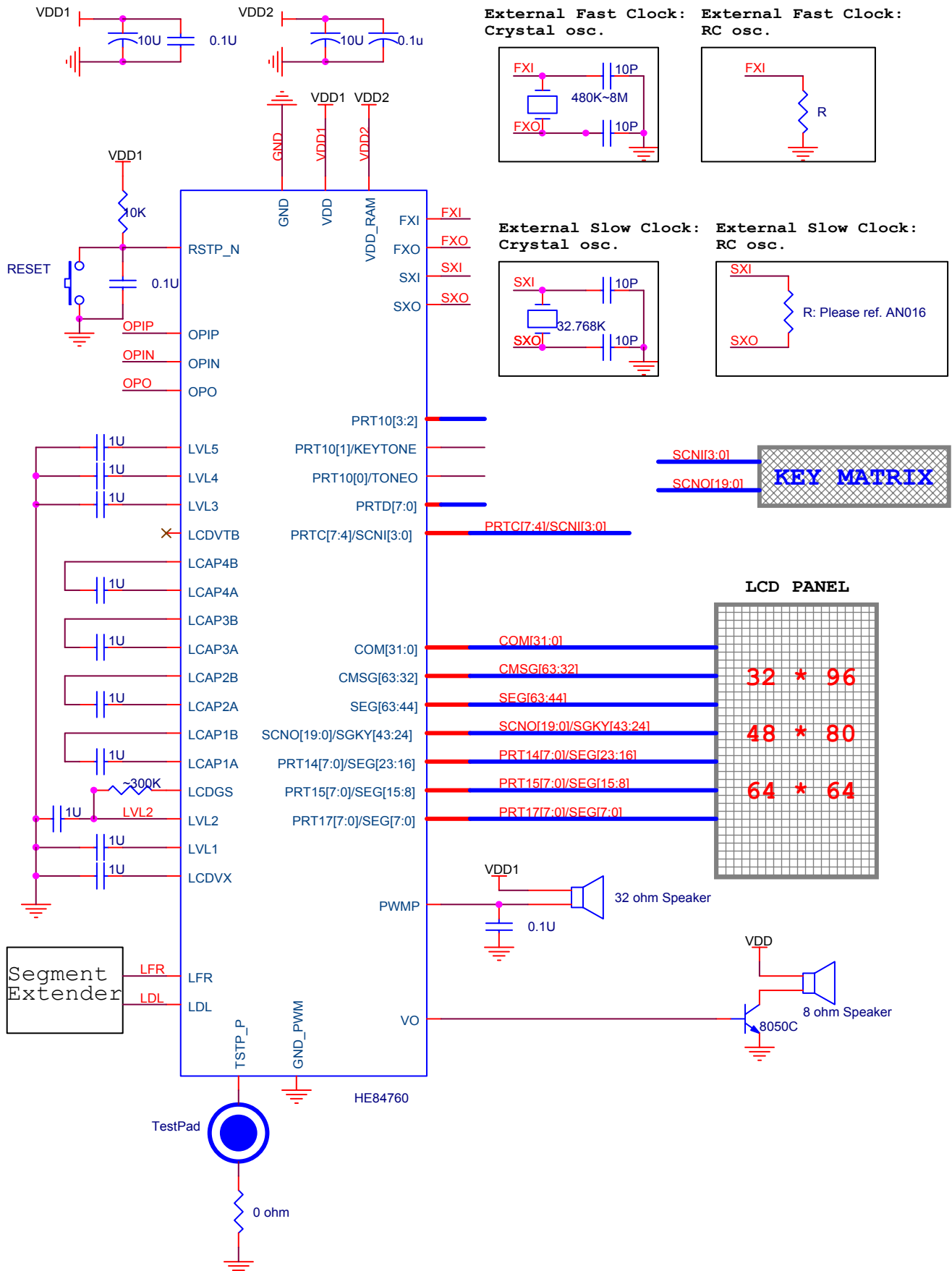


C. Application Circuit

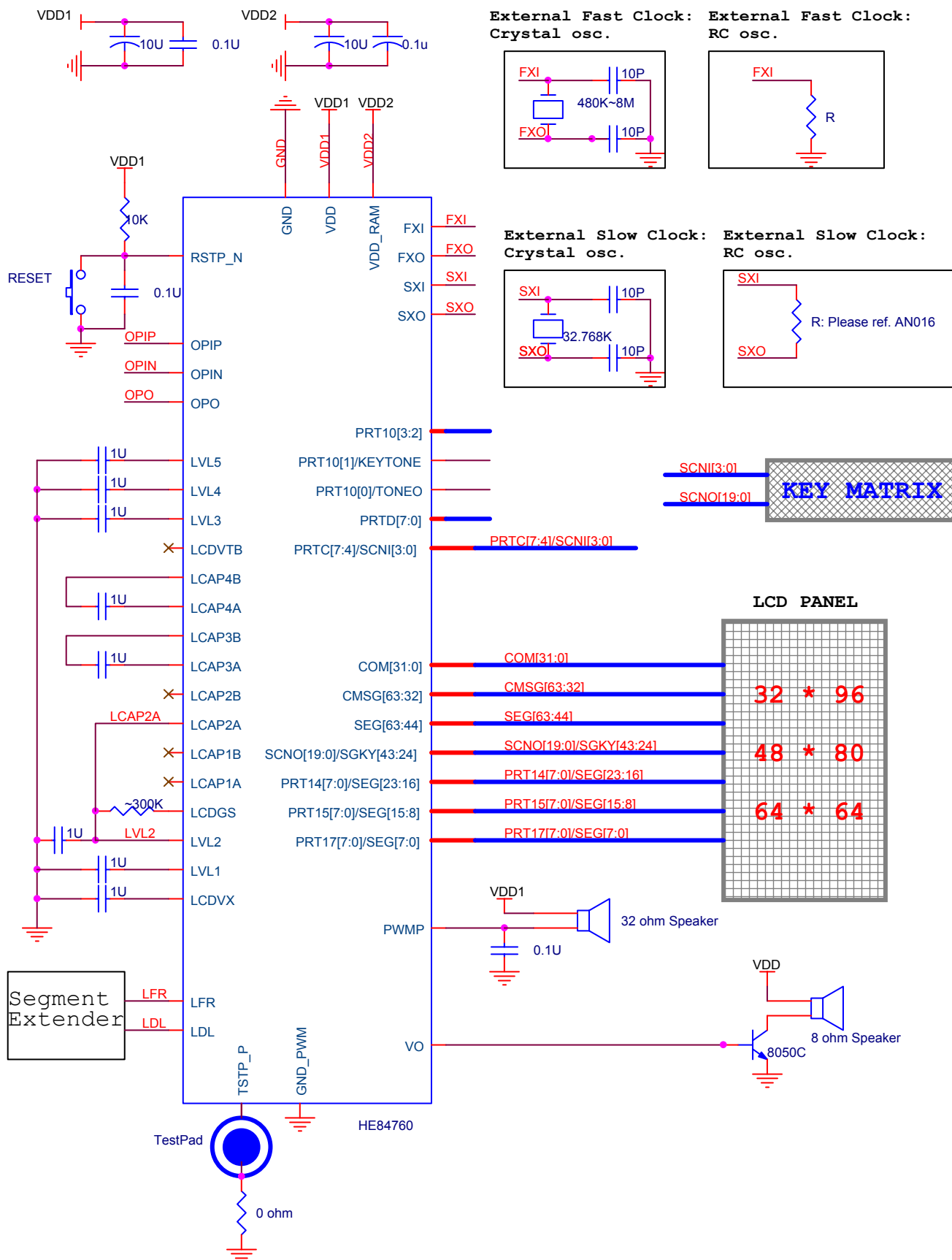
This circuit is **only for bias 1/6.5, 1/7.0, 1/7.5 and 1/8.0**. KB suggests user use this circuit at most conditions. The other two circuits are (1/5.0, 1/5.5, 1/6.0) and (1/8.5, 1/9.0, 1/9.5, 1/10.0). To make sure your LCD glass has best display effect, please use ICE5.x (Type-III LCD Driver) to simulate the equivalent effect of Type-IV LCD driver. The same bias and LV5 will get almost the same result of display effect. Please adjust your bias and LV5 on ICE 5.x and make sure the display of LCD is OK. Then the display effect of 84760 (Type-IV LCD driver) will be the same at the same bias and LV5.



Application Circuit of Bias (1/8.5, 1/9.0, 1/9.5, 1/10.0)



Application Circuit of Bias (1/5.0, 1/5.5, 1/6.0)





Formula: $LV5 = LV2 / 2 * Bias;$

***1: Real VDD < Typical Min. VDD (LCD will be turned off.)**

	Bias	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
<u>Typical Min. VDD</u> ^{*1}	LV2	LV5 = LCD Glass Operating Voltage										
2.70	2.40	6.00	6.60	7.20	7.80	8.40						
2.60	2.30	5.75	6.33	6.90	7.48	8.05						
2.50	2.20	5.50	6.05	6.60	7.15	7.70	8.25					
2.40	2.10	5.25	5.78	6.30	6.83	7.35	7.88	8.40				
2.30	2.00	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50			
2.20	1.90	4.75	5.23	5.70	6.18	6.65	7.13	7.60	8.08	8.55		
2.10	1.80	4.50	4.95	5.40	5.85	6.30	6.75	7.20	7.65	8.10	8.55	
2.00	1.70	4.25	4.68	5.10	5.53	5.95	6.38	6.80	7.23	7.65	8.08	8.5