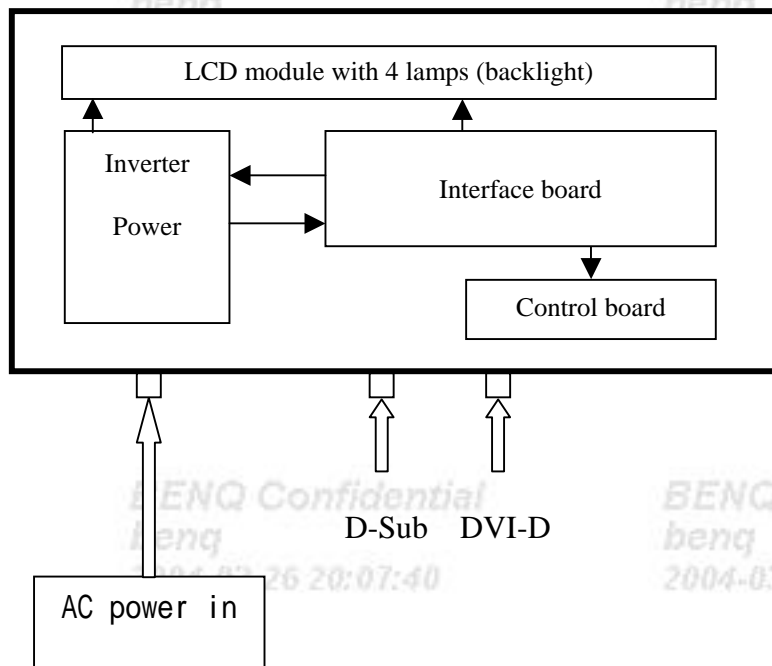


I. Introduction:

The Q7T3-FP731-D is a 17" SXGA (1280x1024) , 262 K colors(R, G, B 6-bit data) TFT LCD monitor with multi-media function. It's an Dual (analog and digital) interface LCD monitor with a 15 pins D-sub signal cable and a 24pins DVI-D cable . it's compliant with VESA specification to offer a smart power management and power saving function. It also offers OSD menu for users to control the adjustable items and get some information about this monitor, and the best function is to offer users an easy method to set all adjustable items well just by pressing one key, we called it "Auto key" which can auto adjusting all controlled items. Q7T3-FP731-D also offer DDC2 function to meet VESA standard.

II. Block diagram

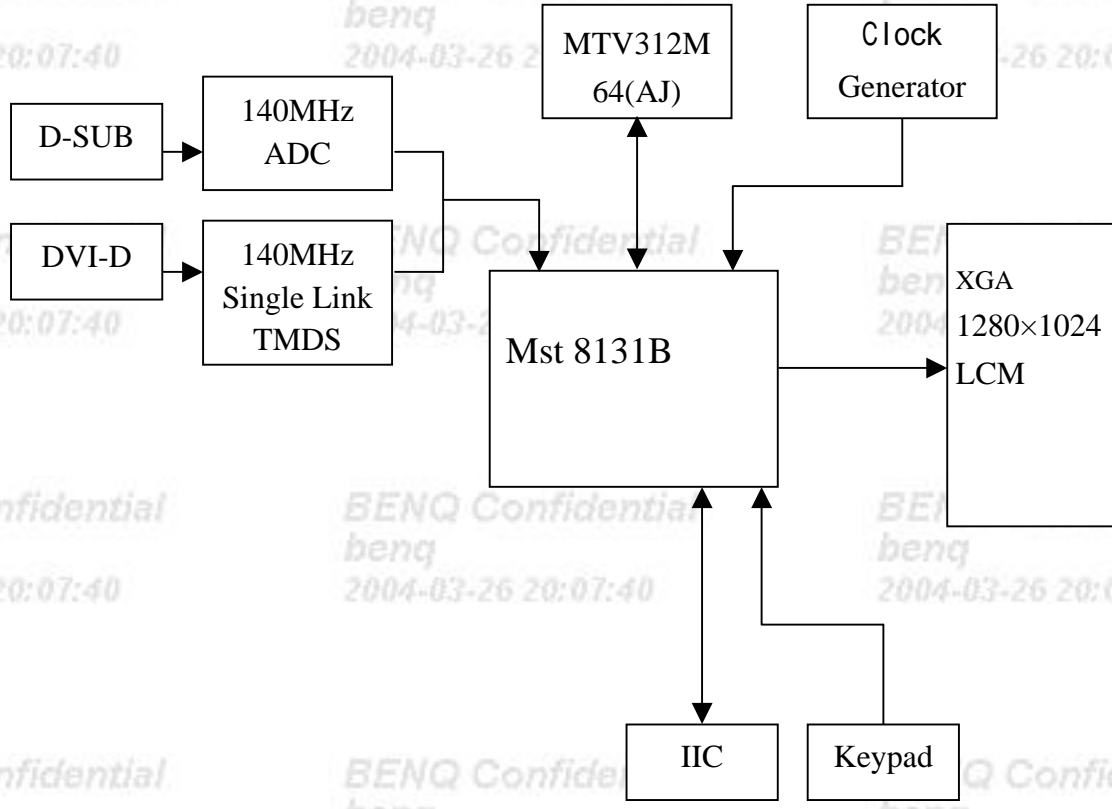
The Q7T3-FP731-D consists of a head and a stand (base). The head consists of a LCD module with 4 lamps, a power board (include AC/DC, DC/DC and inverter board), a control board and interface BD. The block diagram is shown as below.



III. Circuit operation theory:

A.) HEAD:

A-1.) Interface board diagram:



(a) Circuit operation theory:

A basic operation theory for the interface board is to convert input signal into digital RGB . Analog RGB signal is converted to digital signal through ADC. DVI-D signal is converted through TMDS receiver. The microprocessor Mst8131B receives video data and optimizes the image automatically. It also supports input source selection, 16 color from a 64k palette bitmap OSD, and keypad controlling. The output data are sent to LCD module.

(b) IC introduction:

- 1.) DDC (Display Data Channel) function: We use DDC IC to support DDC/2B function. DDC data is stored in 24C04(EEPROM). Those data related to LCD monitor specification. PC can read them by “SDA” and “SCL” serial communication for I²C communication for DDC2B.
- 2.) Mst8131B IC: There are A/D, Scaling, OSD, MCU functions in the Mst8131B IC. Scaling IC is revolutionary scaling engine, capable of expanding any source resolution to a highly uniform and sharp image, combined with the critically proven integrated 8 bit triple-ADC and patented Rapid-lock digital clock recovery system. It also support detect mode and DPMS control. MCU control unit, it controls all the functions of this interface board, just like the OSD display setting, the adjustable items, adjusted data storage, the external IIC communication, support DDC2B.
- 3.) EEPROM: We use 24C04 to store all the adjustable data and user settings.
And use 24C02 to store DVI EDID data.
- 4.) MTV312M64: To stored the source code which is accessed by MCU to run program.

A-2.) Power board diagram:

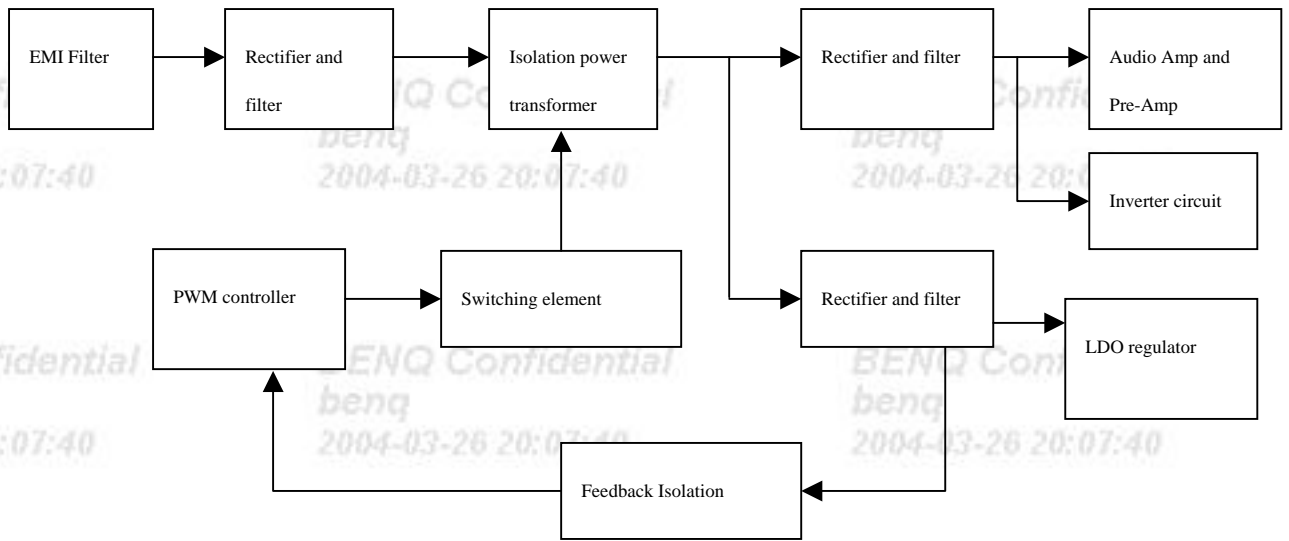


Fig.1

#1 EMI Filter

This circuit (fig. 2) is designed to inhibit electrical and magnetic interference for meeting FCC, VDE, VCCI standard requirements.

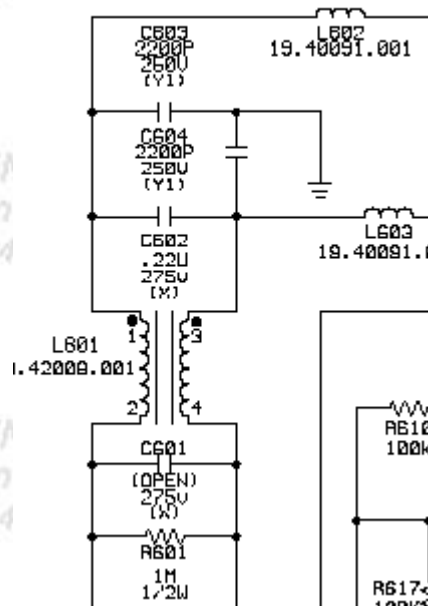
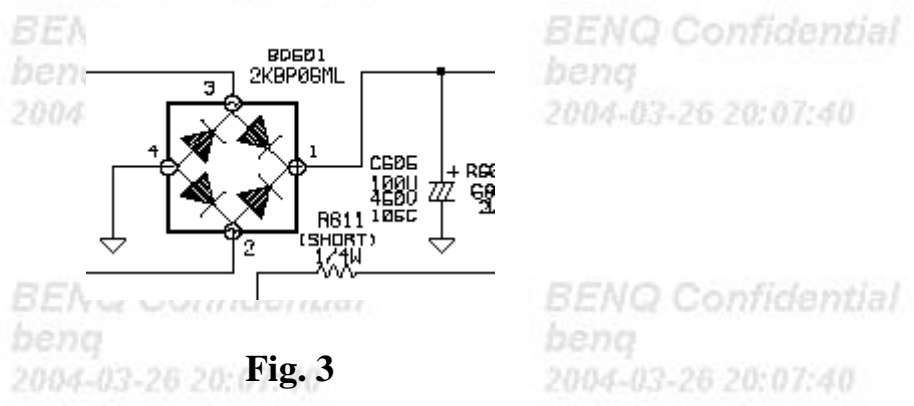


Fig. 2

#2 Rectifier and filter

AC Voltage (90-264V) is rectified and filtered by BD601, C605 (See Fig 3) and the DC Output voltage is $1.4 \times (\text{AC input})$. (See Fig.3)



#5 PWM Controller

The PWM controller NCP1200A implements a standard current mode architecture. With an internal structure operating at a fixed 40KHz. Where the switch time is dictated by the peak current set-point. When the current set-point falls below a given value. The output power demand diminishes, the IC automatically enters the so-called skip cycle mode and provides excellent efficiency.

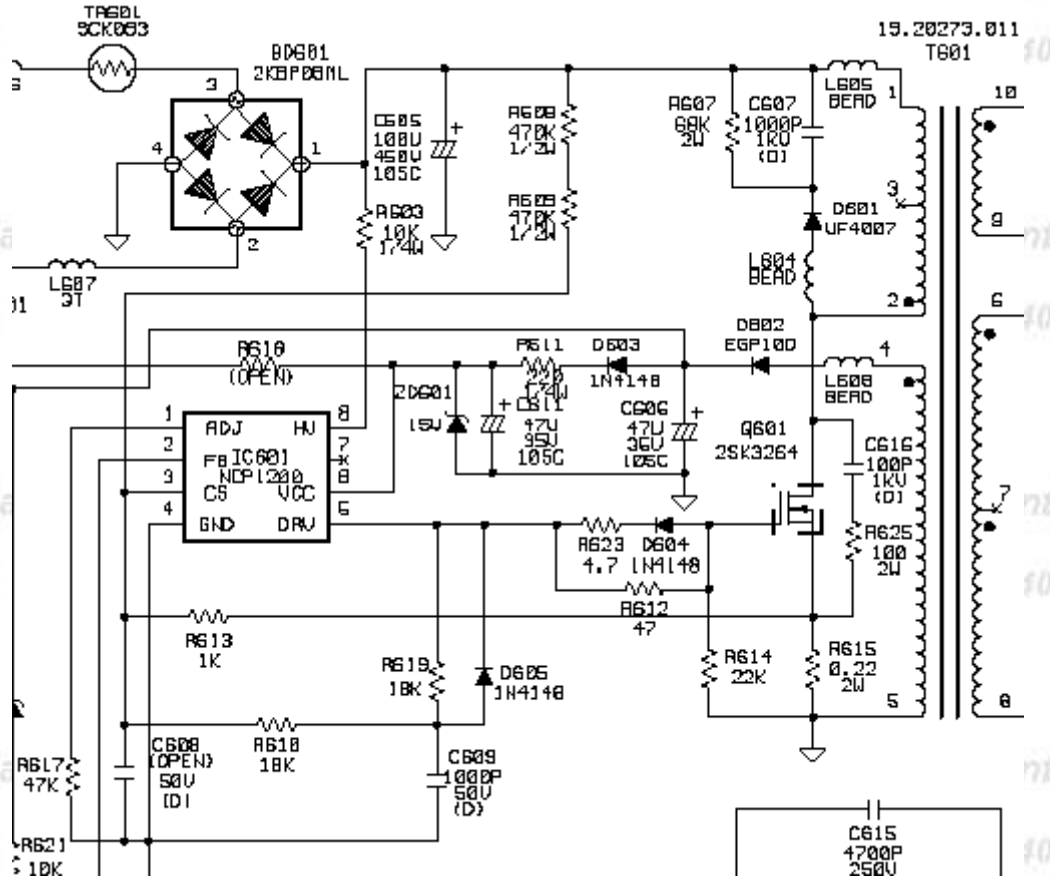


Fig. 6

#6 Feedback circuit

PC123 is a photo-coupler and TL431 is a shunt regulation. They are used to detect the output voltage change and be the primary and secondary isolation. When output voltage changes, the feedback voltage will be compared and duty cycle will be decided to control the correct output voltage. (See Fig.7)

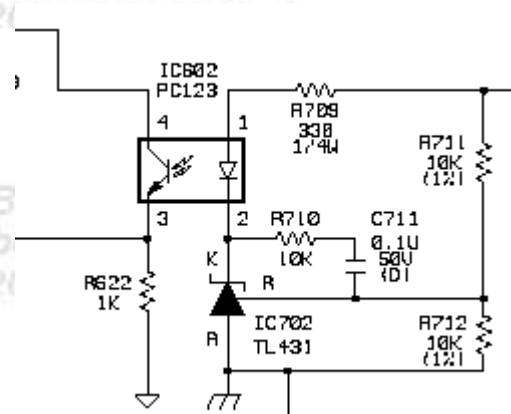


Fig. 7

A-3.) Control board introduction:

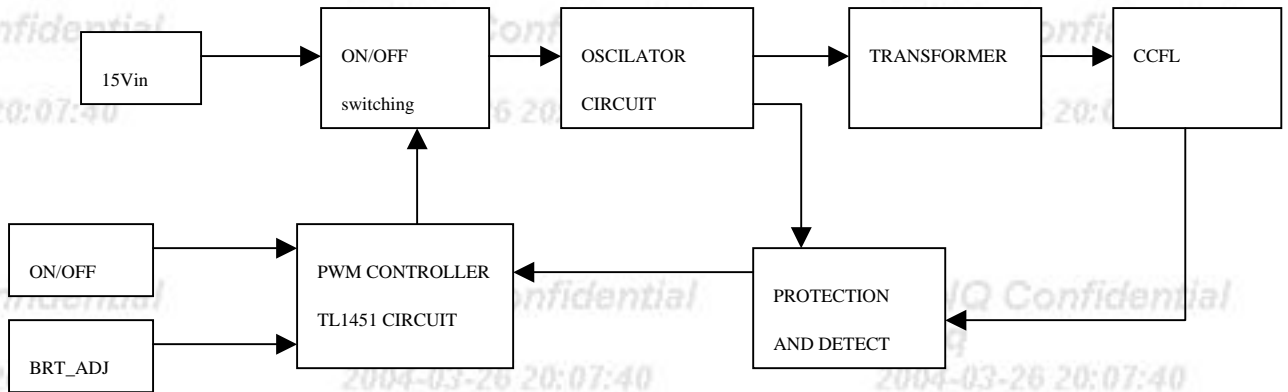
The main parts of the control board are a push button, and a LED.

(a) Push button: It's a simple switch function, pressing it for "ON" to do the auto adjustment function, releasing it for "OFF" to do nothing.

(c) LED: It indicates the DPMS status of this LCD monitor; green light means DPMS on (Normal operating condition). Amber light means DPMS off (Power off condition).

A-4.) Inverter diagram:

1. Block Diagram:



2. General Specification

Input Voltage: 15V

Input Current: 2A max.

ON/OFF Voltage: 3.3V

PWM Duty: 3.3V/47KHz

Output Requirement:

Max. Output Current: 15mA

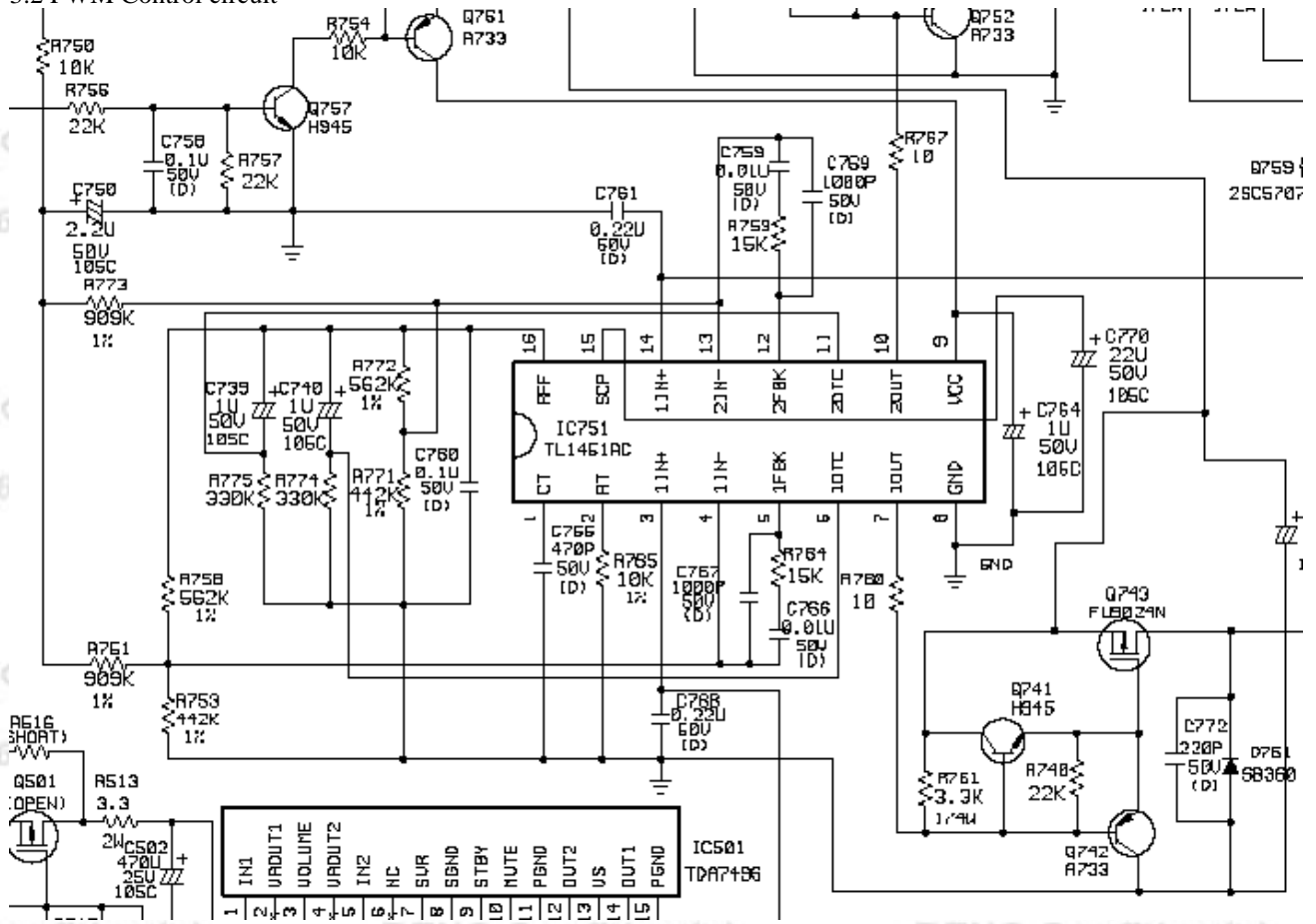
Min. Output Current: 6mA

Lamp Working Voltage: 600Vrms

Open Lamp Voltage: 1700Vrms

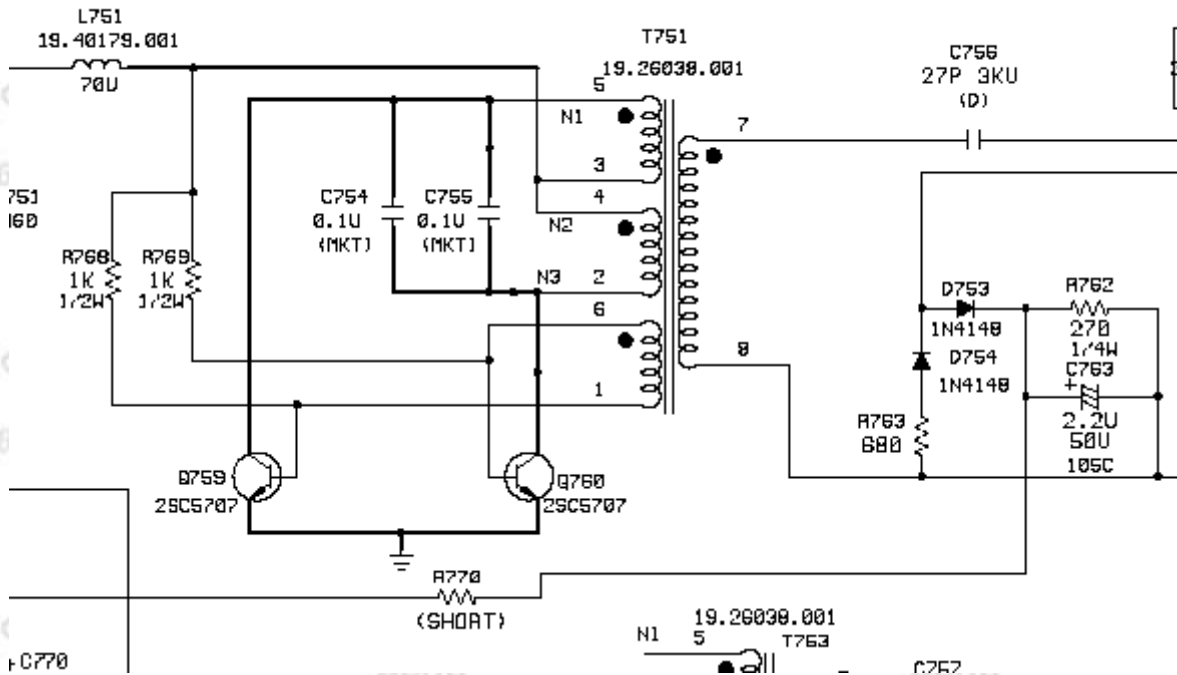
Frequency: 50KHz

3.2 PWM Control circuit



TL1451 is a dual PWM controller. C765 and R765 decide the working frequency. BLT_ADJ signal is from control board, control pulse width then decide how much energy delivery to CCFL also decide CCFL brightness. Q741 and Q742 be the buffer to rise the drive capability and the totem poles circuit can improve a capable of driving for Q743. C770 decide the striking time delay.

3.3 Oscillator Circuit



Royer circuit uses the characteristic of transformer saturation to oscillate. When the DC power inject, Q759 or Q760 will turns on, and the current I_c increases. After a period, the transistor will leave the saturation status and V_{ce} increase. The result causes the voltage of primary coil get lower. Finally the transistor turn off, and another transistor turn on. These statuses are repeated and the pin7 and pin8 of T751 will get a Sin Wave to turn on CCFL.