

Team 39Z – The Zip Ties

Electronics Online Challenge Sponsored by Texas Instruments

10 January 2018

Samsung LCD Monitor Disassembly

PREFACE

In this disassembly we will examine the inner workings of the Samsung SyncMaster 245BW Widescreen LCD Monitor. This 24” monitor has a maximum resolution of 1920x1200 (aspect ratio 16:10) and was released in 2008. Full specifications can be found at <https://www.cnet.com/products/samsung-syncmaster-245bw/specs/> The monitor used for this experiment was non-functional as of September 2017.



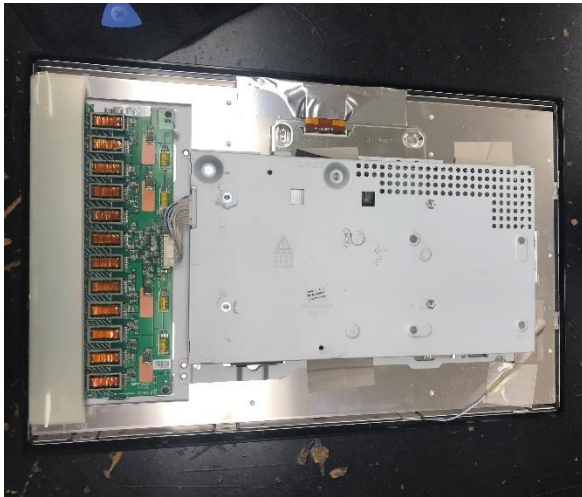
(image courtesy of Newegg.com)

DISASSEMBLY



(front)

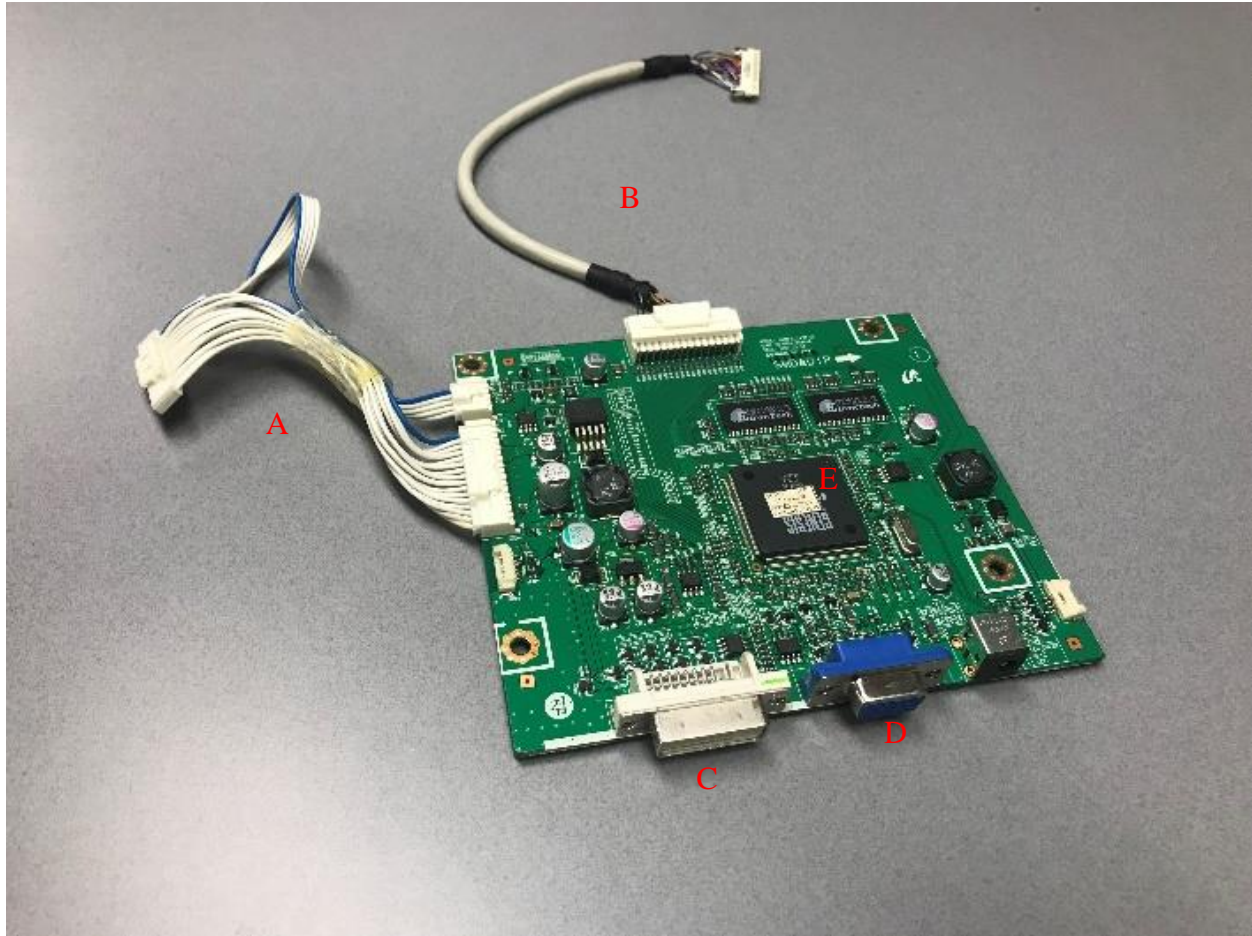
(back)



(left) After removing the back-plastic casing, a large metal panel still obscures nearly all electrical components.

(below) The inside of that large metal panel contained the two most interesting components for this disassembly, the power supply unit and main controller board.

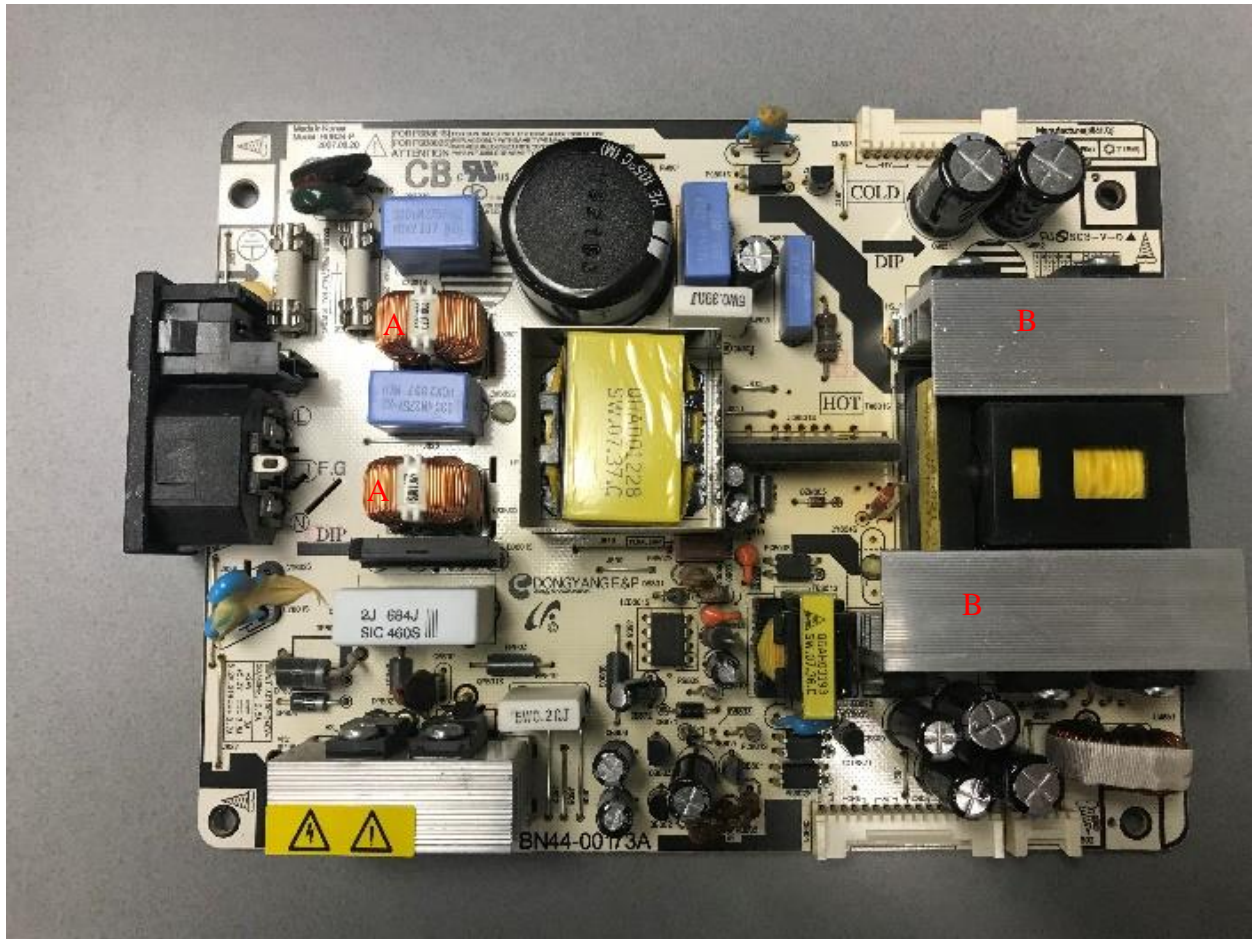




Close-up of the main control board. Of note on the main control board is the power connector (A), LCD-array connector (B), DVI port (C), VGA port (D), and main LCD controller (E). Full datasheet for the LCD controller (Genesis gm5862H) can be found here:

<http://igorx.irk.ru/datasheet/ziepgg72IuOaldgxZdDz.pdf>

The gm5862H chip is an integrated mixed signal LCD controller. It converts input signals from VGA or DVI inputs into electrical signals which are then sent to the LCD panel. The chip has support for operation up to 205MHz and resolutions up to 1080i via the VGA analog input, or operation up to 165MHz with HDCP via the DVI input. In the data-sheet, the manufacturers advertise this chip's cost-effectiveness and versatility.



Close-up of the main power board. Besides the many capacitors, Components of note include the EMI filters (A), Heat Sinks (B)



(left) This board was connected to the main LCD panel via a ribbon cable

(right) The main LCD panel with controllers and ribbon cable below





(above) The main lightbulb controller with 12 transformers. The six ports on the bottom connected to the lightbulbs. The single port at the top-center connected to the main control board.

(below) The exposed lightbulbs after light-filters and LCD panel are removed. The cables that connect to the lightbulb controller are visible on the far right.



CONCLUSION

The disassembly allowed our team to learn a lot about the inner-workings of an LCD monitor. We were not previously aware how complex these systems truly are. We also learned a lot about the concerns a microchip company considers when manufacturing a microchip. The datasheet discusses the high-efficiency and cost-effectiveness of the main gm5862H chip. We were also amazed at the amount of processing this chip can do considering it only has 256 pins. Members of our team further enjoyed this disassembly because it gave us practice reading data-sheets, a skill needed in many fields including electrical engineering.