



## TV Based Display System

Project number: C2951

### Summary

This project shows how easily a TV can be used to display information. RAMDAC like approach is used but even the sync pulses are encoded into the SRAM instead of generating them in hardware. Screen resolution supported is 400 horizontal by 148 vertical dots for PAL and 400 horizontal by 124 vertical dots for NTSC. 18 lines of text with 36 chars each can be displayed with an 8x8 pixel font. Extra SRAM not used for video information can be used to store data.

### Introduction

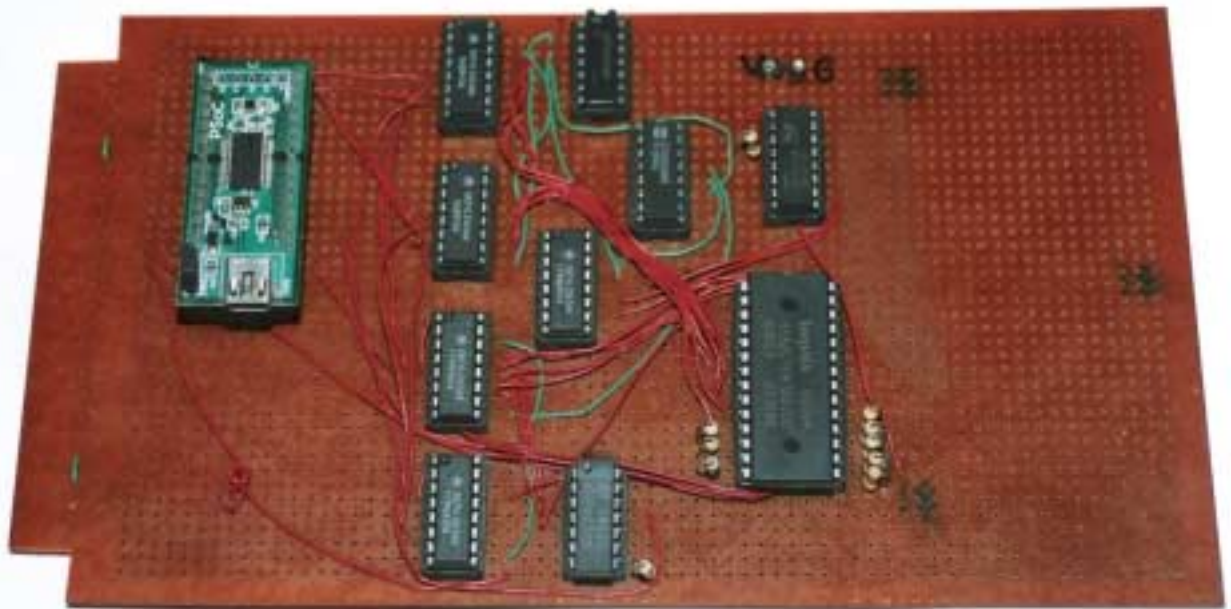
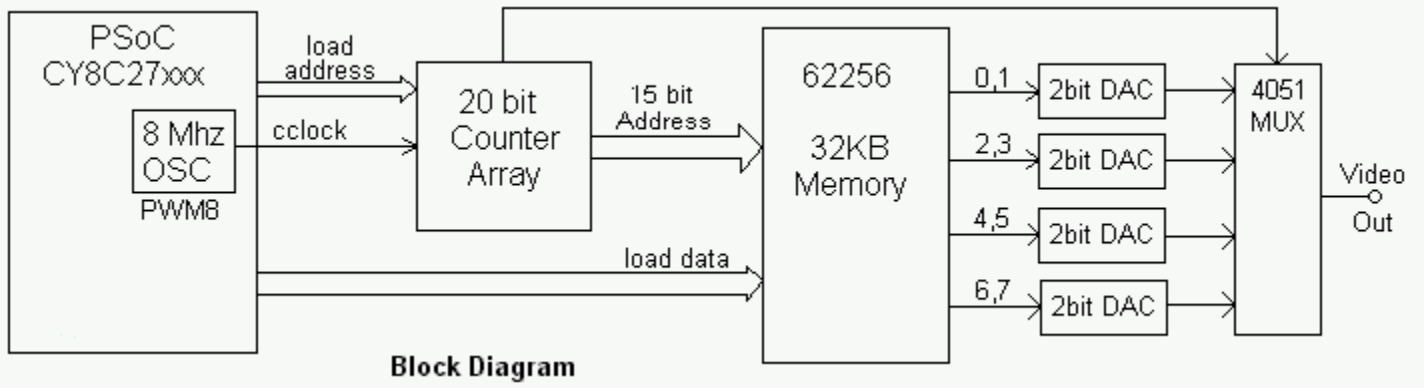
Televisions are around us almost everywhere. They are mass produced and therefore inexpensive. They have standard interfaces. Of particular interest are small 6 inch TV sets that are available for about Rs 550 (US \$12). These can be used to display information at a much lower cost when compared to LED or LCD display of equivalent size. An experimenters dream comes true.

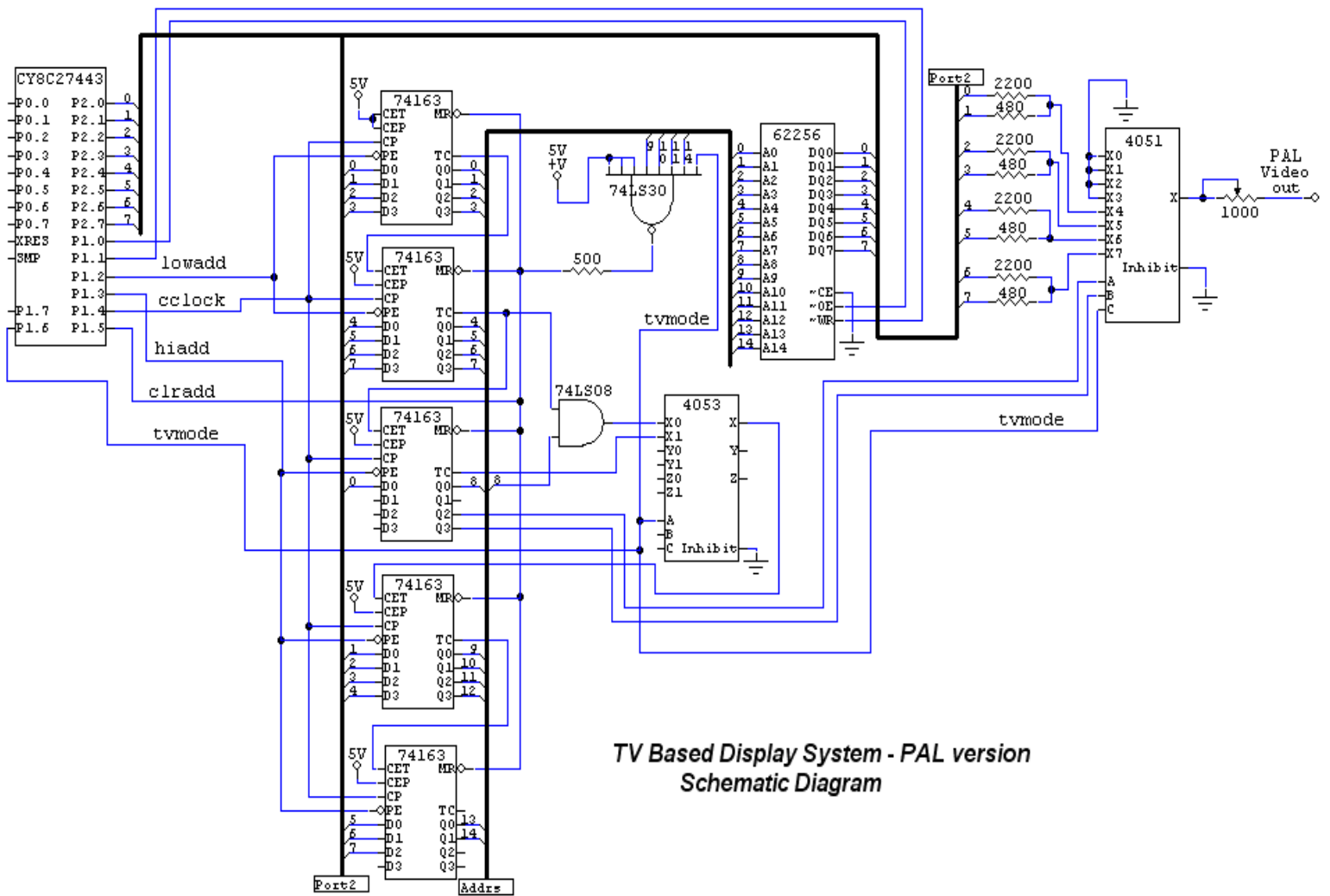
There have been projects before that use TV as a display. However they use a very fast (and expensive) MCU to generate all parts of the video signal i.e. video pixels, horizontal sync and vertical sync. Almost all the resources of the MCU are used up in keeping up with the tough timing requirements of a video signal and there is little "juice" left in the MCU to do anything significant.

This project takes a diametrically opposite approach. The philosophy behind it is that the MCU should compute and all the monotonous tasks are left to memory-DAC subsystem that remembers what the MCU computed and blasts that information to the TV. Memory capacity is cheaper than raw computing power and will remain so. Therefore this circuit uses minimal parts and even the sync pulses (both horizontal & vertical) are encoded into the SRAM. 32 K Byte SRAM chips are inexpensive and cost about Rs35 (US \$0.75). Therefore trying to generate sync pulses with discrete logic will be more expensive.

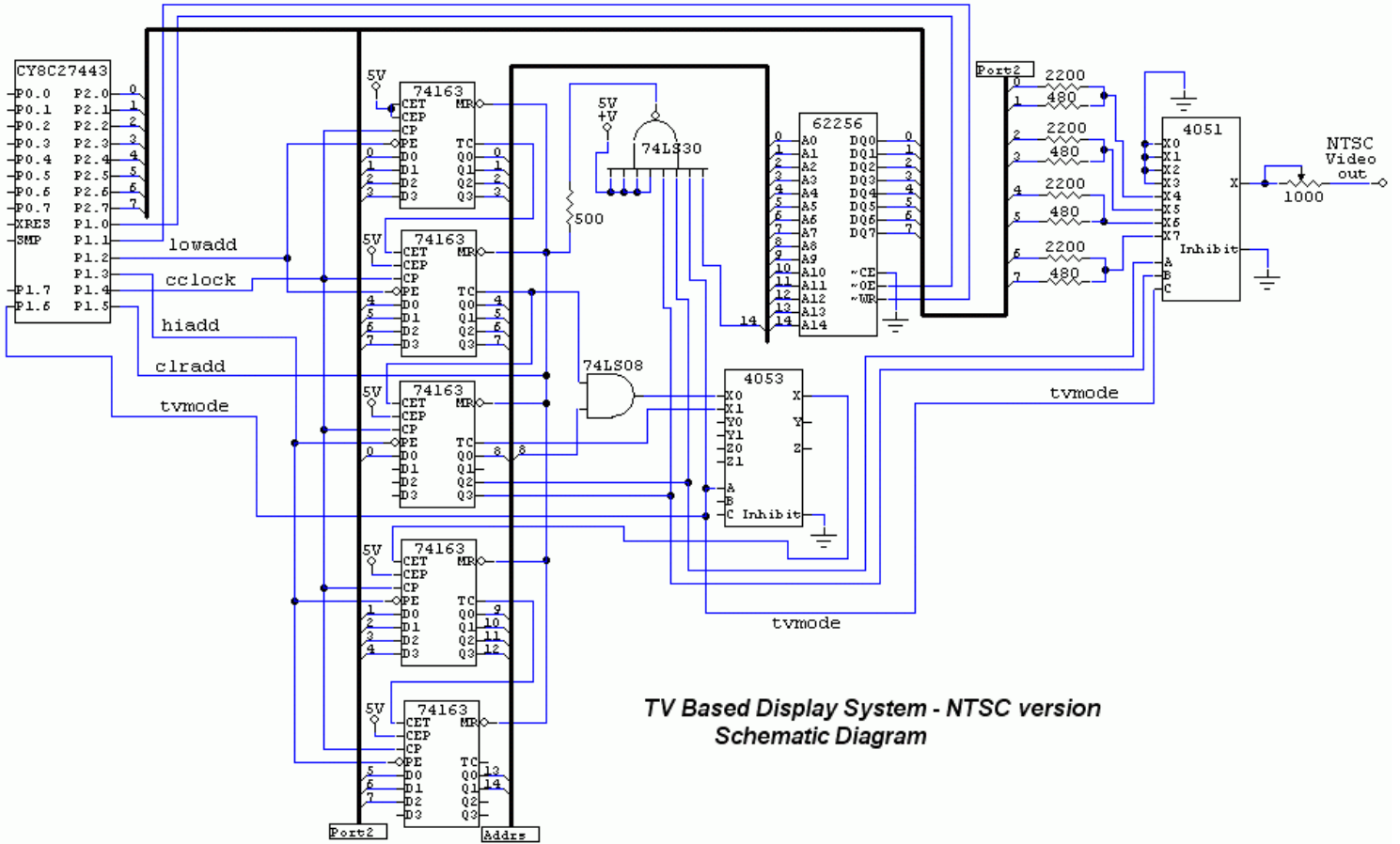
Another benefit of soft encoding sync information is the ease in adapting the circuit to support a different video standard. This will become clear when NTSC version of the circuit is described later in this report. The SRAM area not used for video data can be easily used store information relevant to the task at hand. Address setup and data store operations are done in 8 bit parallel mode.

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TV Based Display System - PAL version  
Schematic Diagram



**TV Based Display System - NTSC version  
Schematic Diagram**