



Team 12 Presents



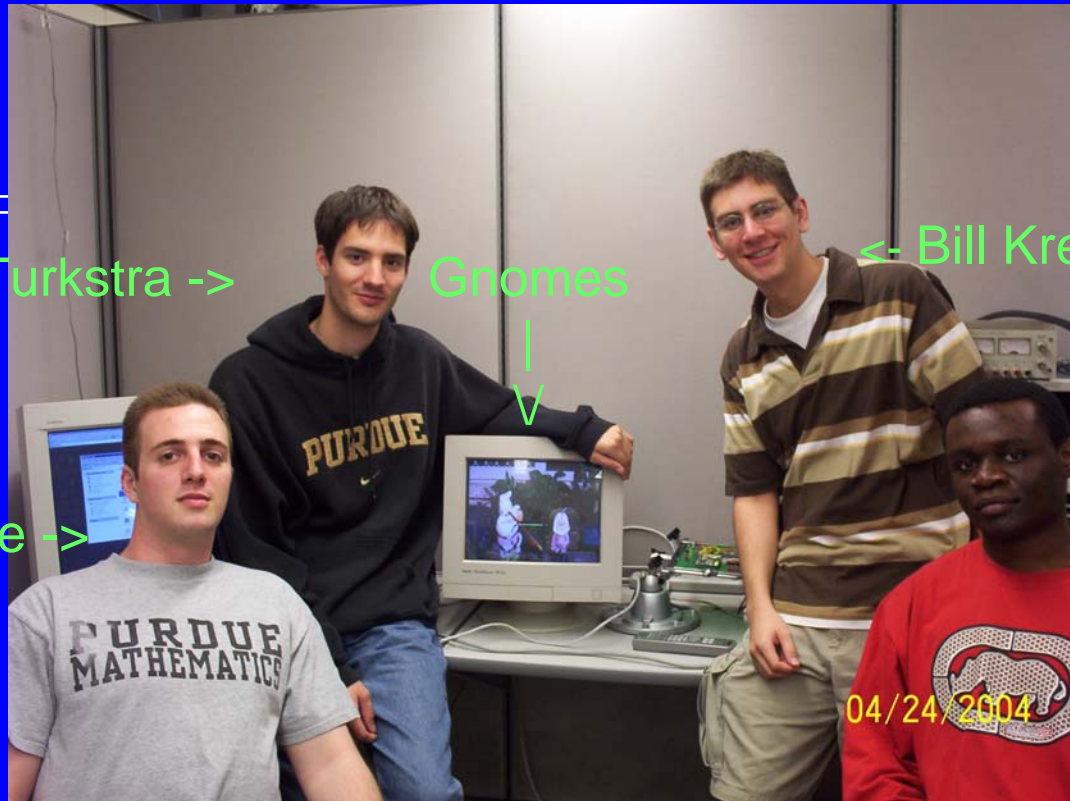
Jeff Turkstra ->

Gnomes

<- Bill Kreider

Phillip Boone ->

<- Egomaron
Jegade



“DiPFI”

“Digital Picture Frame Interface”

A “Black Box” solution to turning old monitors
into digital picture frames



DiPFI Features



- Provides a “networked VGA controller” to display pictures on any compatible VGA device
- Image data provided via Ethernet to Rabbit Microcontroller.
 - VGA display is done via Epson controller interfacing with a 4MB EDO DRAM memory chip.
 - Address/Data Multiplexing achieved via a PLD “hack”
 - Epson driven by 25.175 MHz oscillator
- Display controlled by on-device pushbuttons and remote control
- IR remote control allows product to be placed out of reach
- Status LEDs indicate transmission of a picture



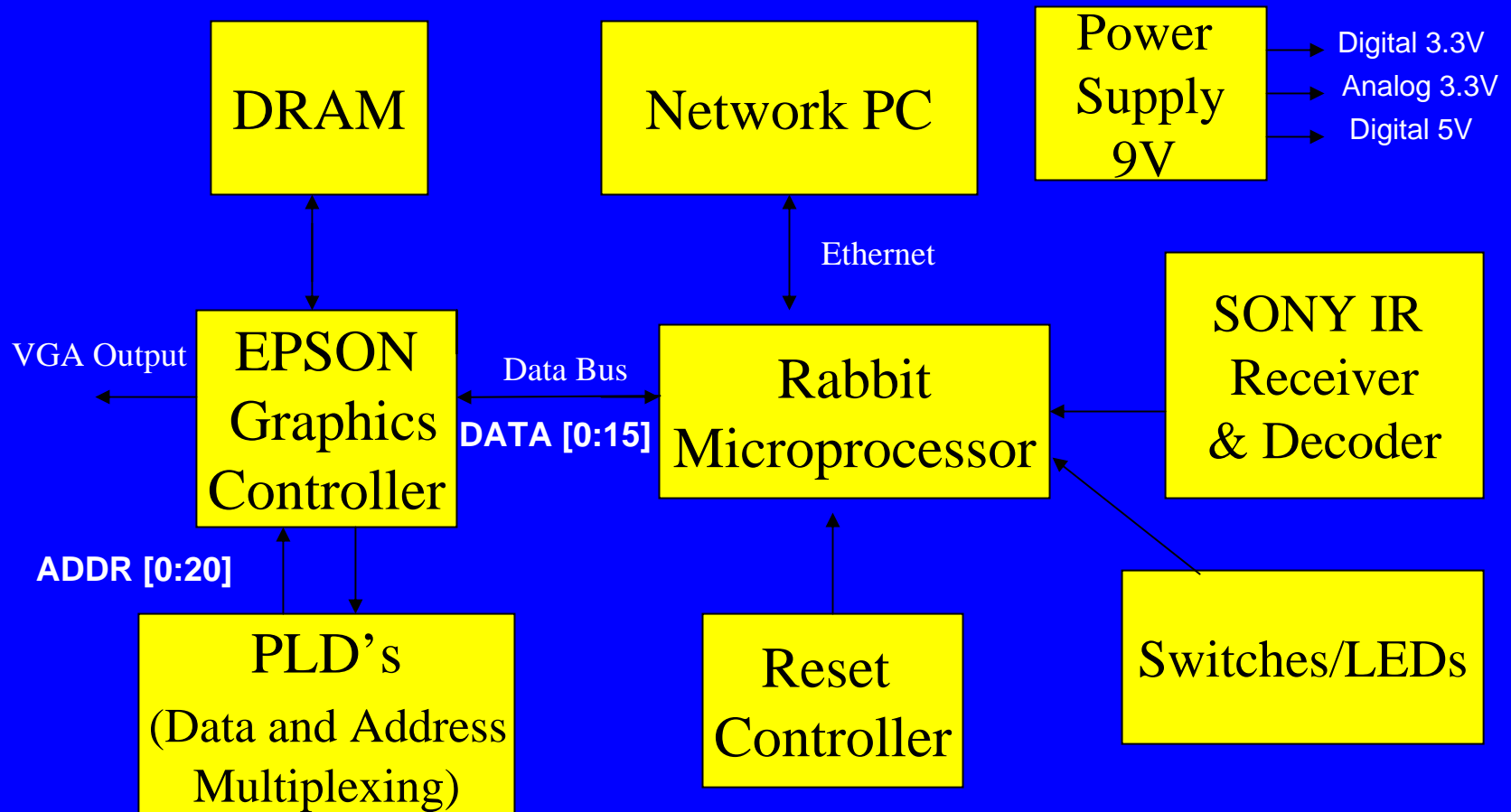
Motivation

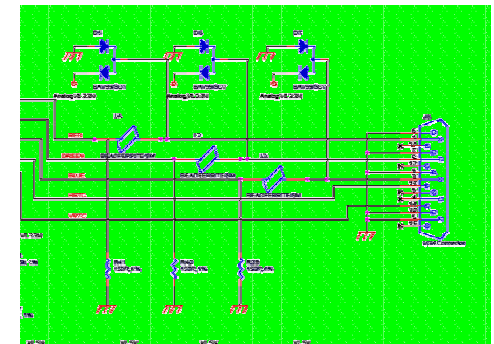
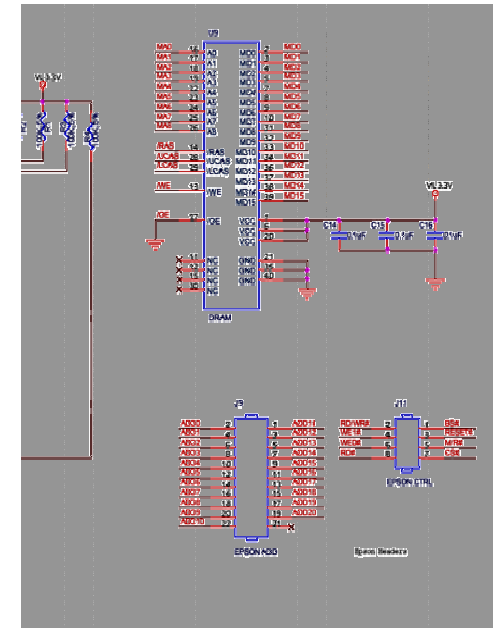
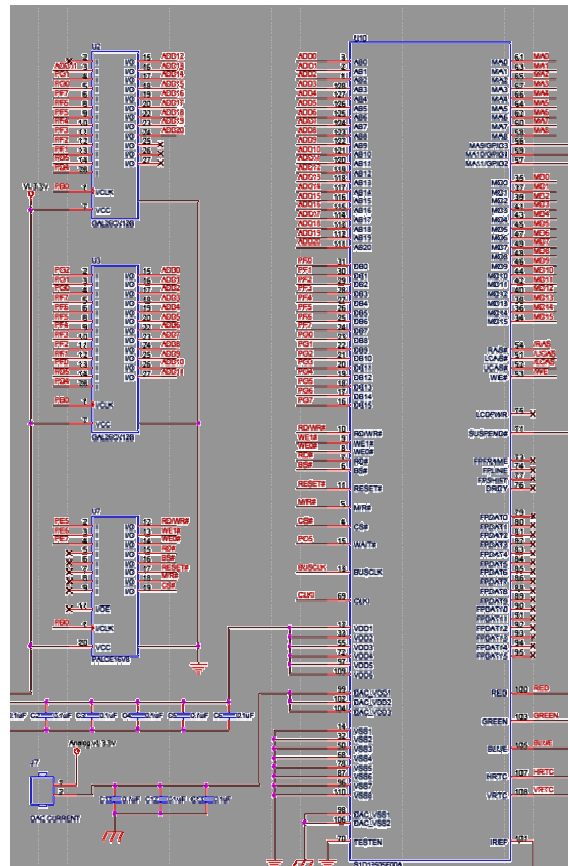
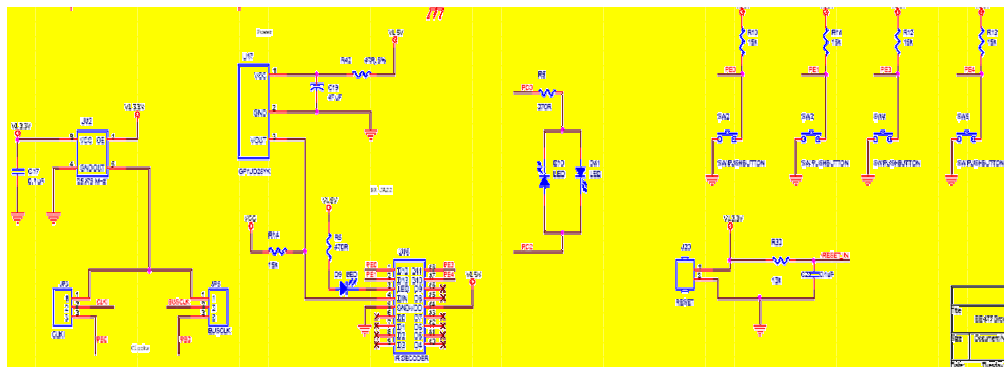
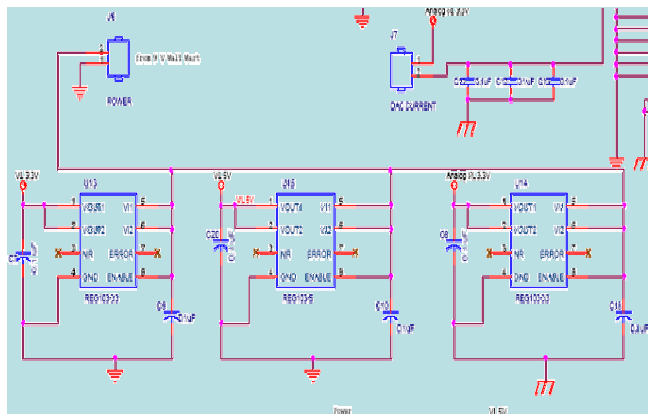
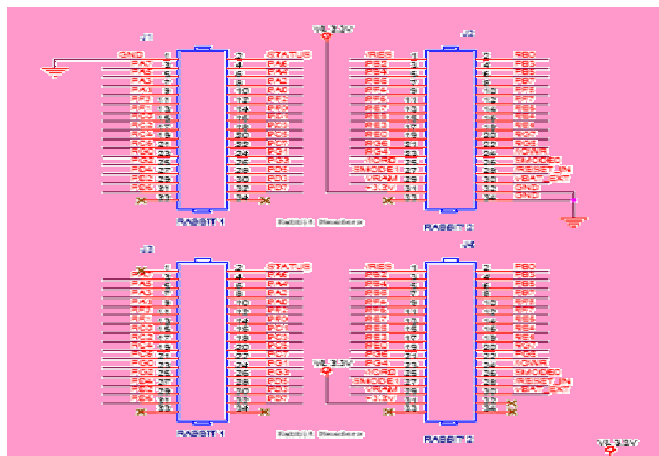


- Idea originated as a “Digital Picture Frame” (with onboard LCD)
 - Possible uses included a replacement for concert band sheet music and a generic digital photo album
- Unfortunately, reasonably large LCD’s are expensive
- Decided to kill the LCD and interface with any VGA-compatible device
 - Made device more flexible, as well as significantly reducing cost



DiPFI Block Diagram

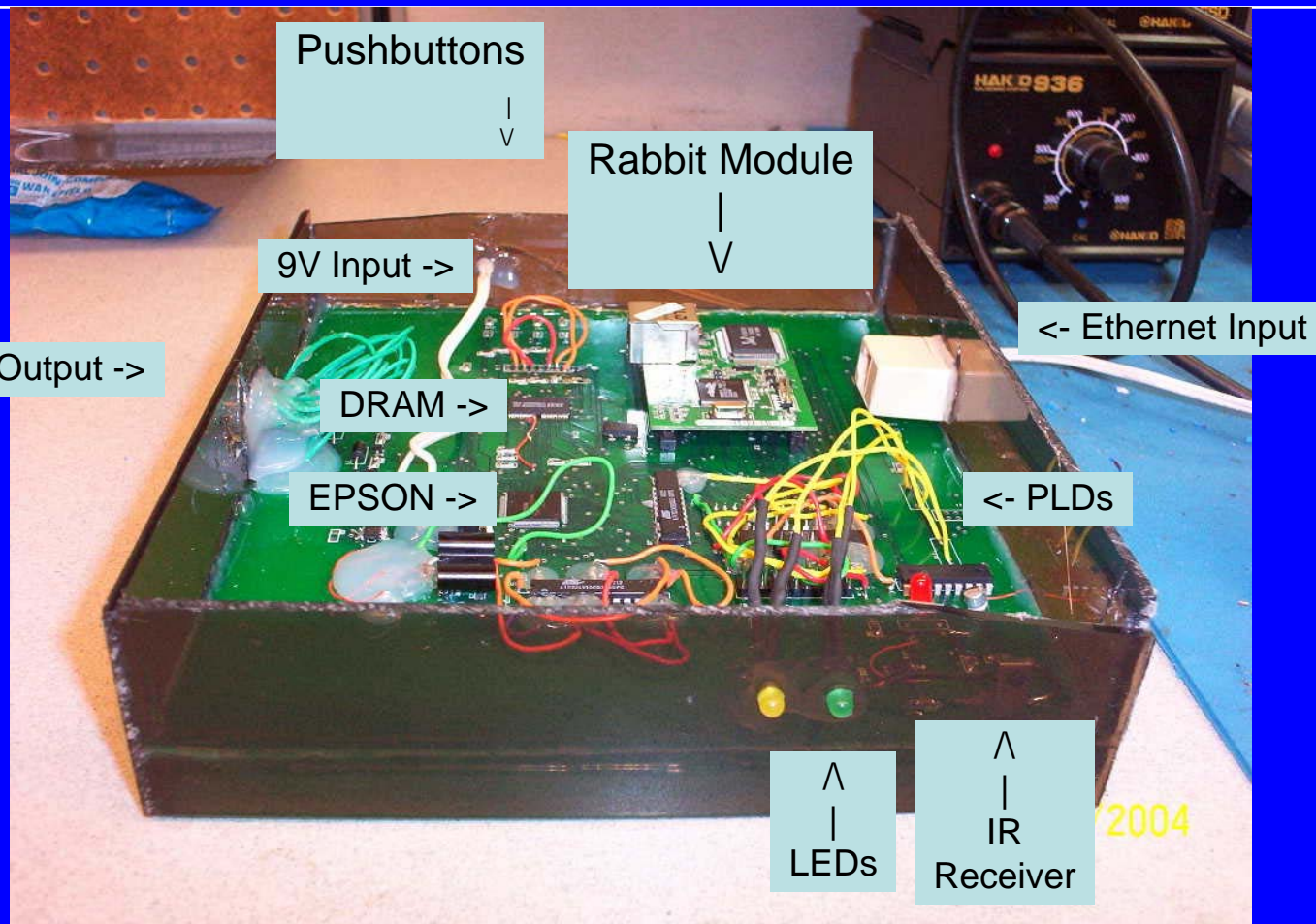




Power Supply	9V Wall Wart, Voltage Regulators
User Interface	Push buttons, IR Decoder and Receiver
Physical Connectors	VGA Connector, (RJ-45 on core module)
Graphics	EPSON, DRAM, PLDs, Crystal Oscillator
Microcontroller	Rabbit 3000 (Headers)



DiPFI Realization





Design challenges



- Epson graphics controller, with 128 pins and 2mil spacing between each pad (rather small)
- Lack of enough pins to directly interface with a 21-bit address bus & separate 16-bit data bus
 - Solved with PLD's
- Finding appropriate parts for each required function
 - DRAM especially
- Software for PC and Rabbit



Why You're in 270/362



- (with respect to this project)
- PLD's
 - Programmed using a language similar to ABEL and the Dataman programmer
 - Are basically a mode-controlled series of flip-flops
- Microcontroller Interfacing
 - You'll learn this in ECE 362
 - Incredibly useful in terms of programming the Rabbit as well as interfacing with the Epson graphics controller
- Addressing schemes
 - Provides necessary insight for interfacing with Epson/DRAM data and address busses
- Timing analysis
 - Required to interface with just about any device
- Ability to interpret device data sheets
 - Lot's and lot's of data sheets
- Digital logic analyzers
 - Incredibly useful and reassuring



Video Demonstration





DiPFI



? Questions ?