

PhotoArray: Optical Display System

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- Testing jig for an optical display system
 - Configured by command terminal over USB
 - Reports optical changes via UDP Ethernet packets
 - Sub-millisecond response required
- Uses an NXP LPC1833 Cortex M3
 - Running Keil MDK RTX RTOS
- Uses Keil MDK USB/Ethernet middleware
- Hardware design chained multiple units together
 - Single master, multiple slave arrangement
 - Single PCB design with two build variants

Hitex Design Capabilities Case Study Overview

Quad Brushless DC Motor Drive

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Hardware:

- Compact design including Power & Control Electronics for four BLDC motors
- Utilising Infineon TriCore TC1782
- D.C. Link Voltage up to 150V with continuous current of 10A / motor (limited only by cooling capability)
- Linear position feedback from LVDT
- High Speed CAN interface for data logging
- User communication and Flash Reprogramming via RS-485

Software:

- Developed in C with HighTec compiler and HiTOP debugger tool-chain
- LabVIEW User Control GUI via RS-485
- LabVIEW Data Logging GUI via CAN
- User PID control tuning with data saved in non-volatile memory



FPGA / AURIX development platform

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- A development kit utilising the Infineon Aurix TC299 and Xilinx Kintex-7 FPGA for very high-performance and safety critical applications
- Multiple debug ports available, including via USB for single point debugging
- USB, Ethernet, Flexray, SD card and 2 CAN ports for general use
- FPGA state monitoring and control via microcontroller
- System managed by a top level PC GUI application and custom bootloader
 - FPGA image upgrade function available from PC with no additional tools

FPGA system:

- A sizeable amount of resources are available in the Xilinx XC7K410T-3 Kintex-7:
 - 406,720 logic cells
 - 28,620 Kb block RAM
 - 1,540 DSP slices
 - 676 ball device with 500 pin I/O
- FPGA appears as an external 32-bit bus peripheral to the microcontroller
- 1GB of DDR3 SDRAM is available directly to the FPGA
- High-speed LVDS bus available off-board
- PCB track length matched for 2 FPGA variants
- FPGA JTAG port available for direct access

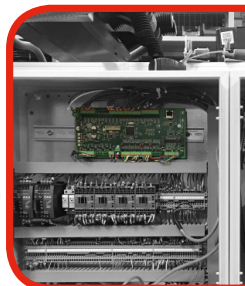
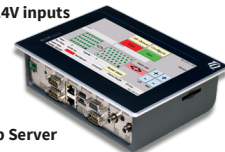
Infineon XMC4500-based Industrial Machine Controller

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Full System Development In-house: Key Design Notes

- Based on Infineon's XMC4500 industrial ARM microprocessor
- Fit for purpose on first build
- Cost-effective & space saving PLC replacement with peripherals including:
 - Range of debug options
 - USB port, 4 RS485, CAN and 10/100 Ethernet
 - 4 isolated 5V inputs; 22 isolated 24V inputs
 - 22 isolated configurable outputs
 - 4 isolated analogue inputs
 - 1 isolated analogue output
- DIN rail mounted
- WinCE based Touch Screen controller with Web Server
- Implementation of Keil's CMSIS based driver solution



Power-train Starter Kit Injector Add-On

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Key Design Notes:

- Drives four injector solenoids
 - Injection waveforms adjustable in amplitude & time
 - Variable under hardware, direct software or CAN message control
 - Injector current waveforms monitored
 - Timing signals generated internally or externally
- Drives fuel pressure pump directly
 - Controls fuel pump precisely
 - Fuel pressure feedback monitored
- Safety-centric design
 - Uses the Infineon AURIX TC275 as the main processor
 - Additional micro-processor to monitor system health
 - Hardware current limits with monitoring via software
- Additional ports for debugging and ECU development
 - 10/100 Mbit Ethernet, USB interface, SD card slot, isolated CAN ports, SENT, LIN and contactor ports

What will you challenge us to achieve next..?