ENCE464

Embedded Software & Advanced Computing Tutorial

Term-3 Project : Week-2, Term-3

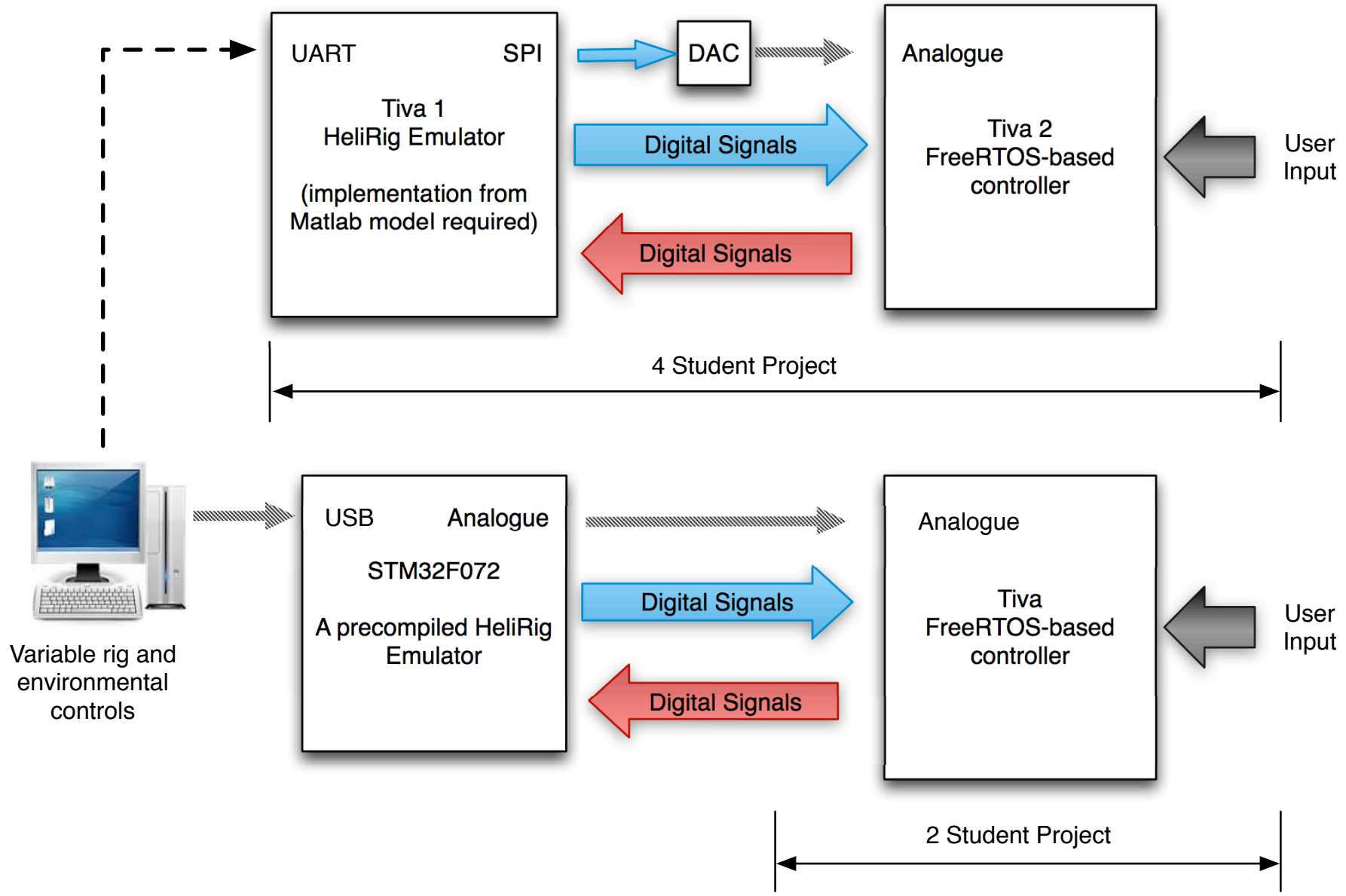
By: Steve Weddell

25 July 2019

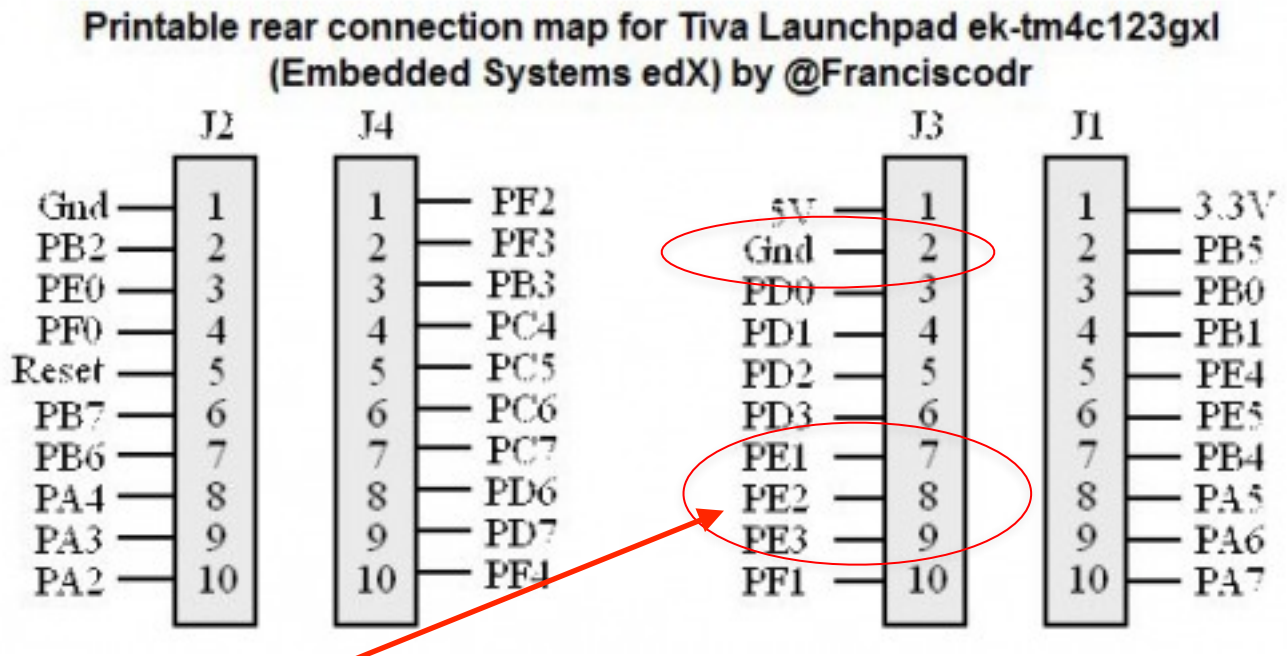
Project Milestones and Deliverables

WinCalendar	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Jul 2019	1 Mid-year break	2 Mid-year break	3 Mid-year break	4 Mid-year break	5 Mid-year break	6	7
	8 Mid-year break	9 Mid-year break	10 Mid-year break	11 Mid-year break	12 Mid-year break	13	14
	15 Outline ENCE464 proj. in Lect.	16 ENCE464 Term3 Project spec. on Learn	17 Project group selection on Learn	18 ENCE464 Proj. discussion in ESL	19 Students **allocated if not in a group!!**	20	21
	22	23	24	25 ENCE464 Mlestone 1: Interface	26	27	28
	29	30	31	1 ENCE464 M2: Control & Emulator	2	3	4
Aug 2019	5	6	7	8 ENCE464 Milestone 3: Emulator	9	10	11
	12	13	14	15 ENCE464 Milestone 4: Testing	16	17	18
	19	20	21	22 **Deadline!! Deliverable 1: Demo; 2: Code**	23	24	25 **Deadline!! Deliverables 3: Critiq.; 4: Report**
	26 Lecture break	27 Lecture break	28 Lecture break	29 Lecture break	30 Lecture break	31	1

One Project, Two Perspectives



Header Connections



ADC ports { PE3 (AIN0) *internal* (Orbit) for Week-3
PE1 (AIN2) *external* (SigGen) for Week-4

Note: for external connections via the connector on the underside of your Tiva LaunchPad, a Ground connection is essential.

HeliRig analogue Height O/P

SHARP GP2Y0A41SK0F

GP2Y0A41SK0F

Distance Measuring Sensor Unit
Measuring distance : 4 to 30 cm
Analog output type

■Description

GP2Y0A41SK0F is a distance measuring sensor unit, composed of an integrated combination of PSD

■Agency approvals/Compliance

1. Compliant with RoHS directive (2002/95/EC)

Emulator analogue O/P: Use an SPI DAC

MICROCHIP **MCP4801/4811/4821**

8/10/12-Bit Voltage Output Digital-to-Analog Converter with Internal V_{REF} and SPI Interface

Features

- MCP4801: 8-Bit Voltage Output DAC
- MCP4811: 10-Bit Voltage Output DAC
- MCP4821: 12-Bit Voltage Output DAC
- Rail-to-Rail Output
- SPI Interface with 20 MHz Clock Support
- Simultaneous Latching of the DAC Output with $\overline{LDAC}$ Pin
- Fast Settling Time of 4.5 µs
- Selectable Unity or 2x Gain Output
- 2.048V Internal Voltage Reference
- 50 ppm/°C V_{REF} Temperature Coefficient
- 2.7V to 5.5V Single-Supply Operation
- Extended Temperature Range: -40°C to +125°C

Applications

- Set Point or Offset Trimming
- Sensor Calibration
- Precision Selectable Voltage Reference
- Portable Instrumentation (Battery-Powered)
- Calibration of Optical Communication Devices

Description

The MCP4801/4811/4821 devices are single channel 8-bit, 10-bit and 12-bit buffered voltage output Digital-to-Analog Converters (DACs), respectively. The devices operate from a single 2.7V to 5.5V supply with an SPI compatible Serial Peripheral Interface.

The devices have a high precision internal voltage reference (V_{REF} = 2.048V). The user can configure the full-scale range of the device to be 2.048V or 4.096V by setting the Gain Selection Option bit (gain of 1 of 2).

The devices can be operated in Active or Shutdown mode by setting a Configuration register bit or using the $\overline{SHDN}$ pin. In Shutdown mode, most of the internal circuits, including the output amplifier, are turned off for power savings, while the amplifier output (V_{OUT}) stage is configured to present a known high resistance output load (500 kΩ, typical).

The devices include double-buffered registers, allowing a synchronous update of the DAC output using the $\overline{LDAC}$ pin. These devices also incorporate a Power-on Reset (POR) circuit to ensure reliable power-up.

The devices utilize a resistive string architecture, with its inherent advantages of low DNL error, low ratio metric temperature coefficient and fast settling time

Emulator to Controller Interface