Clock sources and configure peripheral clock

Understand about the clock source and the frequency. Select the main clock source and its clock tree to enable, disable, and configure the clock on peripherals.

Last update: May 6, 2021

#arm #stm32 #clock

Measure distance using Ultrasonic sensor US-100

US-100 is one of popular distance sensor used in many project. It has ranging distance upto 450 cm with 1mm resolution in less then 15 degree of view angle. It also has temperature sensor to compensate the result. It provides 2 interface, one-pulse and UART.

Last update: May 6, 2021

#sensor #distance #pulse #uart

Direct Memory Access Management

DMA is used as an independent memory transfer between memory and peripherals that frees CPU from handling data exchange, therefore it speeds up the system performance. Understand about transfer modes, configure source and destination address. Example to copy data from memory to memory, or memory to a peripheral.

Last update: May 6, 2021

#arm #stm32 #dma

Timers and working modes

Understand about timers and working modes to configure the periodic tasks, Pulse-width modulation, and Capture mode.

Last update: May 6, 2021

#arm #stm32 #timer #pwm #capture

Notes for C and C++ programming

Last update: May 4, 2021

#c #c++ #notes

Setup Camera with V4L2, FFmpeg, and PiCamera

Enable Camera module on Raspberry Pi. Install drivers and applications to capture image or video from the camera. Compare the performance of some encoders used in ffmpeg and python picamera package.

Last update: May 4, 2021

#pi #camera #v4l2 #ffmpeg #python #picamera

Setup Raspberry Pi in headless mode

Headless Mode means system runs without any primary input and output such as keyboard or monitor. The system won't use desktop environment and therefore GUI applications will not run.

Last update: May 4, 2021

#pi #headless

General Purpose Input/Output pins

Understand about GPIO hardware, working modes and speeds, alternative function and input interrupts. Steps to control a GPIO using HAL. Example to blink LEDs and get input from a button.

Last update: May 4, 2021

#arm #stm32 #gpio

Interrupts management and events

An interrupt is an asynchronous event that causes stopping the execution of the current code on a priority basis. Interrupts originate by the hardware, and can be controlled via a Nested Vectored Interrupt Controller.

Last update: May 4, 2021

#arm #stm32 #interrupt

Introduction to ARM Cortex-M and STM32 MCUs

Overview about ARM Cortex-M cores, with general information about registers, memory map, interrupts, clock source and the CMSIS SW library. Overview about different types of STM32 MCUs.

Last update: May 4, 2021

#arm #stm32

Notes for ARM and STM32 programming

Last update: May 4, 2021

#arm #stm32 #notes

Redirect the Standard IO to an UART or a VCP

Standard C has built-in functions to communicate on the standard IO, such as printf(), gets(). To use those functions with the host machine IO via an UART port on a VCP terminal, redirection

technique is implemented by re-writing some low-level functions.

Last update: May 4, 2021

#arm #stm32 #uart #vcp #redirect

Enable semihosting on ARM for debugging purpose

ARM semihosting is a distinctive feature of the ARM platform, that allows to use input and output functions on a host computer that get forwarded to the microcontrollers over a hardware debugger.

Last update: May 4, 2021

#arm #stm32 #debug #semihosting

Universal Synchronous Asynchronous Receiver Transmitter protocol

Understand about USART protocol, how to configure its clock, baud rate, and working mode. Steps to setup an USART module using HAL. Example to print messages, and get user's inputs in polling and interrupt modes.

Last update: May 4, 2021

#arm #stm32 #usart #uart

Customize theme to create personalized pages

Configure the theme, override some templates, design new pages and layouts.

Last update: April 28, 2021

#mkdocs #jinja

Tool-chain and documents for developing on STM32 MCUs

Install a tool-chain including IDE, programmer, debugger for developing on STM32 ARM Cortex-M. List of necessary documents related to hardware and software. How to read and extract information from documents.

Last update: April 28, 2021

#arm #stm32 #toolchain

Print pages to PDF files

Install print plugins. Add cover page and customize styles for printing. Automatically export to PDF files when building the site.

Last update: April 27, 2021

#python #mkdocs

Backup SDCard and restore from saved image

Save the SDCard content to an image file to restore it later. Use Content-only mode and Incremental backup mode to reduce the backup size. This is helpful for systems running on an SDCard like Raspberry Pi.

Last update: April 23, 2021

#sdcard #backup #restore

Diagnostic Camera on I2C Bus

When the camera is not detected, check for a loosen cable or any hardware failure. Or diagnostic the camera module by checking responses on the I2C bus.

Last update: April 23, 2021

#pi #camera #i2c

Compile FFmpeg with Hardware Acceleration

Download FFmpeg source code and its dependent packages, then compile it on a Raspberry Pi to get a latest version of FFmpeg with new features or new libraries. A simple method thanks to an awesome script.

Last update: April 23, 2021

#pi #ffmpeg #hardware accelerator #omx

Notes for Raspberry Pi

Last update: April 23, 2021

#pi #notes

Monitor resource usage of an process

Create a bash script to execute a process and monitor its CPU and Memory usage using top, grep, and awk. The result is exported to text file, and optionally to a graph if gnuplot available.

Last update: April 23, 2021

#bash #top #grep #awk #performance #gnuplot

Save Power on Raspberry Pi

Save power when running on battery by turning off unused peripherals, or features.

Last update: April 23, 2021

#pi #power

Wifi Access Point

A Raspberry Pi within an Ethernet network can be used as a wireless access point, creating a secondary network. The resulting new wireless network is entirely managed by the Raspberry Pi.

Last update: April 23, 2021

#pi #wifi #access point

Camera live streaming using HLS/DASH protocol

Use FFmpeg to generate playlist of video chunks used in HLS/DASH protocol. A simple web server is running on Apache, NGINX, or Python HTTP. Measure performance and delay of HLS/DASH streaming.

Last update: April 23, 2021

#pi #camera #stream #hls #dash #python

Camera live streaming using H264 format

Use PiCamera to capture and make H264 video stream. Split video into H264 NAL units, and send over the internet via websocket. Decode H264 frames by Broadway.js.

Last update: April 23, 2021

#pi #stream #camera #h264 #python #picamera

Camera live streaming using MJPEG format

MJPEG streaming is a simple method to get low latency. It sends JPEG images over the network and display that sequence of images on the user webpage. However, it consumes much more bandwidth. A server can be easily made by Picamera and Python HTTP.

Last update: April 23, 2021

#pi #stream #camera #mjpeg #picamera

Markdown syntax for writing documents

Install markdown extensions, use new markdown syntax, create better layout, write content faster.

Last update: April 23, 2021

#markdown

MkDocs plugins to manage blog's pages and content

Install MkDocs plugins, add them into the site, customize plugins and rendered content.

Last update: April 23, 2021

#mkdocs

Install and configure a blog based on Material for MkDocs

Install Material for MkDocs, add Markdown extensions, modify layouts and styles.

Last update: April 22, 2021

#python
#mkdocs
