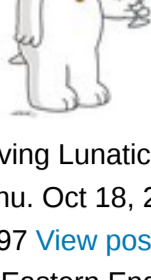
































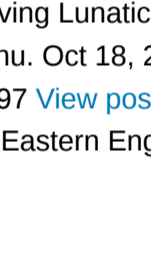














AVRfreaks Design Notes










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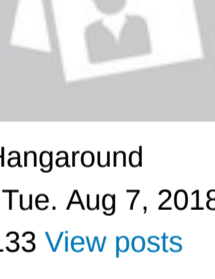
AUTHOR	MESSAGE
<p>Brian Fairchild</p>	<p>Posted : Fri, Feb 1, 2019 - 12:22 PM <span style="float:right">★★★★★ Total votes: 1</span> #1</p>
 <p>Level: Raving Lunatic Joined: Thu, Oct 18, 2001 Posts: 3897 <a href="#">View posts</a> Location: Eastern England.</p>	<p>Way back when, in the mists of time, the old 'freaks site had a pile of useful Design Notes. Some of them a now a bit dated but there is a wealth of useful information in them. They are, in theory, still available on the old site ( as long as it is online). To bring them to a wider audience's attention I'm posting them all here.</p> <p>With thanks to fellow freak sbennett and Bingo600 who filled in some of the blanks.</p> <p>DN001 Using STK500 to program external target STK300                  DN002 Providing correct input voltage to the mega103L in STK300                  DN003 AVR sleep modes                  DN004 Common use of the AVR hardware UART                  DN005 Using AVR Analog Voltage Reference (AREF)                  DN006 AVR Memory Contents After Sleep and Reset                  DN007 Little and Big Endian                  DN008 Efficient I/O handling with bitfields                  DN009 Using the ATtiny15 High-speed Timer                  DN010 Manual AVRISP firmware upgrade                  DN011 Manual JTAG ICE Firmware Update                  DN012 Writing the Cal. Byte to the OSCCAL Reg in ImageCraft ICCTiny                  DN013 Using ATmega8 Async. T/C Osc. with a 32 kHz X-tal on STK500                  DN014 Flash Tables for AVRs without the LPM Instruction                  DN015 Getting Started with the STK100 under Windows 95/98/NT/2000                  DN016 How to distinguish ATmega128 from ATmega103                  DN017 Calibrating the Internal RC Oscillator Using the STK500                  DN018 Calibrating the Internal RC Oscillator                  DN019 Upgrading the Firmware on STK500                  DN020 Understanding AVR Fuses and Lock bits                  DN021 Using the Built-in ADC in AVR                  DN022 I/O Port Details                  DN023 Programming Problems Using STK200/300 Programmer                  DN024 Timer/Counter Basics                  DN025 SPI Setup and Hold Times                  DN026 Serial Port Connection                  DN027 A Simple FSK modem Freq. Measuring and Generation                  DN028 Using External SRAM with Small AVR Devices                  DN029 FIFO Buffer - by Christoph Redecker                  DN030 Frequency Synthesizer                  DN031 Non-blocking Timers                  DN032 AVR Boot Loader                  DN033 DAC Utilizing ADC                  DN034 IO Pin Config                  DN035 Bidirectional SPI                  DN036 Virtual Instrumentation                  DN037 Custom Graphic LCD Characters                  DN038 Fast Look-up Table Driven 16-bit CRC Routine                  DN039 Sound Sample Play Back                  DN040 Connecting an AVR Controller to CAN                  DN041 Interfacing Parallel FRAM to AVR Microcontrollers                  DN042 Efficient Handling of RS-485 Timing Issues                  DN043 A String Display Routine                  DN044 Using Trinary Encoding to Reduce Pin Wastage                  DN045 Using Shift Registers to Increase the Number of I/O Pins                  DN046 Timer Interrupt with a Maximum Accuracy                  DN047 The Pin Adder                  DN048 I2C Bus Sniffer</p> <p>Attachment(s):</p> <ul style="list-style-type: none"> <li> DN_001 Using STK500 to program external target STK300.pdf</li> <li> DN_002 Providing correct input voltage to the mega103L in STK300.pdf</li> <li> DN_003 AVR sleep modes.pdf</li> <li> DN_004 Common use of the AVR hardware UART.pdf</li> <li> DN_005 Using AVR Analog Voltage Reference (AREF).pdf</li> <li> DN_006 AVR Memory Contents After Sleep and Reset.pdf</li> <li> DN_007 Little and Big Endian.pdf</li> <li> DN_008 Efficient I/O handling with bitfields.pdf</li> <li> DN_009 Using the ATtiny15 High-speed Timer.pdf</li> <li> DN_010 Manual AVRISP firmware upgrade.pdf</li> </ul> <hr/> <p>#1 This forum helps those that help themselves                  #2 All grounds are not created equal                  #3 How have you proved that your chip is running at xxMHz?                  #4 "If you think you need floating point to solve the problem then you don't understand the problem. If you really do need floating point then you have a problem you do not understand." - Heater's ex-boss</p> <p>TAGS: Learning and Information, Tutorials</p> <p><i>Last Edited: Sun, Feb 3, 2019 - 07:20 PM</i></p> <p>Log In / Register to post comments <span style="float:right">Top</span></p>

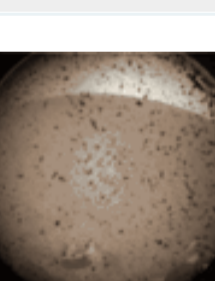

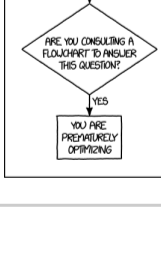
<p>Brian Fairchild</p>	<p>Posted : Sun, Feb 3, 2019 - 07:16 PM <span style="float:right">★★★★★ Total votes: 1</span> #2</p>
 <p>Level: Raving Lunatic Joined: Thu, Oct 18, 2001 Posts: 3897 <a href="#">View posts</a> Location: Eastern England.</p>	<p>DN_015 still to find.</p> <p>Attachment(s):</p> <ul style="list-style-type: none"> <li> DN_011 Man. upgrade JTAGICE DN_011.pdf</li> <li> DN_014 Flash Tables for AVRs without the LPM Instruction.pdf</li> <li> DN_016 How to distinguish ATmega128 from ATmega103.pdf</li> <li> DN_017 Calibrating the Internal RC Oscillator Using the STK500.pdf</li> <li> DN_018 Calibrating the Internal RC Oscillator.pdf</li> <li> DN_019 Upgrading the Firmware on STK500.pdf</li> <li> DN_020 Understanding AVR Fuses and Lock bits.pdf</li> <li> DN_012 Writing the Cal. Byte to the OSCCAL Reg in ImageCraft ICCTiny.pdf</li> <li> DN_013 Using ATmega8 Async. T-C Osc. with a 32 kHz X-tal on STK.pdf</li> </ul> <hr/> <p>#1 This forum helps those that help themselves                  #2 All grounds are not created equal                  #3 How have you proved that your chip is running at xxMHz?                  #4 "If you think you need floating point to solve the problem then you don't understand the problem. If you really do need floating point then you have a problem you do not understand." - Heater's ex-boss</p> <p>Log In or Register to post comments <span style="float:right">Top</span></p>

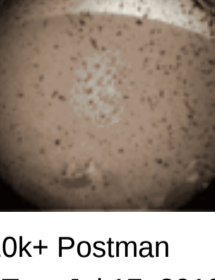
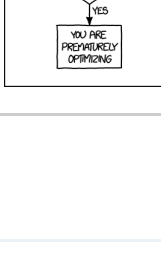
<p>Brian Fairchild</p>	<p>Posted : Fri, Feb 1, 2019 - 12:36 PM <span style="float:right">★★★★★ Total votes: 1</span> #3</p>
 <p>Level: Raving Lunatic Joined: Thu, Oct 18, 2001 Posts: 3897 <a href="#">View posts</a> Location: Eastern England.</p>	<p>DN_023 still to find.</p> <p>Attachment(s):</p> <ul style="list-style-type: none"> <li> DN_021 Using the Built-in ADC in AVR.pdf</li> <li> DN_022 IO Port Details.pdf</li> <li> DN_024 TimerCounter Basics.pdf</li> <li> DN_025 SPI Setup and Hold Times.pdf</li> <li> DN_026 Serial Port Connection.pdf</li> <li> DN_027 A Simple FSK modem Freq. Measuring and Generation.pdf</li> <li> DN_028 Using External SRAM with Small AVR Devices.pdf</li> <li> DN_029 FIFO Buffer - by Christoph Redecker.pdf</li> <li> DN_030 Frequency Synthesizer.pdf</li> </ul> <hr/> <p>#1 This forum helps those that help themselves                  #2 All grounds are not created equal                  #3 How have you proved that your chip is running at xxMHz?                  #4 "If you think you need floating point to solve the problem then you don't understand the problem. If you really do need floating point then you have a problem you do not understand." - Heater's ex-boss</p> <p>Log In or Register to post comments <span style="float:right">Top</span></p>



<p>Brian Fairchild</p>	<p>Posted : Fri, Feb 1, 2019 - 12:43 PM <span style="float:right">★★★★★ Total votes: 1</span> #4</p>
 <p>Level: Raving Lunatic Joined: Thu, Oct 18, 2001 Posts: 3897 <a href="#">View posts</a> Location: Eastern England.</p>	<p>DN_031 to DN_040 complete set with some software files.</p> <p>Attachment(s):</p> <ul style="list-style-type: none"> <li> DN_031 Creating Non-blocking Timers in AVR.pdf</li> <li> DN_032 AVR Boot Loader.pdf</li> <li> DN_033 DAC Utilizing ADC.pdf</li> <li> DN_034 How to Declare IO Pins to Ease Software Design and Maintenance.pdf</li> <li> DN_035 Using the SPI as High Speed, Bi-directional Data Bus with Automatic MasterSlave Switch.pdf</li> <li> DN_036 Virtual Instrumentation.pdf</li> <li> DN_036 WindDir.zip</li> <li> DN_037 Custom Graphic LCD Characters.pdf</li> <li> DN_037.zip</li> <li> DN_038 Fast Look-up Table Driven 16-bit CRC Routine.pdf</li> <li> DN_038 FastCRC16.zip</li> <li> DN_039 Sound Sample Play Back.pdf</li> <li> DN_039 PlayBack.zip</li> <li> DN_040 Connecting an AVR Controller to CAN.pdf</li> </ul> <hr/> <p>#1 This forum helps those that help themselves                  #2 All grounds are not created equal                  #3 How have you proved that your chip is running at xxMHz?                  #4 "If you think you need floating point to solve the problem then you don't understand the problem. If you really do need floating point then you have a problem you do not understand." - Heater's ex-boss</p> <p><i>Last Edited: Fri, Feb 1, 2019 - 12:44 PM</i></p> <p>Log In or Register to post comments <span style="float:right">Top</span></p>

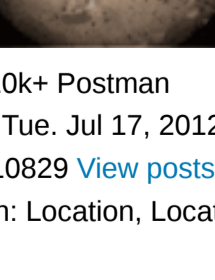
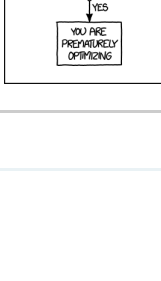
<p>Brian Fairchild</p>	<p>Posted : Fri, Feb 1, 2019 - 12:48 PM <span style="float:right">★★★★★ Total votes: 1</span> #5</p>
 <p>Level: Raving Lunatic Joined: Thu, Oct 18, 2001 Posts: 3897 <a href="#">View posts</a> Location: Eastern England.</p>	<p>DN_048 is the last one published.</p> <p>Attachment(s):</p> <ul style="list-style-type: none"> <li> DN_041 Interfacing Parallel FRAM to AVR Microcontrollers.pdf</li> <li> DN_042 Efficient Handling of RS-485 Timing Issues.pdf</li> <li> DN_043 A String Display Routine.pdf</li> <li> DN_044 Using Trinary Encoding to Reduce Pin Wastage.pdf</li> <li> DN_045 Using Shift Registers to Increase the Number of IO Pins.pdf</li> <li> DN_046 Timer Interrupt with a Maximum Accuracy.pdf</li> <li> DN_047 The Pin Adder Uses Seven Pins to Add 64 or more.pdf</li> <li> DN_048 I2C Bus Sniffer.pdf</li> </ul> <hr/> <p>#1 This forum helps those that help themselves                  #2 All grounds are not created equal                  #3 How have you proved that your chip is running at xxMHz?                  #4 "If you think you need floating point to solve the problem then you don't understand the problem. If you really do need floating point then you have a problem you do not understand." - Heater's ex-boss</p> <p>Log In or Register to post comments <span style="float:right">Top</span></p>

<p>Moe123</p>	<p>Posted : Fri, Feb 1, 2019 - 12:31 PM <span style="float:right">★★★★★ Total votes: 1</span> #6</p>
 <p>Level: Hangaround Joined: Tue, Aug 7, 2018 Posts: 133 <a href="#">View posts</a></p>	<p>Thanks a lot for this effort!</p> <p><i>Last Edited: Fri, Feb 1, 2019 - 12:51 PM</i></p> <p>Log In or Register to post comments <span style="float:right">Top</span></p>

<p>joeymorin</p>	<p>Posted : Sun, Feb 3, 2019 - 03:10 PM <span style="float:right">☆☆☆☆☆ Total votes: 0</span> #7</p>
 <p>Level: 10k+ Postman Joined: Tue, Jul 17, 2012 Posts: 10829 <a href="#">View posts</a> Location: Location, Location</p>	<p>The whole smash as a single zip.</p> <p>Minus the missing bits, of course.</p> <p>EDIT: Added DN_012 (found by sbennett here) to the .zip:  <a href="https://www.avrfreaks.net/comment/2632026#comment-2632026">https://www.avrfreaks.net/comment/2632026#comment-2632026</a></p> <p>EDIT2: Added DN_013 (found by Bingo600) to the .zip:</p> <p>Attachment(s):</p> <ul style="list-style-type: none"> <li> DN.zip</li> </ul> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>"Experience is what enables you to recognise a mistake the second time you make it."                  "Good judgement comes from experience. Experience comes from bad judgement."                  "Wisdom is always wont to arrive late, and to be a little approximate on first possession."                  "When you hear hoofbeats, think horses, not unicorns."                  "Fast. Cheap. Good. Pick two."                  "We see a lot of arses on handlebars around here." - [J Ekdahl]</p>  </div> <p><i>Last Edited: Sun, Feb 3, 2019 - 03:11 PM</i></p> <p>Log In or Register to post comments <span style="float:right">Top</span></p>

<p>joeymorin</p>	<p>Posted : Sat, Feb 2, 2019 - 06:25 PM <span style="float:right">☆☆☆☆☆ Total votes: 0</span> #8</p>
 <p>Level: 10k+ Postman Joined: Tue, Jul 17, 2012 Posts: 10829 <a href="#">View posts</a> Location: Location, Location</p>	<p>Apparently they don't stop at #48?:  <a href="https://www.avrfreaks.net/forum/design-notes-ame1">https://www.avrfreaks.net/forum/design-notes-ame1</a></p> <p>EDIT: Although I see that perhaps this is actually referring to " DN024 Timer/Counter Basics" ... ?</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>"Experience is what enables you to recognise a mistake the second time you make it."                  "Good judgement comes from experience. Experience comes from bad judgement."                  "Wisdom is always wont to arrive late, and to be a little approximate on first possession."                  "When you hear hoofbeats, think horses, not unicorns."                  "Fast. Cheap. Good. Pick two."                  "We see a lot of arses on handlebars around here." - [J Ekdahl]</p>  </div> <p><i>Last Edited: Sun, Feb 3, 2019 - 07:42 PM</i></p> <p>Log In or Register to post comments <span style="float:right">Top</span></p>

<p>joeymorin</p>	<p>Posted : Sun, Feb 3, 2019 - 05:26 AM <span style="float:right">☆☆☆☆☆ Total votes: 0</span> #9</p>
 <p>Level: 10k+ Postman Joined: Tue, Jul 17, 2012 Posts: 10829 <a href="#">View posts</a> Location: Location, Location</p>	<p>Uploaded new .zip in #7 to include DN_012 found by sbennett here:  <a href="https://www.avrfreaks.net/comment/2631826#comment-2631826">https://www.avrfreaks.net/comment/2631826#comment-2631826</a></p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>"Experience is what enables you to recognise a mistake the second time you make it."                  "Good judgement comes from experience. Experience comes from bad judgement."                  "Wisdom is always wont to arrive late, and to be a little approximate on first possession."                  "When you hear hoofbeats, think horses, not unicorns."                  "Fast. Cheap. Good. Pick two."                  "We see a lot of arses on handlebars around here." - [J Ekdahl]</p>  </div> <p>Log In or Register to post comments <span style="float:right">Top</span></p>

<p>joeymorin</p>	<p>Posted : Sun, Feb 3, 2019 - 03:11 PM <span style="float:right">☆☆☆☆☆ Total votes: 0</span> #10</p>
 <p>Level: 10k+ Postman Joined: Tue, Jul 17, 2012 Posts: 10829 <a href="#">View posts</a> Location: Location, Location</p>	<p>Uploaded new .zip in #7 to include DN_013 found by Bingo600 here:  <a href="https://www.avrfreaks.net/comment/2631346#comment-2631346">https://www.avrfreaks.net/comment/2631346#comment-2631346</a></p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>"Experience is what enables you to recognise a mistake the second time you make it."                  "Good judgement comes from experience. Experience comes from bad judgement."                  "Wisdom is always wont to arrive late, and to be a little approximate on first possession."                  "When you hear hoofbeats, think horses, not unicorns."                  "Fast. Cheap. Good. Pick two."                  "We see a lot of arses on handlebars around here." - [J Ekdahl]</p>  </div> <p>Log In or Register to post comments <span style="float:right">Top</span></p>