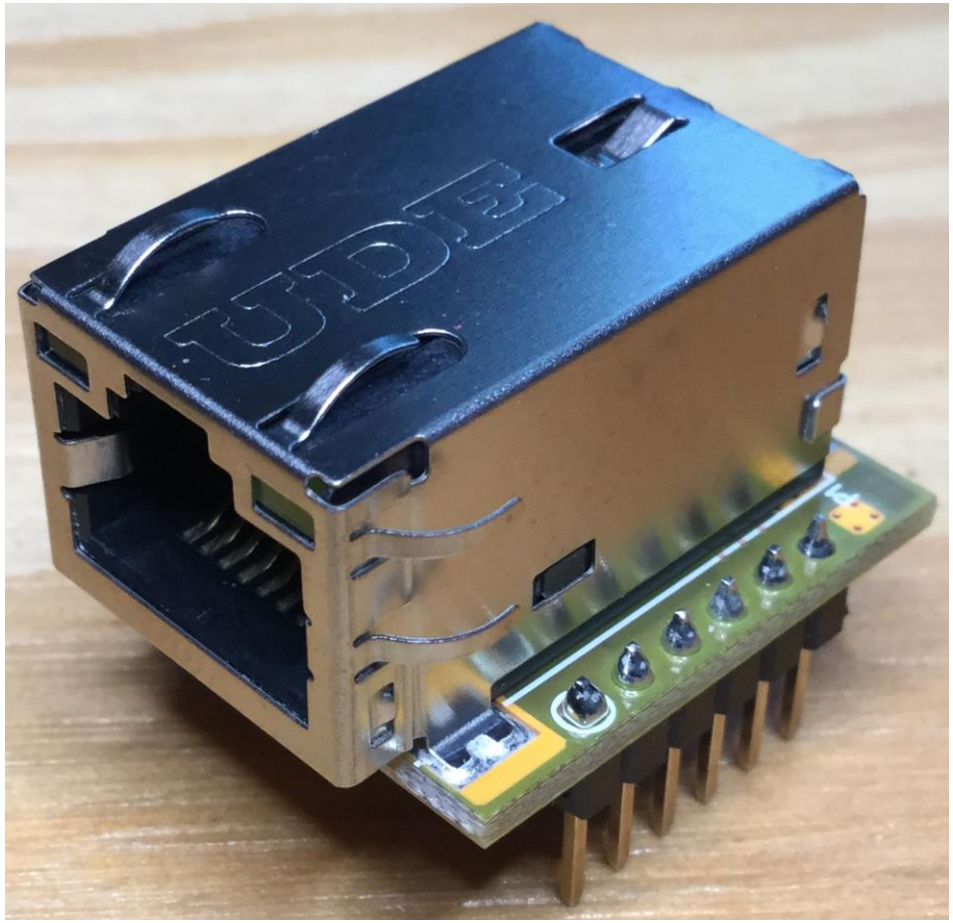
Easy TCP/IP for IoT



TCP/IP in a Can

October 23, 2019

Fred Eady

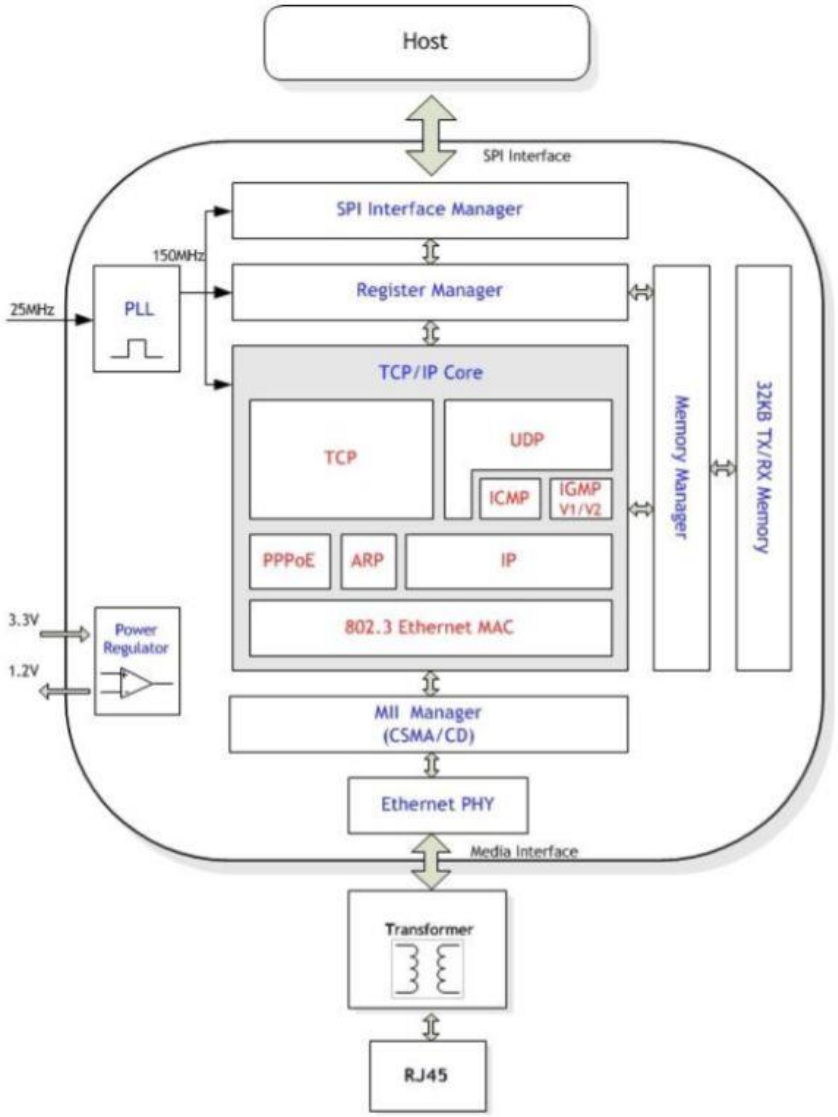
Presented by:

AGENDA

- **Hardware – The WIZ850io**
- **Firmware – Integrating the WIZnet ioLibrary**
- **Day 3 Summary**

Easy TCP/IP for IoT

Hardware – The WIZ850io: W5500 Block Diagram



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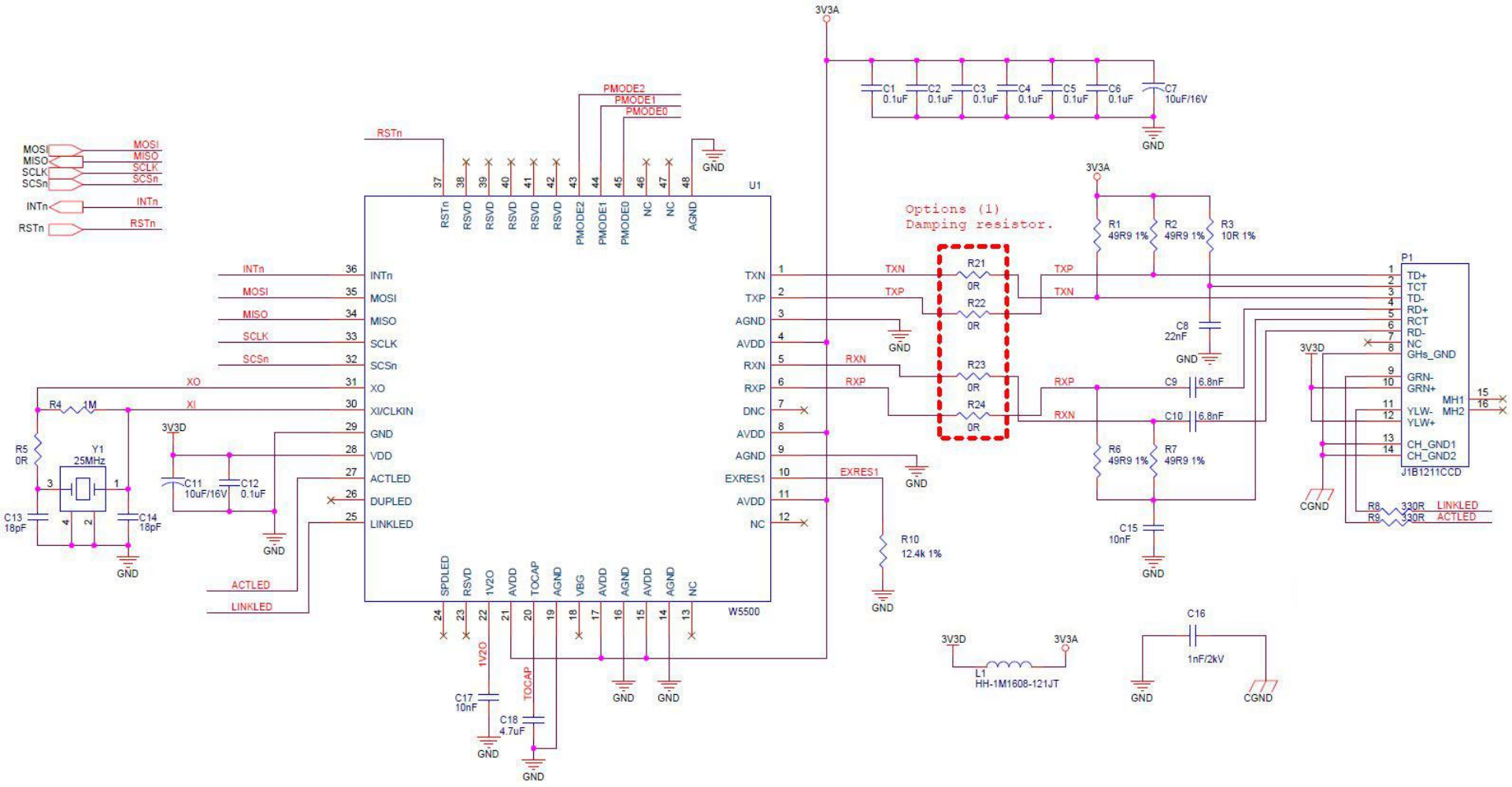
Hardware – The WIZ850io: W5500 Reference Design



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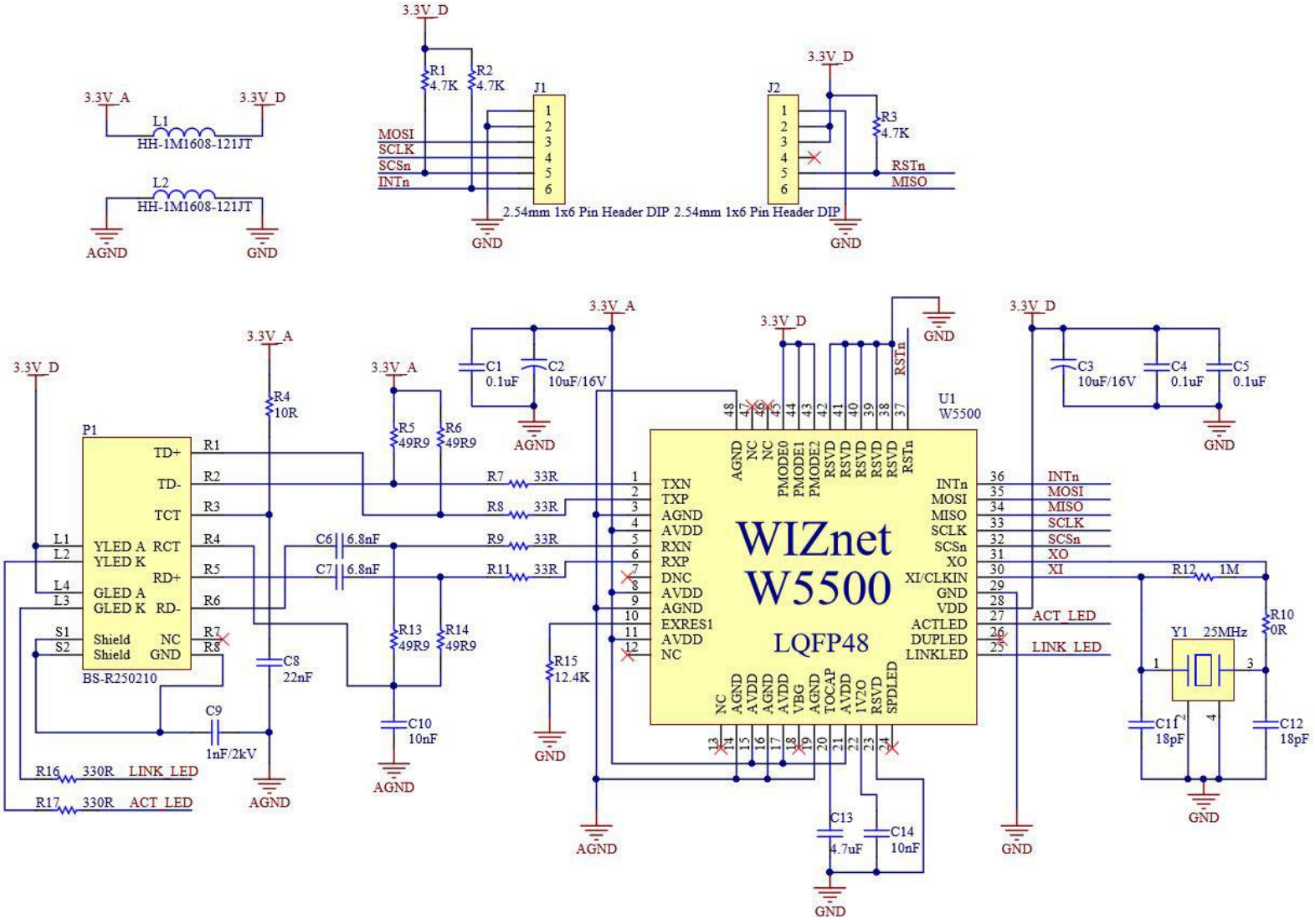
Hardware – The WIZ850io: Module Schematic



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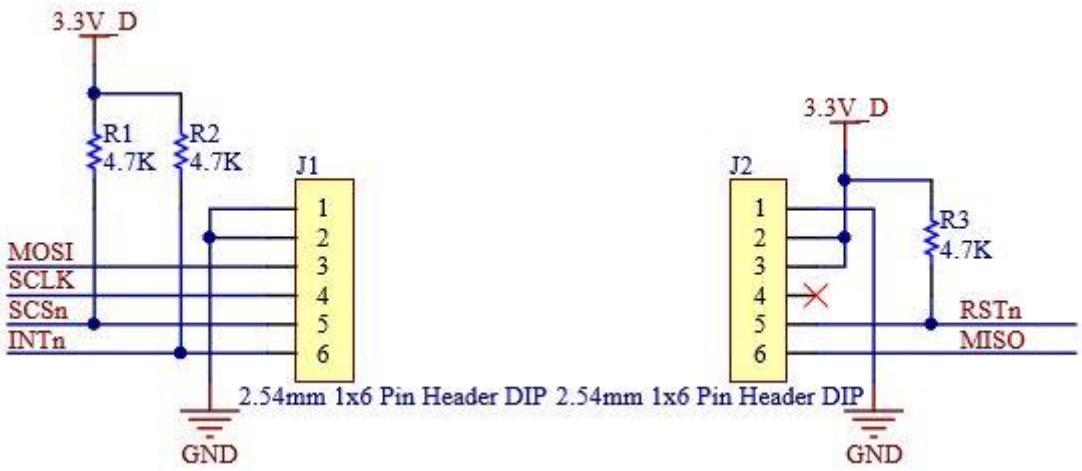
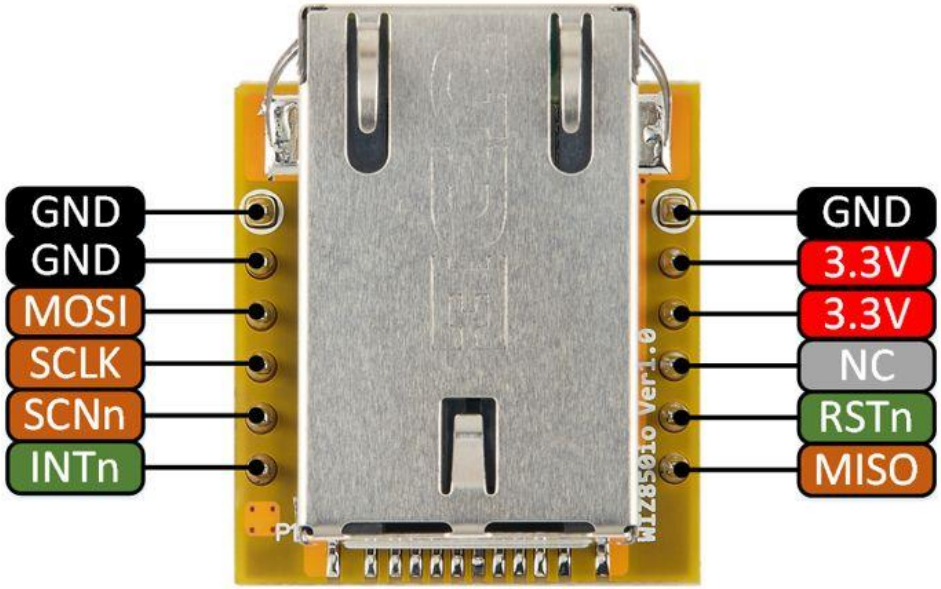
Hardware – The WIZ850io: Module Pinout





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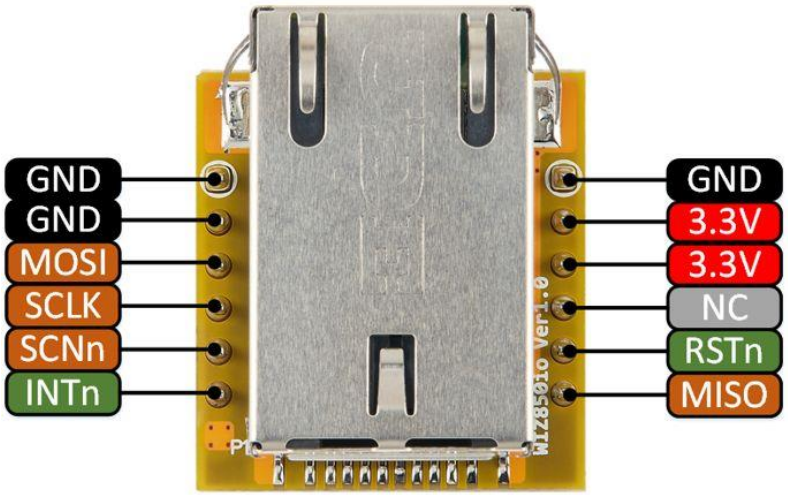
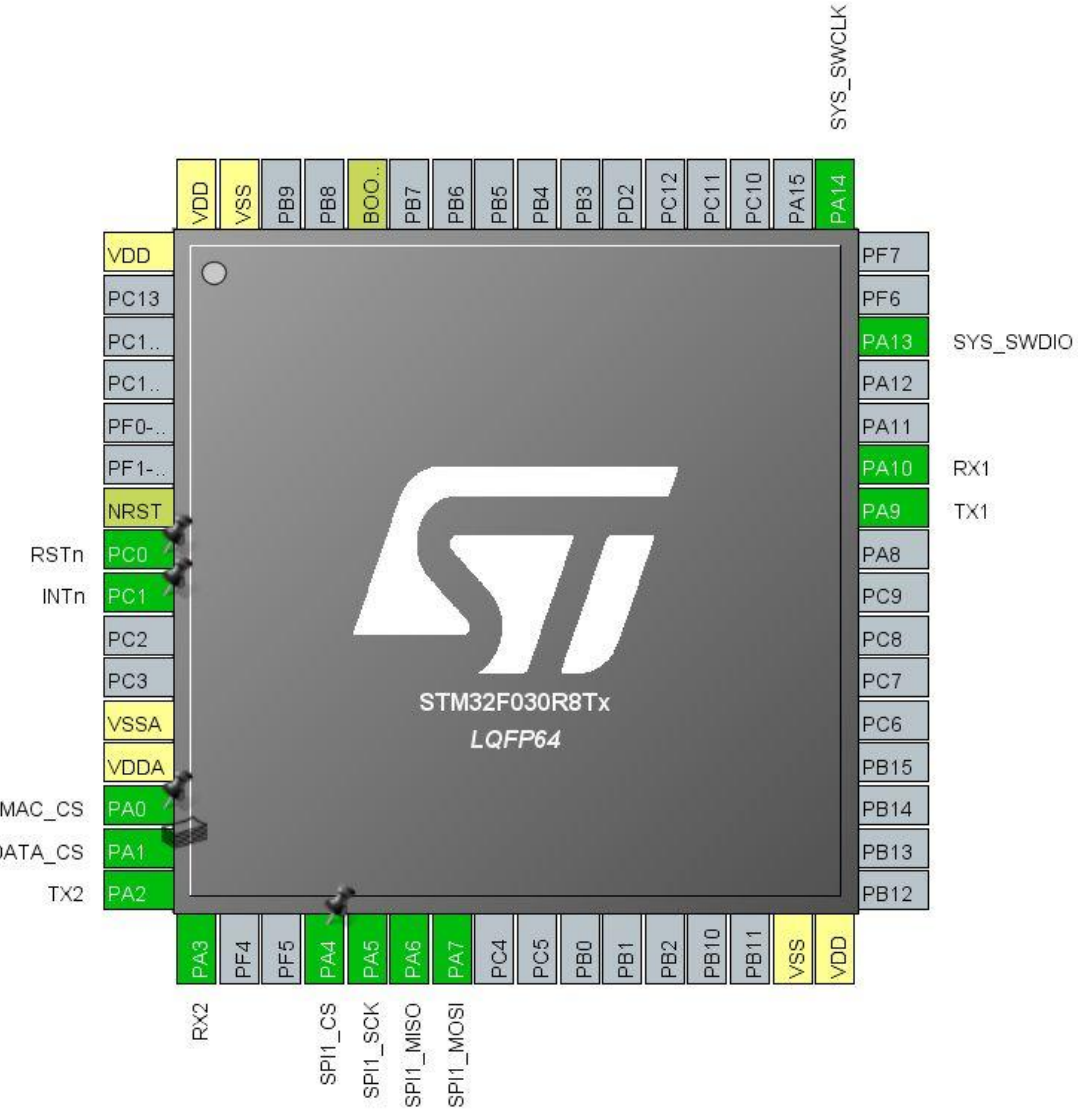
Hardware – The WIZ850io: Module ARM Interface





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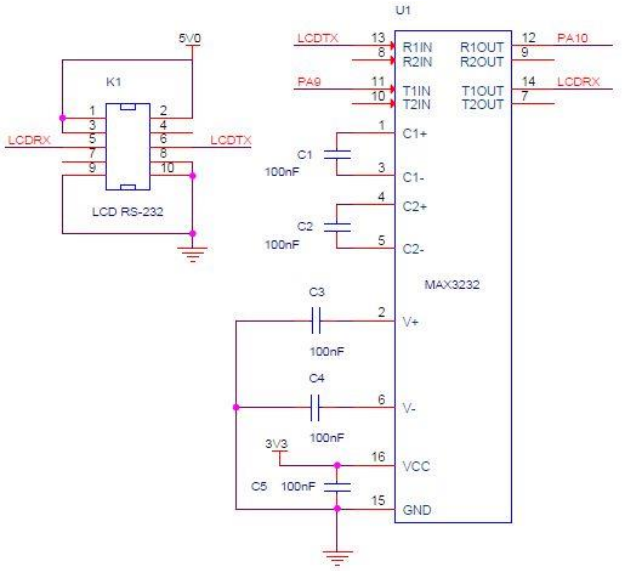
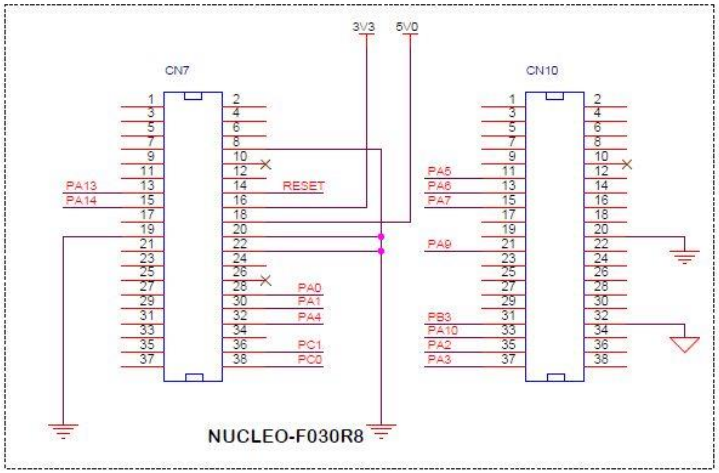
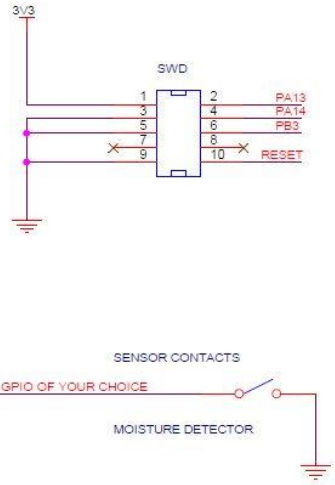
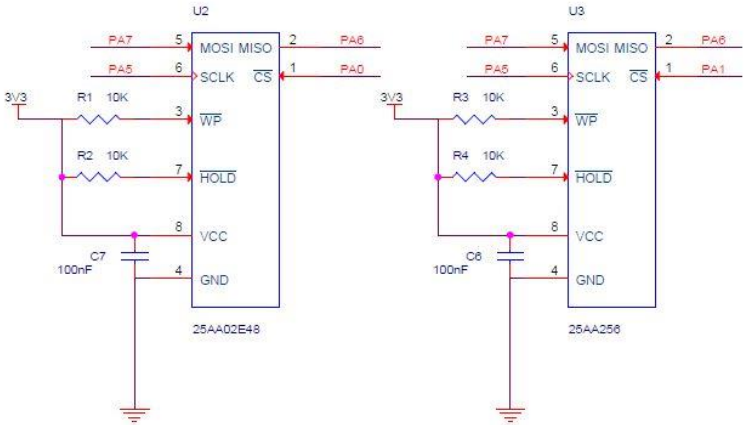
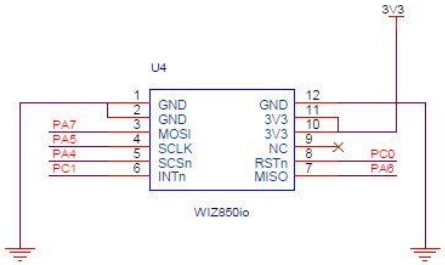
Hardware – The WIZ850io: ARM System

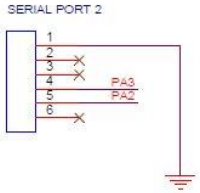












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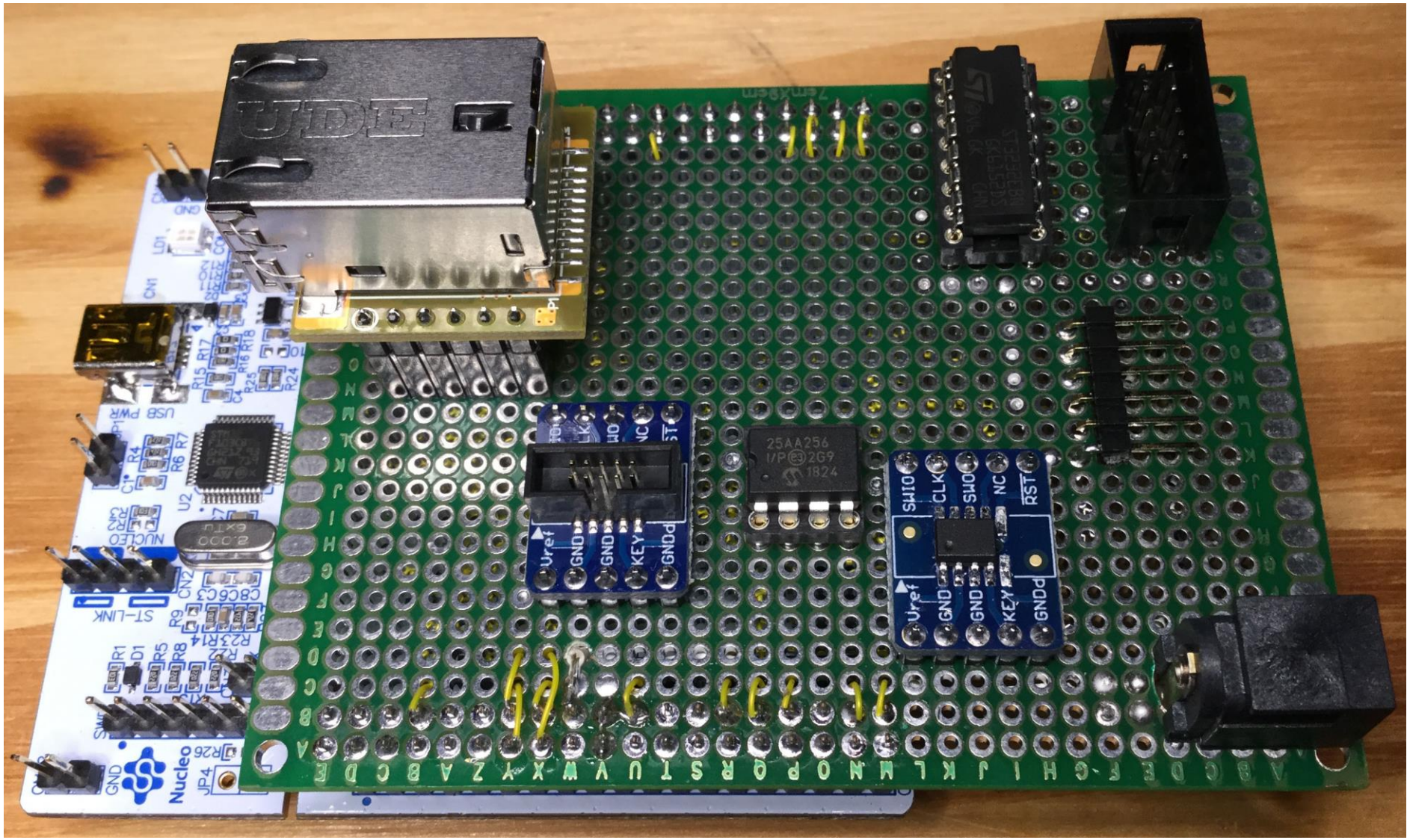
Hardware – The WIZ850io: ARM System



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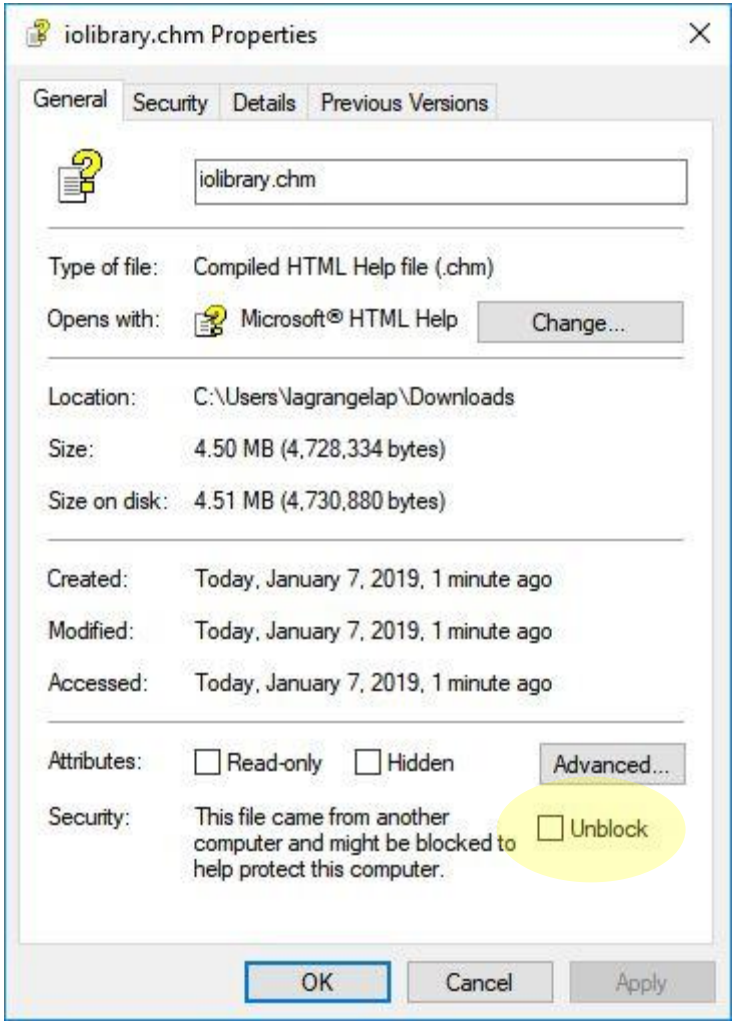
Firmware – Integrating the WIZnet ioLibrary: Unblock ioLibrary.chm



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Firmware – Integrating the WIZnet ioLibrary: Specify W5500 and I/O Mode

wizchip_conf.h

```
62  /**
63   * @brief Select WIZCHIP.
64   * @todo You should select one, \b W5100, \b W5100S, \b W5200, \b W5300, \b W5500 or etc.
65   *       ex> <code> #define \_WIZCHIP_      W5500 </code>
66   */
67
68  #define W5100            5100
69  #define W5100S           5100+5
70  #define W5200            5200
71  #define W5300            5300
72  #define W5500            5500
73
74  #ifndef _WIZCHIP_
75  #define _WIZCHIP_                    W5500   // W5100, W5100S, W5200, W5300, W5500
76  #endif

151 #ifndef _WIZCHIP_IO_MODE_
152     //#define _WIZCHIP_IO_MODE_          _WIZCHIP_IO_MODE_SPI_FDM_
153     #define _WIZCHIP_IO_MODE_          _WIZCHIP_IO_MODE_SPI_VDM_
154 #endif
```

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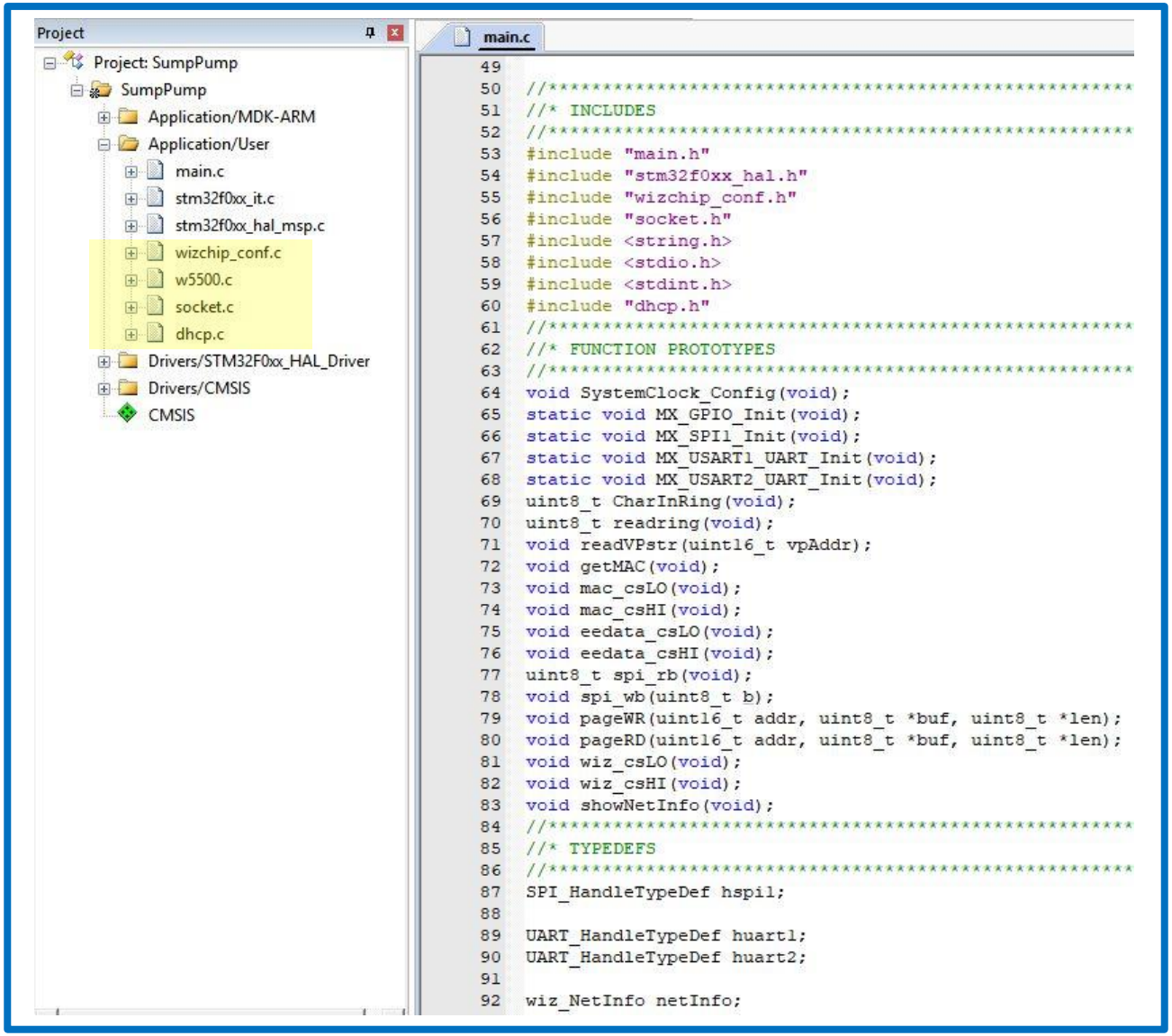
Firmware – Integrating the WIZnet ioLibrary: ioLibrary Files



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Firmware – Integrating the WIZnet ioLibrary: SPI Integration

```
283  //*************************
284  //* GET MAC ADDRESS
285  //*************************
286  void getMAC(void)
287  {
288    mac_csLO();
289    spi_wb(ee_readCmd);
290    spi_wb(mac_eeAddr);
291    for(i=0;i<6;i++)
292    {
293      macAddr[i] = spi_rb();
294    }
295    mac_csHI();
296  }
```

```
782    reg_wizchip_cs_cbfunc(wiz_csLO, wiz_csHI);
783    reg_wizchip_spi_cbfunc(spi_rb, spi_wb);
784    //uint8_t bufSize[] = {2, 2, 2, 2};
785    wizchip_init(bufSize, bufSize);
786    getMAC();
787    for(eeIndx=0;eeIndx<6;eeIndx++)
788    {
789      netInfo.mac[eeIndx] = macAddr[eeIndx];
790    }
791    wizchip_setnetinfo(&netInfo);
```

Watch 1

Name	Value	Type
netInfo	0x20000210 &netInfo	struct wiz_NetInfo_t
mac	0x20000210 &netInfo[]...	unsigned char[6]
[0]	0x00	unsigned char
[1]	0x04	unsigned char
[2]	0xA3 '£'	unsigned char
[3]	0x06	unsigned char
[4]	0xE7 'ç'	unsigned char
[5]	0x4B 'K'	unsigned char
ip	0x20000216 ""	unsigned char[4]
sn	0x2000021A ""	unsigned char[4]
gw	0x2000021E ""	unsigned char[4]
dns	0x20000222 ""	unsigned char[4]
dhcp	0x00	enum (uchar)

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Firmware – Integrating the WIZnet ioLibrary: DHCP

```
793     scratch8 = 0;
794     DHCP_init(0,dhcpBuf);
795     printf("DHCP Init\r\n");
796     do{
797     switch(DHCP_run())
798     {
799       case DHCP_FAILED:
800         printf("DHCP FAILED\r\n");
801       break;
802       case DHCP_RUNNING:
803         //printf("DHCP RUNNING\r\n");
804       break;
805       case DHCP_IP_ASSIGN:
806         printf("DHCP IP ASSIGN\r\n");
807       break;
808       case DHCP_IP_CHANGED:
809         printf("DHCP IP CHANGED\r\n");
810       break;
811       case DHCP_IP_LEASED:
812           if(scratch8 == 0)
813           {
814             printf("DHCP IP LEASED\r\n");
815             wizchip_getnetinfo(&netInfo);
816             showNetInfo();
817             ++scratch8;
818           }
819       break;
820       case DHCP_STOPPED:
821         printf("DHCP STOPPED\r\n");
822       break;
823     }
824   }while(1);
```

Watch 1

Name	Value	Type
netInfo	0x20000210 &netInfo	struct wiz_NetInfo_t
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[3]	0x06	unsigned char
[4]	0xE7 'ç'	unsigned char
[5]	0x4B 'K'	unsigned char
ip	0x20000216 "À¨□à"	unsigned char[4]
[0]	0xC0 'À'	unsigned char
[1]	0xA8 '¨'	unsigned char
[2]	0x01	unsigned char
[3]	0xE0 'à'	unsigned char
sn	0x2000021A "ÿÿÿÿ"	unsigned char[4]
[0]	0xFF 'ÿ'	unsigned char
[1]	0xFF 'ÿ'	unsigned char
[2]	0xFF 'ÿ'	unsigned char
[3]	0x00	unsigned char
gw	0x2000021E "À¨□□"	unsigned char[4]
[0]	0xC0 'À'	unsigned char
[1]	0xA8 '¨'	unsigned char
[2]	0x01	unsigned char
[3]	0x01	unsigned char
dns	0x20000222 ""	unsigned char[4]
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[5]	0x4B 'K'	unsigned char
ip	0x20000216 "À □a"	unsigned char[4]

```
272  //*****************************************************************************
273  //* SHOW NETWORK CONFIGURATION
274  //*****************************************************************************
275  void showNetInfo(void)
276  {
277    printf("Network configuration:\r\n");
278    printf("  IP ADDRESS:  %d.%d.%d.%d\r\n", netInfo.ip[0],netInfo.ip[1], netInfo.ip[2], netInfo.ip[3]);
279    printf("  MAC ADDRESS: 0x%02X:0x%02X:0x%02X:0x%02X:0x%02X:0x%02X\r\n", netInfo.mac[0],netInfo.mac[1], netInfo.mac[2], netInfo.mac[3], netInfo.mac[4], netInfo.mac[5]);
280    printf("  NETMASK:     %d.%d.%d.%d\r\n", netInfo.sn[0], netInfo.sn[1], netInfo.sn[2], netInfo.sn[3]);
281    printf("  GATEWAY:     %d.%d.%d.%d\r\n", netInfo.gw[0], netInfo.gw[1], netInfo.gw[2], netInfo.gw[3]);
282  }
```

[1]	0xFF 'ÿ'	unsigned char
[2]	0xFF 'ÿ'	unsigned char
[3]	0x00	unsigned char
gw	0x2000021E "À¨□□"	unsigned char[4]
[0]	0xC0 'À'	unsigned char
[1]	0xA8 '¨'	unsigned char
[2]	0x01	unsigned char
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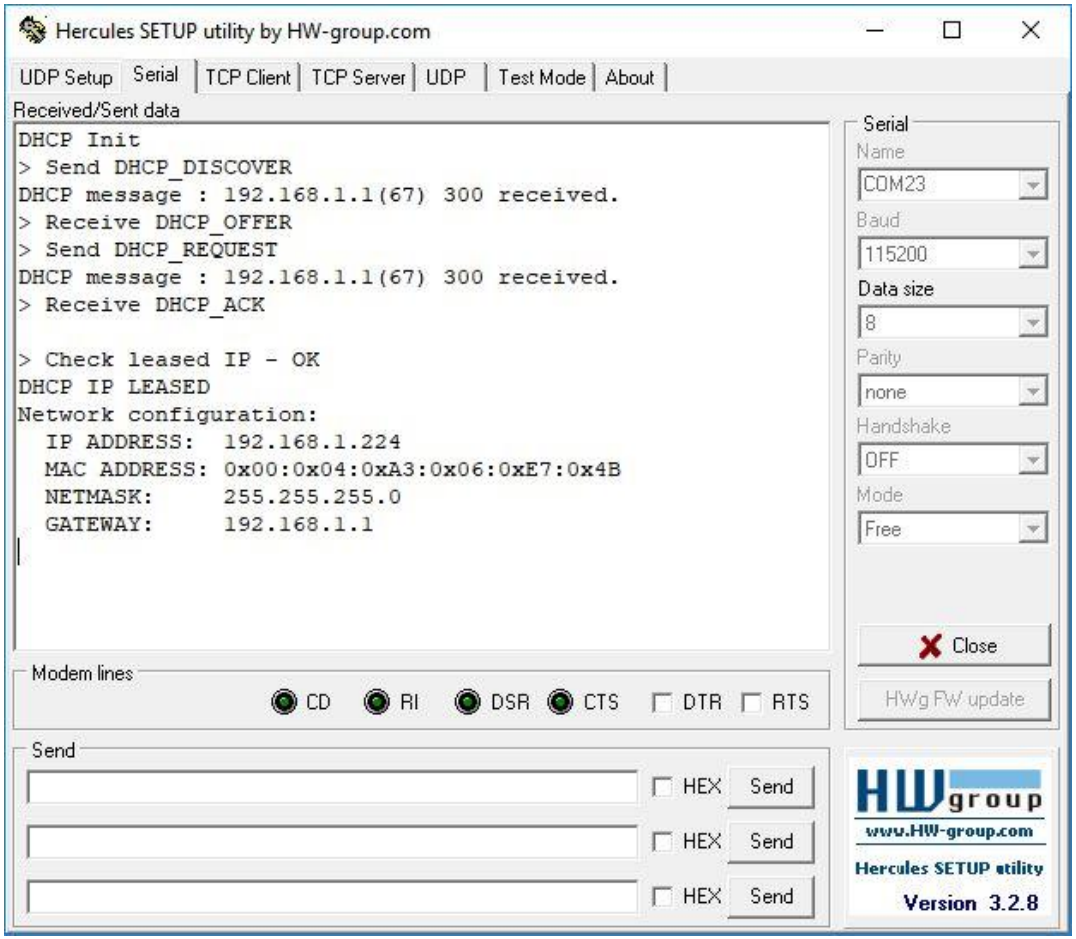

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Day 3 Summary