W5300 Errata Sheet

Document History

Ver 1.1.0 (AUG. 19, 2008)	First release (erratum 1, 2, 3)
Ver 1.2.0 (FEB. 23, 2012)	Add Erratum 4, 5 Change the Errata sheet form (Match with W3150A+ / W5100 Errata sheet.)
Ver 1.2.1(MAR. 23, 2012)	Add a solution for erratum 4,5
Ver 1.2.2 (FEB. 7, 2014)	Add a description of solution for erratum 4
Ver 1.2.3 (MAR. 19, 2015)	Modify a description of solution for erratum 4

For more information, visit our website at http://www.wiznet.co.kr

Erratum 1	
Phenomenon	**In TCP Mode, Sn_SSR(Socket status register)value does not change from "0x10" or "0x11" during the TCP connection process.**
Condition	When the user executes "SEND" command, the user should stay in a waiting state until it receives "SEND_OK" interrupt message[1]. However, when the user executes "CLOSE" or "DISCONNECT" command to terminate the connection during this waiting state, TCP Connection Establishment fails for Socket status register(Sn_SSR)'s fixed value from "0x10" or "0x11".

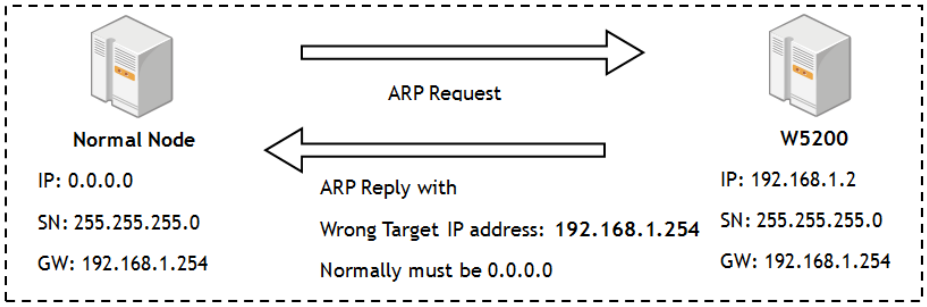
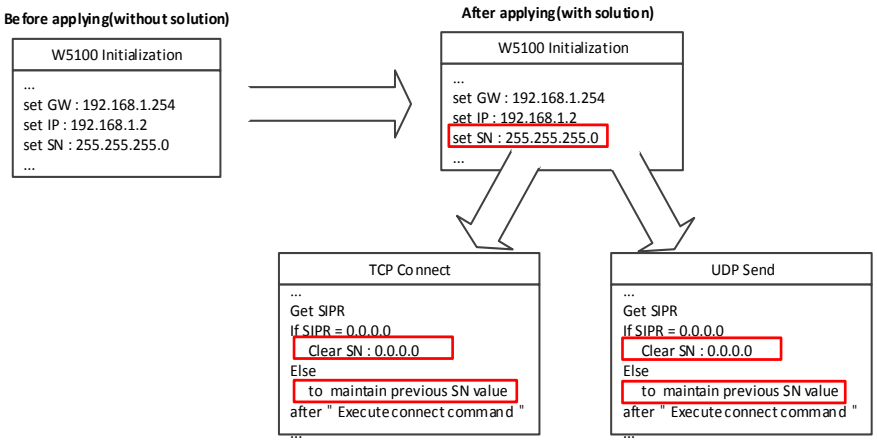
Solution & Recommendation	Insert the following code when the connection is shut manually before the completion of data transfer (or must insert the following code in CLOSE() function)
	
	`socket(ch, Sn_MR_UDP, 5000, 0x00);`
	`// Open with UDP. Port Number can be assigned randomly.`
	`sendto(ch, data_buf, 1,(uchar*)&destip,destport);`
	`// Run the transmission command. destip and destport may use random value.`
	`//  Execute the test by setting destip at 0.0.01 desport 5000`
	`close(ch);`
	`// close`
	
	This will release the data transmission process from pending state.

[1] Occasionally, it takes some time to resolve this incomplete process. TCP would be in an incomplete data transmission process state when the destination window size is smaller than the data size being transmitted. Then TCP stays in a pending state until the receiver's window size becomes large enough.

Erratum 2	
Phenomenon	**In TCP Mode,** **Decrease in transmission speed due to the absence of "Window Update ACK" packet.**
Condition	Usually, TCP controls data transmission speed by exchanging the data buffer size (window). The TCP will be in a pending state when the Peer's buffer size is smaller than the data size being transmitted. Then the peer should announce the change in data buffer size ("Window Update ACK" packet) so that pending state could get released. However, since W5300 does not automatically send out "Window Update ACK" packet as above, user may experience decreased data transmission speed. **) For the reference, when W5300 performs in TCP mode, ACK packet will be transmitted due to the "SEND" command and timeout. Moreover, if user enables "No delayed option" and receives data packet from its Peer, then the ACK packet will be transmitted as well.*
Solution & Recommendation	The most efficient way of solving this matter is to sustain the receiving buffer size bigger than the MSS value as soon as possible. This is because "Windows Update ACK" function is not necessary for above case. If the condition doesn't get satisfied, then the User must execute "SEND" command to transmit the "Window Update ACK" packet manually[2] followed by variation of receiving buffer size: receiving buffer size is less than MSS value -> "RECV" command enlarges the buffer size -> buffer size is sufficient enough to hold the transmitted data.

[2] Transmit the dummy data as a meaning of "No Operation" in user application.

Erratum 3	
Phenomenon	**In TCP Mode,** **Unable to read Destination Port Number Register (Sn_DPORTR) correctly.**
Condition	After the TCP Connection Establishment, Destination Port Number Register (Sn_DPORTR) stores correct Destination Port Number. But the user is unable to read the Destination Port Number Register (Sn_DPORTR) correctly. For example, register will store the destination port number, 0x1234 as it is. However, user can only see duplicated high byte of port number, which is 0x1212.
Solution & Recommendation	None. However, since the Destination Port Number Register (Sn_DPORTR) contains correct Destination Port Number, TCP function will perform without any problem.

Erratum 4	
Phenomenon	**The W5300 replies with gateway IP address for the ARP request from normal node which has "0.0.0.0" IP address. But normally the W5300 should replies with target IP address "0.0.0.0" not the gateway IP address.**
Condition	 The main reason of this erratum is subnet calculating logic. The W5300 misunderstands the node locates other sub-network when target has "0.0.0.0" IP address. So the W5300 set the target IP to the gateway IP instead of "0.0.0.0" and sends the ARP reply.
Solution & Recommendation	 To avoid this erratum we must keep the subnet mask register value to setting value except two cases which are "CONNECT" command in TCP and "SEND" command in UDP. Because only these two cases are referring the subnet mask register and sending the ARP request. So set the subnet mask register to "FF.FF.FF.xx" and keeping it but save the right subnet mask value to the global variable when you initialize the W5100. When you use connect command in TCP or send command in UDP, set the subnet mask register to zero using the variable before executing connect or send command. After done connect or send command, sets the subnet mask register again to keep its value to "FF.FF.FF.xx".

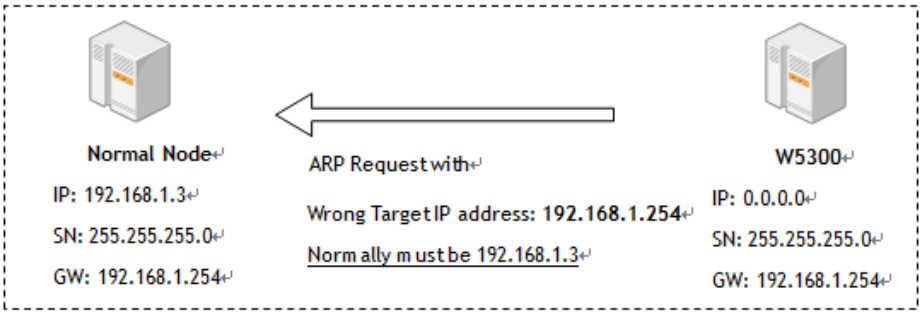
In the case of applying, you can't use the subnet broadcasting.

Example pseudo code:

```
/* Global variable declaration for subnet mask value */
unsigned char subnet_val[4];
/* W5100 initialization function */
Function Initialize_W5100( )
{
...
/* Clear the subnet mask register */
    IINCHIP_WRITE(SUBR0, 0);
    IINCHIP_WRITE(SUBR1, 0);
    IINCHIP_WRITE(SUBR2, 0);
    IINCHIP_WRITE(SUBR3, 0);
/* Save the right subnet mask value if the subnet is 255.255.255.0 */
    subnet_val[0] = 255;
    subnet_val[1] = 255;
    subnet_val[2] = 255;
    subnet_val[3] = 0;
...
}

/* TCP connect function */
Function TCP_Connect( )
{
...

/* Clear the subnet mask register again and keep it */
    IP_Val[0] = IINCHIP_READ(SIPR0);
    IP_Val[1] = IINCHIP_READ(SIPR0+1);
    IP_Val[2] = IINCHIP_READ(SIPR0+2);
    IP_Val[3] = IINCHIP_READ(SIPR0+3);

    If( IP_Val[0]==0 && IP_Val[1] ==0&& IP_Val[2] ==0&& IP_Val[3] ==0)
{
    IINCHIP_WRITE(SUBR0, 0);
```

```
    IINCHIP_WRITE(SUBR1, 0);
    IINCHIP_WRITE(SUBR2, 0);
    IINCHIP_WRITE(SUBR3, 0);
}
/* Execute TCP connect command */
    IINCHIP_WRITE(Sn_CR(socket), Sn_CR_CONNECT);
/* Wait for command done */
    while(Sn_CR(socket));
/* Set the subnet mask register to the right value using the variable */
    IINCHIP_WRITE(SUBR0, subnet_val[0]);
    IINCHIP_WRITE(SUBR1, subnet_val[1]);
    IINCHIP_WRITE(SUBR2, subnet_val[2]);
    IINCHIP_WRITE(SUBR3, subnet_val[3]);
...
}

/* UDP sendto function */
Function UDP_Sendto( )
{
...
/* Clear the subnet mask register again and keep it */
    IP_Val[0] = IINCHIP_READ(SIPR0);
    IP_Val[1] = IINCHIP_READ(SIPR0+1);
    IP_Val[2] = IINCHIP_READ(SIPR0+2);
    IP_Val[3] = IINCHIP_READ(SIPR0+3);

    If( IP_Val[0]==0 && IP_Val[1] ==0&& IP_Val[2] ==0&& IP_Val[3] ==0)
{
    IINCHIP_WRITE(SUBR0, 0);
    IINCHIP_WRITE(SUBR1, 0);
    IINCHIP_WRITE(SUBR2, 0);
    IINCHIP_WRITE(SUBR3, 0);
}
/* Execute UDP send command */
    IINCHIP_WRITE(Sn_CR(socket), Sn_CR_SEND);
/* Wait for command done */
```

```
    while(Sn_CR(socket));
/* Set the subnet mask register to the right value using the variable */
    IINCHIP_WRITE(SUBR0, subnet_val[0]);
    IINCHIP_WRITE(SUBR1, subnet_val[1]);
    IINCHIP_WRITE(SUBR2, subnet_val[2]);
    IINCHIP_WRITE(SUBR3, subnet_val[3]);
...
}
```

Erratum 5	
Phenomenon	**Assuming that the IP address of W5300 is "0.0.0.0" and the gateway, subnet mask is valid (not "0.0.0.0"), the W5300 set the target IP address of ARP request to the gateway IP address not the target node IP address when sends ARP request to another node. So the peer node cannot receive the ARP request from the W5300.**
Condition	 The W5300 miss calculates the sub-network location when sends the ARP request if its own IP address is "0.0.0.0". In the same condition, even if the gateway IP address is "0.0.0.0", the W5300 sends ARP request to "0.0.0.0" IP address because the W5300 sends ARP request to the gateway.
Solution & Recommendation	The reason of this erratum5 is same as erratum4 so the solution is also same with erratum4. Please refer to the solution of erratum4.