How to Access PHY Register

Application Note

Version 1.0.0

http://www.wiznet.co.kr

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1 Introduction

W7500P PHY's Register can be accessed by MDC and MDIO. Users can control MDC/MDIO through GPIOx. MDC/MDIO format is shown in the below table. To access PHY Register in W7500P, MDC should be at least one more cycle than MDIO. That is, a complete command consists of 32 bits MDIO data and at least 33 MDC clocks. When this interface is idle, MDIO is in high impedance.

Table 1 Interface Format

Frame format	<Idle><start><op code><PHY address><Register address><turnaround><data><Idle>
Read Operation	<Idle><01><10><$A_4A_3A_2A_1A_0$><$R_4R_3R_2R_1R_0$><Z0><$b_{15}b_{14}b_{13}b_{12}b_{11}b_{10}b_9b_8b_7b_6b_5b_4b_3b_2b_1b_0$><Idle>
Write Operation	<Idle><01><01><$A_4A_3A_2A_1A_0$><$R_4R_3R_2R_1R_0$><10><$b_{15}b_{14}b_{13}b_{12}b_{11}b_{10}b_9b_8b_7b_6b_5b_4b_3b_2b_1b_0$><Idle>

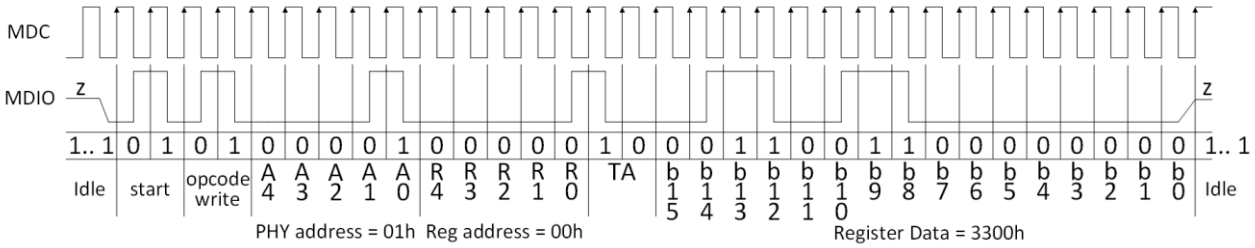

Figure 1 MDC/MDIO Write Format

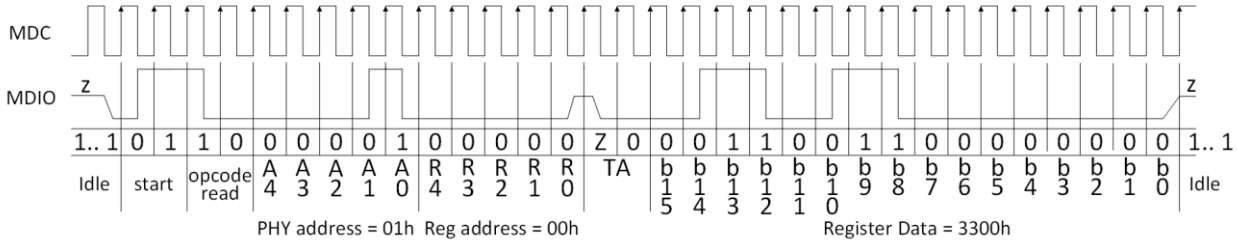

Figure 2 MDC/MDIO Read Format

2 How to Access PHY Register

2.1 Write Access

```
{
START:
        // Set GPIO(Value, Length)
        Set GPIO(0x05, 4);   // Start bits 01, Write Access 01
        Set GPIO(PHY address, 5);   // PHY address
        Set GPIO(REG address, 5);   // MII register
        Set GPIO(0x02, 2);   // turnaround bits 10
        Set GPIO(DATA, 16);
}
```

2.2 Read Access

```
{
START:
        // Set GPIO(Value, Length)
        Set GPIO(0x06, 4);   // Start bits 01, Read Access 10
        Set GPIO(PHY address, 5);   // PHY register
        Set GPIO(REG address, 5);   // MII register
        Set GPIO(CLR, 2);   // turnaround bits high impedance
        Val = Get GPIO(DATA, 16);
}
```

2.3 Get PHY Address

```
{
START:
        // Loop to find PHY address
        for(i=0; i<8; i++)
        {
            Set GPIO(0x05, 4);   // Read Access
            Set GPIO(i, 5);   // PHY address
            Set GPIO(0x01, 5);   // PHY Status Register (0x01)
            Set GPIO(CLR, 2);    // turnaround bits high impedance
            Val = Get GPIO(DATA, 16);   // To check LINK bit in PHY Status Register.
            if(Val != 0) return i;   // i is PHY address
        }
```

```
}
```

Document History Information

Version	Date	Descriptions
Ver. 1.0.0	7AUG2018	Initial Release

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