PHY Register dump over JTAG

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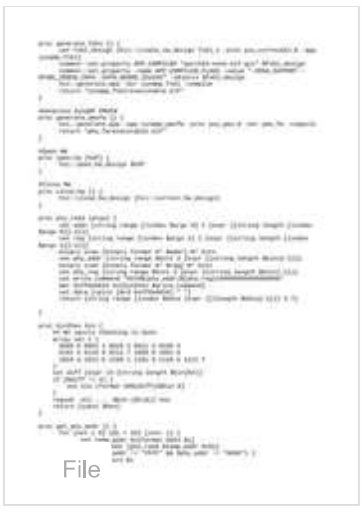
Last updated: Jan 18, 2019 • Legacy editor

In this article we shall use a script that will allow the user to read the PHY management registers over the JTAG. This can be useful for board bring up where uboot is not possible.

The script was tested on a ZCU102, and cross referenced against the u-boot *mii dump* utility for sanity purposes.

To use the script, download the file below:



File

HDF File
User will need to open the TCL and update line 73 to point to their HDF file.

Then, Launch XSCT and source the TCL command:

source TCL

```
source jtag_phy.tcl
```

The script will automatically create the FSBL, and PMUFW (if not detected). The script will then search for the PHY Addr and return the address if found. The script will return -1 if not.

This script assumes the user is using GEM3 for the PHY. So, if this is not the case in your design then open the TCL and make the modifications in the *init_man_port* proc, and the *phy_read* proc.

For help here, see the Zynq MP Register Reference guide.

Once the script is run, and the PHY Addr is successfully found, the use can use the phy_read command to read the PHY registers. For example:

```
Phy Address is: 0x0C
To read a PHY Reg, use the command below:
phy_read 0x0C 0x<phy register>
xsct% phy_read 0x0c 0x01
7949
xsct% phy_read 0x0c 0x02
2000
xsct% phy_read 0x0c 0x03
A231
xsct% phy_read 0x0c 0x04
01E1
xsct% phy_read 0x0c 0x05
0000
xsct% phy_read 0x0c 0x00
1140
xsct%
```

As a sanity check, I compared these results against the uboot utility:

/ PHY Register dump over JTAG

```
  (2040:0040) 0. 6,13 =   b10    speed selection = 1000 Mbps
  (1000:1000) 0.12    =     1    A/N enable
  (0800:0000) 0.11    =     0    power-down
  (0400:0000) 0.10    =
  (0200:0000) 0. 9    =
  (0100:0100) 0. 8    =
  (0080:0000) 0. 7    =     0    collision test enable
  (003f:0000) 0. 5- 0 =     0    (reserved)

1.     (7949)                -- PHY status register --
  (8000:0000) 1.15    =     0    100BASE-T4 able
  (4000:4000) 1.14    =     1    100BASE-X  full duplex able
  (2000:2000) 1.13    =     1    100BASE-X  half duplex able
  (1000:1000) 1.12    =     1    10 Mbps    full duplex able
  (0800:0800) 1.11    =     1    10 Mbps    half duplex able
  (0400:0000) 1.10    =     0    100BASE-T2 full duplex able
  (0200:0000) 1. 9    =     0    100BASE-T2 half duplex able
  (0100:0100) 1. 8    =     1    extended status
  (0080:0000) 1. 7    =     0    (reserved)
  (0040:0040) 1. 6    =     1    MF preamble suppression
  (0020:0000) 1. 5    =     0    A/N complete
  (0010:0000) 1. 4    =     0    remote fault
  (0008:0008) 1. 3    =     1    A/N able
  (0004:0000) 1. 2    =     0    link status
  (0002:0000) 1. 1    =     0    jabber detect
  (0001:0001) 1. 0    =     1    extended capabilities

2.     (2000)                -- PHY ID 1 register --
  (ffff:2000) 2.15- 0 =  8192    OUI portion

3.     (a231)                -- PHY ID 2 register --
  (fc00:a000) 3.15-10 =    40    OUI portion
  (03f0:0230) 3. 9- 4 =    35    manufacturer part number
  (000f:0001) 3. 3- 0 =     1    manufacturer rev. number

4.     (01e1)                -- Autonegotiation advertisement register --
  (8000:0000) 4.15    =     0    next page able
  (4000:0000) 4.14    =     0    (reserved)
  (2000:0000) 4.13    =     0    remote fault
  (1000:0000) 4.12    =     0    (reserved)
  (0800:0000) 4.11    =     0    asymmetric pause
  (0400:0000) 4.10    =     0    pause enable
  (0200:0000) 4. 9    =     0    100BASE-T4 able
  (0100:0100) 4. 8    =     1    100BASE-TX full duplex able
  (0080:0080) 4. 7    =     1    100BASE-TX able
  (0040:0040) 4. 6    =     1    10BASE-T   full duplex able
  (0020:0020) 4. 5    =     1    10BASE-T   able
  (001f:0001) 4. 4- 0 =     1    selector = IEEE 802.3

5.     (0000)                -- Autonegotiation partner abilities register --
  (8000:0000) 5.15    =     0    next page able
  (4000:0000) 5.14    =     0    acknouledge
  (2000:0000) 5.13    =     0    remote fault
  (1000:0000) 5.12    =     0    (reserved)
  (0800:0000) 5.11    =     0    asymmetric pause able
  (0400:0000) 5.10    =     0    pause able
  (0200:0000) 5. 9    =     0    100BASE-T4 able
  (0100:0000) 5. 8    =     0    100BASE-X full duplex able
  (0080:0000) 5. 7    =     0    100BASE-TX able
  (0040:0000) 5. 6    =     0    10BASE-T full duplex able
  (0020:0000) 5. 5    =     0    10BASE-T able
  (001f:0000) 5. 4- 0 =     0    selector = ???
```

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