# Intel® Ethernet Controller E610

## How to Read the Internal Thermal Sensor Using the LANConf Utility

**Application Note**

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**Networking Division (ND)**

***April 2025***

**Intel Confidential**

Revision 1.0

# Revision History

| Revision | Date | Comments |
|---|---|---|
| 1.0 | April 22, 2025 | Initial release (Intel Confidential). |

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# 1.0 Introduction

This Application Note provides step-by-step instructions for reading the temperature of the Intel® Ethernet Controller E610-XAT or E610-XAT, or E610-IAT, via its internal Thermal Sensor.[1]

The following are the summary steps:

1. Obtain, install, and run LANConf.[2]
2. Read the *Global Thermal Status 1* PHY register.[3,4]
3. Convert the hexadecimal register value to a temperature in °C.[5]

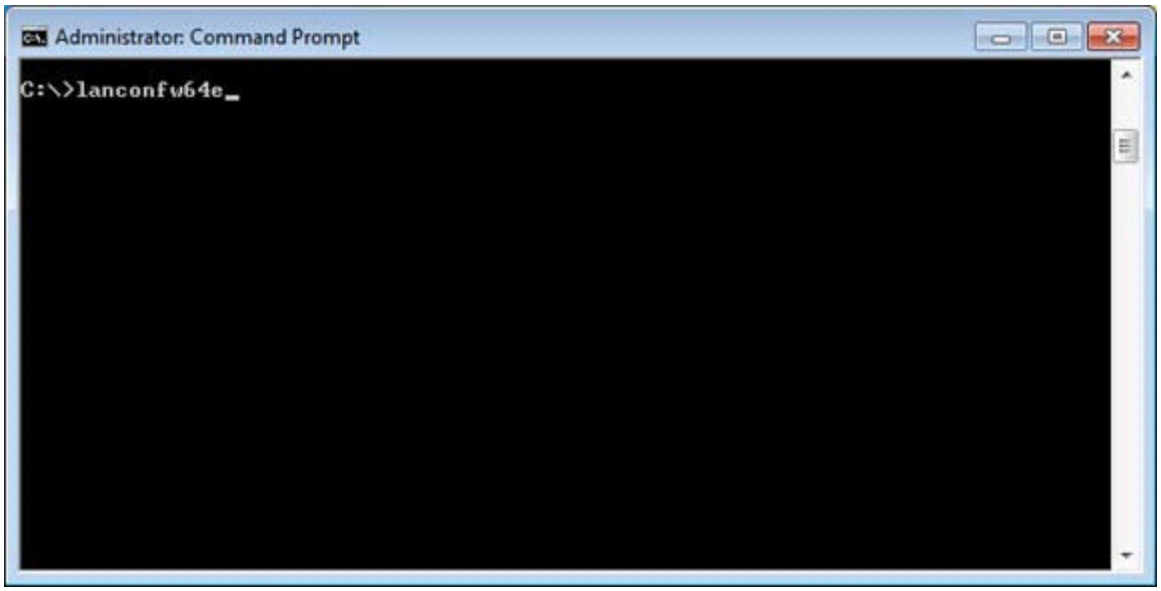
**Note:** Examples shown in this document are from a Windows* 64-bit operating system.

# 2.0 Detailed Procedure

The following is the detailed procedure:

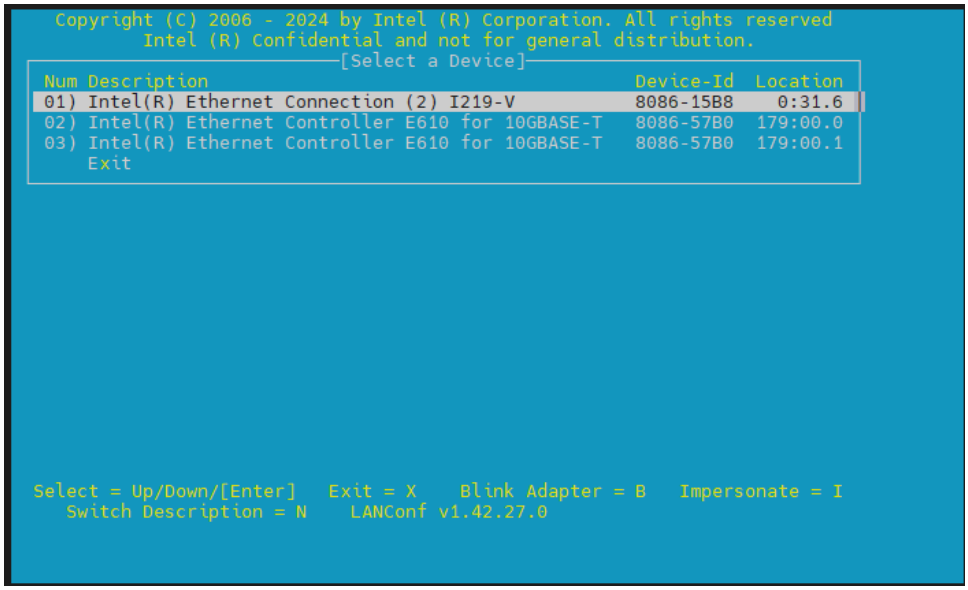
1. Open a DOS window (and "Run as Administrator").
2. Navigate to the folder where LANConf was installed.
3. Type `lanconfw64e` and press **Enter**.

**Note:** Run LANConf with the **zeroinit** option (`lanconfw64e /zeroinit`), if you want to monitor the temp non-intrusively (not affect other applications).

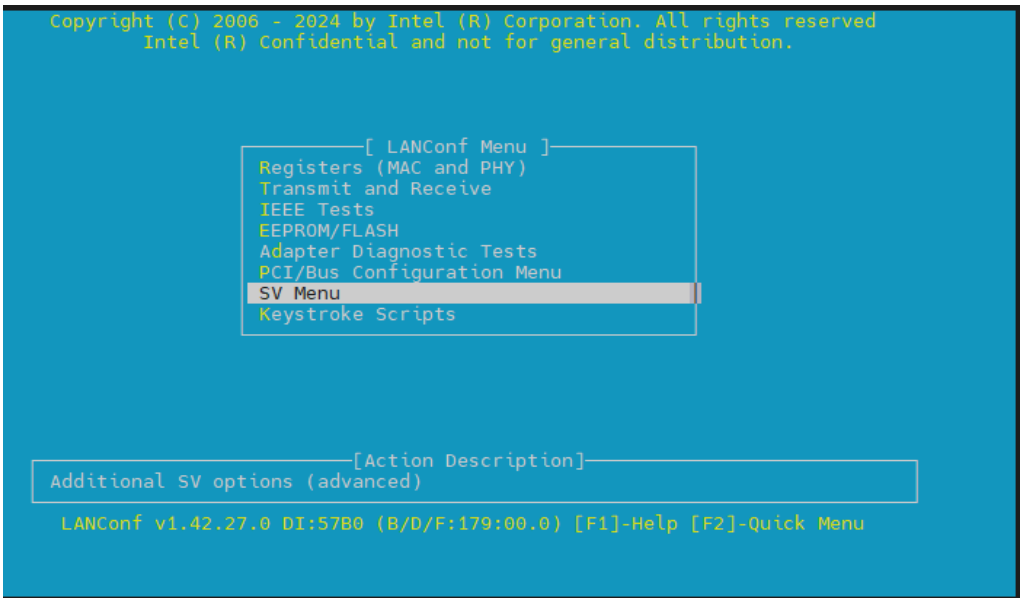



1. There is only one Thermal Sense circuit and corresponding *Global Thermal Status 1* PHY register that accommodates both single-port (E610-AT) and dual-port (E610-AT2, E610-BT2) packages.
2. LANConf is available from Intel® Network Connections Tools release 20.6 (or later), CDI/IBP document #348742, available at: https://cdrd.intel.com/v1/dl/getContent/348742.htm
3. *Intel® Ethernet Controller E610 Datasheet*, Revision 2.0 (or later) available at: http://www.intel.com/content/www/us/en/embedded/products/networking/ethernet-controller-E610-family- documentation.html
4. See the *Intel® Ethernet Controller E610 Datasheet*, Revision 2.0 (or later), Section 10.6.29.
5. A 2's compliment converter is available at: http://www.exploringbinary.com/twos-complement-converter/.

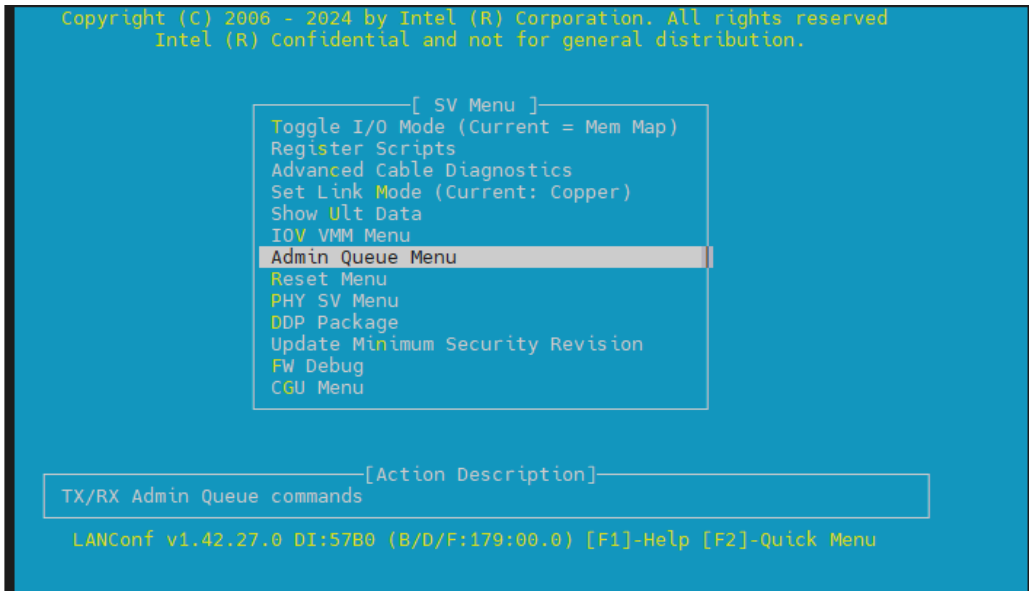
4. Select the E610-based adapter or LOM device from which you want to read the temperature, and press **Enter**.



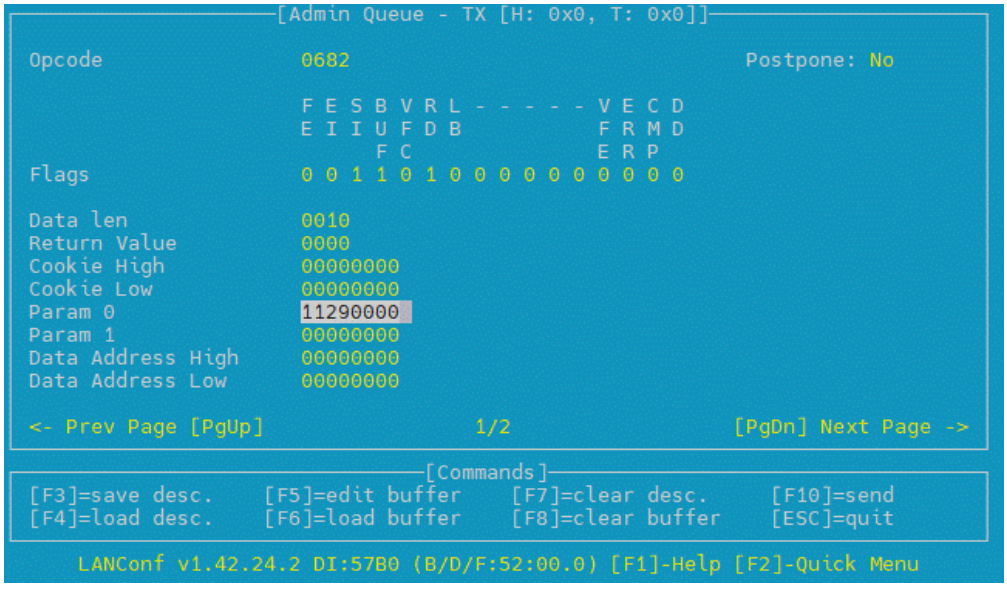

5. Select **SV Menu**, and press **Enter**.



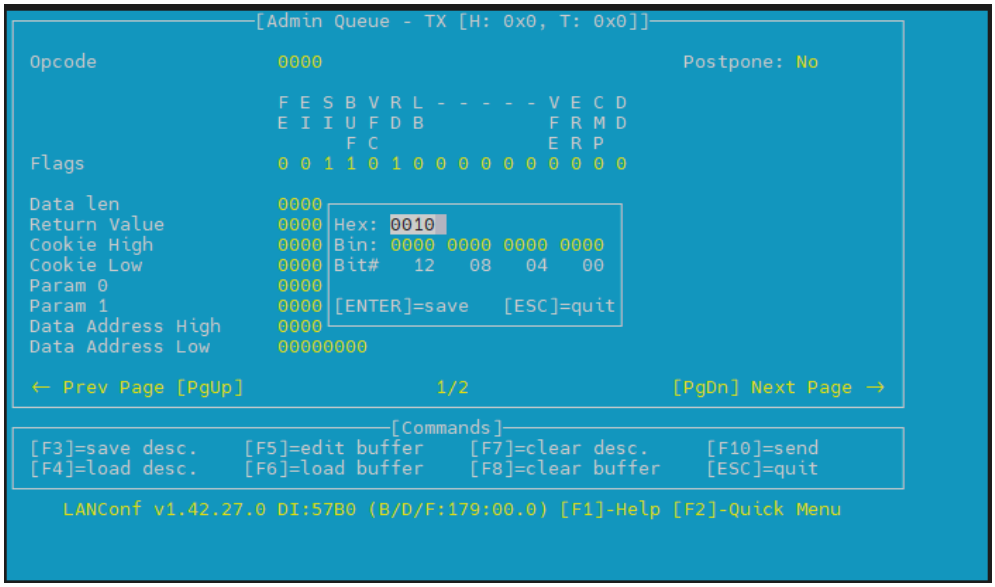
6. Select **Admin Queue Menu**, and press **Enter**.



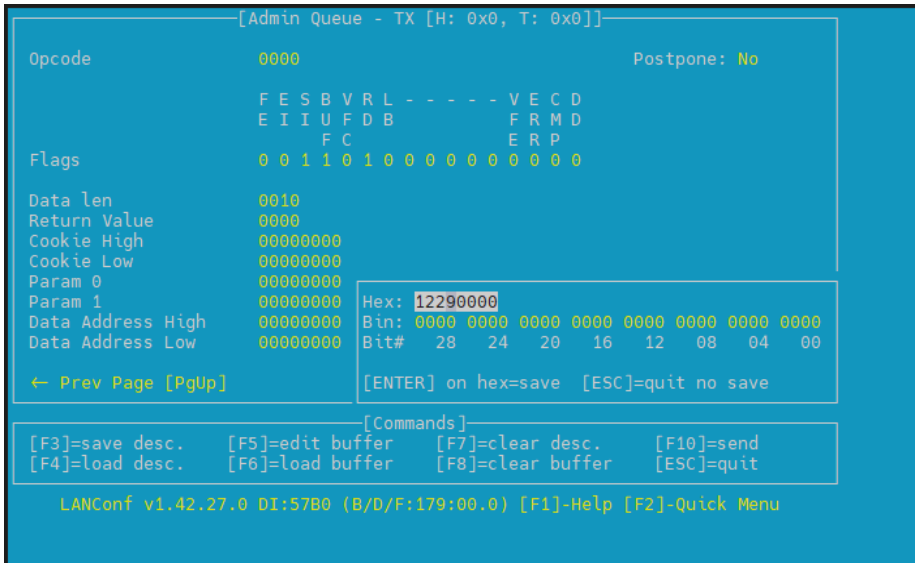

7. Select **Specific Opcode 0682,** with SI, BUF, DF as 1. and press **Enter**.



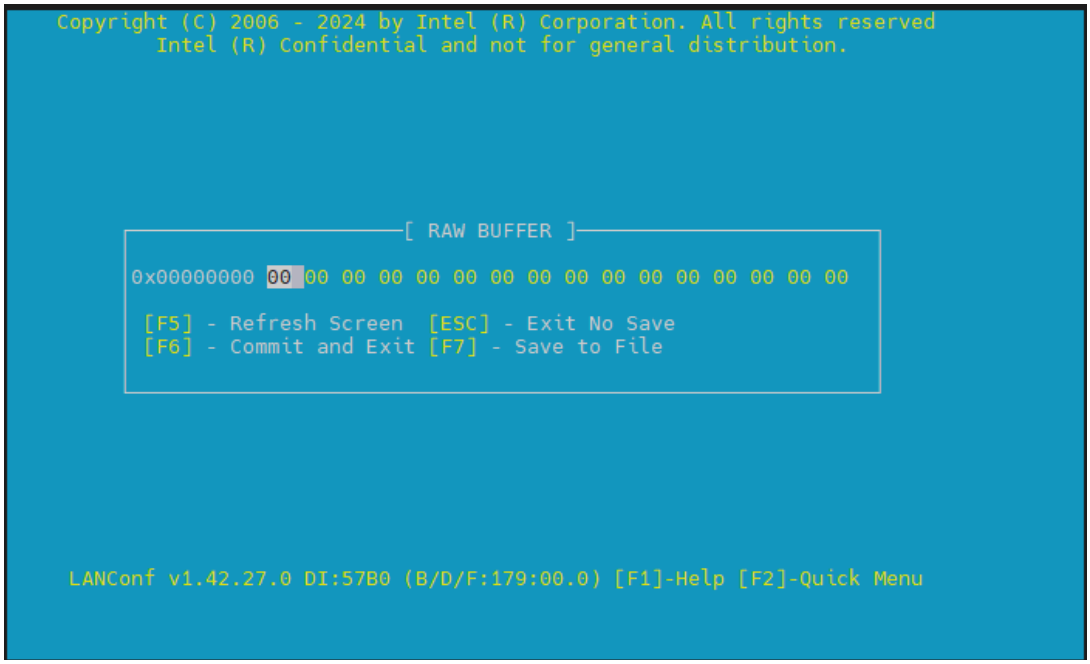
8. Select Specific Data Len as 0010, and press **Enter**.




9. And Param 0 as 11290000, and press **Enter**.




10. Then F5 for RAW buffer data, and fill out the on the 3rd 10 for Port 0 or 11 for Port 1 and then F6 to send.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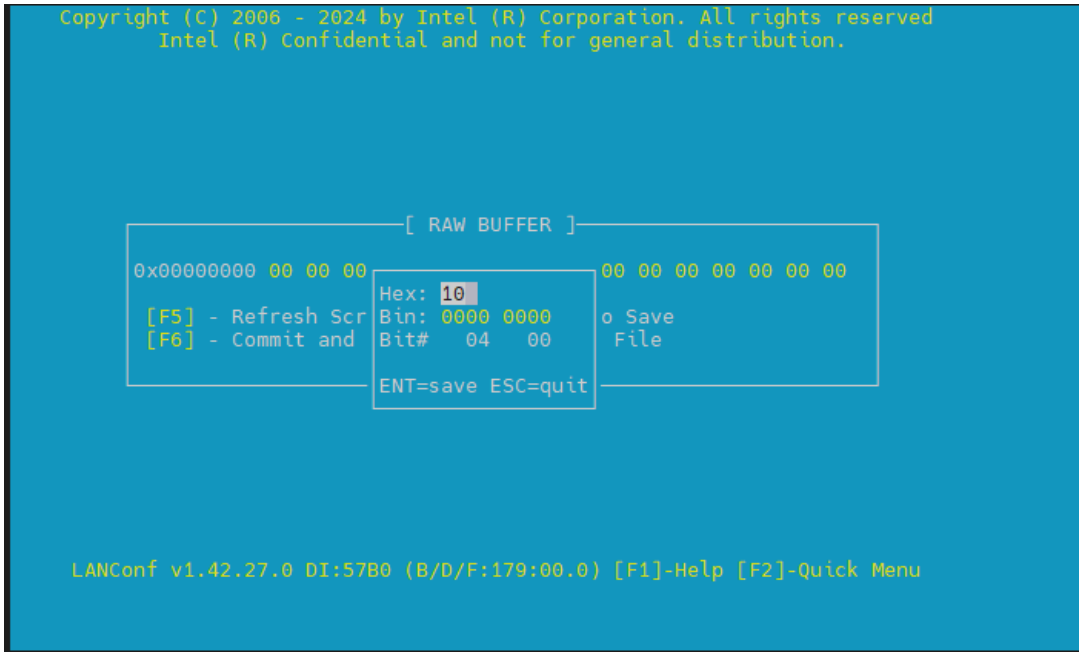
Intel (R) Confidential and not for general distribution.
[ RAW BUFFER ]
0x00000000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
[F5] - Refresh Screen [ESC] - Exit No Save
[F6] - Commit and Exit [F7] - Save to File
LANConf v1.42.27.0 DI:57B0 (B/D/F:179:00.0) [F1]-Help [F2]-Quick Menu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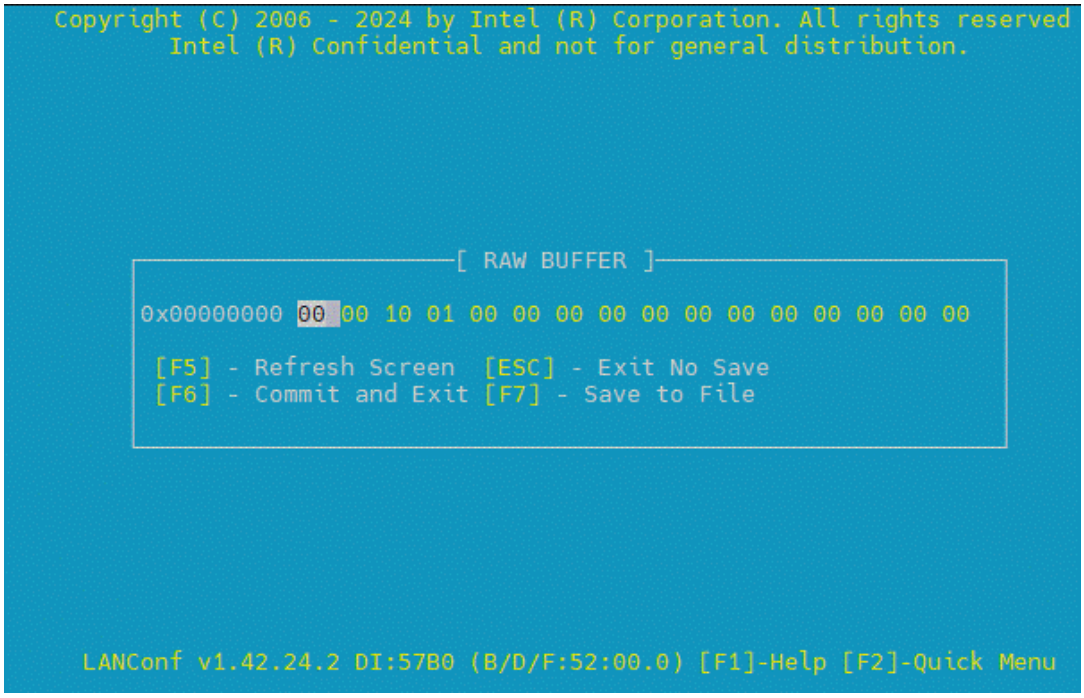
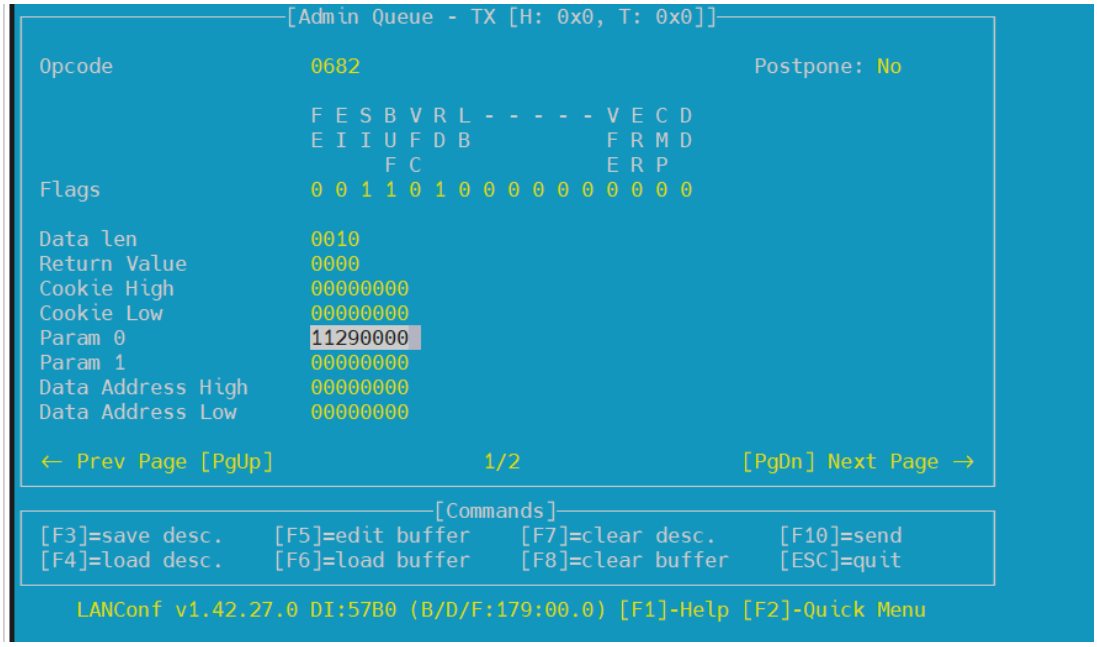
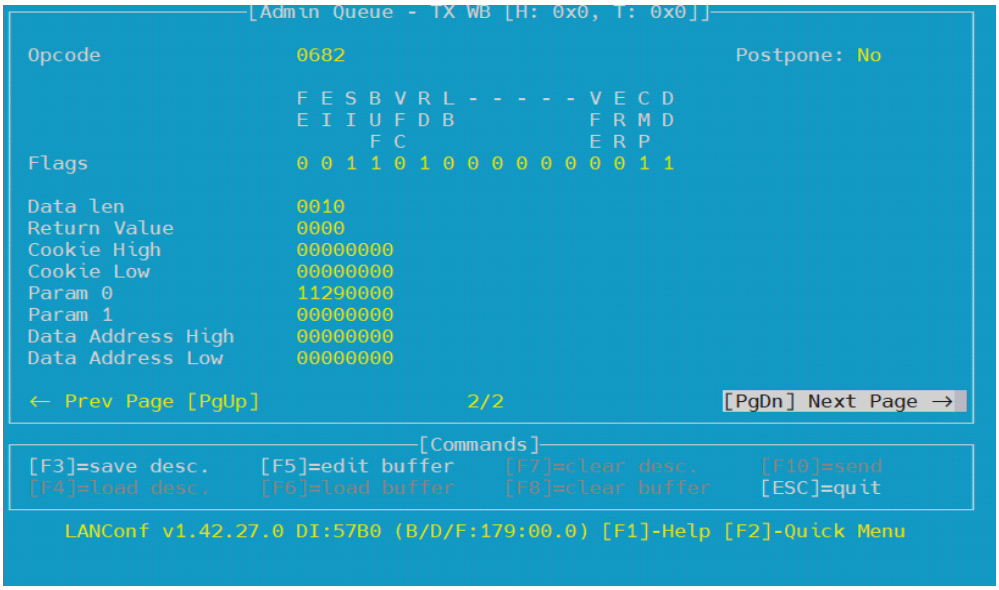
[ RAW BUFFER ]
0x00000000 00 00 00
00 00 00 00 00 00 00
[F5] - Refresh Scr
[F6] - Commit and
o Save
File
Hex: 10
Bin: 0000 0000
Bit# 04 00
ENT=save ESC=quit
LANConf v1.42.27.0 DI:57B0 (B/D/F:179:00.0) [F1]-Help [F2]-Quick Menu



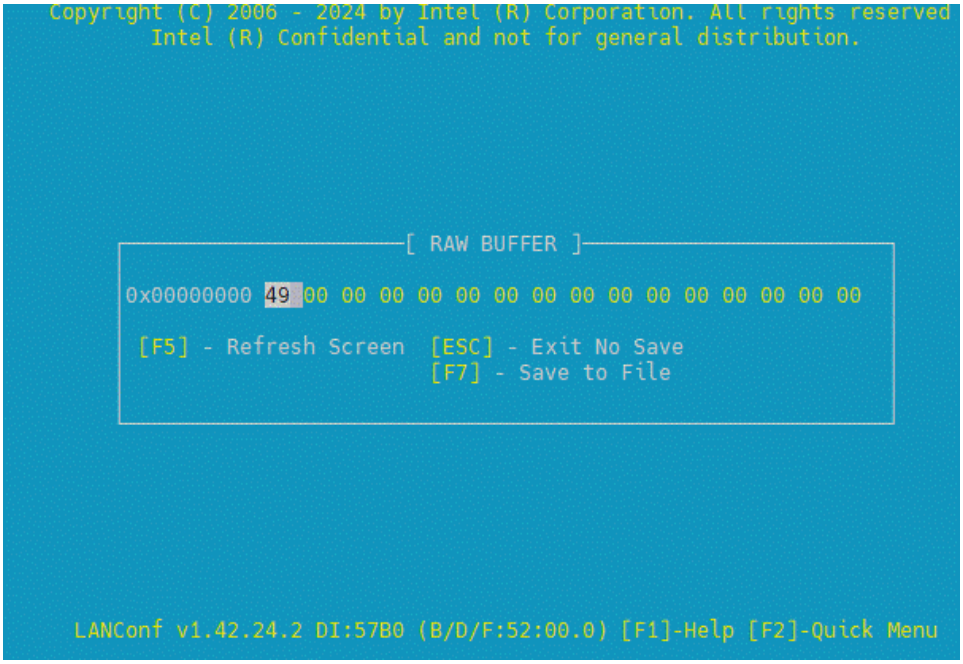

11. Then send the command by F10.



12. Go to next page and if there are no errors then check buffer.

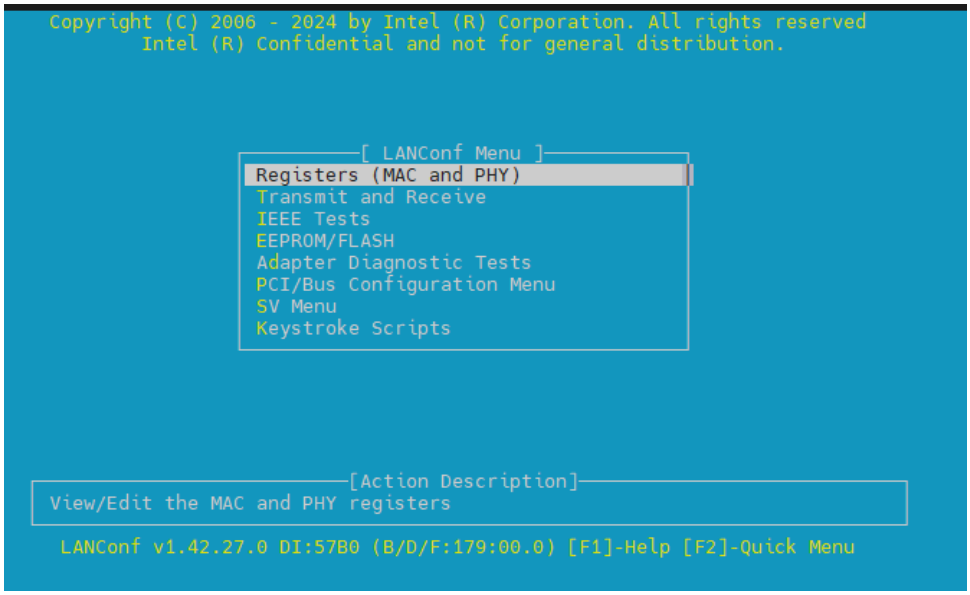



13. Use F5 to access Buffer, and the temp value is the first Byte in this case 0x49 that is 73°C.

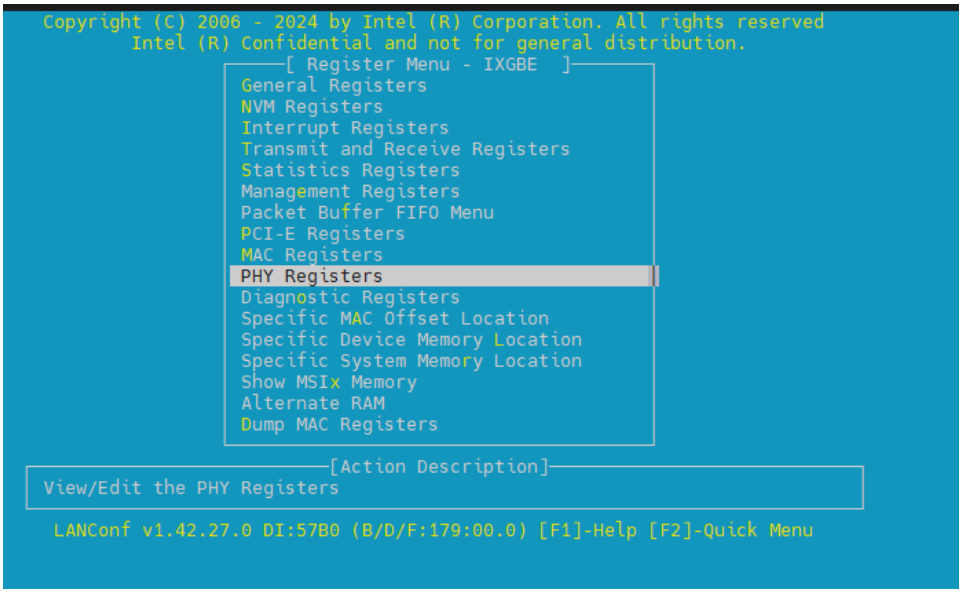


Another option is to read the PHY register. Based on MTD API the temperature is stored in 0xDB0C register on page 3. You need to enter the same menu as on X550, then set up the register data:

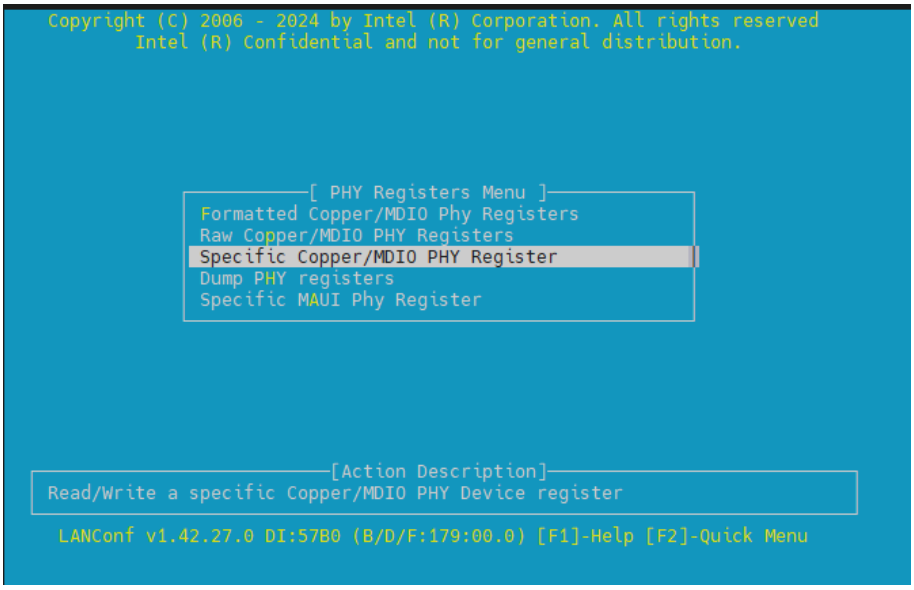
1. Select **Registers <MAC and PHY>**, and press **Enter**.



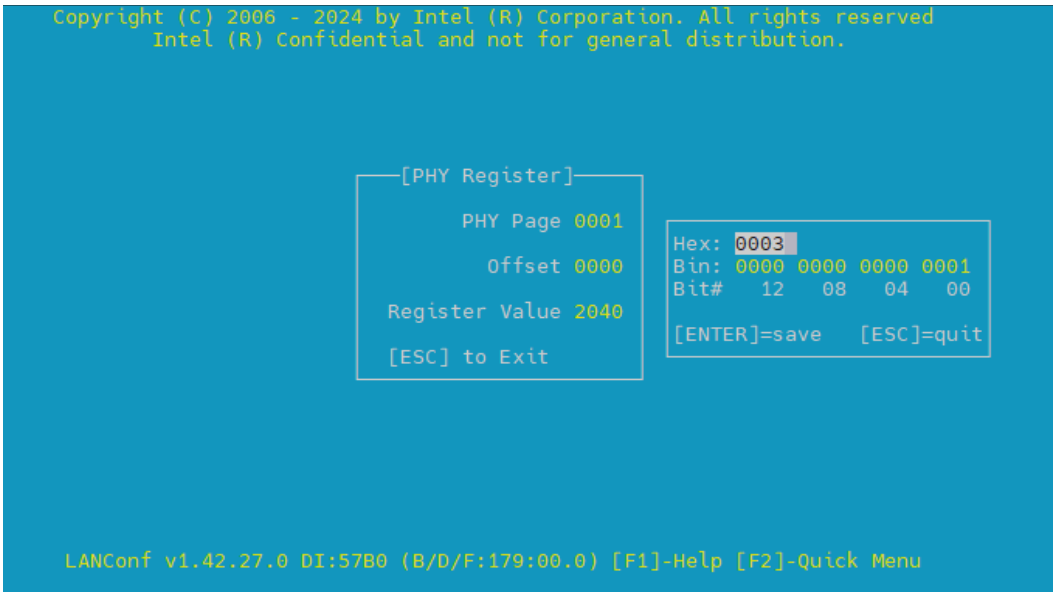

2. Select **PHY Registers**, and press **Enter**.



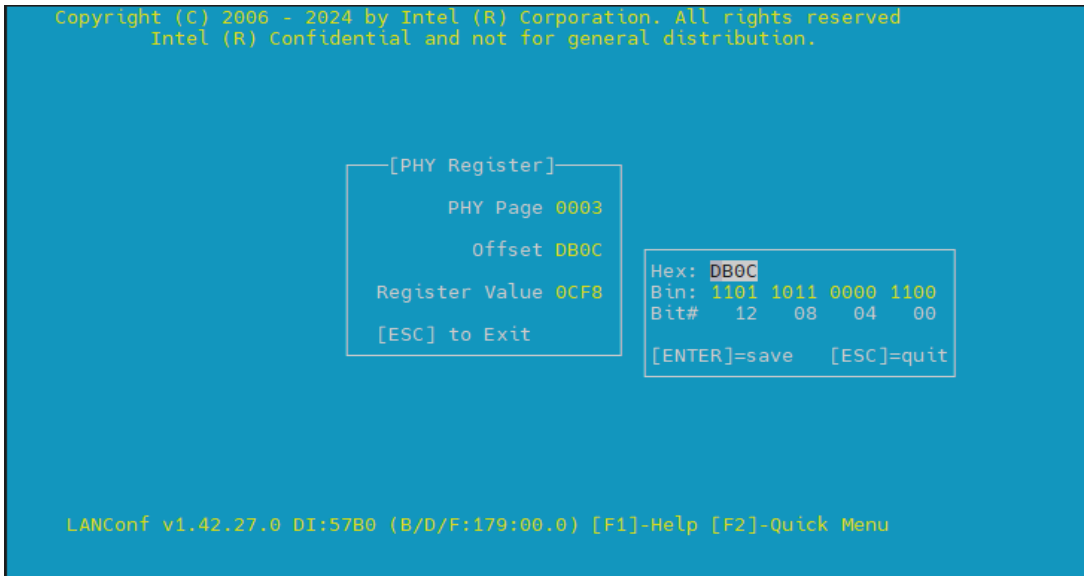
3. Select Specific **Copper/MDIO PHY** Register, and press Enter.




4. Select **PHY Page 003**, and press **Enter**.




5. Select **Offset**, type "DB0C", and press **Enter**.




6. Then the user need to calculate using the equations below.

```
··/*·convert·12·bit·signed·integer·to·32·bit*/
··temp·&=·0xFFF;
··temp32·=·(temp·&·0x800)·?·(0xFFFFF000·|·(MTD_U32)temp)·:·(MTD_U32)temp;
··stemp32·=·(MTD_32)temp32;

··/*·convert·to·Celsius,·ref·to·TESNE·doc·but·scale·up·10000·to·avoid·float·type·*/
··tesneCelsius·=·(stemp32·*·905·+·1122000)·/·10000;
```

7. This is how it looks like for value read.

```
··/*·Example·calculation·for·temp·=·0xe58·*/
··/*·temp·=·0xe58·->·12-bit·signed·integer·=·-424·(0xFFFFFE58·in·32-bit·signed)·*/
··/*·stemp32·=·-424·*/
··/*·tesneCelsius·=·(-424·*·905·+·1122000)·/·10000·=·73°C·*/
```

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