



Writing Your Own Custom IP Drivers for the IOC Blade 9010

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Introduction...

- Background.
- Brief Hardware Overview.
- Write Your Own Driver Notes.



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General

- All (including Source Code) Supplied FREE.
- EPICS 3.14.8.2.
- Scientific Linux Version 4 and RTEMS.
- Kernel Linux Version 2.6.
- Alternatives Windows XP / OPC, V-system etc.



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Typical Non-EPICS Users...



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Typical TANGO Users...



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PCI Devices

- 2 x PCI Devices / Interfaces.
- The first is 1 x PMC.
- The Second is 6 x IP Cards + Carrier Board Specific Registers.
- The IP Cards Access is Memory Mapped.
- The Carrier Board is I/O Mapped.



Carrier Board Hardware

- 6 x Fan Speed Monitoring in RPM.
- Fan Override - Halt, Half or Full Speed.
- 5 Temperature 0-40°C in discreet 10°C Steps.
- Individual IP Cards Clocks 8 / 32 MHz.
- Front Panel and Jumper Switches.
- LCD Automatic / Override with own Messages.



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Why Write Your Own Drivers...

- You May Want Extended / Different Functions.
- Any Hytec IP Card we will support.
- Legacy IPs to support.
- You May Choose IPs from another source.
- **WARNING TO FOLLOW !**



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Use Non HYTEC IP Cards !

Join me on the Dark Side !

Method of IP Cards Drivers

- Directly with Driver Calls.
- Via API.
- Memory Mapped (Hopefully Soon).



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Producing Your Own Quick Driver ...

- Go to <http://www.hytec-electronics.co.uk/>
- Download the EPICS Example the 'Idiots Guide' and IOCBlade9010.tar.gz
- This is an EPICS example application and also includes a copy of the Hytec IOC Blade Linux Kernel 2.6 Driver under the Directory... */IOCBlade9010/pci*
- To install the driver simply type..
/root/IOCBlade9010/pci/IOC9010-load



Simple C Example ...

```
#include "9010LinuxDriver.h"
```

```
/* Open the Stream */
```

```
IOCHandle = open("/dev/IOC9010",0);
```

```
if (IOCHandle == -1) printf("9010: Error Opening  
Device !\n");
```



Simple C Example ...

```
/* Set up the Data Structure */
```

```
ioctl_buf.lAddress = IP_A_ID_BASE_ADDR +  
                    ID_MODEL_NUMBER;
```

```
ioctl_buf.lLength = 1;
```

```
ioctl_buf.sData = (unsigned long>(&data));
```

```
/* Read IP Card Type from ID PROM */
```

```
ioctl(IOCHandle, OP_GENERAL_READ, &ioctl_buf);
```



Simple C Example ...

```
/* Do Something With It */  
printf("IP Slot %c = %4X\n", 'A', data);
```

```
/* Close the Stream */  
close(IOCHandle);
```



Quick Reference Drivers include...

- 9010 Fan / Temp ao, ai, mbbi, mbbo etc.
- 8401 8 x 16 Bit ADC.
- 8402 16 x 16 Bit DAC.
- 8505 16 Bit Digital Input/Output Card.
- 8506 48 Bit Digital Input/Output Card.
- 8601 4 Channel Stepper Motor Card.



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Full Drivers Written...

- 8601 4 Channel Stepper Motor Card.
- Completed 13 June 2006. Debug Testing Now.
- Using AsynDriver Full Motor Record Support.
- Many Thanks to Nick Rees and particularly Peter Denison of Diamond Light Source.
- Written in about 3 Hours (45 min MRE).



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IOC Blade 9010

Any Questions / Help darrell@hytec-electronics.co.uk



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