DON'T PANIC

Folklore, bugs, kludges, hacks and features
March 15, 1994

1 Hardware

- The Transmission board

  Holding the transmission card in reset causes violation LED to light.

  The links on the transmission board are set to 1 (UP) to disable

- The Teaching Board acting as a PROM emulator

  The teaching board won't program correctly if it is not plugged into a PROM socket.

  Never unplug a teaching board while the device to which it is connected is still turned on. It will draw its power from the device through one of the inputs to the teaching board Xilinx chip.

  Xilinx chips may fail to program from teaching boards. This is usually indicated by all eight LEDs on the teaching board flickering. Turn off immediately (as this may damage the Xilinx chip) and try again. Possible solutions to this problem include providing a good common earth for the device and the teaching board and connecting $\overline{INIT}$ on the Xilinx chip to $RESET/\overline{OE}$ on the PROM emulator through an inverter.

- The Yes V2 boards

  Yes boards don't obey the Turbochannel spec.

  Don't use them in a 25MHz Turbochannel.

Don't use DMA on an alpha.

Yes boards suffer from byte slip in octet3. This does not show up as a bad HEC because that's been done before the conversion to 32bits. It shows up as a corrupt header and/or data.

Yes boards sometimes go into funny states where they report inconsistent status and data goes on the floor.

Yes boards may break if other devices are using DMA on the Turbochannel depending on the speed of the Turbochannel.

In general Yes boards don't work very well.

- The Yes V2.2 board

  Be *very* careful when plugging a YES board cable in to a powered board. If you short any pins while doing this, you see some pretty sparks.

  There are two versions of the YES V2 pals. The older versions generate one extra Turbochannel DMA cycle than asked for in both directions. The documentation is wrong about this.

  The Yes V2 boards are slightly longer than the Turbochannel mechanical specification specifies. This can be remedy by filing out the front panel mounting holes to move them closer to the front of the board or simply removing the front panel

  For 12.5 MHz Turbochannels, capacitor C46 should be changed from 15pF to 30pF.

  Resistors R14 and R15 should be 150Ω and R11 (the terminating resister) should be 51Ω.

2 Software

- Fairisle Port Controllers

  Types of bus error:
  A "Barfbarf" is a particular type of bus error generated voluntarily on a port controller when the Xilinx receive buffer overflows. It indicates that you are flooding the port controller with more data than it can handle. All other bus errors are more serious and should be investigated.

  Kernel panics with message:
  `Kernel contains wrong hardware! Xi`*n*` detected`
  The Xilinx programming bits are linked into the kernel. This message is produced if the hardware and software are inconsistent. For FPC2 n will be 2 or 3. There is currently no test for Xi6 bits.

  Kernel hangs after printing:
  `If it hangs here check the fabric clock`
  This message is printed just before the first access through the Xilinx to the SRAM. The most likely reason for this failing is a missing or bad crystal in the fabric or clock board.

  Kernel hangs after programming the Xilinx chip:
  As above, but for kernels built before the message was put in (e.g. many boot ROMs)

When a port controller halts, it sits in a loop flashing its lowest red LED at about 1 Hz and polling the serial line input register. Sending Control C to a machine in this state will cause it to reenter its boot ROMs (except old kernels e.g. some boot ROMs).

- All Machines

  `ARP host %I cannot be active on pod %d.` :
  Machine %I has been seen active on a pod for which this wanda machine has been instructed (via its routeing information) should be on a different pod. The active request has been ignored by the kernel. Although there are some cases when this scenario can legally occur (typically when there are multiple routeing paths between networks with different routers load balancing). It was put in because people were booting machines with random routeing tables and then grumbling or getting confused when weird things happened (i.e. multiple active gateways leading to bad context requests)

  GATEWAY-controls :
  This gives a comma separated list of things that this gateway will search to decide whether to gateway a particular connection request. Each of these entries is of the form `(Bool=net-mask->net-mask)`. Bool is either "T" or "F" or "S". "S" implies true both in the forward direction and in the opposite direction. It should be pronounced as "It is true / false / symmetrically-true that net under mask may connect to net under mask".

  Note that one shouldn't be generating Gateway controls by hand anyway - use the `sc` tool.

  GATEWAY-redirectors :
  This provides a hack for moving a service from one machine to another. It also allows deliberate loop introduction because the target address will be transformed. It is a comma separated list of the form `"%I-%I->%I-%I"`. The values are host *and port* not host and net so explicit entries are needed per service.

- Hostinfo
  When machines boot they sometimes fail to get their hostinfo file. This is usual apparent because they don't know who they are. This is usually due to one or more of the following:

  1. The hostinfo file is not executable by UID wanda.
  2. The hostinfo file contains a bug such as referring to a non-existant file.
  3. The kernel has not been stripped.
  4. The kernel was built without user processes configured.
  5. The current directory for the bootserver must be $W/boot/hostinfo.

- The MSRPC library (not MSRPC2)

  Client side of MSRPC:
  If a client call returns `MSRPC_CANT_ENCODE_ARGS`, check that you haven't tried to encode arguments which require a buffer in excess of 2 KB to store the MSDR format of the arguments. If you have then you have no option but to reduce the size of the arguments you are encoding. The same applies at the server side but the error may be `MSRPC_CANT_ENCODE_RESULTS`.

  The MSRPC library looks for a buffer of size `WandaIPCMaxMsg(PROTOCOL_MSNL)` by default. This, of course, may be less than 2KB if you are working on a kernel which has no large IO bufs. If the MSRPC library can't get hold of a buffer of the largest size then it will return the error `MSRPCSTAT_CANT_SEND`. You then need to do a `clnt_control()` to set the buffer size to the size of the largest IO buf which the library can expect to get its hands on.

If you get things like `MSRPCSTAT_NO_MEMORY` then you have run out of memory, possibly because you are neglecting to call `clnt_freeres()` after finishing with the results returned to you from a server.

If the library crashes, your name is probably Paul Barham.

- Name Server

  Symptom:
  Wanda: `gethostbyname()` or `WandaGetHostName()` or `WandaGetHostByName()` fails.
  Unix: `gethostname()` or `getmsnlhostname()` fails.

  Problem:
  On Unix, if you're using `gethostname()` to obtain the MSNL address of a host, then you're a bozo. Use `getmsnlhostbyname()` instead. Make sure you link with the MSRPC library (see the chapter on MSRPC).

  If you are attempting to get the MSNL address of a host using the appropriate routine, and are getting the reply "no such host", then the following could be the reason: When you do a `gethostbyname()` (Wanda) / `getmsnlhostbyname()` (unix) the libraries attempt to obtain information from the MSNL name server. The name server is normally up and running on a service machine in the lab. See the chapter on the MSNL Name Server. If the name server has crashed, then report the error to someone responsible and it will be restarted. You can see if it has crashed by using the program `hostlookup <name>` where `<name>` is the symbolic name of the host which you are trying to look up. Hostlookup will return the appropriate results if an entry is in the name server. It will return "no such host" if there is no host entry for the name, and it will report an error if it cannot find the name server.

  To find the name server to use, both the libraries (Wanda & Unix) and the hostlookup program use the environment variable `MSNL_NAME_SERVERS` to obtain the address of the name server. This environment variable MUST be present to permit MSNL name resolution. Any number of alternative name servers can be listed in this variable. The format is:

  $$\texttt{MSNL\_NAME\_SERVERS} = "h_{10}.h_{11}.h_{12}.h_{13} : \mathsf{0.0.0.223}, h_{20}.h_{21}.h_{22}.h_{23} : \mathsf{0.0.0.223}"$$

  Where h_{ij} is the j^{th} octet in internet dotted notation of the MSNL address of host h_i. The port `0.0.0.223` is the MSNL name server port.

  Information returned from the name server is returned to the calling process by means of a static area of memory. Results of such calls should thus be copied to ensure they remain valid. On Wanda there is no concurrency protection for this static memory area. Session bindings to the name server are cached.

3 Tools

- The Logic Analyser

When data has been downloaded from the Logic Analyser, you will need to hit the shift key to re-enable the keypad before you can use it again.

- The Analogue Oscilloscope

  Don't leave things on top of the oscilloscope when it is turned on — they'll get very hot.

  Never plug the oscilloscope directly into a power socket — any tension on the cable will cause it to break.

- Man pages

  Man pages for Panda subroutines, tools, interfaces, applications etc can be read using `man panda ...` on any Lab. UNIX machine (currently excepting those running OSF1).

- Bridge Pad Configuration

  An oracle in California writes:

  > To change a bridge pad in the Titan room you will have to ask gt, since we don't have any management lines on them. For the ones in the Trojan room use the management line (I think on 0 for both - it comes to the switch box that was under the logic analyser. If you hit return you should get the standard prompt. Then enter:
  > `set pri=lnm`
  > (lnm = local net management) Then you need a password. Umm...
  > Then you get a slightly different prompt indicating you have privileges. to exit this mode give the "l" (or "listen") command. "help" is quite useful. The trick to remember is in this mode you want to change the default parameters (dp) for other ports. To name a port use "(!n)" for port n. so something like `show (!1) dp` then `setd (!1) ba=7200` (btw 19200 is entered funny - I can't remember what - 19.2 maybe?) You can also clear other port's sessions and stuff `dc (!2)`. `sh ip` is handy for checking the reverse pad IP addresses, and `sh as` for seeing what is connected.

- xwcons

  Problem: xwcons claims the machine is in use but I don't think it is.
  Use `wcheck <machine>` to attempt to locate the process. If the machine is really not in use, use `wunlock [-r] <machine>` to release the lock. The only problem then is xwcons might say 'remote is busy' when you try to connect. In this case you will have to ask someone to clear the call using local pad management.

- xscons

  When `xscons` starts, it now looks to see how many ports there are, and creates just that many text widgets. It also sets the size of the widgets according to:

  ```
  XtSetArg(args[n],XtNheight, XSCONS_VERT/console->switchSize);n++;
  ```

  `XSCONS_VERT` is defined in `console.h` to be 1500, which seemed to be a nice number at the time.

  So that bootset will work in user mode, `xscons` also locks all the ports in a switch. The lock for xxx-switch is considered to be the master. If it locks this, it has "got" the switch. If any of the other locks fail, (this shouldn't happen) a warning message is displayed:

```
printf("xwcons: Warning, couldn't lock %s%s\n",
console->netn, numbers[i]);
```

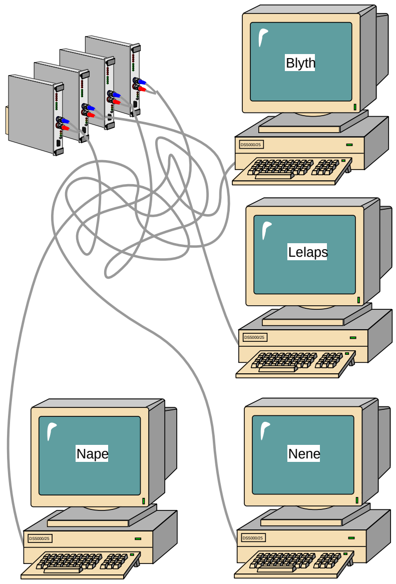
The hard reset button just calls `wreset -hard`, so if there is ever a problem with that, look at wreset not `xscons`.

4 Quiz

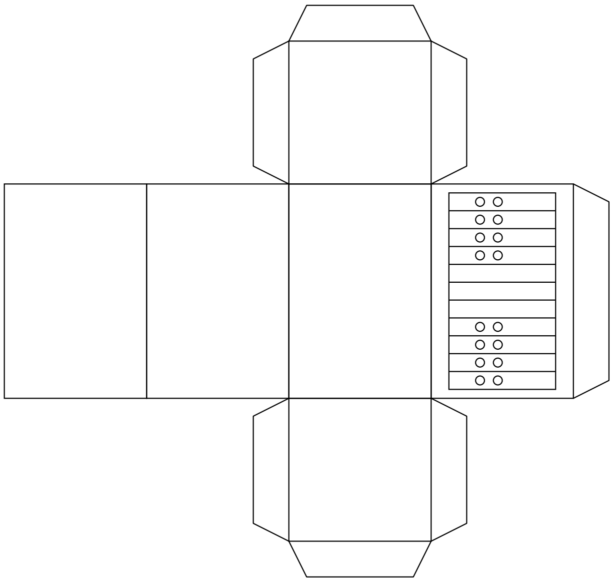
1. Who said "It's always the software!"
2. Who said "It's always the hardware!"
3. Who said "It's always the hostinfo!"
4. Who said "It's always sc!"

Kids' Pages

Mark can't remember which port controller is connected to nene. Can you help him out?



Cut out and stick together this model of a Fairisle Switch.



Cut out and colour in this FPC3 front panel.