GNU Bayonne - *Dialogic Springware How-To*

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1 Introduction

GNU Bayonne can work with several IVR boards like Intel/Dialogic ones. Dialogic boards are divided into two families: springware and dm3. Dm3 boards are for large scale porpouse with several E1/T1 spams, springware borads are for small to medium porpouse, they can have few analog lines or 2/4 digital E1/T1 spams. Dm3 board names usually start with DM prefix, while springware board names usually start with the 'D' letter. This how-to is for dialogic springware boards only[1].
Here we have a list of springware boards supported by dialogic drivers (at writing moment): D/42JCT-U, D/82JCT-U, BRI/80SC, BRI/160SC, BRI/80PCI, BRI/-160PCI, D/41JCT-LS, D/120JCT-LS BOARDS, DCB/320SC, DCB/640SC, DCB-/960SC, MSI/80SC, MSI/160SC, MSI/240SC, D/240SC-2T1, D/300SC-2E1, D/-480SC-2T1, DTI/480SC, DTI/481SC, D/600SC-2E1, DTI/600SC, DTI/601SC, D-/80SC, D/160SC, D/240SC, D/320SC, D/640SC, D/240SC-T1, DTI/240SC, DTI/-241SC, D/300SC-E1, DTI/300SC, DTI/301SC, D/160JCT, D/320JCT, D/240PCI-T1, D/300PCI-E1, D/300PCI-E75, D/300PCI-E120, D/240JCT-T1, D/300JCT-E1, D/480JCT-1T1, D/600JCT-1E1, D/480JCT-2T1, D/600JCT-2E1, LSI/81SC, D/160SC-LS, LSI/161SC,D/21E, D/41E, D/41ESC, VFX/40, VFX/40SC, VFX-40E, VFX/40ESC, VFX/40ESC-plus, D/41E-PCI, VFX/PCI, D/4-PCI, D/4-PCI-U, Dialog/4, D/21D, D/41D, D/21H, D/41H, D/42NS.

2 Software requirements

To use a springware dialogic boards we need:

- a linux system with a 2.4.x kernel and its sources; the official supported distribution is Red Hat 7.3 (www.redhat.com) with kernel 2.4.18-5 (we can find it and its sources on www.redhat.com or www.rpmfind.net);
- a Linux Stream (LiS) package (we can download from www.gcom.com/home/-linux/lis/); the official supported version is 2.15.2;
- dialogic drivers: Service Release 5.1 (www.intel.com/network/csp/products/-indx_aet.htm#srs) and Service Pack 5.1 (resource.intel.com/telecom/support-/releases/unix51/linux51/index.htm) and Feature Pack 5.1(http://www.intel.com/network/csp/products/indx_aet.htm#srs); we can use the first or the first and the second drivers only, but it's highly raccomended to use all available packages.

To have some unofficial and unsupported systems with newer ditributions, kernels and LiS see Appendix A.

3 Dialogic driver

To install and use dialogic drivers we must perform several steps:

- upgrade to the selected kernel
- install Linux Streams (LIS)
- install dialogic packeges
- configure dialogic board(s)

all these steps (without the first) are described in the following subsections.

[1] If someone wants to add some infos for DM3 boards please write us

3.1 Linux Stream installation

To install the LiS package (here the officilal supporterd LiS-2.15.2):

- cd /foo
- tar -xzvf LiS-2.15.2.tgz
- cd LiS-2.15
- ./Configure
- (make clean)
- make
- make install (as root)

The Configure command asks for several options, but default ones are usually ok; this is the configuration output using defaults (and kernel 2.4.18-5):

```
LiS Configure script version 2.54 11/14/02

How do you want to configure STREAMS?
    l = to run in the Linux kernel
    u = to run in user level
    q = to run under QNX (may not work)
Please enter your choice [default: l]

Are you using the native Linux C compiler (y) or
are you cross-compiling using a different compiler (n)?
Native C (y) or cross-compile (n)? [default: y]

Enter directory location of your kernel source
           [default: ///usr/src/linux-2.4.18-5]
No kernel support for SMP detected.
Kernel support for mod-versions detected.

Which version of the kernel are you building for?
[default: 2.4.18-5]

Do you intend to run LiS on this machine with
the currently running kernel? [default: y]
Kernel version verified between kernel source and running kernel
SMP option verified between kernel source and running kernel
MODVERS option verified between kernel source and running kernel

How do you want to build STREAMS for the Linux kernel?
    k = link with the linux kernel
    m = create a kernel loadable module
Please enter your choice [default: m]

After building STREAMS, do you want kernel loadable modules
installed?
This allows you to load it by typing in "insmod streams".
    y = install it for module loading
    n = just leave modules for later "make modules_install"
```

```
Please enter y or n  [default: y]

Enter location of your kernel module directory
               [default: /lib/modules/2.4.18-5/misc]

When you make STREAMS, do you want to use backward compatible
constants in the file stropts.h?  If you answer No (the default)
you will get constants that are compatible with UnixWare and
Solaris, but which differ somewhat from previous versions of LiS.
If you answer Yes you will get constants that are compatible with
 previous versions of LiS but somewhat incompatible with UnixWare
and Solaris.  If you intend to run application programs that were
compiled with LiS-2.6 or earlier then they have the old constants
compiled into them and you should answer Yes to this question.
    y = LiS backward compatible constants in stropts.h
    n = UnixWare/Solaris compatible constants in stropts.h
Please enter y or n [default: n]

When you make STREAMS, do you want to use Solaris style cmn_err?
In Solaris the newline goes on the end of the message.  For SVR4
style cmn_err the newline goes on the beginning.
    y = Solaris style cmn_err
    n = SVR4 style cmn_err
Please enter y or n [default: n]

When you make STREAMS, do you want to compile for source level
debugging?
This is most useful when STREAMS is linked into the kernel and the
gdbstub patch is installed in the kernel for kernel source level
debugging.
    y = set up for source level debugging
    n = no source level debugging
Please enter y or n [default: n]

Do you want to use shared libraries?
If you select static linking, you will get larger binaries that
run by themselves. If you select dynamic linking, the binaries
will be smaller but you will have to install the shared libraries
in a directory that is in your LD_LIBRARY_PATH environment variable.
    y = use dynamic linking with shared libraries
    n = use static linking
Please enter y or n [default: y]
Using sys_call_table from /proc/ksyms.

Warning:
You did not use "make configure" to run this configuration.
Please do "make clean && make dep" first to get a clean build.
```

Note: don't execute *make dep* even if it's suggested.

3.2 Dialogic driver installation

To install dialogic driver we must unpack all three packages (in different directories) and run *sh install.sh* of every version (output for *System Release 5.1*):

```
============================================================
                    Dialogic System Release 5.1 for Linux
                                INSTALLATION

You will now have the opportunity to install software packages.
After the menu is displayed, enter the package number(s) of the
desired packages, separated by a space.  Enter A for all packages,
Q to quit.

Package dependencies will be automatically resolved during
installation. For example, selecting a single package will
automatically install all packages required for that selection.

        Item   Package Description
        ----   ---------------------------------------------------
           1   SpringWare Software
           2   SpringWare Antares Software
           3   DM3 MediaSpan Software
           4   DM3 IPLink Software
           5   DM3 FAX Software
           6   DM3 High Density Station Interface Software
           7   BoardWatch SNMP Software
           8   Documentation

           A   Install All
           Q   Quit Installation

Enter the packages you wish installed, separated by a space,
or [A,a,Q,q]:
```

choose the option 1 (SpringWare Software) only (you can install documentation too) and then quit. Do it again without savin previuos configuration for *System Release 5.1 Service Pack 1* and *System Release 5.1 Feature Pack 1*.

3.3 Dialogic drivers Configuration

Dialogic driver configuration asks to choose:

- Dm3 or springware boards: choose 'n' for *Does the system contain a DM3 type board* and 'y'' for *Does the system contain any other type of Intel Dialogic board.*
- SNMP on system: choose 'n' for *Would you like to configure SNMP on this system.*
- board locator: choose 'n' for *Will this system use "ISA / board locator technology" boards e.g., D/XXE, D/240SC-T1 boards.*
- hardware configurable: choose 'n' for *Will this system use "hardware configurable" boards e.g.,D/XXD or D/XXH series boards.*

- springware board: choose your board in the list (they are listed by family group), choose '0' if you haven't any board of the current family, choose '1' or more if you have some boards of the current family (when you choose one or more boards you must enter *board ID* too and, sometimes, some other options).

Here the output, with some cuts, of the dialogic configuration:

```
================================================================
                Dialogic System Release 5.1 for Linux
                            CONFIGURATION

This is the configuration tool for Dialogic System Release software.
You will be asked to supply information for configuring Dialogic
software.

Does the system contain a DM3 type board (y/n, default=y)?n
Does the system contain any other type of Intel Dialogic board
(y/n, default=n)?y
Would you like to configure SNMP on this system (y/n, default=n)?n

Drivers for LiS will now be built and installed.
A makefile will be invoked, which may take several minutes to
complete.
Many lines of makefile output will be displayed, some of which may
indicate a warning.  This is normal.

Press ENTER to build and install drivers...

.................

Copying driver files...

Starting SpringWare specific configuration...

Will this system use "ISA / board locator technology" boards e.g.,
D/XXE, D/240SC-T1 boards (y/n, default=y)?n

Will this system use "hardware configurable" boards e.g.,D/XXD or
D/XXH series boards (y/n, default=n)?n

The mkcfg utility will now be run so you can set up your hardware
configuration.
Please press ENTER to continue...

     Dialogic Configuration File Generator
     Version 5.00
     Copyright 1997-2000 Dialogic Corporation

     [Type 'Q' at any prompt to exit]
     [Type '?' at any prompt for help]

     Press <return> to begin...

CONFIG INFORMATION FOR D/XXJCT-U  BOARDS
```

```
----------------------------------------

(Includes D/42JCT-U, D/82JCT-U)

Hit RETURN to accept default values, which are listed in
() at each prompt...

     Enter the number of D/XXJCT-U  boards in the system (0):

.....................
.....................

CONFIG INFORMATION FOR T1/E1 PCI HD BOARDS
----------------------------------------

(Includes D/240PCI-T1, D/300PCI-E1, D/300PCI-E75, D/300PCI-E120,
          D/240JCT-T1, D/300JCT-E1, D/480JCT-1T1, D/600JCT-1E1)

Hit RETURN to accept default values, which are listed in
() at each prompt...

     Enter the number of T1/E1 PCI HD boards in the system (0):

.....................
.....................
```

After board choise we have:

```
  Configuration is complete.

You must reboot the system to start the software for the first time.
Thereafter, you may use the dlstop and dlstart scripts found in
/usr/dialogic/bin
```

As reported by the script, we need a reboot of our system.

The configuration of dialogic boards and drivers are stored in the */usr/dialogic/cfg/-dialogic.cfg* file. Here an example for a D/41JCT-LS board:

```
[Genload - All Boards]
LogFile=genload.log
BusType=SCBus
SCBusClockMaster=AUTOMATIC
SCBusClockMasterSource=AUTOMATIC
PCMEncoding=ULAW

[Genload - PCI ID 1] /* D/41JCT-LS  */
```

In some cases (it depends from the board, from the country, from the phone line,. . .), we need some more options, here an example for a D/300-PCI-E1 board in an italian E1 phone network (please note the use of *ParameterFile* option which specifies a file in */usr/dialogic/data* directory, this directory contains a lot of configuration files for several boards and severel countries):

```
[Genload - All Boards]
```

```
LogFile=genload.log
BusType=SCBus
SCBusClockMaster=AUTOMATIC
SCBusClockMasterSource=AUTOMATIC
PCMEncoding=ALAW
Country=IT
ISDNProtocol=ctr4

[Genload - PCI ID 2] /* T1/E1 PCI HD */
ParameterFile=ctr4.prm
```

3.4 Starting and stopping drivers

To start dialogic drivers use the commands above (one of them):

- `service dialogic start`
- `./dlstart` in */usr/dialogic/bin* directory

The output is like this (in this case D/41E-PCI board):

```
Dialogic Generic Downloader Version 5.10 (Build 12)
Copyright (c) 1992-2000 by Dialogic Corp.

Using /usr/dialogic/cfg/dialogic.cfg to configure Dialogic Boards

System Download ........................................

D/41EPCI   (PCI ID 1) Download  .. d4x Firmware Version 6.53
                                       Build 0036.0020

1 Dialogic Board Successfully Installed

Dialogic NFAS Configuration Program
Version 2.0
Linux  2.x.x
Copyright (c) 2001 Intel Corp.
ALL RIGHTS RESERVED

Add SW Devices ....
REGVOX: #
REGVOX: # Dialogic Generic Configuration File
REGVOX: #
REGVOX: #
REGVOX: # Total number of virtual boards - 1
REGVOX: #
REGVOX:
REGVOX: #
REGVOX: # Board Type - D/41EPCI
REGVOX: #
REGVOX: dxxxB1    4    D0010   C         DD000000      2000
                                         1        D4XE  3
Add SW Devices Done

Dialogic SCSA Transmit Timeslot Assignment Program
```

```
Version 2.0
Linux  2.x.x
Copyright (C) 1997-2000 Dialogic Corp.
ALL RIGHTS RESERVED
Using default base timeslot 0; none other specified.
Assigned 4 SCBus time slots successfully for VOICE device dxxxB1
Assigned 4 SCBus time slots successfully for Analog VOICE
                                          device dxxxB1
```

To stop dialogic drivers use the commands above (one of them):

- `service dialogic stop`
- `./dlstop` in */usr/dialogic/bin* directory

If dialogic drivers are running we have (with D/41E-PCI board):

```
 [root@bayonne bin]# ./dlstop
Deleting SW devices ....
Deleting SW devices Done

Shutting down dm3clump Server
Shutting down DeviceMapper Server
```

If dialogic drivers are already stopped we have (with D/41E-PCI board):

```
[root@bayonne bin]# ./dlstop
/usr/dialogic/bin/voxctl: ERROR:4112 cannot stop board:dxxxB1
/usr/dialogic/bin/voxctl: ERROR:4112 cannot stop board:fruB1sd1
/usr/dialogic/bin/voxctl: ERROR:4112 cannot stop board:dxxxB2
/usr/dialogic/bin/voxctl: ERROR:4112: cannot stop PM:sram
System exception 'TRANSIENT'
Reason: Connection refused
Locality: exception has been generated locally
Completed: no
Minor code: 0x4f4f0001 (attempt to establish connection failed)
Device Mapper Failure, Make sure server is running

Shutting down dm3clump Server
Shutting down DeviceMapper Server
```

Note: shutting down dialogic drivers twice without starting them gives no problems, just some errors, but starting dialogic drivers twice without shuttitmg down them can cause the crash of the system or of the board (it depends from the board used) and we may need a reboot.

4 Bayonne

4.1 Compilation

Bayonne compilation doesn't need any special configuration, if LIS and dialogic drivers are installed correctly the *configure* script ouput has two rows like above:

```
.....
checking for LiS streams (/usr/src/LiS)... found
```

```
.....
checking for dialogic sdk (/usr/dialogic)... found
.....
```

and then, as usual, *make* and *make install*.

4.2 Configuration

To configure Bayonne server to use Dialogic drivers and boards we must set */etc/bayonne.conf* and */etc/sysconfig/bayonne* files (sometimes, for some boards and systems, setting one configuration file only is sufficient, but setting both is always ok):

- set `driver=dialogic` to use old dialogic drivers
- set `driver=globalcall` to use globalcall driver (which are the newer dialogic drivers).

(by default in the */etc/sysconfig/bayonne* file the `DRIVER=XXX` row is commented with a #, so we must uncomment it before setting driver value).
If everything is setted right, starting Bayonne server we have (4 port dialogic board, with `driver=dialogic` setting):

```
[root@localhost root]# /usr/local/sbin/bayonne -x
SERVER VERSION 1.2.11; i686 Linux 2.4.18-5
TGI VERSION 2.2; driver=dialogic;
    prefix=/root/.bayonne/bayonne; etc=/etc/
Loading TGI plugins...
tgi: initialized; uid=65535 pid=2000
tgi: buffer=/var/run/bayonne/bayonne.ctrl; cfd=8; time=10
Loading DSO plugin images...
dialogic: setting polled mode
dialogic: vox card 1 of 8; ports=4
Dialogic driver loaded; capacity=4
.....
allocating trunks...
starting trunks.....
driver starting...
driver started 4 port(s)
normal startup; Bayonne Runtime Configuration
fifo: path=/var/run/bayonne/bayonne.ctrl
scheduler: using /etc/bayonne.sched
network: starting
dialogic: service thread started
dx(0): setup waiting
dx(1): setup waiting
dx(2): setup waiting
dx(3): setup waiting
```

and Bayonne is ready to use dialogic boards for incoming and outcoming calls.

4.3 Scripts

Bayonne scripts don't need any special commands for using dialogic drivers: after the *answer* command Bayonne answers to the incoming call. With ISDN boards can use the *accept* command (see the manual for it).

A Unsupported systems

Dialogic drivers can work with system different from Red Hat 7.3 with kernel 2.4.18-5 and LiS 2.15.2, here there is a table for some tested systems[2]:

Distribution	*Kernel*	*LiS*	*Driver*
Red hat 7.3	2.4.20-27.7	2.16.18	Feature Pack 1
Red hat 9.0	2.4.20-31.9	2.16.18	Service Pack 1
Mandrake 9.2	2.4.22-10mdk	2.16.18	Feature Pack 1
Mandrake 10	2.4.25-2mdk	2.16.18	Feature Pack 1
Mandrake 10.1	2.4.27.0.pre2.1mdk	2.16.18	Feature Pack 1
Fedora Core 1	2.4.22-1.2174nptl	2.16.18	Feature Pack 1
Fedora Core 2	2.4.22-1.2174nptl	2.16.18	Feature Pack 1
Red Hat Enterprise release 3	2.4.21-4.ELsmp	2.16.18	Feature Pack 1

Dialogic driver needs *libstdc++.lib6.2-2.so.3* library, in the Red Hat 7.3 and 9.0 it's installad by default, but in Mandrake and Fedora distributions not, so there's the need of additional packages:

Distribution	*Package*
Mandrake 9.2	libstdc++2.10-2.96-0.83mdk
Mandrake 10	libstdc++2.10-2.96-0.83mdk
Mandrake 10.1	libstdc++2.10-2.96-0.83mdk
Fedora Core 1	compat-libstdc++-7.3-2.96.118.i386.rpm
Fedora Core 2	compat-libstdc++-7.3-2.96.126.i386.rpm

All this tested systems use 2.4.x kernels, some tests with 2.6.x kernels failed (maybe that with newer kernels and/or systems dialogic drivers can work well).

NOTE: all this systems are unofficial and unsupported by Dialogic.

B Using more boards

Some dialogic boards have the *SCbus* connection; using a *SCbus cable* these boards can be connected to each other and are seen by driver as a single board with the sum of all voice resourses and ports. When two or more boards are connected together, they must have different *ID boards* (the *ID board* is selected by a switch on the board itself).
For example using a D/41EPCI and a D/41JCT-LS boards connected by a *SCbus cable* drivers start with this output:

```
root@bayonne bin]# ./dlstart
  PID TTY          TIME CMD

Dialogic Generic Downloader Version 5.10 (Build 12)
Copyright (c) 1992-2000 by Dialogic Corp.

Using /usr/dialogic/cfg/dialogic.cfg to configure Dialogic Boards

System Download ................................

D/41JCT-LS (PCI ID 1) Download  .. d4xjct
         Firmware Version 6.65 Build 0153
```

[2]If someone works with dialogic drivers on a different system, please write us to add it to the table.

```
D/41EPCI   (PCI ID 2) Download  .. d4x
         Firmware Version 6.53 Build 0028.0007

2 Dialogic Boards Successfully Installed

Dialogic NFAS Configuration Program
Version 2.0
Linux  2.x.x
Copyright (c) 2001 Intel Corp.
ALL RIGHTS RESERVED

Add SW Devices ....
REGVOX: #
REGVOX: # Dialogic Generic Configuration File
REGVOX: #
REGVOX: #
REGVOX: # Total number of virtual boards - 3
REGVOX: #
REGVOX:
REGVOX: #
REGVOX: # Board Type - D/41JCT-LS
REGVOX: #
REGVOX: dxxxB1    4  4080011   C         D0210000
                  2000        1        D4XE  3
REGVOX: fruB1sd1  0  4080011   C         D0210000
                  2000        1        DCP  4
REGVOX: #
REGVOX: # Board Type - D/41EPCI
REGVOX: #
REGVOX: dxxxB2    4  4070010   C         D0218000
                  2000        2        D4XE  6
Add SW Devices Done

Dialogic SCSA Transmit Timeslot Assignment Program
Version 2.0
Linux  2.x.x
Copyright (C) 1997-2000 Dialogic Corp.
ALL RIGHTS RESERVED
Using default base timeslot 0; none other specified.
Assigned 4 SCBus time slots successfully for VOICE device dxxxB1
Assigned 4 SCBus time slots successfully for Analog
         VOICE device dxxxB1
Assigned 4 SCBus time slots successfully for VOICE device dxxxB2
Assigned 4 SCBus time slots successfully for Analog
         VOICE device dxxxB2
```

C Troubleshooting

- *Problem:*Dialogic drivers don't start: connection failed
  Output:

  ```
  [root@bayonne bin]# ./dlstart
  ```

```
  PID TTY          TIME CMD
System exception ‘COMM_FAILURE’
Reason: temporary error, try again
Locality: exception has been generated locally
Completed: no
Minor code: 0x4f4f000e (gethostbyname() failed)

Dialogic Generic Downloader Version 5.10 (Build 12)
Copyright (c) 1992-2000 by Dialogic Corp.

Using /usr/dialogic/cfg/dialogic.cfg to configure
Dialogic Boards

System Download ..........................................
..............System exception ‘TRANSIENT’
Reason: Connection refused
Locality: exception has been generated locally
Completed: no
Minor code: 0x4f4f0001 (attempt to establish connection failed)
Error calling dm_getHostAU(); it returned: 1

Dialogic NFAS Configuration Program
Version 2.0
Linux  2.x.x
Copyright (c) 2001 Intel Corp.
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System exception ‘TRANSIENT’
Reason: Connection refused
Locality: exception has been generated locally
Completed: no
Minor code: 0x4f4f0001 (attempt to establish connection failed)
Device Mapper Failure, Make sure server is running

Dialogic SCSA Transmit Timeslot Assignment Program
Version 2.0
Linux  2.x.x
Copyright (C) 1997-2000 Dialogic Corp.
ALL RIGHTS RESERVED
/usr/dialogic/cfg/.sctscfg: Failed open: No such file or
directory
```

Solution: you need a correct */etc/hosts* file with a configuration row like `127.0.0.1 localhost` and/or `192.168.1.1 myhost`

D References

The main information source about dialogic boards is the documentation included with drivers themselves. The most important documents are *Release Guide* and *Software Installation Guide*. On the web there are two *HOW-TO* written by *Gerry Gilmore*:

- SR 5.1 SP1 for Linux Installation HOWTO

- SR 5.1 FP1 for Linux Installation HOWTO

they are both available on bayonne.it web site (www.bayonne.it/documentazione/-dialogic).

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