How-To: LibSS7 and Sangoma

This How-To guide shows how to make a basic SS7 connection between two systems using a Sangoma Digital card (aka A10X series of cards).

This guide was written using the following versions, other versions might work but there are no guarantees that they will compile against each other:

-Asterisk-1.6.0.6
-LibSS7-1.0.2
-Dahdi-Linux-2.1.0.4
-Dahdi-Tools-2.1.0.2
-Wanpipe-3.3.16

Written by: Konrad Hammel
             Konrad@sangoma.com

Table of Contents:

1.) Installing all the programs:

1. Download and un-archive all the different programs.
2. Create symbolic links in /usr/src/ to all the different source directories.
   /usr/src/asterisk -> asterisk source files
   /usr/src/libss7 -> Libss7 source files
   /usr/src/dahdi-linux -> dahdi linux source files
   /usr/src/dahdi-tools -> dahdi tools source files
   /usr/src/wanpipe -> wanpipe source files
3. Compile dahdi-linux source files.
   cd /usr/src/dahdi-linux
   make
   make install
4. Compile dahdi-tools source files.
   cd /usr/src/dahdi-tools
   ./configure
   make
   make install
   make config
5. Compile libss7 source files.
   cd /usr/src/libss7
   make
   make install
6. Compile Asterisk source files.
   cd /usr/src/asterisk
   ./configure
   make menuselect (de-select app_dahdiras….having this selected will break the compile)
   make
   make install
   make samples
7. Compile Wanpipe source files.
   ./Setup install
   -selection option 2 to compile for Dahdi/Zaptel support
   -select default options for everything else

2.) Configuring Wanpipe, Dahdi, and Asterisk

1. Run "wancfg_dahdi" and setup the connection as a standard PRI link
   -generate chan_dadhi.conf
   -select the type of line T1 or E1
   -select the line framing and line coding
   -select the clock source…NORMAL to recover the clock from the line MASTER to generate the clock
   -do not used hardware DTMF
   -PRI_CPE as the signaling
   -National ISDN2 as the switch type
   -use all the channels
   -from-pstn as the context
   -set all ports that will be used for SS7 to the above settings
   -select option "3" to shutdown and apply the settings now
   -have "wanrouter" and "dahdi_cfg" run automatically at startup
2. Open each Wanpipe configuration file "/etc/wanpipe/wanpipeX.conf" (where X is the port #) and change the following line:
   TDMV_DCHAN=16
   to:
   TDMV_DCHAN=0
3. Open the file "/etc/dahdi/system.conf", for each port that has an SS7 signaling channel and change "system.conf" from:
   span=1,0,0,ccs,hdb3,crc4
   bchan=1-15,17-31
   hardhdlc=16
   to:
   span=1,1,0,ccs,hdb3,crc4
   bchan=2-31
   mtp2=1
4. For each port that has only Voice channels change "system.conf" from:
   span=1,0,0,ccs,hdb3,crc4
   bchan=1-15,17-31
   hardhdlc=16
   to:
   span=1,0,0,ccs,hdb3,crc4
   bchan=1-31
5. Open the file "/etc/asterisk/chan_dahdi.conf", for each signaling port change the following from:
   ;Sangoma A102 port 1 [slot:2 bus:6 span:1] <wanpipe1>
   switchtype=national
   context=from-pstn
   group=0
   echocancel=no
   signalling=pri_cpe
   channel =>1-15,17-31

to:

```
;Sangoma A102 port 1 [slot:2 bus:6 span:1] <wanpipe1>
context=from-pstn
group=0
echocancel=no

signaling=ss7                     ;this is ss7 signaling
ss7type=itu                       ;using the ITU variant
ss7_called_nai=dynamic            ;NAI for outgoing calls
ss7_calling_nai=dynamic           ;NAI for incoming calls
ss7_internationalprefix=00        ;international prefix value for incoming calls
ss7_nationalprefix=0              ;national prefix value for incoming calls
ss7_subscriberprefix=             ;subscriber prefix value for incoming calls
ss7_unknownprefix=                ;unknown prefix value for incoming calls
ss7_explictacm=yes                ;ACM is send as soon as call enters the dial plan...may not accepted yet though
linkset=1                         ;arbitrary name for this set of channels
pointcode=2                       ;the point code for this system...aka SPC
adjpointcode=1                    ;the point code for the system that we are signaling to... aka APC
defaultdpc=1                      ;the point code for the system that the CICs will be negotiated with...aka DPC
networkindicator=international     ;NI value for MTP3
cicbeginswith=1                   ;the starting value of the CICs
channel=2-31                      ;the channels that are CICs
sigchan=1                         ;the signaling channel
```

6. Restart Asterisk and Wanrouter
   asterisk –rx "stop now"
   wanrouter restart
   asterisk
   asterisk –r

```
#================================================
# WANPIPE1 Configuration File
#================================================
#
# Date: Wed Dec  6 20:29:03 UTC 2006
#
# Note: This file was generated automatically
#      by /usr/local/sbin/setup-sangoma program.
#
#      If you want to edit this file, it is
#      recommended that you use wancfg program
#      to do so.
#================================================
# Sangoma Technologies Inc.
#================================================

[devices]
wanpipe1 = WAN_AFT_TE1, Comment

[interfaces]
w1g1 = wanpipe1, , TDM_VOICE, Comment

[wanpipe1]
CARD_TYPE      = AFT
S514CPU        = A
CommPort       = PRI
AUTO_PCISLOT   = NO
PCISLOT        = 2   < --------- must be changed for your system
PCIBUS         = 6   < --------- must be changed for your system
FE_MEDIA       = E1
FE_LCODE       = HDB3
FE_FRAME       = CRC4
FE_LINE        = 1
TE_CLOCK       = MASTER
TE_REF_CLOCK   = 0
TE_SIG_MODE    = CCS
TE_HIGHIMPEDANCE      = NO
LBO            = 120OH
FE_TXTRISTATE  = NO
MTU            = 1500
UDPPORT        = 9000
TTL            = 255
IGNORE_FRONT_END = NO
TDMV_SPAN      = 1
TDMV_DCHAN     = 0
TDMV_HW_DTMF   = NO


[w1g1]
ACTIVE_CH      = ALL
TDMV_ECHO_OFF  = NO
TDMV_HWEC      = NO
```

---system.conf for System A --

```
#autogenerated by /usr/sbin/wancfg_dahdi do not hand edit
#autogenrated on 2009-03-15
#Dahdi Channels Configurations
#For detailed Dahdi options, view /etc/dahdi/system.conf.bak
loadzone=us
defaultzone=us

#Sangoma A102 port 1 [slot:2 bus:6 span:1] <wanpipe1>
span=1,0,0,ccs,hdb3,crc4
bchan=2-31
mtp2=1
```

--system.conf for System A --

---chan_dahdi.conf for System A ---

```
;autogenerated by /usr/sbin/wancfg_dahdi do not hand edit
;autogenrated on 2009-03-15
;Dahdi Channels Configurations
;For detailed Dahdi options, view /etc/asterisk/chan_dahdi.conf.bak

[trunkgroups]
[channels]
context=default
usecallerid=yes
hidecallerid=no
callwaiting=yes
usecallingpres=yes
callwaitingcallerid=yes
threewaycalling=yes
transfer=yes
canpark=yes
cancallforward=yes
callreturn=yes
echocancel=yes
echocancelwhenbridged=yes
relaxdtmf=yes
rxgain=0.0
txgain=0.0
group=1
callgroup=1
pickupgroup=1
immediate=no


context=from-pstn
group=0
echocancel=no


signalling=ss7              ;this is ss7 signalling
ss7type=itu                 ;using the ITU variant
ss7_called_nai=dynamic         ;NAI for outgoing calls
ss7_calling_nai=dynamic        ;NAI for incoming calls
ss7_internationalprefix=00     ;internation prefix value for incoming calls
ss7_nationalprefix=0           ;national prefix value for incoming calls
ss7_subscriberprefix=          ;subscriber prefix value for incoming calls
ss7_unknownprefix=             ;unknown prefix value for incoming calls
ss7_explictacm=yes             ;ACM is send as soon as call enters the dialplan...may not accepted yet though
linkset=1               ;arbitary name for this set of channels
pointcode=2                ;the point code for this system...aka SPC
adjpointcode=1                ;the point code for the system that we are signalling to... aka APC
defaultdpc=1                ;the point code for the system that the CICs will be negoiated with...aka DPC
networkindicator=international  ;NI value for MTP3
cicbeginswith=1               ;the starting value of the CICs
channel=2-31                ;the channels that are CICs
sigchan=1               ;the signalling channel
```
---chan_dahdi.conf for System A ---

```
-----------------------------------------------------extension.conf for System A ----------------------------------------------------
[from-sip]
exten => _X.,1,answer()
;exten => _X.,n,playback(demo-congrats)
exten => _X.,n,dial(dahdi/g0/123456789)
exten => _X.,n,hangup()

[from-pstn]
exten => _X.,1,answer()
exten => _X.,n,playback(demo-congrats)
;exten => _X.,n,dial(dahdi/g0/123456789)
exten => _X.,n,hangup()
-----------------------------------------------------extension.conf for System A ----------------------------------------------------
```

```
#================================================
# WANPIPE1 Configuration File
#================================================
#
# Date: Wed Dec  6 20:29:03 UTC 2006
#
# Note: This file was generated automatically
#       by /usr/local/sbin/setup-sangoma program.
#
#       If you want to edit this file, it is
#       recommended that you use wancfg program
#       to do so.
#================================================
# Sangoma Technologies Inc.
#================================================

[devices]
wanpipe1 = WAN_AFT_TE1, Comment

[interfaces]
w1g1 = wanpipe1, , TDM_VOICE, Comment

[wanpipe1]
CARD_TYPE      = AFT
S514CPU        = A
CommPort       = PRI
AUTO_PCISLOT   = NO
PCISLOT        = 2   < --------- must be changed for your system
PCIBUS         = 6   < --------- must be changed for your system
FE_MEDIA       = E1
FE_LCODE       = HDB3
FE_FRAME       = CRC4
FE_LINE        = 1
TE_CLOCK       = NORMAL
TE_REF_CLOCK   = 0
TE_SIG_MODE    = CCS
TE_HIGHIMPEDANCE      = NO
LBO            = 120OH
FE_TXTRISTATE  = NO
MTU            = 1500
UDPPORT        = 9000
TTL            = 255
IGNORE_FRONT_END = NO
TDMV_SPAN      = 1
TDMV_DCHAN     = 0
TDMV_HW_DTMF   = NO


[w1g1]
ACTIVE_CH      = ALL
TDMV_ECHO_OFF  = NO
TDMV_HWEC      = NO
```

---system.conf for System B ---
```
#autogenerated by /usr/sbin/wancfg_dahdi do not hand edit
#autogenrated on 2009-03-15
#Dahdi Channels Configurations
#For detailed Dahdi options, view /etc/dahdi/system.conf.bak
loadzone=us
defaultzone=us

span=1,0,0,ccs,hdb3,crc4
bchan=2-31
mtp2=1
```
---system.conf for System B ---

---chan_dahdi.conf for System B ---
```
;autogenerated by /usr/sbin/wancfg_dahdi do not hand edit
;autogenrated on 2009-03-15
;Dahdi Channels Configurations
;For detailed Dahdi options, view /etc/asterisk/chan_dahdi.conf.bak

[trunkgroups]
[channels]
context=default
usecallerid=yes
hidecallerid=no
callwaiting=yes
usecallingpres=yes
callwaitingcallerid=yes
threewaycalling=yes
transfer=yes
canpark=yes
cancallforward=yes
callreturn=yes
echocancel=yes
echocancelwhenbridged=yes
relaxdtmf=yes
rxgain=0.0
txgain=0.0
group=1
callgroup=1
pickupgroup=1
immediate=no


context=from-pstn
group=0
echocancel=no


signalling=ss7             ;this is ss7 signalling
ss7type=itu                ;using the ITU variant
ss7_called_nai=dynamic        ;NAI for outgoing calls
ss7_calling_nai=dynamic       ;NAI for incoming calls
ss7_internationalprefix=00     ;internation prefix value for incoming calls
ss7_nationalprefix=0          ;national prefix value for incoming calls
ss7_subscriberprefix=         ;subscriber prefix value for incoming calls
ss7_unknownprefix=            ;unknown prefix value for incoming calls
ss7_explictacm=yes            ;ACM is send as soon as call enters the dialplan...may not accepted yet though
linkset=1               ;arbitary name for this set of channels
pointcode=1               ;the point code for this system...aka SPC
adjpointcode=2              ;the point code for the system that we are signalling to... aka APC
defaultdpc=2               ;the point code for the system that the CICs will be negoiated with...aka DPC
networkindicator=international  ;NI value for MTP3
cicbeginswith=1              ;the starting value of the CICs
channel=2-31               ;the channels that are CICs
sigchan=1               ;the signalling channel
```
---chan_dahdi.conf for System B ---

---extension.conf for System B --
```
[from-sip]
exten => _X.,1,answer()
;exten => _X.,n,playback(demo-congrats)
exten => _X.,n,dial(dahdi/g0/123456789)
exten => _X.,n,hangup()

[from-pstn]
exten => _X.,1,answer()
exten => _X.,n,playback(demo-congrats)
;exten => _X.,n,dial(dahdi/g0/123456789)
exten => _X.,n,hangup()
```
---extension.conf for System B --