

Setting up Dummy and LogCollector for a TETRAPack connection

Disclaimer

- Please note you follow this guide at your own risk! This is an experimental bridge, and we can't be held responsible if anything bad happens to your precious CTS!
- This guide is for a Single-BS (one CTS) subnet. If you wish to interconnect more CTSes locally, you'll need to modify the network topology + E1 time slotting accordingly.

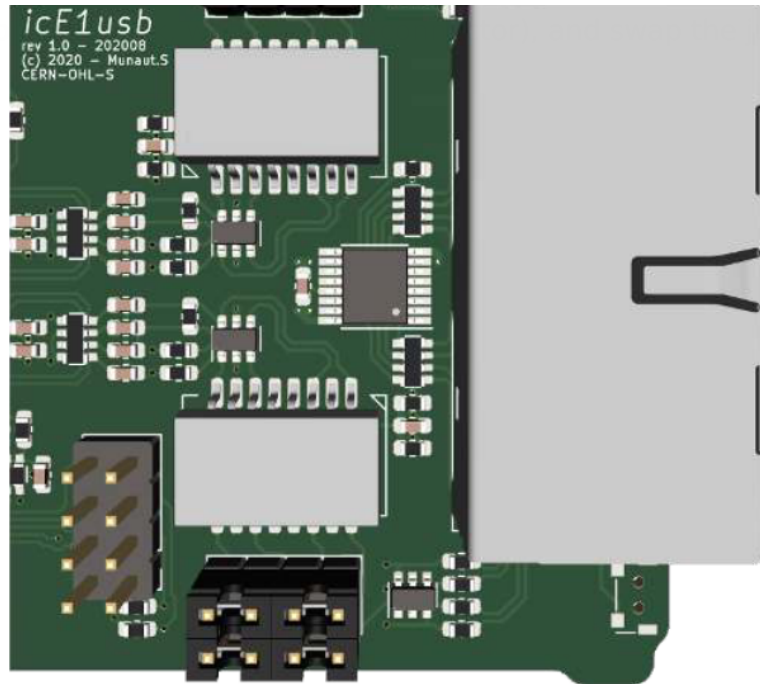
Hardware requirements

- Raspberry Pi (4 is ideal, 2GB is ok), with PSU and SD card
- icE1USB
- A USB-Ethernet Adapter
- A CTS (DUH)

Prep work

- Make sure you understand how TetraPack works, its topology, how Dummy and LogCollector operate with each other, etc.
- Before going any further, [read this!](#)

- Open up the icE1USB (fr



npers so

they match this picture: **NT mode**

CTS Setup

1. Get a clear view of how the CTS is configured, and its necessary configuration files: bssparams.txt, set_x_gp, gm, sc, sub.csv, etc. Please make sure everything works as a standalone site before starting this entire endeavour!
2. You also need good way to remotely connect to the CTS management interface (VNC is a good option).
3. Plan ahead and make a list of the BrandMeister TGs you want your CTS to handle. Add them already to set_x_gp and gm.csv, reboot everything and make sure they already work locally in standalone mode.
4. Open up bssparams.txt on your CTS, and do the following edits. Don't change anything else at this state:

```
## Base-Station Parameters
#####
###
#### Set the name to something simple, short, no special caracters
/base-station/name = "CTSBS";
#### set this to id 1
/base-station/base-station-id = 1;
```

```

#### add or replace:
/base-station/standalone-mode = false;

#### add or replace:
/base-station/use-local-site-fall-back = false;

## Air Interface BLE Parameters
#####
/base-station/BLE/neighbour-cells = 191;

## SDS Gateway Parameters
#####
####
#### Remove all other lines, replace by:
/system/sds-gateway/host-1 = { issi = 262999; ip-address = "44.225.64.18"; };
/system/sds-gateway/host-2 = { issi = 250999; ip-address = "44.225.64.19"; };
/system/sds-gateway/host-3 = { issi = 16777184; ip-address = "44.225.64.20"; };
# These ISSIs will be used for SMS and GPS services (via GWPC emulation, IP addresses don't matter)

## E1 Layout Parameters
#####
####
#### Remove all other E1 layout lines, and replace byt this:
/network/E1-layout/time-slot-01 = { source-type = "SIGNALLING"; };
/network/E1-layout/time-slot-02 = { source-type = "SIGNALLING"; };
/network/E1-layout/time-slot-03 = { source-type = "SIGNALLING"; };
/network/E1-layout/time-slot-04 = { source-type = "SIGNALLING"; };

#### Real BS transceivers
/network/E1-layout/time-slot-17 = { source-type = "BS"; base-station-id = 1; l-transceiver-id = 11; };

#### Dummy's emulated BS transceivers
/network/E1-layout/time-slot-22 = { source-type = "BS"; base-station-id = 8; l-transceiver-id = 11; u-
transceiver-id = 12; };
/network/E1-layout/time-slot-23 = { source-type = "BS"; base-station-id = 8; l-transceiver-id = 13; u-
transceiver-id = 14; };
/network/E1-layout/time-slot-24 = { source-type = "BS"; base-station-id = 8; l-transceiver-id = 15; u-
transceiver-id = 16; };
/network/E1-layout/time-slot-25 = { source-type = "BS"; base-station-id = 8; l-transceiver-id = 17; u-
transceiver-id = 18; };

```

```
#### Dummy's emulated GWPC encoders
```

```
/network/E1-layout/time-slot-26 = { source-type = "DISP"; };
```

```
/network/E1-layout/time-slot-27 = { source-type = "ISDN"; };
```

```
/network/E1-layout/time-slot-28 = { source-type = "ISDN"; };
```

```
/network/E1-layout/time-slot-29 = { source-type = "ISDN"; };
```

```
/network/E1-layout/time-slot-30 = { source-type = "ISDN"; };
```

```
## Network Topology Parameters
```

```
#####
```

```
#### Remove all other network topology parameters, and replace by this. Don't forget to change  
CTSNAME to the same name as in line 3!
```

```
/network/topology/gateway-pc = { name = "Gateway Server"; E1-connection-1 = "BS-8"; };
```

```
/network/topology/base-station-1 = { name = "CTSBS"; E1-connection-1 = "BS-8"; };
```

```
/network/topology/base-station-8 = { name = "DUMMY"; E1-connection-1 = "BS-1"; E1-connection-2 =  
"GW-PC"; };
```

5. Save and reboot the CTS, make sure it still works.
6. Copy bssparams.txt over to your local PC, you'll need it for your Raspberry Pi.
7. Write down the IP address of your CTS BSC computer (mine was 10.10.15.31, but yours will probably be different).

Software Stack Install

1. Prepare an SD card with a 64-bit Raspbian Bookworm (Debian 12)
2. Update/Upgrade the OS after boot:

```
sudo apt update && sudo apt upgrade  
reboot
```

3. Add the Osmocom repo, as per [Osmocom's documentation](#):

```
sudo su  
OSMOCOM_REPO="https://downloads.osmocom.org/packages/osmocom:/latest/Debian_12"  
wget $OSMOCOM_REPO/Release.key  
mv Release.key /etc/apt/trusted.gpg.d/osmocom-latest.asc  
echo "deb [signed-by=/etc/apt/trusted.gpg.d/osmocom-latest.asc] $OSMOCOM_REPO/ ." >
```

```
/etc/apt/sources.list.d/osmocom-latest.list  
apt update
```

4. Install Osmocom E1D:

```
sudo apt install osmo-e1d
```

5. Add the TetraPack repository:

```
wget https://packages.tetrapack.online/install/public.key  
mv public.key tetrapack.asc  
sudo apt-key add tetrapack.asc  
sudo echo "deb [arch=arm64] http://packages.tetrapack.online/repository/ bookworm main" >  
/etc/apt/sources.list.d/tetrapack.list  
sudo apt update
```

6. Install TetraPack dummy and cts-logcollector

```
sudo apt install tetrapack-dummy cts-logcollector
```

7. Plug in the icE1USB to your Rpi, recover the interface serial number:

```
sudo lsusb -d 1d50:6145 -v 2> /dev/null | grep iSerial
```

8. Open (with for instance nano) /etc/osmocom/osmo-e1d.cfg, copy/paste this:

```
log syslog daemon  
e1d  
interface 0 icE1usb  
usb-serial [interface serial number]  
line 0
```

9. Reload the service:

```
sudo systemctl restart osmo-e1d
```

Dummy - E1 Link setup

1. Make sure Dummy is off with:

```
sudo systemctl stop dummy@default.service
```

2. Open/Create /opt/TetraPack/bssparams.txt, and copy/paste the contents from the file created at the CTS setup step. Edit the following lines

```

## System Parameters
#####

#####

### Edit/Replace
/system/name = "DUMMY";

## Base-Station Parameters
#####

###

### Edit/Replace
/base-station/name = "DUMMY";
/base-station/base-station-id = 8;

```

3. Open/Create /opt/TetraPack/default.env

```

# E1D interface and line in format [interface number].[line number]
DUMMY_LINE=0.0

# Path to CTS topology file (bss3.txt or bssparams.txt)
DUMMY_TOPOLOGY=/opt/TetraPack/bssparams.txt

# IP address and mask for CTS VTUN interface
DUMMY_NETWORK="192.168.0.8 mask 255.255.255.0"

# Specific options (multiple values can be delimited with comma):
# replace-forwarded-link-status - replace IP-forwarded status for both E1 lines status of local
BSs/GWPC to up
# emulated-bs-line1-down      - set E1-1 status of emulated BS to down
# emulated-bs-line2-down      - set E1-2 status of emulated BS to down
# emulated-gwpc-line1-down    - set E1-1 status of emulated GWPC to down
# emulated-gwpc-line2-down    - set E1-2 status of emulated GWPC to down
DUMMY_OPTION=

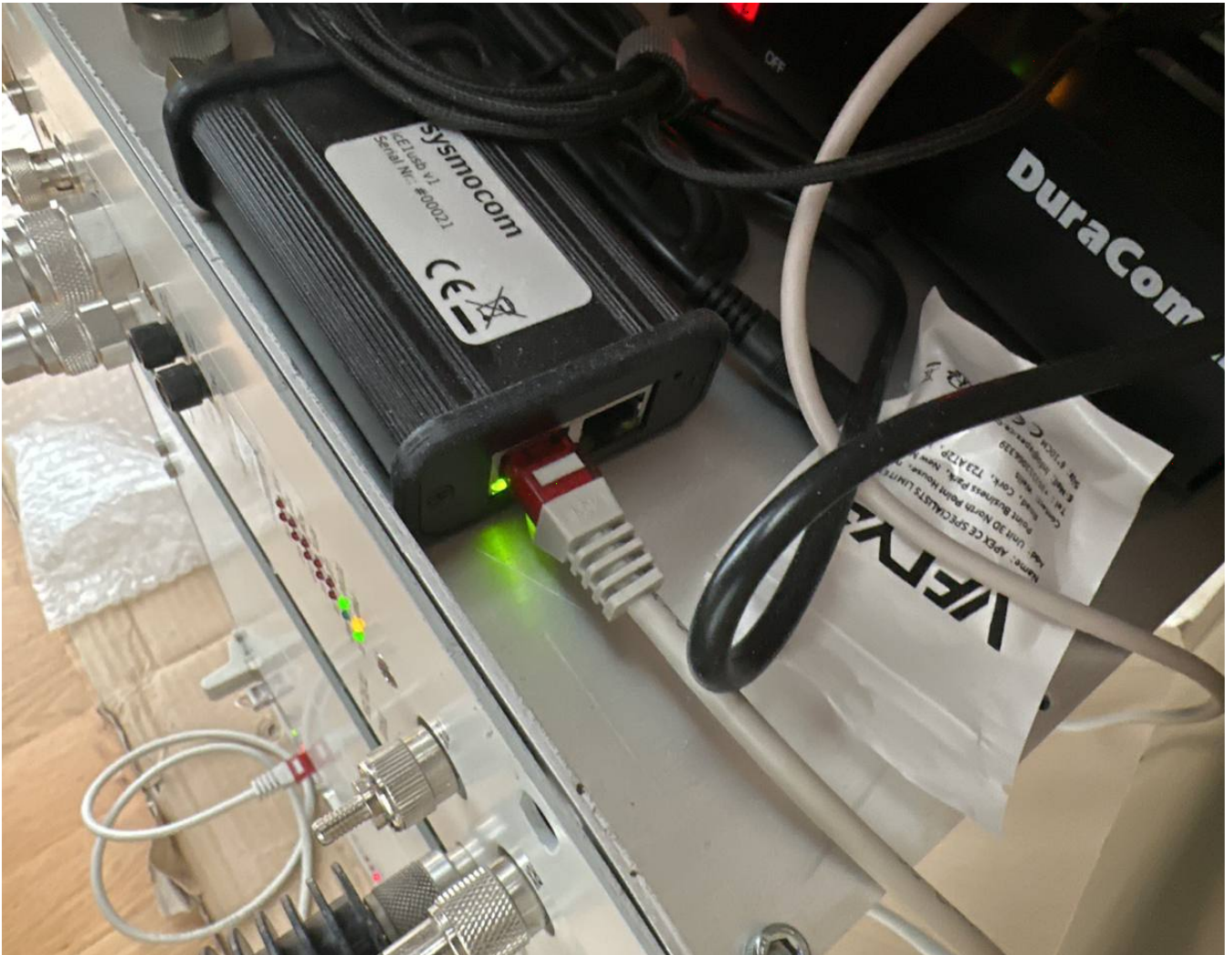
# Server connection URI in format http(s)://[user]:[password]@[address]/[path and parameters]
# If you care about securely stored password, please put credentials into /opt/TetraPack/.netrc (man
netrc)
# REPLACE <YOUR DMR-ID> and <YOUR HOTSPOT/REPEATER PASSWORD> with your radio ID and

```

```
password :)
DUMMY_CONNECTION="http://<YOUR DMR-ID>:<YOUR HOTSPOT/REPEATER
PASSWORD>@core.tetrapack.online:8081/dummy/?mode=bs+gwpc"

# Instance name for D-BUS IPC interface
DUMMY_INSTANCE=default
```

4. Save everything, cross your fingers and connect E1.1 from your BSC to the left port of icE1usb, like so:



5. The matching LED on the port should stop blinking, and the red LED on E1-1 should turn off.
6. Try to start dummy from the console:

```
cd /opt/TetraPack
./run.sh default.env

# First, read startup messages and check that configuration (default.env and bssparams.txt) parsed
successfully

# Second, check connection: if you see, in blue, "Q.921 connection established", congratulations!
```

Your E1 link works!

You should also see "Socket Connection Established" - this means, connection to server established

7. If everything works, Ctrl+C to stop the console instance, and enable the service + start it

```
sudo systemctl start dummy@default.service
```

LogCollector - CTS Management interface setup

1. Connect the USB/Ethernet interface to the Pi, and connect an Ethernet cable from BSC management port to the usb dongle.
2. Stop LogCollector:

```
sudo systemctl stop cts-logcollector@default.service
```

3. Set a static IP on the interface (probably eth1) on the same range as the BSC, by editing /etc/dhcpd.conf and adding this:

```
# Don't forget to edit your ip address to match the range of your BSC!
interface eth1
static ip_address=10.10.15.20
static routers=10.10.15.1
```

4. Test if you can connect via telnet:

```
telnet [BSC IP ADDR] 51600
#If you get "220 Network Management Interface is ready.", you're good to go!
```

5. Through that telnet interface, you can check if you got a good E1 link with Dummy:

```
login a
cd network
netstat
#Look at the table that pops up, and focus on the "Links" column
#260-rsp
#260-Node  Links  DD   AI  ISDN  DISP
#260-----
#260-BS-1   u -   u   u   -   -
#260-BS-2   ??   ?   ?   -   -
#260-BS-3   ??   ?   ?   -   -
#260-BS-4   ??   ?   ?   -   -
```



```
#260-BS-5   ? ?   ?   ?   -   -
#260-BS-6   ? ?   ?   ?   -   -
#260-BS-7   ? ?   ?   ?   -   -
#260-BS-8   u u   u   u   -   -
#260-GWPC   d u   u   -   u   d
```

#260-

#260 .

#BS-1 should have first link on U, BS-8 should have both U, and GWPC should have D U

#If it's not the case, check the topology with:

cd topology

ls

#Should show this:

#260- d-- gateway-pc

#260- d-- base-station-1

#260- d-- base-station-8

#If not, check your bssparams.txt on both the CTS and the Pi, something is wrong.

6. Close the Telnet session (Ctrl+c), open /opt/LogCollector/default.env, and change the ip address:

```
# [IP of basestation] [dummy instance name] [basestation ID (1-8)]
COMMAND_ARGUMENTS=[YOUR BSC IP] default 1
```

7. Enable/Restart LogCollector, wait for a bit and see if you get data coming from the CTS when you place a call or attach to a group:

```
sudo systemctl enable cts-logcollector@default.service
sudo systemctl start cts-logcollector@default.service
#Let's monitor syslog to see if it recovers logs from the CTS. You should see a bunch of lines show up.
tail -f /var/log/syslog | grep cts
```

8. If it works, great! LogCollector is ready. Ctrl+C to quit tail, carry on to the rest

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