BSP Patch Project

Overview

This project provides scripts and instructions for building and patching firmware for Microchip LAN9662 and LAN8651 devices, including setup and deployment using TFTP.

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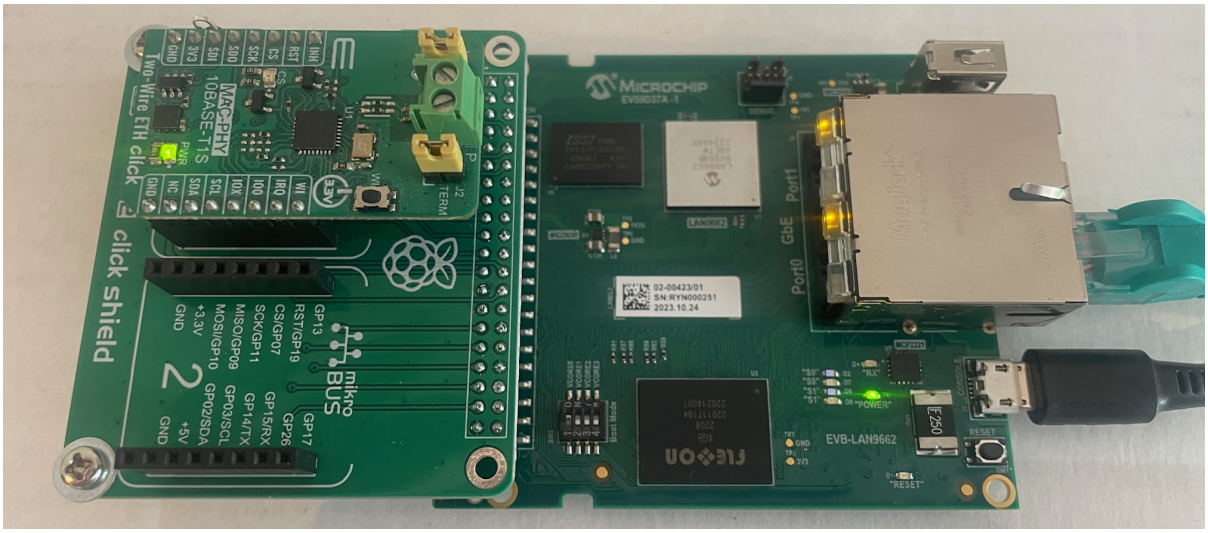
Hardware



- LAN9662 Part Number: EV09D37A
- LAN8651 Two Wire ETH Click
- Adaptor Pi 2 Click Shield

Hardware Devicetree and Kernel Driver description

LAN865x Driver and Device Tree modifications

Prerequisites

- **Linux**: CMake version < 4.x.x, other tools as per Microchip BSP Getting Started
- **Windows**: Python 3, `py3tftp`

- **Board**: LAN9662 PCB8291, LAN9851 Click Board

Setup on Linux Build Machine

This scripts are ment meant more as a How-To then to be executed

1. **Install required tools**
   lan865x_build_tool_setup.sh
2. **Rebuild default firmware for PCB8291**
   lan865x_build_first.sh
3. **Patch sources for LAN9851 Click Board**
   lan865x_build_second.sh

See Microchip BSP Docs for detailed setup.

TFTP Server Setup (Windows)

1. **Install py3tftp**

```
pip install py3tftp
```

2. **Allow UDP port 69 in Firewall**

```
New-NetFirewallRule -DisplayName "TFTP-UDP-69-Temp" -Direction Inbound -
Action Allow -Protocol UDP -LocalPort 69
```

3. **Start py3tftp on port 69**

```
py3tftp --host 0.0.0.0 --port 69
```

4. Ensure `brsdk_standalone_arm.ext4.gz` is in the working directory.

Programming LAN9662 Board

1. **Enter UBoot Mode during startup**
2. **Set up network and download firmware**

```
setenv ipaddr 169.254.35.123
setenv netmask 255.255.0.0
tftp 169.254.35.184:brsdk_standalone_arm.ext4.gz
unzip ${loadaddr} ${mmc_unzip_loadaddr}
run mmc_format
```

```
run mmc_boot0_upd; run mmc_boot1_upd
boot
```

3. **Configure PLCA during runtime**

```
ethtool --set-plca-cfg eth2 enable on node-id 0 node-cnt 8
ethtool --get-plca-cfg eth2
ip addr add dev eth2 192.168.10.11/24
ip link set eth2 up
ifconfig
```

File Overlay and Customization

- Place custom scripts/configurations in `mscc-brsdk-source-2024.09/board/mscc/common/rootfs_overlay`
- Example: `S99myconfig.sh` for auto-configuration

```
#!/bin/sh
echo "Start Custom-Configuration..." > /tmp/bootlog.txt

ethtool --set-plca-cfg eth2 enable on node-id 0 node-cnt 8

ip link set eth0 down
ip link set eth1 down
ip link set eth2 down

ip addr flush dev eth0
ip addr flush dev eth1
ip addr flush dev eth2

ip addr add 169.254.35.112/16 dev eth0
ip addr add 192.168.178.20/24 dev eth1
ip addr add 192.168.0.5/24 dev eth2

ip link set eth0 up
ip link set eth1 up
ip link set eth2 up
```

or compiled as a loadable module you must start the driver with

```
ip link set eth0 down
ip link set eth1 down

modprobe lan865x_t1s
ethtool --set-plca-cfg eth2 enable on node-id 0 node-cnt 8
ethtool --get-plca-cfg eth2
```

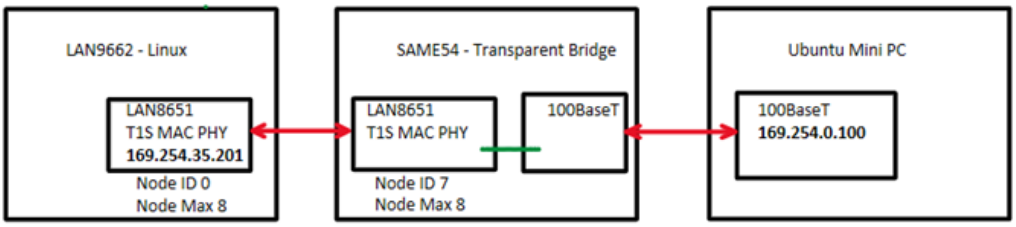
```
ip addr flush dev eth0
ip addr flush dev eth1
ip addr flush dev eth2

ip addr add 169.254.35.112/16 dev eth0
ip addr add 192.168.178.20/24 dev eth1
ip addr add 169.254.35.110/16 dev eth2

ip link set eth2 up
ping 169.254.35.184

ip link set eth0 up
ip link set eth1 up
```

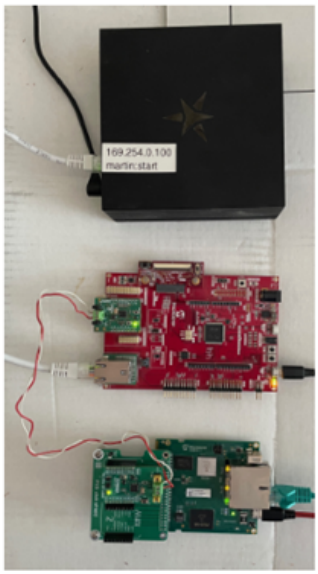
IP Address Assignement

Hardware Port	interface	IP	Description
Left Port	eth0	169.254.35.112/16	AutoIP Adressing
Right Port:	eth1	192.168.178.20/24	typical FritzBox IP
T1S Port:	eth2	192.168.0.5/24	typical DHCP IP

For using the SSH, you must first access the board via terminal console and set an password with "passwd"
Then an SSH Daemon is available on all interfaces
An MQTT Broker with Anonymous Acccess is available on all Interfaces at Port 1883

TestRig





Ubuntu 24.04 **Linux Mini PC**
169.254.0.100

Transparent **T1S to 100Base Bridge**
https://github.com/zabooh/t1s_100baset_bridge.git

LAN9662 -> eth0 169.254.35.110
LAN8651 T1S MAC-PHY -> eth2 **169.254.35.112** -> Default interface

iperf3 Test

iperf3 client running on LAN992 for TCP test

```
#
# iperf3 -c 169.254.0.100 -p 9999

Connecting to host 169.254.0.100, port 9999
[  5] local 169.254.35.112 port 46096 connected to 169.254.0.100 port 9999
[ ID] Interval           Transfer     Bitrate         Retr  Cwnd
[  5]   0.00-1.00   sec   923 KBytes  7.56 Mbits/sec    0   59.4 KBytes
[  5]   1.00-2.00   sec   703 KBytes  5.76 Mbits/sec    0   70.7 KBytes
[  5]   2.00-3.00   sec   730 KBytes  5.98 Mbits/sec    0   70.7 KBytes
[  5]   3.00-4.00   sec   730 KBytes  5.98 Mbits/sec    0   73.5 KBytes
[  5]   4.00-5.00   sec   730 KBytes  5.98 Mbits/sec    0   73.5 KBytes
[  5]   5.00-6.00   sec   730 KBytes  5.98 Mbits/sec    0   73.5 KBytes
[  5]   6.00-7.00   sec   730 KBytes  5.98 Mbits/sec    0   73.5 KBytes
[  5]   7.00-8.00   sec   730 KBytes  5.98 Mbits/sec    0   73.5 KBytes
[  5]   8.00-9.00   sec   730 KBytes  5.98 Mbits/sec    0   73.5 KBytes
[  5]   9.00-10.00  sec   730 KBytes  5.98 Mbits/sec    0   73.5 KBytes
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Retr
[  5]   0.00-10.00  sec  7.29 MBytes  6.11 Mbits/sec    0             sender
[  5]   0.00-10.07  sec  7.00 MBytes  5.83 Mbits/sec                  receiver

iperf Done.
#
```

iperf3 server running on Ubuntu Mini PC

```
martin@martin:~$ iperf3 -s -p 9999
-----------------------------------------------------------
Server listening on 9999 (test #1)
-----------------------------------------------------------
Accepted connection from 169.254.35.112, port 46094
[  5] local 169.254.0.100 port 9999 connected to 169.254.35.112 port 46096
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-1.00   sec   640 KBytes  5.24 Mbits/sec
[  5]   1.00-2.00   sec   768 KBytes  6.29 Mbits/sec
[  5]   2.00-3.00   sec   640 KBytes  5.24 Mbits/sec
[  5]   3.00-4.00   sec   768 KBytes  6.29 Mbits/sec
[  5]   4.00-5.00   sec   768 KBytes  6.29 Mbits/sec
[  5]   5.00-6.00   sec   640 KBytes  5.24 Mbits/sec
[  5]   6.00-7.00   sec   768 KBytes  6.29 Mbits/sec
[  5]   7.00-8.00   sec   640 KBytes  5.24 Mbits/sec
[  5]   8.00-9.00   sec   768 KBytes  6.29 Mbits/sec
[  5]   9.00-10.00  sec   768 KBytes  6.29 Mbits/sec
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate
[  5]   0.00-10.07  sec  7.00 MBytes  5.83 Mbits/sec                  receiver
-----------------------------------------------------------
Server listening on 9999 (test #2)
-----------------------------------------------------------
```

Troubleshooting

- **CMake version**: Ensure you use CMake < 4.x.x.
- **Tool installation**: Run scripts line by line to diagnose errors.
- **TFTP**: Verify firewall and correct port usage.
- **Board networking**: Check cable and IP configuration.

Resources

- Microchip BSP Getting Started
- Building and Programming Guide for LAN966x

For further improvement, consider adding a project logo, badges (build status, license), and contribution guidelines.