Documentation: Basic Packages

This documentation entails all the necessary packages to be installed in linux before using linux to run the motor.

Before we execute the steps, it is important to follow the below prerequisites:

1. Knowledge of basic Linux commands. Click here for the guide.
2. Go through the motor manual. It can be found here.
3. Basic Packages Installed. The link to the zip file containing the files is given here. It is important to keep the packages in a single folder.

All commands are written in this color.

Note: These commands need to be executed only once per device. After that it is not necessary.

Step 1:

```
apt-get install linux-image-rt-amd64
apt-get install linux-headers-rt-amd64
apt-get install build-essential autoconf automake autotools-dev dkms autoconf-archive libltdl-dev
apt-get install libltdl7 libpkgconf3 libtool lsb-release m4  pkg-config  pkgconf pkgconf-bin
```

If the above packages are not being installed, add sudo before the commands.

Step 2:

Change the folder to where the packages are kept using the cd command. Then execute the bellow commands:

```
dpkg -i  ethercat-dkms_1.5.2.429.g3079ece-1+392.1_all.deb
dpkg -i  ethercat-master_1.5.2.429.g3079ece-1+392.1_amd64.deb
dpkg -i  libethercat_1.5.2.429.g3079ece-1+392.1_amd64.deb
dpkg -i libethercat-dev_1.5.2.429.g3079ece-1+392.1_amd64.deb
dpkg -i linuxcnc-ethercat_1.25.1.g180ad89-0_amd64.deb
```

The fifth will install linuxcnc. Install these packages first OR after ethercat-dkms deb file fails, automatically install them with command

```
apt-get install -f
```

Step 3:
Next step is to get the ethernet address - write down the mac address. The command is:
ip a
Open nano and modify the Master address:
nano /etc/ethercat.conf
Once the file is open, set your master0 device to your mac address and device modules to generic. Scroll down until you see these two parts. (They are not together, but separated throughout the code)

MASTER0_DEVICE="a1:b2:c3:d4:e5:f6" (WHATEVER YOUR MAC ADDRESS IS)
#For BYT60 use the value of r8169
DEVICE_MODULES="r8169"

Step 4:
Enable the ethercat service:
sudo systemctl enable ethercat.service

Start the ethercat service:
sudo systemctl start ethercat.service

Check the ethercat status:
sudo systemctl status ethercat.service

Change permissions:
sudo chmod 666 /dev/EtherCAT0

Check that its working with:
ethercat master

You should see numbers in the lines, if not and it's all zero's then something is not linked correctly in ethercat or linux. Make sure it shows a change after doing the "ethercat master" command.

Step 5:

Open in pico to give ethercat port startup permission.
sudo nano /etc/udev/rules.d/99-ethercat.rules
Once the file is open, add the following:
KERNEL=="EtherCAT[0-9]", MODE="0777"

Once back on the command line, then reload the rules using the command:
sudo udevadm control --reload-rules

Then reboot the system.