



# Seco BSP for Yocto

## Revision History

Revision	Date	Author	Changes
1_0	17 <sup>th</sup> December 2015	M.C.	First release
1_1	19 <sup>th</sup> January 2016	M.C.	Add logo customisation
1_2	29 <sup>th</sup> February 2016	M.D.M.	Jethro version
1_3	24 <sup>th</sup> January 2018	M.M.	Pyro version

## 1. Quick start

### SUPPORTED LINUX DISTRIBUTION

- Ubuntu
- Fedora
- CentOS
- Debian GNU/Linux
- openSUSE

If you want to build your image, please check of having at least 50 GB free in your hard drive.

### DEPENDENCIES

#### Ubuntu and Debian

```
$ sudo apt-get install gawk wget git-core diffstat unzip texinfo gcc-multilib \
build-essential chrpath socat cpio python python3 python3-pip python3-pexpect \
xz-utils debianutils iputils-ping libstdc++12-dev xterm
```

#### Fedora

```
$ sudo dnf install gawk make wget tar bzip2 gzip python3 unzip perl patch \
diffutils diffstat git cpp gcc gcc-c++ glibc-devel texinfo chrpath \
ccache perl-Data-Dumper perl-Text-ParseWords perl-Thread-Queue perl-bignum socat \
python3-pexpect findutils which file cpio python python3-pip xz SDL-devel xterm
```

#### openSUSE

```
$ sudo zypper install python gcc gcc-c++ git chrpath make wget python-xml \
diffstat makeinfo python-curses patch socat python3 python3-curses tar python3-pip \
python3-pexpect xz which libSDL-devel xterm
```

#### CentOS

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
SECO srl (HQ) Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	SECO Milano Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	SECO USA Inc. 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	SECO Embedded India Pvt Ltd Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	SECO Asia Pacific Co. Ltd. 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	 Green  COM Express  SBC  ETX / XTX  Carrier board  Services & Solutions



```
$ sudo yum install -y epel-release
$ sudo yum makecache
$ sudo yum install gawk make wget tar bzip2 gzip python unzip perl patch \
diffutils diffstat git cpp gcc gcc-c++ glibc-devel texinfo chrpath socat \
perl-Data-Dumper perl-Text-ParseWords perl-Thread-Queue python3-pip xz \
which SDL-devel xterm
```

## HOW TO BUILD

- Create a work folder and enter it (e.g. /home/seco/BayTrail/):

```
$ mkdir /home/seco/BayTrail
$ cd /home/seco/BayTrail
```

- Create a local copy of poky pyro:

```
$ git clone -b pyro git://git.yoctoproject.org/poky
```

- Create a local copy of the meta-intel repository inside 'poky' folder:

```
$ cd poky
$ git clone -b pyro git://git.yoctoproject.org/meta-intel
Cloning into 'meta-intel'...
remote: Counting objects: 15068, done.
remote: Compressing objects: 100% (4701/4701), done.
remote: Total 15068 (delta 8768), reused 15011 (delta 8711)
Receiving objects: 100% (15068/15068), 4.44 MiB | 957.00 KiB/s, done.
Resolving deltas: 100% (8768/8768), done.
Checking connectivity... done.
```

- Copy meta-seco folder to 'poky' directory:

```
$ cp meta-seco -R /home/seco/BayTrail/poky/
```

- Create a 'build' directory outside 'poky' directory and go inside it:

```
$ mkdir /home/seco/BayTrail/build
$ cd /home/seco/BayTrail/build
```

- Source poky environment with desired target directory:

```
$ source /home/seco/BayTrail/poky/oe-init-build-env seco
(seco folder will be created)
```

- Configure the Build adding meta-intel and meta-seco BSP to bblayers.conf and selecting the BSP by setting MACHINE variable:

```
$ cd /home/seco/BayTrail/build/seco
$ bitbake-layers add-layer /home/seco/BayTrail/poky/meta-intel/
$ bitbake-layers add-layer /home/seco/BayTrail/poky/meta-seco/
$ echo 'INHERIT += "rm_work"' >> conf/local.conf
$ echo 'IMAGE_INSTALL_append = " seco-spi i2c-tools fxl6408 pcal6408
pca9655e minicom setserial net-tools spitools"' >> conf/local.conf
$ echo 'PARALLEL_MAKE ?= "-j ${@oe.utils.cpu_count()}"' >> conf/local.conf
$ echo 'BB_NUMBER_THREADS ?= "${@oe.utils.cpu_count()}"' >> conf/local.conf
$ echo 'MACHINE_EXTRA_RRECOMMENDS += "kernel-module-seco-spi"' >>
conf/local.conf
$ echo 'KERNEL_MODULE_AUTOLOAD += " seco-spi"' >> conf/local.conf
$ echo 'MACHINE ??= "intel-corei7-64"' >> conf/local.conf
$ echo 'CORE_IMAGE_EXTRA_INSTALL+= " alsa-utils"' >> conf/local.conf
```

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
SECO srl (HQ) Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	SECO Milano Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	SECO USA Inc. 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	SECO Embedded India Pvt Ltd Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	SECO Asia Pacific Co. Ltd. 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	 Green  COM Express  SBC  ETX / XTX  Carrier board  Services & Solutions



- You can also manually modify `local.conf` and `bblayers.conf` configuration files present in `seco/conf` folder. **Ensure** that in `local.conf` there aren't uncommented variables having same name of yours. Leave unchanged the others.
- Start to build choosing one of image configuration:
 

```
$ bitbake core-image-minimal      (will create a console-only minimal image)
$ bitbake core-image-sato         (will create a sato gui based image)
```
- You can find a complete list of available images with:
 

```
$ ls /home/seco/BayTrail/poky/meta/recipes*/images/*.bb
```

## OTHER SETTINGS FOR LOCAL.CONF

- If you want to use commercial features, like Intel high definition audio or some audio/video plugins:
 

```
LICENSE_FLAGS_WHITELIST = "commercial"
```
- If ISO and/or HDDIMG are not necessary, it's possible to spare some HD space with the options:
 

```
NOISO = "1"
NOHDD = "1"
```

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
<b>SECO srl (HQ)</b> Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	<b>SECO Milano</b> Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	<b>SECO USA Inc.</b> 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	<b>SECO Embedded India Pvt Ltd</b> Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	<b>SECO Asia Pacific Co. Ltd.</b> 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	



## 2. Provided Binaries

SECO provides two ISO sample Yocto images, downloadable from SECO website:

core-image-minimal  
core-image-sato

**THESE IMAGES ARE PURELY FOR EVALUATION PURPOSES AND ARE PROVIDED “AS IS”.**

**DO NOT USE THESE IMAGES FOR MASS PRODUCTION. INSTEAD, USE THIS GUIDE TO CREATE YOUR OWN IMAGE BY SETTING PROPERLY THE SAFETY ENVIRONMENTS OPTIONS.**

Binaries are created with the following commits:

meta-yocto-bsp                pyro: 2021e95bcd986e5bcfe457da5c3e16d60241d050  
meta-intel                    pyro: 4cd63f57820ce0e4ebd598251d3a13b5a4b9b791

### HOW TO CREATE YOCTO USB KEY LIVE IMAGE

- If you use your custom ISO image:
  - Go to <BUILD\_DIR>/tmp/deploy/images/<MACHINE\_NAME>/
  - Find your <IMAGE\_NAME><MACHINE\_NAME>.iso
  - Write ISO file with your favourite live usb creator, like **Rufus** (for Windows) or **gnome-disks** (with Ubuntu)
- If you use your custom HDD image:
  - Go to <BUILD\_DIR>/tmp/deploy/images/<MACHINE\_NAME>/
  - Find your <IMAGE\_NAME><MACHINE\_NAME>.hddimg (not provided in meta-seco/binary)
  - If /dev/sd $\mathbf{x}$  is the USB flash drive where you want to burn the image (pay attention, because dd doesn't ask for confirmation and you can instead easily erase your hard drive), type the following command:

```
# dd if=/dev/zero of=/dev/sd $\mathbf{x}$  bs=512 count=2
# sync
# dd if=<IMAGE_NAME><MACHINE_NAME>.hddimg of=/dev/sd $\mathbf{x}$ 
```
- If you use SECO ISO binary image in meta-seco/binary directory:
  - Write ISO file with your favourite live usb creator, like **Rufus** (for Windows) or **gnome-disks** (with Ubuntu)

### HOW TO INSTALL YOCTO FROM USB KEY

- Create an USB key live image following “How to create an usb live image”
- Plug the USB key to the system
- Be sure that BIOS setting are configured to boot from USB key first (see on BIOS documentation downloadable from SECO web site)

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
SECO srl (HQ) Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	SECO Milano Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	SECO USA Inc. 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	SECO Embedded India Pvt Ltd Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	SECO Asia Pacific Co. Ltd. 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	 Green  COM Express  SBC  ETX/XTX  Carrier board  Services & Solutions



- Turn on the board
- Select BOOT or INSTALL item in Yocto bootlader menu

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
<b>SECO srl (HQ)</b> Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	<b>SECO Milano</b> Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	<b>SECO USA Inc.</b> 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	<b>SECO Embedded India Pvt Ltd</b> Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	<b>SECO Asia Pacific Co. Ltd.</b> 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	 Greenview  COM Express  SBC  ETX / XTX  Carrier board  Services & Solutions



## 2. Known issues and FAQ

For **Bay Trail Boards**:

- Suspend to RAM (S3) and Suspend to disk (S4) are not supported so disable them in BIOS settings:
  - Turn on the board
  - Enter in BIOS setting pressing ESC at boot
  - Go to **SCU > Advanced > ACPI Table/Features Control** and set to **Disabled** both items "**DSDT - ACPI S3**" and "**DSDT - ACPI S4**"
  - Save and exit.
- Seco-spi module works only in PCI mode.
- Suspend to RAM doesn't work properly on live session.
- Suspend to RAM doesn't work when I2C is enabled with DMA in pci mode. A solution is to switch in ACPI mode (but seco-spi will not work anymore) or disable DMA channel for i2c.

For **Apollo Lake Boards**:

- Boot from SD card is not supported
- Wake on USB doesn't work
- When both HDMI and LVDS are connected, then HDMI screen shows flickering

## FAQ

**Q:** SECO EAPI for x64 doesn't work

**A:** Quick fix, from Yocto shell:

```
# mkdir /lib64
# ln -s /lib/ld-linux-x86-64.so.2 /lib64/
```

If you get `PARAMETER_ERROR` you can have a help passing `-?` as a parameter.

**Q:** No sound detected.

**A:** Sometimes also isn't configured correctly. Type `alsamixer` and try to unmute ("m") your speakers.

**Q:** Can I disable ttyS0 serial outputs console?

**A:** Yes, you must add a comment to line containing `getty` invocation in `/etc/inittab`.

**Q:** How can I use GPIO expander on SBC-A44-pITX board?

**A:** In BIOS setup, you must set:

Advanced\LPSS&SCC Configuration\LPSS&SCC Devices Mode as **ACPI Mode**

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
SECO srl (HQ) Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	SECO Milano Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	SECO USA Inc. 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	SECO Embedded India Pvt Ltd Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	SECO Asia Pacific Co. Ltd. 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	 Green  COM Express  SBC  ETX / XTX  Carrier board  Services & Solutions



Set Advanced\LPSS&SCC Configuration\LPSS DMA#2 Support as **Enabled**

Set Advanced\LPSS&SCC Configuration\LPSS DMA#2 Support\Gpio Expander I2C Support as **Enabled**

It is possible to access to 8 GPIO pins by using **gpiochip330** device, which can be found in the folder **/sys/class/gpio**. The number from 330 to 337 refers to the 8 GPIOs of FXL6408 GPIO Expander

- Type `echo YYY | sudo tee /sys/class/gpio/export` to export the specific single GPIO YYY (YYY from 330 to 337) in folder `/sys/class/gpio`.
- Read `/sys/class/gpio/gpioYYY/direction` value to know the current GPIO YYY direction
- Read `/sys/class/gpio/gpioYYY/value` value to know the current GPIO YYY status
- Use the command: `echo in | sudo tee /sys/class/gpio/gpioYYY/direction` to set GPIO YYY direction as input
- Use the command: `echo out | sudo tee /sys/class/gpio/gpioYYY/direction` to set GPIO YYY direction as output
- Use the command: `echo 1 | sudo tee /sys/class/gpio/gpioYYY/value` to set GPIO YYY status to high
- Use the command: `echo 0 | sudo tee /sys/class/gpio/gpioYYY/value` to set GPIO YYY status to low

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
SECO srl (HQ) Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	SECO Milano Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	SECO USA Inc. 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	SECO Embedded India Pvt Ltd Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	SECO Asia Pacific Co. Ltd. 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	 Green  COM Express  SBC  ETX / XTX  Carrier board  Services & Solutions



### 3. Tested features

The following features have been tested:

- UEFI boot from USB
- UEFI boot from SD Card
- UEFI boot from eMMC
- I2C
- GPIO
- SPI
- HSUART
- Ethernet
- SD Card
- eMMC
- USB
- Front panel button
- Audio
- LVDS
- LVDS Backlight Control
- HDMI
- S3 (suspend to RAM)
- Wake on PWR
- Wake on LAN
- Wake on USB

[www.seco.com](http://www.seco.com)

AREZZO	MILAN	BOSTON	BANGALORE	TAIPEI	Standard products, custom solutions
<b>SECO srl (HQ)</b> Via Calamandrei, 91, 52100 AREZZO ITALY Ph. +39 0575 26979 Fax +39 0575 350210	<b>SECO Milano</b> Via A. Grandi, 46 20017 Rho (MI) - ITALY Ph. +39 02 93902663	<b>SECO USA Inc.</b> 111 South Bedford St., Suite 208 Burlington MA 01803 U.S.A. Ph. +1-781-203-8030	<b>SECO Embedded India Pvt Ltd</b> Murudeshwar Arcade, #49, 2nd Floor, 9th Block, 27th Main, Jaya nagar, Bangalore - 560 069 INDIA ph. and fax +91 080 - 4111 6741, Mob. +91 99000 82775	<b>SECO Asia Pacific Co. Ltd.</b> 2F No97, Sec2, Dunhua S Rd., Taipei TAIWAN, R.O.C. 10682 Ph.: +886-2-7711-1028 Fax: +886-2-7711-7288	 Green  COM Express  SBC  ETX / XTX  Carrier board  Services & Solutions