I

G   C   I   A

A   B   PD

	I B	D	B	D	
					P F P DK
	J C				

G   C   I

A

C

C   E

1

D

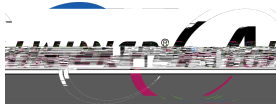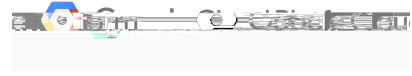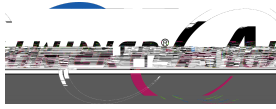A   C L   A

A   A   G
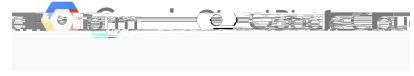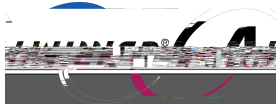
                                                      C   I   A   G
G   A   I   G

                                  A

C

Definitions

GPIO   DRAM

PM   DK   A   D

AP   B   F   B   P

L   F   M

Prerequisites

P
O   D   L   DK   D   C
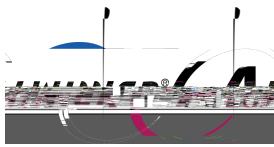O   D   A   F P
C
D   G   C   I   PC D   C   I   A
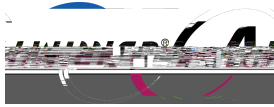G
C   G   C   I   C   P
D   C   I   A   G

F   P   G   C   P

E

F　　　　E　　　　API

IAM　　　　　　　D　　C　I　A　　　G

F　　　　　　IAM

C　　　　　　　D　　C　I　A　　　G

Create device registry

wangxiao@allwinnertech.com created my-registry-id
April 19, 2017 at 6:56:30 PM UTC+8

User	wangxiao@allwinnertech.com
Resource name	projects/allwinner-164401/locations/us-central1/registries/my-registry-id
Request	
Device registry	
Default monitoring config	MONITORING_ENABLED
Id	my-registry-id
Parent	projects/allwinner-164401/locations/us-central1
Response	
Default monitoring config	MONITORING_ENABLED
Id	my-registry-id
Name	projects/allwinner-164401/locations/us-central1/registries/my-registry-id

F   C

C   D   C   I   A   G

O   C   I   A   G
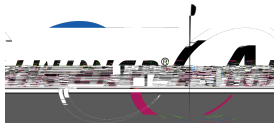
B   G   C   I   I   C   I   A   G

1 Download Tina Linux from GitHub or FTP server

L　　　　　G H　　　　　　　　　　A
I

```
$ curl https://raw.githubusercontent.com/tinalinux/repo/stable/repo  > ~/bin/repo
$ chmod +x ~ /bin/repo
$ export PATH=$PATH:~/bin/
$ mkdir tina && cd tina
$ repo init - u https://github.com/tinalinux/manifest  -b r18-v0.9 -m r18/v0.9.xml
$ repo sync
$ repo start r18-v0.9 --all
```

F　　　　C　　　　　　　　　　　　　L
F　　　　　C　　　　　　　　　　　　　　DK　　C DN

```
$ curl https://code.csdn.net/tinalinux/repo/blob/stable/repo > ~/bin/repo
$ chmod –x ~ /bin/repo
$ export PATH=$PATH:~/bin/
$ mkdir tina && cd tina
$ repo init - u https://code.csdn.net/tinalinux/manifest.git -b r18-v0.9 -m r18/v0.9-csdn.xml
$ repo sync
$ repo start r18-v0.9 --all
```
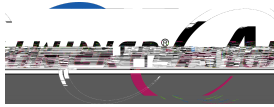
F　　　　D　　　　　　L　　　　　C DN　　C

2 Necessary modules needed by Google Cloud IoT demo on Tina SDK

P　　　　　　　　　　　L

O　　L　　DK

M

```
You're building on Linux

Lunch menu... pick a combo:
     1. octopus_dev-tina
     2. octopus_dev-dragonboard
     3. tulip_m64-tina
     4. tulip_m64-dragonboard
     5. astar_evb-tina
     6. tulip_pine64-tina
     7. tulip_pine64-dragonboard
     8. octopus_sch-tina
     9. octopus_sch-dragonboard
    10. sitar

    22. azalea_perf1-tina
    23. azalea_perf1-dragonboard
    24. astar_spk-tina
    25. astar_spk-dragonboard
    26. cello_perf1-tina
    27. azalea_m2ultraservers-tina
    28. azalea_m2ultraservers-dragonboard
    29. banjo_perf1-tina
    30. azalea_evb-tina
    31. azalea_evb-dragonboard
    32. banjo_dh-tina
    33. azalea_perf2-tina
    34. azalea_perf2-dragonboard
    35. cello_pro-tina

Which would you like?
```
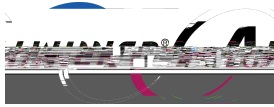
M

P
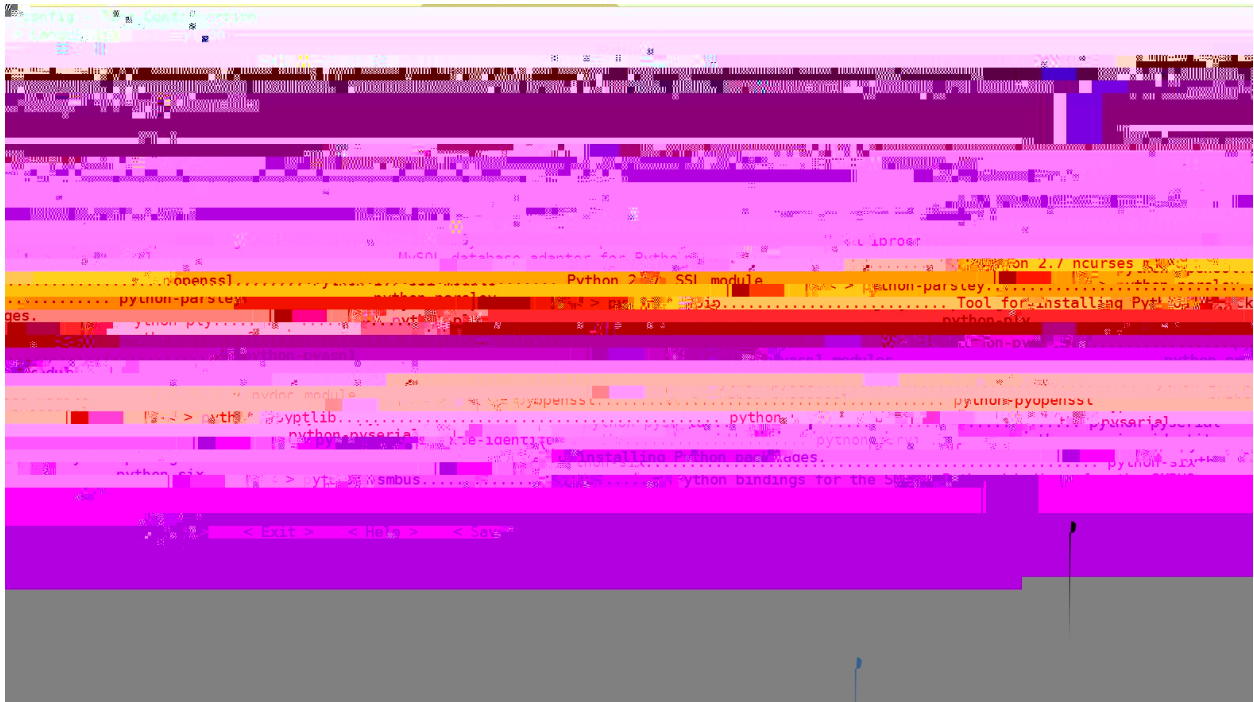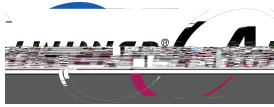
G   C   I

```
config - Tina Configuration
> Languages > Python
                                    Python
   Arrow keys navigate the menu.  <Enter> selects submenus ---> (or empty submenus ----).  Highlighted letters are hotkeys.  Pressing
   <Y> includes, <N> excludes, <M> modulari...  features?  Press <Esc><Esc> to exit, </> for Help...

    -*- python............................ Python 2.7 programming language
    <*> python-attrs................................... python-attrs
    -*- python-base......................... Python 2.7 interpreter
    -*- python-cffi.......................................... python-cffi
    -*- python-codecs...................... Python 2.7 codecs + unicode support
        python-compiler................... Python 2.7 compiler module
    < > python-crcmod........................................ python-crcmod
    -*- python-crypto........................................ python-crypto
    <*> python-cryptography............................... python-c...
                                 ............................... python-gmpy
    < > python-gmpy2........................................ python-gmpy2
    -*- python-idna........................................ python-idna
    (+)
            <Select>     < Exit >     < Help >     < Save >     < Load >
```

F   N   P

F   N   P
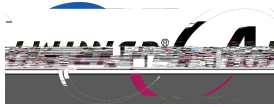
E

              F   AP   L

                                                    O
                                          ARCH   I

F L   L

Wireless LAN

Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters are hotkeys.

```
[ ]   Enable WiFi control function abstraction
< >   Atheros Wireless Cards  --->
< >   Broadcom FullMAC wireless cards support
< >   Broadcom IEEE802.11n embedded FullMAC WLAN driver
< >   IEEE 802.11 for Host AP (Prism2/2.5/3 and WEP/TKIP/CCMP)
< >   Marvell 8xxx Libertas WLAN driver support
[ ]   TI Wireless LAN support  --->
< >   Marvell WiFi-Ex Driver
< >   Realtek 8188E USB WiFi
< >   Realtek 8723B SDIO or SPI WiFi
< >   XRadio WLAN support  --->
```
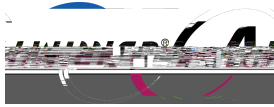
    <Select>   < Exit >   < Help >   < Save >   < Load >

F

F   F   F

```
.config - Linux/arm64 3.10.65 Kernel Configuration
> Device Drivers > Network device support > Wireless LAN
                                                    Wireless LAN
```

Broadcom FullMAC wireless cards support

Interrupt type

Use the arrow keys to navigate this window or press the hotkey of
the item you wish to select followed by the <SPACE BAR>. Press
<?> for additional information about this option.

( ) Out-of-Band Interrupt
(X) In-Band Interrupt
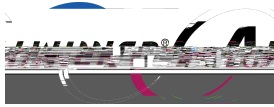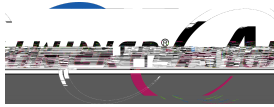
F   C   I B   I

F K

P AP

AP

```
.config - Tina Configuration
> Firmware
                                  Firmware
    Arrow keys navigate the menu.  <Enter> selects submenus --->  (or empty submenus ----).  Highlighted letters are hotkeys.  Pressing
    <Y> includes, <N> excludes, <M> modularizes features.  Press <Esc><Esc> to exit, <?> for Help, </> for Search.  Legend: [*] built-i
    [ ] excluded  <M> module  < > module  enable

                              <*> ap6212-firmware............................... Broadcom AP6212 firmware
                              < > ap6212a-firmware.............................. Broadcom AP6212A firmware
                              < > ap6255-firmware............................... Broadcom AP6255 firmware
                              < > ap6335-firmware............................... Broadcom AP6335 firmware
                               < > ap6356s-firmware............................. Broadcom AP6356S firmware
                               < > r8188eu-firmware............................. RealTek RTL8188EU firmware
                               < > r8723bs-firmware............................. RealTek RTL8723BS firmware
                                < > xr819-firmware.............................. Xradio xr819 firmware



                          <Select>    < Exit >    < Help >    < Save >    < Load >
```
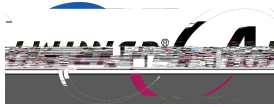
F   AP

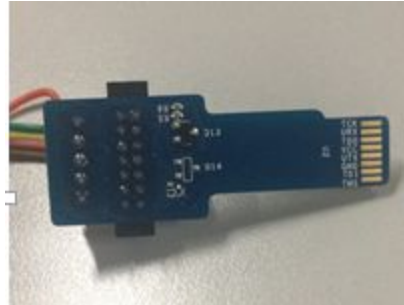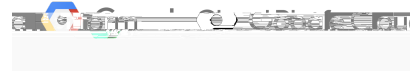B   F   F   I
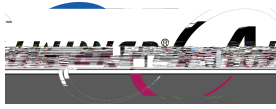

    E

G   C   I
PC

E

F

3 Compile the Tina Linux and flash the firmware on board

N				G	C	I

O

O

F

F   A   F

F


```
/home/wangxiao/workspace/tina_2.0/out/tulip-d1 tina_tulip-d1 card0_ima
pack finish
```

F

P

M

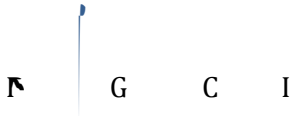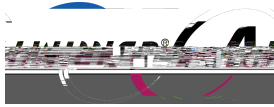## 4 Run Google Cloud IoT Demo on Tina

A   O   P   C   I

```
BusyBox v1.24.1 () built-in shell (ash)

[    8.110129] CPU1: shutdown
[    8.113114] psci: CPU1 killed.

  _____ _              _     _
 |_   _(_)_ __   __ _ | |   (_)_ __  _   ___  __
   | | | | '_ \ / _` || |   | | '_ \| | | \ \/ /
   | | | | | | | (_| || |___| | | | | |_| |>  <
   |_| |_|_| |_|\__,_||_____|_|_| |_|\__,_/_/\_\   Tina is Based on OpenWrt!
 -----------------------------------------------------
 Tina Linux (NeptuneS8743058SEB)
 -----------------------------------------------------
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/#
root@TinaLinux:/# echo 4 > /proc/sys/kernel/printk
printk                 printk_ratelimit
printk_delay           printk_ratelimit_burst
root@TinaLinux:/# echo 4 > /proc/sys/kernel/printk
root@TinaLinux:/# python
Python 2.7.11 (default, Apr 17 2017, 07:00:02)
[GCC 5.2.1] on linux2
Type "help", "copyright", "credits" or "license" for more information
>>> ■
```

F   P

Md?   C   I   ↖   ID PA   OND

        F   ID   P

```
root@TinaLinux:/# wifi_connect_ap_test "SSID" "PASSWORD"

************************************
***Start wifi connect ap test!***
************************************
wpa_suppplicant not running!
ctrl_interface != /etc/wifi/sockets
```

                                        E L

                          F   C   I
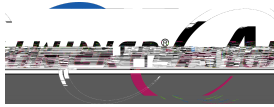
        F   M

O

A A

I

E

G C I

F

```
root@TinaLinux:/# python google.py --project_id=allwinner-164401 --registry_i =
    =registry-id --device-id=my-rs256-device-id --pri  e_key_file=/usr/rsa_privat
 .em --algorithm=RS256
Creating JWT using RS256 from private key file /usr/rsa_private.em
Publishing message 1/100: 'my-registry-id/my-rs256-device-id-payload-1'
on_connect 0: No error.
Publishing message 2/100: 'my-registry-id/my-rs256-device-id-payload-2'
on_publish
on_publish
Publishing message 3/100: 'my-registry-id/my-rs256-device-id-payload-3'
on_publish
Publishing message 4/100: 'my-registry-id/my-rs256-device-id-payload-4'
on_publish
Publishing message 5/100: 'my-registry-id/my-rs256-device-id-payload-5'
on_publish
P   lishing message 6/100: 'my-registry-id/my-rs256-device-id-payload-6'
 on_publish
Publishing message 7/100: 'my-registry-id/my-rs256-device-id-payload-7'
 on_publish
Publishing message 8/100: 'my-registry-id/my-rs256-device-id-payload-8'
 on_publish
Publishing message 9/100: 'my-registry-id                    ce-id-payload-
```
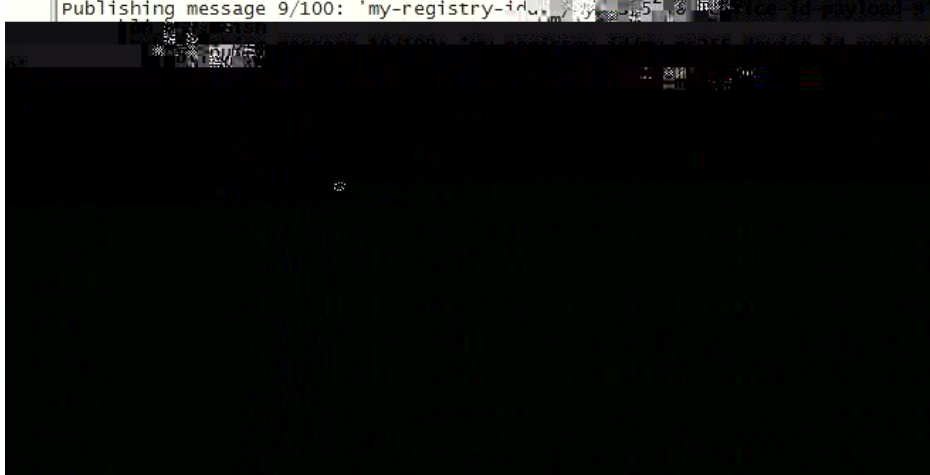
F   D

```
Publishing message 72/100: 'my-registry-id/my-rs256-device-id-payload-72'
on_publish
Publishing message 73/100: 'my-registry-id/my-rs256-device-id-payload-73'
on_publish
Publishing message 74/100: 'my-registry-id/my-rs256-device-id-payload-74'
on_publish
Publishing message 75/100: 'my-registry-id/my-rs256-device-id-payload-75'
on_publish
Publishing message 76/100: 'my-registry-id/my-rs256-device-id-payload-76'
on_publish
Publishing message 77/100: 'my-registry-id/my-rs256-device-id-payload-77'
on_publish
Publishing message 78/100: 'my-registry-id/my-rs256-device-id-payload-78'
on_publish
Publishing message 79/100: 'my-registry-id/my-rs256-device-id-payload-79'
on_publish
Publishing message 80/100: 'my-registry-id/my-rs256-device-id-payload-80'
on_publish
Publishing message 81/100: 'my-registry-id/my-rs256-device-id-payload-81'
on_publish
Publishing message 82/100: 'my-registry-id/my-rs256-device-id-payload-82'
on_publish
Publishing message 83/100: 'my-registry-id/my-rs256-device-id-payload-83'
on_publish
Publishing message 84/100: 'my-registry-id/my-rs256-device-id-payload-84'
on_publish
Publishing message 85/100: 'my-registry-id/my-rs256-device-id-payload-85'
```

```
[Secret-Castle:~ Wang$ gcloud beta pubsub subscriptions pull --auto-ack proje
cts/ allwinner-164401/subscriptions/my-subscription

┌─────────────────────────────────┬──────────────────┬──────────┐
│              DATA               │    MESSAGE ID    │ATTRIBUTES│
├─────────────────────────────────┼──────────────────┼──────────┤
│ egistry-id/my-rs256-device-id-payload-66 │ 121017144547... │ my-      │
│ evice-id deviceNumId=2647740481950093 deviceRegistryId=my-registry-id devi │ s256=  │
│ gistryLocation=us-central1 projectId=allwinner-164401 subFolder= │ ceR │
└─────────────────────────────────┴──────────────────┴──────────┘
                                                         Secret-Cas
le:~ wangs
```
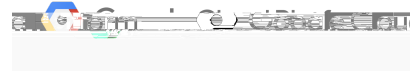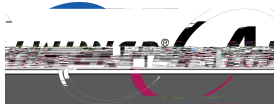
F

ʀ

"Cloud IoT (Alpha) - User Guide", handrei@, eschapira@, mkess@,malter@, indchak@google.com02/20/2017

roots.pem