Using GadgetPC as a Remote Web Camera

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BiPOM Electronics

Overview

GadgetPC is quite suitable for connecting various cameras and networking options to build your own camera system that can be used for security and remote monitoring systems. Unlike commercial web cameras that are restrictive in functionality, you can use GadgetPC to customize your own camera system. As an example, you can connect multiple web cameras to a single GadgetPC. Another useful option is to connect GadgetPC to a GPRS aircard or even to a solar panel for true remote monitoring at locations where power and/or network connection does not exist.

Unlike many commercial networked webcams that support only Internet Explorer when viewing camera images, a GadgetPC-based camera system works with virtually any browser. (Firefox, Safari, etc.)

Advantages:

- Low-power
- Support for multiple cameras
- Capability to run parallel applications such as web servers, file servers, and such while running camera
- Embedding camera images inside a web page on a web server running on the same GadgetPC

Wired Ethernet

Parts Required

1 x GadgetPC
1 x ADP-5V1A-MiniUSB Power Adapter
1 x DUB-E100 Ethernet card
1 x Ethernet Cable
1 x USB Flash Drive to run Linux (optional)
1 x Webcam (see supported hardware)

Connect the various components as shown in *Figure 1*.
- The MiniUSB Power Adapter should be connected to a power source such as a computer or a USB to AC Adapter.
- The DUB-E100 Ethernet card should be connected to any one of GadgetPC's USB ports while the Ethernet cable is connected to a router or modem.
- The webcam should be connected to any one of GadgetPC's USB ports.
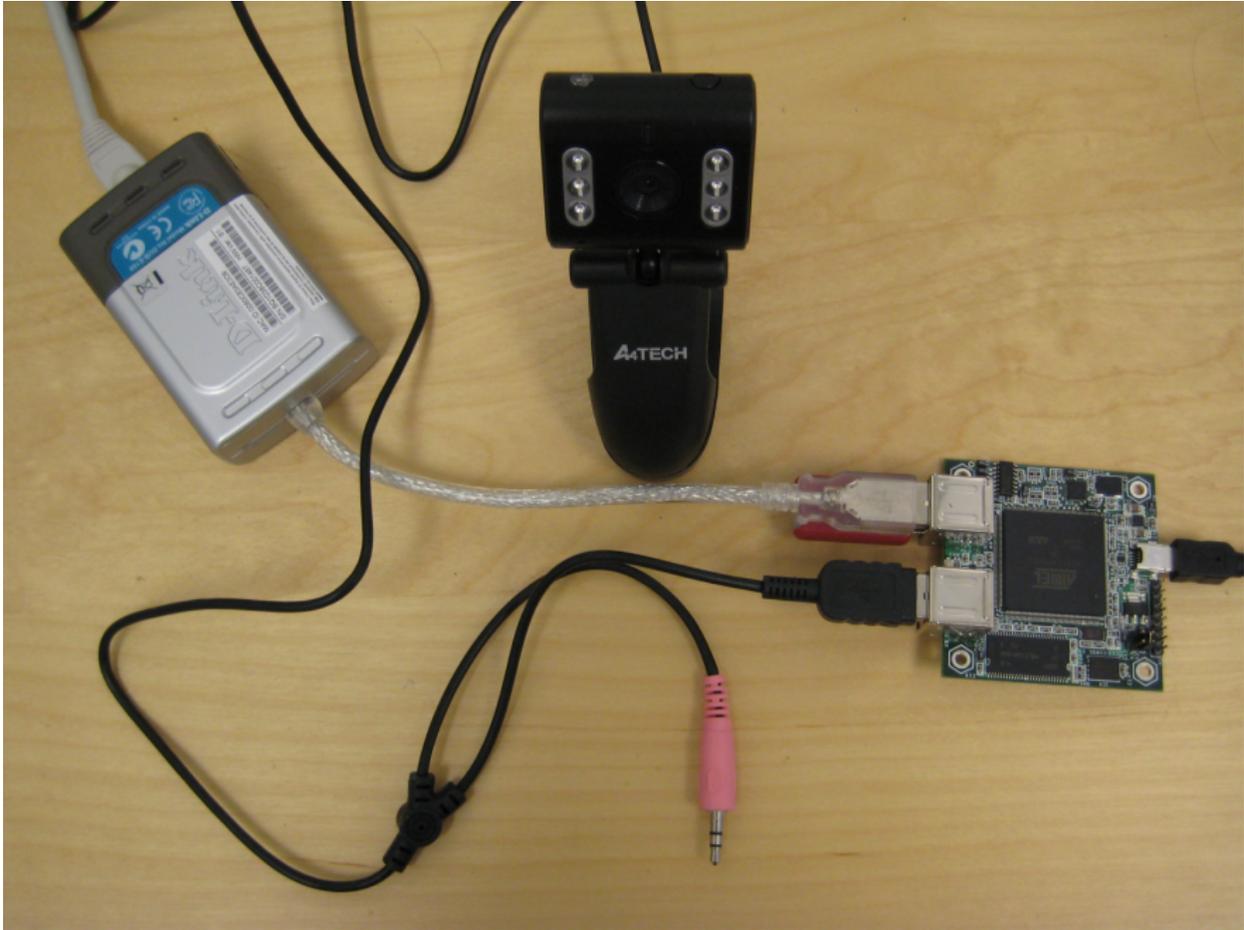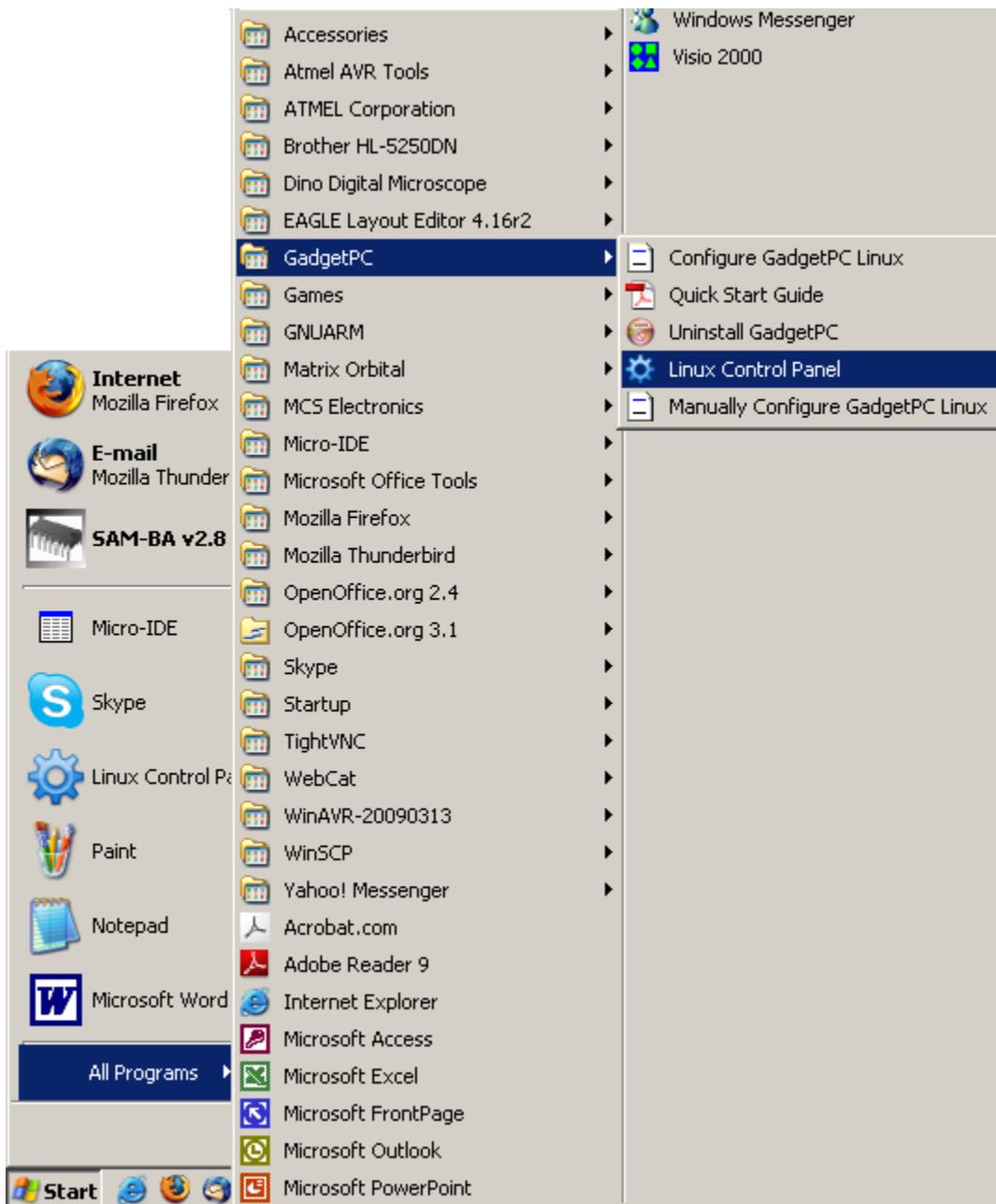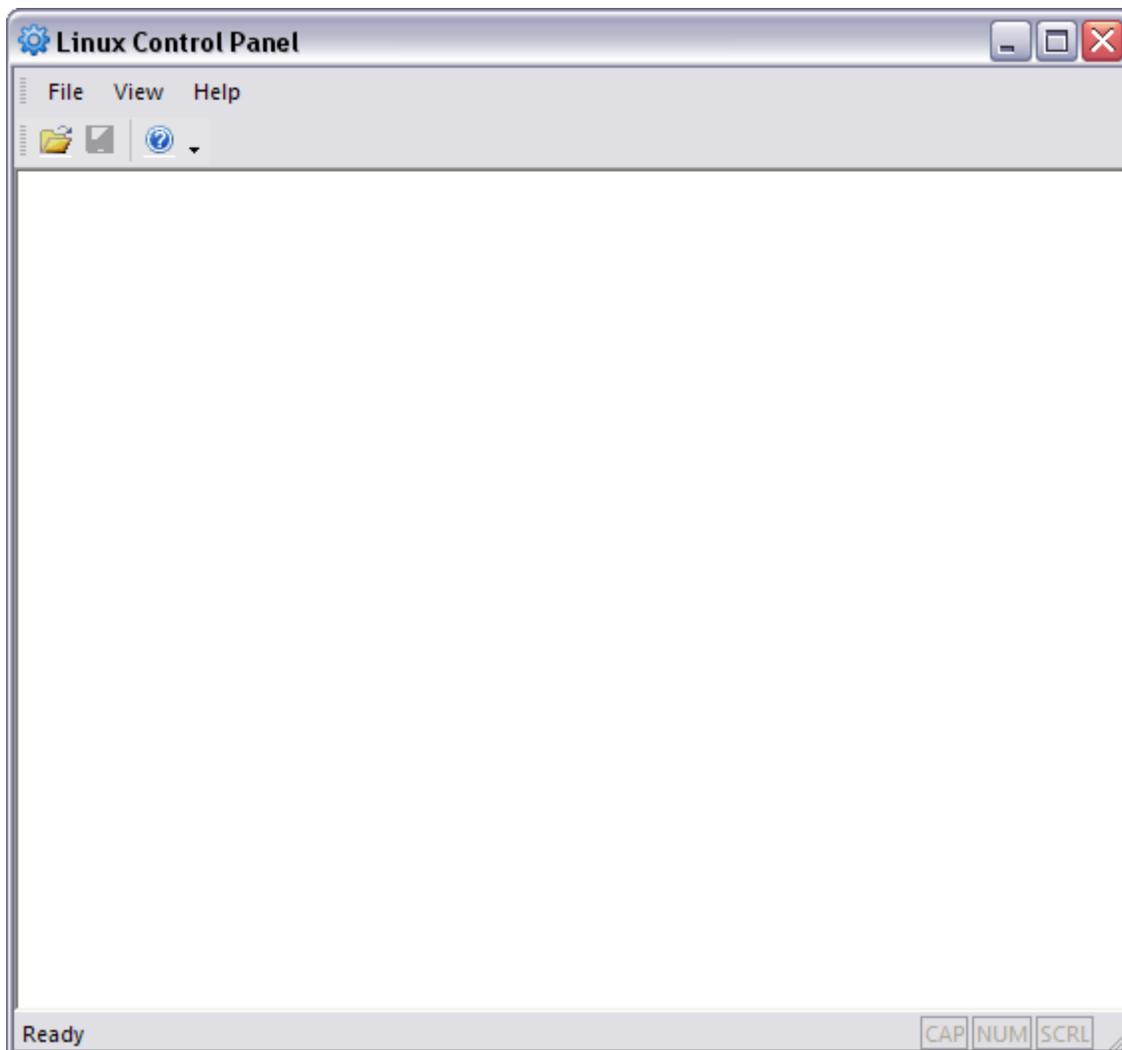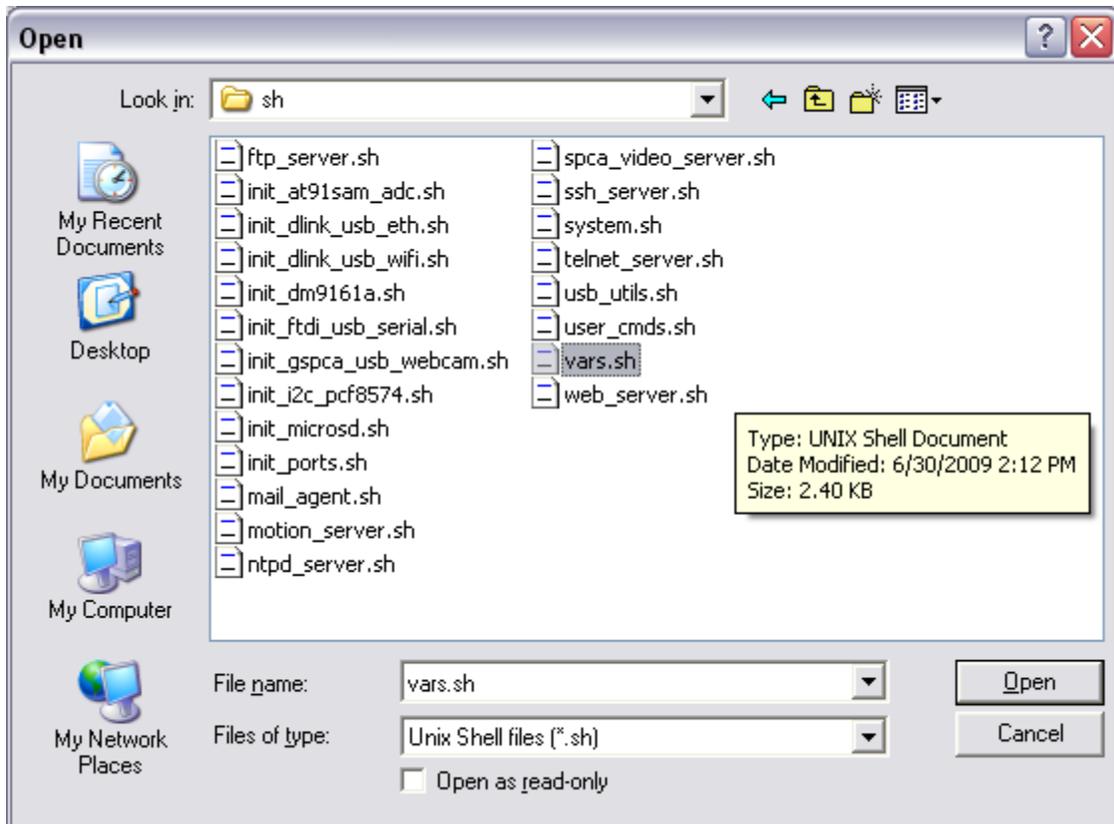
Figure 1.

Software Setup

We need to edit the Linux vars.sh file to enable certain configuration options.

1) Open **Linux Control Panel** that comes with GadgetPC setup. (Start Menu -> All Programs -> GadgetPC -> Linux Control Panel)

2) Click File -> Open. By default, program will start from folder where GadgetPC was installed. Go to **sh** folder and select **vars.sh** file.

Open dialog:

Look in: sh

ftp_server.sh	spca_video_server.sh
init_at91sam_adc.sh	ssh_server.sh
init_dlink_usb_eth.sh	system.sh
init_dlink_usb_wifi.sh	telnet_server.sh
init_dm9161a.sh	usb_utils.sh
init_ftdi_usb_serial.sh	user_cmds.sh
init_gspca_usb_webcam.sh	vars.sh
init_i2c_pcf8574.sh	web_server.sh
init_microsd.sh	
init_ports.sh	
mail_agent.sh	
motion_server.sh	
ntpd_server.sh	

Type: UNIX Shell Document
Date Modified: 6/30/2009 2:12 PM
Size: 2.40 KB

File name: vars.sh

Files of type: Unix Shell files (*.sh)

☐ Open as read-only

[Open] [Cancel]

Linux Control Panel: Editing vars.sh.

File   View   Help

Hardware and Peripherals   System   Network   Software

Ready   CAP NUM SCRL

3) Double-click **Hardware and Peripherals** and enable **DUB-E100** (Turned ON) and **GSPCA USB web camera** (Turned ON).

Variables Dialog	
⊟ **Network**	
DM9161A Ethernet adapter	OFF
D-Link DUB-E100 Ethernet Adapter	ON
D-Link WUA-1340 USB Wi-Fi adapter	OFF
Sierra Compass855 AirCard USB Modem	OFF
⊟ **I/O Subsystem**	
FTDI USB serial adapter	OFF
PCF8574 I2C Controller on MINI-MAX/ARM9 Series Boards	OFF
Initialize unused I/O ports on the hardware	YES
⊟ **Peripherals**	
GSPCA USB web camera	**ON**
ADC hardware on MINI-MAX/ARM9 Series Boards	OFF
Mount MicroSD	NO
USB to SERIAL generic adapter	OFF
Vendor code for USB to SERIAL generic adapter	0x12d1
Product code for USB to SERIAL generic adapter	0x1001

4) Double-click **Network** and assign an IP address, subnet mask, and gateway IP address under **TCP/IP Options**.

Variables Dialog	
⊟ **GPRS Connection**	
Start Life;) GPRS Internet Connection	NO
Send PIN code to unlock SIM card in GPRS modem	NO
PIN code of SIM card	1111
GPRS device name	/dev/ttyUSB3
Delay before sending PIN (in seconds)	3
Delay for registration modem on GPRS network (in seconds)	15
Delay before start PPP service (in seconds)	3
⊟ **Network**	
Key for Wi-Fi network interface	1237489567
SSID for Wi-Fi network interface	DLinkRouter
Install PPP	NO
⊟ **TCP/IP Options**	
IP Address of Device	192.168.1.210
Subnet Mask	255.255.255.0
IP Address of Gateway	192.168.1.254
⊟ **3G Connection**	
Start People.Net 3G Internet Connection	NO
Delay before start 3G connection (in seconds)	45
Delay after start 3G connection (in seconds)	3
3G device name	/dev/ttyUSB0
⊟ **DynDNS**	
Username for dyndns.org account	GadgetPC
Pasword for dyndns.org account	gadgetpcpassword
Update period (in milliseconds)	600000
Alias for the host	gpcgprs.dyndns.org

5) Double-click **System** and assign a root password.
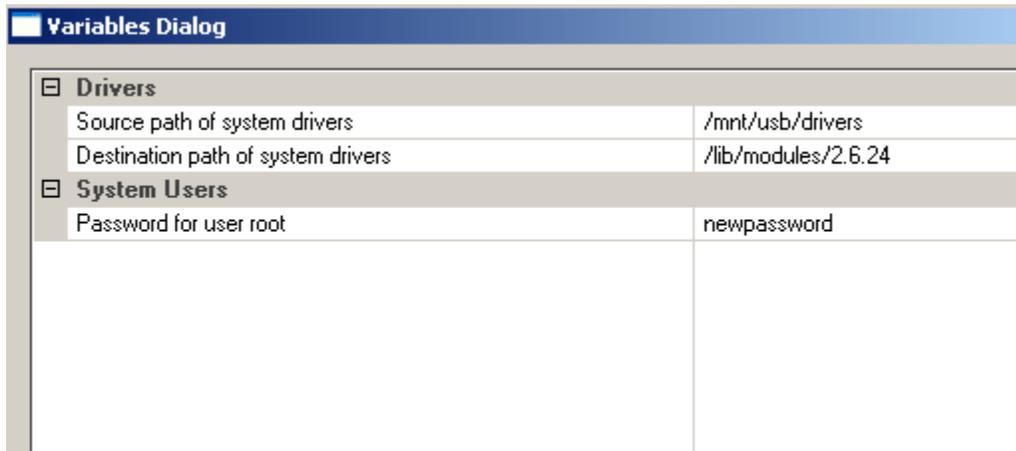
6) Save the **vars.sh** file.

NOTE: Every time you access **vars.sh** file, you either need to have a temporary copy on your computer so that you can replace the actual copy on the USB Flash Drive or remove the USB Flash Drive from the GadgetPC and insert the USB Flash Drive into the computer for direct editing.

7) Insert the USB Flash drive to GadgetPC.

8) Apply or cycle power to GadgetPC (Turn OFF/ON).

9) After about 30-45 seconds, Linux will boot up and GadgetPC will be ready to serve camera images.

10) Start up **Microsoft Telnet**.
  - Connect to the IP address you assigned in Step 4 by typing the following command:
    o open xxx.xxx.xxx.xxx (where xxx.xxx.xxx.xxx is your IP address you assigned to the GadgetPC)
  - Sign in with your username and password (default username/password: root/newpassword).
  - Initiate **servfox** by typing the following command:
    o nohup /mnt/usb/servfox/servfox -f -d /dev/video0 -s 640x480 -w 7070 &
      § The dimensions of the webcam image can be adjusted by changing the value of 640 x 480 to desired value

```
Telnet 192.168.1.25                                          _ □ ×
GadgetPC login: root
Password:
[root@GadgetPC /root]$nohup /mnt/usb/servfox/servfox -f -d /dev/video0 -s 640x48
0 -w 7070 &
nohup: appending output to nohup.out
[root@GadgetPC /root]$
```

Now, there are three methods to view the camera image:

11a) **Method 1:** Run spcaview.exe
- Copy over spcaview.exe and SDL.dll into desired folder.
- Create a temporary batch file.
  - o Create a new text file "temp.txt".
    - § Edit txt with notepad with the following lines:
      - spcaview -w xxx.xxx.xxx.xxx:7070 (where xxx.xxx.xxx.xxx is your IP address)


```
temp.txt - Notepad
File  Edit  Format  View  Help
spcaview -w 192.168.1.25:7070
pause
```

  - o Rename temp.txt to "temp.bat"
  - o Run "temp.bat"

09/07/2009-10:54:57
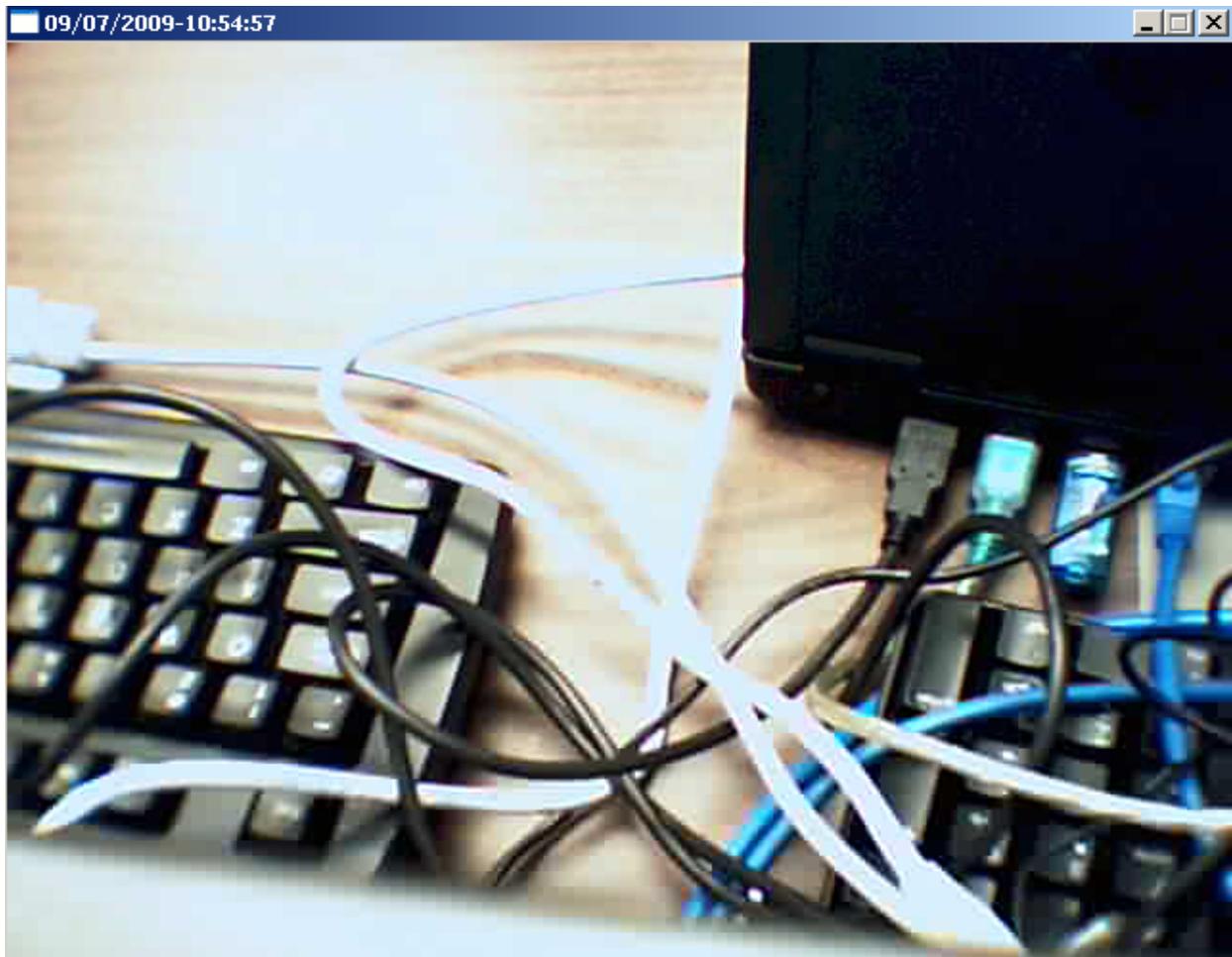
11b) **Method 2:** Embedded browser view
- Edit the file: \myweb\camera\index.htm
  o Change dimensions to match **servfox** dimensions (in our case – 640 x 480).

```
index.html - Notepad
File  Edit  Format  View  Help
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
   <head>
     <title>GadgetPC WEB camera</title>
   </head>

   <body>
<center><h1>GadgetPC WEB camera </h1></center>
<center>
<table border=2 cellspacing=10 cellpadding=10 align="center">
<tr><td>
<applet codebase="." archive="JwebcamPlayer.jar" code="JwebcamPlayer.class"
name="JwebcamPlayer" ID="JwebcamPlayer" align="center" width="640" height="480" MAYSCRIPT>
<param name="Color" value="#ffffff">
<param name="Server" value="127.0.0.1">
<param name="Port" value="7070">
<PARAM NAME="scriptable" value="true">
<PARAM NAME="mayscript" value="true">
<strong>You need to download Java.<br>
Click <a href="http://www.java.com/en/download/manual.jsp">here:
http://www.java.com/en/download/manual.jsp</a></strong><br>
</applet>
</td>
</table>
</center>
<center> click on the window surface to set brightness and contrast <br>
when done, click again to remove the control box.</center>
   </body>
</html>
```
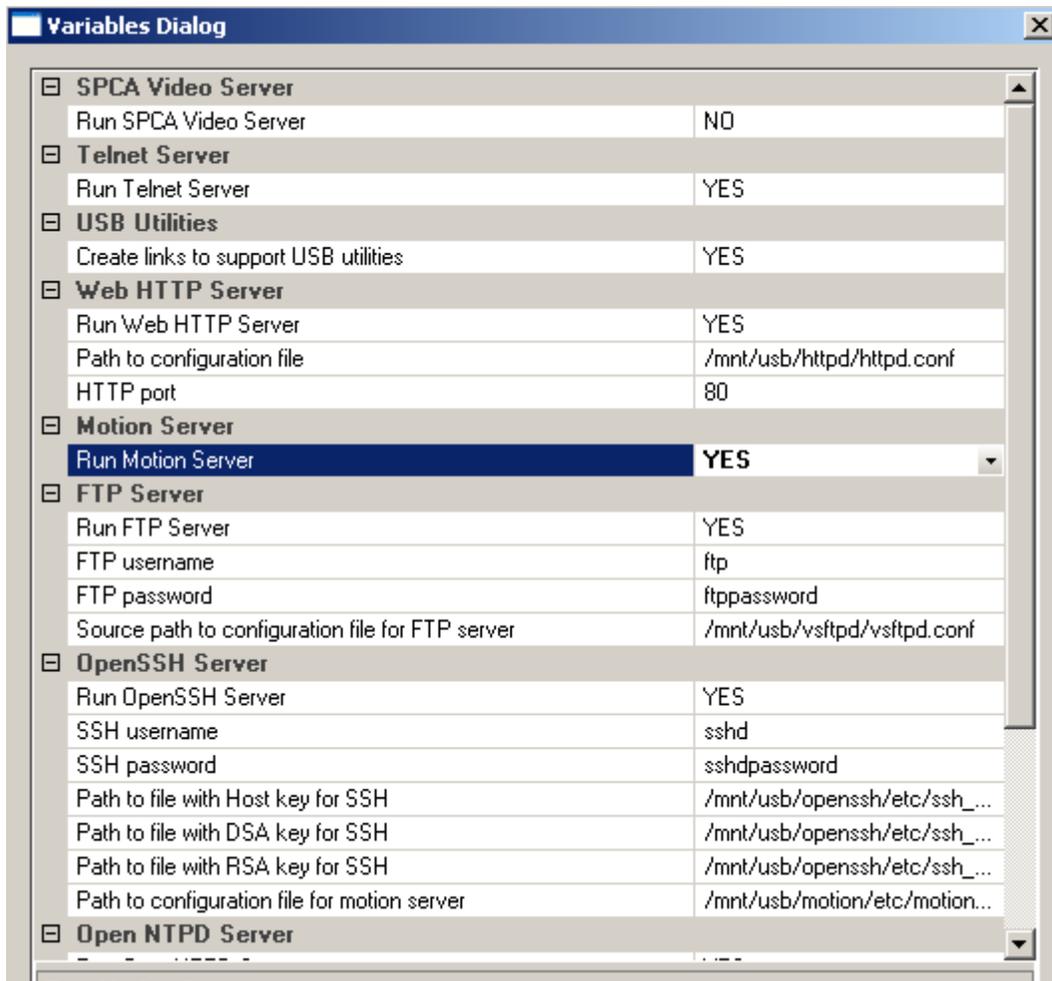
- Save the file.
- **Reminder: servfox** should be still be running; if you had to reboot Linux or remove the USB Flash Drive to edit files, repeat Step 8.
- Open up an internet browser that is connected to the same network as GadgetPC.
  - Type the url: http://xxx.xxx.xxx.xxx/camera/index.htm (where xxx.xxx.xxx.xxx is your IP address)
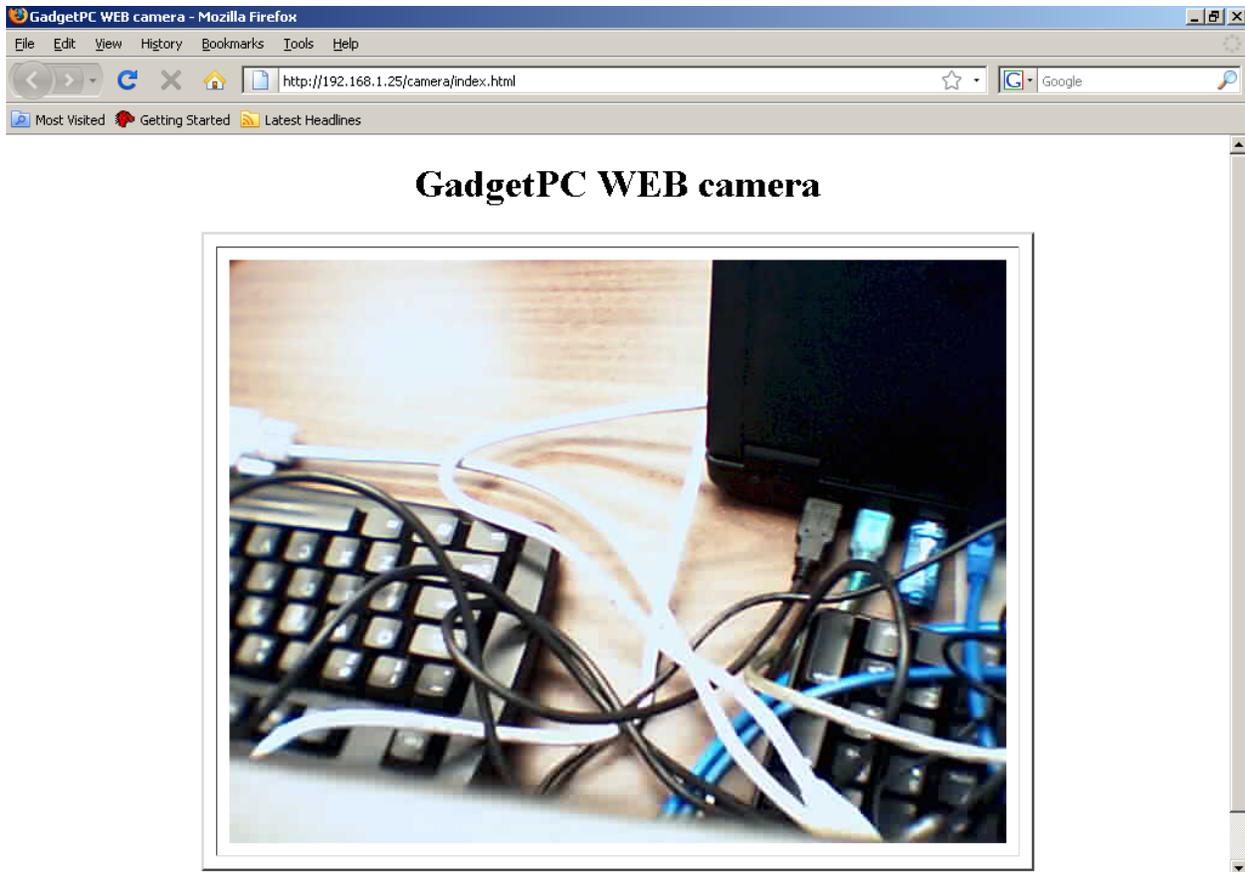
11c) **Motion Capturing:** Saving pictures

- Open **Linux Control Panel**
- Select **vars.sh** again
- Click on the **Software** Icon
- Enable **Motion Server**

Variables Dialog	
SPCA Video Server	
Run SPCA Video Server	NO
Telnet Server	
Run Telnet Server	YES
USB Utilities	
Create links to support USB utilities	YES
Web HTTP Server	
Run Web HTTP Server	YES
Path to configuration file	/mnt/usb/httpd/httpd.conf
HTTP port	80
Motion Server	
Run Motion Server	YES
FTP Server	
Run FTP Server	YES
FTP username	ftp
FTP password	ftppassword
Source path to configuration file for FTP server	/mnt/usb/vsftpd/vsftpd.conf
OpenSSH Server	
Run OpenSSH Server	YES
SSH username	sshd
SSH password	sshdpassword
Path to file with Host key for SSH	/mnt/usb/openssh/etc/ssh_...
Path to file with DSA key for SSH	/mnt/usb/openssh/etc/ssh_...
Path to file with RSA key for SSH	/mnt/usb/openssh/etc/ssh_...
Path to configuration file for motion server	/mnt/usb/motion/etc/motion...
Open NTPD Server	

- Save the **vars.sh**.
- Insert USB Flash Drive into GadgetPC.
- As GadgetPC boots Linux, observe the LED on the webcam turn ON. If it does, then Motion Server is working and picture files are saved into **\motion\picture** folder located on the USB Flash Drive as JPEG images.
- The user may remove the USB Flash Drive and view their **Motion Captured** images on any Windows PC.

Wireless Ethernet

Parts Required

1 x GadgetPC
1 x WUA-1340 Wi-Fi card
1 x USB Flash Drive to run Linux (optional)
1 x Webcam (see supported hardware)

Connect the various components as shown in *Figure 2*.
- The MiniUSB Power Adapter should be connected to a power source such as a computer or a USB to AC Adapter.
- The WUA-1340 Wi-Fi card should be connected to any one of GadgetPC's USB ports while the Ethernet cable is connected to a router or modem.
- The webcam should be connected to any one of GadgetPC's USB ports.

Figure 2.

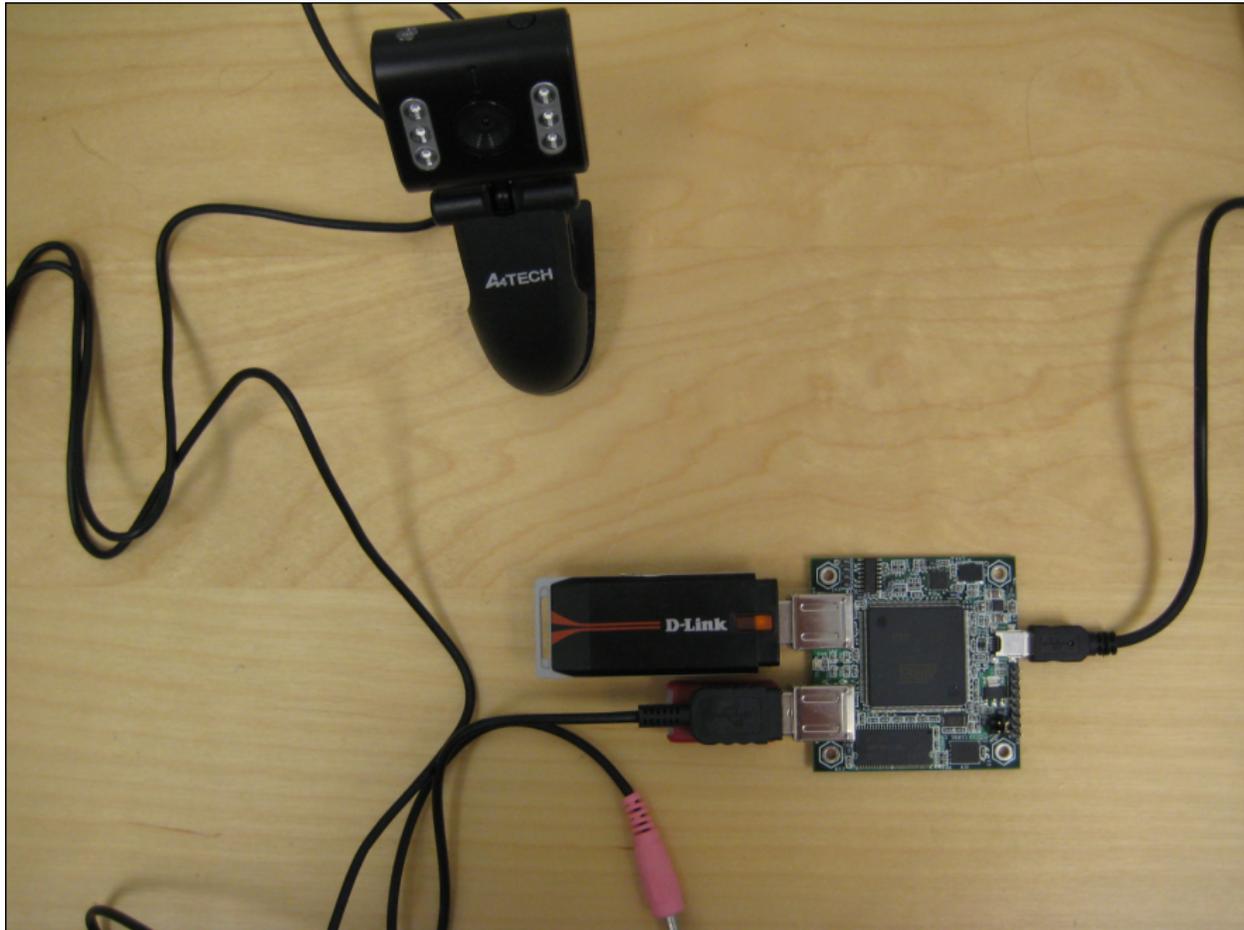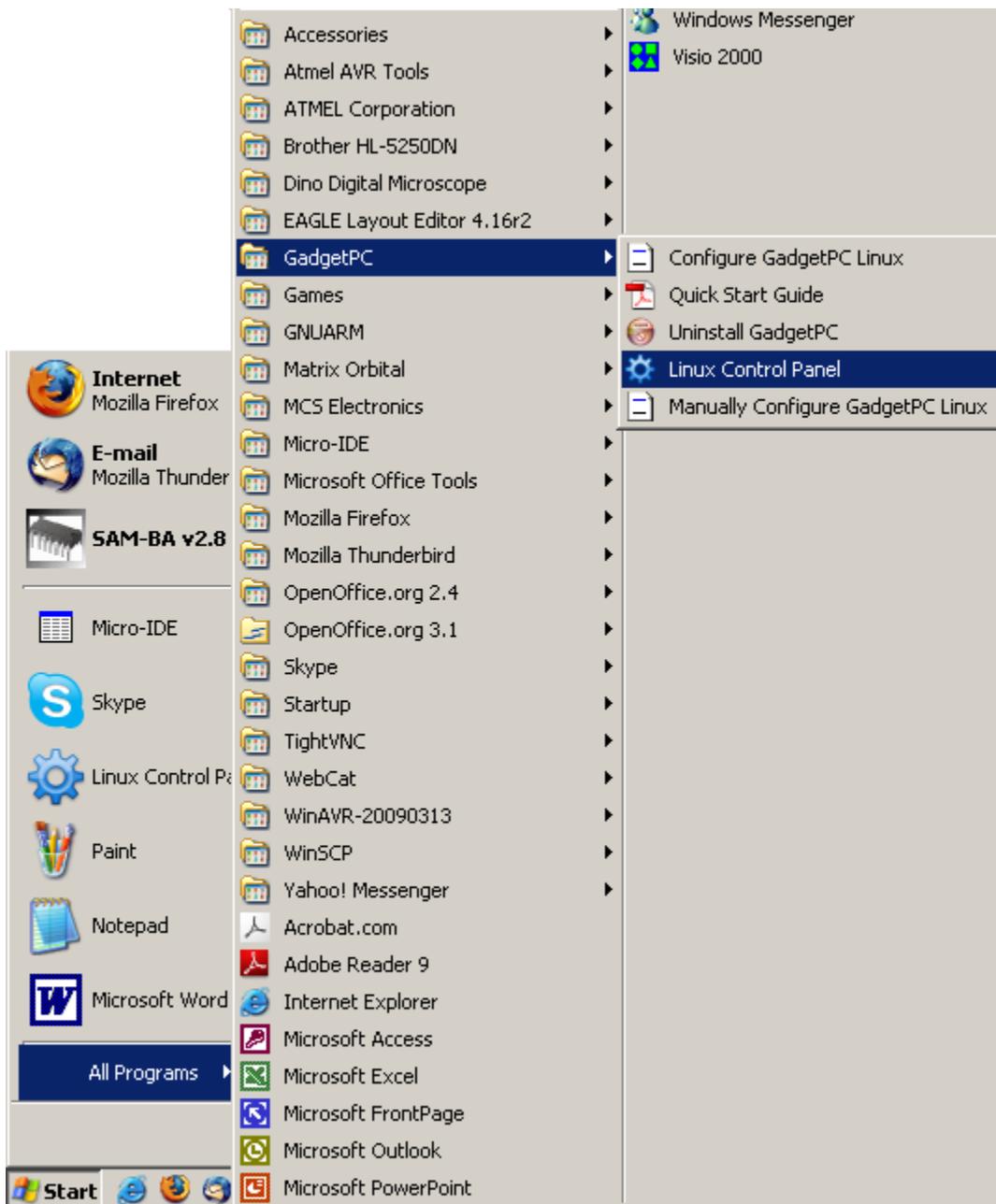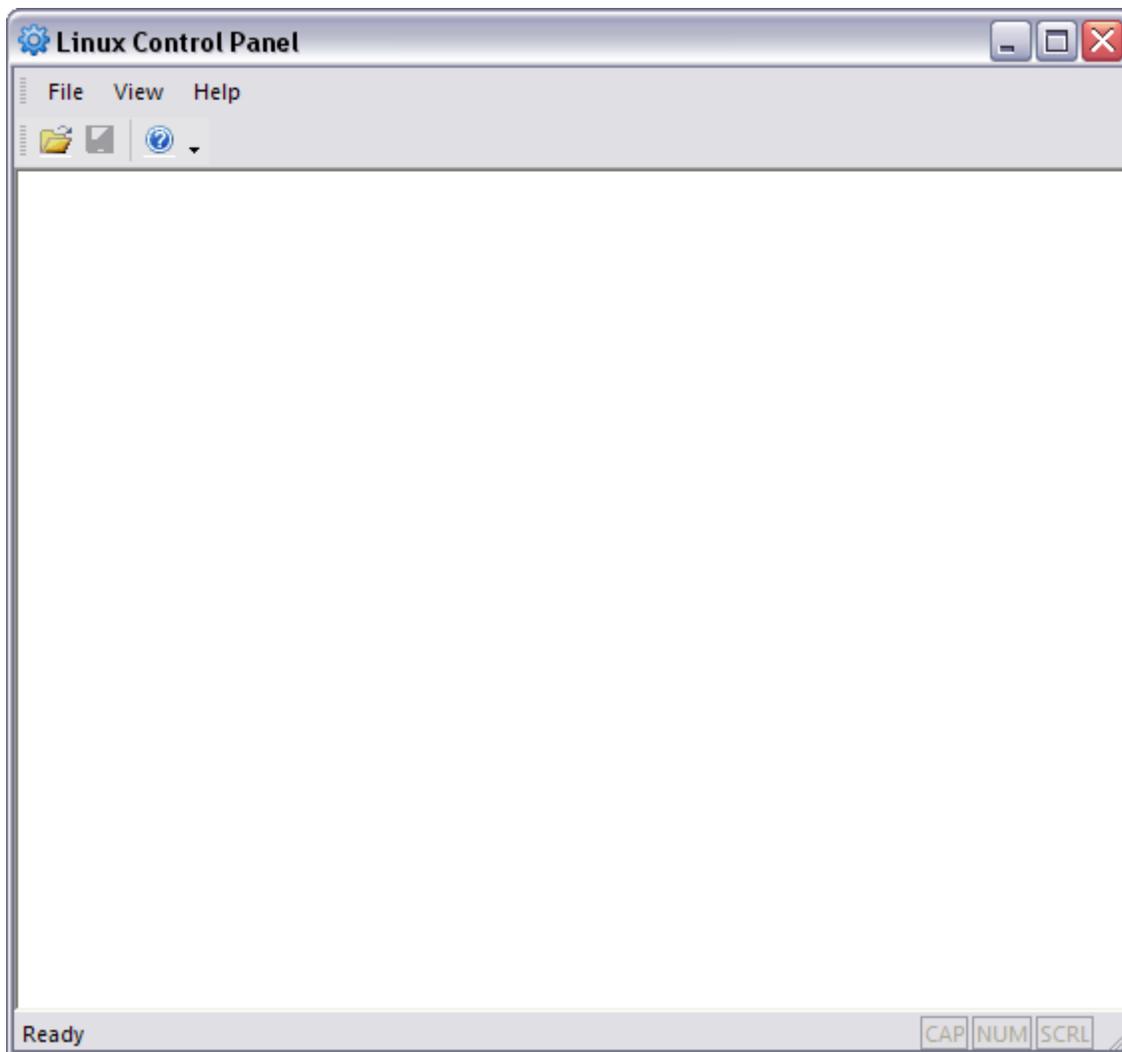1) Open **Linux Control Panel** that comes with GadgetPC setup. (Start menu -> All Programs -> GadgetPC -> Linux Control Panel)

2) Click File -> Open. By default, program will start from folder where GadgetPC was installed. Go to **sh** folder and select **vars.sh** file.
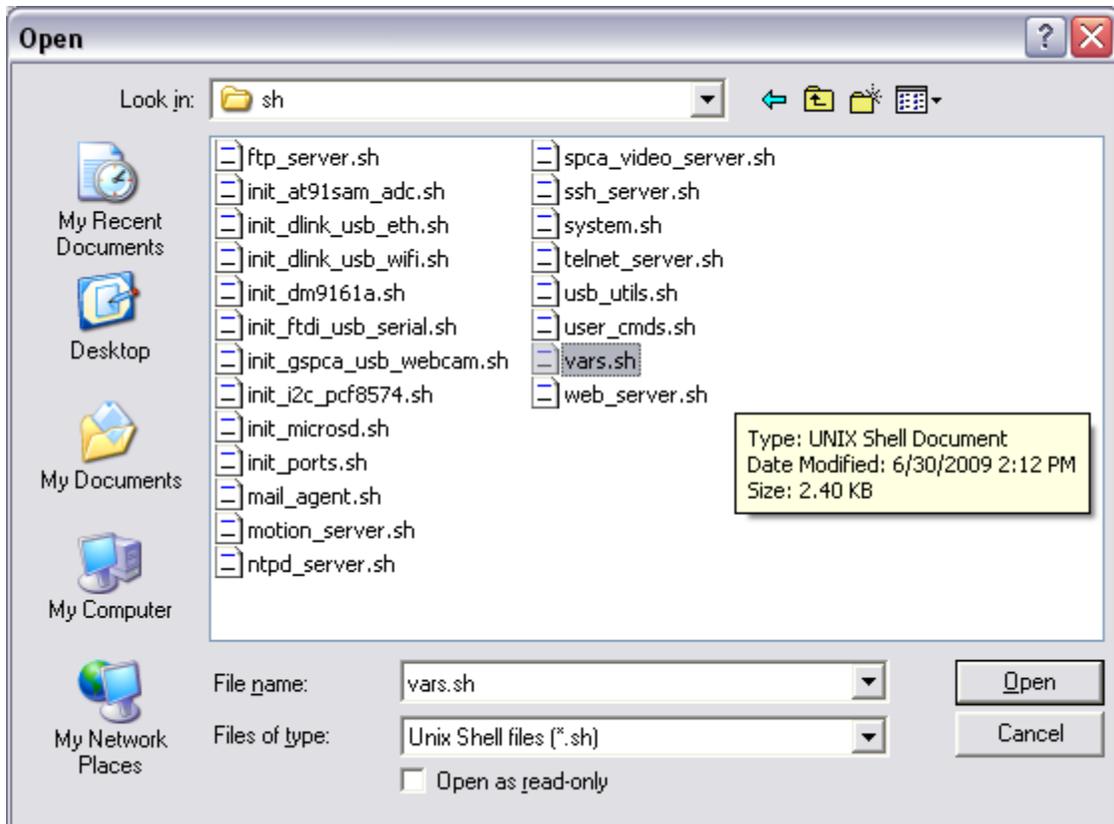
3) Double-click **Hardware and Peripherals** and enable **WUA-1340** (Turned ON) and **GSPCA USB web camera** (Turned ON).

Variables Dialog

Network	
DM9161A Ethernet adapter	OFF
D-Link DUB-E100 Ethernet Adapter	**OFF**
D-Link WUA-1340 USB Wi-Fi adapter	**ON**
Sierra Compass855 AirCard USB Modem	OFF
I/O Subsystem	
FTDI USB serial adapter	OFF
PCF8574 I2C Controller on MINI-MAX/ARM9 Series Boards	OFF
Initialize unused I/O ports on the hardware	YES
Peripherals	
GSPCA USB web camera	ON
ADC hardware on MINI-MAX/ARM9 Series Boards	OFF
Mount MicroSD	NO
USB to SERIAL generic adapter	OFF
Vendor code for USB to SERIAL generic adapter	0x12d1
Product code for USB to SERIAL generic adapter	0x1001

4) Double-click **Network** and type in your **SSID** and **Key** under **Network** for your Wi-Fi interface.

Variables Dialog

GPRS Connection	
Start Life;) GPRS Internet Connection	NO
Send PIN code to unlock SIM card in GPRS modem	NO
PIN code of SIM card	1111
GPRS device name	/dev/ttyUSB3
Delay before sending PIN (in seconds)	3
Delay for registration modem on GPRS network (in seconds)	15
Delay before start PPP service (in seconds)	3
Network	
Key for Wi-Fi network interface	
SSID for Wi-Fi network interface	**bipom**
Install PPP	NO
TCP/IP Options	
IP Address of Device	192.168.1.25
Subnet Mask	255.255.255.0
IP Address of Gateway	192.168.1.254
3G Connection	
Start People.Net 3G Internect Connection	NO
Delay before start 3G connection (in seconds)	45
Delay after start 3G connection (in seconds)	3
3G device name	/dev/ttyUSB0
DynDNS	
Username for dyndns.org account	GadgetPC
Pasword for dyndns.org account	gadgetpcpassword
Update period (in milliseconds)	600000
Alias for the host	gpcgprs.dyndns.org

Key for Wi-Fi network interface
BIPOMVAR_WIFI_KEY

OK   Cancel

The rest of the setup is identical to the steps under **Wired Ethernet**. (Please refer to Steps 4-11 under **Wired Ethernet**).

Aircard GPRS

Parts Required

1 x GadgetPC
1 x Sierra Wireless Compass Aircard
1 x SIM Card with Data Plan
1 x USB Flash Drive to run Linux (optional)
1 x Webcam (see supported hardware)

Connect the various components as shown in *Figure 3*.
- The MiniUSB Power Adapter should be connected to a power source such as a computer or a USB to AC Adapter.
- The Sierra Wireless Compass card should be connected to any one of GadgetPC's USB ports while the Ethernet cable is connected to a router or modem.
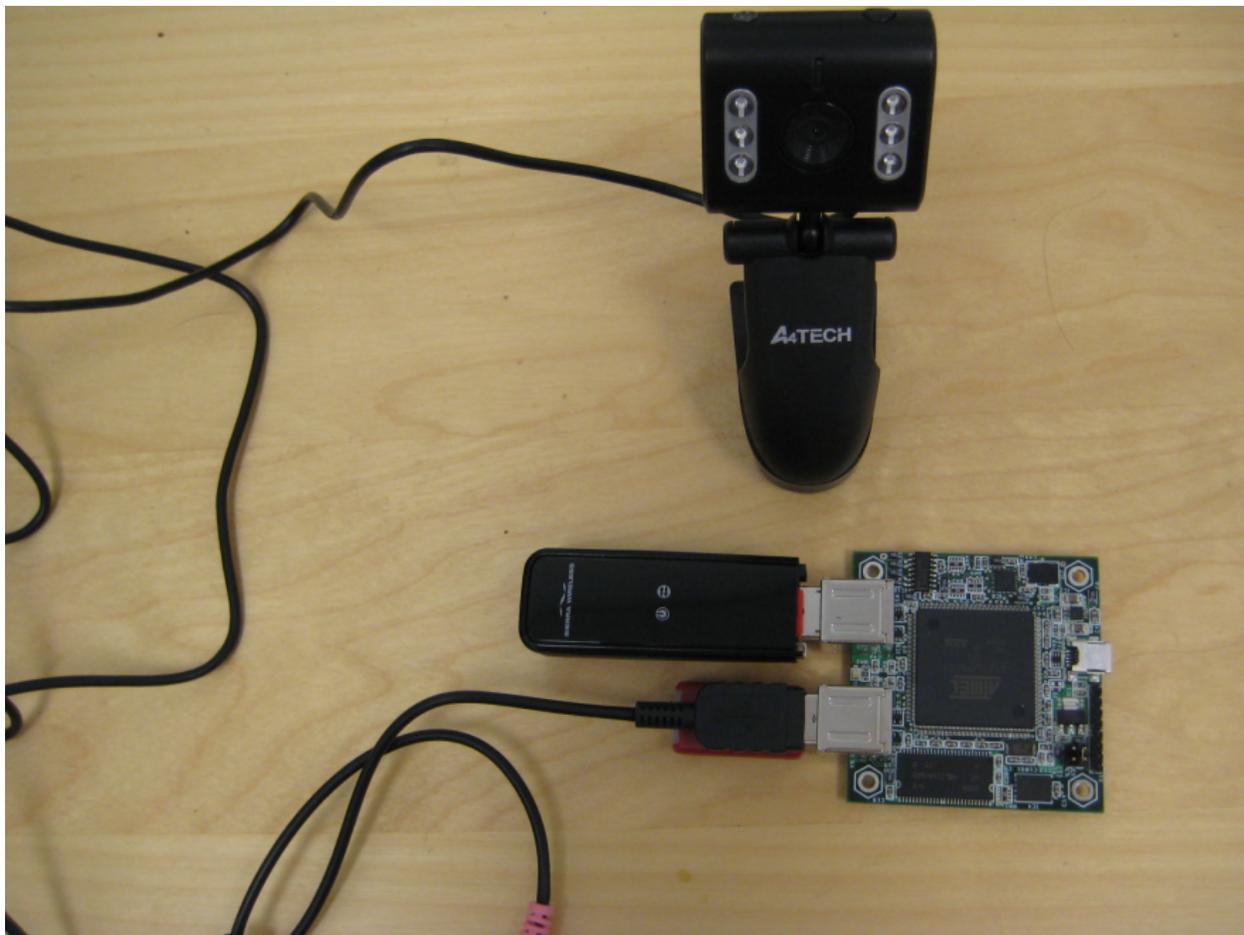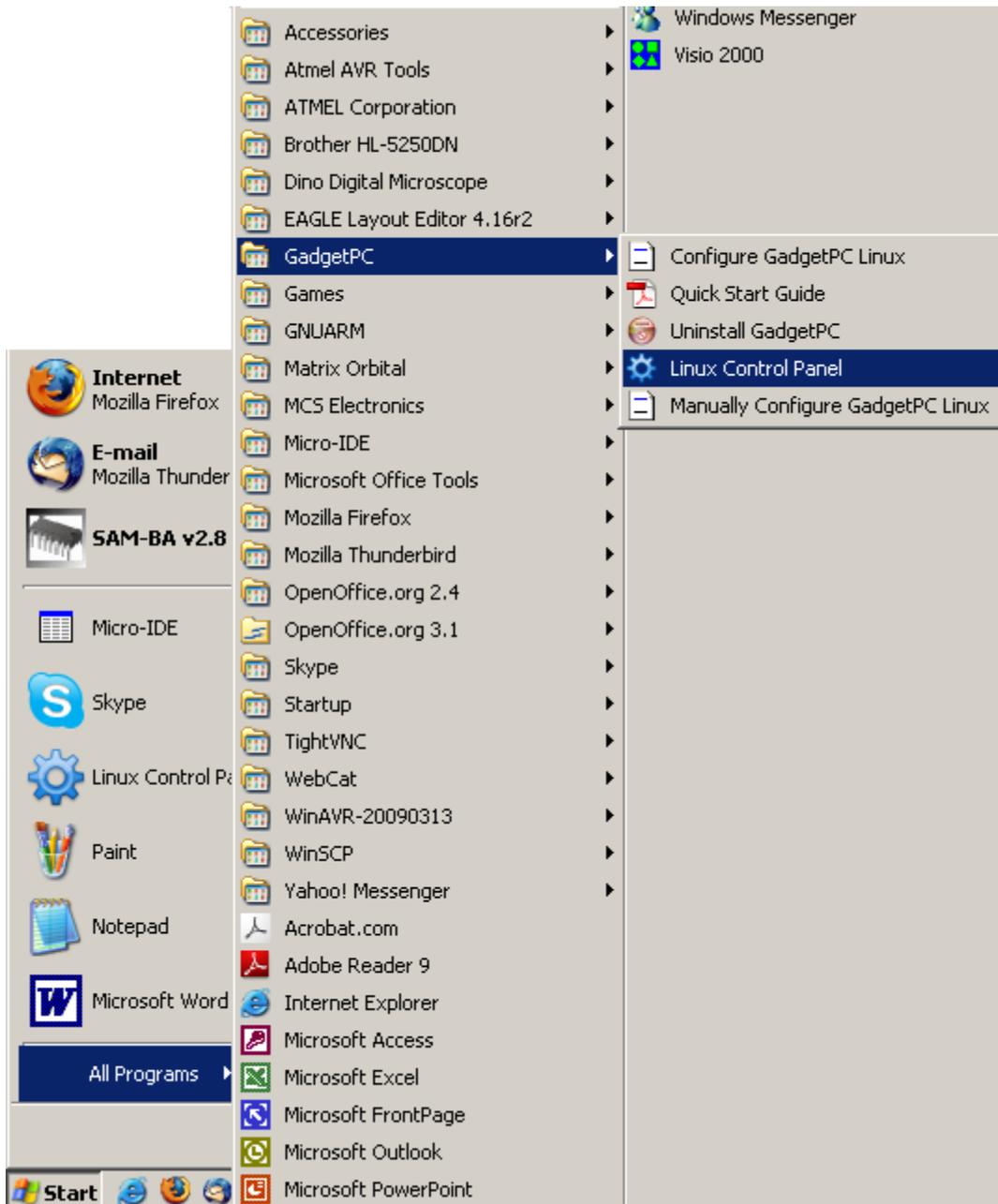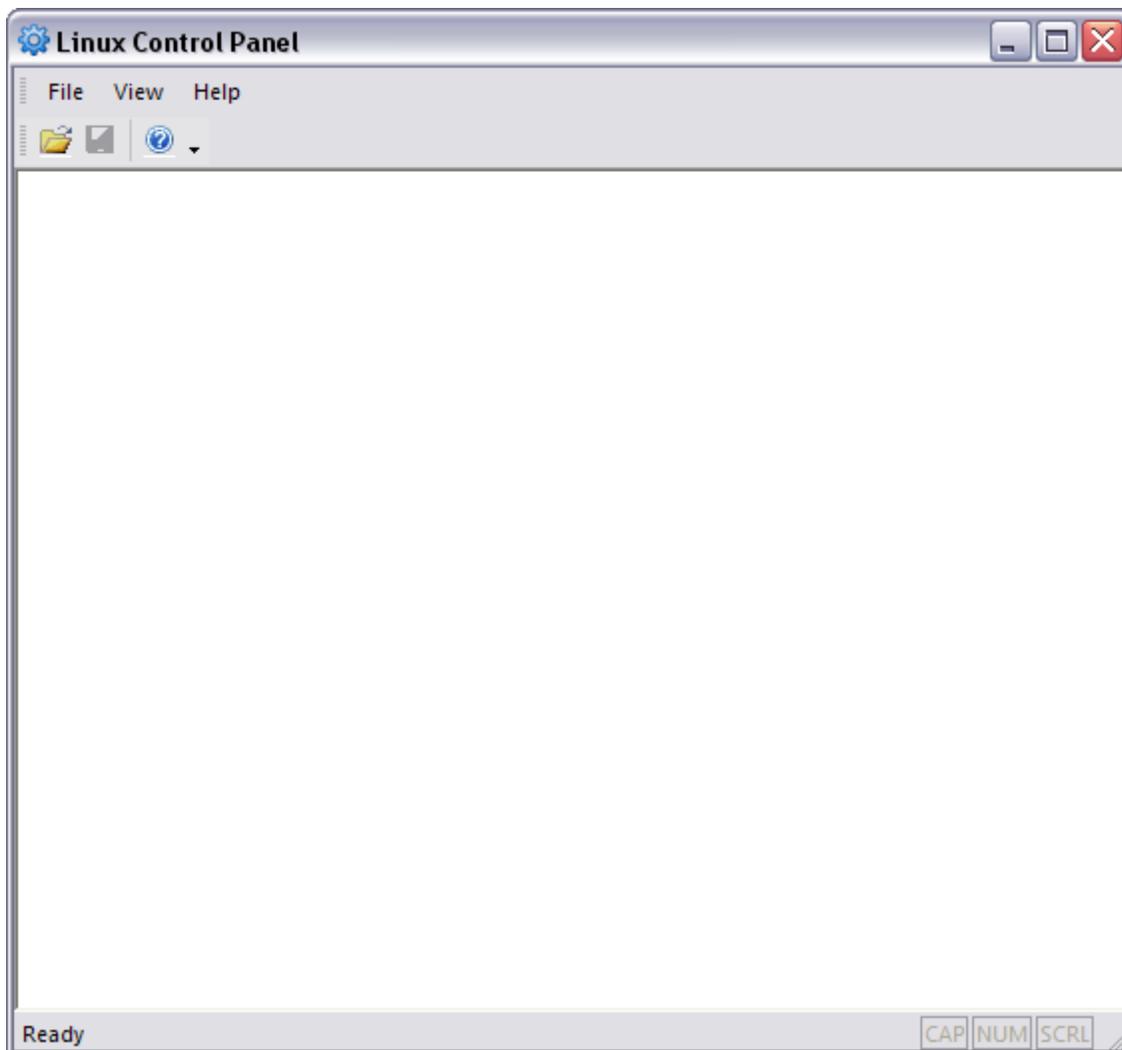- The webcam should be connected to any one of GadgetPC's USB ports.

Figure 3.

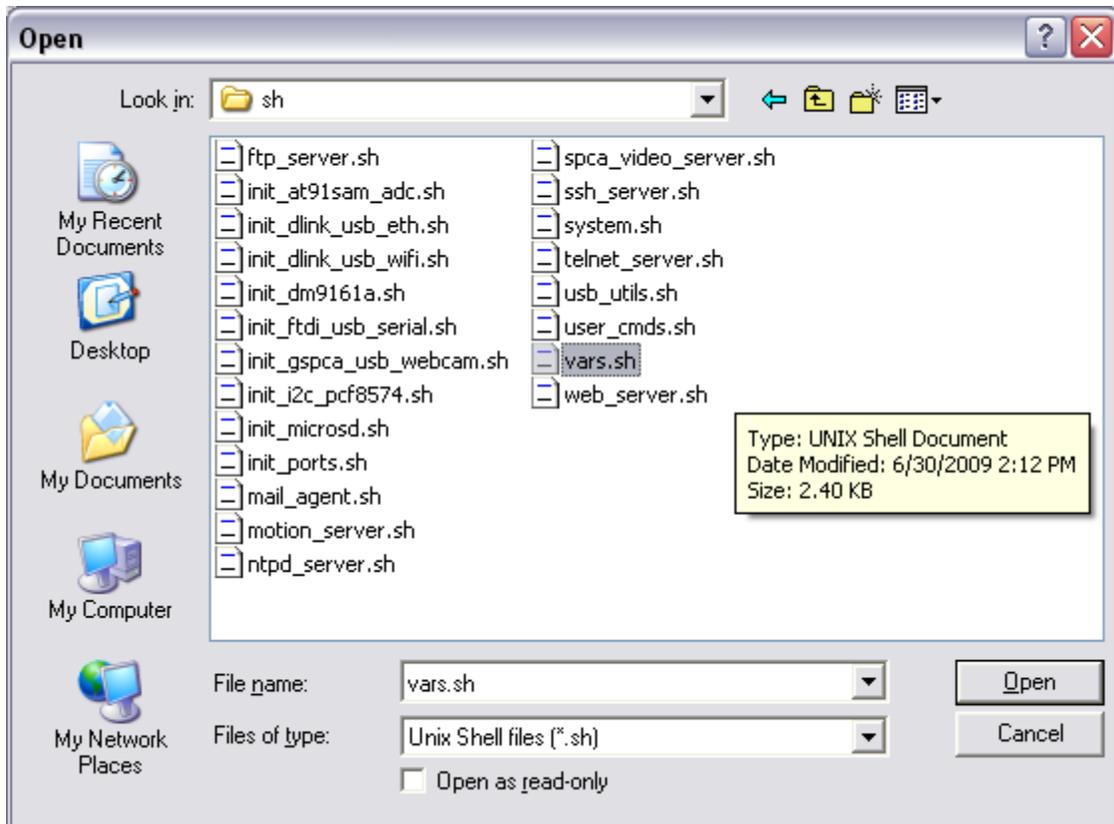Insert your SIM card into the Aircard. SIM card should have data service (voice only SIM cards will not serve the purpose).

1) Open **Linux Control Panel** that comes with GadgetPC setup. (Start menu -> All Programs -> GadgetPC -> Linux Control Panel)
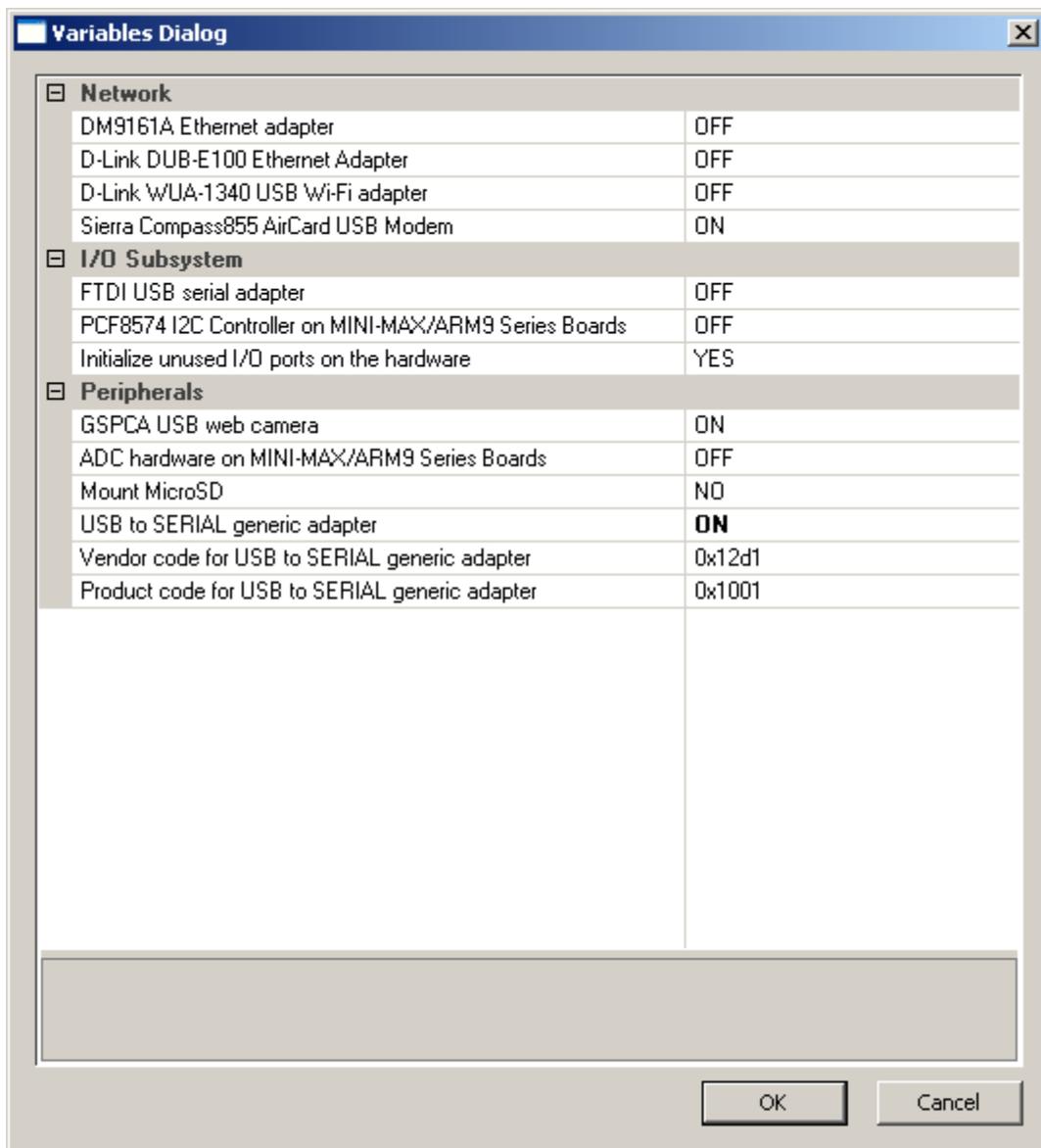
2) Click File -> Open. By default, program will start from folder where GadgetPC was installed. Go to **sh** folder and select **vars.sh** file.

3) Double-click **Hardware and Peripherals** and enable **Sierra Compass Aircard** (Turned ON), **GSPCA USB web camera** (Turned ON), and USB to Serial generic adapter (Turned ON).

Variables Dialog

Network	
DM9161A Ethernet adapter	OFF
D-Link DUB-E100 Ethernet Adapter	OFF
D-Link WUA-1340 USB Wi-Fi adapter	OFF
Sierra Compass855 AirCard USB Modem	ON
I/O Subsystem	
FTDI USB serial adapter	OFF
PCF8574 I2C Controller on MINI-MAX/ARM9 Series Boards	OFF
Initialize unused I/O ports on the hardware	YES
Peripherals	
GSPCA USB web camera	ON
ADC hardware on MINI-MAX/ARM9 Series Boards	OFF
Mount MicroSD	NO
USB to SERIAL generic adapter	**ON**
Vendor code for USB to SERIAL generic adapter	0x12d1
Product code for USB to SERIAL generic adapter	0x1001

[OK]   [Cancel]

4) Double-click **Network** and enable **Install PPP** (Turned ON) and assign an IP address, subnet mask, and gateway IP address under **TCP/IP Options**.

Variables Dialog

⊟ Network	
Install PPP	YES
⊟ GPRS Connection	
Start Life;) GPRS Internet Connection	NO
Send PIN code to unlock SIM card in GPRS modem	NO
PIN code of SIM card	1111
GPRS device name	/dev/ttyUSB3
Delay before sending PIN (in seconds)	3
Delay for registration modem on GPRS network (in seconds)	15
Delay before start PPP service (in seconds)	3
⊟ TCP/IP Options	
IP Address of Device	192.168.1.210
Subnet Mask	255.255.255.0
IP Address of Gateway	192.168.1.254
⊟ 3G Connection	
Start People.Net 3G Internect Connection	NO
Delay before start 3G connection (in seconds)	45
Delay after start 3G connection (in seconds)	3
3G device name	/dev/ttyUSB0
⊟ DynDNS	
Username for dyndns.org account	GadgetPC
Pasword for dyndns.org account	gadgetpcpassword
Update period (in milliseconds)	600000
Alias for the host	gpcgprs.dyndns.org
Path to logging file	/mnt/usb/inadyn/log/inadyn.log

OK   Cancel