

GadgetPC

Single Board Computer

Quick Start Guide

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Overview

Thank you for your purchase of the GadgetPC Single Board Computer. GadgetPC is a powerful computer board that is capable of running high-level operating systems such as Linux.

This document describes how to quickly get started with GadgetPC and includes the following steps:

- Requirements
- Hardware Setup
- Software Setup

Requirements

GadgetPC can be used for many different applications. The minimum requirements to run Linux are:

- GadgetPC
- USB Flash Drive
- A Windows PC to install and run GadgetPC software and Linux Control Panel

Optional accessories for use with Linux:

- BRD-RS232-TTL-1: Connects GadgetPC to your PC's serial port for console output
- DUB-E100: Dlink DUB-E100 Ethernet USB Adapter: For 100 Mbit Ethernet capability on GadgetPC
- ADP-5V1A-MiniUSB: MiniUSB Power Adapter: This option allows standalone operation of GadgetPC without having to power from a PC's USB port

These accessories already included in GadgetPC Development Kit.

Hardware Setup

1. Place the GadgetPC board on a clean, non-conductive surface.
2. Connect the provided USB Device Cable to the USB Device port on the GadgetPC.
3. Connect the other end of the USB Device Cable to an available USB port on your PC. GadgetPC is powered from your PC's USB port and does not require an external power supply.



4. Connect the optional Dlink DUB-E100 Ethernet USB Adapter to a USB Host port of GadgetPC. It does not matter which port is used.



Software Setup

GadgetPC first boots up from on-board DataFlash memory. Compressed Linux image is decompressed to GadgetPC's on-board RAM and executed. This loads Linux kernel, drivers, and applications such as BusyBox. Much like the Linux distributions on regular PC's, GadgetPC Linux runs from RAM.

GadgetPC's Linux distribution includes standard Linux kernel drivers as well as BiPOM-supplied drivers for various popular USB devices.

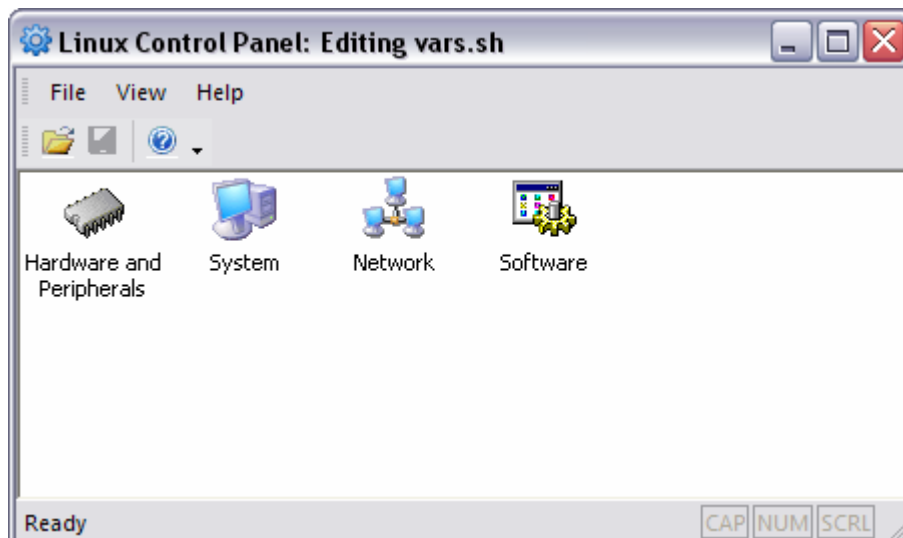
GadgetPC automatically detects USB Flash Drives (for example, Thumb drives). To make GadgetPC run your own applications and any custom commands, place commands to special shell file (Bash Shell) with the name **user_cmds.sh**. This file is in **sh** folder in root directory on USB Flash Drive. Also you can configure the Linux with **Linux Control Panel**. This software allows to change many options like Network settings, Hardware list etc,

Here are the steps to configure and run GadgetPC Linux:

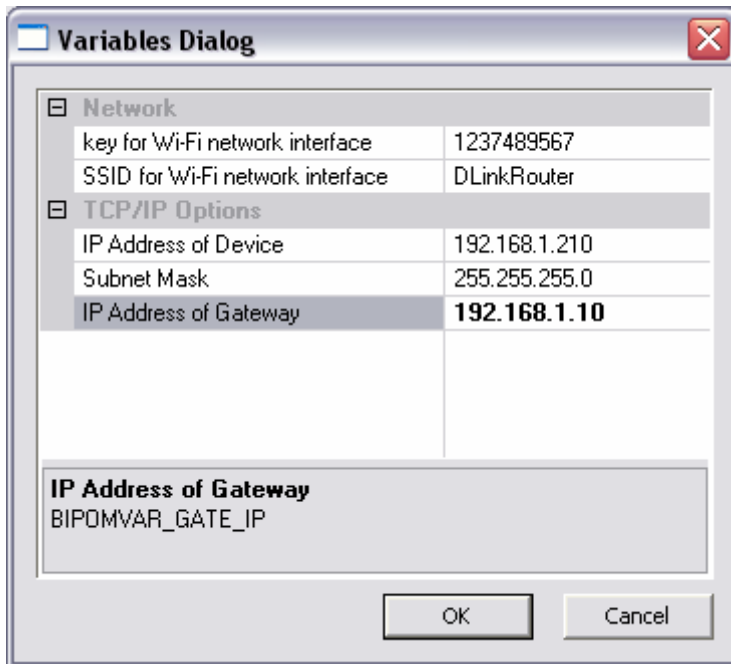
- 1) Download latest **GadgetPC Linux Release (Windows Installation)** from <http://www.bipom.com/gadgetdk.php> and install it.
- 2) In order to configure **GadgetPC Linux**, start **Linux Control Panel** software from **Start -> All Programs -> GadgetPC -> Linux Control Panel**. After **Linux Control Panel** starts, open **vars.sh** file that is located in **c:\bipom\devtools\GadgetPC\sh** (if you installed Linux Control Panel to default path).

Select **File → Open** from the menu and open **vars.sh** file in **sh** folder. By default, the program will start from the folder where GadgetPC release was installed.

When you open **vars.sh** file, you will see configuration group icons such as **Hardware & Peripherals**, **Software**, **System** and **Network**.



Now you can double click on any icon to view and edit all possible configuration options for that group.



You can change any options as needed and click the OK button. The options correspond to the configuration variables in **vars.sh** file. You can read the description of each variable in the chapter titled **Linux Configuration File**.

The bottom area of Variables Dialog gives a short description and name of variable from **vars.sh** file. When you change the option, that variable will be changed in **vars.sh**.

In order to save your changes, select **File → Save** from the menu. This saves all the changes back to **vars.sh** on your computer.

The current GadgetPC release has 5 sections:

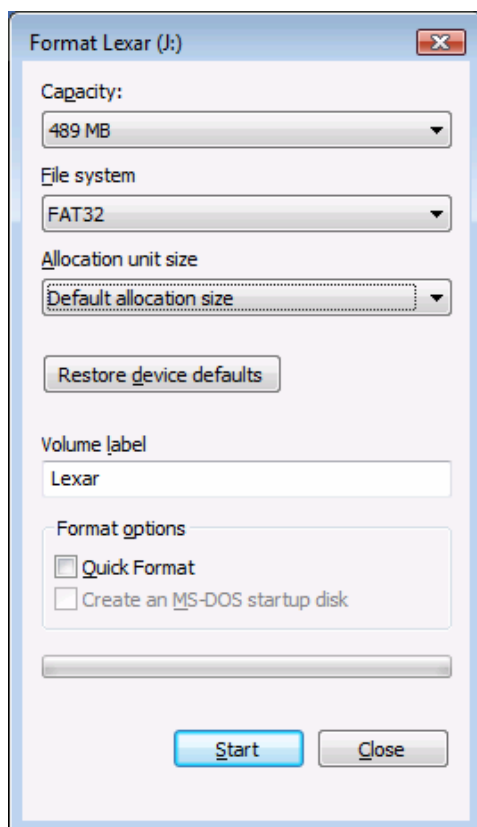
- **Hardware and Peripherals** – allows enabling/disabling of embedded hardware and peripherals
- **System** - allows configuring of system parameters
- **Network** - allows configuring of network parameters
- **Software** - allows configuring various software packages in GadgetPC Linux
- **User Defined Options** - allows configuring of user defined variables

IMPORTANT: Please be careful when editing any **.sh** files (**vars.sh**, **user_cmds.sh**, etc.) manually. These are **UNIX script** files and almost all **Windows** editors will corrupt them. This will cause the files to be not executable under Linux. You can use the **Micro-IDE** editor that works with **.sh** files. Also, do NOT rename predefined variables and avoid modifying them manually. Instead, use the **Linux Control Panel** to modify predefined variables.

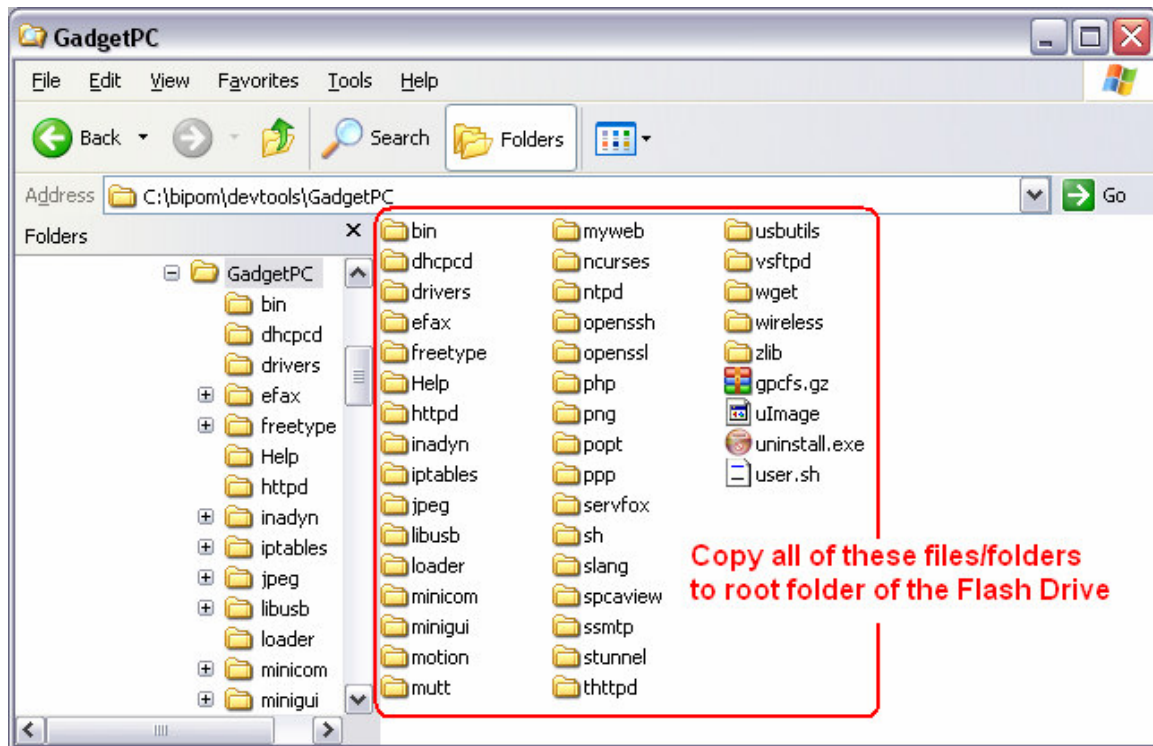
- 3) You can edit **user_cmds.sh** in Micro-IDE if you need start your programs at boot time. This file will be executed after Linux boots up. This file also located in **c:\bipom\devtools\GadgetPC\sh** (if you installed release to default path).
- 4) Plug the USB Flash Drive to your PC's USB port. Skip to Step 5 if the USB Flash Drive is already formatted.



- 5) Format the USB Flash Drive with FAT32 format on Windows if the USB Flash Drive has not yet been formatted:



- 6) Copy all other files/folders from folder where you installed **GadgetPC Linux Release** to the root directory of your USB Flash Drive.

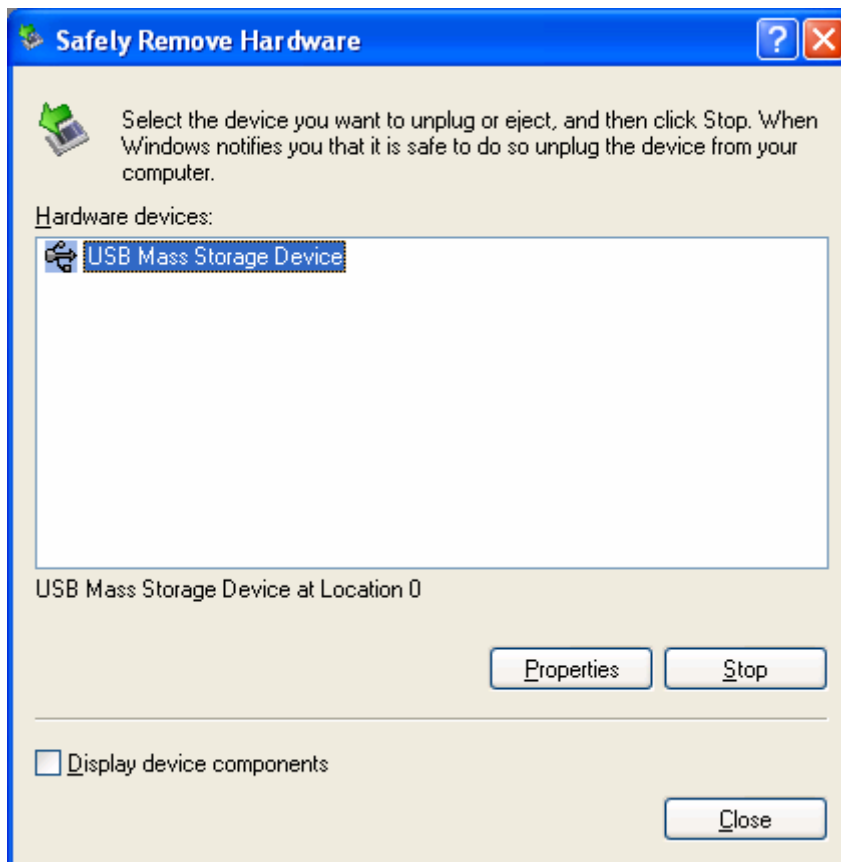


- 7) Stop your USB Flash Drive using the “Safely Remove Hardware” icon on your Windows taskbar:

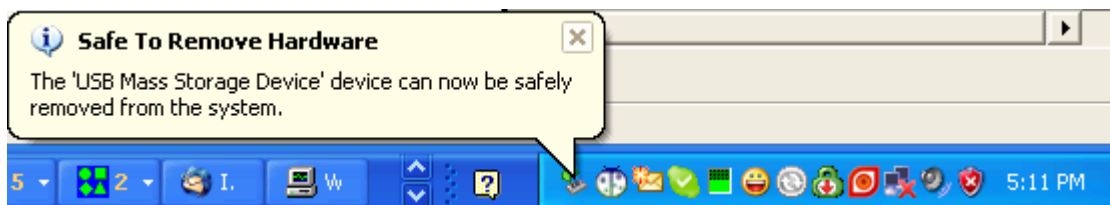


Stop USB Flash Drive

When you click “Safely Remove Hardware” icon, the “Safely Remove Hardware” dialog will appear. Click Stop to stop the USB Mass Storage Device (your USB Flash Drive)



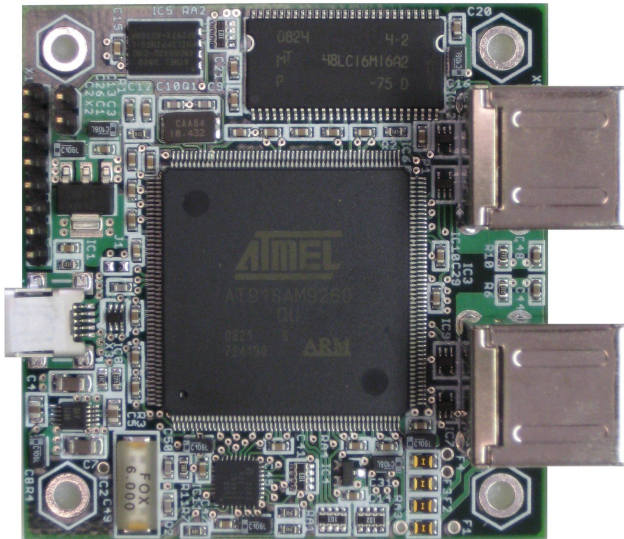
Shortly after you click the Stop button, a message will appear:



indicating that it is safe to remove the USB Flash Drive.

Remove from USB Flash Drive your PC.

8) Insert the USB Flash Drive to any unused USB port of GadgetPC.



- 9) Remove power from GadgetPC and reapply power. GadgetPC will boot Linux and within few seconds it will be ready to use.

Linux Configuration File

vars.sh file contains shell variables that are used by other shell files to configure various aspects of GadgetPC Linux. The following describes the various configuration options in more detail. You can edit **vars.sh** and other ***.sh** files to match your Linux system needs.

Lines starting with '#' sign are comment lines and have no effect on configuration. Echo command prints useful information to console. By default, console output goes to GadgetPC's serial port.

The **vars.sh** is located in the **/sh** directory of USB Flash Drive. This directory also has other configuration files.

Current GadgetPC release has following configuration files (more files may be added as the software is upgraded and more hardware devices and software packages are added):

Filename	Description
ftp_server.sh	Configure and start FTP server
init_at91sam_adc.sh	Configure ADC hardware on MINI-MAX/ARM9 Series Boards
init_dlink_usb_eth.sh	Configure D-Link DUB-E100 Ethernet Adapter
init_dlink_usb_wifi.sh	Configure D-Link WUA-1340 USB Wi-Fi adapter
init_dm9161a.sh	Configure DM9161A Ethernet adapter
init_ftdi_usb_serial.sh	Configure FTDI USB to serial adapter
init_gspca_usb_webcam.sh	Configure GSPCA USB web camera interface
init_i2c_pcf8574.sh	Configure I2C interface
init_microsd.sh	Mount MicroSD card
init_ports.sh	Set unused I/O port
mail_agent.sh	Configure mail agent
motion_server.sh	Configure and start Motion server
ntpd_server.sh	Configure and start NTPD server
sppa_video_server.sh	Configure and start SPPA Video server
ssh_server.sh	Configure and start SSH server
system.sh	Configure common system parameters
telnet_server.sh	Configure and start TELNET server
usb_utils.sh	Create links to support USB utilities
user_cmds.sh	User can add new commands here.
vars.sh	Set configuration variables which used in other files
web_server.sh	Configure and start HTTP server

You should NOT edit any **.sh** files except **vars.sh** and **user_cmds.sh**

You can modify the variables in **vars.sh** to configure the Linux system using **Linux Control Panel** as described previously.

user_cmds.sh file is called after the system is initialized. You can add here any UNIX shell commands available in current **GadgetPC Linux Release** or call any software developed for **GadgetPC Linux Release**. By default, **user_cmds.sh** is empty.

The following list describes all predefined variables from **vars.sh** available in current GadgetPC Linux Release.

Appendix A: Linux Configuration Variables

Variable Name :	BIPOMVAR_DM9161A_ETHERNET
Value :	ON OFF
Description :	If set to ON then script will configure DM9161 Ethernet adapter. If set to OFF then script will skip configuration code for this device.
Variable Name :	BIPOMVAR_DLINK_USB_ETHERNET
Value :	ON OFF
Description :	If set to ON then script will configure D-Link DUB-E100 Ethernet adapter. If set to OFF then script will skip configuration code for this device.
Variable Name :	BIPOMVAR_GSPCA_USB_WEBCAM
Value :	ON OFF
Description :	If set to ON then script will configure GSPCA USB web camera. If set to OFF then script will skip configuration code for this device.
Variable Name :	BIPOMVAR_DLINK_USB_WIFI
Value :	ON OFF
Description :	If set to ON then script will configure D-Link WUA-1340 USB Wi-Fi adapter. If set to OFF then script will skip configuration code for this device.
Variable Name :	BIPOMVAR_FTDI_USB_SERIAL
Value :	ON OFF
Description :	If set to ON then script will configure FDTI USB to serial adapter. If set to OFF then script will skip configuration code for this device.
Variable Name :	BIPOMVAR_AT91SAM_ADC
Value :	ON OFF
Description :	If set to ON then script will configure ADC hardware on MINI-MAX/ARM9 Series Boards. If set to OFF then script will skip configuration code for this device.
Variable Name :	BIPOMVAR_I2C_PCF8574
Value :	ON OFF
Description :	If set to ON then script will configure PCF8574 I2C Controller on MINI-MAX/ARM9 Series Boards. If set to OFF then script will skip configuration code for this device.
Variable Name :	BIPOMVAR_MICROSD
Value :	ON OFF
Description :	If set to ON then script will mount MicroSD card. If set to OFF then script will not mount this device.
Variable Name :	BIPOMVAR_CONFIGURE_UNUSED_PORT_PINS
Value :	ON OFF
Description :	If set to ON then script will initialize unused I/O ports on the hardware. If set to OFF then I/O ports will be in not initialized state.

Variable Name :	BIPOMVAR_ROOT_PWD
Value :	Text string
Description :	This parameter sets password for 'root' user on Linux system.
Variable Name :	BIPOMVAR_DRIVER_SOURCE_PATH
Value :	UNIX style path
Description :	This parameter sets path to directory where system drivers are located.
Variable Name :	BIPOMVAR_DRIVER_INSTALL_PATH
Value :	UNIX style path
Description :	This parameter sets path to directory where system drivers are copied.
Variable Name :	BIPOMVAR_HOST_IP
Value :	IP address
Description :	This parameter sets IP address of device.
Variable Name :	BIPOMVAR_NETMASK
Value :	IP address
Description :	This parameter sets subnet mask.
Variable Name :	BIPOMVAR_GATE_IP
Value :	IP address
Description :	This parameter sets IP address of gateway.
Variable Name :	BIPOMVAR_WIFI_KEY
Value :	Text string
Description :	This parameter sets KEY for Wi-Fi network interface (if used).
Variable Name :	BIPOMVAR_WIFI_SSID
Value :	Text string
Description :	This parameter sets SSID for Wi-Fi network interface (if used).
Variable Name :	BIPOMVAR_TELNET_SERVER
Value :	YES NO
Description :	If set to YES then script will run TELNET server. If set to NO then script will not run TELNET server.
Variable Name :	BIPOMVAR_WEB_SERVER
Value :	YES NO
Description :	If set to YES then script will run HTTP server. If set to NO then script will not run HTTP server.
Variable Name :	BIPOMVAR_HTTP_CFG_FILE_PATH
Value :	UNIX style path
Description :	This parameter sets path to configuration file
Variable Name :	BIPOMVAR_HTTP_PORT
Value :	INT (integer number)
Description :	This parameter sets HTTP port
Variable Name :	BIPOMVAR_FTP_SERVER
Value :	YES NO
Description :	If set to YES then script will run FTP server. If set to NO then script will not run FTP server.

Variable Name : **BIPOMVAR_FTP_USER**
Value : **Text string**
Description : This parameter sets FTP username.

Variable Name : **BIPOMVAR_FTP_PWD**
Value : **Text string**
Description : This parameter sets FTP password.

Variable Name : **BIPOMVAR_OPEN_SSH_SERVER**
Value : **YES | NO**
Description : If set to YES then script will run SSH server.
 If set to NO then script will not run SSH server.

Variable Name : **BIPOMVAR_SSH_USER**
Value : **Text string**
Description : This parameter sets SSH username.

Variable Name : **BIPOMVAR_SSH_PWD**
Value : **Text string**
Description : This parameter sets SSH password.

Variable Name : **BIPOMVAR_SSH_HOST_KEY_PATH**
Value : **UNIX style path**
Description : This parameter sets path to HOST KEY file

Variable Name : **BIPOMVAR_SSH_DSA_KEY_PATH**
Value : **UNIX style path**
Description : This parameter sets path to DSA KEY file

Variable Name : **BIPOMVAR_SSH_RSA_KEY_PATH**
Value : **UNIX style path**
Description : This parameter sets path to RSA KEY file

Variable Name : **BIPOMVAR_OPEN_NTPD_SERVER**
Value : **YES | NO**
Description : If set to YES then script will run NTPD server.
 If set to NO then script will not run NTPD server.

Variable Name : **BIPOMVAR_NTPD_USER**
Value : **Text string**
Description : This parameter sets NTPD username.

Variable Name : **BIPOMVAR_NTPD_PWD**
Value : **Text string**
Description : This parameter sets NTPD password.

Variable Name : **BIPOMVAR_NTPD_CFG_FILE_PATH**
Value : **UNIX style path**
Description : This parameter sets path to configuration file of NTPD server

Variable Name : **BIPOMVAR_MAIL_AGENT**
Value : **YES | NO**
Description : If set to YES then script will run mail agent.
 If set to NO then script will not run mail agent.

Variable Name : BIPOMVAR_USB_UTILS
Value : YES | NO
Description : If set to YES then script creates links to support USB utilities.
If set to NO then script will skip configuration of USB utilities.

Variable Name : BIPOMVAR_SPCA_VIDEO_SERVER
Value : YES | NO
Description : If set to YES then script will run SPCA Video Server.
If set to NO then script will not run SPCA Video Server.

Variable Name : BIPOMVAR_MOTION_SERVER
Value : YES | NO
Description : If set to YES then script will run Motion Server.
If set to NO then script will not run Motion Server.

Variable Name : BIPOMVAR_MOTIONSrv_CFG_FILE_PATH
Value : UNIX style path
Description : This parameter sets path to configuration file of motion server