Wireless Camera Pod on Fire Bird V Robot

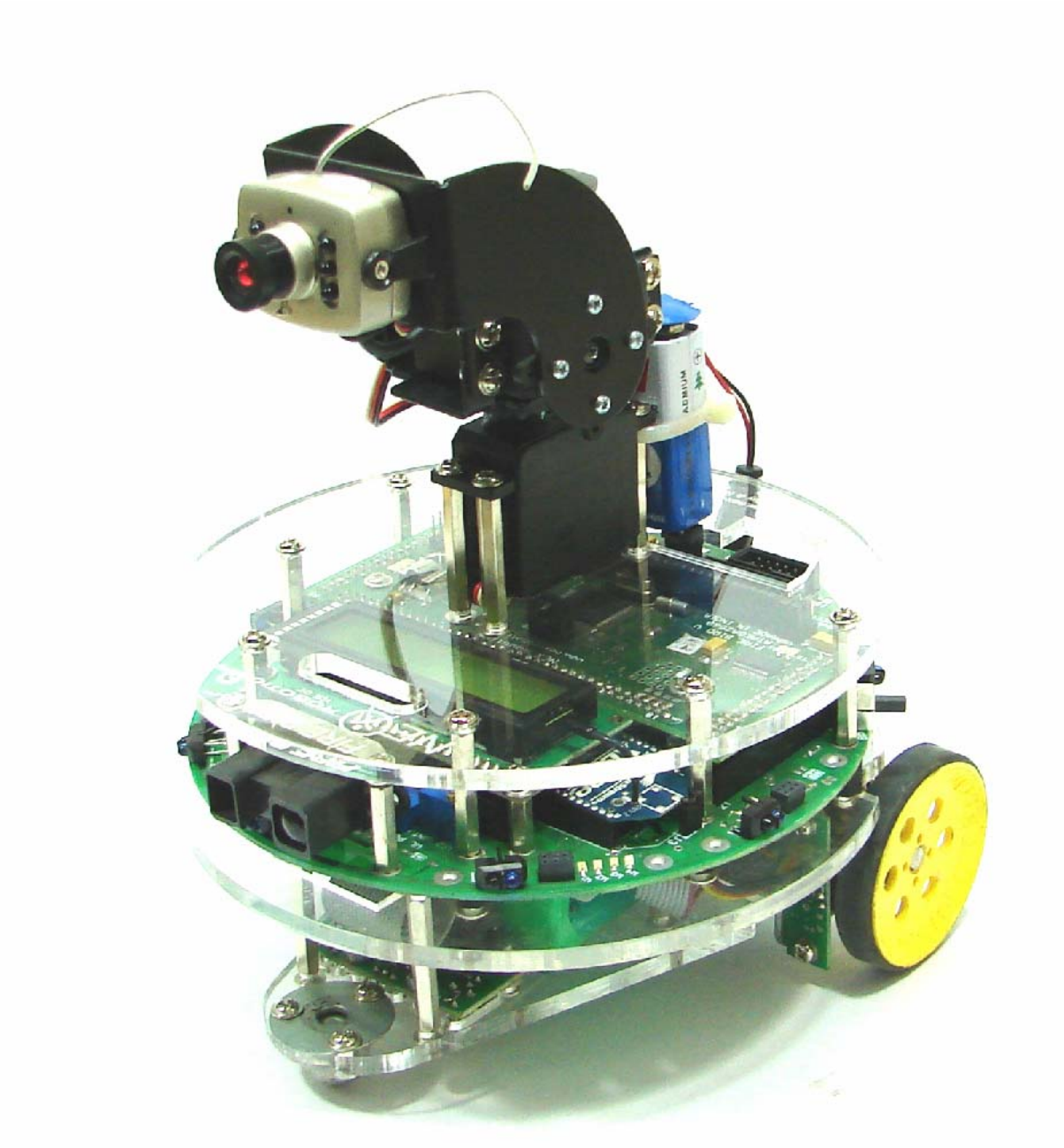

Figure 1: Wireless camera with servo pod mounted on the Fire Bird V Robot

Fire Bird V series of robots supports servo pod mounted wireless camera with pan and tilt motion.

Following topics are covered in this application note:

1. Hardware installation of the wireless camera pod.
2. Interfacing wireless camera pod with the PC using USB TV Tuner card
3. Acquiring video stream on the Fire Bird V robot's GUI

Camera Pod mounting on the Fire Bird V robot

Figure 2 shows the fully assembled servo pod with the wireless camera.

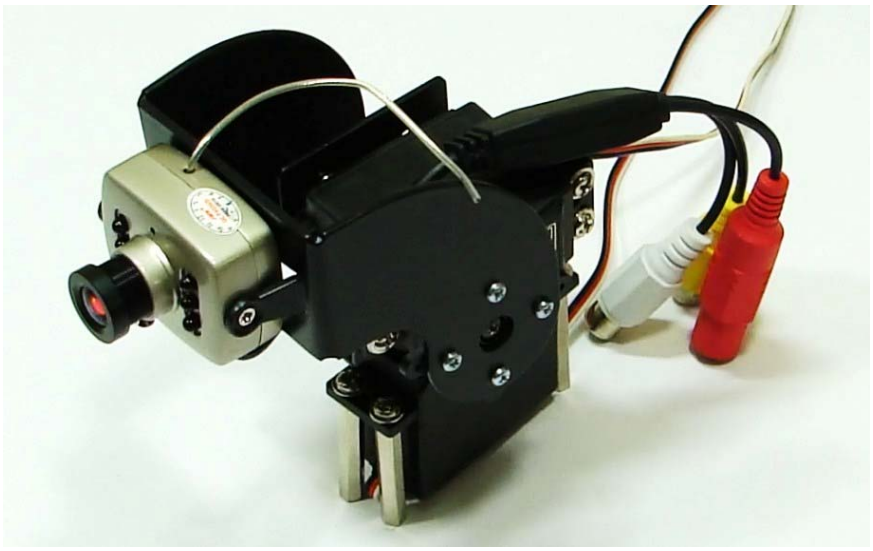

Figure 2: Camera Pod from NEX Robotics

Camera installation:
Step 1: Remove the acrylic top plate from the Robot.

Figure 3: Top Acrylic plate

Step 2: Mount the camera pod on the Acrylic plate with M3 washer nuts which are fixed on the respective studs.

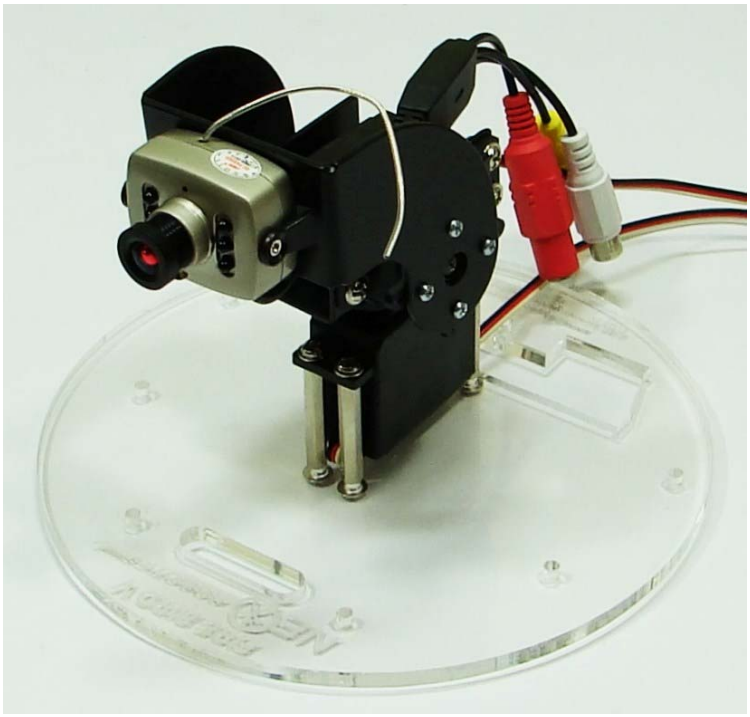

Figure 4: Camera pod on Acrylic plate

Step 3: Fit the acrylic top plate on the robot as shown in figure 5.

Figure 5: Acrylic plate fitted on FBV ATMEGA2560 Robot

Step 4: Figure 6 shows the location of the connectors for the servo motors. Connect Pan servo motor to S1 and Tilt servo to the S2 connector. Figure 7 shows the actual connections. Notice the white wire's direction. If you have servo motor with orange, red and brown wires then while connecting, orient orange wire in the similar position of white wire as shown in figure 7.

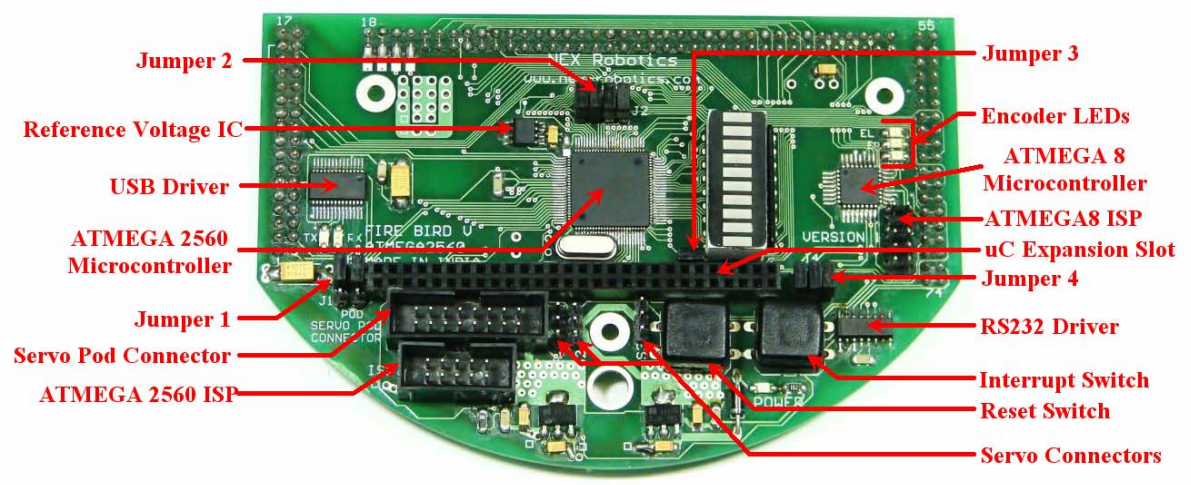

Figure 6: ATMEGA2560 microcontroller adaptor board for the Fire Bird V robot

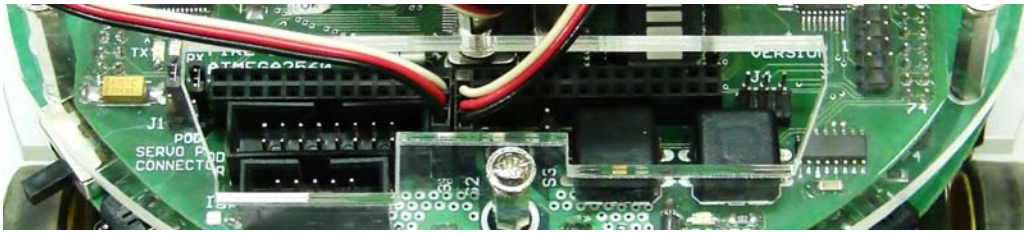

Figure 7: Servo motor connections

Camera pod	ATMEGA 2560 Microcontroller
Tilt servo	OC1A (uC pin 24)
Pan servo	OC1B (uC pin 25)

Table 1: ATMEGA2560 PWM pins for Pan and Tilt Servo motor

Note:
For servo motor control, refer to experiment "7_Servo_Motor_Control_using_PWM" which is located in the "Experiment" folder in the documentation CD.

Camera Accessories

Figure 8 shows the accessories of the wireless camera.

Wireless camera contains following accessories:

1. Wireless camera: Qty. 1;
2. Wireless receiver module: Qty. 1;
3. Antenna for wireless receiver module: Qty. 1;
4. AC Adaptors / SMPS for wireless camera and wireless receiver module: Qty. 2;
5. 9V Battery connector socket for wireless camera: Qty. 1;
6. Audio and Video AV wire: Qty. 1;

Note:
Depending on the model Wireless receiver module will work on 9V or 12V. Wireless camera always works on 9V. Never ever connect 12V adaptor to the wireless.

Figure 8: Wireless camera and accessories

USB TV Tuner Card Installation:

USB TV tuner card is used for acquiring image transmitted by the wireless camera on the PC. After driver installation you can acquire video stream in TV Tuner card's GUI, Robot GUI from NEX Robotics and on Matlab etc.

For application example on image processing using Matlab, refer to following link on NEX Robotics' website: http://www.nex-robotics.com/resources/image-processing-tutorial/

Note:
In this application example TV Tuner card from UMAX is covered. You can follow the similar process for any TV Tuner card.

TV Tuner card installation steps:

1. Connect the USB TV tuner card with the PC.
2. Insert its CD and complete the installation process.
3. For more information on installation, refer to TV Tuner card's manual.

Figure 9: TV Tuner

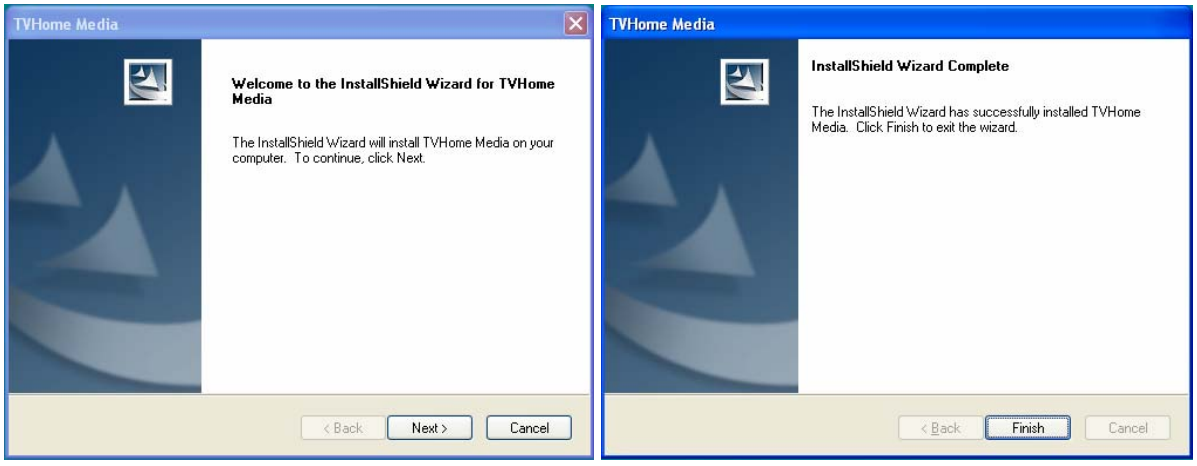

Figure 10: TV Tuner card Installation

Setting up hardware:

Step 1:
Connect Audio-Video AV connector cable between TV Tuner card and the wireless receiver module.
Connect TV Tuner card with the PC.
Power up wireless receiver module with 12V / 9V adaptor.

Figure 11 shows the hardware connections between USB TV Tuner card and wireless receiver module.

Figure 11: RADIO AV Receiver with TV Tuner connection

Step 2:
Connect 9V battery with the camera using 9V Battery connector socket. Fix the battery with the camera pod's studs using cable tie or rubber band. Figure 12 shows the battery connection.
If you want to do experiments for longer duration, you can use 9V adaptor to power up the camera.

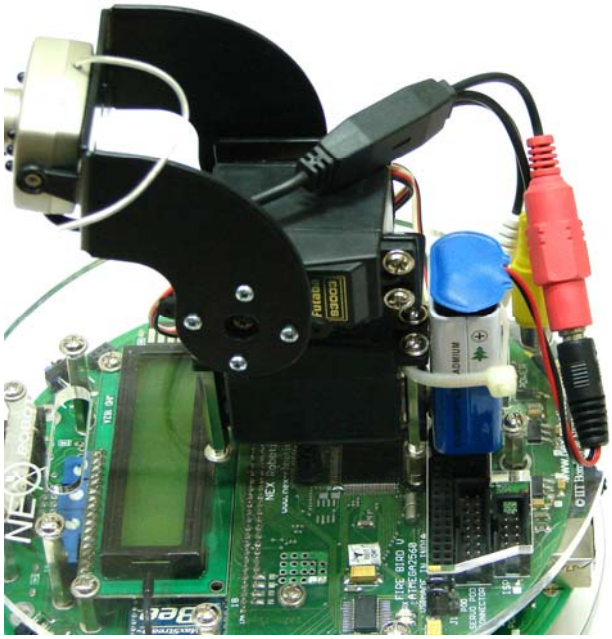

Figure 12: 9V Battery connected to Camera

Acquiring Image on the GUI of the USB TV Tuner card via wireless medium

Output of the wireless camera's receiver module is in the composite video format. In order to acquire the image you need to set the input video format as composite video.

Follow these steps to acquire video on the screen:

1. Start the TV Tuner Card's GUI
2. Go to TV and then to Settings. Set video source as composite video.
3. Go back to TV window.
4. If connections are correct, you can see the noise / jumbled video on the screen. You need to tune the frequency using tuning knob on the wireless receiver.

Figure 13: GUI's default window

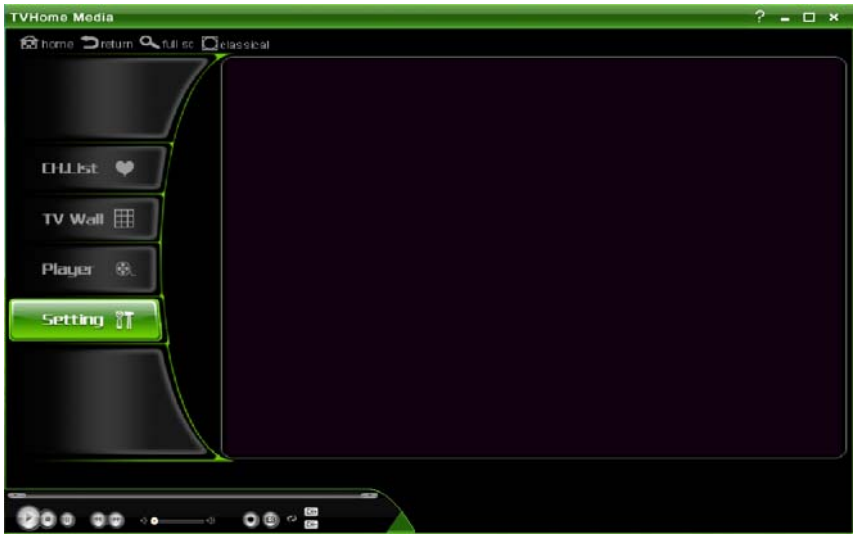

Figure 14: GUI's setting window

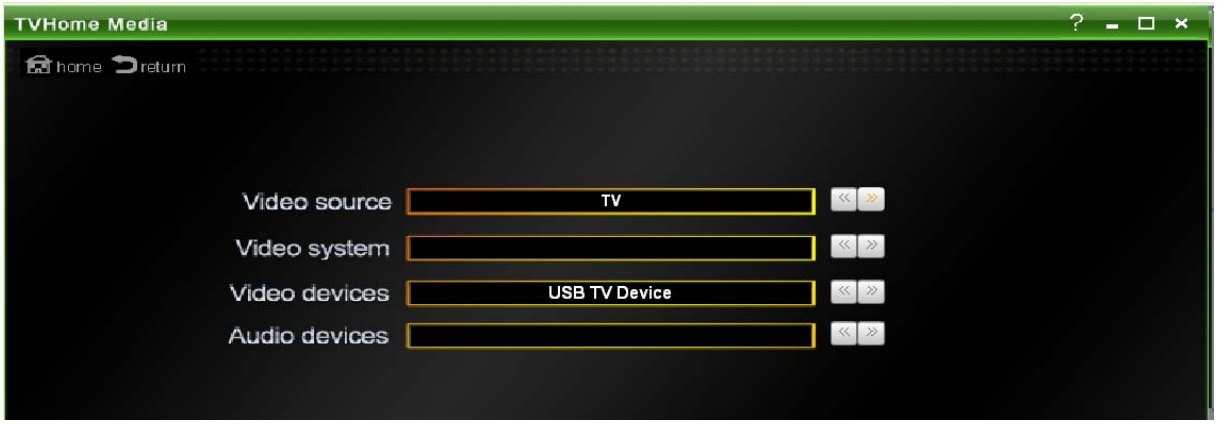

Figure 15: GUI's Video setting window

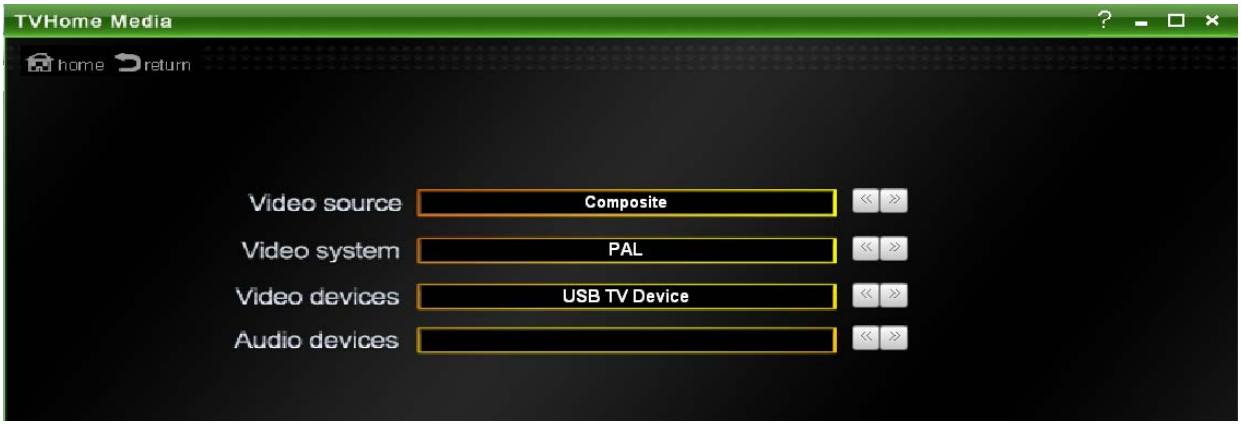

Figure 16: Correct settings for image acquisition

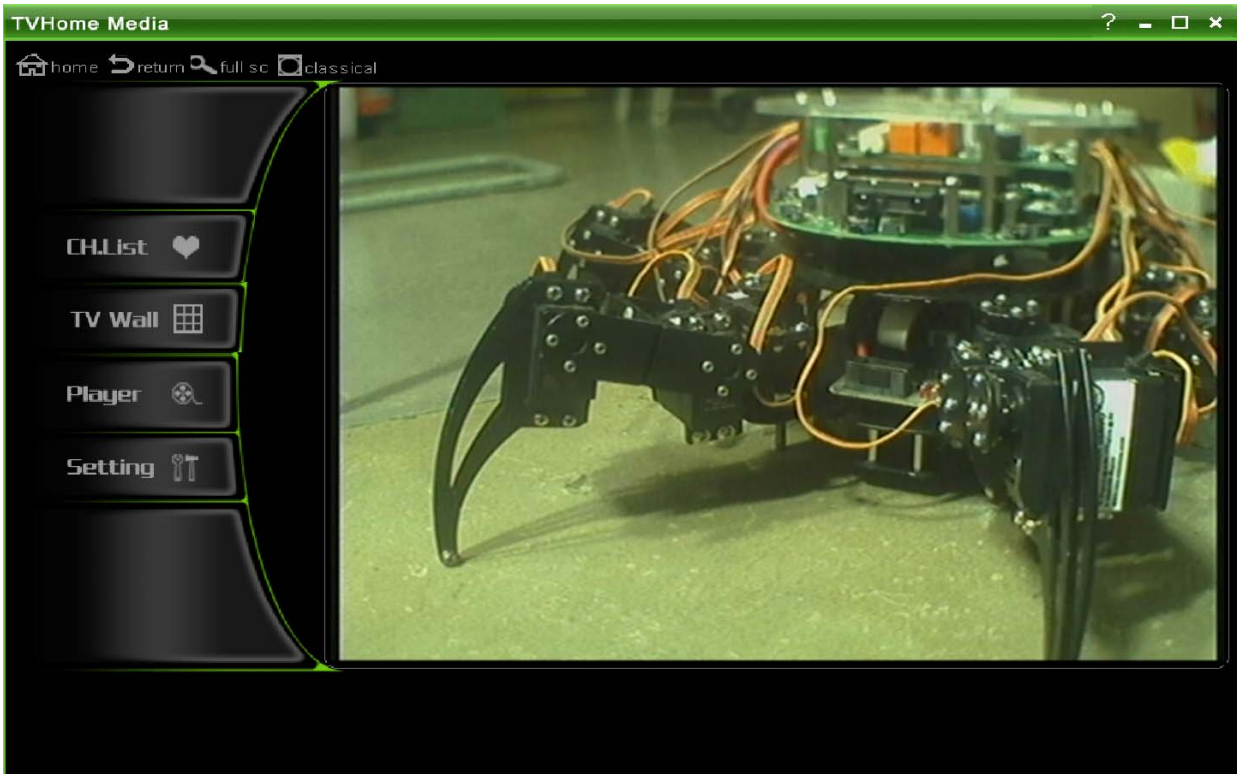

Figure 17: Acquired image on the GUI from wireless camera

Acquiring Image on the GUI of the USB TV Tuner card via wired connection

Camera can be directly connected to TV Tuner card if it has composite video out connector. This is an optional accessory and will not come with all the cameras.

Camera can be connected in wired mode for doing experiments for long duration of time or if you encounter any problem during warless image acquisition.

To do this, follow all the steps as mentioned in previous two sections. Only difference will be that instead connecting Audio-Video AV cable with the wireless receiver module, connect it directly to the wireless camera's Audio-Video AV out.

Acquiring Image on the Fire Bird V's GUI in wired or wireless mode

Once video is acquired on the TV Tuner card's GUI, you are ready to acquire video on the Fire Bird V robot's GUI. All the GUIs of the Fire Bird V support live video display. For connections and driver installation refer to all the previous sections.

Follow these steps for video acquisition:

1. Connect USB TV Tuner card with PC and wait for 5 seconds.
2. Start the Fire Bird V robot's GUI
3. In the video window, select devices as USB TV Device. This option will be visible only if USB TV Tuner card is installed and connected.
4. Press start button to acquire the video.

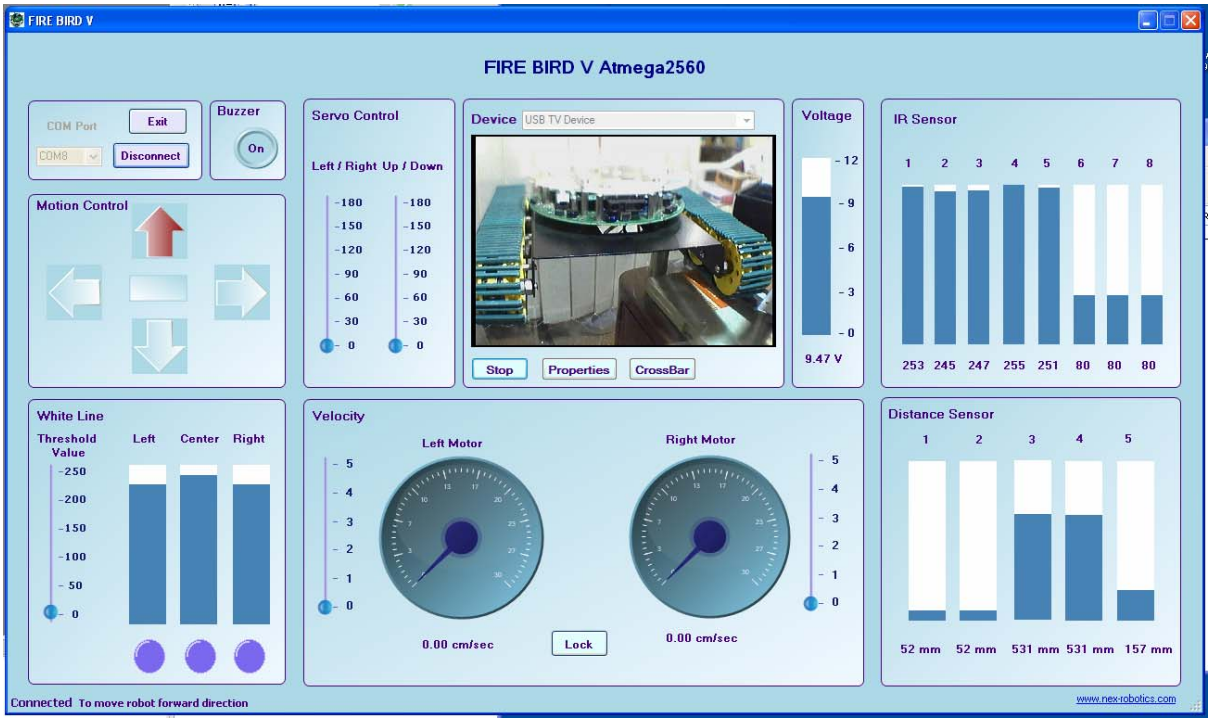

Figure 18: Video display on the Fire Bird V robot's GUI

Notice

The contents of this manual are subject to change without notice. All efforts have been made to ensure the accuracy of contents in this manual. However, should any errors be detected, NEX Robotics welcomes your corrections. You can send us your queries / suggestions at
info@nex-robotics.com

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⚠ **Read the user manuals completely before start using this product**

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