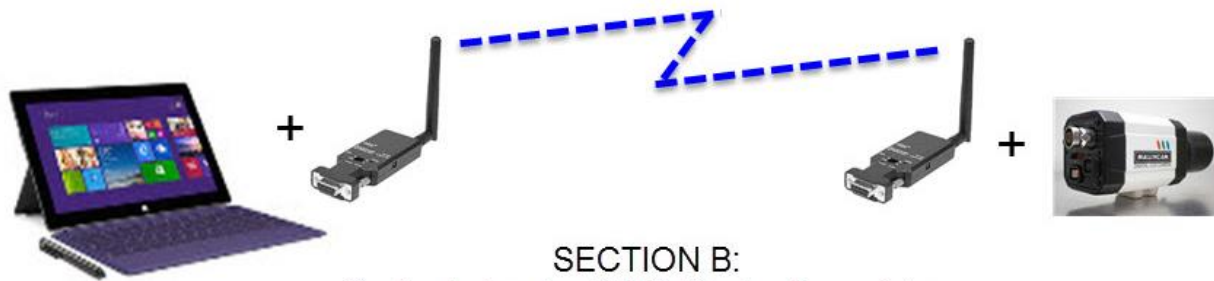


How to use Bluetooth to control the MallinCam Micro with MMEC

This document is composed to two main sections. Section A beginning on page 2 describes how to control the MallinCam Micro using your Laptop's Bluetooth connection to a SIIG Bluetooth module connected to the Micro. Section B beginning on page 6 describes how to control the Micro over a dedicated pair of SIIG Bluetooth modules, even if your Laptop does not support Bluetooth. The pair of SIIG Bluetooth modules also provides a longer range wireless connection.



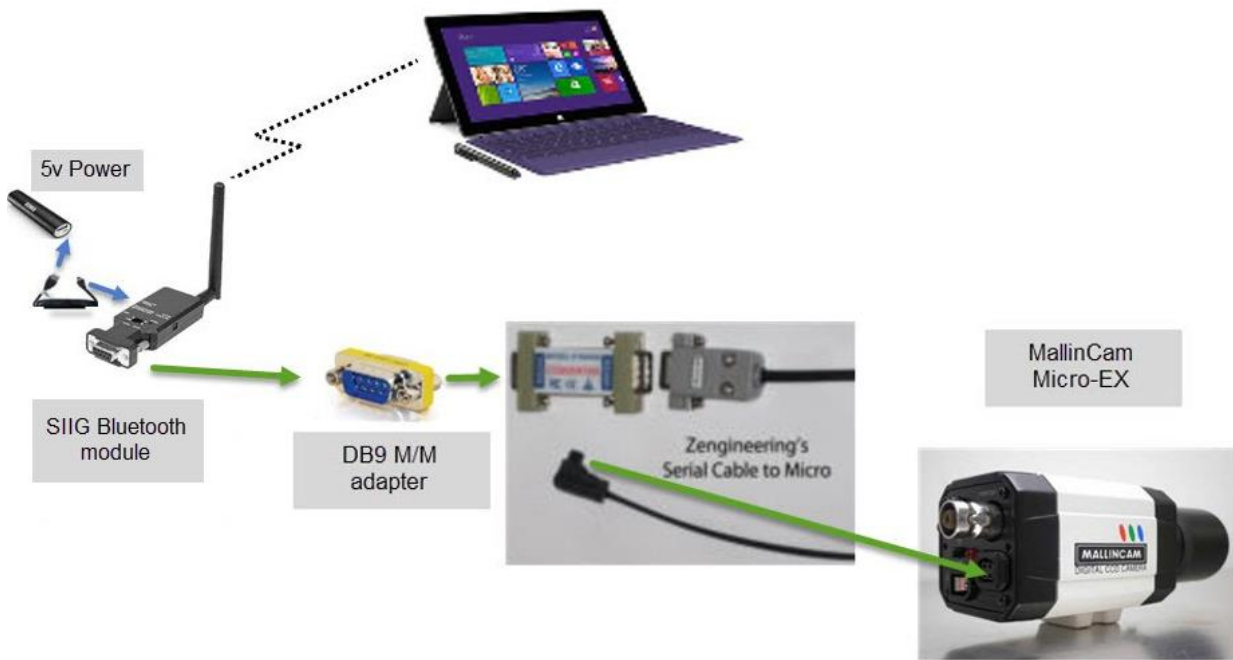
SECTION A:
Laptop Bluetooth connection to SIIG Bluetooth module



SECTION B:
Dedicated pair of SIIG Bluetooth modules

SECTION A: How to control the MallinCam Micro using your Laptop's built in Bluetooth capability

The MallinCam Micro can be controlled over Bluetooth from the MallinCam Micro Extended Control (MMEC) application running on a laptop by using a SIIG TAA-RS-232 Bluetooth Adapter Serial module connected to Zengineering's Standard Serial Cable attached to the Micro's serial port. You will also need a DB9 Male/Male adapter and 5V power for the SIIG module. I use a 5V battery charger for cell phones to power the SIIG.

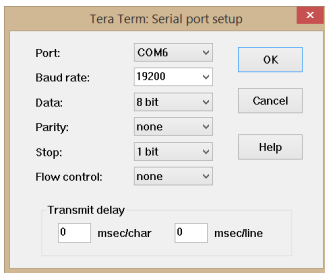


Configuring the SIIG Bluetooth Module

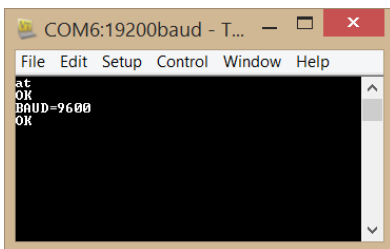
When you unpack the SIIG module, it will need to be configured to work properly with the Micro-EX serial communications. You will need to connect it to your laptop using a USB to Serial adapter as shown below. Be sure its side switch is in the DCE position (toward the SIIG's connector) and 5v power is supplied using the connector on the other side. When you apply power to the SIIG, its red LED should come on and its blue LED should begin blinking.



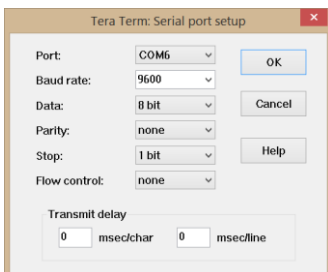
Start a terminal program on your computer, such as Hyperterm or Tera Term. Select the Serial Com port associated with your USB to Serial adapter. Use the terminal program's Serial port Setup to set the program's Baud rate to 19200 so it can communicate using the SIIG default setting.



You should now be able to type commands in the terminal window to change the SIIG's settings. You are going to enter a command to change the SIIG's default baud rate from 19200 to 9600 to match the Micro's 9600 baud rate. Type "at" in the terminal window and press Enter. It should respond with "OK". Now type "BAUD=9600" and press enter. It should again respond with "OK".



At this point you cannot type anything to send to the SIIG because its BAUD rate is now 9600. Use the terminal program's Serial port Setup to change the terminal program's Baud rate to 9600 so it can communicate again with the SIIG module and verify it works at 9600 Baud.



If you type "at" in the terminal window you should now see it respond with "OK", confirming it is working OK at 9600 baud. If it responds ERROR, try typing "at" again, and if it responds "OK" then it is working fine. Close the terminal program and disconnect the USB to serial adapter from the computer. Disconnect the SIIG from the USB to serial adapter as well. Move the switch on the side of the SIIG to DTE (toward the antenna) to complete the SIIG setup. You only have to do this setup once.



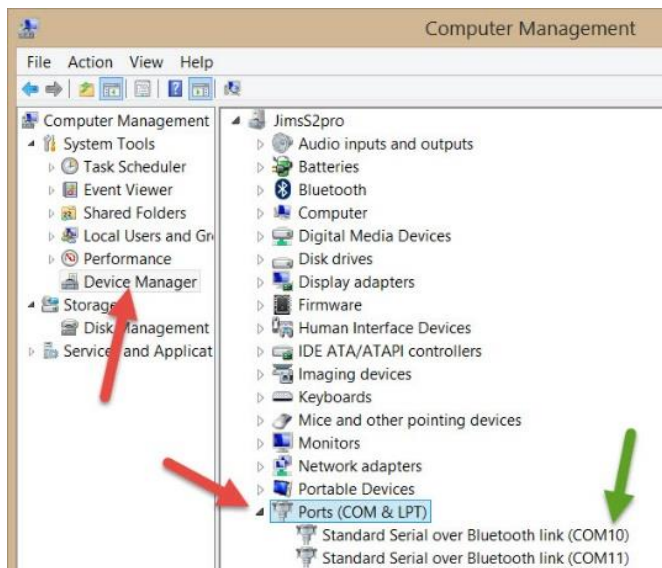
Pairing the SIIG

You are now ready to pair the SIIG to use it with your Micro-EX. Connect the SIIG to the DB9 Male/Male adapter which should be connected to the Zengineering's Serial cable to Micro as shown in the first figure above. Connect the other end of the Serial cable to the Micro's serial connection on the back of the Camera. Connect the video output of the Micro to a display device and apply power to the Micro. Make sure you have the 5v battery connected to the SIIG Bluetooth module and its red LED is on and its blue LED is blinking. Note: when using battery for its power, an easy way to turn the SIIG on is to move the switch on the side to Battery (toward the connector), and turn it off by moving it to Pin9 (toward the antenna).

At this point you need to pair your computer with the SIIG Bluetooth module. You should initially do this with your laptop close to the SIIG Bluetooth module. (Once connected, you can move further away.)

- For Windows 8, select Settings/Change PC settings and select Bluetooth. After a few moments you should see "Serial Adapter" in the list and "Ready to pair" underneath it (be sure to wait until it says Serial Adapter). Click on Serial Adapter and Pair. You will be prompted to enter the passcode for your device. Enter "1234" for the passcode and click Next. It will now show the Serial Adapter as "Connected". Note: on my Microsoft Surface Pro, sometimes it does not auto connect the next time I turn the SIIG module on and I have to click on Serial Adapter, remove it, and pair it again when "Serial Adapter" and "Ready to Pair" appears.
- For Windows 7, go to the Control Panel and select Hardware and Sound. Click on Add a Bluetooth device and click on Serial Adapter Bluetooth Other when it appears. Click on it and enter "1234" when prompted for the device's pairing code. After a few moments it should say successfully added.

Go to the Control Panel and select Device Manager (For Windows 8, it is under Administrative Tools/Computer Management. For Windows 7, it is under Hardware and Sound/Devices and Printers). Click on Ports (COM & LPT) and you should see two entries for Standard Serial over Bluetooth link (COMxx).

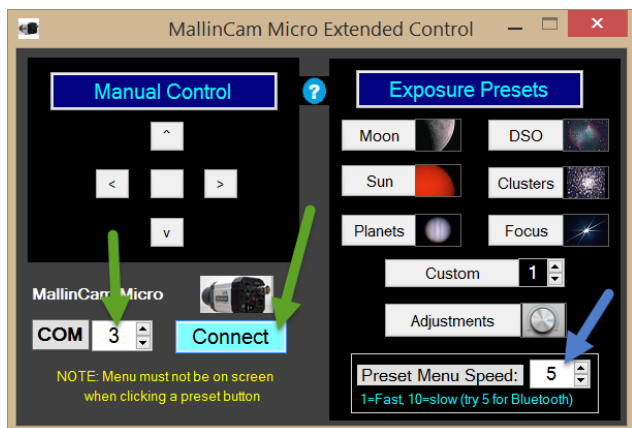


Note the COMxx value for the first entry. This is the one to use for the MMEC COM setting.

Using the MallinCam Micro Extended Application over Bluetooth

Start the MMEC application (and your video display application if you are using one). Set the number next to COM on the main MMEC window to match the value you noted in the Device Manager in the prior section and click Connect. It may take a couple of seconds to connect to Bluetooth. Since the Bluetooth connection adds a little overhead to the communications, I have found the Preset Menu Speed may need to be slowed down for reliable control when using

Presets. Try changing the Preset Menu Speed to 5 whenever you use the MMEC with a Bluetooth connection. Otherwise a Preset command sequence may not complete properly.



Watch the video output from the Micro on your screen and click on the middle Manual Control button. The menu should be seen on the screen (if not, press the real middle button on the back of the camera and make sure the image from the camera is being shown on the display with its menu on screen. Check your connections until you see the menu). Click on the MMEC manual control buttons as needed to exit the Menu. Then click on a preset (e.g. Moon). You should see the Menu selections being changed on the screen. If the Micro on-screen display Menu is still shown on the screen after the Preset finishes, click on the manual control buttons as needed to exit the Menu (to make sure you revert to your previous good settings, be sure to select EXIT, not SAVE/EXIT). Adjust the Preset Menu Speed to the next higher number and try again until you have reliable communications.

At this point the MallinCam Micro Extended Control application works the same as it does with a direct cable connection to the Micro.

Changing back to direct cable connections

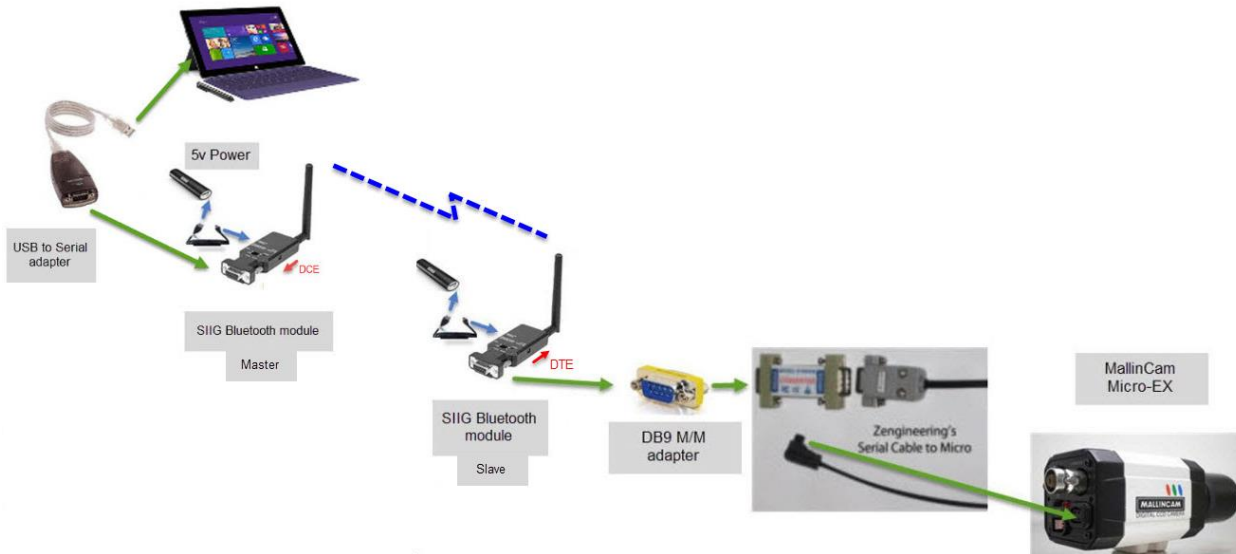
When you change back to a direct cable connection to the Micro using a serial to USB adapter (instead of the SIIG Bluetooth module), you can change the Preset Menu Speed back to a faster speed (e.g. 1). Be sure to also change the Com number back to your normal USB to Serial adapter port number before clicking on Connect.



The Preset Menu Speed and Com number are only things you will have to adjust when switching back and forth between a direct cable connection and a Bluetooth connection.

SECTION B: How to control the MallinCam Micro using a pair of Bluetooth devices

The MallinCam Micro can also be controlled from the MallinCam Micro Extended Control (MMEC) application running on a laptop by using a pair of SIIG TAA-RS-232 Bluetooth Adapter Serial modules, a USB to serial adapter and the Zengineering's Standard Serial Cable attached to the Micro's serial port. You will also need 5V power for the SIIG modules. I use a 5V battery charger for cell phones to power the SIIG. With this setup, the laptop does not have to be configured for Bluetooth - in fact the laptop does not even have to have Bluetooth capability. The pair of SIIG Bluetooth adapters provide a wireless communication link between your laptop and the Micro.



Even though it requires buying two SIIG Bluetooth modules, this setup provides the following advantages over a straight Bluetooth to laptop connection:

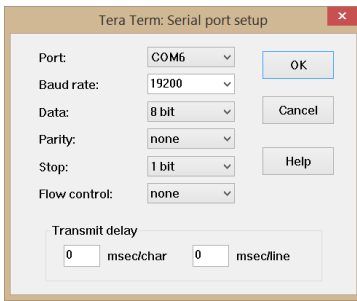
- It is easier to setup (the Laptop does not even “know” it is using Bluetooth)
- Once configured, the two Bluetooth modules automatically connect when turned on
- The dedicated Bluetooth pair provide a longer range wireless communication

Configuring the SIIG Bluetooth Modules

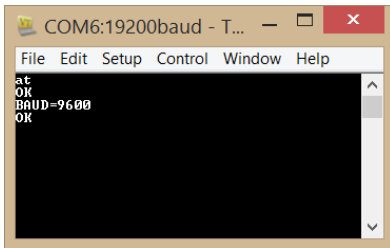
1. When you unpack the SIIG modules, they will need to be configured to work properly with the Micro-EX serial communications and function as a Master/Slave pair. You will need to connect each to your laptop one at a time using a USB to Serial adapter as shown below. Be sure the side switch is in the DCE position (toward the SIIG's connector) and 5v power is supplied using the connector on the other side. When you apply power to the SIIG, its red LED should come on and its blue LED should begin blinking. The switch next to the battery connection should be in the Battery position.



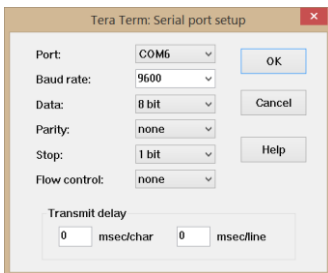
2. Start a terminal program on your computer, such as Hyperterm or Tera Term. Select the Serial Com port associated with your USB to Serial adapter. Use the terminal program's Serial port Setup to set the program's Baud rate to 19200 so it can communicate using the SIIG default setting.



You should now be able to type commands in the terminal window to change the SIIG's settings. You are going to enter a command to change the SIIG's default baud rate from 19200 to 9600 to match the Micro's 9600 baud rate. Type "at" in the terminal window and press Enter. It should respond with "OK". Now type "BAUD=9600" and press enter. It should again respond with "OK".



At this point you cannot type anything to send to the SIIG because its BAUD rate is now 9600. Use the terminal program's Serial port Setup to change the terminal program's Baud rate to 9600 so it can communicate again with the SIIG module and verify it works at 9600 Baud.



If you type "at" in the terminal window you should now see it respond with "OK", confirming it is working OK at 9600 baud. If it responds ERROR, try typing "at" again, and if it responds "OK" then it is working fine.

3. Disconnect the SIIG from the USB to serial adapter. Move the switch on the side of the SIIG to DTE (toward the antenna) to complete the SIIG setup. This will be your Slave device that connects to the Micro's serial control cable. Disconnect power and set it aside for now.



4. Connect the second SIIG module in the same way as described in step 1.

5. Configure it for 9600 baud as described in step 2.

6. After you verify it is working OK at 9600 baud, type "ROLE=M" in the terminal window. It should respond "OK". This will be your Master device that connects to the laptop's USB port the same way it is currently connected. The side switch stays in the DCE position. Leave the terminal program running at this time so you can pair the devices as described in the next section.

Pairing the two SIIG Bluetooth devices

You are now ready to pair the two SIIG Bluetooth devices. Connect the Slave SIIG device to the DB9 Male/Male adapter which should be connected to the Zengineering's Serial cable to Micro as shown in the first figure above. Connect the other end of the Serial cable to the Micro's serial connection on the back of the Camera. Connect the video output of the Micro to a display device and apply power to the Micro. Make sure you have the 5v battery connected to both SIIG Bluetooth modules and their red LED is on and blue LED is blinking. Note: when using battery for power, an easy way to turn the SIIG on is to move the switch on the side to Battery (toward the connector), or turn it off by moving it to Pin9 (toward the antenna).

With both devices on and blinking, type "search=?" in the terminal window. You will see the response from the Slave device and its 12 digit number. Type "connect=nnnnnnnnnnnn" where nnnnnnnnnnn is the 12 digit number from the response of the Slave device. You should see "OK" followed by CONNECT and the 12 digit number in the window. The blue LEDs on each device should stop blinking and remain on. Now type "disconnect". You should see DISCONNECT and the 12 digit number in the window. Now type "AUTO=Y" and you should see "OK". Turn both devices off and back on and they should now automatically connect. Below is what you should have seen in the terminal window during this process (but with your Slave SIIG's 12 digit number)

```
ROLE=M
search=?
Inquiry Results:
Device [1] = Serial Adaptor
0018 DB 010D97
connect=0018db010d97
OK
CONNECT : 0018 DB 010D97

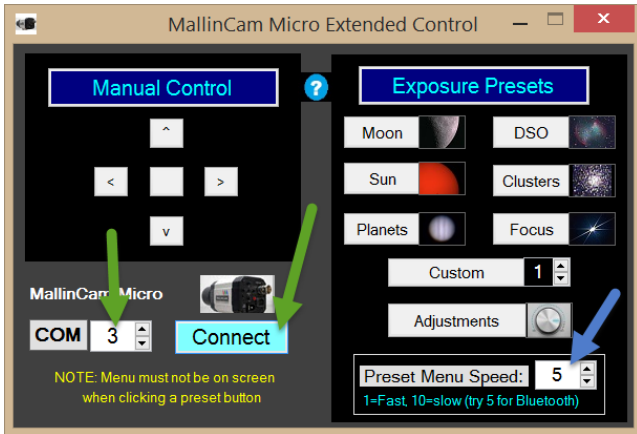
DISCONNECT : 0018 DB 010D97
AUTO=Y
OK
CONNECT : 0018 DB 010D97
```

You can now close the terminal program. The two SIIG devices are now permanently paired (unless you change them) and will automatically connect when both are turned on.

Using the MallinCam Micro Extended Application over the paired Bluetooth link

Next you need to determine the COM port used for your USB to serial adapter. Go to the Control Panel and select Device Manager (For Windows 8, it is under Administrative Tools/Computer Management. For Windows 7, it is under Hardware and Sound/Devices and Printers). Click on Ports (COM & LPT) and note the COM port number. If there is more than one, you can unplug the USB to serial adapter and plug it back in to see which one goes away and comes back. This is the COM port number you will use in the MMEC application.

Start the MMEC application (and your video display application if you are using one). Set the number next to COM on the main MMEC window to match the value you noted in the Device Manager and click Connect. It may take a couple of seconds to connect to Bluetooth. Since the Bluetooth connection adds a little overhead to the communications, I have found the Preset Menu Speed may need to be slowed down for reliable control when using Presets. Try changing the Preset Menu Speed to 5 whenever you use the MMEC with a Bluetooth connection. Otherwise a Preset command sequence may not complete properly.



Watch the video output from the Micro on your screen and click on the middle Manual Control button. The menu should be seen on the screen (if not, press the real middle button on the back of the camera and make sure the image from the camera is being shown on the display with its menu on screen. Check your connections until you see the menu). Click on the MMEC manual control buttons as needed to exit the Menu. Then click on a preset (e.g. Moon). You should see the Menu selections being changed on the screen. If the Micro on-screen display Menu is still shown on the screen after the Preset finishes, click on the MMEC manual control buttons as needed to exit the Menu (to make sure you revert to your previous good settings, be sure to select EXIT, not SAVE/EXIT). Adjust the Preset Menu Speed to the next higher number and try again until you have reliable communications.

At this point the MallinCam Micro Extended Control application works the same as it does with a direct cable connection to the Micro.

Changing back to direct cable connections

When you change back to a direct cable connection to the Micro using a serial to USB adapter (instead of the SIIG Bluetooth modules), you can change the Preset Menu Speed back to a faster speed (e.g. 1). You will not have to change the Com number since you use the same USB to Serial adapter.



The Preset Menu Speed is the only thing you will have to adjust when switching back and forth between a direct cable connection and the two Bluetooth device pair connection.