

## **Extending the reach of the USB-UIRT device using an IR termination block**

### **1. Overview**

Here is a list of the components used to make this work:

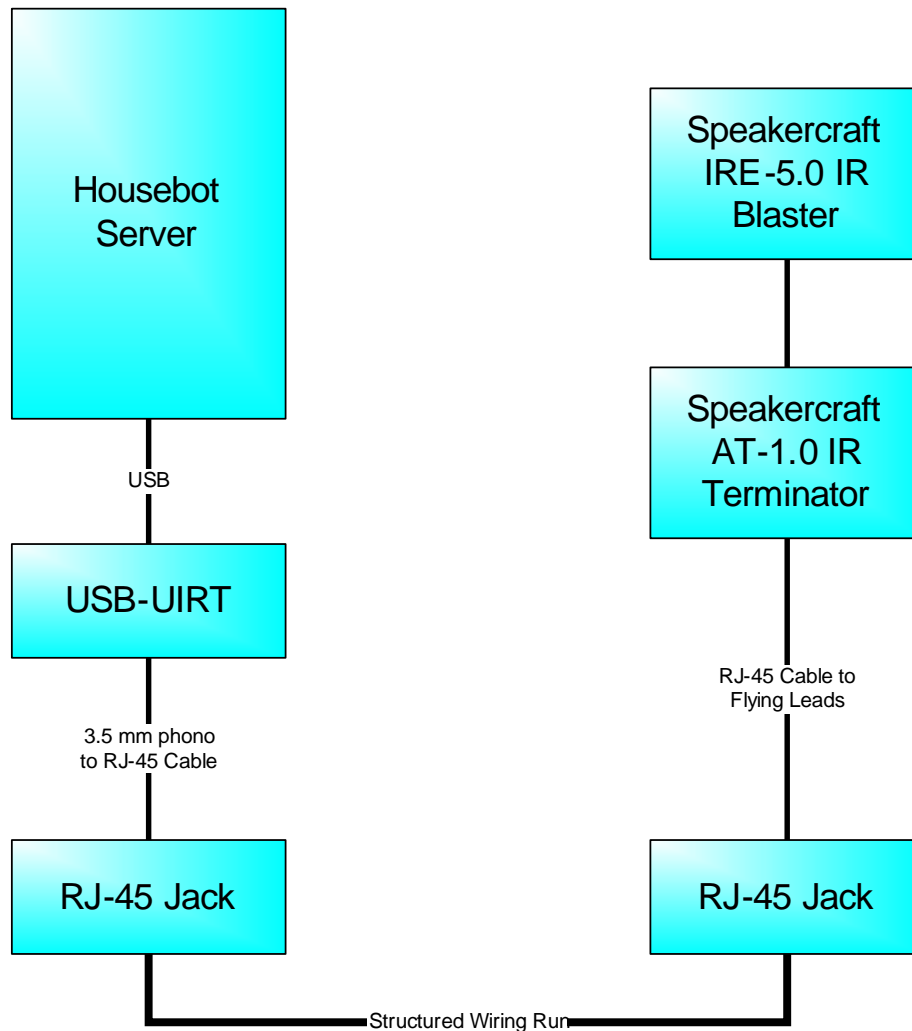
- (1) USB-UIRT (<http://www.usbuirt.com/>)
- (2) AT-1.0 Amplified Terminator
- (3) IRE-5.0 IR Blaster
- (4) PS-1.0 12VDC 200MA regulated power supply
- (5) Custom Cable with RJ45 plug at one end and a 3.5mm phono plug on the other.
- (6) Cable with RJ45 plug at one end and flying leads at the other

Items 2 through 4 above can be purchased at <http://www.smarthome.com>

The idea is to extend the reach of the USB-UIRT to allow it to blast IR signals over extended distances using Cat-5E cabling. The only caveat is that it is not currently possible to receive IR signals over extended distance because the USB-UIRT does not have a phono jack for receiving IR signals.

However, it may be possible to modify the USB-UIRT to add a phono jack for receiving IR signals. I chose not to do this as I do not use the USB-UIRT to receive IR signals, but it is possible because the AT-1.0 amplified terminator is capable of both receiving and transmitting IR signals over extended distances.

My home has structured wiring, which includes Cat 5E network hookups in every room. It is possible to use items #5 and #6 (custom cable assemblies with RJ-45 connectors) to extend the reach of the USB-UIRT. Here is a block diagram of what extending the USB-UIRT connection would look like when complete.

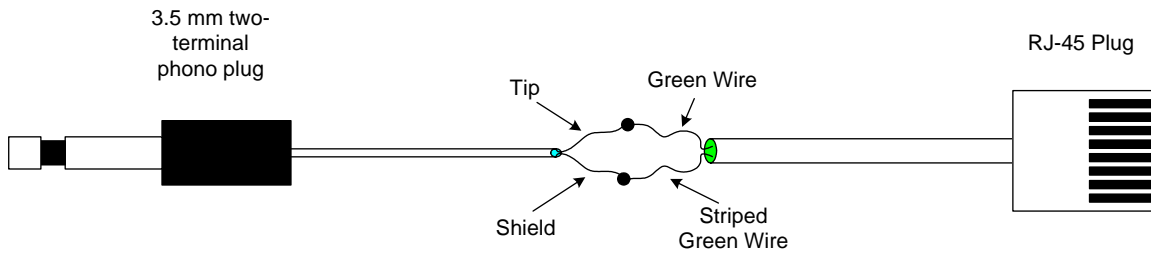


## **2. Cable Assemblies**

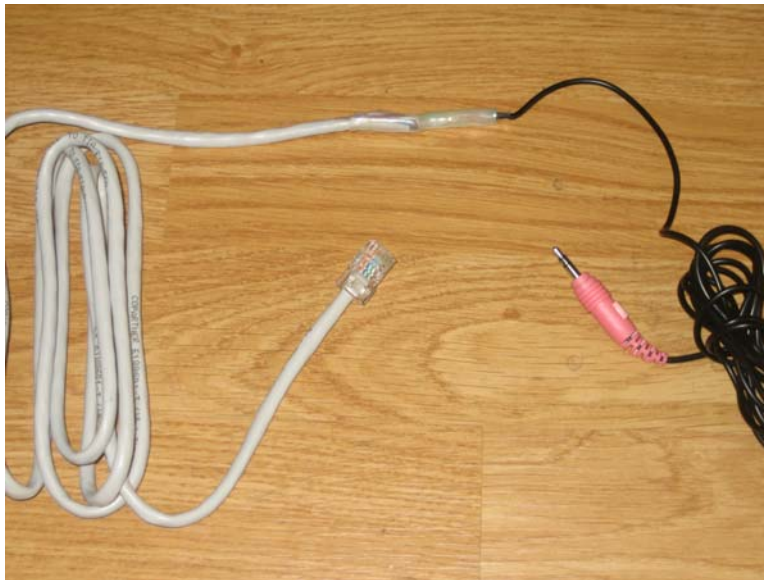
First, make the two cable assemblies you will need. The first cable assembly consists of a cable with a 3.5 mm phono plug at one end and an RJ-45 plug at the other. It will require some soldering skill to make the splice, or twist the wires together. Soldering the connection is preferable. I built my cable assembly by taking a short Cat-5E Ethernet cable and cutting it in half. One half is spliced to an earphone cable (with the earphone piece cut off). The other half of the Ethernet cable was used as the second cable assembly.

### 3. First Cable Assembly (item #5)

Here is the diagram of the first cable assembly:



Here is what the cable assembly looks like when it is completed:



Note that I used a three terminal phono plug. As long as the tip and the base are connected to the two wires in the RJ-45 cable, it will work fine. If you are unsure which wire in the phono jack cable is the tip and the base, usually the outermost wire is the base and the center wire is the tip.

When in doubt, use a multimeter set to resistance mode to double check by attaching the probes to the ends of the wire. If the wire is connected properly, the resistance should measure 0.5 ohms or less. When the cable assembly is complete, double check the continuity of the wire from end to end to ensure that the splice job is good. The multimeter should display 0.5 ohms or less.

It is important that the tip and the plug connections match the second half of the cable assembly. Any two twisted wire pair should suffice so as long as the wire pair is twisted and matches the same color wiring in the second cable assembly.

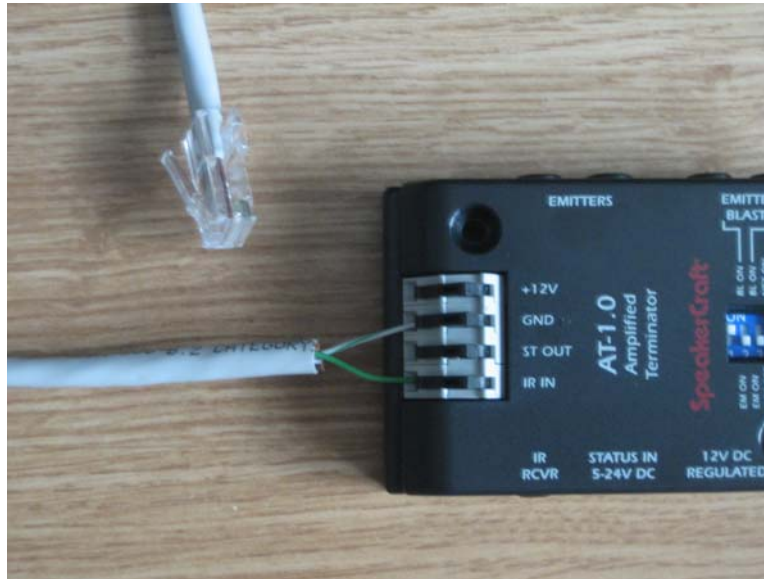
#### **4. Second Cable Assembly (item #6)**

Here is what the second cable assembly looks like. It's just the other half of the RJ-45 cable that was cut in half, with the two leads exposed (green wire and striped green wire). The exposed leads will be used to connect to the AT-1.0 IR Terminating Block terminals.



## 5. Connecting the Cable Assembly (item #6) to the IR Terminator Block

Next, attach the second cable assembly to the AT-1.0 Terminator block. The green wire is connected to the “IR-IN” jack, and the striped green wire is connected to the “GND” jack. Here is what the attached cable looks like:



## 6. Configuring the IR Terminator Block

It is good practice to terminate a long electrical cable run with a resistor to improve the signal quality at the receiving end, especially for fast switching electrical signals. The AT-1.0 terminating block has this termination capability built in, but it is selectable. Assuming that you intend to drive the IR signal over a long run (more than 30 feet), it is recommended that you enable the termination feature of the AT-1.0 terminating block.

The termination is enabled by switching the “NET ON” switch to the “on” position. The following picture shows what it looks like when configured to terminate and to use the increased drive strength for an IR blaster. See the area in the red circle in the figure below.



## **7. Connecting the Cable Assembly (item #5) to the USB-UIRT**

At the Housebot PC, here is what the cable assembly looks like when it is plugged into the USB-UIRT.



## **8. Connecting the USB-UIRT to the Housebot PC**

First, ensure that there is nothing plugged into the RJ-45 jack at the endpoint where the AT-1.0 terminating block plugged into. Next, plug the USB-UIRT USB cable into the PC first. Then, plug the RJ-45 connector into the jack at the starting point of the Cat-5E wiring run.

On the Housebot PC, ensure that the USB-UIRT device drivers are loaded properly and that the USB-UIRT device is functioning within Housebot by sending an IR command. The USB-UIRT will flash its red LED to indicate that it is operating properly when Housebot sends an IR command. Alternatively, you can check the device manager to check for the presence of the USB-UIRT to check to see if it is working properly.

## 9. Connecting the IR Blaster to the IR Terminating Block

Next, at the endpoint of the Cat-5E wiring run where the AT-1.0 terminating block will be located, plug the RJ-45 connector into the jack. Next, connect the power supply and the IRE-5.0 IR blaster. This is what it looks like:



Make sure that the IRE-5.0 is visible to the gear you wish to control via IR. Send an IR command via Housebot and check to see if it the gear responds via IR command received from the IR blaster.

This completes the installation! Enjoy!