

T2-135 and Nuvi 350 modifications.

There are a few different ways to hook up the Nuvi 350 to a Tracker2 (Or T2-135). I will try and cover each of the different ways and the pros and cons to each method.

Since the Tracker2 is a "stand alone" TNC that can be connected to many different radios, I will concentrate on the T2-135 installation that I built as well as the modifications to both the Nuvi 350 and the Alinco DR-135.

Items of importance will be **BOLDED** and/or highlighted in **RED**.  
(Items in green I need to add/fill in/update)

I will write this up as TWO different methods (Easiest and HARD)

**NOTE: The Nuvi 350 is the ONLY GPS that will properly (1/26/09) display stations. The T2 series of TNC's utilize the Garmin FMI protocol (for messaging) and an older Garmin protocol for posting the other APRS stations as waypoints. The other Garmin GPS's do not overwrite the previous station, but instead rename and add new stations, leaving "breadcrumbs".**

Easiest:

- a. Purchase an Alinco DR-135 from a vendor of your choice (WITHOUT the TNC option).
- b. Purchase a Garmin Nuvi350 from a vendor of choice (NOTE: This model is out of production, but still available as factory refurbished from many online retailers).
- c. From ArgentData purchase a T2-135 and a Garmin FMI cable (specify it is for the T2-135).
- d. Install the T2-135 into the DR-135 following the instructions supplied.

Follow the assembly direction and use the directions at  
<http://www.paulsnet.org/nuviv1.pdf>

**NOTE: The most COMMON failure is for people not to follow the directions that the Nuvi MUST be externally powered and the FMI cable installed between the GPS and the T2 when you POWER ON the GPS!!!!**

**HARD: (NOTE: If you find that step "7" – Modify the "Dock Port" is hard, or you can't work with VERY small parts, go no further!!!! The GPS mods are MUCH more difficult!!!!) Replacing a destroyed dock port is MUCH cheaper than throwing away your GPS!**

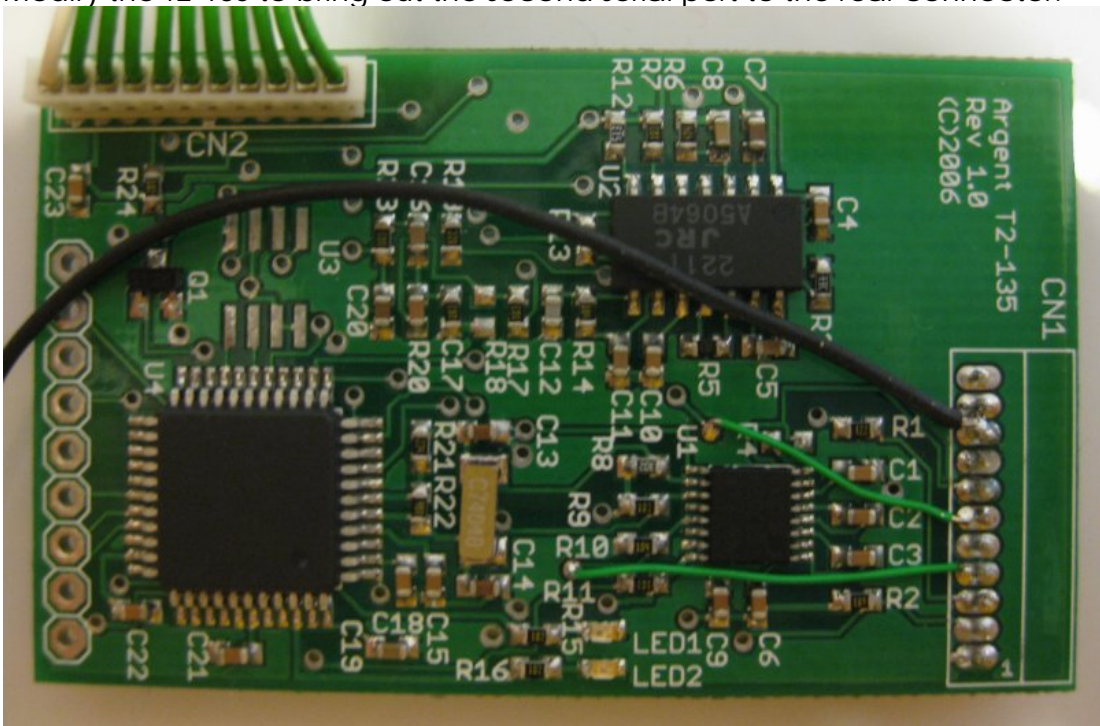
**This modification allows you to install/remove the Nuvi from the Dock port without having to connect/disconnect the FMI cable from the side USB port. It involves modifications INSIDE both the Nuvi, Dock port, and building a custom FMI/T2 cable!**

Supplies and equipment needed:

1. Purchase an Alinco DR-135 from a vendor of your choice (WITHOUT the TNC option).

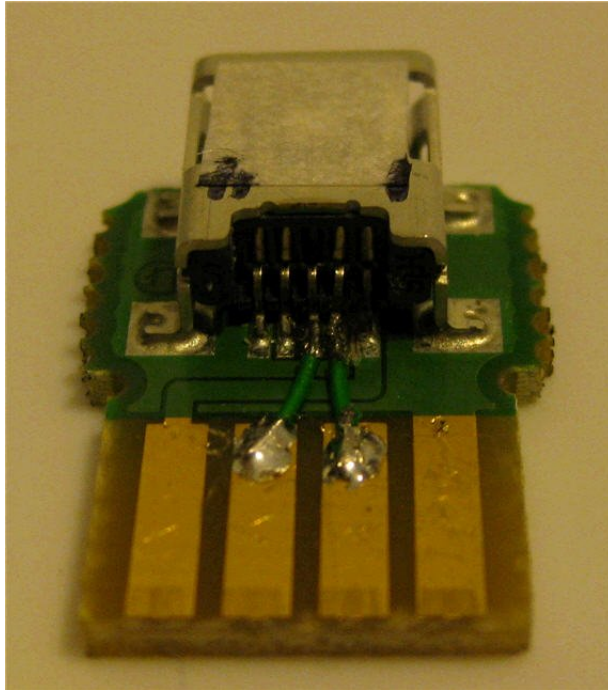
2. Purchase a Garmin Nuvi350 from a vendor of choice (NOTE: This model is out of production, but still available as factory refurbished from many online retailers).
3. From ArgentData purchase a T2-135 and the 5 wire USB right angle connector.
4. The following Generic parts.
  - a. (1) 7805 voltage regulator.
  - b. (1) 1N914 signal diodes.
  - c. (1) DB-9(F) connector.
  - d. (1) DB-9 Hood.
  - e. (2) 1k resistors
  - f. (1) 3.3 v zener diode.
  - g. (1) 8.2k surface mount resistor [7-9k tolerance]
  - h. Small gauge wire wrap wire.
5. While installing the T2, also add the 7805 voltage regulator to supply voltage to the Nuvi (or other GPS). The best location for this is to remove the screw closest to the power input wires on the PA module. Since the case will be properly grounded, you can simply cut the center lead of the 7805. The lead (left) closest to the power input is the power input of the 7805. Connect a jumper between it and the OUTPUT of the 7808 voltage regulator. Cut the YELLOW wire about an inch from the T2-135. Solder the yellow wire to the output lead of the 7805. Add a dedicated ground to pin 5 of the DB-9! This will put regulated 5v on pin 4 of the DB-9 (Same pin as used on TinyTraks and OpenTrackers+).
 

NOTE: In my earlier instructions and in the photos I show a jumper wire to pin 9 of the T2-135 connector. The T2 connector was NOT up to the task of providing almost 1 amp during charging to the Nuvi! I had connector failure on both pin 9, the yellow wire, AND the ground connector (Pin 1).
6. Modify the T2-135 to bring out the second serial port to the rear connector:



This will allow a splitter cable to be built so you can get the FULL second serial port in/out from the back panel connector. (Port B is normally an input only port on the front of the DR-135).

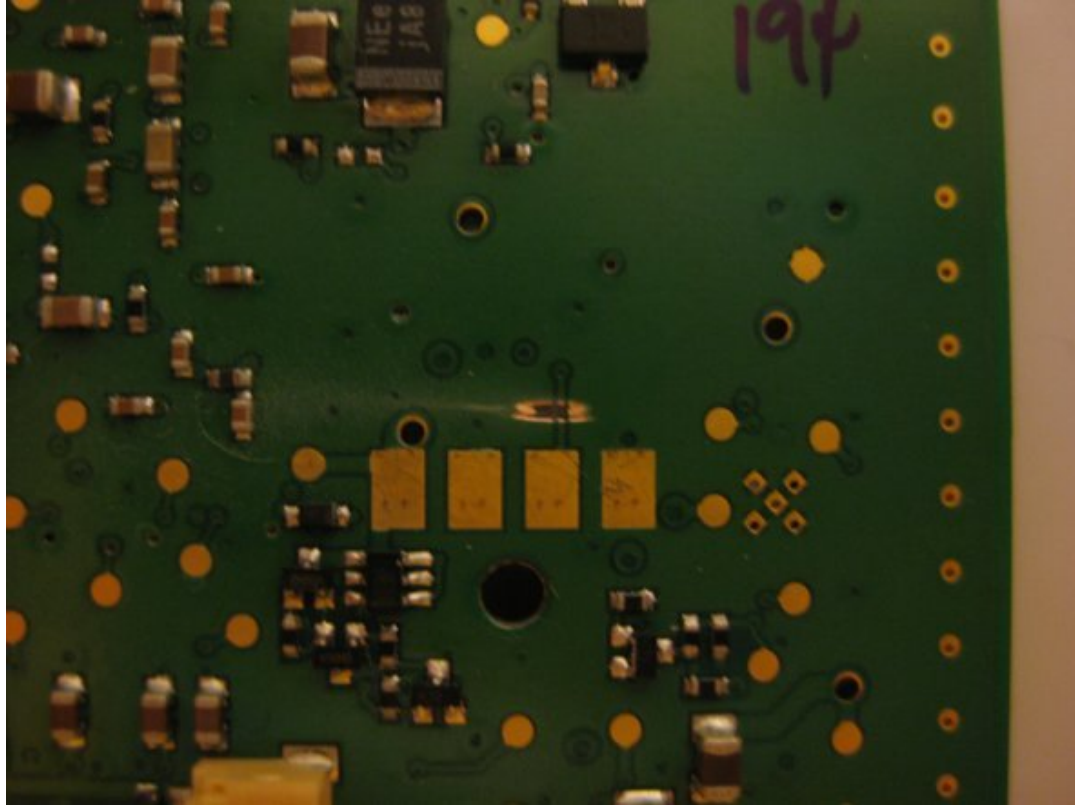
7. Modify the "Dock Port"
  - a. Remove the two small Philips head screws.
  - b. CAREFULLY "split" the housing. There are two plastic "ears/clips" on each of the four sides.
  - c. Remove the USB to card edge adapter. Install TWO small jumpers as shown below.



- d. Re-assemble the dock port.
8. Modify the GPS – **NOTE: IF YOUR DOCK PORT MODIFICATION WAS NOT EASY for you....What you are about to do will be VERY hard!**
  - a. Remove the GPS antenna. (There are two screws under the hinge) The antenna is hinge can best be described as similar to a watch band retainer. It is spring loaded on the "left" side as viewed from the back. You need to "push/slide" the piston INTO the antenna using two SMALL screwdrivers. Rotate the antenna out enough to get to the two small screws in the GPS body. Remove the two screws (T5 Torx). After removing the two screws, remove the "piston" from the GPS antenna and put the antenna back into place (Tape it into place) – THIS WILL PREVENT DAMAGE TO THE RIBBON CABLE!!!!!! (I disassembled my antenna the first time (This added complexity to the job!) – BUT was easier to remove the piston. Moving the antenna to the "in between" detents pushes the piston in most of the way.
  - b. Starting from the top (where the two screws are) work your way around the case to release the plastic "clips". Start from the top and move

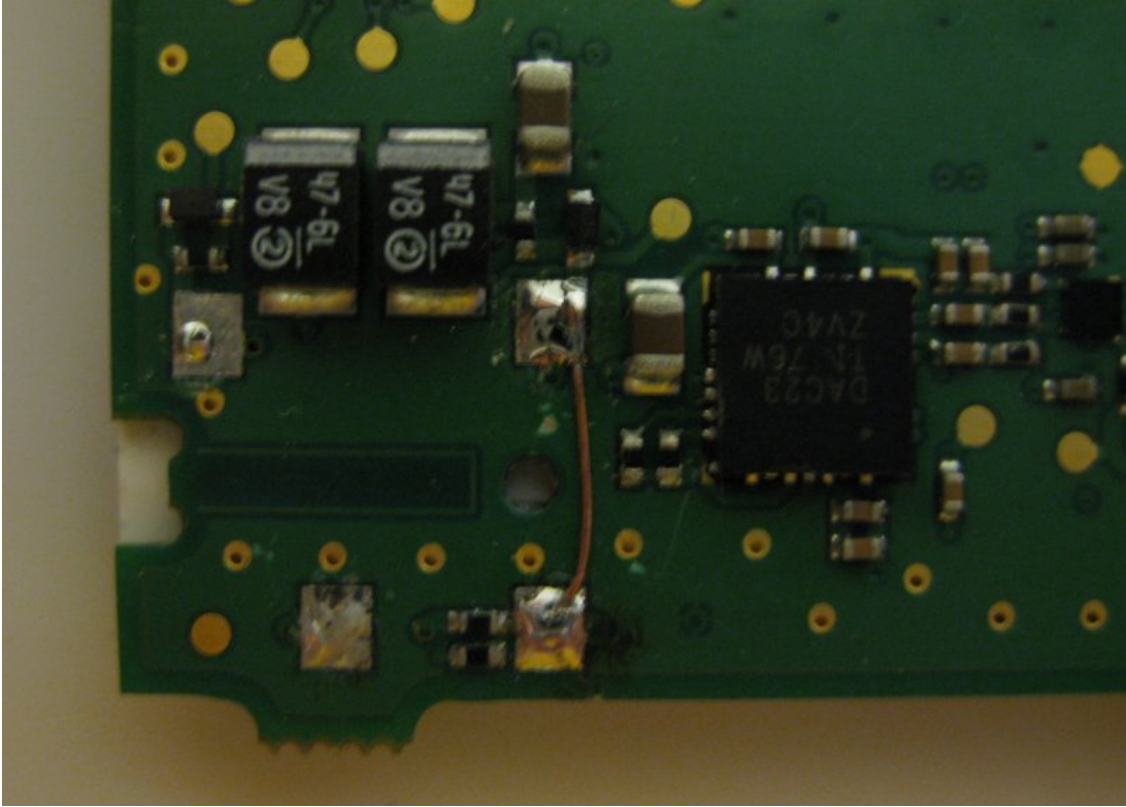
around first to the side OPPISITE of the USB/SD ports. The last side will be the side with the ports, this is the most fragile.

- c. "Hinge" the case halves open and disconnect the TWO ribbon cables (each has a plastic retainer/clamp). One is the display, the other is the antenna.
  - d. Remove the circuit board (Single screw in the middle of the board). (disconnecting the battery and speaker)
9. Cut the trace near the four "dock port" pads. The function of the trace is UNKNOWN!!!!!!! (by me). The other pad is unused (to my eyes). There are small pads near the USB port to attach to.

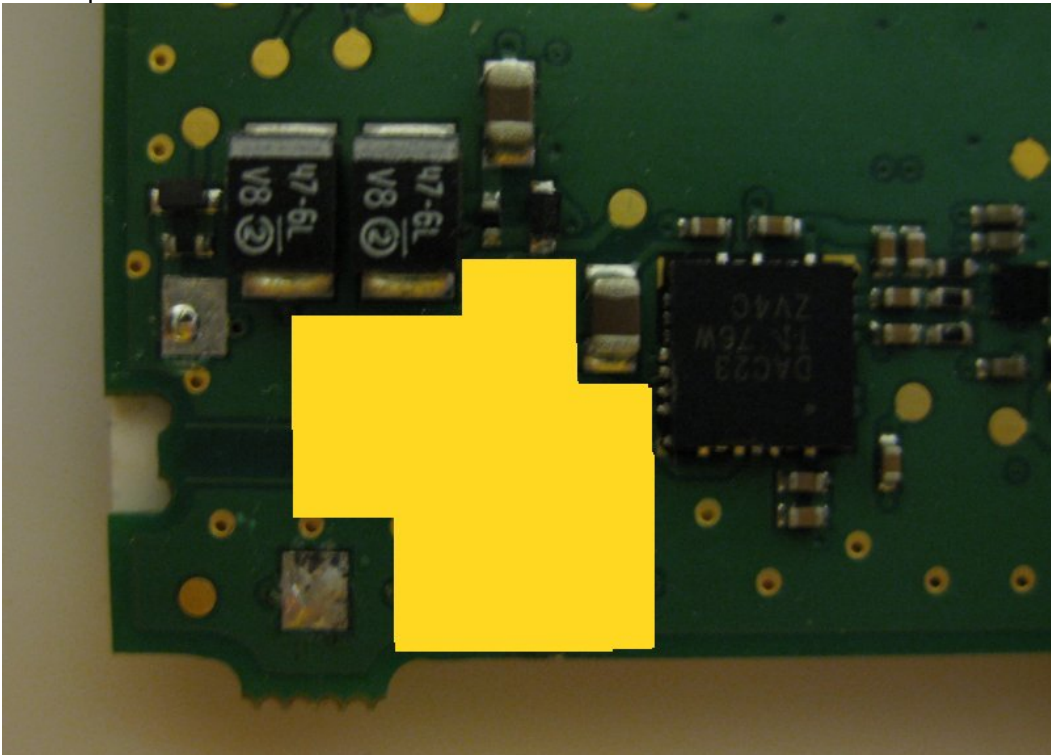


10. Remove the external speaker jack. (Four solder pads hold it on). Install a bridge as shown using a SMALL jumper wire.





11. Cut a small insulator to cover the jumper wire and both pads. (See "Yellow" area of picture below.

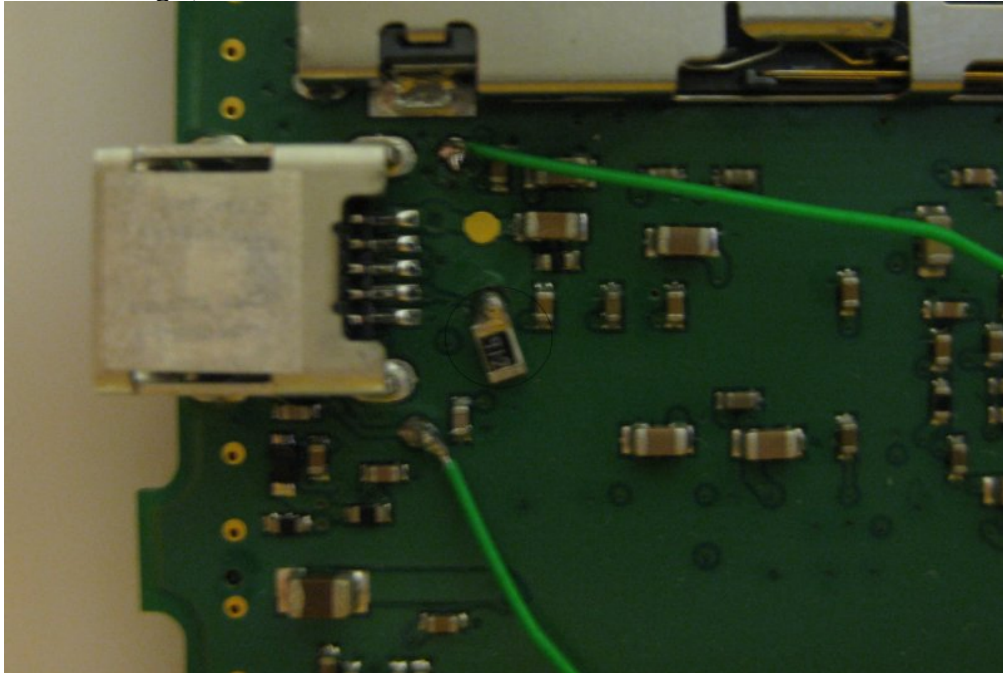


12. Bend the two unused tabs "up" against the plastic of the speaker jack. You will be connecting to them soon!. Cut the lipup "dimple" off the bottom of the

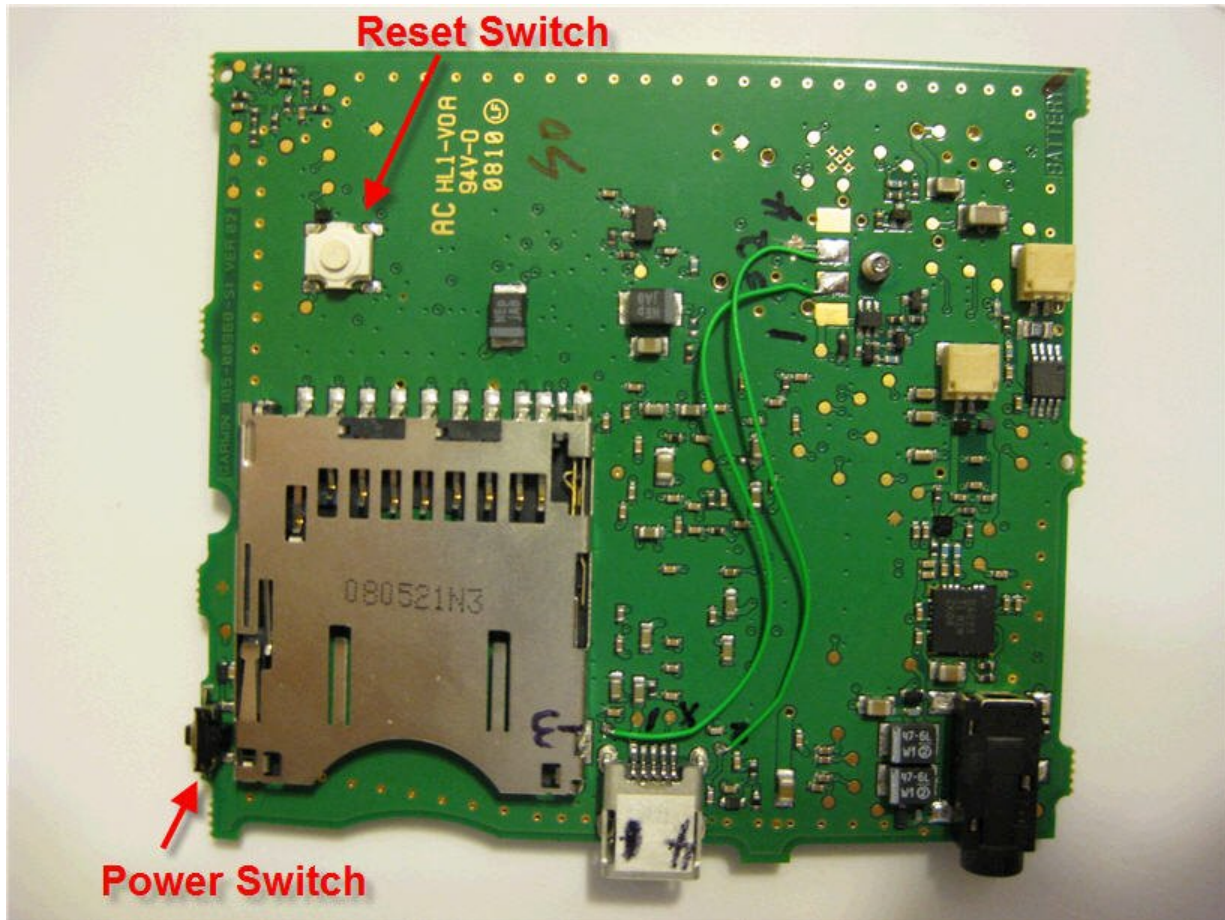
connector. Solder the speaker jack back to the board using only the two remaining solder pads.

NOTE: This modification kills the use of the external speaker jack for an external speaker, BUT makes the jack a switch input. When NO 3.5mm plug is inserted the USB port is in FMI mode. When you INSERT a 3.5mm plug the Nuvi is in USB mode!!! (for connecting to a computer).

13. Install the 8.2k surface mount resistor to pad X near the USB connector. (see image)



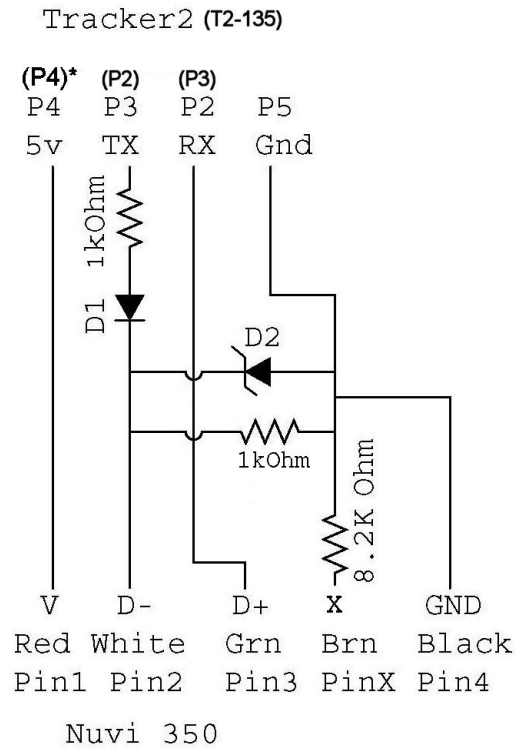
14. Install two jumper wires. (Sorry NO PICTURES!)
  - a. One between one of the unused speaker jack connectors and the surface mount resistor.
  - b. The second between the other unused speaker jack connector and Ground. (Any of the pads around the edge of the board).
15. Install two jumpers between pin 2 of the USB connector and pad 2 of the Dock port connector. The second is from Pin 3 of the USB connector to pad 3 of the Dock port connector.



16. Build a CUSTOM FMI cable that will provide power AND the data signals to the DOCK port (Modified) of the Nuvi350.  
NOTE: The USB port on the side CANNOT be used for testing. The Nuvi is confused if you try it!)  
This cable DOES work! The 8.2k resistor shown is NOT needed since the resistor was added inside the Nuvi in the modification above! Just leave pin X on the cable not connected!

# Homebuilt Tracker 2 to Nuvi Cable

Use 5conductor USB cable from ArgentData



D1 is 1N914 or 1N4148

D2 is 3.3v Zener

8.2k to pin X is not needed if Nuvi is modified.

\* Pin 4 on the T2-135 by default does NOT have 5V - Must be modified.

Prepared by Brad Heaton, KD7QHX

Rev 2.1 - 20 Jan 2009

Based on N1VG design from Tracker2 group.

Modified, tested, and confirmed working  
by KC5EVE

Options:

Alinco DR-135 out of band modification:

Cut the "blue" jumper (JP3) in the control head. Perform a power on reset (Power on while holding the Function key).

Resources:

<http://www.garmin.com>

<http://www8.garmin.com/solutions/pnd/supportedproducts.jsp> (Models that have FMI)

<http://www.argentdata.com/products/tracker2.html> (ArgentData T2 page)

[https://www.argentdata.com/catalog/product\\_info.php?products\\_id=111](https://www.argentdata.com/catalog/product_info.php?products_id=111) (USB 5

Conductor pigtail)

<http://www.paulsnet.org/nuviv1.pdf> (excellent Howto!)



Alinco NOTES:

How to get the radio into "narrow" mode:

How to reduce the power consumption:

- a. Option1: Turn the display to "dim"
- b. Option2: Remove resistor (R84) in the control head. This will change the backlight "dim" mode to NO BACKLIGHT. (High will not be any different – Bright!)

Nuvi 350 NOTES:

- a. Power on while holding finger in the bottom right corner will prompt for a full reset (Or press the reset button on the back of the unit).
- b. Press the signal strength (upper left) on the nav screens to see the sat. constellation.
- c. Press the
- d. The resistor used in the USB port between 4 and X enables different modes of the USB port.
  - a. (None) – USB port is a USB port – connect to a computer.
  - b. 8.3k – Routed power OUT of the USB port – Enables TTL levels.
  - c. Xx.xk – Power connector only (for charging)
  - d. (Short) – USB port is a USB port – Many USB cables have this shorted.



**Pins 4 x 3 2 1**

