

# μSmartDigi™ Digipeater Getting Started Guide

The μSmartDigi requires no assembly itself but must be installed in a TNC-X that contains an LM7805 voltage regulator. TNC-X kits from Coastal ChipWorks (<http://www.tnc-x.com>) may come with a low-current LM78L05 voltage regulator that must be replaced to use the μSmartDigi. Caution- the μSmartDigi draws 100-200 mA that will damage the low-current regulator! You **must** use the LM7805! You also **must** mount the LM7805 in contact with the TNC-X enclosure to serve as a heat sink or add your own heat sink!

You will need to decide whether you will use a GPS unit, an ASCII Monitor, like HyperTerminal, or none of these. This use dictates how the μSmartDigi Serial Configuration Jumpers at J3 will be configured. J3 provides means to connect the μSmartDigi serial port to the TNC-X Main serial connector (DB-9R) or optional USB, the Aux serial connector (3.5 mm stereo jack), or split between them. Your TNC-X may have an optional USB module that is configured to replace the Main serial connector. The following table shows how to select the jumpers. An abbreviated table can be found near J3 on the μSmartDigi PCB.

**Serial Port Configuration Table**

Function	μSmartDigi Receive	μSmartDigi Transmit
GPS or Monitor on Main/USB connector	Jumper J3 Pin 1 to Pin 2	Jumper J3 Pin 4 to Pin 5
GPS or Monitor on Aux connector	Jumper J3 Pin 2 to Pin 3	Jumper J3 Pin 5 to Pin 6
Monitor on Main/USB connector and GPS on Aux connector (split)	Jumper J3 Pin 2 to Pin 3	Jumper J3 Pin 4 to Pin 5
GPS on Main connector and Monitor on Aux connector (split)	Jumper J3 Pin 1 to Pin 2	Jumper J3 Pin 5 to Pin 6

To select between the Main connector and USB install jumper at JP3 for Main and remove for USB on the TNC-X board. To download Configurations, Rules or Firmware from a PC or laptop you can use any of the 3 connectors. The Main offers a standard DB-9R to connect to a standard RS-232 serial PC cable and the USB directly connects to the computer with a USB cable. The Main DB-9R is DCE and requires a “straight” PC cable. Jumper J3 either Main/USB or Aux for both Transmit and Receive for Downloading.

The PC or laptop Configuration Utility software, as well as μSmartDigi firmware updates and documentation, can be downloaded from <http://usmartdigi.com>. The Configuration Utility is a Windows (95,98,98SE,ME,2000,XP) console program requiring no installer. Simply download this program and execute it. You can use the μSmartDigi without any Configuration or Rules configured by relying on the defaults.

## Step-by-Step Instructions

1. TNC-X already assembled- Remove all power to the TNC-X, disconnect all cables and remove the PCB from its enclosure. If you have used the LM78L05 regulator you will need to replace it with the LM7805. Desolder and remove LM78L05 (U6). Clean out the holes.
2. Install the 7805- Drill a  $\frac{9}{64}$ -inch hole in the enclosure base,  $\frac{1}{4}$  inch from the front and  $\frac{9}{16}$  inch from the left side (looking from the front). Deburr the hole on both sides. Cut 3 wires about 3 inches long, remove the insulation from the ends and tin them. Cut 3 short pieces of heat-shrink tubing (or use electrical tape) and place over the wires. Solder the 3 wires to the 7805 and secure the heat shrink over the soldered legs or tape them. Observing the 3 terminal assignments, solder the other wire ends to the 3 holes in the PCB. Apply some silicone heat sink grease to the 7805, reassemble the PCB into the enclosure and secure the 7805 to the TNC-X base with a screw, lock washer and nut.
3. Remove both jumpers from the Expansion Header of the TNC-X. On older TNC-X this is J1, on Version 2 it is JP5. Jumper the TNC-X to 19200 baud (remove JP1 and JP2). **You must install the TNC-X jumper JP4 on pins 1&2 because the USB cannot supply enough current to power the μSmartDigi.**
4. Remove the protective tape from the foam adhesive on the bottom of the μSmartDigi PCB. Install the PCB aligning the TNC-X 8-pin Expansion Header with the 8-pin socket on the bottom of the μSmartDigi. The μSmartDigi only fits one way without extending outside the TNC-X PCB. Press on the μSmartDigi PCB to set the foam adhesive.

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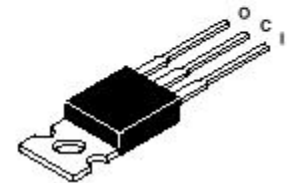
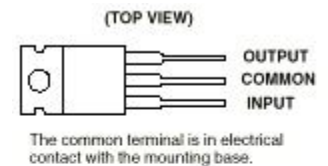
- Install the 2 jumpers removed in Step 3 on the µSmartDigi at J3 according to the Serial Port Configuration Table.
- Connect an ASCII Terminal, PC or laptop serial cable using HyperTerminal or similar interactive device to test and configure µSmartDigi. Make sure your terminal or terminal emulator is ready and set it to 57600 baud, 8 bits, no parity and 1 stop bit (8N1), Send line ends with LF (nl), Local Echo, No Flow Control. This terminal will be referred to as the µSmartDigi Monitor.
- Apply power to the µSmartDigi/TNC-X. You should see the following prompt:
 

```
uSmartDigi          Version 2.x          by Rich Painter, ab0vo
Copyright 2004-2007 Painter Engineering, Inc.  usmartdigi.com
Enter <ctrl>-c for Host mode or Enter nothing for Monitor mode.
Error: Station Call Sign has not been set!
Please set it now.
Waiting for 20 seconds...
uSmart>
```
- Enter your Station Call Sign:
 

```
uSmart> call <your_call>
```
- Commands are terminated with the Enter key. Type a ? to display the help. Typing *dconf* will display the default configuration. Modify your Configuration and Rules as needed.
- Connect the TNC-X to your radio system. On the µSmartDigi Monitor enter the command *tnc* to enable the TNC operation and continue monitoring the µSmartDigi operation. When the TNC-X receives a packet it should be displayed on the µSmartDigi Monitor with its *Pass* or *Drop* repeater disposition. A *Pass* should result in the TNC-X repeating this packet.

## Default Configuration (partial list)

Parameter	Setting	Meaning
call & SSID	NOTSET & 0	No call or SSID are set
position Lat	39.028084	Latitude
position Lon	-104.66900	Longitude
beacon	600	Sends beacon every 600 seconds
bcomment	NOTSET	Beacon comment is empty
havegps	no	No GPS is expected to be connected
log	yes	Logging is enabled to Monitor port
nonaprs	no	Do not repeat without valid position
host baud	57600	Initial baud rate
gps baud	4800	Initial baud rate
tnc baud	19200	Initial baud rate
widemax	3	Maximum WIDEn: $n \leq 3$
widetotal	6	Total WIDEn: Sum of $n \leq 6$
dupewin	28	Dupe check window is 28 seconds
relaydrop	disabled	Allow RELAY in path
implicit rule	pass	Pass with no other rules configured



LM7805 Regulator

I is pin 1  
C is pin 2  
O is pin 3

Please visit <http://usmartdigi.com> for more information and product updates. Send product suggestions and bug reports to [painter@usmartdigi.com](mailto:painter@usmartdigi.com).

Thanks for purchasing a µSmartDigi!

Rich Painter, AB0VO  
Painter Engineering, Inc.

Firmware Shipped Version \_\_\_\_\_