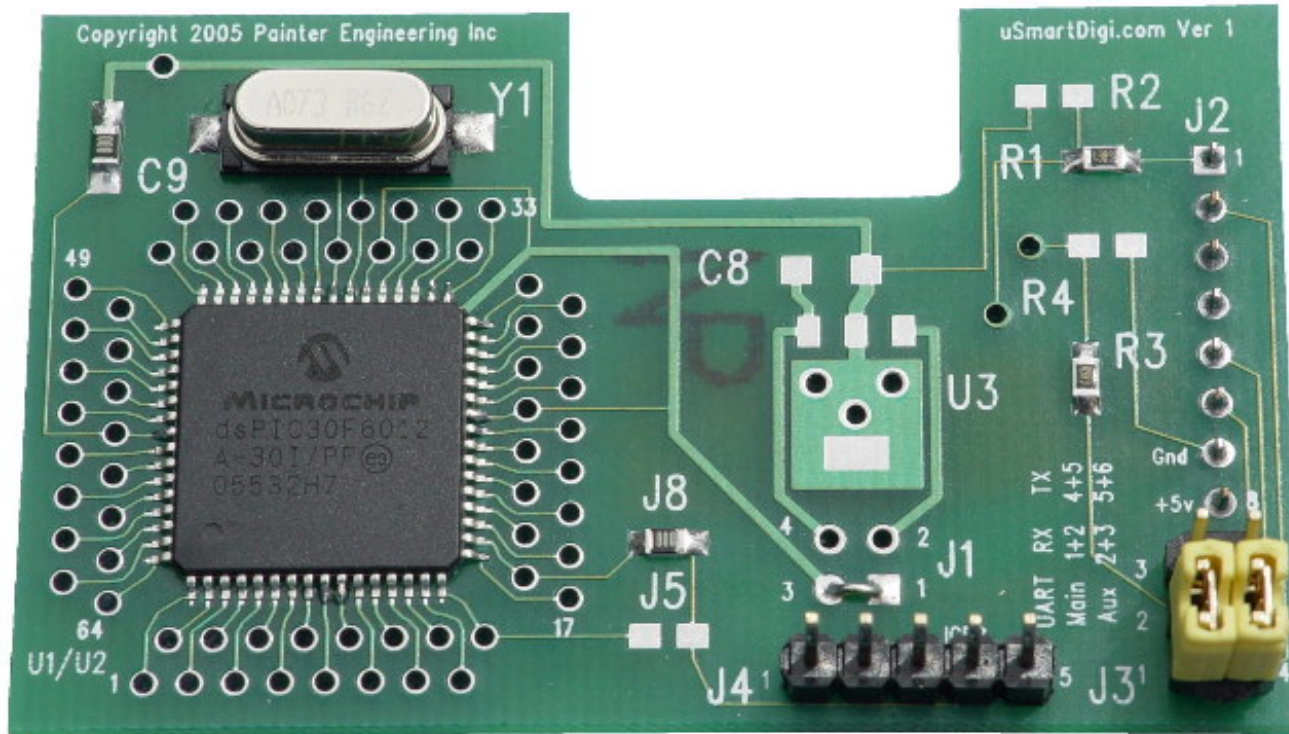
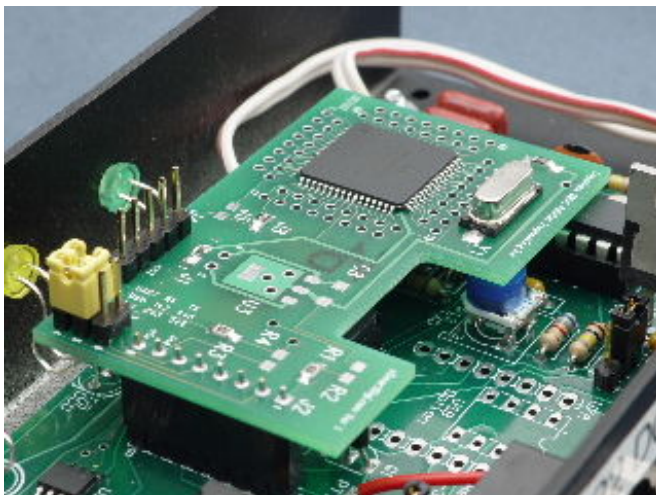


Introducing the μ SmartDigi™ APRS® Digipeater and μ SmartDigi™ D-Gate™ D-STAR Gateway

A postage-stamp-sized DSP microcontroller imbedded
in the TNC-X eliminates the dedicated laptop or PC.



μ SmartDigi expansion board for the TNC-X
(Actual board size is 1.46 in. x 2.4 in.)



Click [HERE](#) for more photos of the voltage regulator mounting methods.

Note- All international shipments will be by the new US Postal Service International First Class Rate. If you want some other method please contact me PRIOR to placing your order!

Order μ SmartDigi APRS Digipeater or D-Gate NOW!

The μ SmartDigi and TNC-X can be ordered by selecting the links below. These use John Hansen's PayPal Shopping Cart for your convenience. You can also obtain more information or order the TNC-X directly from tnc-x.com. John will ship you the TNC-X products and I will ship you the μ SmartDigi and integrated TNC-X. Under certain conditions I may ship your μ SmartDigi to John for incorporation with his shipment to you.

	US\$67	μ SmartDigi APRS Digipeater (USA Purchases- includes S&H&Insurance) <i>Note: This requires a TNC-X.</i>
	US\$75	μ SmartDigi APRS Digipeater (Non-USA Purchases- includes S&H&Insurance) <i>Note: This requires a TNC-X.</i>
	US\$67	μ SmartDigi APRS D-Gate for D-STAR (USA Purchases- includes S&H&Insurance) <i>Note: This requires a TNC-X.</i>
	US\$75	μ SmartDigi APRS D-Gate for D-STAR (Non-USA Purchases- includes S&H&Insurance) <i>Note: This requires a TNC-X.</i>
	US\$78	TNC-X Kit Assembly, Integration and Testing with μ SmartDigi (includes case mounting the 7805 V-regulator) <i>Note: This requires a μSmartDigi and TNC-X.</i>
	US\$48	TNC-X rev 2.4 Kit without enclosure or USB (USA Purchases - plus S&H)
	US\$52	TNC-X rev 2.4 Kit without enclosure or USB (Non-USA Purchases - plus S&H)
	US\$20	USB module with Socket configured for TNC-X <i>Note: This module will only work with revision 2.2 to 2.4 boards.</i>
	US\$15	TNC-X rev 2.2 Custom Drilled Enclosure for TNC-X <i>Note: This enclosure will only work with revision 2.2 to 2.4 boards.</i>

μ SmartDigi News and Updates!

5 March 2008 - μ SmartDigi D-Gate 2.2 is released! The long-awaited updates are done! I have taken a number of the enhancements that are in the Digi and put them in the D-Gate. Now you do not have to cycle the power to perform firmware flashing and config and rule downloading. It also supports the new GPS-A Mode. Other features such as fully configurable beacon, rate limiting all packets and the *serialtest* have been added too.

2 March 2008 - μ SmartDigi 2.7 is released! Now you do not have to cycle the power to perform firmware flashing and config and rule

downloading. It also has a new feature for rate limiting all packets. To aid users in testing their serial ports used with μ SmartDigi a new command *serialtest* has been added to the PC Host Utility. The new rule features are being worked on and will be released in version 2.8 as soon as possible. Thanks go to Peter Martin for all his help in testing 2.7!

6 December 2007- Due out shortly is Digi version 2.7. This is being beta tested now and has eliminated the requirement for the power cycling to perform the firmware flashing and config and rule downloading. It also has a new feature for rate limiting all packets. This release *may* also have a new drop rule heuristic. This rule will recognize packets with lat-lon that are to be dropped from the normal geo rules and then later drop packets from the same source call which don't have the lat-lon.

5 November 2007- Digi version 2.61 and 2.62a were made to provide a more flexible download configuration in that you now don't need to first set the Call Sign in order to download configurations. Several printf() problems affecting the displaying of the configuration and rules were also fixed. Version 2.62 was made to set the DEFAULT host serial port speed to 19,200 baud. Some users were having problems with the initial setting of 57 kbaud. You may experiment and set the baud to whatever seems to work for downloading configs and rules, which is the most taxing on the PC host.

26 August 2007- Digipeater update 2.6 is ready! This has a number of enhancements. A new command *uitrace* has been added to enable and disable the UITrace feature for digipath debugging. It can be downloaded with other config commands or entered directly to the console monitor. A monitor-only command *debug* has been added. It is volatile since it is not saved in EEPROM. Debug enables a detailed decoding of the incoming packet and is displayed on the console monitor. This will assist you in reporting any problems. An *altitude* command has been added in preparation for the change to the Beacon format. Four other changes were made: 1) don't repeat your own beacon, 2) back-space key deletes previous character entry for the console monitor (cursor is moved but the display is NOT updated), 3) all of the path elements are now counted for comparison with the WIDEMAX and WIDETOTAL config parameters, and 4) a "path correction" has been implemented.

Some APRS sources produce bad path elements that violate the APRS spec. The "path correction" was implemented where it could be determined that a digipath element with say WIDE2-0 had an H=0 bit (in the AX.25 HDLC structure). If this path element was preceded by an unambiguous, unexhausted path element then the current hop count would be "corrected" to WIDE2-2, for example. Without this, it MUST NOT be repeated with the current hop count being zero (-0) even though H=0. Prior to this 2.6 release if an element had a -0 and H=0 it was summarily dropped.

I'm considering changing the names of WIDEMAX and WIDETOTAL, maybe PATHMAX and PATHTOTAL or HOPMAX and HOPTOTAL, since this is more descriptive. Let me know if you DON'T want this changed for some reason or would like some other names.

5 August 2007- I have discovered a Main serial port flashing problem on recent TNC-X containing the USB option module. This is not an issue during normal operation nor with the Aux serial port. The problem happens when the USB is not connected to a host computer (ie. the module is not powered) and you are attempting to flash firmware using the Main Serial port. The flash may fail at the start.

I have created an updated for the Digi PC Utility 2.52 to help identify this condition. If you have the USB option and you want to use the Main serial port for flashing then the workaround is to do one of the following: connect the USB cable to a host OR remove the USB chip in the TNC-X. If you have the USB you are likely to use it to do the flashing. In this case there is no problem. Please report any problems like this and your results with this workaround.

24 July 2007- The 2.52a update uses the "#" Digi symbol for the Beacon by default.

19 July 2007- The 2.52 update uses the "In Service" MIC-E message format for the Beacon. Also, the USB drivers have been updated on the Linx site. See the USB Driver section below.

11 July 2007- The 2.51 update uses the MIC-E message format for the Beacon.

1 July 2007- The 2.5 update contains the Beacon Icon command and Configuration Parameter. See the descriptions below.

A rare problem has been discovered with some TNC-X RS232 chips from ST Microelectronics. Only a few of the chips in the field appear to have this problem. The problem only impacts using the serial port (not the USB port) when flashing the μ SmartDigi firmware. This flashing is done immediately after doing a power reset. If you use USB as most people do then you won't be affected. If you use the serial port and have problems flashing new firmware then contact me so I can assist you in diagnosing the problem. If it is confirmed this is the cause, a new RS232 chip will be sent to you. Alternatively, you can send me the entire μ SmartDigi+TNC-X and I will diagnose and fix it.

17 March 2007- The Digipeater has been updated with a number of features that have been planned and some that were requested by users. Version 2.4 has added Beacons and support for digi path name styles such as SSn-n. A *digipath* command has been added to the Monitor to allow changes to the Digi Path without the PC Utility. Likewise *beacon* and *bcomment* commands have been added to the Monitor and Configuration file for Beacons.

Another change that will affect you is the *relay* command. It has been changed to *relaydrop* to improve clarity in both the Monitor and Configuration file. The significance here is that the drop-pass notion has reversed its logic. Setting *relaydrop* y (enabling) will cause packets to be dropped if they contain RELAY in Digi1. The abbreviated command *relay* still works but acts as *relaydrop* now so you will have to edit your Configuration files to reverse the logic from previous versions.

Setting *beacon* 0 disables Beacons. Beacons can be set for 10 to 65,535 seconds. Now you will be required to enter a Call Sign. If you do not do this with the PC Utility you must do it with the Monitor before it will operate. Likewise, you will be required to enter a Digi Path if you enable Beacons.

Another new feature is the addition of APRS Software Version TOCALLs specific to μ SmartDigs. Our version identifiers are of the form APnnnU. See [APRS Software Versions](#) for specifics.

A side effect of these additions was the need to reduce the maximum number of Rules that can be configured to 50 from 100 due to on-chip memory limitations. This should not affect anyone since the 100 limit was likely excessive anyway.

Previews of Upcoming Changes

Here is a list of changes I'm working on. Please send me your suggestions and ideas. Be as specific and detailed as possible so I can spec out the implementation.

- Add two new modes: 1) KISS passthrough monitoring (only incoming packets are sent to the host port) and 2) full KISS mode (just as if the uSmartDigi wasn't installed)
- D-Gate support for GPS-A mode (in test now!)
- Use MIC-E for Beacons for the D-Gate (already in the Digi)
- Add support for multiple, switchable configurations
- Implement a method for remote configuration and possibly firmware updates

TNC-X Update!

John has recently changed the PCB for the TNC-X. Units shipping now contain this revised PCB. The revision changes TNC-X jumper JP3.

Pre December 2006 Rev 2.4 Revisions

Prior to this revision JP3 was a 2-pin jumper that enabled (jumper IN) the RS232 input and disabled it (jumper OUT). In these older PCB the USB serial input to the TNC was hardwired. So if you don't have the USB you simply install the JP3 jumper. However, if you installed the USB it **had** to be the serial input since it was hardwired and you **had** to remove the JP3 jumper. If you wanted to use the RS232 for input you had to remove the USB cable or the USB module itself.

December 2006 Revision 2.4

The latest PCB revision changes the JP3 to a 3-pin jumper. This allows you to have the USB module installed and USB cable active while still using the RS232 for input. It also provides output to both ports simultaneously. The input is controlled by JP3. Install the jumper on the 2 pins closest to the USB and the USB is used for input. Alternatively, install the jumper on the 2 pins closest to the MAX RS232 chip and the RS232 is used for input.

µSmartDigi APRS Digipeater Technical Stuff

Special Note for both Digi and D-Gate

When powering the µSmartDigi-TNC-X with input voltages above 9 volts DC you will need to either add a heat sink to the 7805 voltage regulator or relocate the regulator to use the TNC-X metal enclosure as a heat sink. You may use the PCB-mounted 7805 without a heat sink if you are using an input from 7.5v to 9v DC. This is the preferred method since the TNC-X PCB can be serviced without removing or unbolting the regulator. The PCB hold-down screws and DB9 screws can be removed and the PCB can be rotated upward. Here are the instructions for mounting the 7805 to the metal enclosure.

1. Remove the 7805 from the PCB. If you find it too difficult to unsolder it just cut the 2 inboard legs and desolder the remaining leg. Then clean the first 2 holes. There is plenty of leg left to solder wires to in Step 4.
2. Drill a 9/64-inch hole in the enclosure base, 1.25 inch from the front and 9/16 inch from the left side (looking from the front). Debur the hole on both sides. This hole is located such that the PCB will not cover it making it easy to install the regulator.
3. Cut 3 wires about 3 inches long, remove the insulation from the ends and tin them.
4. 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.
5. Observing the 3 terminal assignments, solder the other wire ends to the 3 holes in the PCB.
6. Apply some silicone heat sink grease to the 7805 and secure it to the TNC-X base with a screw, lock washer and nut.

An alternate method is to mount the regulator on the PCB in the normal location and construct a right-angle bracket of aluminum where it is then bolted to the case. This method is not convenient for servicing the TNC-X since it must be removed from both the case and regulator.

Photos for the mounting of the regulator are [HERE](#).

The μ SmartDigi, an expansion board to embed in Coastal ChipWorks' TNC-X produced by John Hansen, eliminates the host computer (PC, laptop, etc.), eliminates duplicate packets and filters any packet with advanced rule-based controls. These features offer unprecedented control, flexibility, portability and low-power use at a low cost in a tiny package. This will especially benefit amateurs to quickly and easily deploy a custom configured APRS repeater for emergency service. Different functional products are based upon this foundation platform.

The first products are the μ SmartDigi APRS Digipeater and the μ SmartDigi D-Gate Icom® D-STAR Gateway.

Features

Features	Benefits
Tiny Size- It plugs into the TNC-X and fits within its case.	Self contained in TNC-X. Very Portable. Easily fits in a vehicle.
Low Power Consumption (typical 130 mA, maximum 220mA)	Battery Operation.
Performs Duplicate Packet checking based on the Source, Source SSID, Destination and Info Fields Only!	Correctly eliminates repeating of Duplicate Packets after filtering.
User Configurable Rules for Packet Filtering with a rich set of parameters.	Precisely control Repeater Traffic, especially for emergency service operation.
User-Configurable settings for limiting the WIDE and WIDEn counts in the VIA Path.	Provides Repeater Operators better control over malformed paths.
GPS RS-232 Serial Interface for connecting a GPS unit.	Provides automatic location or supports mobile operation.
Configure Configuration and Rules once with a PC or Laptop. Saved in EEPROM.	Completely computer- and hands-free operation after configuring.
Configuration Parameters can be changed using Hyperterminal (or similar) directly connected to the μ SmartDigi	Fast changes and no need for the μ SmartDigi PC Configuration Program.
Flash Program Updates using a PC or Laptop computer.	Easy to update firmware without requiring a programmer.
Support planned for No Source Routing (NSR) [not fully implemented in Version 2]	You can use conventional routing or NSR.
Windows 32-bit Console program is used to download the Configuration Parameters, Rules and Firmware updates.	Common platform.

Technical Specifications [under construction]

The μ SmartDigi is based upon Microchip's dsPIC30F6012 Digital Signal Processing (DSP) microcontroller. It is planned that the production boards will use either the dsPIC30F6012A or the newer 33FJ series. This will depend on the Microchip production schedule and quality for the new chip.

The software, written in Microchip's C30 C compiler, is completely native to the microcontroller. There is no additional operating system. The dsPIC30F6012 features 144Kbytes of program flash memory, 8Kbytes of RAM and 4Kbytes of EEPROM. It is clocked to run at 30 MHz. This chip sports two serial interfaces that are used to interface with the TNC-X and optional GPS unit.

The GPS and Monitor Port are shared on a single TNC-X serial port. The μ SmartDigi can be configured without a GPS. If one is configured, the μ SmartDigi detects this on startup. The Monitor Port is detected when no GPS NMEA messages are received or no GPS is configured.

The Configuration Parameters have defaults with only the Call Sign being required to set. All parameters are contained in an ASCII file and read in and processed by the μ SmartDigi PC Configuration Program. These parameters can also be changed by connecting a serial terminal or terminal emulator, like Hyperterminal on a PC or laptop, without the need for the μ SmartDigi PC Configuration Program.

The device supports flash programming over the serial line from the μ SmartDigi PC Configuration Program from a firmware hex file. Firmware may be updated from time to time and will be available on this web site. You will download this firmware hex file and use the μ SmartDigi PC Configuration Program to flash the new firmware into the device. You can also use the Microchip ICD2 programmer. A 5-pin header is provided to interface with the ICD2.

Configuration Parameters are specified with optional leading white space and arguments are separated by white space or commas. White space is one or more spaces and tabs in any combination. Abbreviating commands is allowed to the extent that the result is not ambiguous.

The Configuration Parameters are summarized below:

Parameter	Arguments	Description	Ver
call	CALL	Sets the Call Sign	
ssid	SSID	Sets the SSID with Decimal, Octal or Hex number	
position	Lat Lon	Sets the Base Latitude and Longitude (alias base)	
base	Lat Lon	same as position	
lat	Lat	Sets the Base Latitude	
lon	Lon	Sets the Base Longitude	
altitude	nF nM	Specify station's altitude in feet (F) or meters (M) [Use NO decimal points!]	
digipath	string	Comma or space separated (no tab) Digi Path	
uitrace ¹		Toggles ON and OFF UITrace digipath debugging mode	
beacon	seconds	Sets the beacon period in seconds, 0 for OFF, range [10..65535]	
icon	xx	2 characters representing the Symbol Table ID or Overlay and Symbol Code	
bcomment	string	Sets the beacon comment string	
havegps ¹	y n	Sets existence of a GPS	
log	y n	Enables Disables Logging to the Monitor/GPS Port	
nonapr ¹	y n	Enables Disables repeating of packets without valid position info	
dropmangled	y n	Enables Disables dropping mangled packets	
haltonerr	y n	Enables Disables halting on error [for testing only]	
host	[baud]	Sets optional Host baud	
tnc	[baud]	Sets optional TNC baud	

gps ¹	[baud]	Sets optional GPS baud	
dstar ²	[baud]	Sets optional D-STAR baud	
nsr ³	y n	Enables Disables No Source Routing	
relaydrop ¹	y n	Enables Disables dropping anything with RELAY in Digi1 path	
widemax ¹	N	Sets the maximum wideN in the remaining path	
widetotal ¹	N	Sets the maximum total wide for the remaining path	
ratelimcall	seconds	Sets the Rate Limit Window in seconds for all Call Signs. 0 disables feature.	2.7
dupewin	seconds	Sets the Duplicate Check Window Time in seconds	
fixvalid ²	y n	Enables Disables requiring the GPS fix to be valid	

Notes:

1. Digipeater parameter only.
2. D-Gate parameter only.
3. Not fully implemented in Digipeater Version 2.

μSmartDigi Rules

The Rules are described [HERE](#). [I will write up this within this web page soon!] The Rules are also contained in an ASCII file and read in and processed by the μSmartDigi PC Configuration Program.

Extensive error and format checking and reporting are performed for the Configuration Parameters and Rules by the Configuration Program.

μSmartDigi PC Configuration Program Commands

Commands are specified with optional leading white space and arguments are separated by white space or commas. White space is one or more spaces and tabs in any combination. Abbreviating commands is allowed to the extent that the result is not ambiguous. The following table summarizes the PC Configuration Program Commands:

Command	Arguments	Description	Ver
help		Displays the Commands (alias ?)	
?		same as help	
angles		Displays the Angles format used for Lat, Lon and Rules	
baud	baud	Changes the baud rates on host and μSmartDigi once connected	
configure	file_name	Reads a Configuration File named file_name	

rules	file_name	Reads a Rule File named file_name	
dconfigure		Displays the current Configuration	
drules		Displays the current Rules	
connect	com_port [baud]	Connects to the μ SmartDigi on com_port at optional baud to enable a download	
disconnect		Disconnects from the μ SmartDigi	
download		Downloads the Configuration and Rules to the μ SmartDigi (requires connection)	
firmware	com_port file_name	Updates μ SmartDigi firmware on com_port from HEX file file_name	
serialtest	iterations	Performs a write and read loop test between the serial port and μ SmartDigi	2.7
.		[Period] Repeat the last command. Normal DOS/WIN edit commands apply.	
exit		Exits the program	
quit		same as exit	
x		same as exit	

μ SmartDigi Monitor Commands

Commands are specified with optional leading white space and arguments are separated by white space or commas. White space is one or more spaces and tabs in any combination. Abbreviating commands is allowed to the extent that the result is not ambiguous. When entering commands the back-space key will delete the previous character. The cursor will move left but the display will not be updated (you will still see the previous character until you type a new one). When in normal operating mode commands will be ignored. To return to the command prompt enter a control-c (hold the control key and hit the c key). To return to normal operating mode enter the TNC or RESET command or power cycle the TNC-X.

The following table summarizes the commands supported using a serial terminal or terminal emulator connected to the Monitor Port:

Command	Arguments	Description	Ver
version		Displays the firmware version	2.7
help		Displays the Commands (alias ?)	
?		same as help	
monitor		Enables TNC and enters Monitor mode	
debug		Toggles ON and OFF decoded display of incoming packet (VOLATILE)	
log	y n	Enables Disables Logging to the Monitor/GPS Port	
havegps ¹	y n	Sets existence of a GPS. Monitor/GPS Port switches to baud set by command gps	
tnc	[baud]	Sets optional baud, enables TNC and enters Monitor mode	

control-c		Breaks out of Monitor mode and returns to the command prompt	
gps ¹	[baud]	Sets optional baud and enters GPS mode	
dstar ²	[baud]	Sets optional baud and enters D-STAR mode	
host	[baud]	Sets optional Host baud	
call	CALL	Sets the Call Sign	
ssid	SSID	Sets the SSID with Decimal, Octal or Hex number	
digipath	string	Comma or space separated (no tab) Digi Path	
uitrace ¹		Toggles ON and OFF UITrace digipath debugging mode	
beacon	seconds	Sets the beacon period in seconds, 0 for OFF, range [10..65535]	
icon	xx	2 characters representing the Symbol Table ID or Overlay and Symbol Code	
bcomment	string	Sets the beacon comment string	
implicit	drop pass	Sets the Implicit Rule Action (drop or pass)	
widemax ¹	N	Sets the maximum for any element of the digipath	
widetotal ¹	N	Sets the maximum total of all elements for the digipath	
ratelimcall	seconds	Sets the Rate Limit Window in seconds for all Call Signs. 0 disables feature.	2.7
dupewin	seconds	Sets the Duplicate Check Window Time in seconds	
nsr ³	y n	Enables Disables No Source Routing	
relaydrop ¹	y n	Enables Disables dropping anything with RELAY in Digi1 path	
nonaprs ¹	y n	Enables Disables repeating of packets without valid position info	
dropmangled	y n	Enables Disables dropping mangled packets	
haltonerr	y n	Enables Disables halting on error [for testing only]	
fixvalid	y n	Enables Disables requiring GPS fix to be valid	
position	Lat Lon	Sets the Base Latitude and Longitude (alias base)	
base	Lat Lon	same as position	
lat	Lat	Sets the Base Latitude	
lon	Lon	Sets the Base Longitude	
altitude	nF nM	Specify station's altitude in feet (F) or meters (M) [Use NO decimal points!]	
dconfigure		Displays the Configuration	
drules		Displays all the Rules	

clearrules		Temporarily clears the Rules. EEPROM Rules are not affected. Restored by RESET	
angles		Displays the Angles format used for Lat and Lon and Rules	
boot		Reboots the system (aliases reboot, reset)	
reboot		same as boot	
reset		same as boot	

Notes:

1. Digipeater parameter only.
2. D-Gate parameter only.
3. Not fully implemented in Digipeater Version 2.

µSmartDigi Angles Specification

The µSmartDigi uses a very flexible format to specify angles such as Latitude, Longitude and actual angles found in the Rules file. This allows users to enter these angles in a format that is easy and familiar while not being restrictive. Here are some examples: -38:33:29.222, 38.33.379, 42d23.7m33.9c, W104D40.6m. A complete description for the the Angles Specification is found in the latter part of the Rules description found [HERE](#) and can also be displayed from the µSmartDigi Monitor mode using the *angles* command.

Getting Started µSmartDigi comes with a 2-page Getting Started Guide. See the Versions tables below for the latest edition.

µSmartDigi D-Gate D-STAR Gateway Technical Stuff

[Under Construction]

Download [HERE](#) a recent paper presented at ARRL-TAPR Digital Communications Conference in September 2006. This paper, "µSmartDigi™: an APRS® Digipeater and D-Gate™ D-STAR Gateway", provides an overview of both the APRS Digipeater and the D-Gate.

Cables

Instructions for making serial cables for the µSmartDigi can be found [HERE](#). Cabling for the TNC-X to the Radio can be found in the TNC-X manual included with your TNC-X and also at Coastal ChipWorks <http://www.tnc-x.com/documentation.htm>. A TNC-X Radio wiring diagram is <http://www.tnc-x.com/ hookup.gif> but use the µSmartDigi serial cabling instructions instead of the serial wiring in this image.

Software and Documentation Downloads

µSmartDigi PC Configuration software and Firmware can be downloaded by selecting the appropriate link from the table below. Make certain you have selected the correct PCB and Chip Versions! Due to the small size of the PC Utility it is the actual executable program file. A general rule is to use the latest versions for each of the Firmware, PC Utility and Instructions.

µSmartDigi APRS Digipeater Versions

Firmware

Firmware Version	PCB Version	Chip	Comments
2.1 Released 20 Jun 2006	1.0	dsPIC30F6012A	Initial Release; Requires PC Utility 2.1 and higher
2.2 Updated 17 Aug 2006	1.0	dsPIC30F6012A	Added commands nonaprs and clearrules; Requires PC Utility 2.2 and higher
2.3 Updated 10 Nov 2006	1.0	dsPIC30F6012A	Sync rev to PC Utility; Requires PC Utility 2.3 and higher
2.3a Updated 30 Nov 2006	1.0	dsPIC30F6012A	Added Monitor Mode serial interrupt ctrl-c; Requires PC Utility 2.3 and higher
2.3b Updated 2 Jan 2007	1.0	dsPIC30F6012A	Expand dupe time window; Requires PC Utility 2.3 and higher
2.4 Updated 18 Mar 2007	1.0	dsPIC30F6012A	Add APnnnU, Beacons, Monitor commands, add SSn-n, change relaydrop; Requires PC Utility 2.4 and higher
2.5 Updated 1 Jul 2007	1.0, 2.0	dsPIC30F6012A	Add Beacon Icon; Requires PC Utility 2.5 and higher
2.52a Updated 24 Jul 2007	1.0, 2.0	dsPIC30F6012A	Beacon uses MIC-E message format. Symbol # for Digi; Requires PC Utility 2.5 and higher
2.6 Updated 26 Aug 2007	1.0, 2.0	dsPIC30F6012A	uitrace, altitude, debug commands; don't repeat beacon; back space; digi counts; Requires PC Utility 2.6 and higher
2.61 Updated 2 Nov 2007	1.0, 2.0	dsPIC30F6012A	fix config & rule display, fix download; Requires PC Utility 2.61 and higher
2.62a Updated 5 Nov 2007	1.0, 2.0	dsPIC30F6012A	change default host serial speed to 19200 baud; Requires PC Utility 2.62 and higher
2.7 Updated 2 March 2008	1.0, 2.0	dsPIC30F6012A	add version, ratelimcall commands; add serialtest; eliminate power cycle; Requires PC Utility 2.7 and higher

PC Utility

PC Utility Version	PCB Version	Chip	Comments
2.1 Released 20 Jun 2006	1.0	dsPIC30F6012A	Initial Release; Requires Firmware Version 2.1 and higher
2.2 Updated July 2006	1.0	dsPIC30F6012A	Added commands nonaprs and clearrules; Requires Firmware Version 2.2 and higher
2.2b Updated 17Aug 2006	1.0	dsPIC30F6012A	Requires Firmware Version 2.2 and higher
2.2b-1 Updated 11 Oct 2006	1.0	dsPIC30F6012A	Allow imbedded spaces in file names; Requires Firmware Version 2.2 and higher
2.3 Updated 10 Nov 2006	1.0	dsPIC30F6012A	Comm ports >9; Requires Firmware Version 2.3 and higher
2.3b Updated 2 Jan 2007	1.0	dsPIC30F6012A	Requires Firmware Version 2.3 and higher
2.4 Updated 18 Mar 2007	1.0	dsPIC30F6012A	Add Beacons, change relaydrop; Requires Firmware Version 2.4 and higher
2.4a Updated 17 Jun 2007	1.0, 2.0	dsPIC30F6012A	Allow additional initial NULLS in sync from current lot of dsPIC; Requires Firmware Version 2.4 and higher
2.5 Updated 1 Jul 2007	1.0, 2.0	dsPIC30F6012A	Add Beacons Icon; Requires Firmware Version 2.5 and higher

2.52 Updated 6 Aug 2007	1.0, 2.0	dsPIC30F6012A	More diagnostics during flashing; Requires Firmware Version 2.5 and higher
2.6 Updated 26 Aug 2007	1.0, 2.0	dsPIC30F6012A	Added uitrace and altitude commands; Requires Firmware Version 2.5 and higher
2.61 Updated 2 Nov 2007	1.0, 2.0	dsPIC30F6012A	fix config & rule display; Requires Firmware Version 2.61 and higher
2.62 Updated 2 Nov 2007	1.0, 2.0	dsPIC30F6012A	change default host serial speed to 19200 baud; Requires Firmware Version 2.62 and higher
2.7 Updated 2 March 2008	1.0, 2.0	dsPIC30F6012A	add version, ratelimit commands; add serialtest; eliminate power cycle; Requires Firmware Version 2.7 and higher

Getting Started Instructions

Getting Started Instructions	PCB Version	Chip	Comments
2.1b Released 21 Jun 2006	1.0	dsPIC30F6012A	Initial Release; For Firmware Version 2.0 and higher
2.2a Updated 17 Aug 2006	1.0	dsPIC30F6012A	Added commands nonaprs and clearrules; Requires Firmware Version 2.2 and higher
2.3 Updated 4 Nov 2006	1.0	dsPIC30F6012A	Added 7805 heat sinking instructions; Requires Firmware Version 2.2 and higher
2.3a Updated 17 Dec 2006	1.0	dsPIC30F6012A	Minor edits; Requires Firmware Version 2.2 and higher
2.3b Updated 2 Jan 2007	1.0	dsPIC30F6012A	Requires Firmware Version 2.3 and higher
2.4 Updated 18 Mar 2007	1.0	dsPIC30F6012A	Requires Firmware Version 2.4 and higher
2.4a Updated 9 May 2007	1.0	dsPIC30F6012A	Requires Firmware Version 2.4 and higher
2.4b Updated 30 May 2007	1.0	dsPIC30F6012A	Requires Firmware Version 2.4 and higher
2.5 Updated 11 Jul 2007	1.0, 2.0	dsPIC30F6012A	Requires Firmware Version 2.5 and higher
2.52 Updated 24 Jul 2007	1.0, 2.0	dsPIC30F6012A	Requires Firmware Version 2.5 and higher
2.6 Updated 3 Oct 2007	1.0, 2.0	dsPIC30F6012A	Requires Firmware Version 2.6 and higher
2.62 Updated 16 Nov 2007	1.0,2.0	dsPIC30F6012A	Requires Firmware Version 2.62 and higher
2.62a Updated 16 Dec 2007	1.0,2.0	dsPIC30F6012A	Requires Firmware Version 2.62 and higher
2.7 Updated 2 Mar 2008	1.0,2.0	dsPIC30F6012A	Requires Firmware Version 2.7 and higher

µSmartDigi D-Gate Versions Firmware

Firmware Version	PCB Version	Chip	Comments
2.0 Released 17 Aug 2006	1.0	dsPIC30F6012A	Initial Release, uses 3rd-party APRS packet; Requires PC Utility 2.0 and higher

2.1 Updated 26 Oct 2006	1.0	dsPIC30F6012A	Sync rev to PC Utility; Requires PC Utility 2.1 and higher
2.1a Updated 2 Jan 2007	1.0	dsPIC30F6012A	Expand dupe time window; Requires PC Utility 2.1 and higher
2.2 Updated 5 Mar 2008	1.0, 2.0	dsPIC30F6012A	Add GPS-A D-STAR Mode; eliminate power cycle; add rate limiting & serialtest; Requires PC Utility 2.2 and higher

PC Utility

PC Utility Version	PCB Version	Chip	Comments
2.0 Released 17Aug 2006	1.0	dsPIC30F6012A	Initial Release, uses 3rd-party APRS packet; Requires Firmware Version 2.0 and higher
2.0-1 Updated 11 Oct 2006	1.0	dsPIC30F6012A	Allow imbedded spaces in file names; Requires Firmware Version 2.0 and higher
2.1 Updated 1 Nov 2006	1.0	dsPIC30F6012A	COM ports > 9; Requires Firmware Version 2.1 and higher
2.1a Updated 2 Jan 2007	1.0	dsPIC30F6012A	Requires Firmware Version 2.1 and higher
2.2 Updated 5 Mar 2008	1.0, 2.0.	dsPIC30F6012A	Eliminate power cycle; add rate limiting & serialtest; Requires Firmware Version 2.2 and higher

Getting Started Instructions

Getting Started Instructions	PCB Version	Chip	Comments
2.0 Released 30 Aug 2006	1.0	dsPIC30F6012A	Initial Release, uses 3rd-party APRS packet; For Firmware Version 2.0 and higher
2.1 Updated 4 Nov 2006	1.0	dsPIC30F6012A	Added 7805 heat sinking instructions; For Firmware Version 2.0 and higher
2.1a Updated 2 Jan 2007	1.0	dsPIC30F6012A	For Firmware Version 2.1 and higher
2.2 Updated 5 Mar 2008	1.0, 2.0	dsPIC30F6012A	For Firmware Version 2.2 and higher

TNC-X USB Drivers

TNC-X USB Drivers for the optional USB are listed below. These devices use the Virtual Comm Port (VCP) drivers. Make certain you use the correct set for the version of USB you have- there are several!

USB Module Description	Version	Driver Information	Guides	Version	Windows XP & 2K Drivers	Version	Windows 98 & ME Drivers
DLP-USB232M USB Module	all	DLP USB Info	DLP XP DLP 2K DLP 98/ME	1.00.2176	DLP VCP Win 2K & XP Driver		??
Linx QS USB Module	3.0	Linx DLP QS Driver Info	Linx Installation	1.00.2154	Linx QS VCP Win 2K & XP Driver	1.00.2154	Linx QS VCP Win 98 & ME Driver
Linx QS USB Module	4.0	FTDI USB Driver Info	FTDI Installation	2.02.04	FTDI USB VCP Win 2K & XP Driver	1.09.06	FTDI USB VCP Win 98 & ME Driver

Under Construction

This site is under construction and will frequently change during Q1 2008. Please be patient while I update the site with the product and technical documentation and other related information. Please send me your comments and suggestions to make the site and product even better!

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