MFJ

X-DIGI
TNC-X Digipeater
Daughter Board

Model MFJ-1270DG

INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

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VERSION 1A

DISCLAIMER

Information in this manual is designed for **user purposes only** and is ***not*** intended to supersede information contained in customer regulations, technical manuals/documents, positional handbooks, or other official publications. The copy of this manual provided to the customer will ***not*** be updated to reflect current data.

Customers using this manual should report errors or omissions, recommendations for improvements, or other comments to MFJ Enterprises, 300 Industrial Park Road, Starkville, MS 39759. Phone: (662) 323-5869; FAX: (662) 323-6551. Business hours: M-F 8-4:30 CST.

MFJ-1270DG X-DIGI TNC-X Digipeater Daughter Board

Introduction

Thank you for purchasing the **MFJ-1270DG X-DIGI TNC-X Digipeater Daughter Board** for the **MFJ-1270X TNC-X Packet Controller**. X-DIGI is a daughter board for the TNC-X KISS mode TNC. It is designed to emulate the most popular features of the widely used UI-DIGI EEPROM for TNC-2's. In addition, X-DIGI provides digipeater services for both UI APRS frames and for connected packets. It makes it easy to put up a temporary digipeater to fill in coverage "holes" in emergency situations. It consumes very little current. Both TNC-X and X-DIGI can be powered all day on a single 9 volt battery. It can be configured in the field through the TNC-X serial port using any computer with any terminal program. It also contains a "firmware bootloader" so that future firmware revisions can be easily uploaded using any Windows PC.

Installation Instructions

To install the X-DIGI Daughter Board, first remove the two jumpers on header **JP5** on the TNC-X (this is the 8 pin header). Then insert the X-DIGI board so that the notch on the 18F2525 is toward the back of the TNC-X. C3 will be toward the LED side of the TNC-X board. Set the TNC-X so that it runs at 9600 baud: **JP1** on the TNC-X board should be off, while **JP2** should be on.

Configuration Instructions

The X-DIGI Daughter Board is configured via the standard TNC-X serial port. Connect your computer to the primary serial port. You can use either the serial port connection or the USB port (if you have this option installed). You can even use a hand held device like a Palm Pilot running a terminal program to configure the device. However, you cannot connect

the USB port on a Palm Pilot to the USB port on TNC-X. To configure the X-DIGI, set the 14 pin jumper block up as follows:

Corner of board =>

Run a terminal program on the PC that you have connected to the TNC-X
serial or USB port. If you are running a Windows computer, hyperterminal will do fine. if you are using the USB port to configure TNC-X, you may find the easiest way to do this is to do this is to remove JP4 of TNC-X so that the USB module is powered up but the TNC is not. Then run your terminal program (it will recognize the USB serial port). Then replace JP4 to power up the TNC. .Set your terminal program for 9600 baud and no flow control. Turn on the TNC-X with the X-DIGI daughterboard installed and within 20 seconds strike any key in the terminal program to get the X-DIGI's attention. You should see the following menu:

X-DIGI Ver 2.0E Configuration MenDigi Menu
C. Set Digipeater Callsign. :URCALL
A. Set Digipeater Alias. :URDIGI
F. Set UIFlood Callsign. :NY
L. Set UIFlood Limit. :7
T. Set UITrace Callsign. :WIDE
M. Set UITrace Limit. :4
1. Set UICall 1. :
2. Set UICall 2. :
3. Set UICall 3. :
4. Set UICall 4. :
5. Set UICall 5. :
6. Set UICall 6. :
7. Set UICall 7. :
8. Set UICall 8. :
D. Set Dupe Time (x5 secs). :6
P. Set Remote Password. :
B. Set Beacons.
Q. Quit.
Enter Selection:

Choose the item you wish to reconfigure by pressing the letter or number in the left hand column. The Callsign and Alias are fairly straightforward, but some of the other parameters may require explanation. The UIFlood callsign supports the WIDEn-N paradigm. When the digi receives a

packet with a path of, say WIDE3-3, it will decrement the SSID value (to WIDE3-2) and retransmit the packet. When it reaches WIDE3-0, it will

replace this value with the X-DIGI's callsign. UITrace works in a similar manner, but adds X-DIGI's callsign to the path. So, for example, WIDE3-

3 becomes URCALL, WIDE3-2 in the above example. The limits for UIFlood and UITrace are provided to allow the X-DIGI to stop overly long paths. In the above case the UITrace limit is set to 3, so an incoming path of WIDE4-4, for example, would be simply be digipeated as URCALL. The UICall fields allow you to specify up to 8 calls for which X-DIGI will
simply do callsign substitution.

For example, if you wanted to support RELAY (not currently recommended) you could do so by adding this value in UICALL. Packets with a path of RELAY would be digipeated with a path of URCALL. The menu also allows you to specify a dupe time value in 5 second intervals. Duplicates are calculated based on a CRC that is applied to the entire packet except for the path. So if X-DIGI sees a packet with the same source and destination address and the same contents within the time period specified by dupetime, it will not diigipeat it. Because this timer is set in increments of 5 seconds, a value of 6, for example, will result in a 30 second duplicate checking period. Do not set this value higher than about 24 (2 minutes). Setting the dupe value to 0 turns off dupe checking. Selecting the B value from the menu brings up another menu that allows you to set up the beacons. X-DIGI supports 4 different beacons, each of which can be sent at a different interval, have a different path, and have a different text. To set up these beacons, hit the B key. The time values here are in increments of 5 seconds, so to set a beacon to transmit every 10 minutes, for example, you would use a value of 120. The offset value allows you to specify a time period to elapse before the first beacon is sent. For example, if you set Beacon 1 to be sent every 5 minutes and Beacon 2 to be sent every 10 minutes, every other time you would have both beacons sent at the same time. While this will work, you might prefer to have X-DIGI wait a minute or two before sending the first beacon so that the two beacons would never be sent at the same time. You can do this with offset. The path for each beacon can also be set via this menu. Simply enter the path with a comma between each callsign, for example W2SB,WIDE3-3. Selecting Q will exit the beacon menu. Another Q will exit configuration. After programming, turn off the unit and change the jumpers so that they are set up as follows:

Corner of board =>

By using this setup, incoming data will be routed through to the PC serial port. As a result, you will be able to run a standard APRS program (such as WinAPRS, MacAPRS, UIView, etc.) and watch the activity coming in to the digipeter. It is not necessary to operate X-DIGI with a PC attached, it will work perfectly well as a stand alone unit. However, this option is available to you if you like. If you decide to run the X-DIGI as a stand alone unit, you can simply leave the jumpers in their "configuration" setting. X-DIGI is designed to be field upgradeable. It has boot loader built in that allows you to upload new firmware if and when it becomes available. Instructions on how to use the boot loader are available on a link from the TNC-X webpage: http://www.tnc-x.com/firmware.htm
There is a Yahoo group called X-DIGI that is available to support users of the X-DIGI daughter board. Announcements of firmware revisions will be posted to this group.

Using the Remote Sysop Feature

As of version 2.0 of the X-DIGI firmware, it is possible to change the parameters of X-DIGI remotely. Doing so requires a 5 letter password. All X-DIGI parameters except the password are remotely configurable. In order to use the remote sysop feature, you must first set a remote password using the configuration procedure described above. The password must have exactly 5 characters and is case sensitive. To disable the remote sysop feature, set the password to five spaces. When you boot up X-DIGI, it will wait 20 seconds for a command to reconfigure before it starts up. When the 20 second timer has expired, X-DIGI will send the text in the first beacon to let you know it is in digipeter mode (and is available to be remote sysop-ed. To reconfigure X-DIGI remotely, change the UNPROTO parameter in your remote TNC to specify the callsign that is configured in X-DIGI. So, for example, if the X-DIGI callsign is UR0CAL you could set up UNPROTO as follows: UNPROTO UR0CAL After you have changed the UNPROTO parameter, go into converse mode (with a k on most TNC's) and hit the return key. This will send an empty packet out using the UNPROTO path. When X-

DIGI hears your transmission, it will respond with a string of four letters. This four letter combination is a function of a random number generator inside X-DIGI and the password that you have specified. You must then respond with the proper 4 letter code in order to enter remote sysop mode. This code can be obtained from a program that is available on the X-DIGI webpage (http://www.tnc-x.com/X-DIGI.htm) called calcpw.jar. The program was written in Java, so it should run on any platform and it is an executable .jar file so you should be able to run it simply by double-clicking on it. Of course you will need to have the Java runtime

environment on your computer to run the program, but most computers these days already have this loaded. This program is fairly selfexplanatory. You enter your password (the one you entered in the configuration screen) and the four letter code you received from X-DIGI, and then it tells you what your response should be. Send the response back to the X-DIGI. The X-DIGI will respond with either “yes” (if you were successful) or “not” if you were not.

Once you have successfully entered remote sysop mode, you can send commands to the X-DIGI in the form:
X value
for commands from the first configuration page.

X-DIGI Ver 2.0E Configuration MenDigi Menu
C. Set Digipeater Callsign. :URCALL
A. Set Digipeater Alias. :URDIGI
F. Set UIFlood Callsign. :NY
L. Set UIFlood Limit. :7
T. Set UITrace Callsign. :WIDE
M. Set UITrace Limit. :4

1. Set UICall 1. :
2. Set UICall 2. :
3. Set UICall 3. :
4. Set UICall 4. :
5. Set UICall 5. :
6. Set UICall 6. :
7. Set UICall 7. :
8. Set UICall 8. :
D. Set Dupe Time (x5 secs). :6

So, for example, to change the Dupe Time to 10, you would send the command:

D 10

X-DIGI will respond by telling you the new value of the parameter you entered. If you simply want to inquire about the current value of a parameter send:

X?

where X is the letter of the parameter you want sent back to you. So to ask what the Dupe Time value is send

D?

Note that any changes take effect immediately. So if you change the callsign of the X-DIGI, you will need to change the UNPROTO value in your TNC to be able to continue to communicate with it. You can send as many commands as you want during a remote sysop session. The session will conclude in one of two ways. If you send the command:

Q

You should receive back the word “Done” and the X-DIGI will exit remote sysop mode. If 45 seconds passes and the X-DIGI does not receive a command, it will automatically reboot. You’ll send the Beacon 1 text transmitted to let you know that the session has expired.

To make changes on the Beacon menu:

Beacon Configuration Menu
0. Set Beacon Destination Call :APRS
1. Set Beacon 1 Path :WIDE2-2
2. Set Beacon 2 Path :

3. Set Beacon 3 Path :
4. Set Beacon 4 Path :
5. Set Beacon 1 interval (x5 secs) :00120 Offset :0
6. Set Beacon 2 interval (x5 secs) :00000 Offset :0
7. Set Beacon 3 interval (x5 secs) :00000 Offset :0
8. Set Beacon 4 interval (x5 secs) :00000 Offset :0
A. Set Beacon 1 text:X-DIGI Test.
B. Set Beacon 2 text:
C. Set Beacon 3 text:
D. Set Beacon 4 text:

Send a command in the following form:

BX value

where X is the letter of the parameter you wanted to change. So, for example to change the Beacon 1 text you would send:

BA This is the new beacon text.

Note that for parameters 5 through 8 you must specify 2 values, the interval and the offset. To change beacon 1 so that it beacons every minute with an offset of 5 seconds, for example, you would enter:

B5 00012 001

In the case of items 5 through 8 you must specify exactly 5 digits followed by 1 space and 3 digits. You can inquire about the value of a parameter form this page using the syntax:

BX?

where X is the parameter from the Beacons page that you want to ask about.

All beacons are turned off during a remote sysop session. However, regular digipeting does continue. Of course a collision between you transmitting a command and a user having a packet digipeted will result in both packets being lost.

Technical Assistance

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by reading the manual you may call *MFJ Technical*

Service at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

LIMITED 12 MONTH WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free from
defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original or machine reproduction of such proof of purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.

2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product under warrantee provided the product is returned postage prepaid to
MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **$10.00** covering postage and handling.

3. This warranty is **NOT** void for owners who attempt to repair defective units. Technicalconsultation is available by calling the Service Department at 662-323-0549 or the MFJ Factory at 662-323-5869.

4. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc.

5. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board product is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, or cables, etc. sent to MFJ Enterprises, Inc. will be
returned at the owner's expense unrepaired.

6. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or
property by the use of any MFJ products.

7. Out-of-Warranty Service: MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.

8. This warranty is given in lieu of any other warranty expressed or implied.

9. MFJ Enterprises, Inc. reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.

10. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to:

MFJ Enterprises, Inc.
300 Industrial Park Road
Starkville, Mississippi 39759 USA

and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.

11. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

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