# Packet Tracker
## A Graphical Packet Tracking Program

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## ABSTRACT

Packet Radio is a very interesting and growing part of Amateur Radio. For the new person investigating Packet Radio, there are many things to be learned and lots of different aspects of Packet Radio that will not be grasped for a long time. Even the advanced **Packeteer** usually does not understand everything going on with Packet Radio. If someone wants to know what kind of Packet services and what BBS's or other activity is going on in their area, they are usually told to hook up their TNC and put it into MONITOR mode to see what is going on. This process will give them screen after screen, day after day, of almost unintelligible garbage flying across their screen. Unless they take the time to start writing down call signs and understand some of the different protocols, they will be COMPLETELY lost and confused.

**Packet Tracker** is a program that monitors that stream of 'garbage' and presents a graphical representation of all of the different conversations occurring on the frequency at one time. It does this by showing icons representing the different stations and draws lines from one station / icon to another representing who is talking to whom. It also shows where retries are happening and who was the most recent person to actually transmit and how many packets were transmitted by each station. **Packet Tracker** also keeps track of lots of statistics about the activity of each station and also statistics about actual band usage.

## INTRODUCTION

**Packet Tracker** is the first program in a series of Packet Utility programs specifically designed to teach us something about what is going on in our complex hobby. **Packet Tracker** 'TRACKS' packets and displays what station they are coming from and what station they are going to. **Mail Tracker** is the second in this series, it 'TRACKS' entire mail messages. See the article on Mail Tracker elsewhere in these proceedings.)

**Packet Tracker** keeps statistics about each station it sees and also statistics about band utilization and retries. This program shows all of this information via graphical representation on the computer screen. It displays stations as ICONs, it shows different types of stations as different ICONs, it show which station transmitted most recently and how much information each station transmits. It also shows who is talking to who by drawing lines between the different ICONs. In the case of multi user BBS's and digipeaters, a single ICON/Station may have several different lines into and out of it. In the case of a DX Cluster, there may be many lines going to many different stations. **Packet Tracker** also keeps track of retries, band-width utilization and other statistics.

## DISTRIBUTION

**Packet Tracker** is freeware. I encourage you to give this program to as many packet users that have Macs as you can. I would, however ask that you send me a QSL card stating that you are using my program and what type of Macintosh you are using it on. Copies of the program will be made available on the Internet and on various on-line services such as CompuServe and America On Line. It is also available on the April 1993 Buckmaster's CD-ROM. You are welcome to put a copy of the program on any BBS's provided that the entire package and documentation are included.

## OPERATION

**Packet Tracker** runs on any Macintosh with System 6.0.5 or later (System 7.0 preferred) and needs the Comm Tool Box installed. (This is standard with System 7.0). It will work with any TNC that has a MONITOR mode. **Packet Tracker** has been tested with AEA, PACCOM, Kantronics and MFJ. It will not work with a KISS only TNC. **Packet Tracker** monitors all of the information that is received from the TNC and tries to make sense of it. It keeps lots of internal data structures for keeping track of all of this information.

There are four windows in Packet Tracker. The main window is **the Station Map Window.** The other three windows are the **Station List Window**, the **Bar Chart Window,** and the **Communications Window. You** can also get information about a specific station by double clicking on it which brings up a fifth window which is the **Information Window.**

Packet Tracker can optionally be set up to do long term statistics. This statistics get written to a log file every hour. This is useful if you want to find out the overall channel usage or other types of statistics about Packet usage.

## Station Map Window

The most important window in this program is the map window. It shows all of the stations and data paths graphically. There are two types of stations displayed on the map, heard stations and unheard station. A station that we can hear directly is a heard station. It is displayed as an icon on the map. The default icon is a radio with a computer sitting on top of it. If the program can make any determination as to what the station is, it will automatically change the icon to the appropriate one. You can also change the icon for a station. When a station transmits to another station, a line is drawn on the map to show that connection. Throughout the program I refer to these as "connections" but in fact they may not actually be connections. It is to difficult for the program to determine if the stations are actually connected. If station A transmits to station B, they are assumed to be connected and the line is drawn. After 30 seconds, the line is changed from a heavy line to a thin line. After the time-out specified in the preferences, the line goes away. If the line is dashed, it signifies that there is more than 10% retries on that connection. After the time-out for the station, the station will go away. If you LOCK a station, it will never go away.
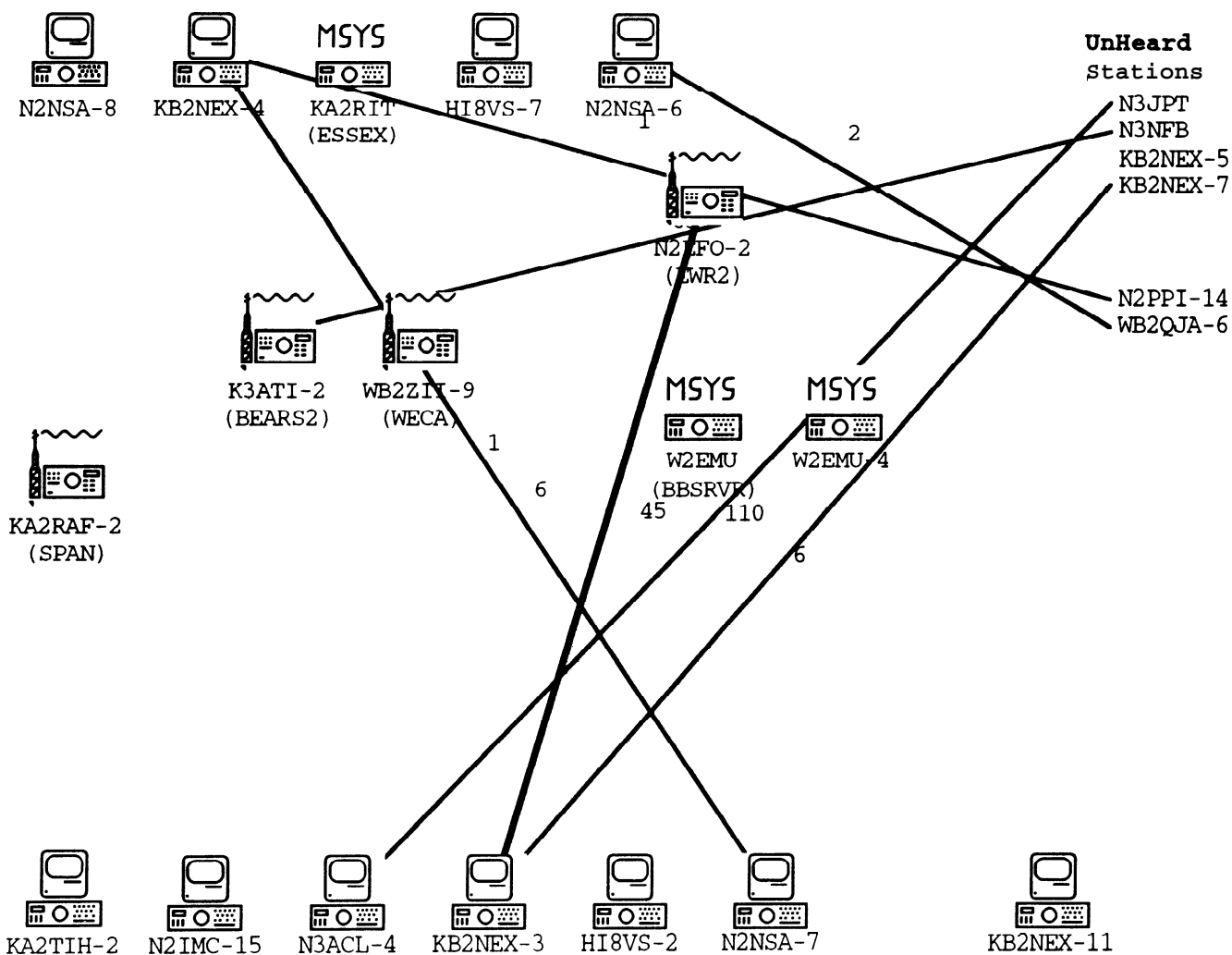
**Station List Window**

The Station List Window contains a list of the current active stations, it has their call sign, alias if they have one, number of packets transmitted, percentage of packets transmitted, age (hh:mm:ss) of last transmission. After the age their may be a character. The characters have the following meanings:

!      **Most recent** station to transmit

-      **Unheard station**

If you have a color screen, the station that transmitted most recently is colored red. All of the information on the Station Map window is displayed here along with some extra information such as the percentage of packets. It is just presented **in manner** which may be more useful in some circumstances.

```
▤▢▬▬▬▬ Station List ▬▬▬▬▣▤

Total nodes =    14 Elapsed Time
Total packets= 10805 17: 1148:48

Station    Alias  Pkts  %    Age

WB2ZII-9   WECA    848   7%  0:00:30!
W2EMU-4            3592  33% 0:01:26
KA2RAF-2   SPAN    169   1%  0:02:06
N2EFO-2    EWR2    593   5%  0:02:00
W2EMU      BBSRVR  2 15   1%  0:02:02
K3ATI-2    BEARS2  426   3%  0:03:33
K2APL-4            0     0%  0:00:30-
WB2REM             13    0%  0:03:20
N2PLR              0     0%  0:03:18-
KB2NEX             0     0%  0:03:33-
K2ILF-4            0     0%  0:01:27-
WK2P               6     0%  0:02:59
K2ILF-11           6     0%  0:01:27
KB2MYM-4           0     0%  0:01:27-
```

**Bar Chart Window**

The Bar Chart Window displays information about the channel utilization. The calculations are based on the number of characters received from the TNC. Therefore, the numbers are not exact but close approximations. If I implement KISS mode in a later version of this program, it will be more exact. All graphs are based on full scale being 100%
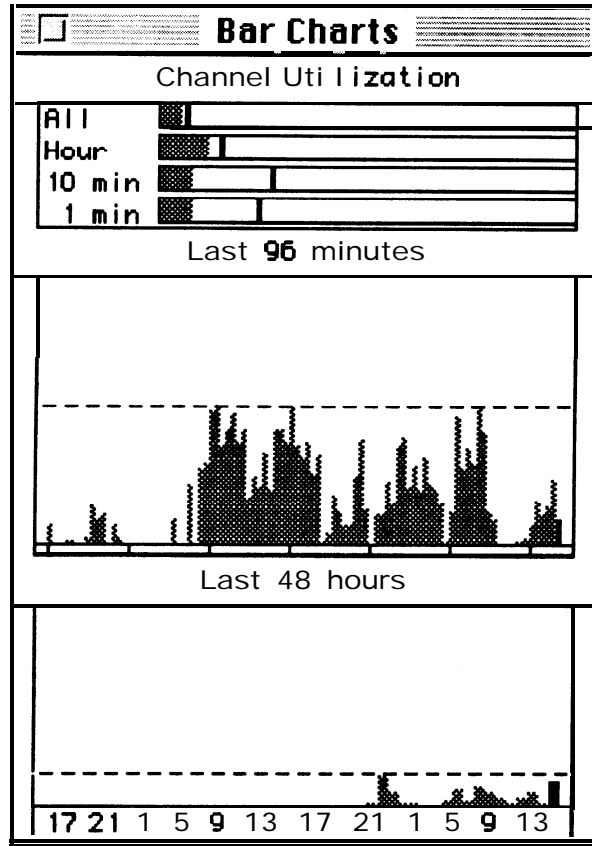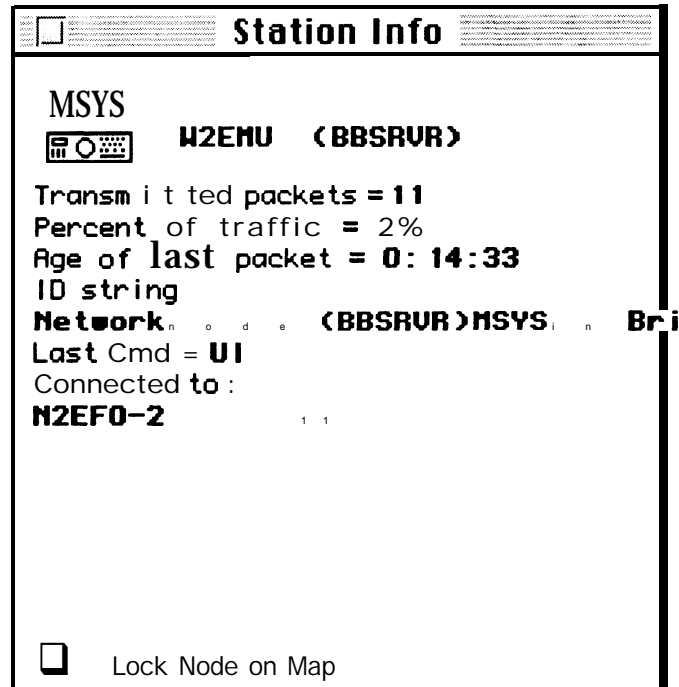


The Bar Chart Window is broken up in to 3 parts, the first part is the current utilization. It has 4 horizontal bar graphs. The first one is overall utilization since the program was started. The second is the previous hour (last 60 minutes), the third bar is the previous 10 minutes and the last one is the previous minute. The solid line in each of the bars is the high water mark.

The second graph on the window is utilization for each of the previous 96 minutes. Why 96 you ask, because it is twice 48 and I wanted 48 hours using 2 pixel wide bars for the next section and 96 1 pixel wide bars fit in the same space. The tick marks at the bottom are spaced 15 minutes apart.

The third graph is the utilization for each of the previous 48 hours. In both the last 96 minutes and last 48 hours, the most recent one is in black and the rest are in gray. The dashed line is the high water mark for both cases.

**Station Info Window**
  To look at the detailed information about a specific station, double click on the icon in the map window or the entry in the Station List Window. This displays everything known about the station, its call, the alias if there is one, the number of packets transmitted, number of retries, age of last transmitted packet, ID string if the station has transmitted one, who the station talking to and if the station locked on the map.

```
┌──────────────────────────────────────────────┐
│ ▢    ═══════  Station Info  ═══════           │
├──────────────────────────────────────────────┤
│                                                │
│   MSYS                                          │
│   [▣◎▦]    W2EMU   (BBSRVR)                     │
│                                                │
│   Transm i t ted packets = 11                  │
│   Percent of traffic = 2%                      │
│   Age of last packet = 0: 14:33               │
│   ID string                                    │
│   Network n  o  d  e  (BBSRVR)MSYS  i  n  Br i │
│   Last Cmd = UI                                │
│   Connected to :                               │
│   N2EFO-2            1  1                       │
│                                                │
│                                                │
│                                                │
│                                                │
│   ❑    Lock Node on Map                        │
└──────────────────────────────────────────────┘
```

  The information contained in this window includes:

- The call sign of the station.
- The alias if there is one.
- Total number of packets that the station has transmitted.
- Percentage of total packet traffic
- Age of last packet transmitted.
- ID String if there was one.
- The AX.25 command string of the last packet transmitted.
- A list of the stations it is connected to. This is a list of all of the other stations that this station has transmitted to. Therefore "connected to" may not be really correct, but it is close. Also, this list does not get purged unless one of the stations itself gets purged.
  On each line of the connections, the number of packets transmitted to that station and the number of retries if any in "()".
- Lock Station on Map: If you check this box, the station will not be purged (aged out due to lack of transmission) and will be saved to the map file when you do a save command. Only those stations with this lock flag set will be saved.

## Communications Window

This window is simply the raw output of the TNC as it is being received. You can watch this window to see what you were used to seeing without this program. This will show you what kinds of data is being used to create all of the maps and charts.

## CONCLUSIONS

**Packet Tracker** has proved to be a very useful program for examining what is going on in Packet Radio. It has been downloaded hundreds of times from the various on-line services. This program has taught many of us, even some of the advanced Packet people many new things about what is going on. It has also allowed us to see where excessive retries were happening that we were not aware of before. This program has proven to be more educational than we had imagined, and has turned into a very successful program for the packet community.