

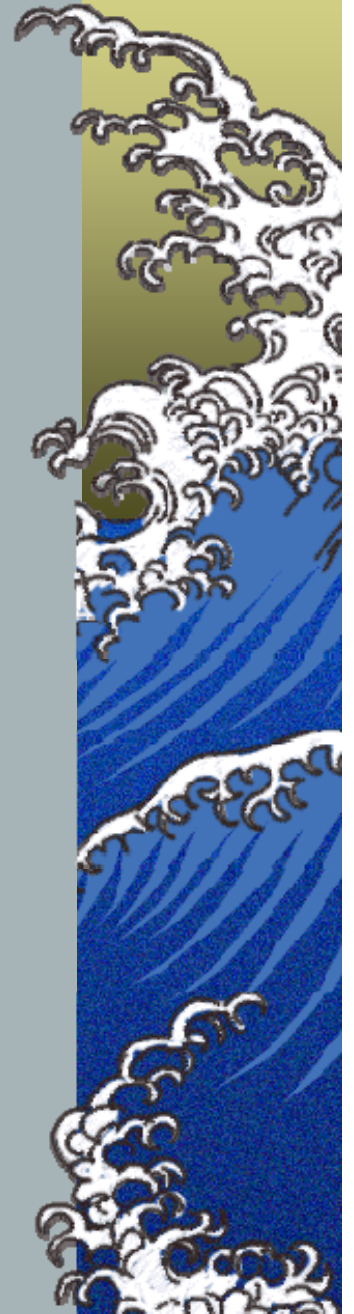
Winlink 2000 and APRS in one  
system.

*Or how to have two simultaneous  
digital operations on one antenna.*



# What was missing in NE Harris County?

- ▶ *Support for APRS*
- ▶ *Support for VHF Packet*
- ▶ *Support for any VHF “Classic Digital”*



# What was available?

- ▶ *No site with internet access.*
- ▶ *No building access.*
- ▶ *Not much interest from local club.*



# What Changed?

*Katrina and Rita*



# From Two Hurricanes

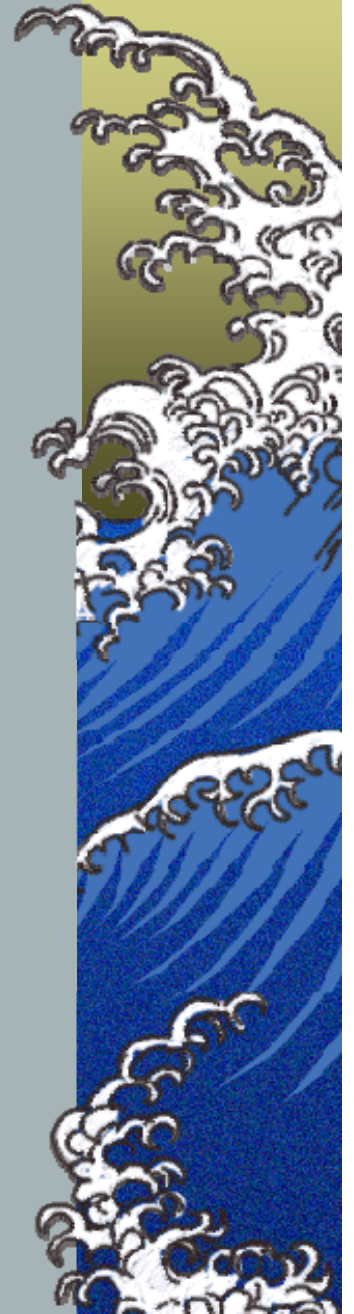
- ▶ *Houston and Harris County were paralyzed by storm that never touched it.*
- ▶ *Far reaches of Houston and Harris County were left without communications and support from centers of power and management.*
- ▶ *Several organizations formed and determined not to see this happen again.*





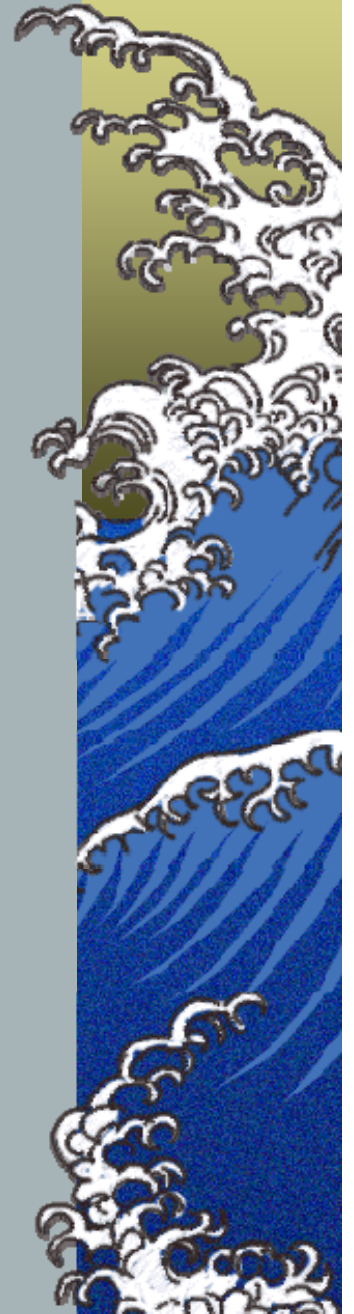
# Resources now available.

- ▶ *Single tower site with high speed uninterruptable internet and power.*
- ▶ *Would allow only one additional antenna on tower.*
- ▶ *Would give Hams a small foot print of floor space.*



# Implementation needs.

- ▶ *APRS I-gate*
- ▶ *Winlink 2K support*
- ▶ *Reliability*
- ▶ *Simple Maintenance*



# Two Systems

- ▲ *APRS Packet*

- ▲ *Half-duplex*

- ▲ *Transceiver*

- ▲ *144.390 mHz*

- ▲ *TNC*

- ▲ *Computer*

- ▲ *Internet Connection*

- ▲ *Power Supply*

- ▲ *Airmail Packet*

- ▲ *Half-duplex*

- ▲ *Transceiver*

- ▲ *145.070 mHz*

- ▲ *TNC*

- ▲ *Computer*

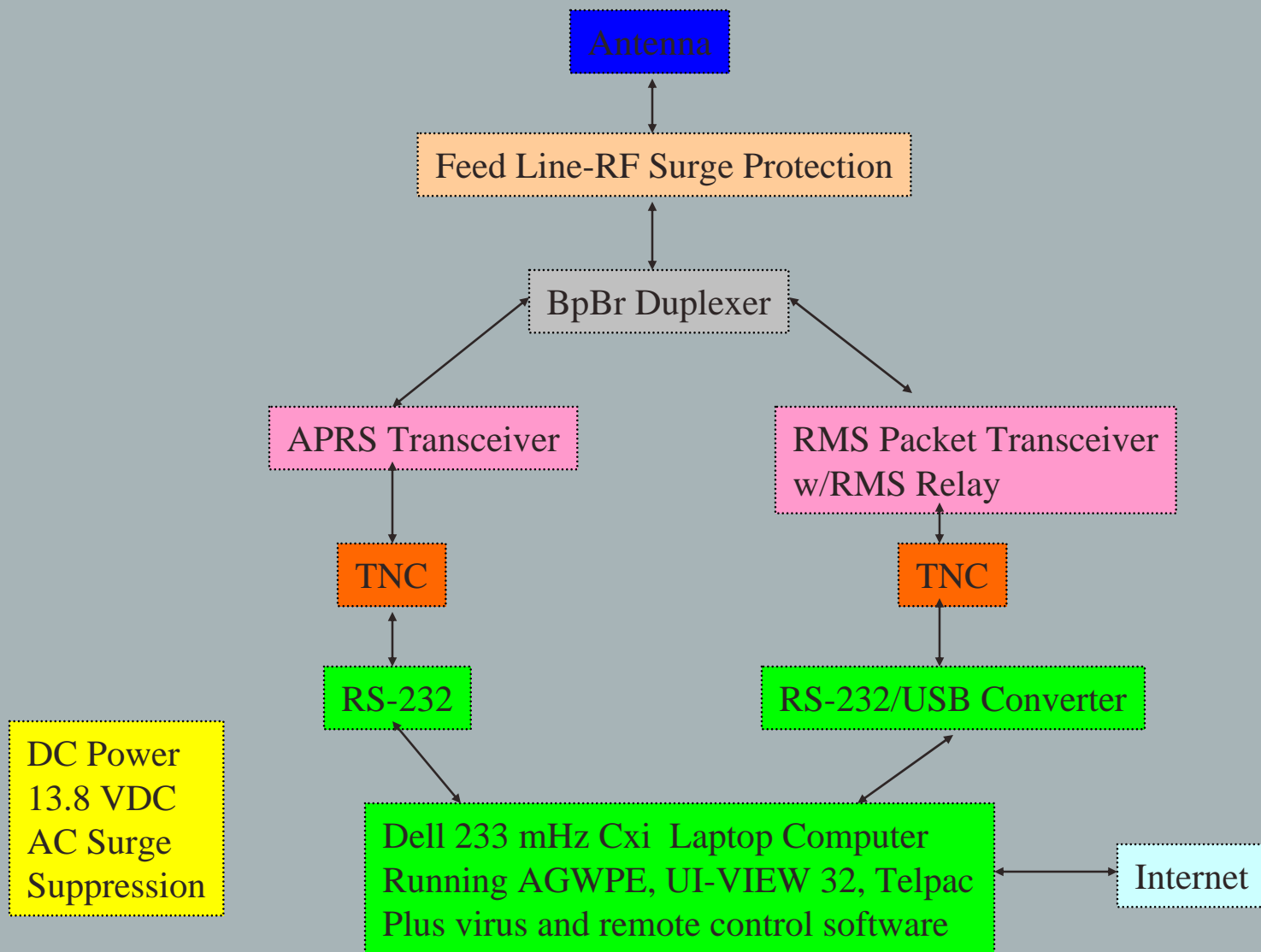
- ▲ *Internet Connection*

- ▲ *Power Supply*





# System Design



# KSBJ Station Tower

Dual Band

UHF/VHF

Comet GP-3



# KSBJ Station Tower



# Inexpensive Duplexer Test Station



# Duplexer Test Setup Detail

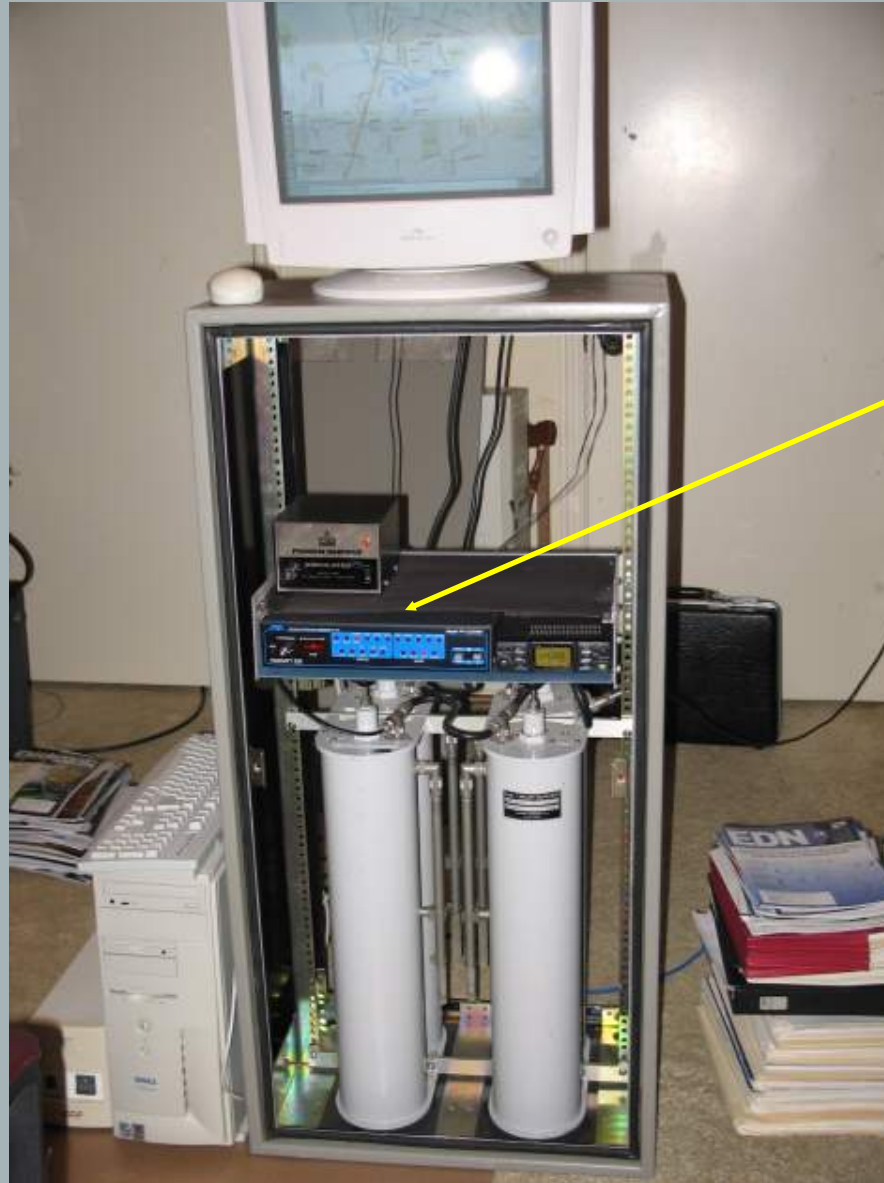




# Duplexer and Lower Equipment Shelf In Motorola Repeater Cabinet



# APRS System Test



PK-232C  
MBX TNC

Probably best

APRS TNC  
ever made ;-)

# APRS Test

Test  
Power  
Supply  
and  
Computer



# APRS in operation!





# APRS arrives in NE Harris County Finally!





# Rear Door



# Telpac TNC



Not directly supported by Telpac so AGWPE was used as driver software and TNC is run in KISS mode.

# Telpac TNC Jumper Settings

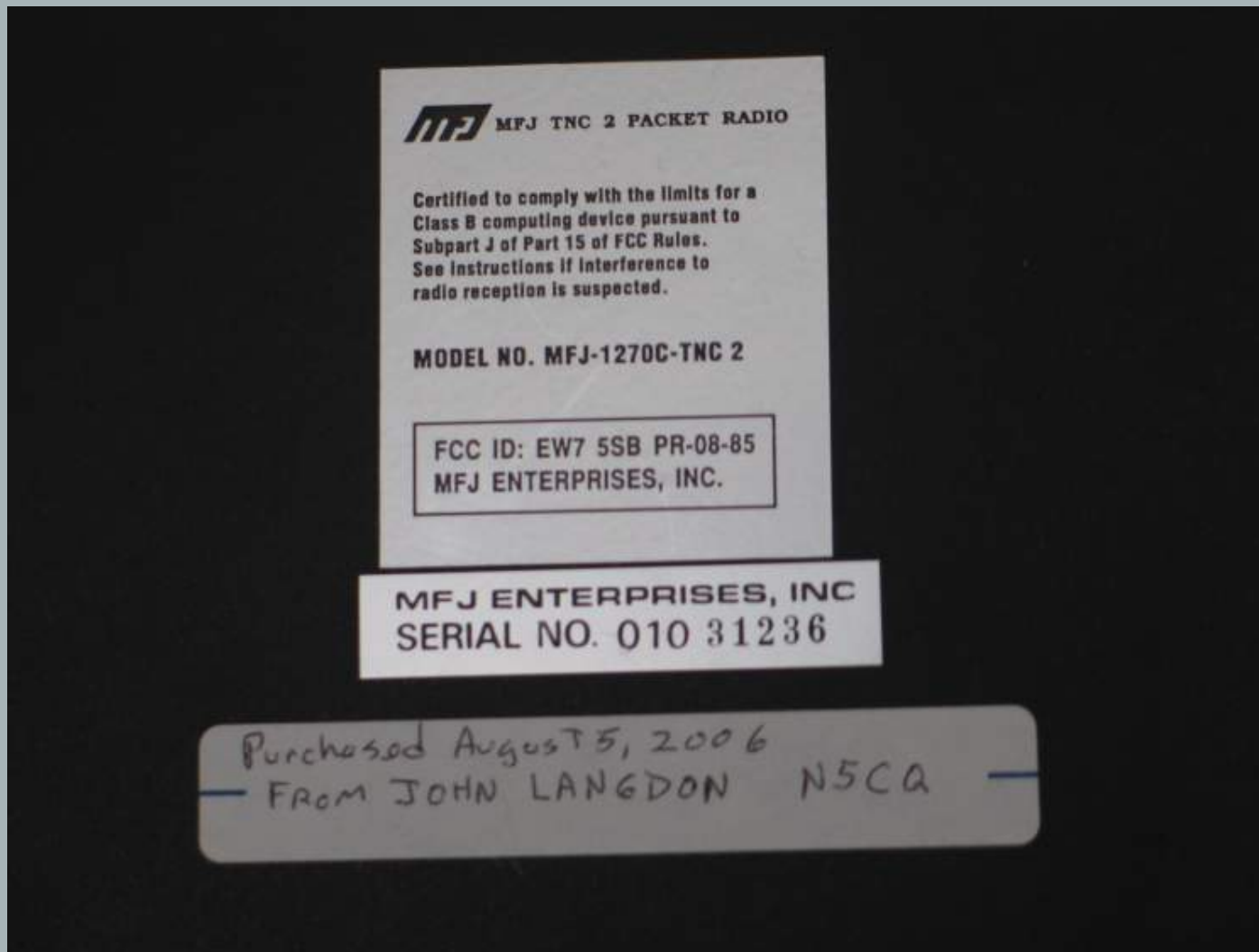




# Telpac TNC Switch Settings

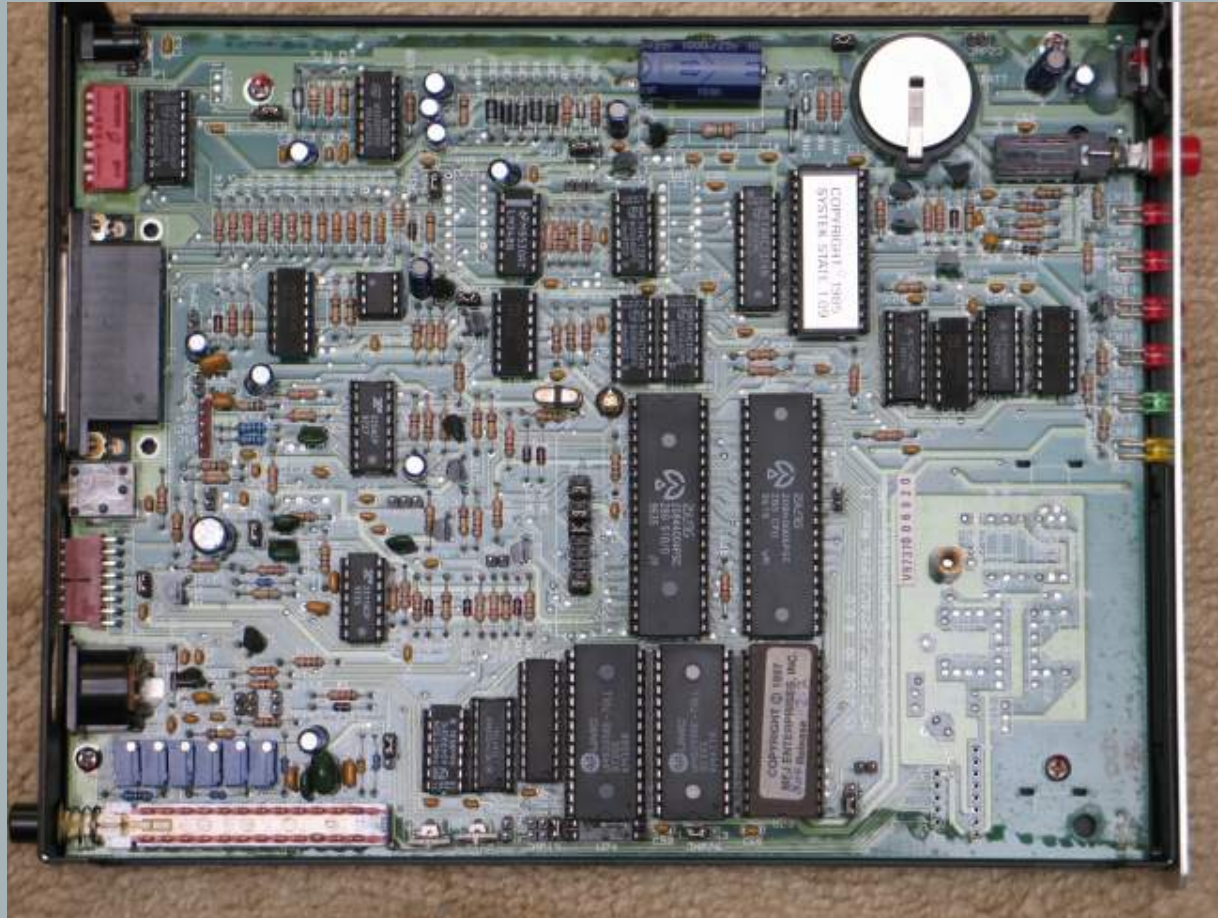


# Telpac TNC Details



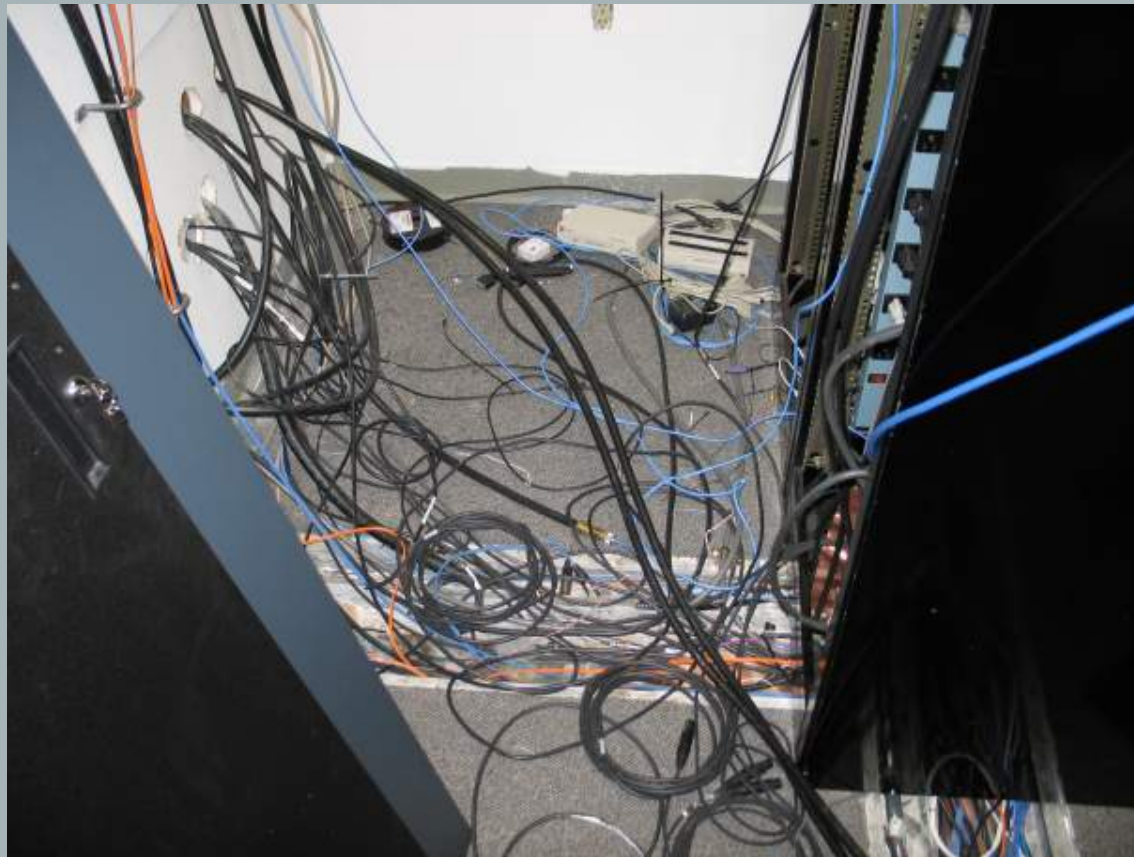


# Telpac TNC



Modern Digital Camera is a superior tool for recording settings, fabrication and wiring details. This is a good example.

# KSBJ Site Survey



KSBJ was beginning the multi-year process to convert from classic analog FM broadcast to complete digital process from recording to transmitter.

# KSBJ Tower Cable and Phone System Entry Point



The beginning of an unified ground system for all signals and power.



# External View Cable Entry



# APRS and Winlink System together and in place at KSBJ





Laptop Shelf

Telpac Shelf

New 25 Amp 13.8  
VDC Power Supply

APRS Shelf

Switched Receive Monitor  
Speakers

Duplexer

New AC Power Filter



## COMMON EQUIPMENT

MOTOROLA CABINET

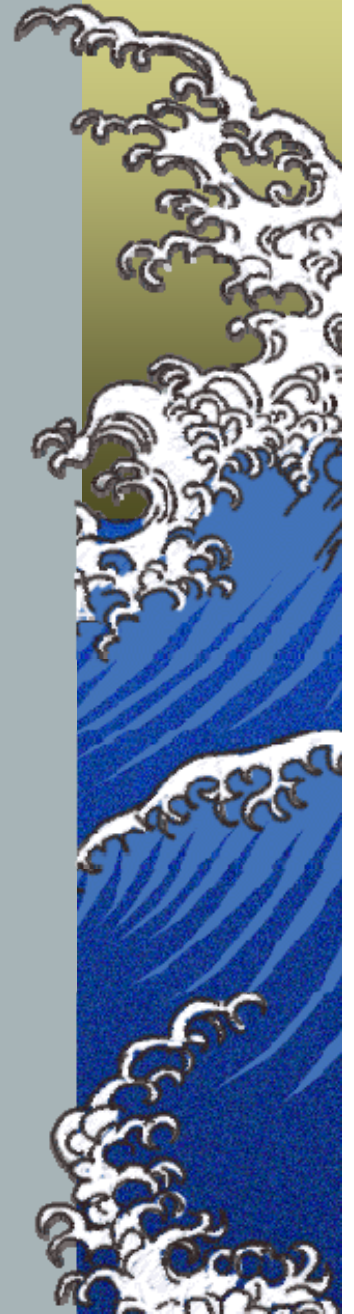
ANTENNA - COMET GP-3

COAX – 200' ½ " HELIAX

LIGHTNING PROTECTION – POLYPHASER

DUPLEXER – WACOM BpBr - MODEL WP-639

Rated for 600 khz spacing minimum



## PRS EQUIPMENT

TRANSCEIVER – ICOM IC-281H

Programmed for automatic timeout

TNC – AEA MODEL PK-232C - RS232 DIRECT TO  
COMPUTER

AUDIO MONITOR – OLD RS CAR STEREO SPEAKER with  
added SPST ON-ON with 10 Ohm load applied in off position.



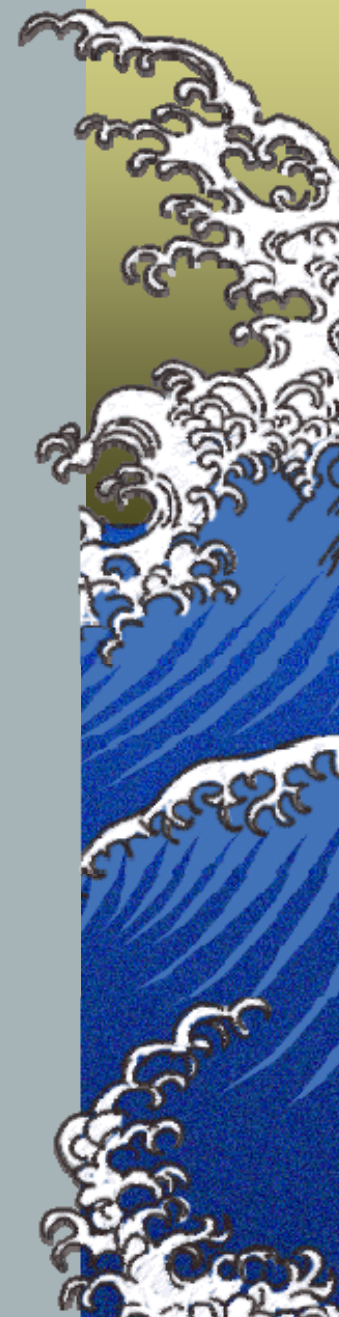
## INLINK TELPAC

TRANSCEIVER – ALINCO DR-150

Programmed for automatic time-out

TNC – MFJ-1270C with USB to Serial Port Adaptor and  
AGWPE for hardware/software compatibility issues

UDIO MONITOR – Old surface mount RS Car Stereo Speaker  
with SPST ON-ON with 10 Ohm resistive load in off position.

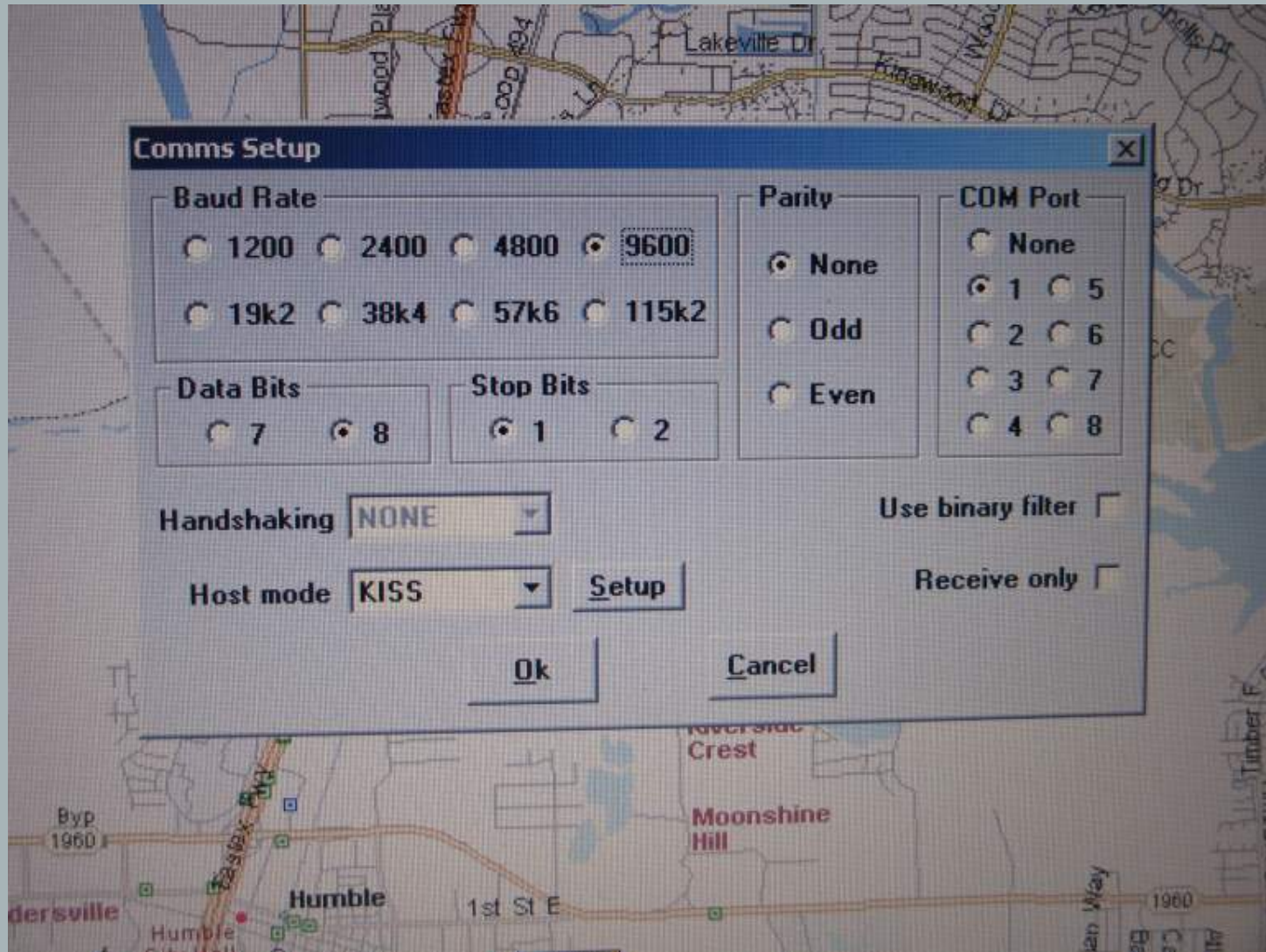


# Ground System





# APRS UI-View32 Computer to TNC Communications SETUP



# APRS UI-View32 Station Setup

The screenshot shows the 'Station Setup' dialog box in the UI-View32 software. The dialog is overlaid on a map of Humble, Texas, with labels for 'Moonshine Hill' and 'Humble'. The dialog contains the following fields and options:

Callsign	Latitude	Longitude	Locator
W5SI-2	29.59.76N	095.15.01W	EL29IX

Unproto port: 1  
Unproto address: APRS.WIDE1-1

Beacon comment: PHG3440 APRS Digi IGate Humble TX      UI-View Tag

Beacon interval (mins):

Fixed	30	Mobile	0	0	Internet	30
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Units:  miles       km

Symbol: No. Digi (dropdown)      O'ly: 1       (Green Star icon)

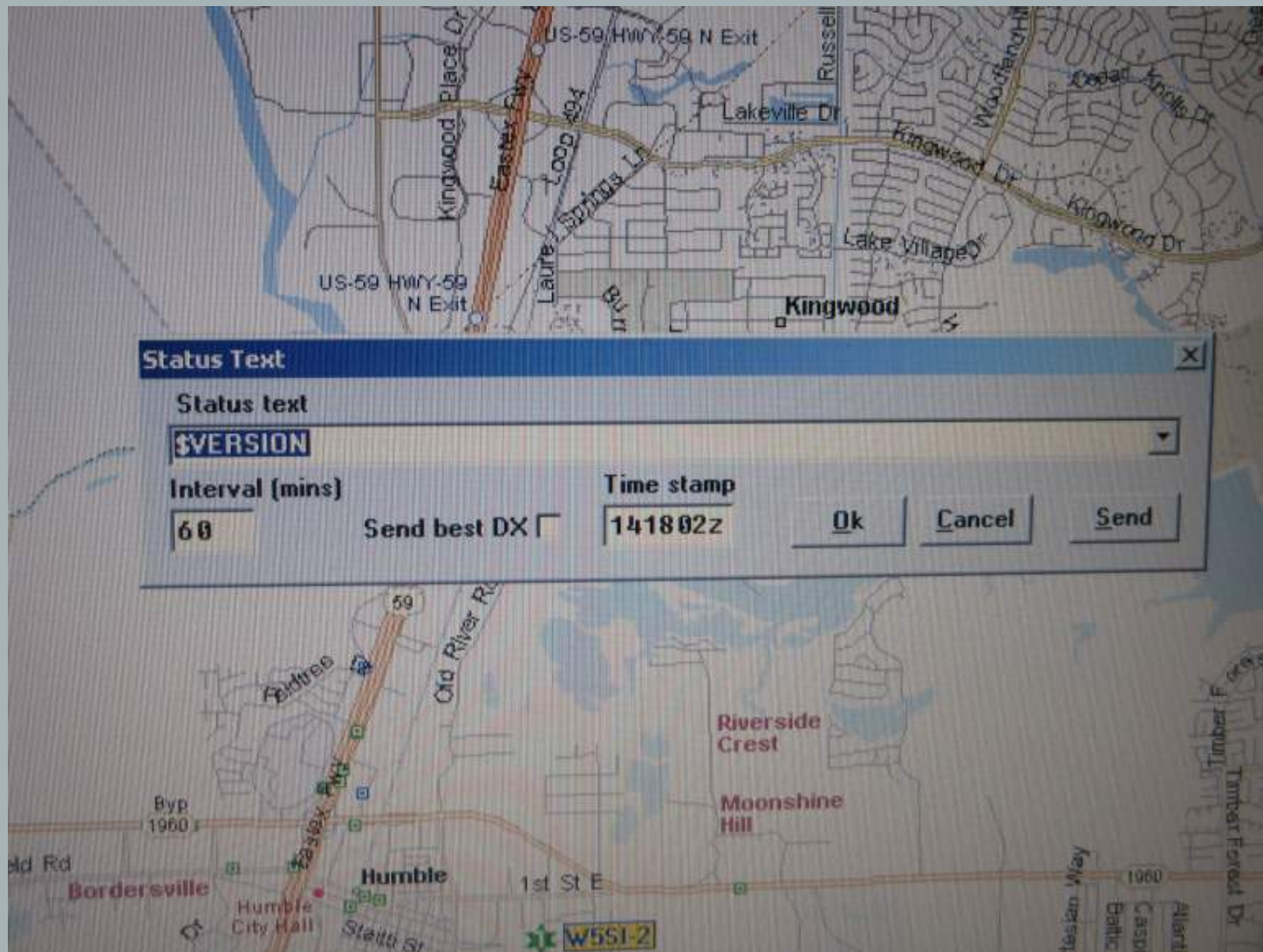
GPS symbol: Car (dropdown)      O'ly:        (Red Car icon)

Compressed Beacon:

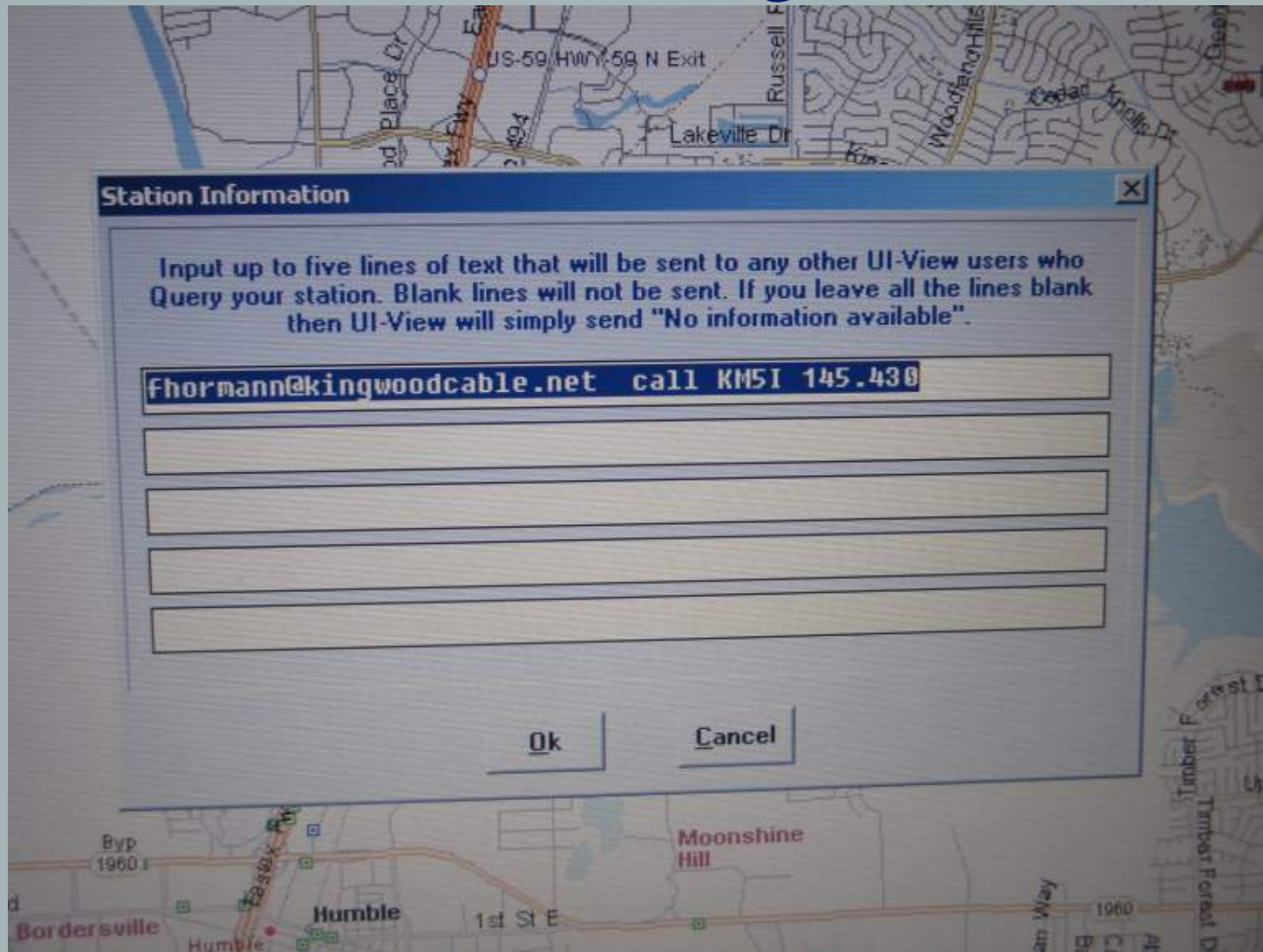
Buttons:



# APRS UI-View32 Status Text

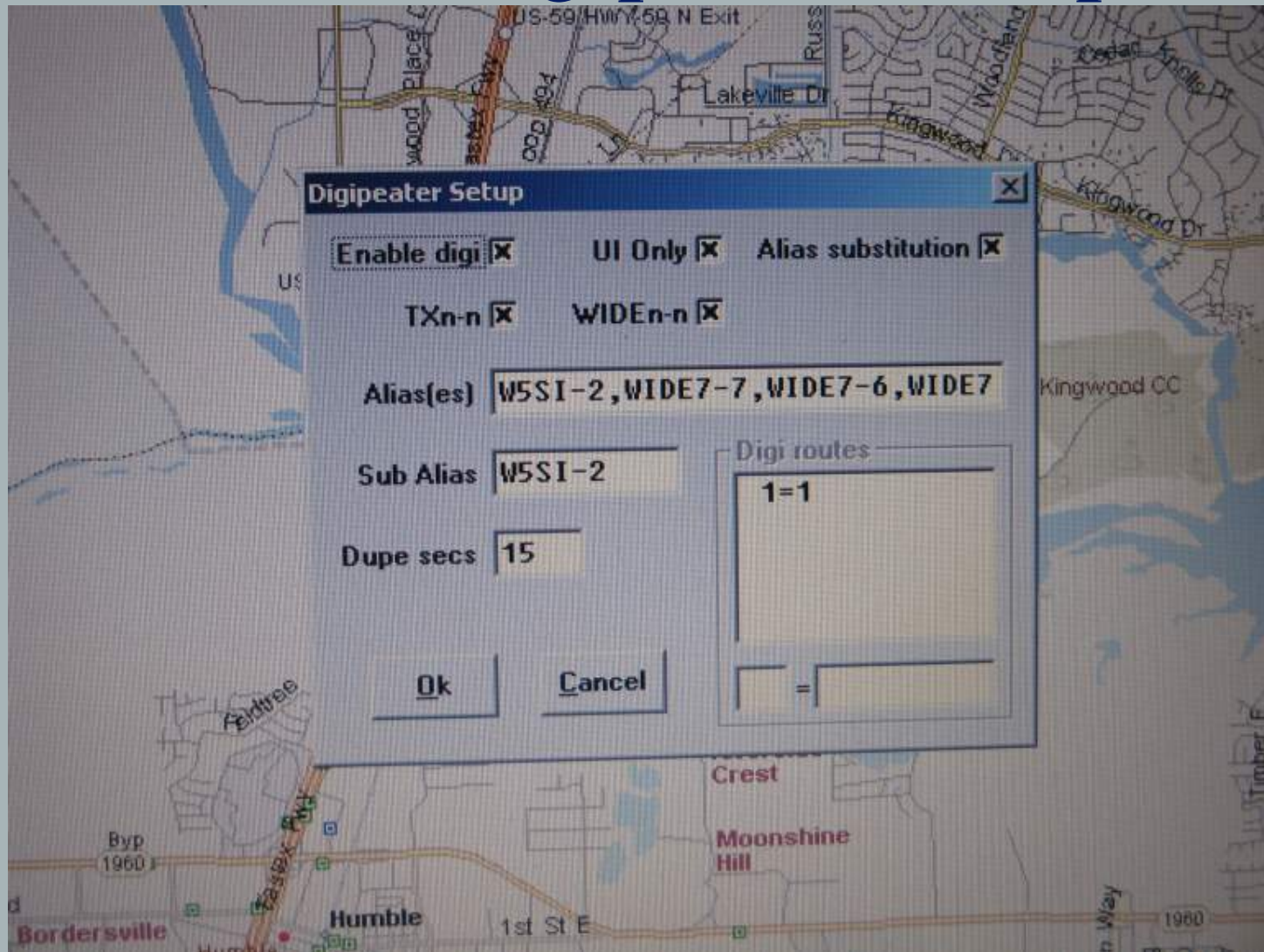


# APRS Message Text

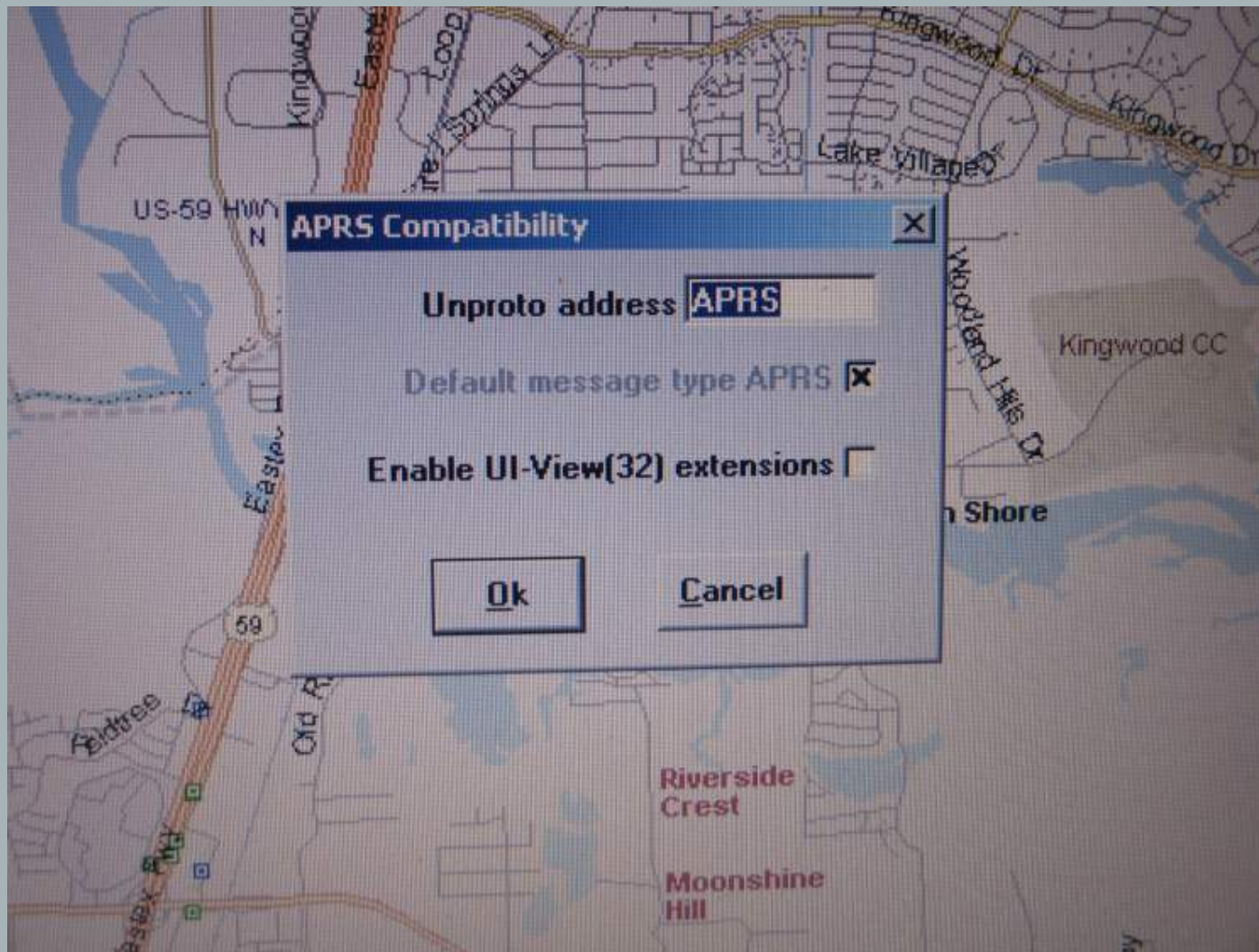




# APRS Digipeater Setup

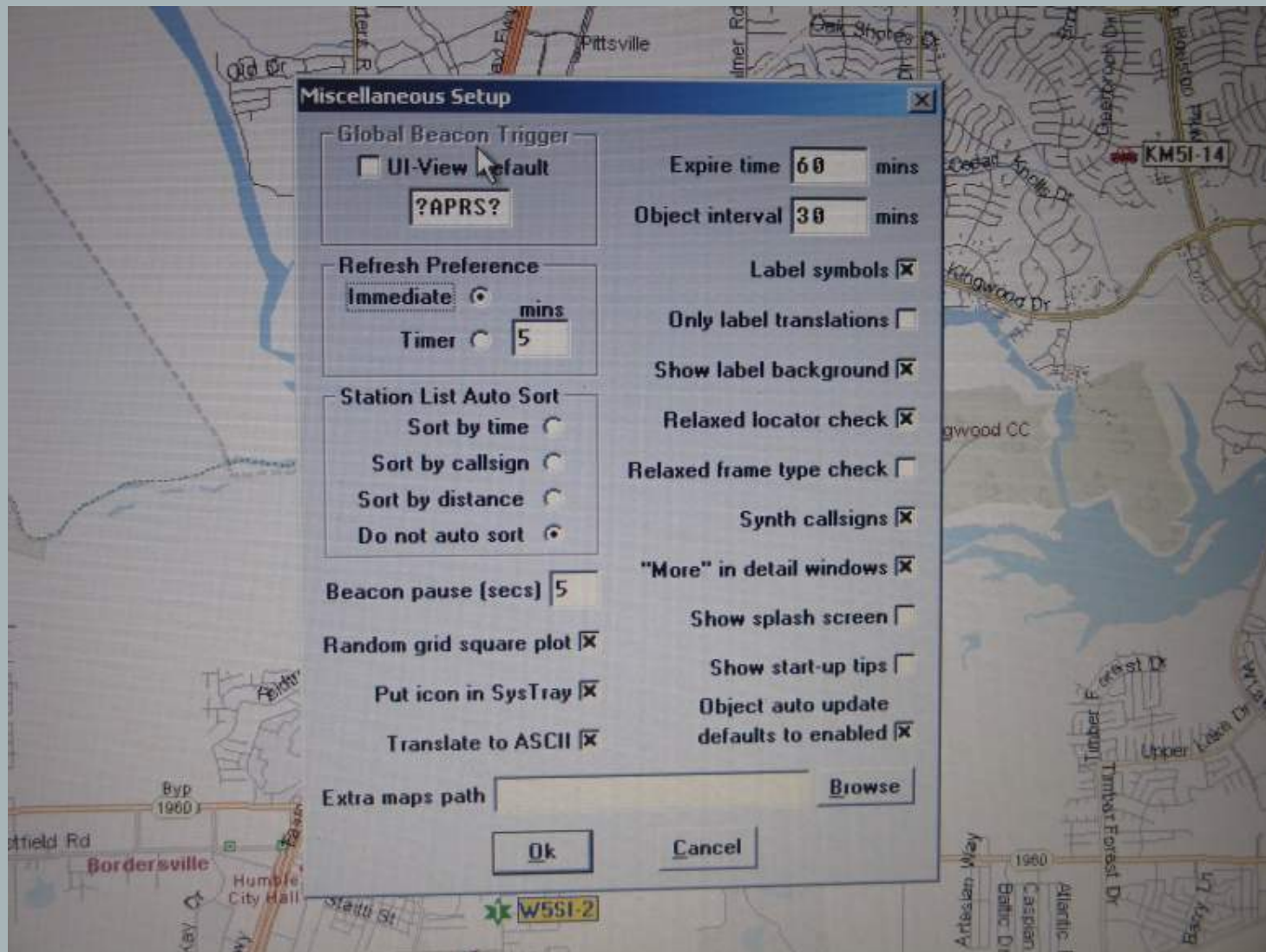


# APRS Compatibility





# APRS Miscellaneous Setup



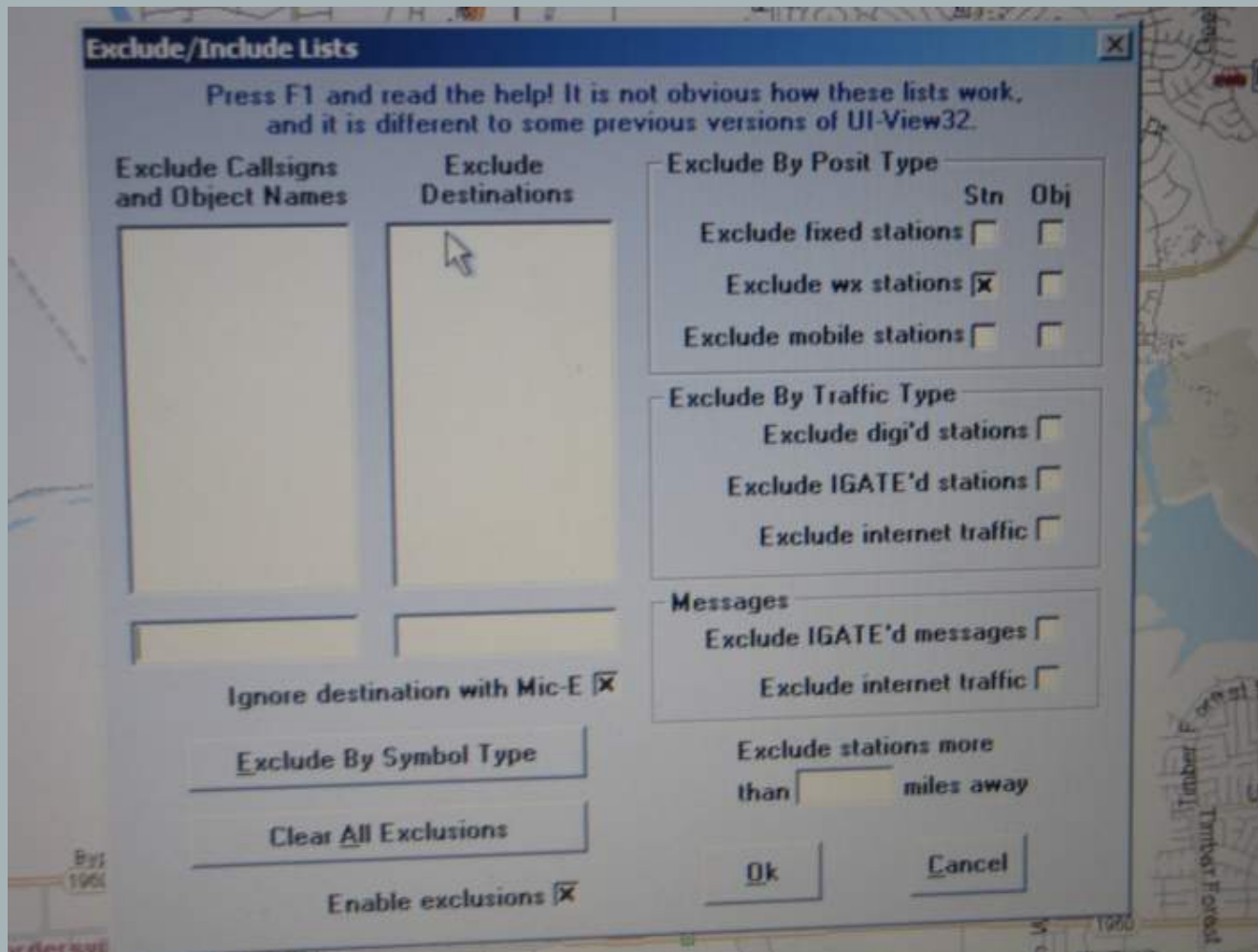
# APRS Server Setup

The screenshot shows a 'APRS Server Setup' dialog box with the following settings:

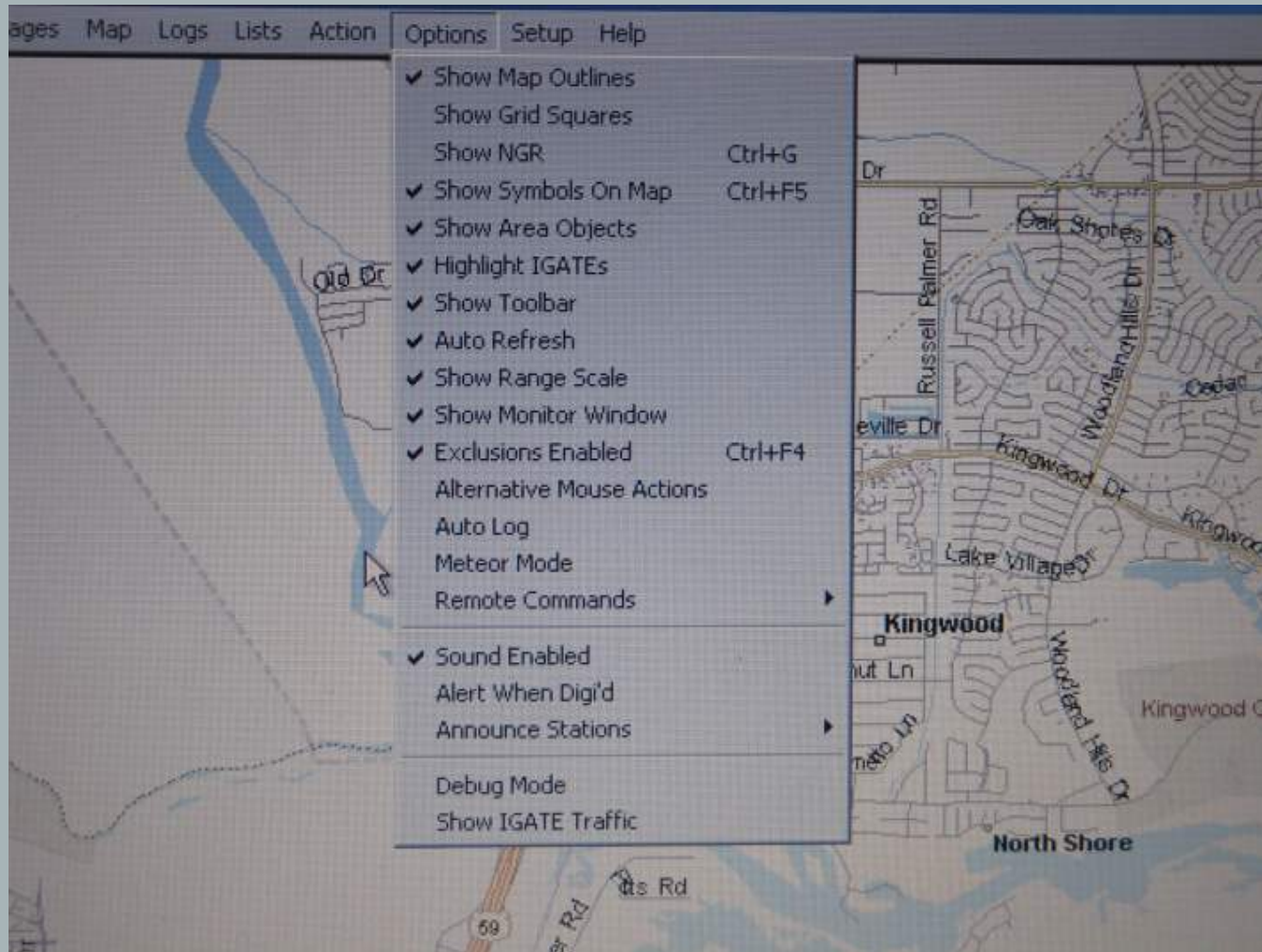
- Select One Or More Servers:**
  - arizona.aprs2.net:145
  - indiana.aprs2.net:145
  - newmexico.aprs2.net:1
  - argentina.aprs2.net:1
  - australia.aprs2.net:1
  - australia2.aprs2.net:
  - brazil.aprs2.net:1458
- Text to send on connection:** (Empty text box)
- APRS server log on required:**
- Validation number:** 30622
- Enable auto reconnect:**
- Extra log-on text:** filter n/300
- Gate RF To Internet:**
  - Open the gateway:**
  - Gate objects:**
  - Insert station callsign:**
- Gate Internet To RF:**
  - Gate local messages:**
  - Use reverse digi path:**
  - Transmit IGATE status:**
- Enable local server:**
- Max silence:** 5 mins
- Buttons:** Ok, Cancel



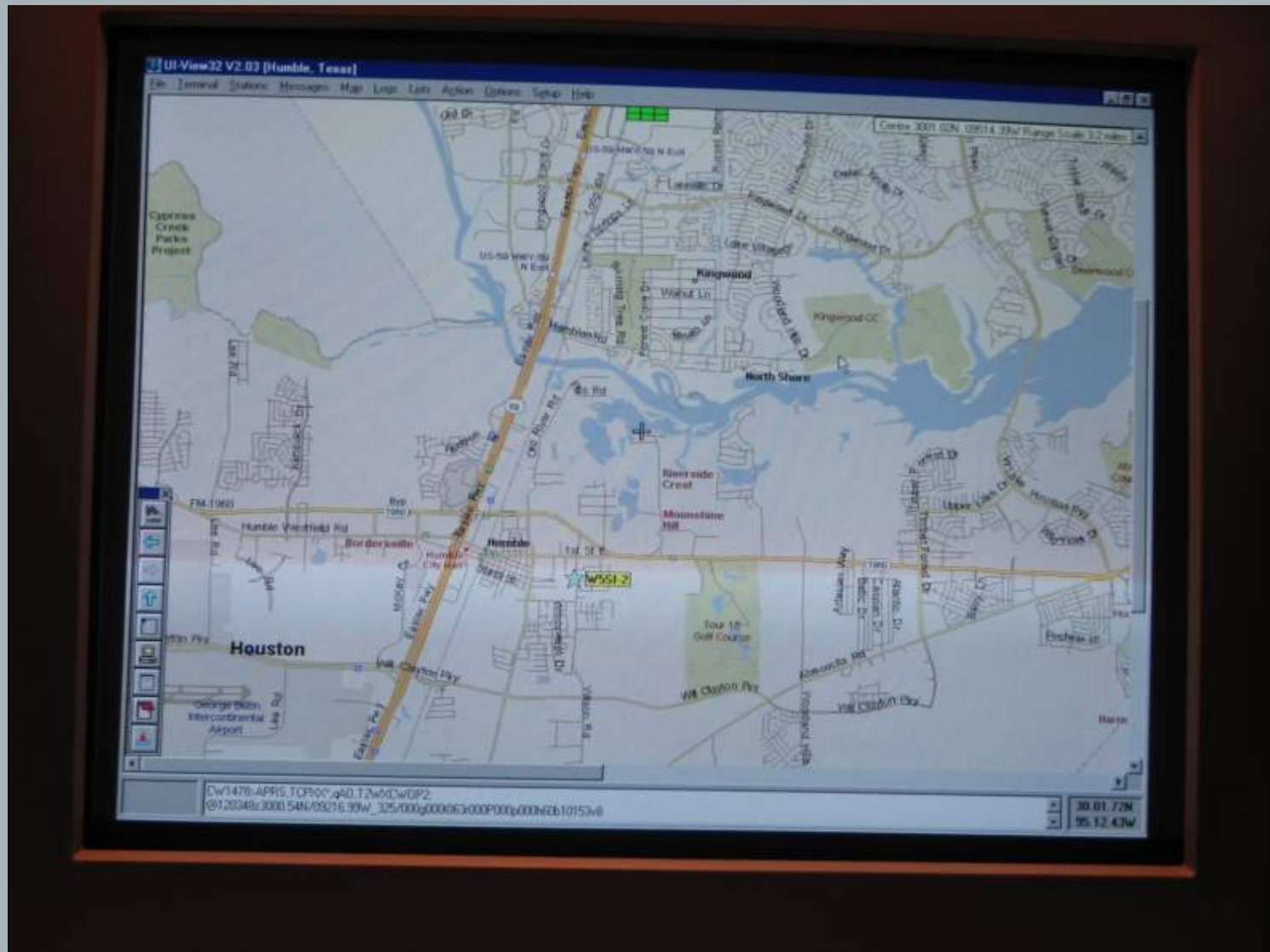
# APRS Local Display Setup



# APRS Options Setup



# APRS



# Typical Telpac or RMS Packet (Winlink) Host Setup

**WL2K Telpac Setup Instance 1**

Initialize Cancel Check TNC Comm AGWPE Ports

Node Call Sign  Connection Timeout (min)

AGWPE  
AGW ports Enabled: 1  
Max Outstanding Frames:  Max Streams:

Enable Logging

IP / Logon Info

IP   
IP port   
ID   
PW

Telnet Hosts

Server Type

IP Connection	Host	Port	Password
default	198.46.75.30	12001	WL2KTELNETCLIENT
default	w0mac.no-ip.info	12001	WL2KTELNETCLIENT
default	n5tw.ecpi.com	12001	W1LL1AMSON

TNC Type:  File Path:

IP Connection Type

Full time  
 Dial Up

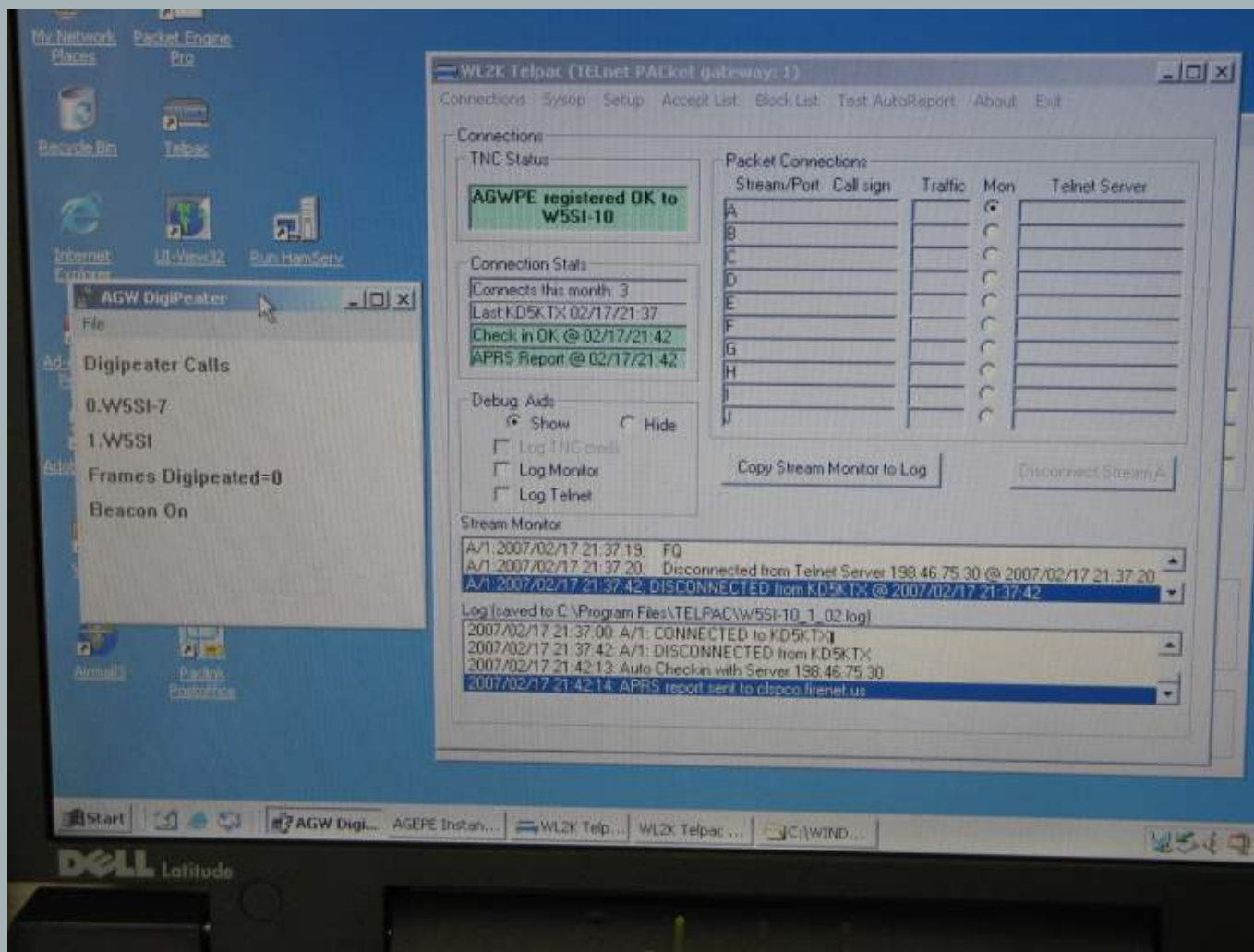
Auto Reporting

Interval (minutes):

Enable Auto Checkin to Host  
 APRS Reporting



# Telpac (Winlink) Monitor Display



# And Special Thanks to All Contributors

KSBJ Site, Antenna, Feedline, Data Port and UPS Power

Alan Isaachsen KB2WF Cabinet  
and MFJ TNC

Hugh Davis W5FM Duplexer

Rusty Herman KB5R Transceiver

Frank Hormann KM5I Construction Site, Labor and Power Supply

Richard Driscoll KD5URB PK-232MBX, AC Power Distribution  
and AGWPE

Calvary Christian Church Paster Rod Bryant KB5WAQ Dell Laptop

Texas Emergency Amateur Communicators (TEAC) Radio Club

# Fast Forward to October 2008

- ▶ *System has been in operation since summer of 2006 with only one failure due to direct lightning strike. (PK232 MBX)*
- ▶ *All components are used except for power supply and AC line filter.*
- ▶ *Typical range is better than 20+ miles radius to typical mobile car setup.*
- ▶ *Airmail stations can access system from same range.*
- ▶ *There has been no indication of any co-channel interference.*
- ▶ *System was used during Hurricane Ike to pass over 350 messages and almost 2.0 MB of data.*

