Chelmsford Amateur Radio Society

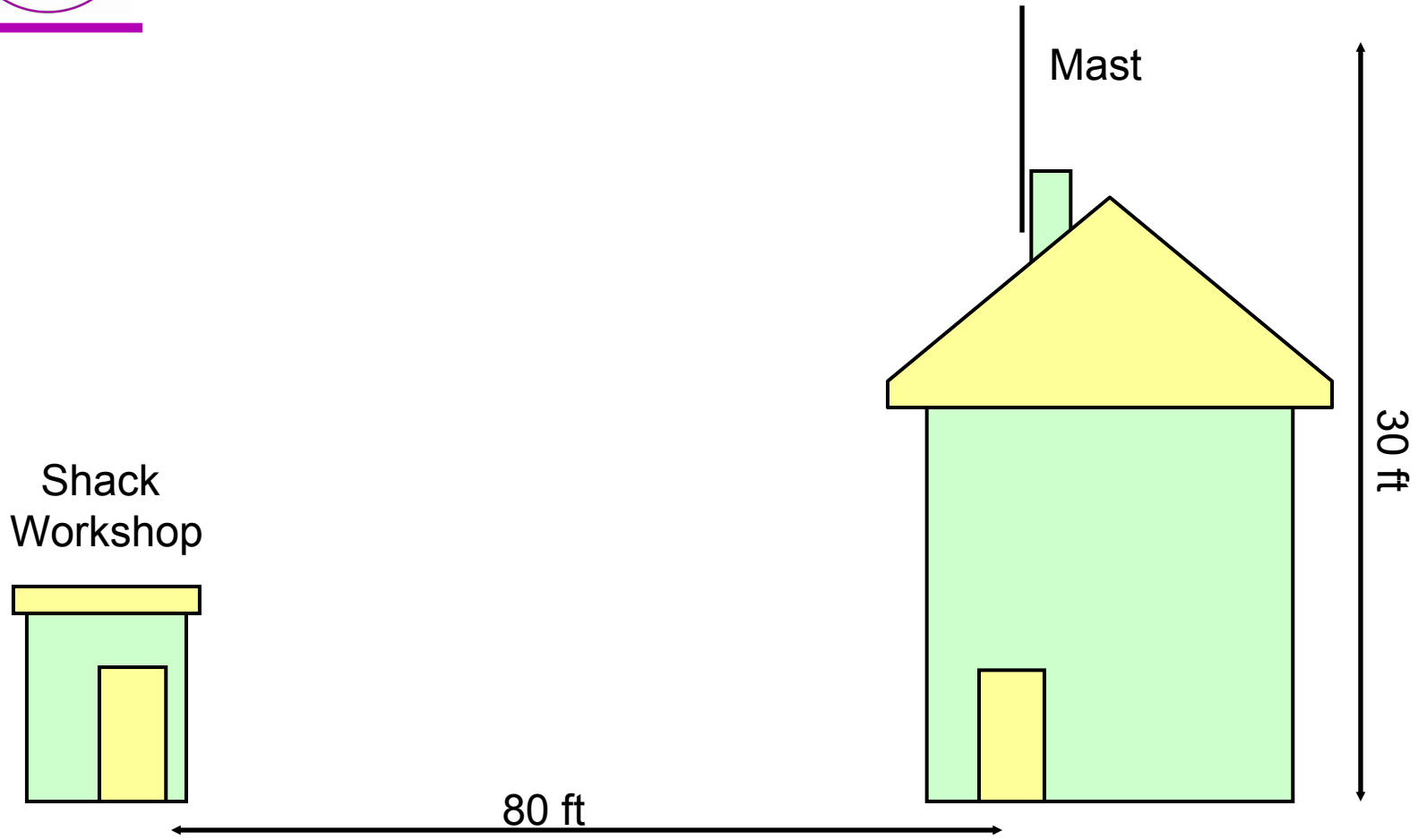
Anthony Martin
M1FDE
1U Xrouter Project

1U Xrouter

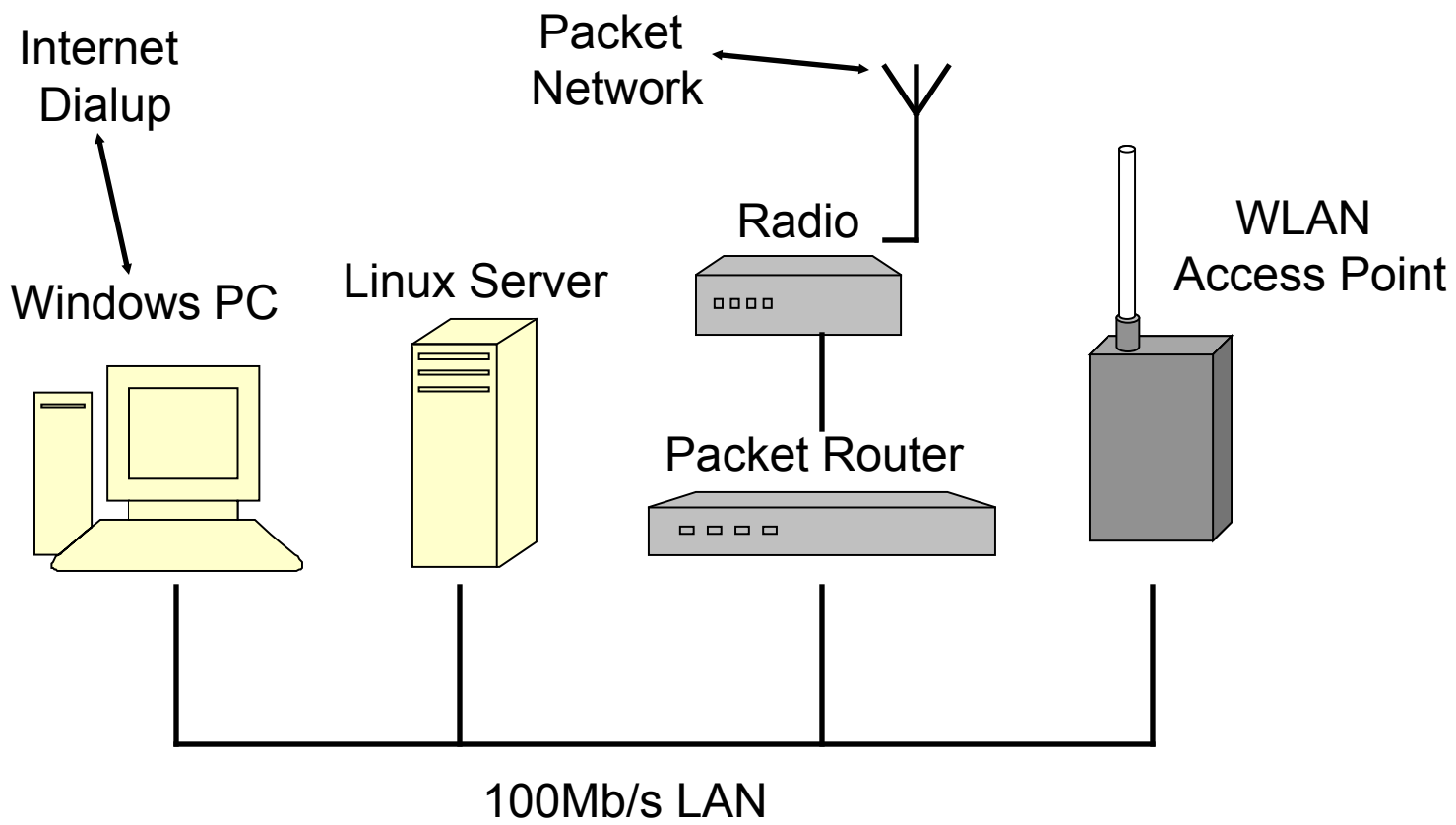
Summary

- 8 Port TNC/Router
- 4 modems
- Ethernet
- No fans or hard disk
- 1U Rack case

Geography



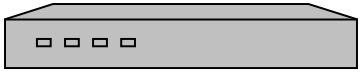
Home Network



Packet Router requirements

- **Remote operation via LAN**
- **Always On**
- **Low power**
- **Low noise**
- **Reliability**
- **Like a big TNC**
  - Xrouter software available
  - Arkwright's till board available
  - Capacity for future experiments

Packet Router



Front panel

- Power & reset switches
- FDD drive - useful for test
- CF card slot – system software and config
- System status – PSU, HDD, LAN
- 8 Channels Tx and Rx status

Arkwright's board

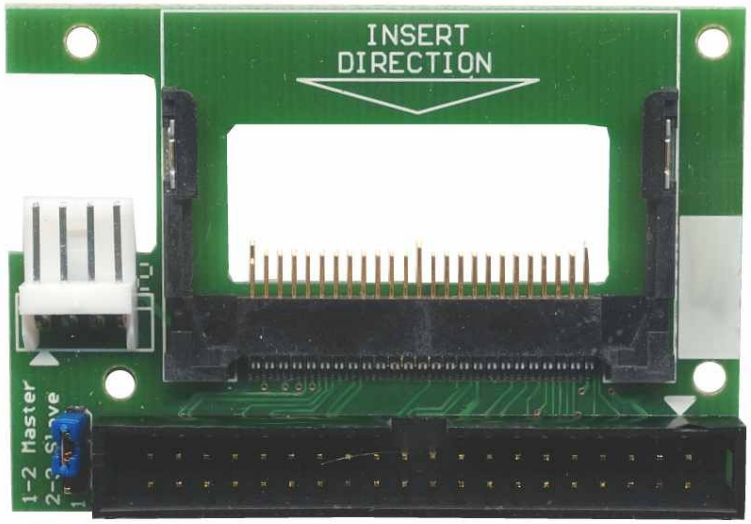
- 80386SX CPU
- 4M RAM
- FDD, IDE HDD
- COM1, LPT1, KBD
- CGA video
- 8x SCC Ports!
- Power input 20W
- Runs DOS, Linux

Compact Flash

- Bootable IDE disk
- Very fast
- Low power
- Removable
- Easy to load software
- Easy to backup disk images
- Backup on Windows using "*Gemulator Explorer*"

CF-IDE adaptor

- **Suppliers:**
  - TAPR
  - linitx.com

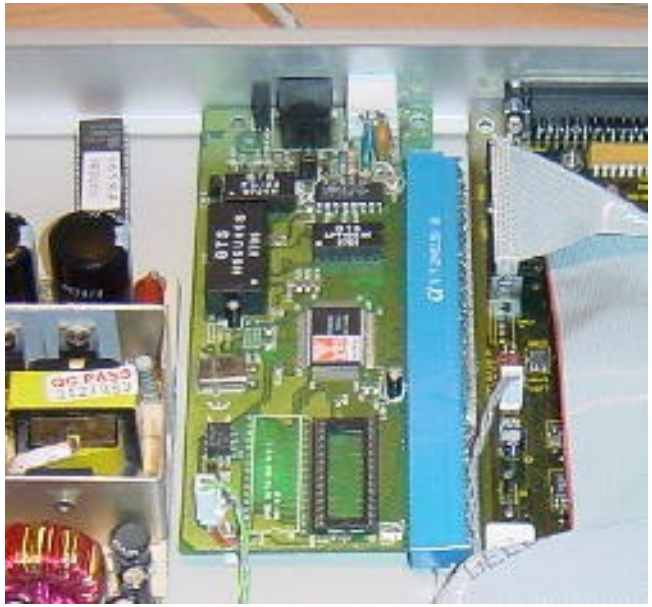


Power Supply

- Modified standard 180W AT
- Select for small transformer
- Replace the heatsinks
- Swop any other high parts
- Check adequate cooling
- Safety - mains on heatsinks

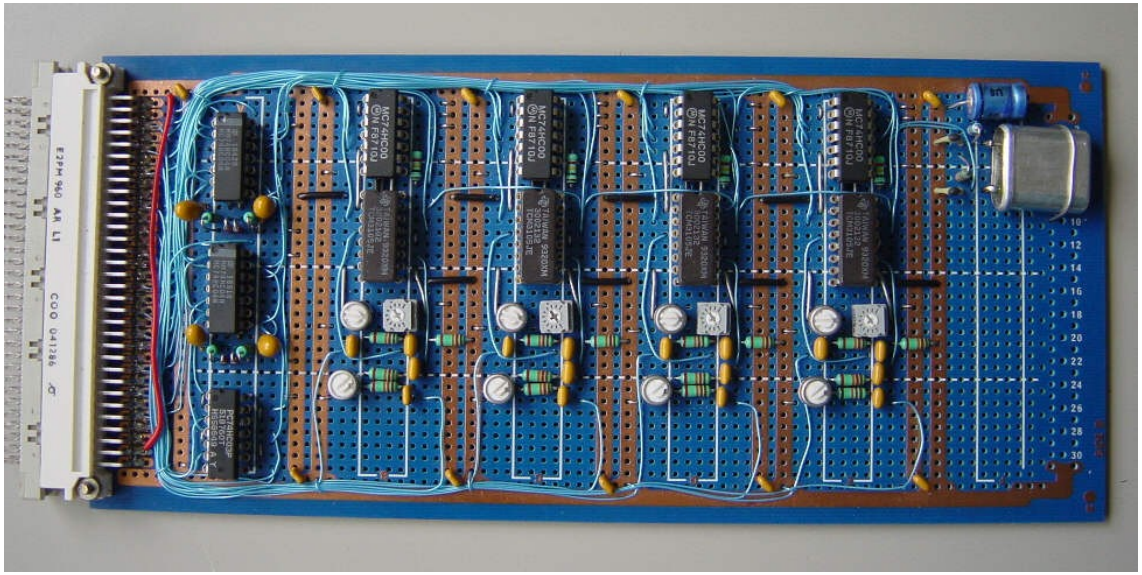
Network card

- **Standard PC NIC**
  - 10Mbit/s
  - 400kb/s FTP
- **10baseT Cat 5 cable**
- **Connection via ribbon cable to AT bus**



Modem board

- Internal modems for 4 ports
- Basic 1200 Baud FSK
- TCM3105 modem chips



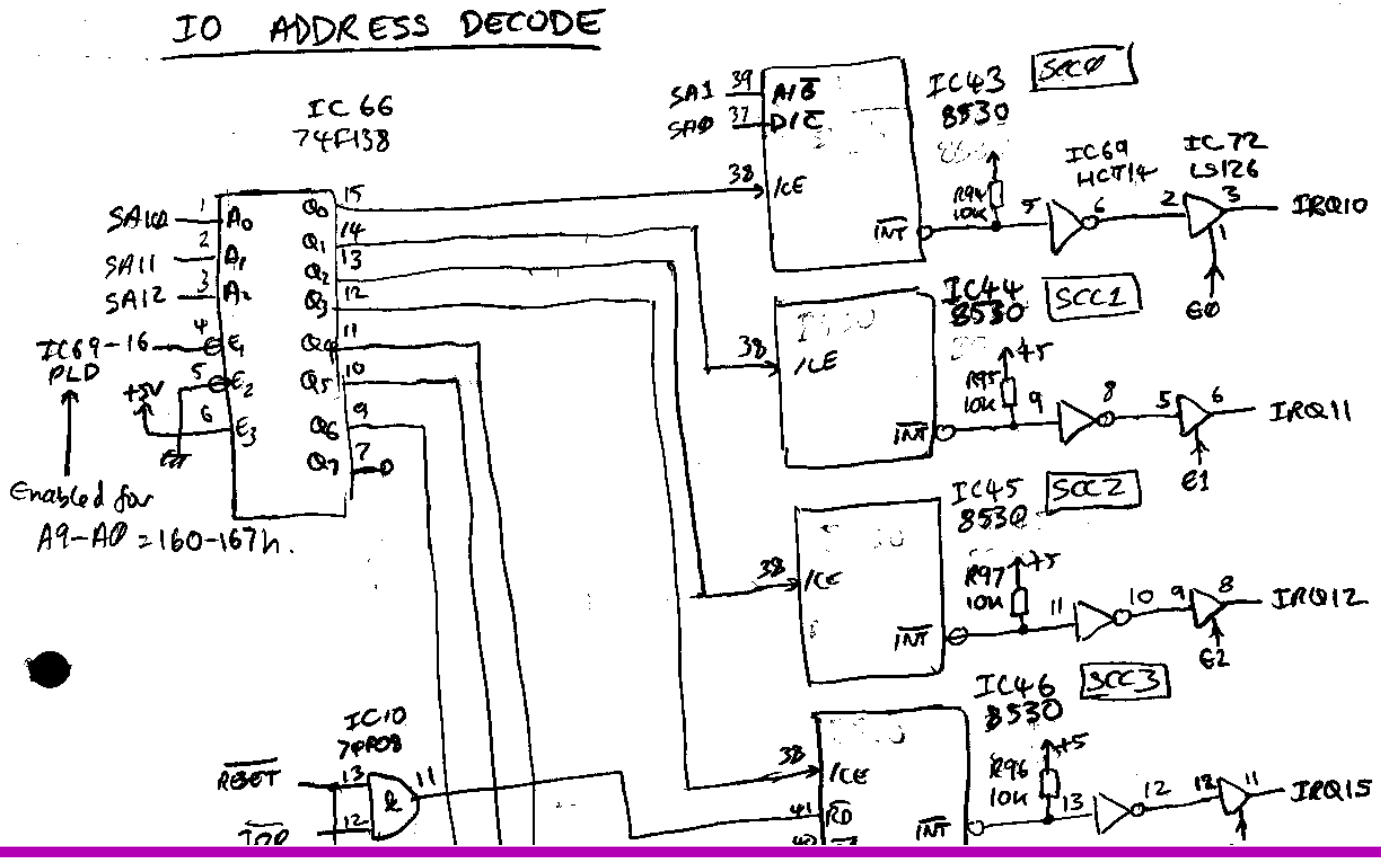
Xrouter Software

- Author Paula Dowie G8PZT
- many network protocols
- many interfaces
- very configurable
- low CPU resources
- Running on FreeDOS
- Running with XFS186 (PC-NFS clone)

Arkwrights' Revenge

- more reverse engineering
- sketch schematics available
- connector & register map document available

Schematic sketches available



Register maps available

Arkwright's Till CPU motherboard

Rev 1.2 Reverse-engineered data by A.N. Martin M1FDE 28 July 2003

This document is designed to document the SCC ports register set. It also documents other aspects of the hardware; particularly those that may be unused but cause conflicts when using high-memory or mapping add-on cards like NICs.

IO Address Map

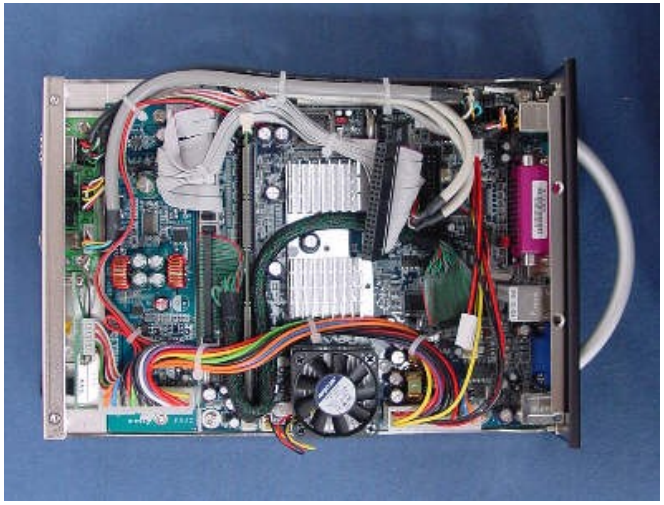
IO Address map	
0x160	SCC0 Channel A control
0x161	SCC0 Channel A data
0x162	SCC0 Channel B control
0x163	SCC0 Channel B data
0x560	SCC1 Channel A control
0x561	SCC1 Channel A data
0x562	SCC1 Channel B control
0x563	SCC1 Channel B data
0x960	SCC2 Channel A control
0x961	SCC2 Channel A data
0x962	SCC2 Channel B control
0x963	SCC2 Channel B data
0xD60	SCC3 Channel A control
0xD61	SCC3 Channel A data
0xD62	SCC3 Channel B control
0xD63	SCC3 Channel B data
0x1160-0x1167	Read buffer 0

Project Status

- **Hardware nearly all tested**
- **Router works on air**
- **Connect over LAN via telnet from Winpack**
- **Final modem tests**
- **to be done**
  - Test G8PZT's support for Arkwright SCCs
  - Control of RC748 transceivers

More ideas

- 1GHz PC
- Smaller than a TNC
- Fit CF-card drive
- Run Win95+AGWPE
- or run Linux
- Dual port TNC?
- Below £300
- *linitx.com*



Future projects

- **Low cost RF circuits for Tinytrak**
- **High rate RF modems**
  - lowest cost vs. programmable architecture
  - RF out, KISS-in (Ethernet in? or PCI card?)
  - 23 cms? (All bands?)
- **Server applications scripting; new kinds of services**

- **Operating; time permitting!**

Contacts and links

- **http://www.g8pzt.pwp.blueyonder.co.uk/**
- **http://www.tvipug.org/arkwright/arkindex.html**
- **http://linitx.com/**
- **Anthony Martin M1FDE**
  - http://homepage.ntlworld.com/mtn/
  - mailto://m1fde@g0mwt.org.uk/
  - http://www.g0mwt.org.uk/

M1FDE