

# Fun New Ways to use D-Star



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Livermore Amateur Radio Klub

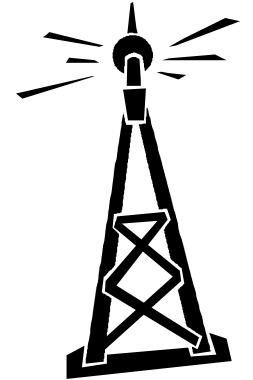
# Digital Ham Radio?

I've done it. Got my Novice license in 1959



Well, CW was the 1<sup>st</sup> digital mode...

# What's New, What's Classic?



I only go back to the SSB vs. AM wars

- First transmitter: Globe Chief Deluxe (75 watts CW)
- Upgraded in 1960, added VFO & screen modulator (AM)
- In 1961 I went SSB
- The AMers could not stand the squawks coming out of their receivers
- Yet today I can still hear AMers on the air

What did I learn?

- Many of us don't like change
- The old ways were super and we should keep them
- But new ways are also fun

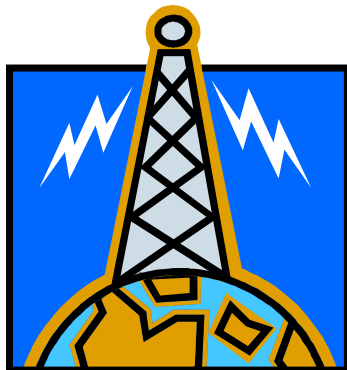
# Digital Ham Radio?

- RTTY has been around for years
- PSK31 and many others use PCs for keyboard to keyboard QSOs via RF
- Ever seen someone having a PSK QSO?
- Can you spell Macro?



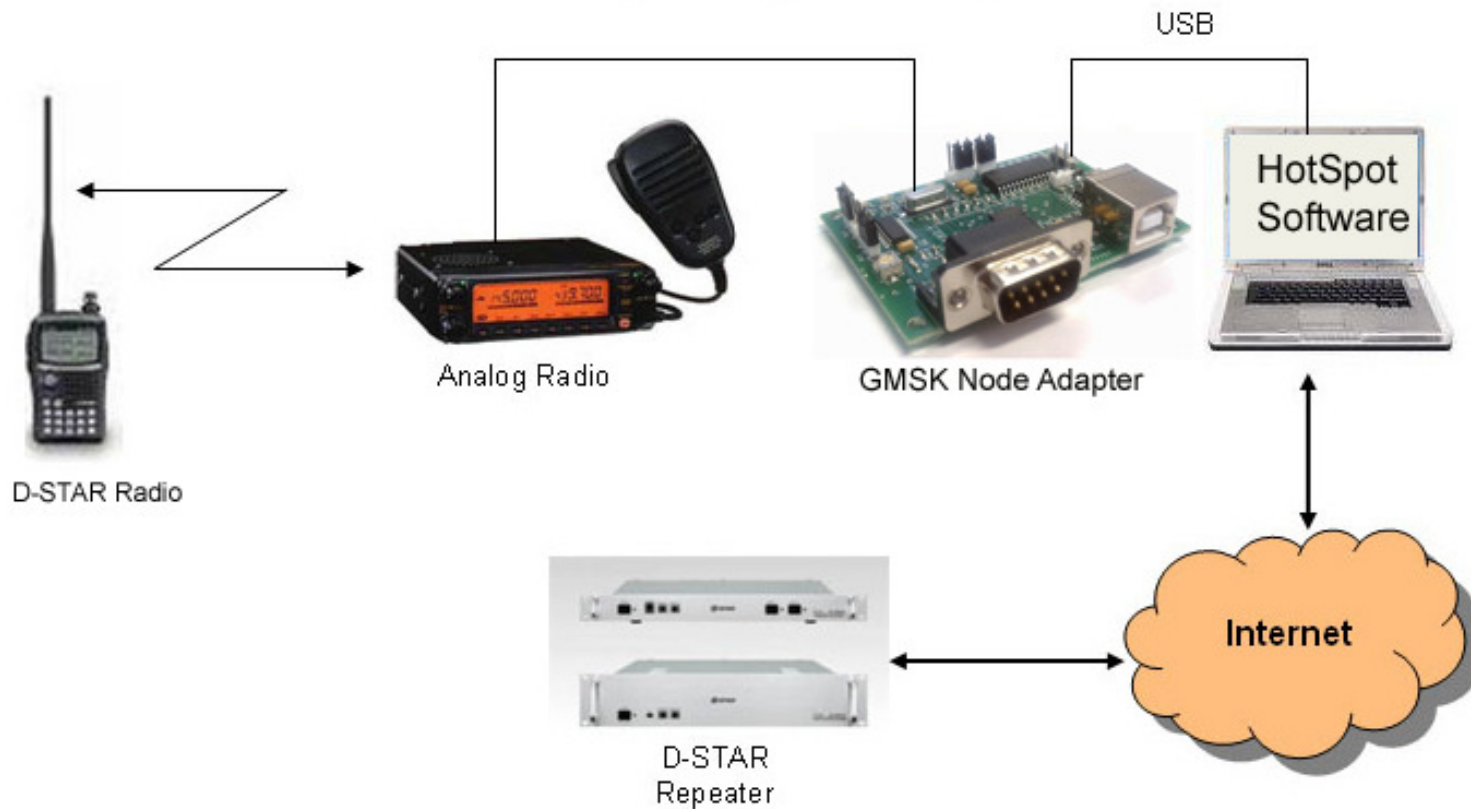
***BANG. ONE KEYSTROKE AND  
WE'VE EXCHANGED 5-9, QTH,  
HANDLE, 73 & VERY BEST DX  
TO YOU & YOUR FAMILY --***

# D-Star: Most successful Digital Voice mode so far

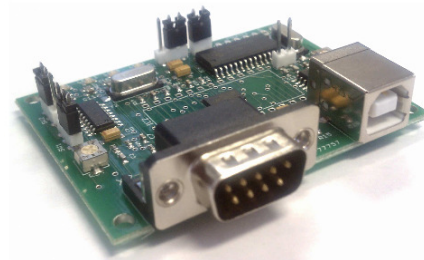


- JARL facilitated open RF protocol using AMBE chips for CODEC
- Only ICOM so far has produced radios
- K6LRG (Ian W6TCP, Trustee), K6MDD, W6CX are some of the Bay Area D-Star repeaters
- Hams have begun to homebrew extensions to D-Star, including HotSpots

# What's a HotSpot?



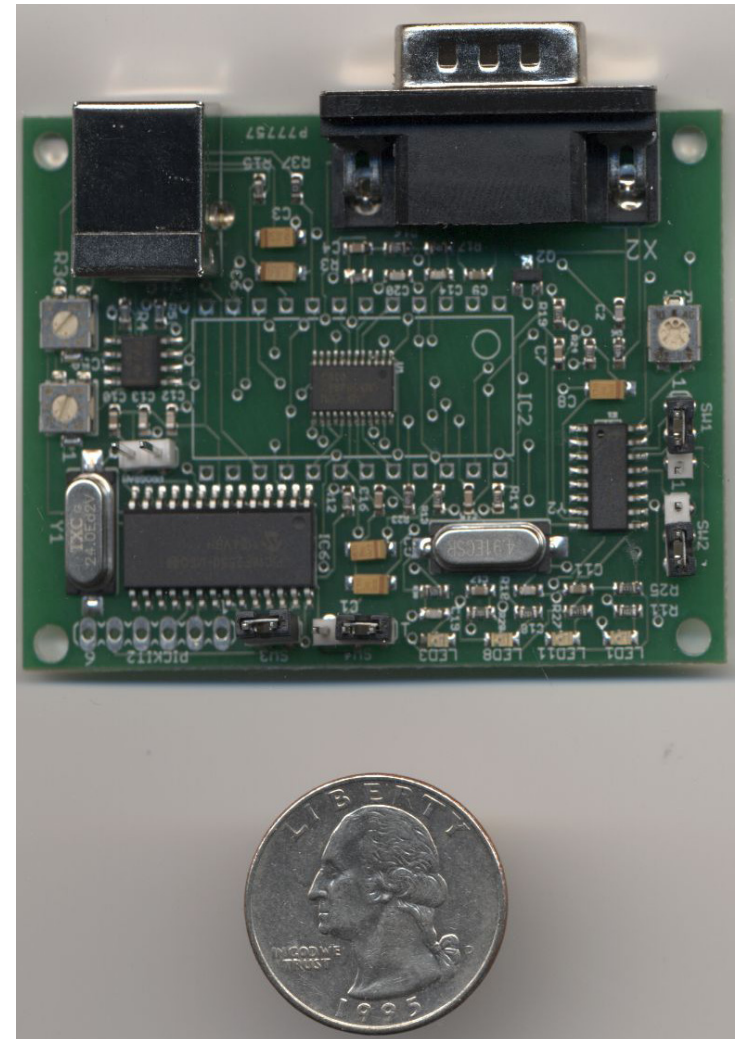
# Why HotSpots?



- **If your QTH has no RF access to a D-Star repeater**
- **Or (like my QTH) is in a multipath shadow**
- **Or you want to link to whatever repeater whenever you want**
- **Or you need extra power for extra range**
- **Analog Radio must provide access to discriminator and to direct FM modulator (9600 Data Port normally works)**
- **PC runs free software (DVAR, WinDV, others)**
- **GMSK Modem interfaces the PC and the radio**

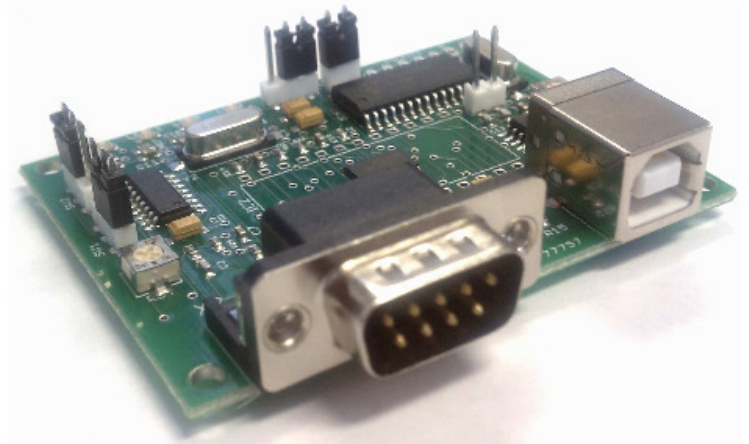
# Just what is a GMSK Node Adapter?

- **Also called Mini Hot Spot (MHS) or GMSK Modem**
- **TX: generates gmsk audio for analog FM transmitter**
- **RX: demodulates audio for processing by PC**
- **Decodes the gmsk protocol (headers, routing info)**
- **Does NOT decode or generate Digital Voice stream**
- **So you need a D-Star radio to use it**
- **Relatively inexpensive**



# GMSK Node Adapter Sources

- **Fred van Kempen PA4YBR**
  - <http://www.dutch-star.eu>. Provides “mini hotspot” boards, related hardware, firmware and tools.
- **Matrix Circuits & MoenComm**
  - <http://www.moencomm.com>. Provides built SMT boards based on PA4YBR’s design, comes with DUTCH\*Star firmware and tools.
- **Satoshi Yasuda 7M3TJZ/AD6GZ**
  - <http://d-star.dyndns.org/>. Designed the first Node Adapter. Also produces firmware and tools.



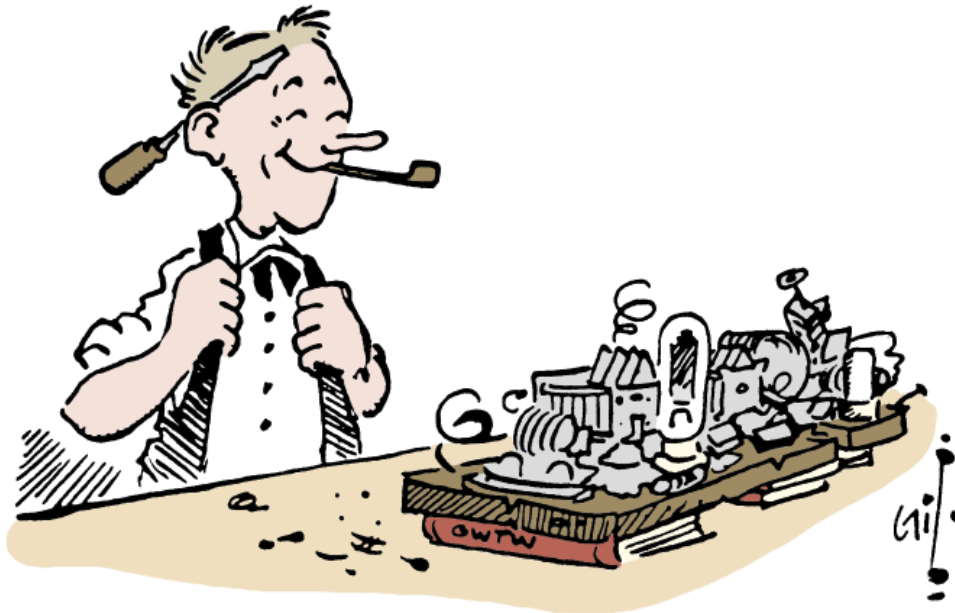
# 5 Simple Steps to Setup HotSpot

Check out [www.k6jm.com/dstar](http://www.k6jm.com/dstar)



1. Register on the D-Star network
2. Install software tools to configure & test
3. [Load firmware on GMSK Node Adapter board]
4. Configure and test board
5. Install & Configure software (e.g. DVAR, WinDV)

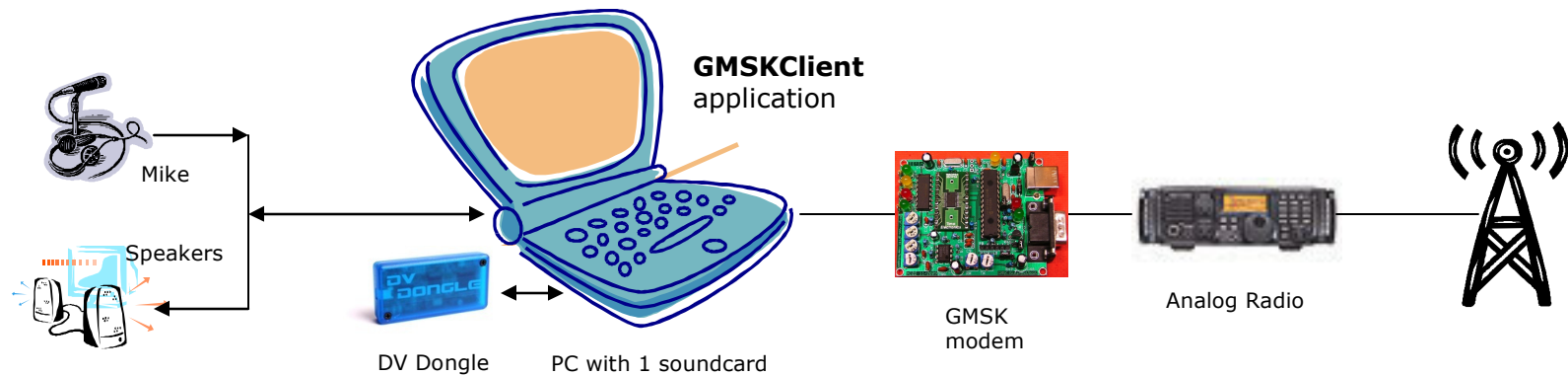
# More uses for GMSK Node Adapter



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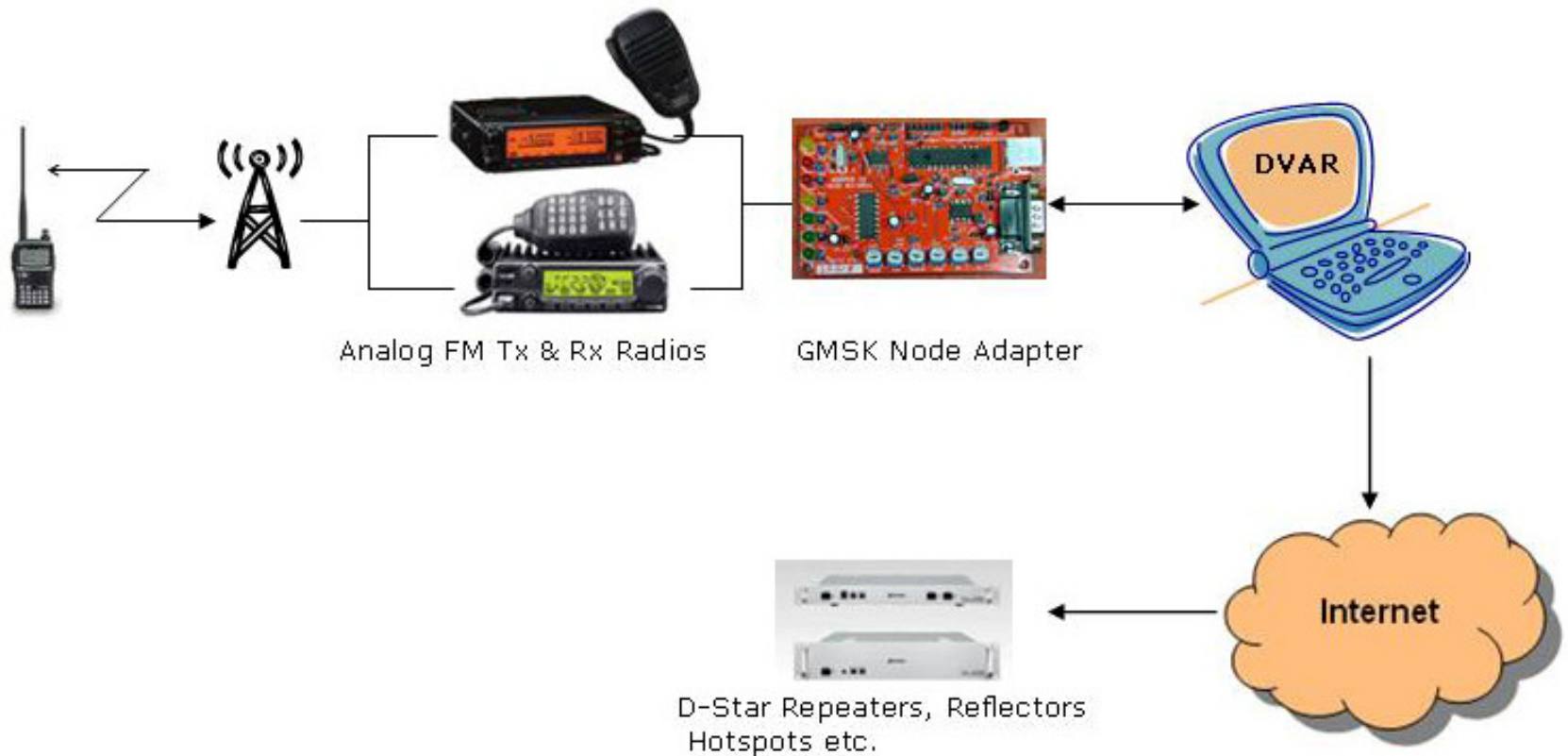
- Convert analog FM radio to D-Star DV
- Put up inexpensive DV repeater using analog radios

# Transmit D-Star DV over Analog FM radio



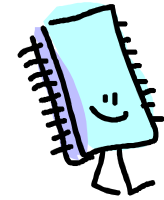
- PC App: **GMSKClient** by Jonathan Naylor, G4KLX (Windows, Linux)
  - Available in Files section of "dstar\_development" Yahoo group
- Analog radio with 9600 Data port (VHF/UHF or HF)
- GMSK node adapter same as used by HotSpot
- DV Dongle provides access to AMBE codec chip used to encode/decode DV
- Talk to those IC-9100s using D-STAR on 6 and 10 meters
- D-STAR DX on HF!
- Inexpensive
- Cheaper than the Alternative
  - DV Adapter 2.0 (\$600) has LCD, control pad, does not need PC

## A GMSK Node-Adapter D-Star Compatible Repeater



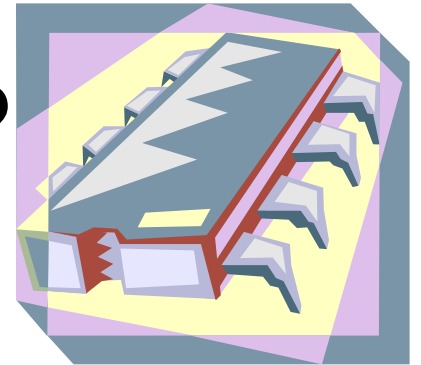
- Hardware is not expensive (but don't forget the duplexer)
- Choices for software: WinDV, DVAR are simple
- G4ULF (Linux) creates G2 compliant D-Star Repeater
- G4KLX "GMSK Repeater" + ircDDB Gateway

# What's in the Works?



- New DSP boards with powerful CPUs
  - Fewer dedicated chips, software does the work
  - DV-RPTR (Germany)
    - Open source firmware and board design
    - Very new, slow delivery, but should improve
    - May represent future design model for ham boards
  - ON8JL's Standalone D-Star Node
    - Large processor, ethernet connector
    - Firmware does what PC normally does
    - New and very expensive, but interesting

# What else is coming?



- Boards with AMBE codec chip
  - Plug headset into Hotspot board, hear and generate D-Star digital voice
  - Don't need D-Star radio in the shack
- Cheaper DV Adapters
  - Add D-Star to analog radio without needing a PC)
  - Add AMBE chip, LCD and control pad
- All kinds of new software

# Shameless Plug



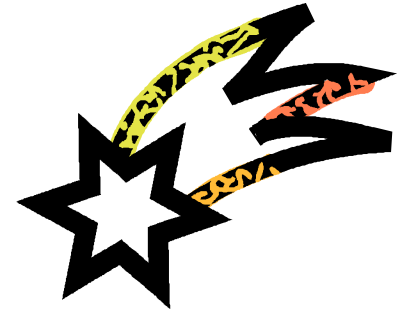
**MOENCOMM**

DIGITAL AMATEUR RADIO



- [www.moencomm.com](http://www.moencomm.com)
- I sell the Star\*Board Node Adapter
- Includes DUTCH\*Star firmware
- \$119 SMT board
- Professionally fabricated
- Great support

# Summary



- Do It Yourself is still fun
- This stuff is easy - We can all do it
- Lots of support available
  - Getting Started: [www.k6jm.com/dstar](http://www.k6jm.com/dstar)
  - Yahoo Groups:
    - gmsk\_dv\_node
    - dstar\_development
    - gmsk\_dv\_modem
    - DVRPTR
  - Vendors' sites:
    - MoenComm K6JM [www.moencomm.com](http://www.moencomm.com)
    - Fred van Kempen PA4YBR [www.dutch-star.eu](http://www.dutch-star.eu)
    - Satoshi Yasuda 7M3TJZ/AD6GZ [d-star.dyndns.org/](http://d-star.dyndns.org/)