- Presented to SASTAR
- 20220221

Go-Kit Building

Design Considerations

VE6 AI7LK

Vince d'Eon, VE6LK/AI7LK
RAC AuxComm Assistant EC, Membership Director
Foothills Amateur Radio Society
Okotoks, Alberta, Canada

Presentation Overview

1. **Who's Vince?**
2. **Go-Kit Types**
3. **What's in a Go-Kit?**
4. **What's your Purpose?**
5. **What's in my Kit?**

Who's Vince?

- Amateur Radio – interested at age 7, licensed at 40
- Public Service – my very first event was, for me, a ~~train wreck~~ ***tremendously fulfilling learning experience***
- ICS level 300 certified
- ARES/AuxComm, Alberta Foothills area
- Ham Radio Workbench podcast team member
- I help out with repeaters and projects in my club
- I build stuff for my radios to make my hobby more enjoyable
- PADI AOW and EAN certified. Self-certified musician since '69

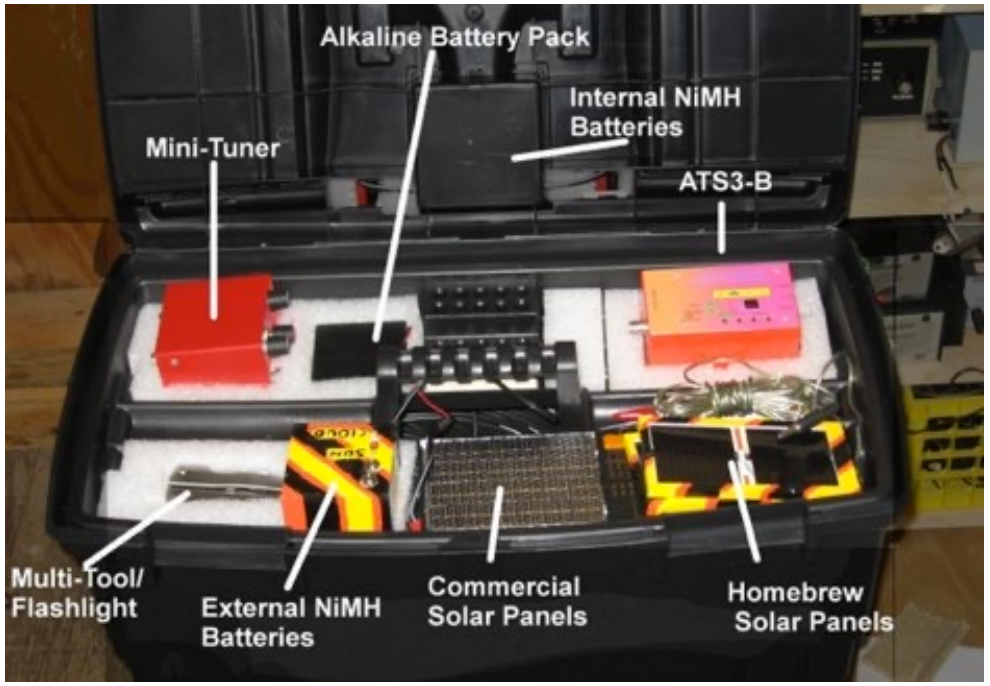
Go-Kit types

Go-Kits fall into two main categories

1. Those that fit in a bag of some sort
   - Backpack
   - Camera
   - Laptop
2. Those that fit in a box of some sort
   - 19” Rackmount case eg. “Gator” and others
   - Plastic suitcase
   - Built to suit

And two sub-categories

1. Battery powered
2. Grid powered



What's in a kit?

All kits have at least these items:

- Radio
- Power distribution

Beyond the box or the bag you need

- Antennas
  - And antenna supports
- Feedline
- Power cables
- Manuals for your gear

Some kits have these things too:

- More than one radio
- Microphone. CW Key. Digital interface. Computer.
- Power meter
- Antenna Tuner
- External speaker(s)
- Battery. Charger. Solar panel.

And stuff to make your life easier:

- Paper/pencil/pen/Sharpie/clipboard/notebook/highlighter/tape
- Coffee mug/Water bottle. Fuel Bar. First Aid Kit.
- Fresh clothing. Adequate food. Lighting. Poncho.

What's your Purpose?

Define your purpose

- Why: Camping/POTA? Events? EmComm/AuxComm support?
- Where used: Picnic table? Indoor? Mountaintop?
- Frequencies: HF? V/UHF?
- Operating modes: CW? Voice? Digital?
- Operating power level: 5W? 100W?
- Purpose for QSOs: Casual? Contest? EmComm?

Define your electrical requirements

- Source of power: commercial mains, generator, battery, solar
- Operating TX power level: 5W? 25W? 100W?
- Length of operating time: a few hours? Unlimited?
- Location of power: close by or distant?

Sidebar - - Let's do the math for a battery:

- Assumption: FT-8900 FM rig on 2M at 50W
- Assumption: Busy Event Net Control station 40% Talk 60% Listen
- Assumption: 8h duration
- FT-8900 manual says TX Current = 8.0A and RX Current = 0.8A

- Transmit: 8h X 40% X 8A = 25.6Ah *add* Receive: 8h X 60% X 0.8A = 3.84Ah
- = 25.6Ah + 3.84Ah = 29.44Ah of battery required
  - *Add battery (or charging) to allow for overtime or cold weather or voltage sag*

- Add up power consumption of ***all*** devices in your kit
- Power consumption duty cycle varies by mode (TX/RX)
  - Vince's rules for a TX busy station: FM 40/60 -- Digi 40/60 -- CW 40/60 -- SSB 25/75

Define your mechanical requirements

- Size: Tiny? One-hander? Luggable? Needs a crew of roadies?
- Weight: 3 lb? 10 lb? 50 lb?
- Form factor: Small bag? Backpack? Suitcase? Dedicated vehicle?
- Setup location: Table needed? Sits on the ground? Body-worn?

What's in my kit?

My design requirements

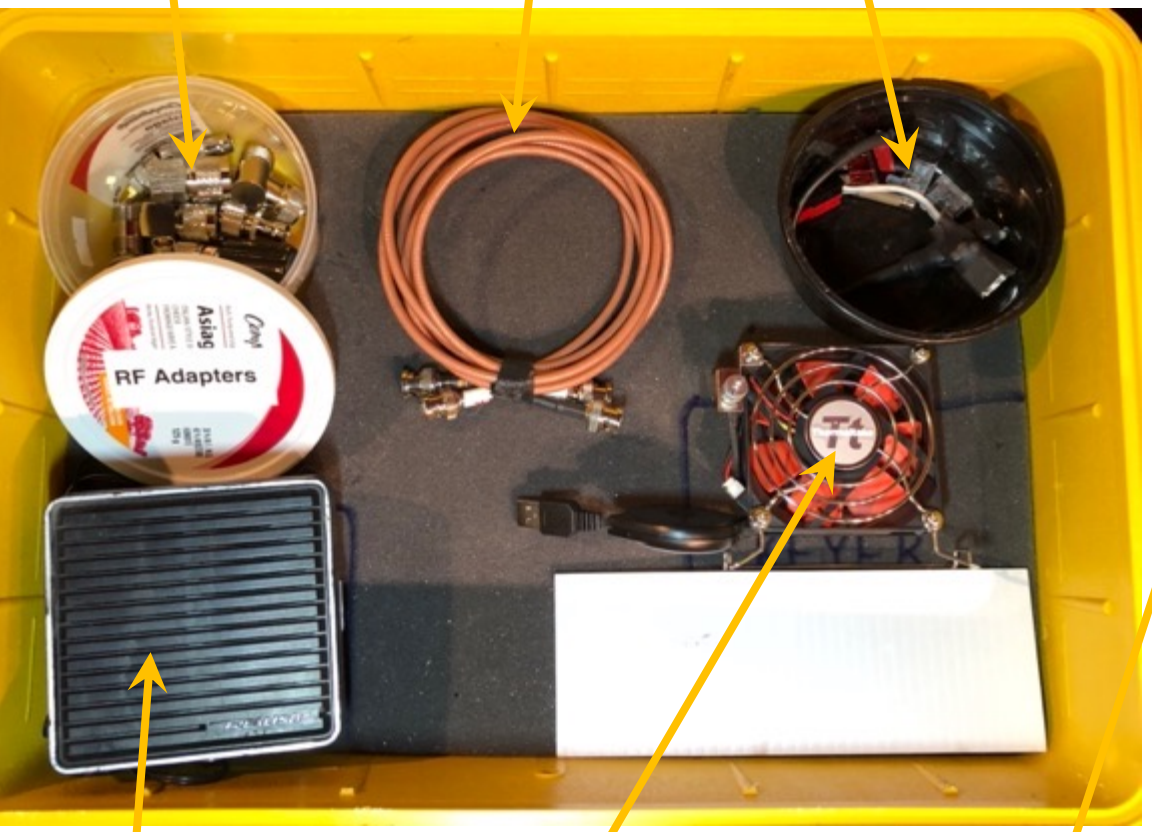
- Where: Indoors – EOC, Logistics/Net Control, or glamping
- Power: 120VAC Mains, 12VDC optional “just in case”
- Frequencies: Coverage from 80m to 70cm
- Operating modes: Phone, CW, Digital
- Operating Power Level: up to 100W
- Purpose: Event Support, Disaster/AuxComm support, glamping

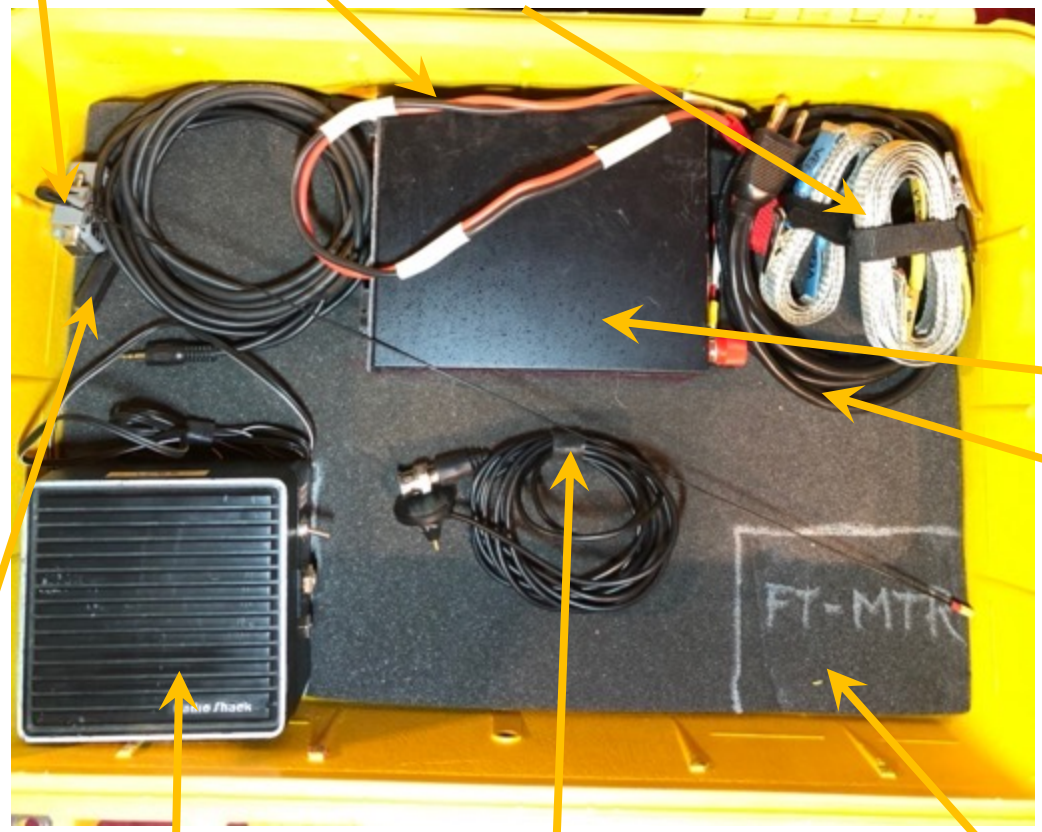
Must have items

- Multiple concurrent V/UHF VFOs (Two is one, one is none)
- External amplified speaker, headphone distribution amp
- Each piece must be one-arm carryable and rugged for transport

Operator point of view


Yaesu VX-7 with Drop-in charger
External Speaker
Creature Comfort Device
12V Distribution
120V to 12V Supply (below)
External Speaker
50Ah 12V LiFePo4
5W UHF Data Radio TNC "Winlink To-Go"
H'Phones Amp 1 channel is 2.5W for speaker
LDG Z-11 ProII HF-6m tuner
SignaLink USB Sound Card
FT-8800 Dualband Crossband
FT-857D Allmode 160m-70cm
FT-Meter
Toughbook CF-53 i5 8GB 200GB SSD Win7





Assorted RF Adapters

Short RG-400 Jumper cables Spare

12V to USB cables

FT-857 CAT Cable

12V to Left case

5’ and 10’ flat Grounding cables

Powerwerx 30A supply

Powerwerx AC cable

External speaker 1 of 2

Creature Comfort Device

Headphone Extension Cable

External speaker 2 of 2

Dualband 19” Mag Mount antenna

FT-Meter Goes here

Other gear

- 3x 50’ RG-400 feedline + spares
- 80/40/20m fan dipole
- Comet HFJ-350m vertical + tripod
- Diamond X50 V/UHF antenna
- 30’ push-up mast, guy ropes, stakes
- 120VAC extension cables
- Headphones (Heil Pro 7, Sony)
- CW Key
- Panasonic CF-53 Toughbook

Problem solvers

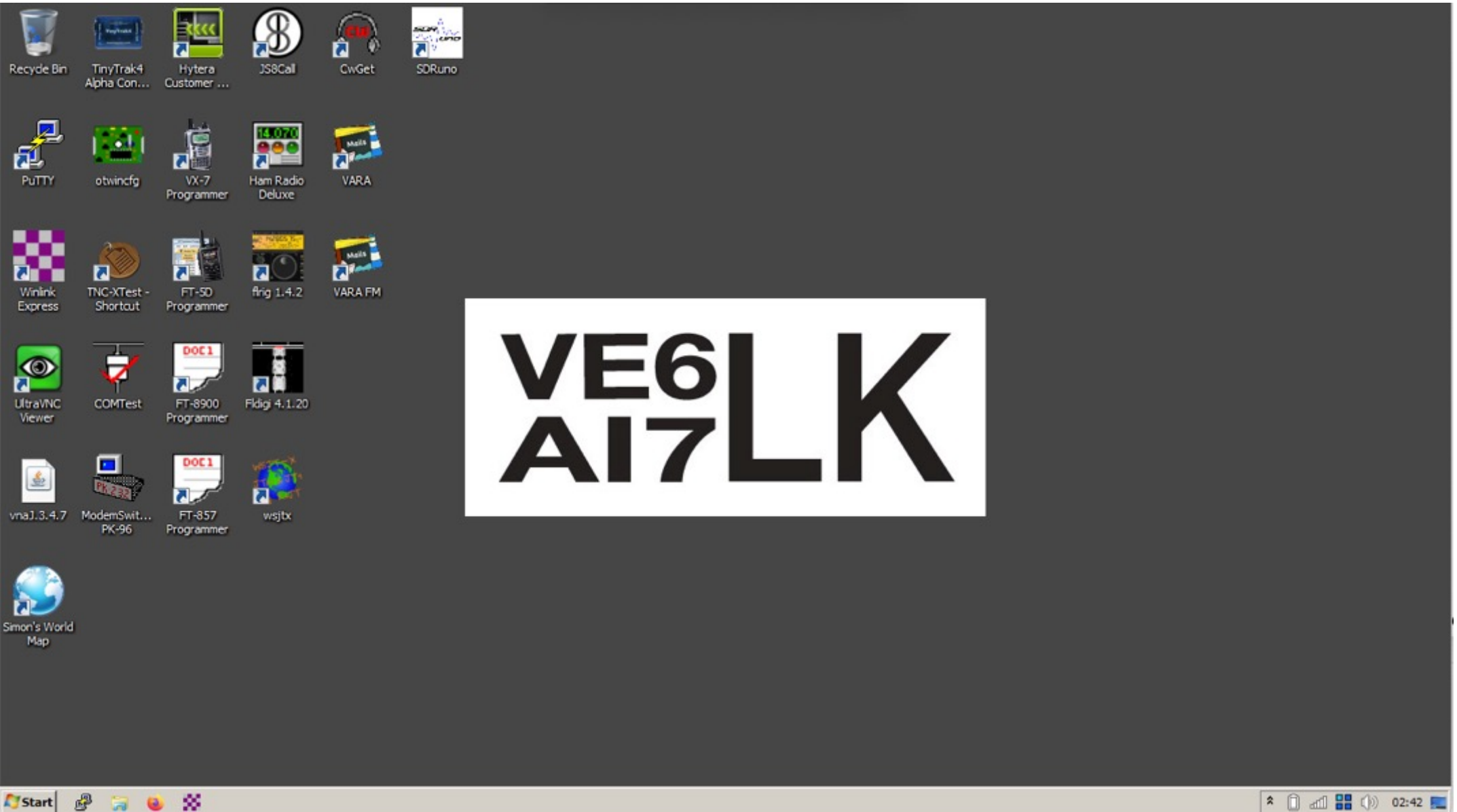
- 3M Blue painter’s tape
- Assorted Sharpie Markers
- Paper/Pen/Pencil/Clipboards
- Dollar store carabiners
- Lee Valley Tools rare earth magnet hooks
- Set of hand and soldering tools
- Extra feedline (100’ RG8X)
- Extra V/UHF mag mount whips
- Antenna Analyzer


behringer
SPKR
INPUT
MicroAMP
HA400
AMPLIFIER
ON
LEVEL 1
LEVEL 2
LEVEL 3
LEVEL 4
0
10

What is the computer?

- Panasonic Toughbook CF-53 MK4
- Magnesium alloy case
- Long battery life
- i5-4310U processor (not a speed demon)
- 8GB RAM, 200GB Solid State Disk
- 14” Daylight viewable screen, 1366x768
- 5.9 pounds and integrated carrying handle
- All the I/O ports you can imagine, it has. And then some.

What's on the computer?



www.ve6lk.com

Summary

- Use the Kepner-Tregoe method
  - determine your *must have* and *nice to have* items
- Evaluate Purpose, Locations for use and Mechanical considerations

Purpose, Electrical, and Mechanical design elements
determine functionality and kit building points

Narrow focus = light weight

however

Highly Flexible <> light weight

Q&A / Contact

Vince d’Eon, VE6LK/AI7LK

 ve6lk@rac.ca

 www.ve6lk.com

 @ve6lk