Single-Op and Multi-Op Contesting

Randy Thompson, K5ZD

• CTU •
CONTEST UNIVERSITY

ICOM

Single Operator Category

- One human does all operating
- Unassisted
  - Operator finds all QSOs on his own
- Assisted
  - Use of spotting assistance to find QSOs

Read the rules!
Each contest may have its own rules for single operator.

"Assistance"

- Use of QSO alerting assistance is limited to the Single Operator Assisted and Multi-Operator categories.
- QSO alerting assistance is the use of any technology or outside method that provides call sign and frequency information regarding any other station to the operator.
- Includes use of DX cluster, packet, local or remote call and frequency decoding technology (e.g., Skimmer), Internet chat rooms or web sites, operating arrangements involving other individuals.

Before the Contest

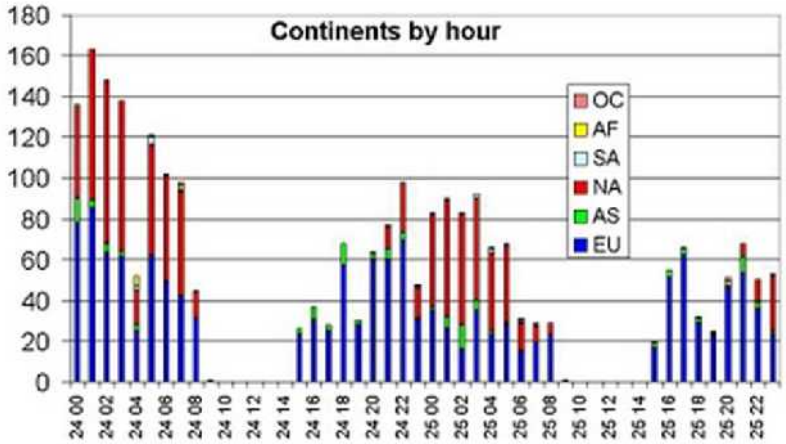
- Understand the scoring
  - Points for each QSO?
  - What is a multiplier?

Score - 3,774,014 Points

Band	QSOs	Pts	Cty	ZN
1.8	7	14	5	5
3.5	143	408	42	21
7	761	2252	59	24
14	401	1142	64	28
21	2021	5980	70	27
28	118	322	14	14
Total	3451	10118	254	119

Score: 3,774,014

- Study past results
  - Do the winners focus on QSOs or multipliers?
  - Where do the QSOs come from?



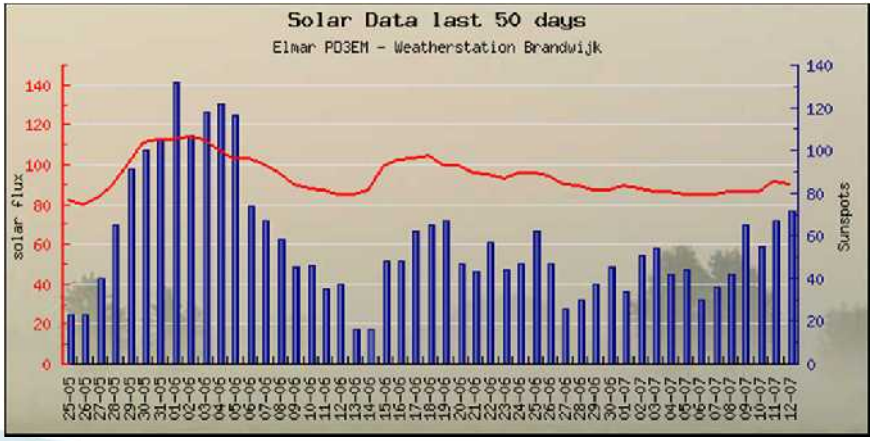
Choose the Game

- Select category
  - All band or single band?
  - Power – High, low, QRP?
  - Assisted or unassisted?

- Set a goal
  - Have fun?
  - Win a certificate?
  - Set a record?

Make a Plan

- What hours to be on the air?
- Operating plan for each band
- When to “run” and when to “search”



Sleep Strategy

- Contests require operating for 24, 36 or 48 hours!

- Get extra sleep the 5-7 days before the contest
- Operating strategy should plan for sleep breaks
- Sleep in intervals of 90 minutes
- Avoid caffeine until needed

Keep Pushing

- Use time wisely
  - The clock never stops
- The next QSO could make the difference!
- Pay attention to accuracy
- Everyone is experiencing the same conditions!

Advanced Operating – SO2R

- Single Operator Two Radios
  - Only **one** transmitted signal at any time

- Why?
  - Use time better – increase score
  - Make better decisions – increase score
  - Reduce boredom – increase score
  - Increase the fun – increase score

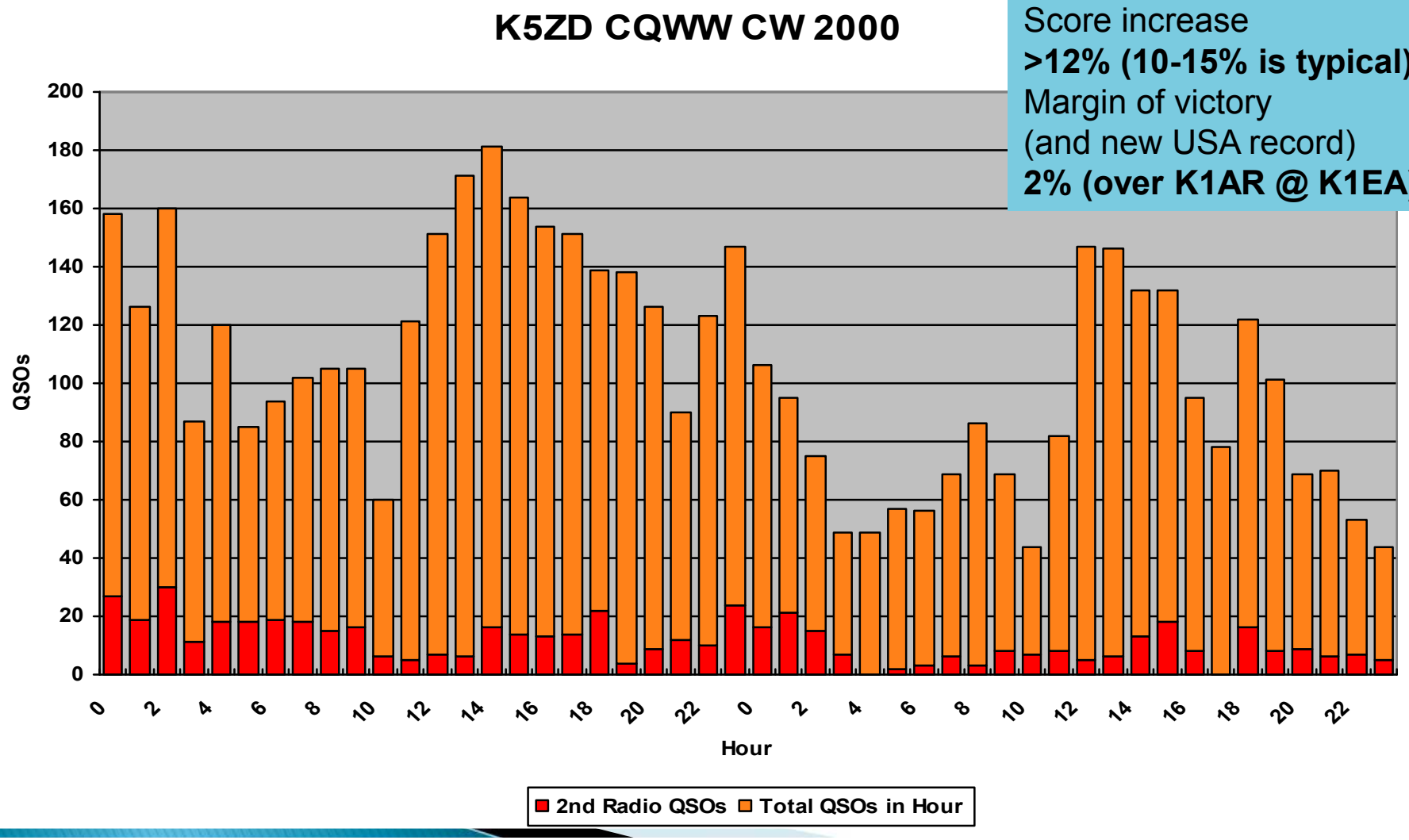
Why Does SO2R Help?

- Winning means…
  - Working the most guys who "aren't in the contest" – they answer CQs
  - Working the most rare multipliers – they answer CQs

- Paradox
  - You have to work everyone else who is calling CQ too!

How Much is it Worth?

Second radio QSOs
550
Score increase
>12% (10-15% is typical)
Margin of victory
(and new USA record)
2% (over K1AR @ K1EA)



How Do You Do It?

- *Call CQ!*

- When transmitting, dial the second rig's VFO!
  - Look for multipliers
  - Look for QSOs (best use of time in low-rate situations)
  - Check for band openings

When is SO2R Most Effective?

- Best when you have:
  - Easy to use station design
    - Efficient audio switching
    - Minimal interference
  - Low to moderate QSO rates
    - Less than 80/hour
    - Especially helpful for low power or QRP

- Least effective when:
  - Very high noise situations
  - You're unable to hold a good run frequency

Important Points

- Don't bother doing two radios until you have mastered using one very well

- Learning takes time…
  - Prepare for a few contests where score may not improve

The Challenges of SO2R

- Achieving zero interstation interference
  - You have to be able to hear while transmitting
- Efficient switching
  - Minimize complexity of using two radios
- Learning the skills
  - Requires practice!

How Do You Get Started?

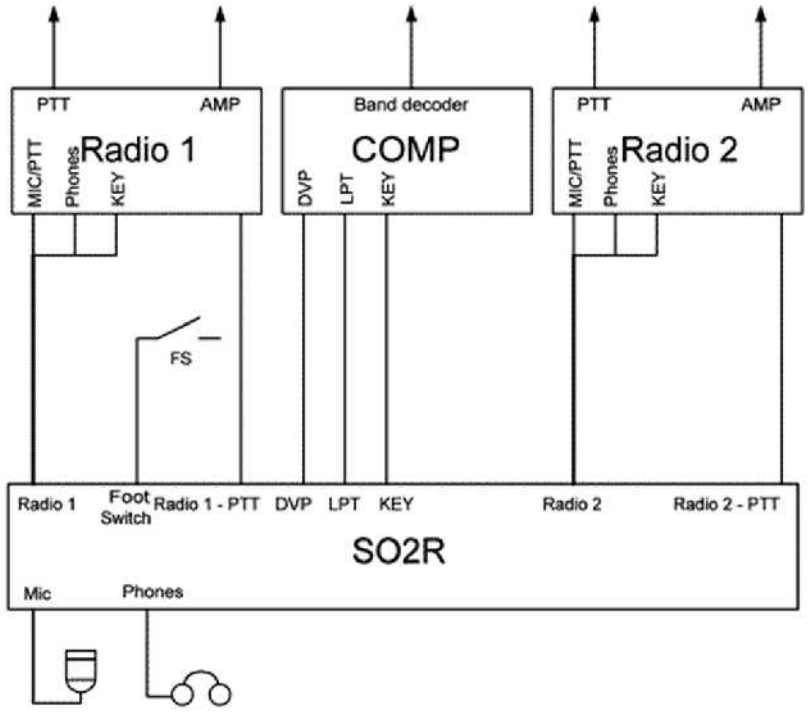
- Add a second radio!

- Minimal setup:
  - Two inexpensive radios, two multiband antennas
  - Manually switch the key/mic line and RX audio between rigs
  - Ensure that you cannot transmit on both rigs at the same time; this is illegal in almost all contests
  - Protect the receiver front end!

Efficient Switching

- The SO2R controller needs to deal with
  - Receiver audio
  - CW key line and/or mic audio
  - PTT
- Station switching deals with
  - Antenna feedlines
  - Associated band-pass filters or coax stubs

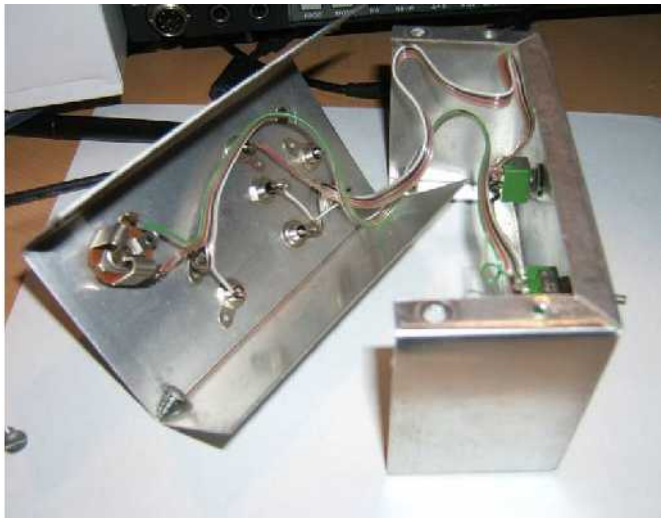
Typical SO2R Setup



Source: http://www.ok1rr.com/view.php?cisloclanku=2004122505

My First SO2R "Controller"

Front View



Inside View

Rear View

SO2R Controllers

- Ham Radio Solutions, EZMaster, $600+
- microHAM MK2R, $800+
- Top Ten DX Doubler, $200+
- W5XD MK-1100 Keyer, no longer avail
- Array Solutions SO2R Master, no longer avail
- Home-brew solution, <$100 depending on features and parts used.

Computers and Software

- Interface rigs to PC
  - Frequency control (serial/USB interface)

- Use all the control outputs available to you
  - CW output (serial or parallel) and paddles (parallel)
  - PTT output to key radio(s)
  - Radio A/B select output for switching receiver audio/CW/voice
  - Parallel port band data for antenna and filter selection

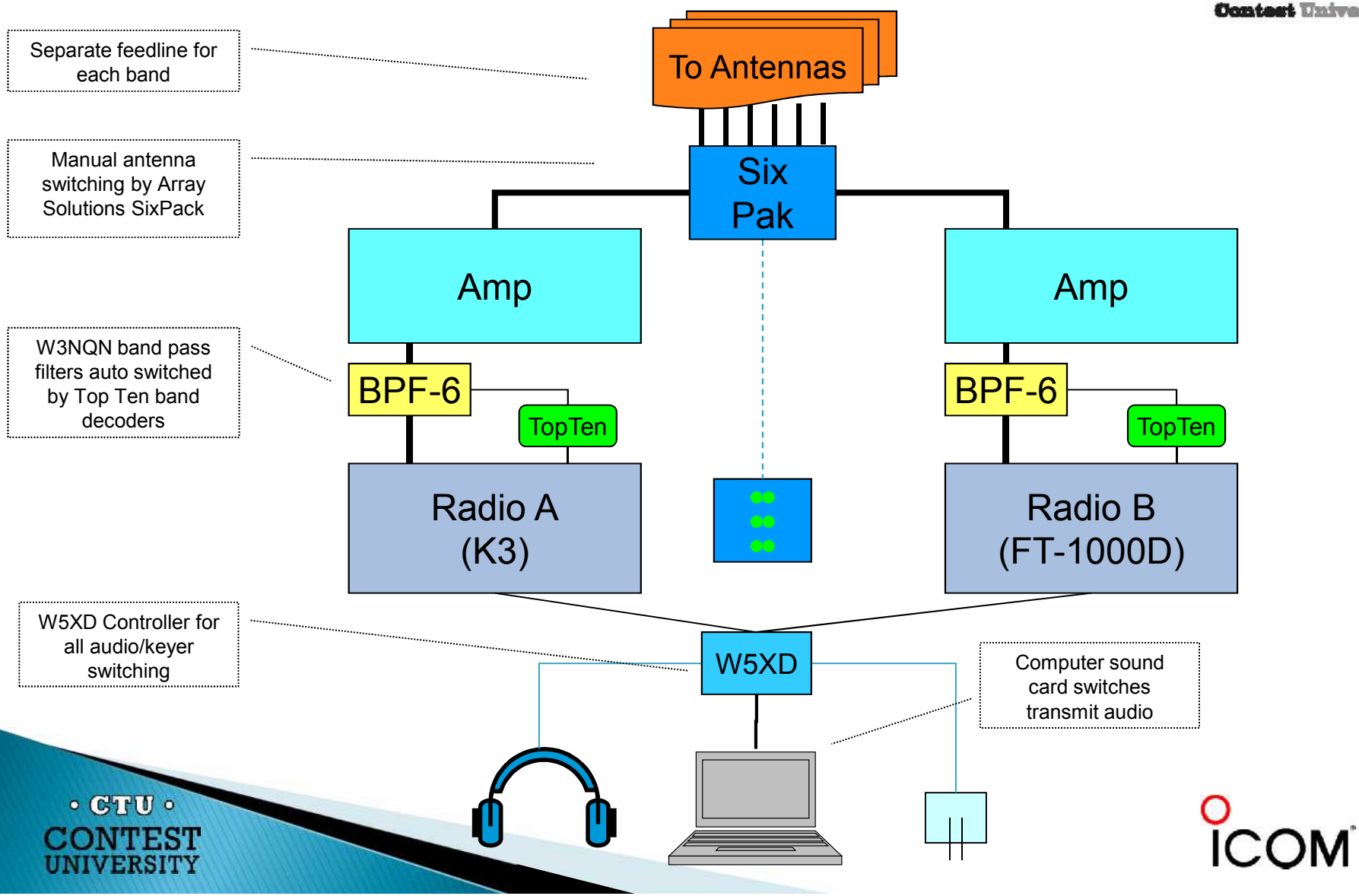
Software

- WriteLog
  - One logging window for each radio
- N1MM
  - Two logging windows
  - Ability to automate switching modes
  - Uses sound card for SO2R audio switching
- Win-Test
  - Ability to automate switching modes
  - CT style user interface

One Computer or Two?

- Two computers
  - Requires more physical movement (less ergonomic)
    - Enables data entry on either radio without impacting the other one
  - Two keyboards/monitors take more room on table
  - Must have lockout between transmitters
- One computer
  - Keep hands on one keyboard
    - Requires good keyboarding skills to change radios quickly
  - Less equipment
  - Transmit lockout handled by computer software

K5ZD SO2R Station Diagram



K5ZD Station Layout

Rotators on left so can turn while sending

Monitor near keyboard to reduce head movement and mistakes

L-shape table keeps everything within reach

Antenna switches on right to minimize chance of changing while sending

CTU BRASIL Contest University

• CTU • CONTEST UNIVERSITY

ICOM

What About Low Power/QRP?

- SO2R is very effective with a small lot and close spaced antennas for LP/QRP entrants
  - You can get by without much filtering or antenna separation
- You can do well with simple antennas
  - Tribander for the CQ rig
  - Wires, such as parallel dipoles with single feed point, for second radio
- It's possible to double your rate, especially during slow times
  - Call CQ whenever possible
  - Use tune second radio while waiting your turn in a pileup

SO2R Skills?

- You know you are ready for SO2R if you find yourself wanting to watch TV or read a book while operating one radio
  - Example: Driving a car
    - Had to think about everything at first
    - With experience, able to focus on other things
- Know the “flow”
  - Contest QSOs have a rhythm and sequence
  - Use timing to know when you can make it work
- Learn to type
  - SO2R requires a lot of typing without room for errors

Technique Differences for SSB?

- SSB is more difficult
  - Transmissions are shorter
  - More QRM, harder to hold CQ frequency
  - Computer doesn't do all the talking
- Tips
  - Use voice keyer to call stations and send exchange on second radio
  - Focus on "easy" QSOs or multipliers only

Multi-Operator

- More than one operator
- Limit on number of transmitters
  - One (Multi-single)
  - Two (Multi-Two)
  - Unlimited (Multi-Multi)
- In most contests, multi-ops are only High Power
- Allowed to use spotting assistance

Why Enter Multi-op?

- You enjoy the challenge of building a station and seeing what it can do
- You like the idea of working with a team
- You are not up to a full-time single op effort, but you still want to put your station on the air for the whole weekend
- You want to provide more points for the club score

Multi-Op Team Members

- Runners – operators who can generate high rates
- Hunters – operators who like to find every available multiplier
- Planners – team members who focus on making tactical operating decisions throughout the contest
- Technicians – team members who know how the station is built and can fix anything at a moment's notice

Challenges

- Achieving zero interstation interference
  - You want to be able to hear on other bands while transmitting
  - Protect the receivers
- Keep it simple
  - All switches should be clearly labeled
  - Amplifier settings marked
- Not all operators have the same skill
  - They will break things!

Minimizing Interference

- Antennas
  - Physically separate as far as possible — difficult for most of us
  - Avoid tribanders or multi-band antennas if possible — less rejection of other bands

- Radio Protection
  - Coaxial stubs — good, especially with monobanders
  - Band-pass filters — better
  - Receiver protection circuit

Multi-Single Rules

- 10 minutes
- Band changes per hour
- Run + Multiplier stations

10-minute rule

- IARU Contest
  - Must remain on a band and mode for at least 10 minutes before changing bands or modes.

- Clock starts when first QSO is logged on a new band
- Can't make contacts on any other band until 10 minutes have passed

Band Changes per Hour

- CQ WPX
  - A maximum of ten (10) band changes may be made in any clock hour (00 through 59 minutes).

```
QSO:  3500 CW 2011-05-28 1757
QSO:  3500 CW 2011-05-28 1759
QSO: 14000 CW 2011-05-28 1800
QSO: 14000 CW 2011-05-28 1804
QSO:  7000 CW 2011-05-28 1805
QSO:  7000 CW 2011-05-28 1805
QSO:  3500 CW 2011-05-28 1806
QSO:  7000 CW 2011-05-28 1806
QSO:  7000 CW 2011-05-28 1808
QSO:  7000 CW 2011-05-28 1808
QSO:  3500 CW 2011-05-28 1809
QSO: 21000 CW 2011-05-28 1810
QSO: 14000 CW 2011-05-28 1812
QSO:  7000 CW 2011-05-28 1813
QSO:  7000 CW 2011-05-28 1813
QSO:  3500 CW 2011-05-28 1813
QSO:  3500 CW 2011-05-28 1815
QSO:  7000 CW 2011-05-28 1820
QSO:  350  CW 2011-05-28 1836
QSO:  350  CW 2011-05-28 1844
```

New hour, first band change

Band change #10

Run + Mult

- CQ WW
  - Only one transmitter and one band permitted during any 10-minute period. Exception: One— and only one—other band may be used during any 10-minute period if—and only if—the station worked is a new multiplier. Ten-minute periods are defined as starting with the first logged QSO on a band. A multiplier station cannot call CQ.

- Really two stations
  - Run station can work anyone, must stay on band for 10 minutes
  - Mult station can only work multipliers, must stay on band for 10 minutes

Final Thoughts

- Set goals
- Do your best
- Enjoy the experience
- Submit your log
- Make plans to do better next time

Have fun!

Hour 43 – The SO2R “look”

Questions?