

VK9WA DXpedition Operations Guide

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This guide is being made publicly available to provide insight and assistance to other DXpedition planners and team members. Feel free to use as you see fit. Feedback is welcome. -Jared (N7SMI)

The following guide provides an overview of the VK9WA DXpedition goals, guidelines, and procedures and station layout, configuration, and usage.

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Goals

- Have fun putting on a safe and high quality, respected DXpedition.
- Provide optimal 'new ones' to amateurs worldwide by making at least 60,000 QSOs while minimizing 'busted' calls.

Operating Guidelines

- We will review and follow N7NG's [DXpeditioning Basics \(2013 edition\)](#) and [Best Practices for DXpedition Operating](#).
- We will operate four high-power stations with at least three stations on the air the majority of each day throughout the operation.
- Regularly call for operators on difficult paths (SA, EU, Africa, and US East Coast) during limited openings, even if at the cost of rate to closer locations.
- Provide substantial operating time and long runs on 'money' bands (primarily 20 meters), including time in General portions of the bands (particularly later in the operation).
- Dedicate notable time to 80 and 160 meters, especially on gray line.
- Provide notable RTTY time.
- Maintain pile-up order and QSO speed by...
 - Operating split.
 - Signing "VK9WA" and providing instructions ("UP 5", "EU Only Up 5-10", etc.) very regularly (typically every 1-3 QSOs).
 - Minimizing pileup bandwidth (especially on 40 meters, 20 meter General band, and 17 meters) – generally no more than CW up 1-5 (down for JA on 160 meters), SSB up 5-15, and RTTY up 1-4+.
 - Minimizing disruption of the bands by following our band plan (below) and checking transmit and receive frequencies before operating.
 - Maintaining rhythm in the pileup and following a generally regular pattern.
 - Working the entire indicated pileup width (if you indicate "Up 5-10", work between 5 and 10 up, not just 5 up and not 5-15 up).
 - Avoiding working by numbers unless necessary. If working by numbers, work all numbers quickly. Don't work 0 through 6 then go QRT leaving 7-9 frustrated.
 - Announcing plans regularly ("Will work 0 through 9 then repeat" or "Will work EU for 10 minutes then QRT"). Do not go QRT without informing the pileup, preferably with an explanation ("QRX 5 for op change", "Moving to 12 meters", etc.).
 - Working and logging all dupes without comment (confront kindly only if it's a persistent issue - mention Club Log query on web site).
 - Persisting with a particular caller until they are in the log or no longer workable.
 - Sending the full call after corrections or fills so the other operator has confirmation we got it correct.
 - Avoiding unnecessary fillers (e.g., "N7SMI 59" rather than "Roger, N7SMI, you're 59. QSL?").
 - NEVER engaging with or logging deliberate QRMers or acknowledging the QRM they will create.
 - NEVER working out-of-turn-callers.
- Upload logs to Club Log at least twice daily.

Band Plan

Frequencies are +/- QRM.

Mode	160m	80 m	40 m	30 m	20 m	17 m	15 m	12 m	10 m
CW	1.8265 *	3.524	7.023	10.105	14.020	18.075	21.020	24.894	28.018
SSB	-----	3.793	7.085 & 7.180	-----	14.185 or 14.275	18.140	21.295	24.955	28.480
RTTY	-----	-----	7.045	10.142	14.083	18.105	21.083	24.922	28.083

*Listen DOWN 2-3 on 160m (or move below 1.825) for JA. Listen UP for all others.

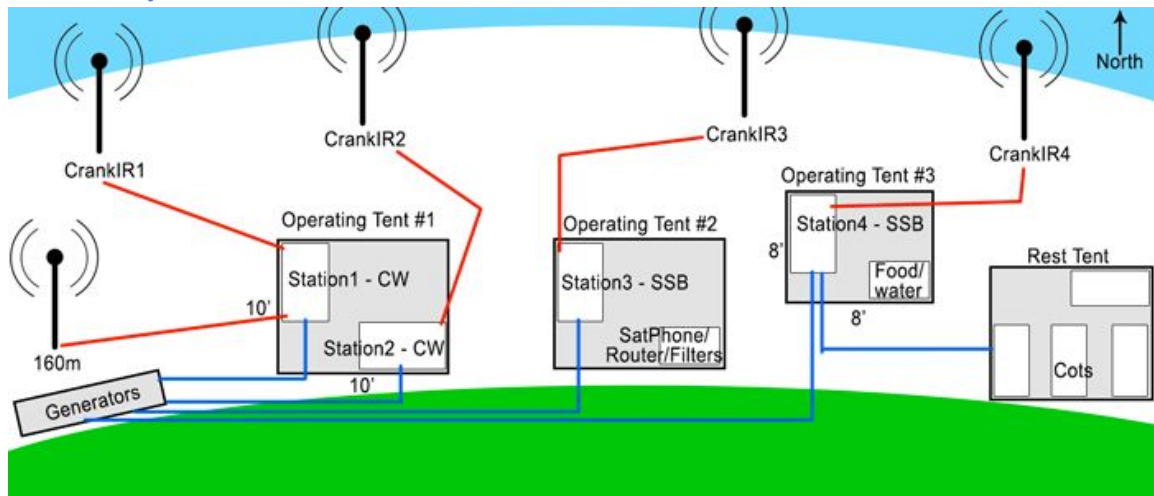
Hardware Overview

VK9WA will have four nearly identical stations consisting of the following hardware:

- Elecraft K3S transceiver
- Elecraft KPA500 amplifier (Station #1 will have an Expert Amps 1.3K-FA)
- SteppIR CrankIR
- DX Engineering (or similar) 12v power supply w/ fused RigRunner
 - All 12v connections are Anderson PowerPoles
- Lenovo laptop
 - Windows 7
 - 7-port powered USB hub
 - USB mouse
 - USB LED light
- RadioSport RS60CF headset
- K1EL WKUSB CW keyer and CW paddles
- LP-PAN2 with ASUS Xonar U7 Sound Card for wide band CW decoding
- W3YY RTTY FSK interface
- Single band pass filter
 - Interchangeable based on active band

All power will be via Honda EU20i generators and will be 220 volts.

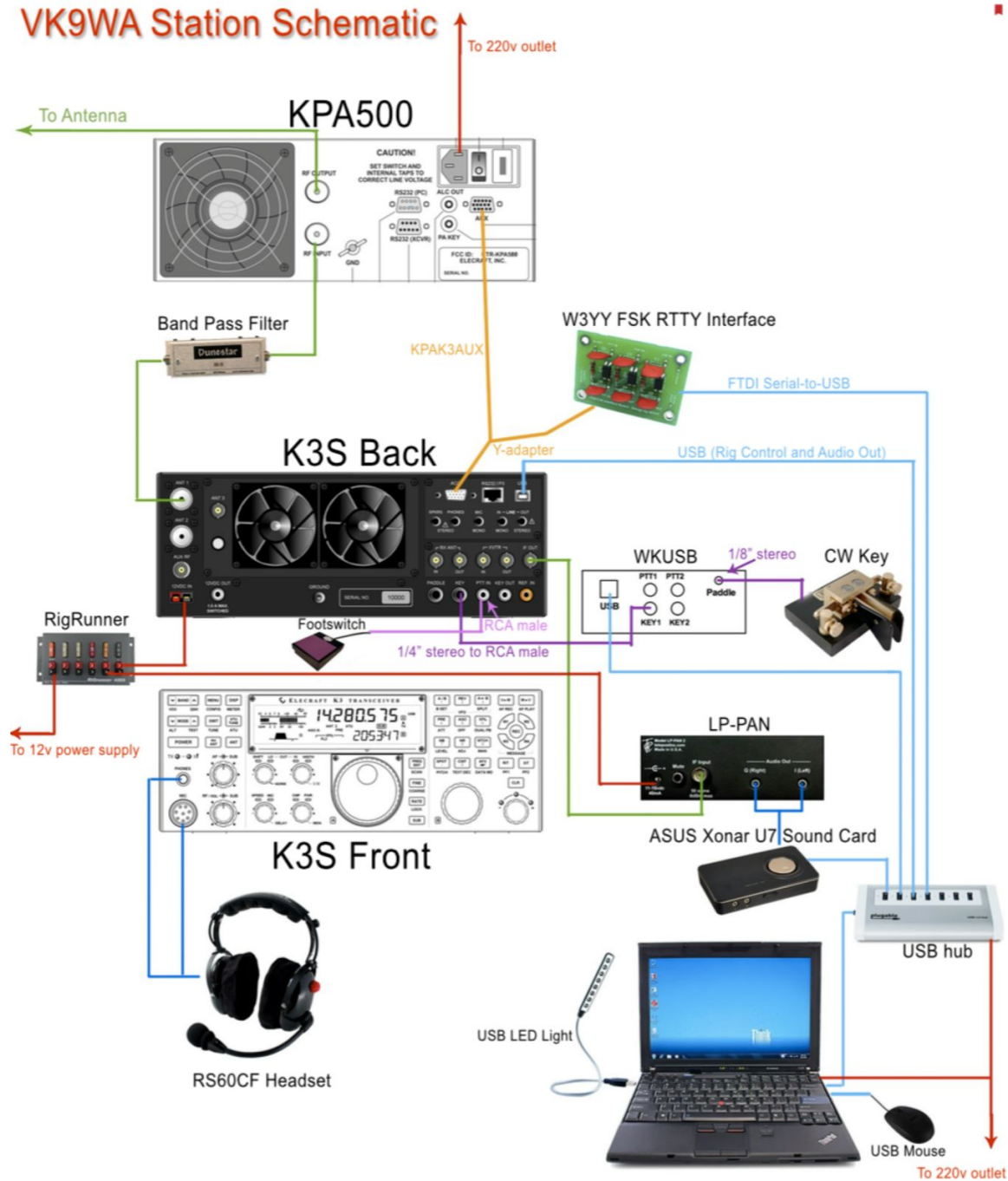
Station Layout



Station Schematic

You can view a video of the station configuration at https://www.youtube.com/watch?v=4BEg9D_2UIQ

Below is a station schematic. Pay particular attention to the cabling. Any cables or hardware provided must terminate in the correct cable type.



Software Overview

Each laptop will come preconfigured with the following software.

- N1MM+ (version 1.0.5221)

- MMTTY decoder (with EXTFSK module for K3 keying)
 - 2Tone decoder
- CW Skimmer
- LP-Bridge
 - Provides CW Skimmer and N1MM virtual COM ports so they can each communicate with the K3 via a physical COM port (i.e., 1 cable for two rig control software programs).
- WinKey3 Tools
 - For changing WKUSB settings, if necessary.
- K3 Utility
 - Only for full reconfiguration of a K3 due to settings loss or misconfiguration.

Note that the laptops do not have a virus scan program or firewall (Windows Firewall is disabled). Avoid or use great care in connecting to an Internet connection before leaving home.

Computer Access and Configuration

Each laptop will be clearly labeled with its network name ("Station1", "Station2", etc.).

Use only icons located on the desktop to start programs. The only programs necessary for operating are LP-Bridge, N1MM+, and (if desired) CW Skimmer.

IMPORTANT: Programs *MUST* be opened in a specific order:

1. Ensure the K3 is powered up.
2. Open LP-Bridge – *Wait approximately 30 seconds* after opening LP-Bridge for it to create the virtual COM ports and then display the icon in the system task bar.
3. Open N1MM+. Ensure it properly reads the K3 frequency and mode.
4. Open CW Skimmer (if desired).

Do not open N1MM+ or start logging QSOs until the laptop is connected to the WIFI network and also the N1MM Master logging computer (see below).

All computers will be set to Cairns time and time zone and will display a 24-hour system clock. Cairns is UTC + 10 hours. **DO NOT CHANGE THE COMPUTER DATE OR TIME!** Date/Time settings for each computer will be controlled by the Master computer over the network.

A "**VK9WA Docs**" folder on the desktop will contain this document, propagation guides, as well as manuals for all software and hardware.

Band Changes

Band changes require a specific procedure:

1. Place the KPA500 in Standby mode.
2. Remove the band pass filter from the jumpers between the K3 and the KPA500 and return it to the inventory.
3. Retrieve the desired band pass filter from the inventory and place it in your operation station chair.

- Because there is only one filter per band, this ensures that you do not change to a band that is already occupied. Placing the filter in your chair ensures nobody transmits on the station until fully configured.
- 4. Adjust the CrankIR radiator and radial to the desired band.
 - Be careful to not touch the bare wire to avoid RF burns from other stations.
 - CrankIR band markers are as follows:
 - **BLACK** - 10 meters
 - **RED** - 12 meters
 - **ORANGE** - 15 meters
 - **YELLOW** - 17 meters
 - **GREEN** - 20 meters
 - **BLUE** - 30 meters
 - **VIOLET** - 40 meters
 - **???** - 80 meters
- 5. Change K3 to the appropriate band/mode and turn K3 power down to a few watts.
- 6. Verify that you have the correct band pass filter in your chair, then insert it into the K3-to-KPA jumpers.
- 7. Put the amplifier in OPER mode.
- 8. Double check that everything is configured for the correct band before transmitting.
- 9. Transmit momentarily while ensuring the KPA500 SWR is reasonable (less than 1.5:1). If it's not, something's wrong or you need to fine tune the CrankIR.
- 10. Slowly increase Power while monitoring SWR until the KPA500 registers just under 500 watts output (400 watts if operating RTTY).

To set maximum peak output, you should transmit a carrier signal - send CW characters or hit TX in RTTY. For SSB, you can set the radio temporarily to DATA mode and hit the XMIT button to transmit a carrier to adjust to maximum output, then change mode to SSB.

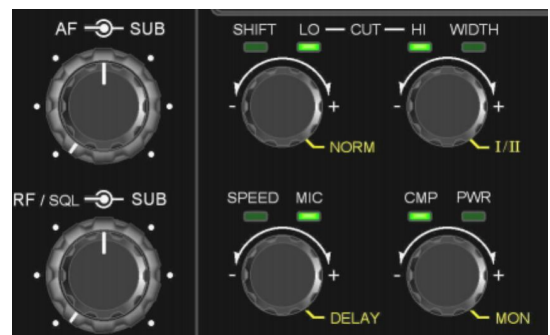
Elecraft K3S Configuration

Each K3S will be pre-configured with a Master configuration file loaded via the K3 Utility. Documentation of every K3 setting change from the default in this loaded configuration is located in *Appendix 1*.

Mic Bias *must* be enabled to use the RadioSport headsets. **The RadioSport microphones are designed to be positioned VERY close to and immediately in front of your lips.**

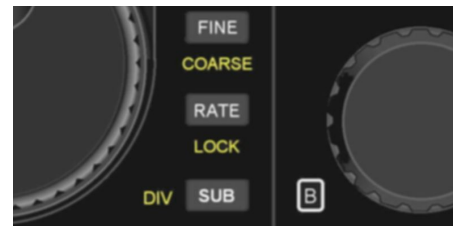
The following are K3 settings you MIGHT want to change to your preference. **Most changes should not be necessary. If you change something (especially anything in the menus), note the change and change it back when you're done. If you mess something up, ask for help.**

- AF Gain (e.g. Volume)
 - Keep the volume at a reasonable level to protect your hearing.
- RF Gain
 - With many strong signals, decreasing the RF Gain can minimize the weaker signals and pileup interference so you can get the strong, wide



signals out of the pileup faster. If the pileup seems too big to handle, crank down RF Gain to hear only the strong signals. While it sounds counter-intuitive, with very weak signals, decreasing RF Gain can increase signal to noise.

- Filter WIDTH
 - Adjusts the DSP filter passband width to block out adjacent signals. Going too narrow will decrease receive audio fidelity.
- Filter LO/HI/SHIFT
 - Shifts the filter passband or filter edges up and/or down. This may be useful if you're trying to filter out a pesky noise source or QRM just above or below your listening frequency.
- NORM
 - If you've made filter Width, Lo/Hi, or Shift changes, pressing and holding NORM will set everything back to the defaults.
- SPEED
 - Sets CW paddle speed in the K3. This is irrelevant to us. CW speed will be set via N1MM controlling the WKUSB. This would only be relevant if you plug paddles directly into the K3.
- MIC
 - Mic Gain should be set *no higher than ~30* to minimize background noise and distorted audio. Use Monitor to listen to your audio occasionally.
- MON
 - Monitor (press and hold to activate, then turn knob to adjust monitor volume) allows you to listen to what you are transmitting.
 - TIP: For SSB operations, I've found that a little bit of Monitor audio helps me keep my voice quieter so it lasts longer and won't disturb other operators. It also helps me ensure I'm not cutting off the beginning or end of transmissions. Do not turn it up too high or you may affect your ability to hear weak signals. Set to the default of 0 after your shift.
- COMP
 - SSB Speech Compression should be utilized to maximize our signal strength, but *not set higher than ~22* to avoid distortion.
- RF Power (PWR)
 - This should be set to maximize CW and SSB output to the KPA500 at ~500 watts peak. You should very rarely see Orange lit up on the KPA Power meter. The PWR value will generally be **~20-27 watts**. Do not overdrive the amp! On RTTY, adjust Power to put out no more than ~400 watts.
- SUB
 - Press to enable the sub-receiver. This should always be enabled for split operations (see below).
 - Note that diversity receive (holding the SUB button) for listening to VFO A in one ear and VFO B in the other is disabled via the CONFIG:L-MIX-R setting (set to "A A" – you should only hear VFO A in both ears). Activating DIV may result in odd behavior, so don't.
- LOCK
 - Press and hold to lock the frequency on VFO A.
- A/B
 - Swap VFO A frequencies, settings, etc. into VFO B and vice versa.



- A>B
 - Copy VFO A frequencies, settings, etc. into VFO B.
- SPLIT
 - Set transmit on VFO B and receive on VFO A.
- REV
 - Pressing and holding REV (while not transmitting) will allow you to temporarily listen on your transmit frequency.
- PRE
 - Pre-amp will boost signals. It can be handy for very weak signals, but do not use if you have a loud pileup.
- ATT
 - Attenuator weakens all signals. It can be handy if you have many very strong signals that are blowing out everybody else, but can make weak signals disappear (which can be desired at times). Hold for 2 seconds to change attenuation level. Decreasing RF gain is generally better than using ATT.
- AGC
 - Automatic Gain Control will normalize the audio to minimize abrupt changes in volume. It can help save your hearing, but also causes some distortion of the natural signals. Tap to switch between slow (AGC-S) and fast (AGC-F) modes. Slow causes higher normalization (or slower changes) between loud and soft signals. Press and hold to turn AGC off. AGC off can sometimes be helpful for weak signals. Note that turning off AGC will also disable Noise Reduction and can result in VERY loud and instant audio (such as from lightning crashes or somebody tuning). You probably will want to enable AF Limiter (Config... AF Lim... set 17-22), turn down the volume, and/or decrease RF gain if you disable AGC to protect your hearing.
- XFIL
 - Selects the roofing filter you want to use. For SSB, this will only be 2.7 or 2.8kHz. For CW and RTTY, the filter options will vary based on the filters installed. Choose the filter closest to what you want and then adjust with the DSP filter WIDTH option (above). The K3 will automatically select/change roofing filters based on the WIDTH adjustments (e.g., choosing a 400Hz filter then widening it at all with WIDTH will automatically jump to the next widest filter).
 - Note that changing roofing filters will also change the CW Skimmer offset value and will require a minor change in CW Skimmer to ensure that clicked signals are centered within that filter's bandpass. See additional details and offset values below under CW Skimmer.
- APF
 - In CW Mode, this enables Audio Peak Filter, which has a very narrow peak (~30 Hz) but very little ringing due to its broader skirts. In CW it can be great for pulling out very weak signals. Be sure to turn off for loud signals.
 - In RTTY mode, this enables Dual Tone Filter (see RTTY notes below).
- NB
 - Noise Blanker can filter out man made, cyclical noise. We should not (hopefully) need this. Be sure to leave it off because it causes notable signal distortion.
- NR and ADJ
 - Enabling Noise Reduction is great for the ears, but will result in audio distortion that makes audio sound 'hollow'. Press and hold to adjust (ADJ) the Noise Reduction settings (turn the VFO B knob to choose your desired setting). There are multiple



primary noise reduction types (the first number) with 4 levels of strength for each type (the second number). So 2-4 indicates the 2nd noise reduction type with a maximum strength of 4. You can play with the NR settings, but only Off, 1-1, or 2-1 are recommended unless there is very high levels of noise.

- NTCH and MAN
 - Notch filter will filter out a very narrow signal such as a carrier. Tapping the button will enable Auto Notch (SSB only) – the K3 finds one strong, narrow signal and filters it out. This can save your eardrums if someone is tuning in the pileup and can allow you to work stations underneath the carrier tone. MAN (all modes) allows you to adjust the notch frequency. This could be helpful to filter out a carrier in the middle of your pileup. Be sure to turn it off when not needed because it causes notable signal distortion and blocking at the notch filter location.
- AFX
 - Enables Audio Effects. This creates a phase shift between left and right headphones making it sound like you just entered a large cathedral. Some claim it can help with distinguishing weak signals. Others think it's just a gimmick. With the sub-receiver enabled (which should always be the case for us), it shouldn't make any difference, so leave it off.
- DATA MD
 - Sets the data mode. This should not be changed unless the mode has been inadvertently set to something other than FSK D.
- RIT/XIT
 - These should not probably be utilized. Change your RX or TX frequencies by adjusting VFO A or B respectively.

Split Operations

Below are procedures for setting up split mode.

1. Tune VFO A (the big tuning knob) to your transmit frequency and mode. Make sure that frequency and your desired pileup location are clear.
2. Ensure that the sub receiver is activated. You should see SUB below the frequency on the display. If not, tap the SUB button to activate it. The sub-receiver will be VFO B (changed by the small tuning knob).
3. Tap A>B to copy the VFO A frequency/mode and settings to the sub-receiver (VFO B). A and B will now be identical.
4. Press and hold LOCK (above the SUB button) to lock VFO A.
5. Press A/B to swap VFO A and B. VFO B will now be locked on your transmit frequency. Locking will ensure you can't accidentally change your transmit frequency while operating.
6. Press and hold SPLIT (same button as A>B) to enter Split mode.

You will then tune VFO A to listen to the pileup (Up 5... or wherever) while having your transmit locked at the VFO B frequency. When properly configured in split mode (listening up

1), the display should look like this:



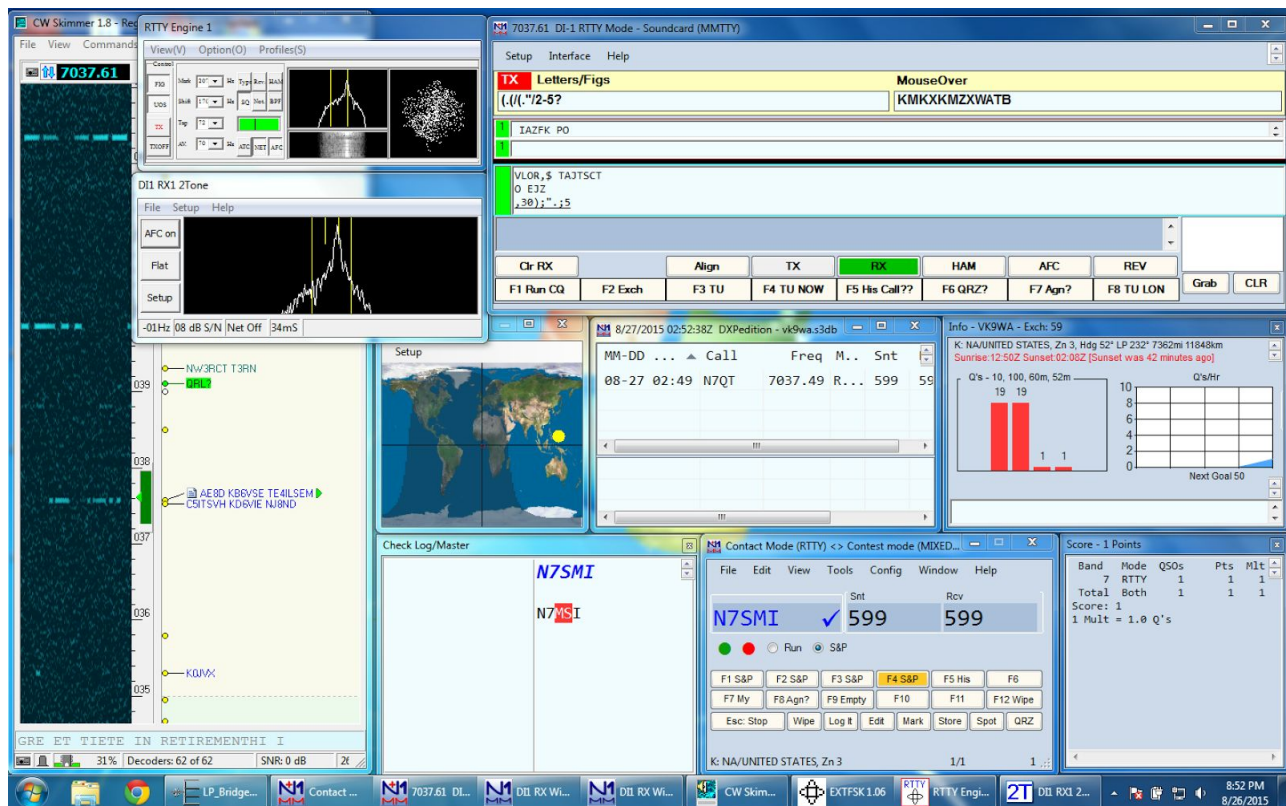
Note the SUB and SPLT indicators, and the lock icon on VFO B. The TX arrow verifies that transmit is on VFO B.

TIPS:

- If pressing SPLIT does not activate split mode, it's likely because VFO A and B are not on the same band and mode (i.e., you didn't follow step #3 above).
- Be sure to check your VFO B frequency occasionally to make sure you are still transmitting on your desired frequency (shouldn't change if you locked it).
- Listen to your transmit frequency (hold REV) occasionally, especially if it seems the pileup cannot hear you. This can be handy to check for QRM or folks that need to be reminded what "UP" means.
- If you want to make quick changes to VFO B, you can press A/B, make your change, and press A/B again, or you can press and hold B SET (the A/B button) while making the VFO B modification (change frequency, etc.). You may need to unlock VFO B to make changes.
- Pressing the ` key (next to ESC) on the keyboard with N1MM active will toggle the sub receiver on or off. This will mess things up! Be mindful of this and monitor your transmit frequency often to ensure it is correct and that the sub-receiver is enabled.

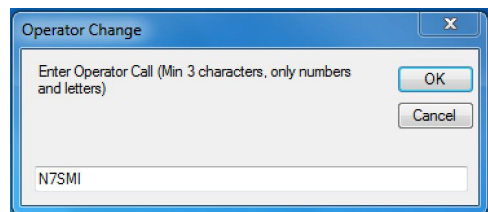
N1MM Usage

Below is the default N1MM window layout.



Most of the windows should be self-explanatory. Check the N1MM documentation for more details. This has both CW Skimmer (left side) and RTTY Digital Interface with 2 decoders (MMTTY and 2Tone) open.

IMPORTANT: *The first thing you should do upon starting OR ending a shift is press CTL + O to open the Operator Change window. This ensures that your QSOs are logged under your call sign. Be sure to type your call correctly! This will also allow users at Club Log to see which of us logged them (along with photo).*



The **Entry window** is at the bottom of the screen to minimize visual distance between the keyboard and the Entry window. We will **ALWAYS** want to be in Run (CQ) mode. Make sure the Run option is activated or the function keys and ESM will not function as anticipated. Press **ALT + F11** to turn on "Run/SP auto-toggle disabled". This will ensure that N1MM won't switch to S&P mode when you QSY.

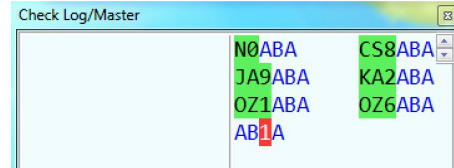
IMPORTANT: We will utilize a Call History file for all donors. If you type the call sign of a donor in the Entry window, you will see DONOR and their first name at the bottom of the window. Thank them by name for their support.

The **Info window** shows your rates for the last 10 and 100 QSOs, and the previous hour and number of minutes since the beginning of the last hour. Green equals good! The Info window also displays network messages (see N1MM Messaging below).

The **Check Log/Master window** will display possible call sign matches based on a database of known call signs (right column) and our existing log (left column). This can help you determine the correct call if you only get a partial, and can help verify valid calls. Call signs that don't appear in the Check window should be suspect – if you're not sure you got it right, ask for a repeat or verification. **We will always favor accuracy over rate!** A mis-logged station is frustrating for everyone, will result in dupes, and is a LOT of work to fix later.

CHECK WINDOW TIP:

For Japanese stations, for example, that all start with JA, JE, JR, etc., rather than trying to guess at the prefix when 100 JA stations are calling, sometimes it's best to just enter a 3 letter suffix and then find the best "J" match in the Check window. For example, if you hear "J??ABA", you can simply type "ABA" into the Entry window. Based on the Check window you can be reasonably assured that it is JA9ABA (the only Japanese call listed). Clicking JA9ABA will populate that call into the Entry window. This can save a lot of time with repeats. Sending "J?" isn't going to thin things out at all and sending "ABA?" will result in a lengthy repeat. Simply assuming that it's JA9ABA and sending the exchange will get you the QSO quickly. If it's not JA9ABA, you'll get a correction anyway.



Quick Keys

The following can save a lot of time when logging (roughly in order of usefulness):

- **ESC** – Stop the current message transmission.
- **CTL + W** or **F12** – Wipes the current Entry window. Often faster than hitting Delete several times to clear a call sign.
- **CTL + Q** – Quick Edit the last log entry. Repopulates the Entry window with the last logged QSO for editing. Allows quick fixes to a call sign that was incorrectly logged. Press multiple times to quick edit previous entries. Hit Enter to save.
- **ALT + F11** – Enables "Run/SP auto-toggle disabled" to lock N1MM in RUN/CQ mode.
- **Page Up/Page Down** – Adjust CW sending speed faster or slower via the WKUSB. Note that the speed control knob on the WKUSB is disabled.
 - On CW, our messages will be set to send "5NN" and "TU" at a slightly faster rate than other exchange information. This will save maybe 1/2 second per QSO – which over 10 days will result in many additional QSOs.
- **CTL + K** – Opens the CW window. Whatever you type will be keyed in CW by the WKUSB at the currently defined speed. Press **ESC** to close.
- Type "CW", "RTTY", "USB", or "LSB" into the Entry window and press Enter to quickly change modes. N1MM will automatically change the K3 settings and open/close the RTTY Digital Interface as needed. Type a frequency (e.g., "14020") and press Enter to tune directly to that frequency.
- **CTL + D** – Delete previous QSO. Use with care.
- **CTL + M** – Enable/Disable Enter Sends Message (ESM) mode (see below).
- **=** – Pressing the = key will send the last macro again. This can be handy for a call/signal report repeat (hitting Enter in ESM will log the station and send "TU" instead and cause frustration if you are still trying to verify the QSO).
- **ALT + Y** – Yank the top call sign from the Check window into the Entry window. Faster than a point and click or manual edit of the call sign.
- **ALT + '** – Changes the selected filter width without touching the radio.

- **UP** and **DOWN** arrows – enables and adjusts RIT to change the receive frequency up or down 100Hz on SSB, 20Hz on CW/RTTY. Because this uses RIT, it can be confusing if you don't pay attention. Be sure to clear and disable RIT regularly.
- **CTL+ALT+G** or **F6** (a custom macro) – Stacks the call sign from the Entry window to the call stack. Think of the call stack as a notepad that stores queued up call signs. The last stacked/queued call sign (or partial call sign) appears immediately above the Entry window call sign text box. Simply press SPACE in an empty Entry window or click the stacked call sign to add it to the Entry window for logging.
 - Scenario: You ask for "the W4" and hear "W4NG" and type this call then hear "W4WW" in the pileup. Type W4NG into the call window, press CTL + ALT + G to add it to the stack ("W4NG" appears above the Entry window), then type W4WW and work and log him as usual (now if it were N7WW that called, do not do this – he's an out-of-turn caller and we don't answer out-of-turn callers). When you've logged W4WW, hit SPACE or click W4NG to add (called "pop" in N1MM) that call to the Entry window and work him immediately ("Thank you. Now W4NG 59.") without a "QRZ?". It's a bit tricky to pull off, but can be much easier than writing down or trying to remember calls or partial calls, and can result in VERY fast rates if you can pull it off frequently or with several call signs in a row.
 - In RTTY, you can ALT + click on a call sign to add it to the call stack. You can then use the LOGTHENPOP macro to work it immediately.

We only need to log 59 and 599 signal reports. If someone sends a 535 signal report, you don't need to worry about logging the report unless you want to. Sending anything other than 59/599 can result in confusion.

ESM Mode

By default, N1MM will have Enter Sends Message (ESM) mode enabled. If you've not used this, we recommend giving it a try – it really will save time and effort in logging. ESM should be mostly irrelevant to SSB operators.

Read more about ESM at

<http://n1mm.hamdocs.com/tiki-index.php?page=ESM++Enter+Sends+Message>

If you simply cannot use this mode, you can disable it in the Config menu or by pressing CTL + M. Please re-enable it at the end of your shift.

RTTY Operations

Typing "RTTY" in the N1MM Entry window and pressing Enter will switch you to RTTY mode and open the Digital Interface (DI). When operating RTTY, the K3 should be set to DATA mode. The default mode should be set to FSK D (if not, set it to FSK D by holding down DATA MD and adjusting the active data mode). If the Digital Interface window doesn't open automatically, open it via Window... Digital Interface. The DI opens at the top of the screen.

You should see two RTTY decoder windows at the left – the top one utilizes MMTTY and the other utilizes 2Tone. Each will decode the RTTY signal slightly differently to help ensure a good copy. You can change the decoder settings (to optimize decoding of fluttered signals, for instance) for each decoder in the Profiles menu of the MMTTY window or by clicking the middle button (Flat, Flutter, Selectiv, or Spread) in the 2Tone window.

The DI window will display one text decoding areas for each decoder. You can click decoded call signs in either area to add them to the Entry window.

You can add up to three 2Tone decoder windows (in addition to the primary MMTTY window) by selecting Setup... Add. RX Windows... Open Add. RX Window. Each decoder can/should have different settings to aid in decoding. You may need to resize the DI window to allow space for each of the text decoding areas.

In RTTY you can enable the Dual Tone Filter for optimal decoding of an accurately tuned signal. It is a very narrow filter, so you may want to select a wider filter when trying to find a signal in the pileup.

When the DI window is open, a separate EXTFSK window will be open. This program handles the FSK keying and must remain open. Be sure the DI is closed when operating CW or SSB. Closing the DI will close EXTFSK and all decoder windows.

Messages

We hope to use identical message definitions for each station. Each mode will have slightly different messages. The only messages that should be operator edited are the CQ (F1) and TU (F3) messages – and only to indicate the current split location/range ("UP 1", "UP 2-4", etc.) or to point to the correct .wav file for voice macros. To edit the message file, right click on the Function key button display on the Entry window, make the appropriate edits (be careful!), and then click Save. A backup of the default messages is in the Desktop... VK9WA Files folder on the desktop.

Voice Keyer

If the K3 at your station has a KDVR3 Digital Voice Recorder built in, function keys in SSB will be programmed to trigger the voice keyer memories as follows:

- F7 – Memory 1 (M1) - "CQ CQ..."
- F9 – M2 - "59"
- F10 – M3 - "Thank you. QRZ?"
- F11 – M4 - "Thank you. VK9WA Up ?"

Both F10 and F11 will automatically log the call sign in the Entry window – no need to hit Enter and then F10 or F11.

Tap REC on the K3 (top right) then tap any of M1 - M4 to start recording your voice macro. Tap REC again to end, or CLR to erase. You will need to re-record the M4 message if your split changes.

N1MM messaging

N1MM will allow messaging between stations. This may be handy to indicate that you're switching bands or for any other relevant message that you want to send without leaving the operating position. Received messages will appear on the Info window of N1MM.

To send a message press CTL + E (or Window... Talk to Another Station) to open the Talk window. The * indicates that your message will go to all networked computers. Simply type your message after the * and press Enter to send it. To send a message to a

specific station computer, replace * with the computer name ("Station1", "Station2", etc.) and then type your message. Typing "Station1 Do you want to take over on 20 meter RTTY?" will send that message only to Station #1. Note that there is no space in "Station1".

Network Reconnect Procedure

Laptops should not be put to sleep, turned off, removed from the network, or have N1MM closed down except for extreme situations.

If your computer is removed from the network for any reason (N1MM crash, etc.), ensure you have reconnected to the WIFI network and also that N1MM is properly connected to the logging network BEFORE beginning to log new QSOs. Open the Networking Status window (Window... Networking Status) and ensure that at least "Master" appears in the station list. It may take a minute to appear. N1MM should automatically resync with all network computers. The Networking Status window also allows you to see who is operating which station and band/mode. You can close the Network Status window when you're done.

CW Skimmer

Skimmer allows a broad view of the pileup, multi-signal CW decoding, and point and click functionality to tune directly to a signal in the pileup. Read more about CW Skimmer at <http://www.dxatlas.com/CwSkimmer/Files/Skimmerintro.pdf> (start on page 7).

The CW skimmer signal is transmitted from the LP-PAN via the ASUS USB sound card. This requires notable setup (not documented here). The key is to NOT change CW skimmer, laptop audio, sound card settings (including any button on the sound card itself), or CW tone settings once configured.

To align the CW skimmer signals with the actual signals in the K3 requires a minor setting change when the K3 filter is changed. Click View... Settings... to set the Audio IF setting as follows:

- -6090 for 400Hz filter
- -4250 for 2.7kHz filter

These are *rough* estimates. Each station will be slightly different. Adjust the offset setting until a properly zero-beated CW signal is centered within the CW skimmer passband (the green marker with arrow). Note the proper Audio IF settings for your station for each available filter and enter them *each time you change filters* otherwise CW skimmer signals will not align with your K3 bandpass.

Press the radio icon at the top left of the window to begin decoding. Green call signs in CW skimmer are verified call signs (found in master.dta) and blue ones match a call sign pattern. "599" from stations will be highlighted red. Double-clicking a call sign in the right pane will tune your receive frequency to that station. Double-clicking on the waterfall will also tune to that frequency. While CW skimmer may show the call sign, you must still manually enter it into N1MM. You can click and drag on the frequency display to change the portion of the pileup that is visible.

Appendix #1 – K3S Configuration Changes

Below are the changes made between the default/factory stock settings and the VK9WA Configuration for the K3S.

- Set USB input: Config... RS232... USB
- Microphone high gain enabled
 - MENU... select MIC SEL... ensure FP. is displayed. Press 1 to enable High Gain.
- Bias enabled (required for RadioSport and Heil electret headphones)
 - MENU... select MIC SEL... ensure FP. is displayed. Press 2 to enable Mic Bias.
- If using Line In for SSB voice macros
 - Menu... select MIC SEL... change to Line In
 - Adjust Mic gain (front panel) to desired level (15?)
 - Menu... select MIC SEL... change to FP.H BIAS
 - Menu... select MIC+LIN... set to On
- Equalizer settings
 - Both TX and RX equalizer settings are set so that bass is lowered and mid-tones and lower high tones are amplified. It's not broadcast quality, but is optimized DXpedition audio.
- CONFIG:L-MIX-R
 - Set to A A
 - This will output VFO A audio out both headphones, otherwise you'll hear VFO B (transmit frequency) in one each.
- CONFIG:AF LIM
 - Set to ~20. This limits AF when AGC is disabled.
- CONFIG:AGC DCY
 - Set to SOFT. Will decrease IMD in pileup conditions.
- After loading a new config, you MAY need to re-enable the KRX3 sub-receiver in the K3 settings then turn off then back on the K3 to initialize it.

Appendix #2 – N1MM Configuration Changes

- Set N1MMLogger.net.exe to run as Administrator
 - Right click file... Properties... Compatibility tab... check Run this program as an Administrator
 - This allows network master to set system date/time
- New Database
 - File... New Database... save as vk9wa.
- Update station data
 - Config... Change Your Station Data...
 - Call: VK9WA
 - Name: {empty}
 - Country: {empty}
 - Grid Square: QH43xs
 - CQ Zone: 30
 - ITU Zone: 55
 - ARRL Section: DX
 - All other fields (except Lat/Lon) should be empty
- New Log
 - File... New Log in Database.
 - Log Type: DXpedition
 - Operator: Multi-Multi
 - Mode: MIXED+DIG
 - All other fields as default

- Update tools
 - Tools... Download and Install Latest Check Partial File
 - Tools... Download and Install Latest Country
- Config menu options
 - Enter Sends Message (ESM) Mode enabled
 - Enable Call History Lookup enabled
 - All others not enabled
 - Subreceiver always on enabled
- Configurer options
 - Config... Configure Ports, Mode Control, Audio, Other...
 - Hardware
 - WKUSB
 - First option to COM 7 for WKUSB
 - Radio: None
 - Check CW/Other checkbox
 - Click Set
 - Enable Winkey checkbox
 - LP-Bridge (for rig control)
 - Second option to COM 11 for LP-Bridge
 - Radio: Elecraft K3
 - Speed: 19200
 - Parity: N
 - DataBits: 8
 - Stop Bits: 1
 - DTR/RTY: Always Off
 - PTT via Radio Command SSB Mode
 - All other options disabled
 - Ensure LP-Bridge running to connect to radio
 - Function Keys
 - Send corrected call before end of QSL: Enabled
 - Send partial calls: Enabled
 - Use CW contest word spacing: Enabled
 - Work dupes when running: Enabled
 - All others: Disabled
 - Digital Modes
 - DI 1 TU Type: Soundcard
 - MMTTY Mode Type: FSK
 - MMTTY Path: C:\Ham\MMTTY\MMTTY.EXE
 - Other:
 - Disable "Check for new program versions"
 - Winkey
 - All checkboxes unchecked
 - Pin 5 function: PTT
 - Ignore Winkey Speed Pot: enabled
 - Leadtime: 1
- Digital Interface
 - MMTTY & EXTFSK64
 - Ensure Extfsk64.fsk is in MMTTY folder.

- In MMTTY Settings...
 - TX... PTT&FSK = EXTFSK64
 - Misc... Tx... Port = COM-TxD(FSK)
 - Misc... USB Port... A Normal
 - Sound Card... Microphone (USB Audio Codec)
 - Set sound card levels to ~30
- In EXTFSK64
 - Port: COM9
 - FSK output = TXD
 - PTT output = RTS
- Setup... Settings...
 - Window Scroll... Scrolling
 - Callsign Validity and Highlight Rules
 - Use these resources:
 - Master.scp, Call History, and Logged Calls enabled
 - Message Setup tab... Number of Message: 0
- Digital Call Stacking... Enable using Last In First Out
- In MMTTY...
 - SQL on
 - AFC off
- Setup... Add Rx. Windows... Enable Attached RX Windows enabled
- Setup... Add Rx. Windows... Open Add. Rx. Window...
 - Window Type... MMTTY
 - Path... C:\Ham\2Tone\2Tone.exe
 - Hit SAVE
 - In 2Tone...s
 - Setup... Receive Settings... Microphone (USB Audio Codec)
- Network Status window... Options... Don't automatically change to S&P mode
- Check Window...
 - Show only Log and Master panes
- Gray Line Window...
 - Setup... Show Home, Sun, Equator, Mercator (all others disabled)
- Info Window...
 - Right click... Sunrise/Sunset, Message Window, Show Goals enabled (all others disabled)

Appendix #3 - Laptop Setup

COM Port configuration (subject to change):

- COM 7 – WKUSB
- COM 8 – K3 (either USB for K3S or FTDI USB-to-serial for retrofitted K3)
- COM 9 – W3YY RTTY Interface
- COM 11 – N1MM (virtual COM port via LP-Bridge)
- COM 12 – CW Skimmer (virtual COM port via LP-Bridge)

To change COM port assignments, open Device Manager, right click on desired COM port and select Properties. Select Port Settings... Advanced... and change Com Port Number.

LP-Bridge

- Connect to K3 on COM8
- Check "Auto Connect"
- Check "Start Minimized"
- Virtual COM Port #1
 - COM11
 - Auto Create
 - Pgm: N1MM
- Virtual COM Port #2
 - COM12
 - Auto Create
 - Pgm: CWSkimmer
- Virtual COM Port #3 can be set to COM13 temporarily for NaP3, if needed.

Asus Xonar U7 Soundcard

- Install drivers
- In Xonar control panel
 - Select Line In Input (cables must be plugged into sound card mic in)
 - Audio Format - 192kHz and 24 Bits
 - Record volume = 100
- NaP3
 - Setup
 - Input and output = Xonar U7
 - Calibrate - +10db
 - Rig Global Offset - -6080 (or similar)

CW Skimmer

- Settings
 - Radio
 - Hardware Type: SoftRock-IF
 - Audio IF: -6090 (or appropriate offset)
 - Sampling rate: 192 kHz
 - Audio
 - Driver: MME
 - Signal I/O: Line (Xonar U7)
 - Audio I/O: Headphones (Xonar U7)
 - Left/Right = Q/I
 - 0 Samples
 - CAT
 - Configure... RTS and DTR set to LOW

Appendix #4 - N1MM Messages

CW Message Set #1

F1 CQ,CQ CQ {MYCALL} {MYCALL} UP
F2 Exch, <<5NN>>
F3 TU, <<TU>> {MYCALL} UP

F4 {MYCALL},{MYCALL}
F5 His Call, !
F6 Empty,
F7 Empty,
F8 Agn? ,?
F9 Empty,
F10 Call?, ! ?
F11 Empty,
F12 Wipe,{WIPE}

SSB Message Set #1 (DVR for voice macros)

F1 CQ,
F2
F3
F4
F5
F6 Stack, {STACKANOTHER}
F7 CQ, {CATA1ASC SWT21;}
F8
F9 59, {CATA1ASC SWT31;}
F10 TUQRZ, {CATA1ASC SWT35;}
F11 TU, {CATA1ASC SWT39;}
F12 Wipe, {WIPE}

SSB Message Set #2 (.wav for voice macros)

F1 CQ,{OPERATOR}\CQ5.wav
F2 Exch,{OPERATOR}\Exchange.wav
F3 TU,{OPERATOR}\TU5.wav
F4 {MYCALL},{OPERATOR}\MyCall.wav
F5 Empty,
F6 Spare,
F7 QRZ?,{OPERATOR}\QRZ.wav
F8 Agn?,{OPERATOR}\Again.wav
F9 Empty,
F10 Spare,
F11 Spare,
F12 Wipe,{WIPE}

RTTY Message Set #1 (Basic)

F1 CQ,{TX}{ENTER}CQ CQ {MYCALL} {MYCALL} UP1-3{RX}
F2 Exch,{TX}{ENTER}! {SENTRST} {SENTRST} !{ENTER}{RX}
F3 TU,{TX}{ENTER}! TU {MYCALL} UP1-3{ENTER}{RX}
F4 Empty,{END}
F5 His,{TX} {RX}
F6 Empty,{END}
F7 TX/RX, {ALT-T}
F8 Agn?,{TX}{ENTER}AGN? AGN?{RX}
F9 NIL, {TX}{ENTER}! NIL {MYCALL} UP{ENTER}{RX}{WIPE}

F10 Empty,{END}
F11 Clear, {CLRRX}
F12 Wipe,{WIPE}

RTTY Message Set #2 (Advanced - Stacking, LogThenGrab, LogThenPop)

F1 CQ,{TX}{ENTER}CQ CQ {MYCALL} {MYCALL} UP1-3{RX}
F2 Exch,{TX}{ENTER}! {SENTRST} {SENTRST} !{ENTER}{RX}
F3 TU,{TX}{ENTER}! TU {MYCALL} UP1-3{ENTER}{RX}
F4
F5 Empty,{TX}
F6 Stack, {STACKANOTHER}
F7 TX/RX, {ALT-T}
F8 Agn?,{TX}{ENTER}AGN?{RX}
F9 GRAB,{TX}{ENTER}! {LOGTHENGRAB} TU...{ENTER}NOW {F5}{F2}{RX}
F10 POP,{TX}{ENTER}! {LOGTHENPOP} TU...{ENTER}NOW {F5}{F2}{RX}
F11 Clear, {CLRRX}
F12 Wipe,{WIPE}