Nittany ARC Station Guide

Version 2024-07-12-1135

Rick Gilmore W3TM

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1. Preface

1.1. About

Welcome to the Nittany Amateur Radio Club's (NARC) station guide. The radio station is one of the best benefits of joining the club.

Rick Gilmore W3TM manages the station with the help of Mike Coslo N3LI, Eric Prescott W3EDP, and Woody Brem K3YV. Mark Wharton K0LO provides computer networking support.

This site provides information about how to gain access to the mountaintop station and how to use the equipment.

The mountaintop station has been a focal point of activity for the club. We operated Field Day 2023 from the station, and we have held W3M special event operations, Pennsylvania QSO Party activities, and other contesting events.

For a PDF version of this guide, click here.

2. Logistics

2.1. Location

The station is located in the Rothrock State Forest. The club pays a nominal fee to rent the property. The location on top of a mountain means that our HF antennas have excellent take-off angles, especially to the north and north-northwest.

2.2. Keys

Members who wish to access the station must get two keys from W3TM. One key opens the padlock that secures the yellow access road gate. This key also opens the portable toilet. A second key opens the station door.

W3TM prefers to give new members an in-person tour of the station. So, please schedule that tour at your convenience. You'll receive your keys during the tour.

2.3. Arrival procedures

Here is the sequence we prefer all members use when accessing the mountaintop station.

2. Logistics

- Unlock the yellow gate. Use the small key to unlock the padlock. The larger key opens the clubhouse itself. Take the padlock and locking bolt with you to the shack.

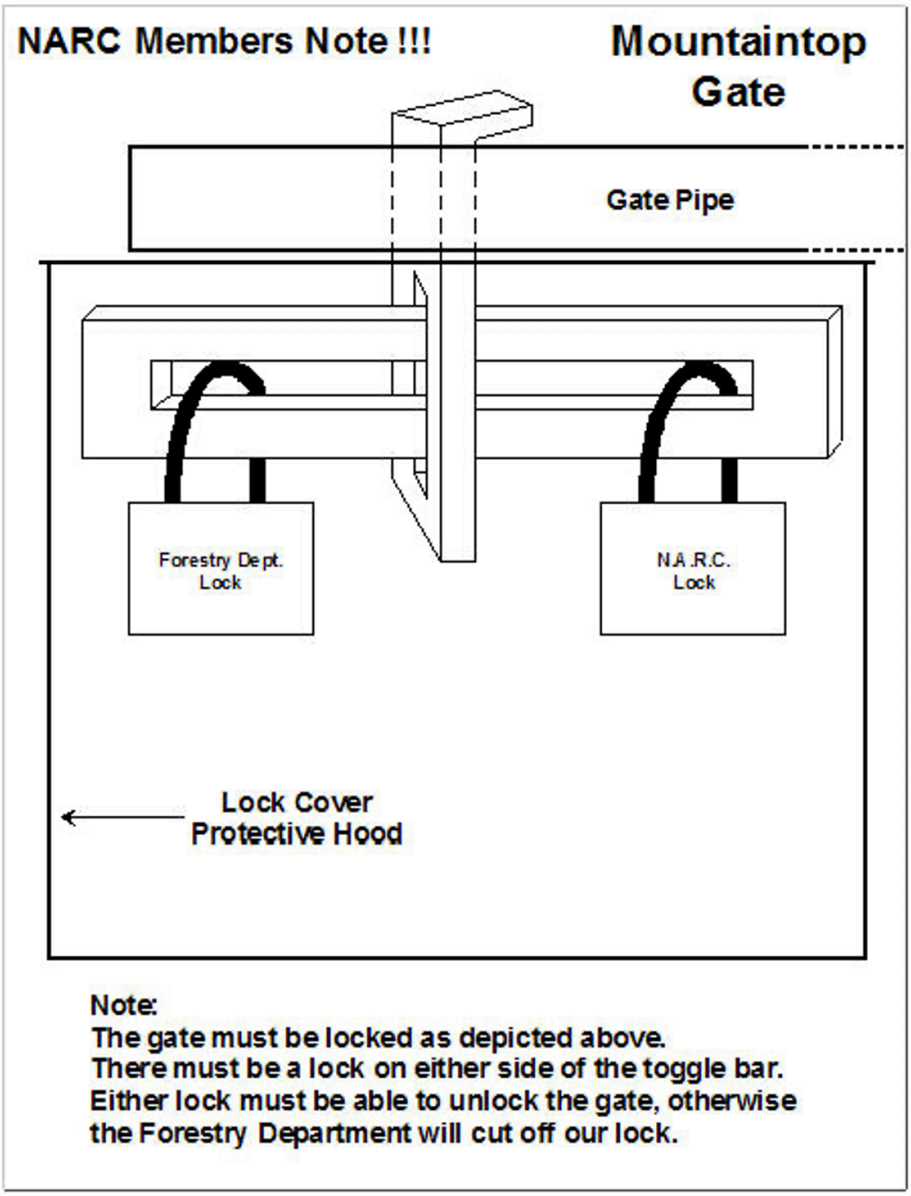


Figure 2.1.: How to lock the gate

- Close the gate and replace the lock bar, but do not re-lock the gate.
- If you know that others will be joining you soon, you may leave the gate open, but make sure to park cross-wise, blocking the past the shack. This ensures that no other driver can inadvertently drive past you and get locked behind the gate when you leave.

Figure 2.2.: NARC Clubhouse looking North

- Unlock door of the shack using the larger of the two keys. There is one lock above the door handle. Turn the key to the left (counter-clockwise) to unlock the door.
- There are light switches on the left just inside the door.
- Put the padlock and locking bar on the desk near the door.

- Turn up the heat, if needed.
  - Go to the breaker box near the southeast corner of the shack (on your right as you enter the shack). By default, we leave breakers 7-14 – the baseboard and north wall 240 V heaters – **off**, and the remainder on. There is a label on the breaker panel to remind you.
  - Turn breakers 7-14 **on** by pushing the breaker lever to the left to align with the others.
- The porta potty key is on a hook to the right of the door. **Note**: The small key that opens the State Forest gate also opens the porta potty.
  - The toilet is serviced periodically. If it needs to be serviced, please let Rick W3TM know. The porta potty is on the South side of the shack.
- Please text W3TM (814-777-3298), Eric W3EDP (814-867-3393), or Mike N3LI (814-404-3991) when you leave. Please report any issues that need to be addressed.

Part I.

Stations

The club maintains two full power HF + 6m stations (NARC-1 and NARC-2), plus a 100 W HF + 6m station (NARC-3). In addition, the mountain-top radio station has a dual band VHF/UHF FM radio for monitoring the 146.86 MHz W3YA and 146.76 MHz W3GA repeaters. We have a packet station and bulletin board operating on 145.030 MHz, and the club supports a full-time APRS digipeater active on 144.390 MHz as W3YA-1.

3. NARC-1

3.1. Overview

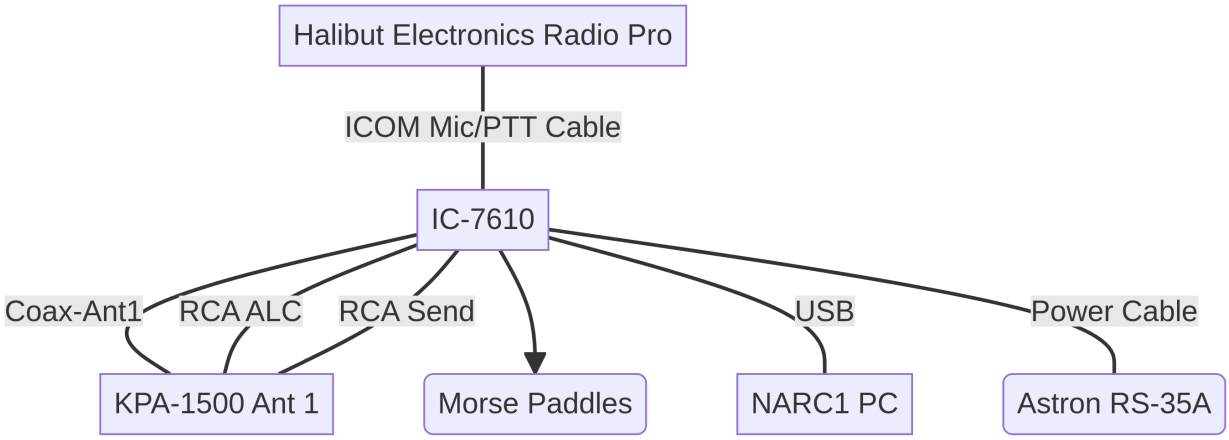
NARC-1 is the first HF station on your left as you enter the station.

Figure 3.1.: NARC-1 operating position

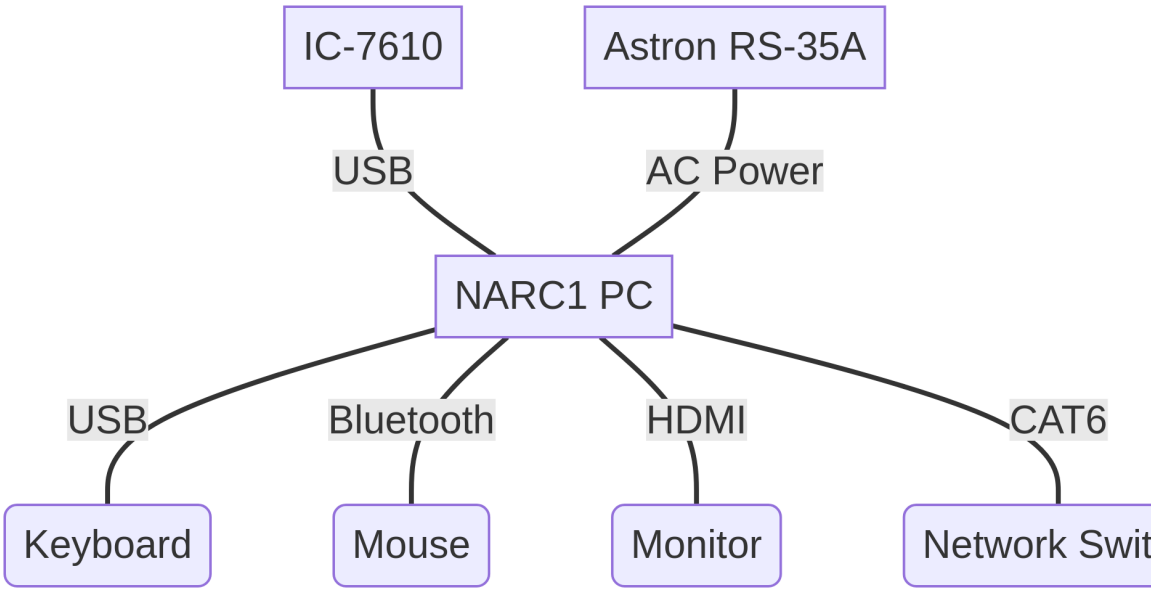
3.1.1. Equipment summary

- Icom IC-7610 (HF + 6m) transceiver
  - Astron RS-35A power supply
- Icom SM-50 desk mic
- Clipper PTT footswitch
- Heil Pro-7 headset
- Nifty mini-manual and other manuals
  - Check the right side of the operating position and the drawer under the radio.
- HP PC, dual monitor set-up
- Elecraft KPA1500 amplifier
  - Elecraft power supply

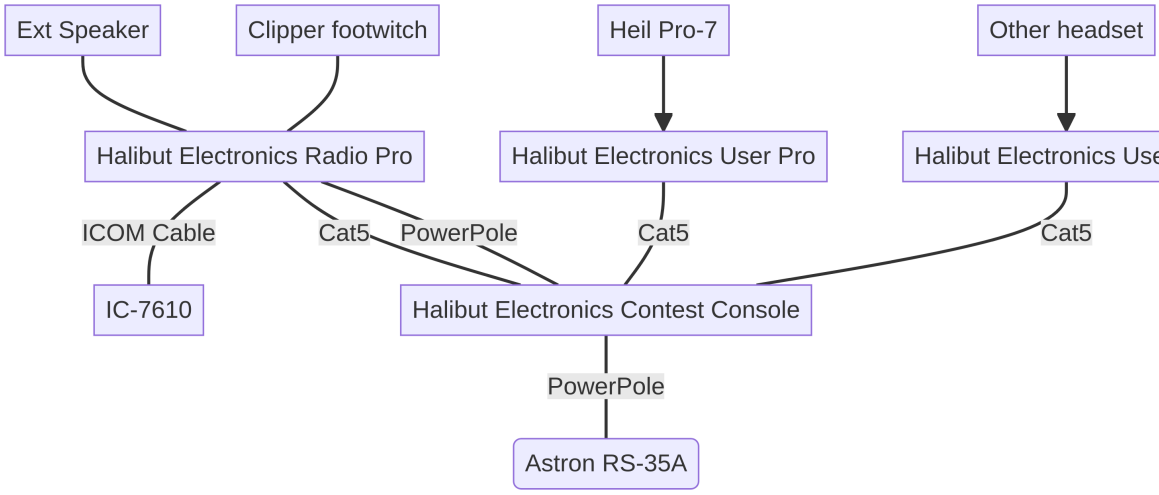
3.1.2. Connection scheme



Connection diagram for NARC1 IC-7610



Connection diagram for NARC1 PC



Connection diagram for NARC1 Halibut Electronics Audio

3.1.3. Software summary

> **Note**
>
> These sections are generated by parsing a CSV data file in `include/csv/software_versions.csv`.
> The code is hidden in the output for aesthetic reasons, but may be revealed by examining the source code file.

3.1.3.1. Operating System

software	version	date
MS Windows	10	2024-05-22

3.1.3.2. Digital modes

software	version	date
WSTJ-X	2.5.4	2024-05-22
JTAlert	2.50.0	2024-05-22
GridTracker	1.24.0512	2024-05-22
JS8Call	2.2.0	2024-05-22
Winlink Express	1.7.15.0	2024-05-22
VARA HF	4.8.7	2024-05-22
VarAC	9.1.0	2024-05-22
Yoniq (SSTV)	1.13	2024-05-22
fldigi	4.1.26	2024-06-14

3.1.3.3. Logging

software	version	date
ACLog	7.0.10	2024-05-22
N1MM+	1.3.10316.0	2024-06-14
N3FJP Field Day Contest Log	6.6.8	2024-06-14

3.1.3.4. Remote Control

software	version	date
Win4Icom	NA	2024-05-22
SmartSDR	3.7.4	2024-06-14

3.1.4. Operating Guide

The operating guide is found under Rigs/IC-7610 section.

4. NARC-2

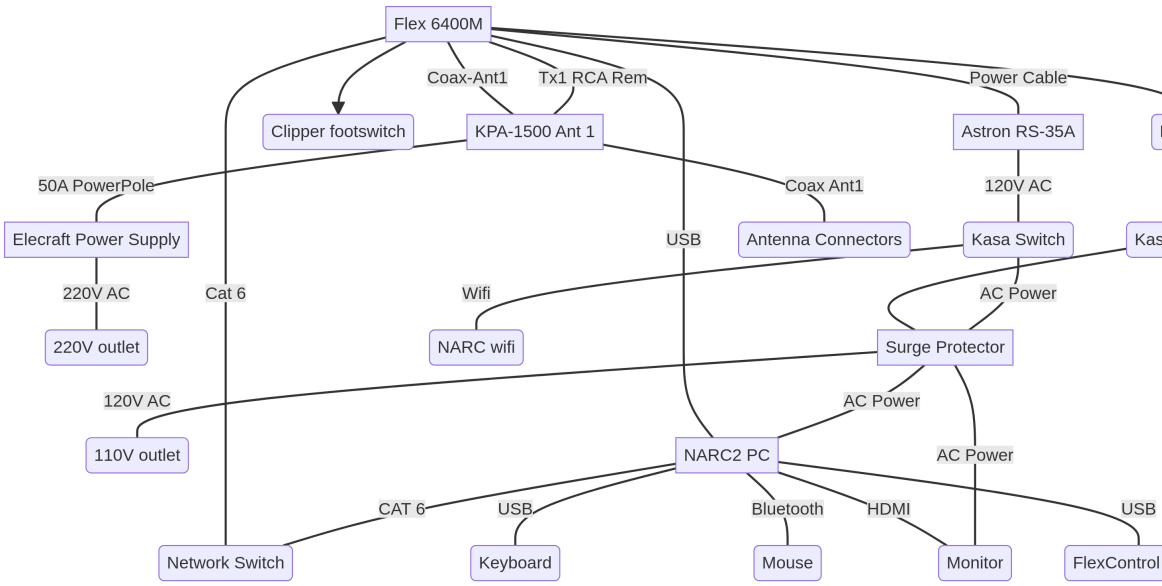
4.1. Overview

NARC 2 is the second HF station on your left as you enter the station.

4.1.1. Equipment summary

- FlexRadio Flex 6400M (HF + 6m) transceiver
  - Astron RS-35A power supply
- Clipper PTT footswitch
- Dell PC, dual monitor set-up
- Elecraft KPA1500 amplifier
  - Elecraft power supply

4.1.2. Connection scheme



Connection diagram for NARC2

4.1.3. Software summary

> **Note**
>
> These sections are generated by parsing a CSV data file in `include/csv/software_versions.csv`.
> The code is hidden in the output for aesthetic reasons, but may be revealed by examining the source code file.

4.1.3.1. Operating System

software	version	date
MS Windows	10	2024-06-08

4.1.3.2. Digital modes

software	version	date
flrig	2.0.01	2024-06-14
WSJT-X	2.5.4	2024-06-08
JTAlert	2.60.2	2024-06-08
JS8Call	2.2.0	2024-06-08
fldigi	4.1.26	2024-06-14
Winlink Express	1.7.16.0	2024-06-08
VARA HF	4.8.7	2024-06-08
VarAC	9.1.0	2024-06-08
MTTY	1.71K	2024-06-14

4.1.3.3. Logging

software	version
ACLog	7.0.10

4.1.3.4. Remote Control

software	version	date
SmartSDR	3.7.4	2024-06-08

4.1.4. Operating Guide

The operating guide for the Flex 6400M is here

5. NARC-3

5.1. Overview

NARC-3 is the HF station on the far (north) wall of the station. It is located to the right of NARC-2, and immediately to the left of the packet station.

5.1.1. Equipment summary

- Icom IC-718 (HF + 6m) transceiver
  - Astron RS-35A power supply
- Dell PC, dual monitor set-up

5.1.2. Software summary

- Windows 10
- Digital modes
  - WSTJ-X
  - JS8Call
  - fldigi suite
  - VarAC
- Logging

- N1MM
- Amateur Contact Log (ACLog) by N3FJP

6. NARC-4 Packet/APRS

6.1. Packet station

The packet station is located along the North wall of the shack near the HF antenna feedlines.

- Icom IC-2710 Dual Band Transceiver set to 145.030 MHz
- HP Computer
- Astron power supply

Figure 6.1.: IC-2710 Packet Transceiver

6.2. APRS station

The station and TNC are located in the cabinet near the back door of the shack.

The W3YA-1 digipeater operates on 144.390 MHz. Here is link to data about the stations recently heard by W3YA-1, according to APRS.fi site.

Part II.

Rigs

The next chapters describe the three main HF+6m rigs the club supports: the Icom IC-7610, FlexRadio Flex-6400M, and the Icom IC-718.

7. Icom IC-7610

7.1. IC-7610 operating guide

Figure 7.1.: Icom IC-7610

This transceiver is currently connected to the NARC1 station computer.

7.1.1. Icom manuals

Here are links to the IC-7610 manuals:

- Basic manual
- Advanced manual

7.1.2. Starting up

- The IC-7610/NARC1 is located closest to the main door off the porch.

7.1.2.1. Connect equipment and power-up

> **Note**
>
> We have been experimenting with remote control of some station operations, including powering on the rig power supplies. As a result, the next set of actions may or may not be required.

1. Connect to the power mains.
    - Power cables are located between the wooden shelf and the east wall.
    - Plug the large 240 V cable (green tag) for the amplifier power supply into the 240 V wall outlet.
    - Plug the smaller 120 V cable for the Uninterrupted Power Supply (UPS) into the 120 V wall outlet.
2. Connect the radio to a suitable antenna.

> **Warning**
>
> **Before you power up the radio, connect it to a suitable antenna**.

The antenna connections are located on the north wall, near the repeater cabinet. Choose the PL-259 connector with the yellow IC-7610 tag. Plug the cable from the radio into the cable connector for one of the antennas, for example, one of the triband Yagis for 10-20 m.

Figure 7.2.: Antenna connections

> **Warning**
>
> **Please do not remove the N/PL-259 connectors from the antenna feedlines.**

3. Power up the UPS by pushing the front button. The green power light should illuminate.
4. Power up the Astron RS-35A power supply that powers the IC-7610/NARC1. The power supply is located to the right of the Elecraft KPA1500 amplifier.

Figure 7.3.: Astron RS-35A power supply

5. Power up the IC-7610/NARC1 by pressing and briefly holding the power button highlighted in Figure 7.4.
6. Power up the Elecraft KPA1500 amplifier

Figure 7.4.: IC-7610 power switch

The IC-7610/NARC1 is connected to the Elecraft KPA1500 amplifier. The power supply for the KPA1500 is under the desk on a small footstool. Check that the KPA1500 power supply is on. If necessary, power-up the power supply by hitting the power switch on the upper rear left side of the power supply. When the amplifier power switch is on, you will see 3 green lights: AC on, High V supply, Low V supply. Power up the KPA1500 by pressing the `on` switch on the lower right hand side of the KPA1500 front panel as shown in Figure 7.5.

> **Note**
>
> If you are not operating with more than 100 W or do not need the KPA1500's built in antenna tuner, then leave the KPA1500 powered off.

7.1.2.2. Log-in to the computer

1. Power up the PC by pressing the power button on the right rear panel.
2. Log-in using the appropriate password

Figure 7.5.: KPA1500 Power Switch

The IC-7610/NARC1 is connected via USB2 to the NARC1 PC. Open your logging program of choice. NARC has licenses for N1MM and N3FJP's Amateur Contact Log.

To operate digital modes (e.g., FT8/FT4, JS8Call, fldigi), open those programs. See instructions for operating these modes in separate sections below.

7.1.3. Basic controls

- Audio levels for the two VFOs are controlled via separate knobs on the left side of the front panel as shown in Figure 7.6.
- As shown in Figure 7.7 You may switch operating bands in one of two ways:
  - Buttons located on the right side of the front panel
  - Pressing the frequency on the touch screen.
- Switch operating modes by pressing the mode button on the touch panel as shown in Figure 7.8.

Figure 7.6.: IC-7610 audio gain controls

Figure 7.7.: IC-7610 band change controls

Figure 7.8.: IC-7610 mode change control

This opens a window where you can choose the mode of operation. - Hit the arrow button to close the window and save your choice.

- Turn digital noise reduction on or off by pressing the NR button on the left side of the front panel highlighted in Figure 7.9. When NR is on, the NR button will be illuminated.
  - To adjust the amount of noise reduction, press and hold the NR button to open a window on the upper right corner of the touch panel display.
  - Turn the MULTI key to adjust the level of noise reduction.
  - Close the NR window by pressing the MULTI key or by pressing the NR button.
- Adjust preamplifier (`P.AMP`) settings, automatic gain control (`AGC`), Intercept Point (`IP+`), `VOX`, and compression (`COMP`) settings by pressing the corresponding button on the left side of the touch/display screen.
- Adjust touch/display screen settings via the MENU1/MENU2 buttons at the bottom of the touch/display screen illustrated in Figure 7.10.

Figure 7.9.: IC-7610 left panel controls

Figure 7.10.: IC-7610 bottom menu touch screen buttons

- Select receive filter settings via the `FILTER` button on the right side of the front panel, below the `TWIN PBT` knob as highlighted in @ic-7610-filter.

Figure 7.11.: IC-7610 filter control

- Set RF power by pressing the MULTI button to open a window on the display/touch screen. Press the RF POWER panel to select it, and adjust the output power by turning the MULTI knob as shown in Figure 7.12.

Figure 7.12.: IC-7610 multifunction control

7.1.4. Settings

The rig and computer settings are tested on a regular basis, approximately monthly. If you would like to help W3TM test the rigs or improve and update the documentation, let him know.

> ⚠ Warning
>
> Please do not change any software or rig settings without:
>
> 1. Contacting W3TM 814-777-3298 first OR
> 2. Documenting your changes in detail

The following setting parameters are provided for reference:

- A single USB A/B cable connects the rig to the PC.
- COM3 is used for most CAT control. The IC-7610 creates a second COM port that is currently unused.
- 8-N-1 at 38400 baud is used for serial control.
- Audio in/out are via USB Audio CODEC. The ICOM driver has been installed.

7.2. Phone operations

7.2.1. On the PC

You do not need to use the PC to operate phone, but you may want to use the PC for logging.

1. Power up the NARC-1 PC by pressing the power button on the front panel.
2. Log-in using the appropriate password

Open your logging program of choice. NARC has licenses for N1MM and N3FJP's Amateur Contact Log.

7.2.1.1. N1MM

> ⚠ Warning
>
> **Please do not update N1MM without asking Mike N3LI, Rick W3TM, or Eric W3EDP first.**

7.2.1.2. Amateur Contact Log (ACL a.k.a. N3FJP)

You may need to download the specific log for the contest you want to work. The club has paid N3FJP for a license under the W3YA callsign. Ask W3TM for information about the license codes for contests that are are not already installed.

1. Open Amateur Contact Log
2. Confirm that the program tracks frequency & mode.

7.2.2. On the IC-7610

1. Confirm the rig is in SSB mode.

To change the mode, press the mode indicator on the touch screen to open a window to toggle the mode (USB/LSB) appropriate for your band.

Figure 7.13.: IC-7610 mode control

Remember, the convention is to use LSB below 10 MHz except for 60 m.

2. Set your receive bandwidth by pressing the FILTER button located on the right side of the front panel.

You may adjust the filter settings by pressing and holding the filter button on the right side of the rig control panel. Press and hold the FILTER button on to save and apply the filter settings.

2. Check audio output levels.
3. Set desired RF power output using MULTI knob.

Press and hold the MULTI button to open a window on the touch/display screen. Press the RF POWER panel and rotate the MULTI button to set RF power.

7.2.3. On KPA1500

1. For < 100W output, set amplifier to STBY mode (yellow light) by pressing MODE button to toggle between STBY and OPER.

For higher power output, follow these instructions for tuning the KPA1500 amplifier.

2. Confirm ANT1 is output (press ANTENNA to toggle).
3. Confirm ATU is IN (not BYP) by pressing and holding ATU TUNE button.

7.3. Digital mode operations

The setup for each digital mode is slightly different, so we have created separate sections to describe those operations.

7.3.1. Fldigi suite

As of 2023-12-19, the installed version of fldigi is 4.1.26.

7.3.1.1. On the PC

1. Open fldigi. (Icon is on desktop.)

Fldigi is configured to use the flrig program to interface between the radio and the computer. Flrig should open automatically a few seconds after fldigi opens. If flrig shows the current VFO frequency and so does fldigi, the two devices are talking to one another.

2. Confirm Settings

It's not essential to confirm the settings each time you start up, but doing so will make sure that you are able to operate without difficulty.

In flrig, open the Config menu and select Setup > Transceiver. This opens a separate window.

Parameter	Value	Comments
Rig	IC-7610	
Ser Port	COM3	
Baud	38400	
Parity	N or none	
(Stop bits)	1	
PTT via CAT	✓	
CI-V adr	0x98	

You may now close the Configuration window by pressing the CLOSE button or close window (X) button.

3. Check receive operations

- Turn to a known PSK31 frequency, for example, 14.070 MHz in the 20 m band.
- From the fldigi Op Mode menu, select PSK > BPSK-31

If all is well, you should see decodes in the left hand window and signals in the waterfall below.

4. Configure your operational settings.

- From the Configure menu, select UI > Operator to open a window.
- Under the Operator tab set Station Callsign, Operator Callsign, Operator Name, Antenna, Station QTH, Station Locator and other items.

7.3.1.2. On the IC-7610

1. Confirm rig is in USB Data 2 (USB-D2) mode.

Figure 7.14.: IC-7610 mode select button

To change the mode, press the mode indicator on the touch screen to open a window to toggle the mode (USB/LSB) to USB. Unless you are sure that your digital mode uses LSB, select USB. Press and hold the DATA button to switch between D1, D2, and D3 data mode connectors. D2 is configured for use via USB.

2. Set your bandwidth to filter 1 (wide) by pressing the FILTER button located on the right side of the front panel.

Figure 7.15.: IC-7610 filter control

You may adjust the filter settings by pressing and holding the filter button on the right side of the rig control panel. Press the arrow/return button on the display/touch screen to save and apply the filter settings.

3. Set other settings

The following settings can be changed via buttons on the left side of the touch/display screen.

Figure 7.16.: IC-7610 left panel controls

- Preamp (*P.AMP*) off

Press the P.AMP button to cycle through the settings (OFF, P.AMP 1, P.AMP 2)

- Attenuator (*ATT*) off

Press the ATT button to cycle through the attenuator settings (OFF, 6 dB, 12 dB, 18 dB)

- IP+ off

Press the IP+ button to select ON or OFF

- Turn Automatic Gain Control (*AGC*) off

Press and hold the AGC button on the display/touch screen. This opens a panel. Under the SSB column, select the SLOW setting. Adjust the AGC level downward until the indicator says OFF. Press the arrow/return button on the display/touch screen to enter the setting.

- *VOX* off
- Noise reduction (*NR*) off

Press the NR button on the left side of the front panel to turn off the illuminator.

- Noise blanker (*NB*) off

Press the NB button on the left side of the front panel to turn off the illuminator.

4. Set desired RF power output using MULTI knob.

Figure 7.17.: IC-7610 MULTI knob

Press and hold the MULTI button to open a window on the touch/display screen. Press the RF POWER panel and rotate the MULTI button to set RF power.

> **Note**
>
> Generally speaking, 40-50 W RF output is more than sufficient for successful operation using fldigi-supported modes.

7.3.1.3. On KPA1500

It's possible to use the amplifier for fldigi-supported modes, but we do not recommend it. These modes involve high duty cycles and put a lot of stress on the amplifier.

7.3.2. WSJT-X

The current installed version as of 2023-12-19 is v2.5.4.

7.3.2.1. On the PC

1. Open WSJT-X (Icon is on desktop.)

WSTJ-X opens to the same operating frequency as the rig is on when you start.

2. Confirm Settings

It's not essential to confirm the settings each time you start up, but doing so will make sure that you are able to operate without difficulty.

a. Open the Configurations menu and select a configurations set. `Standard Ops` is a good place to start.

b. Open Settings from the File menu

General tab:

Set My Call to your personal callsign unless you have permission to use the club callsign (W3YA). Set any Display or Behavior settings per your personal preferences.

Radio tab:

Change these at your own risk.

Parameter	Value	Comments
Rig	Icom IC-7610	
Ser Port	COM3	
Baud	38400	
Data Bits	8 bits	
Parity	none	
(Stop bits)	1	
Handshake	none	
Force Control Lines:	unset	
PTT method	CAT (port should be COM3)	
Mode	Data/pkt	
Split operation	`Rig` or `Fake It`	

You may want to check/confirm that rig control is working by pushing the Test CAT button in this panel. If the button turns green, then the rig and computer are communicating.

You may also want to check that PTT is working. Adjusted the rig's power output to a low level (1-5 W) before testing. On the IC-7610, press the MULTI button, touch the RF Power panel on the touch screen, and turn the MULTI button to set desired output power.

Press the `Test PTT` button and observe whether the transmitter keys up. If so, all is well.

Audio tab:

Parameter	Value	Comments
Input	USB Audio Codec	
Output	USB Audio Codec	

Reporting tab

You may want to set the Op Call to your own callsign.

Advanced tab:

Check or uncheck `Special Operating Activity` per situation, for example ARRL Field Day or the NA VHF Contest.

You may now close the `Settings` window by pressing the OK button.

Switch to the desired mode (e.g., FT8) from the `Mode` menu. Select the desired operating band and default frequency from the dropdown menu on the lower left side of the main WSJT-X application panel.

3. Check computer clock accuracy

Open a browser; visit https://time.is

If your time synch is within .5s of the correct time, you may proceed.

If you are decoding signals in the waterfall, then all is well.

7.3.2.2. On the IC-7610

1. Confirm rig is in USB Data 2 (`USB-D2`) mode.

Figure 7.18.: IC-7610 mode select button

To change the mode, press the mode indicator on the touch screen to open a window to toggle the mode (USB/LSB) to USB. Unless you are sure that your digital mode uses LSB, select USB. Press and hold the DATA button to switch between D1, D2, and D3 data mode connectors. D2 is configured for use via USB.

2. Set your bandwidth to filter 1 (wide) by pressing the FILTER button located on the right side of the front panel.

Figure 7.19.: IC-7610 filter control

You may adjust the filter settings by pressing and holding the filter button on the right side of the rig control panel. Press the arrow/return button on the display/touch screen to save and apply the filter settings.

3. Set other settings

Figure 7.20.: IC-7610 left panel controls

The following settings can be changed via buttons on the left side of the touch/display screen.

> **Note**
>
> The following settings let the software do the heavy-lifting.

- Preamp (P.AMP) `off`

Press the P.AMP button to cycle through the settings (OFF, P.AMP 1, P.AMP 2)

- Attenuator (ATT): `off`

Press the ATT button to cycle through the attenuator settings (OFF, 6 dB, 12 dB, 18 dB)

- IP+: `off`

Press the IP+ button to select ON or OFF

- Automatic Gain Control (AGC): `off`

Press and hold the AGC button on the display/touch screen. This opens a panel. Under the SSB column, select the SLOW setting. Adjust the AGC level downward until the indicator says OFF. Press the arrow/return button on the display/touch screen to enter the setting.

- VOX: `off`
- Noise reduction (NR): `off`

Press the NR button on the left side of the front panel to turn off the illuminator.

- Noise blanker (NB) off

Press the NB button on the left side of the front panel to turn off the illuminator.

4. Set desired RF power output using MULTI knob.

Figure 7.21.: IC-7610 MULTI knob

Press and hold the MULTI button to open a window on the touch/display screen. Press the RF POWER panel and rotate the MULTI button to set RF power.

Remember, WSJT-X is a weak signal mode. Less than 50 W is plenty, especially if you are using one of our “gain” antennas (Yagis).

7.3.2.3. On KPA1500

It’s possible to use the amplifier for fldigi-supported modes, but we do not recommend it. These modes involve high duty cycles and put a lot of stress on the amplifier.

7.3.2.4. Operating hints

1. Make sure that your audio input level is not too high.

There are several ways to adjust this: - Adjust the RF/SQL button on the rig - Adjust the mic levels on the PC (open the Audio control panel)

7.4. CW operations

> **Note**
>
> Coming soon!

8. FlexRadio Flex 6400M

8.1. Flex 6400M HF Transceiver

This transceiver is currently connected to the NARC-2 computer.

8.1.1. Manuals

Here are links to some useful FlexRadio manuals:

- SmartSDR software user guide
- Flex-6400M user guide

8.1.2. Connect and power-up

1. Connect the Flex 6400M to an antenna.

Before you power up the radio, connect it to a suitable antenna. **The antenna connections are located on the north wall, near the repeater cabinet**. Choose the PL-259 connector with the yellow FlexRadio tag. Plug the cable from the radio into the cable connector for one of the antennas, for example, one of the triband Yagis for 10-20 m. **Please do not remove the N/PL-259 connectors from the antenna feedlines.**

> **Note**
>
> We have been experimenting with remote control of some station operations, including powering on the rig power supplies. As a result, the next set of actions may or may not be required.

2. Connect radio to the power mains.
    - Power cables are located between the wooden shelf and the east wall.
    - Plug the large 240 V cable (green tag) for the amplifier power supply into the 240 V wall outlet.
    - Plug the smaller 120 V cable for the Uninterrupted Power Supply (UPS) into the 120 V wall outlet.
3. Power up the UPS by pushing the front button. The green power light should illuminate.

> **Note**
>
> Check to see if the Astron RS-35A power supply is on before carrying out the next step.

4. Power-up the Astron RS-35A power supply that powers the Flex 6400M/NARC2. The power supply is located to the right of the Elecraft KPA1500 amplifier.

Figure 8.1.: Astron RS-35A power supply

5. Power up the Flex/NARC-2 by pressing and briefly holding the power button.

> **Note**
>
> If you do not plan to use the amplifier or the built-in antenna tuner, you may skip step 6.

6. Power up the Elecraft KPA1500 amplifier

The Flex/NARC-2 is connected to the Elecraft KPA1500 amplifier. The power supply for the KPA1500 is under the desk on a small footstool.

Check that the KPA1500 power supply is on. If necessary, power-up the power supply by hitting the power switch on the upper rear left side of the power supply. When the amplifier power switch is on, you will see 3 green lights: AC on, High V supply, Low V supply. Power up the KPA1500 by pressing the `on` switch on the lower right hand side of the KPA1500 front panel.

Figure 8.2.: KPA1500 Power Switch

8.1.2.1. Log-in to the computer

1. Power up the PC by pressing the power button on the right rear of the computer/display.
2. Log-in using the appropriate password.

The Flex 6400M is connected via USB to the NARC-2 PC.

Open your logging program of choice. NARC has licenses for N1MM and N3FJP's Amateur Contact Log.

To operate digital modes (e.g., FT8/FT4, JS8Call, fldigi), open those programs. See instructions for operating these modes in separate documents.

8.1.3. Basic controls

9. Icom IC-718

9.1. Icom IC-718

This transceiver is currently connected to the NARC-3 computer.

9.1.1. Connect equipment and power-up

1. Connect to the power mains.
2. Connect the radio to a suitable antenna.

> ⚠ Warning
>
> **Before you power up the radio, connect it to a suitable antenna. The antenna connections are located on the north wall, near the repeater cabinet.**

Choose the PL-259 connector with the yellow FlexRadio tag. Plug the cable from the radio into the cable connector for one of the antennas, for example, one of the triband Yagis for 10-20 m.

> ⚠ Warning
>
> **Please do not remove the N/PL-259 connectors from the antenna feedlines.**

3. Power up the UPS by pushing the front button. The green power light should illuminate.
4. Power up the Astron RS-35A power supply that powers the IC-718/NARC3.
5. Power up the IC-718.
6. Power up the Elecraft KPA1500 amplifier

9.1.1.1. Log-in to the computer

1. Power up the PC by pressing the power button on the right rear panel.
2. Log-in using the appropriate password

The IC-718 is connected via USB2 to the NARC-3 PC.

To operate digital modes (e.g., FT8/FT4, JS8Call, fldigi), open those programs. See instructions for operating these modes in separate documents.

9.1.2. Basic controls

9.1.2.1. Audio levels

9.1.2.2. Filter settings

9.1.2.3. Operating modes

9.1.2.4. Bands

9.1.2.5. RF Power

9.1.3. More information

Here's a helpful video from KB9VBR's YouTube channel.

10. Kenwood TM-D710

10.1. Overview

The Kenwood TM-D710 is available for members who want to monitor the 146.86 and 146.76 repeaters while they are at the clubhouse.

Figure 10.1.: Kenwood TM-D710

10.2. Manuals

- Basic manual
- APRS manual

10.3. Operating instructions

The radio is located along the north wall, above the NARC-4 packet station.

1. Press the power button on upper right corner of the radio.
2. Adjust the audio gain for either the left or right VFO via the small "inner" knobs.
3. Select the operating band by pressing and holding the lower left or right small buttons.
4. When you leave the shack, please power-down the rig. Press and hold the power button in the upper right.

Part III.

Other resources

11. Antennas

The mountaintop station has many antennas from which to choose. We have rotatable Yagis and fixed position dipoles. We have resonant antennas on 160m, 80m, 40m, 20m, 17m, 15m, 12m, 10m, and very soon, 6m. This page describes them.

11.1. Towers

With the help of K3ARL's team from Centre Communications, the club maintains four towers.

11.1.1. 60 foot tower

- 4 element Mosley triband (10, 15, 20m + WARC bands - 12 and 17m) Yagi
- 40m dipole

11.1.2. 100 foot tower

- VHF 4 element vertical orientation Yagi + rotator
- 2 VHF fixed direction vertical orientation 6 element Yagis (W3YA system)
- VHF 2m vertical polarization
- 20m dipole

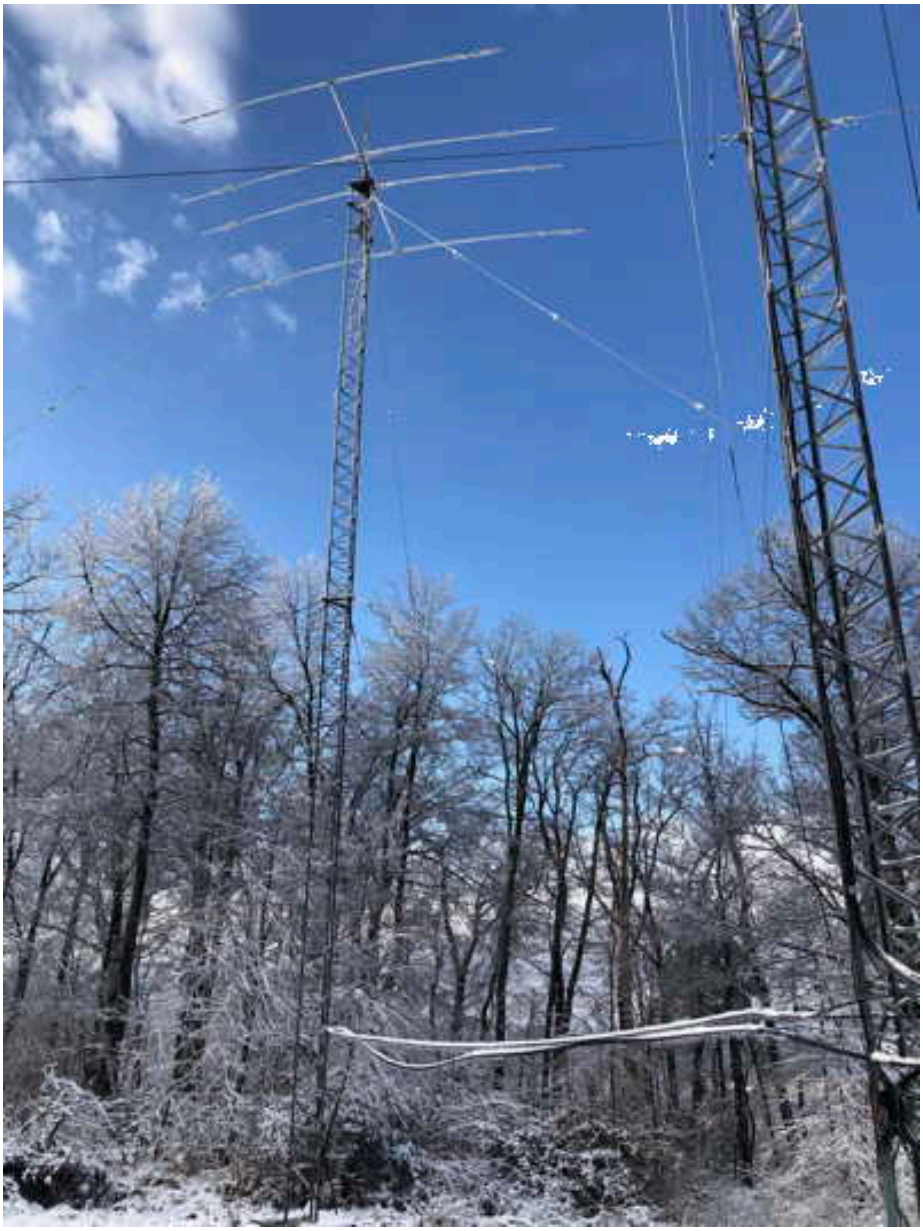


Figure 11.1.: 60 foot tower

Figure 11.2.: 100 foot tower

11.1.3. 80 foot tower

- 4 element triband (10, 15, 20m + WARC) Yagi
  - Rotor
- ~~160m dipole~~
- 40m dipole

Figure 11.3.: 80 foot tower

11.1.4. 60 foot tower

- VHF vertical
- 80m dipole oriented N/S

Figure 11.4.: 60 foot tower

11.2. Antennas by band

11.2.1. 10, 12, 15, 17, 20m

- 4 element triband (10, 15, 20m + WARC bands - 12 and 17m) Yagi (on 60 foot tower)
- 4 element Mosley Classic triband (10, 15, 20m + WARC bands - 12 and 17m) Yagi (on 80 foot tower) (new in 2023)

11.2.1.1. Rotator and Controller

Both Mosley triband antennas are moved by (new in 2023) Yaesu G-2800 rotators.

A Green Heron RT-21 Rotator Controller controls each Yaesu rotator.

11.2.1.1.1. Manuals

- Yaesu G-2800 rotator manual and calibration procedure.
- Green Heron RT-21 Rotator Controller manual and version 4 revision notes.

> **Coming soon...**
>
> Mark K0LO is configuring a PC server so that all of the NARC computers can control the rotators.

Figure 11.5.: Yaesu G-2800 rotator

Figure 11.6.: Green Heron RT-21

11.2.2. 40m

- ~~Dipole (on 100 foot tower)~~
  - Current out of service.
- Dipole (on 80 foot tower)

> **Note**
>
> The 40m dipole on the 100 foot tower has been replaced with a 20m dipole. A replacement 40m/80m fan dipole has been ordered. We hope to install the dipole soon.

11.2.3. 80m

- Dipole, CW cut, on 60 foot tower.
- Dipole, Phone (75m) on other 60 foot tower.

11.2.4. 160m

- Dipole on 80' north tower.

> **Note**
>
> The 160m dipole is out of service. A replacement has been acquired. The club hopes to install the replacement in Fall 2023.

11.2.5. VHF/UHF

- The club has acquired a 6m yagi for future installation on the 100 foot tower.
- The K3YV UHF repeater has its transmit and receive antenna on the 60 foot tower.
- The club does not have resonant antennas for 30 or 60m.

11.3. Future plans

- The club has plans to replace some of our 40m and 80m single band dipoles with 40m/80m fan dipoles. Those antennas are on-hand, but have not yet been installed.
- The club has acquired a 6m Yagi. We plan to install that antenna on the 100 foot tower at a future date.
- There is a vertically polarized 2m Yagi on top of the 100 foot tower. The 6m antenna may replace the 2m antenna, or we may service or replace the 2m antenna.
- There has been some discussion about installing an HF receive antenna, and about building or installing antennas for 60m and 30m.

11.4. Antenna use

Figure 11.7.: Antenna connections in clubhouse interior

- Confirm that it is impossible for your transceiver to transmit while you are connecting your transceiver's (color-tagged) feedline to one of the antenna connectors.
- Switch antennas manually by connecting your radio feedline from array of antenna connectors on the north wall.
- When you leave the shack, disconnect the transceiver feedline from the antenna you were using and hang it on one of the hooks on the wall using the attached paracord.

12. Wifi & internet

12.1. Background

Thanks to the work of Mark K0LO and Eric Brooks N3EB (SK), the clubhouse got internet service in the fall of 2020.

12.2. Connecting to wifi

The wifi is for club members only. The ssid is `NARC Members`.

Ask Mike N3LI, Rick W3TM, or Eric W3EDP for the password.

Figure 12.1.: The Ubiquiti wifi router

12.3. Connecting to the internet via an Ethernet cable

The TP Link bridge/router has ethernet ports you may plug in to.

> **Note**
>
> TODO: Add a photo of the bridge/router here.

> TODO: We might also consider having some ethernet cables connected to the bridge/router.

Note that NARC1, NARC2, and NARC3 use ports 1, 3, and 5. Please leave these connections alone. The system runs a DHCP server, so you should be able to plug in your computer and acquire an IP address after a few moments.

13. Remote operations

13.1. Overview

Since the winter of 2022-23, several club members have been experimenting with remote operations at the mountaintop. The experiments have been conducted during the time of the year when lightning is not a meaningful risk, essentially December through February.

13.2. Remote access to NARC-1

The steps are as follows:

1. Connect to the VPN.

2. Power up the radio via the Kasa app or the NARC Node Red server.

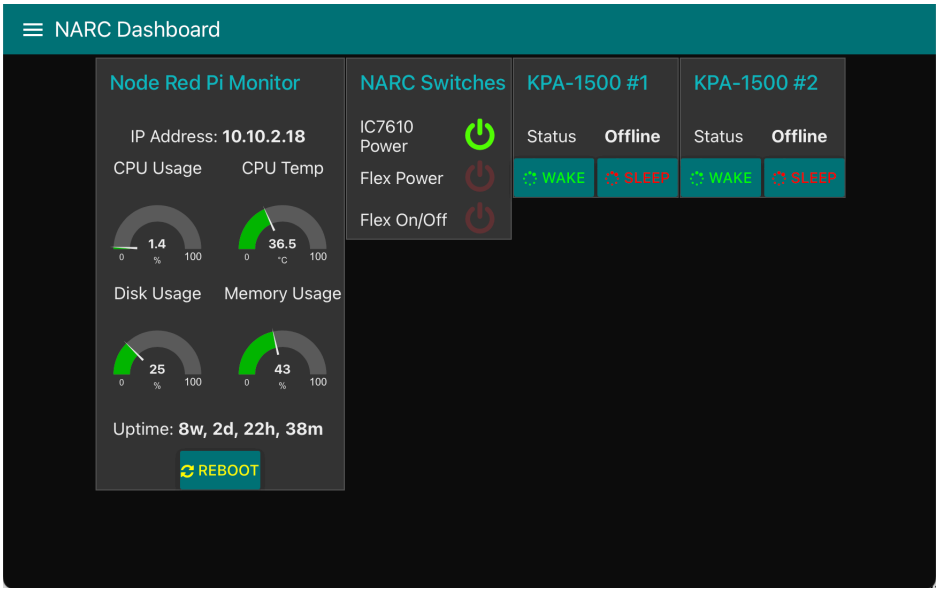


Figure 13.1.: NodeRed Dashboard

3. Connect to the radio

W3TM uses the SDR-Control application. It works on MacOS and iOS (both iPhone and iPad) and has an interface similar to the MacOS and iOS SmartSDR application for FlexRadios (see below). The following screenshots depict SDR-Control operations from a Mac.

When the application opens, the following screen appears.

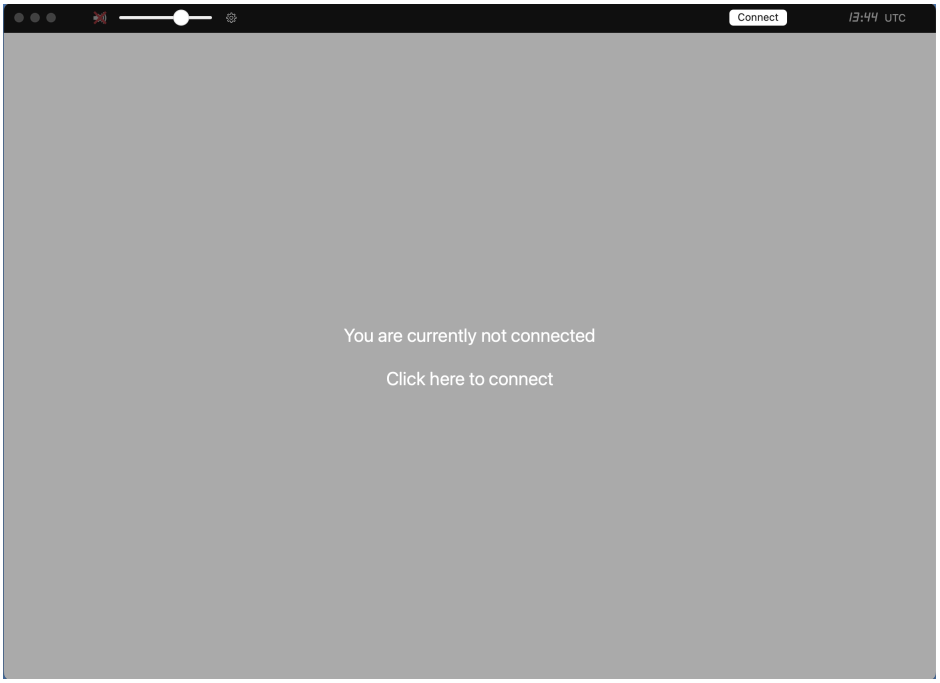


Figure 13.2.: SDR-Control connection screen

Clicking on the panel opens a window with available radios.

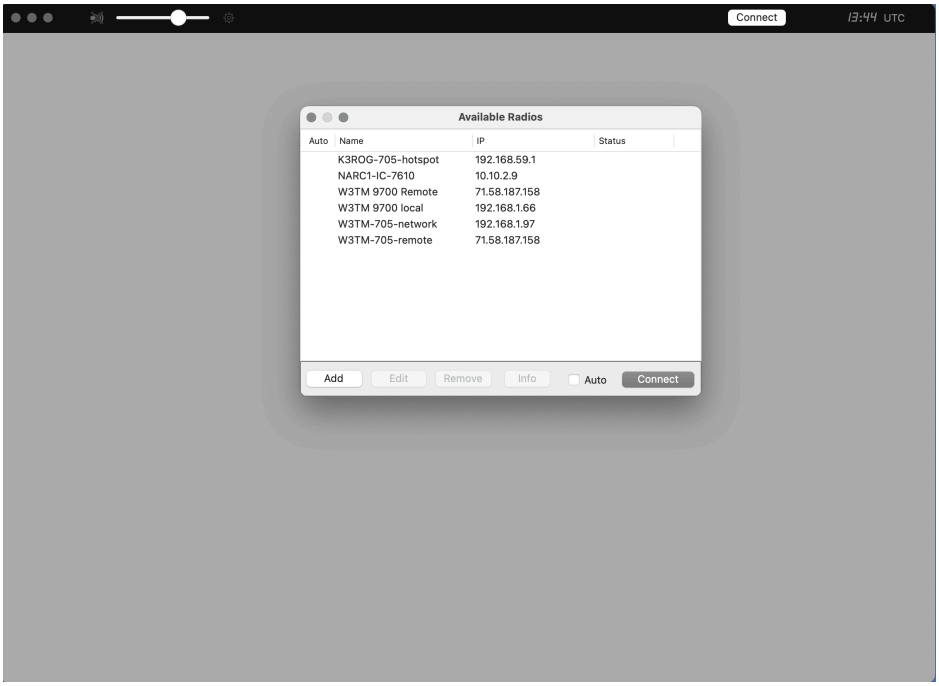


Figure 13.3.: SDR-Control available radios

Clicking on the “NARC1-IC-7610” line connects to the radio.

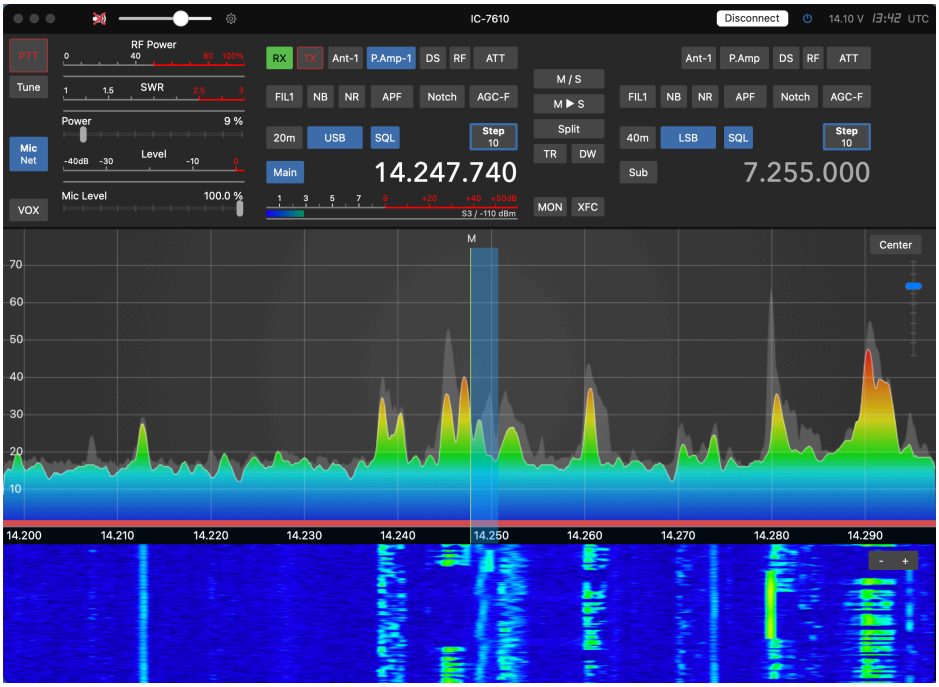


Figure 13.4.: SDR-Control screen of remote access to NARC-1 IC-7610

13.2.1. Shutting down

The steps to shut down are as follows:

1. Press the white “Disconnect” button in the upper panel.

2. Disconnect from the NARC VPN.

13.3. Remote access to NARC2

There are two ways to access the NARC-2/Flex 6400M station. One way involves use of the SmartSDR application to connect to the radio directly. The other way involves accessing the NARC-2 PC and using the local copy of SmartSDR.

13.3.1. Access directly via SmartSDR

The (paid) MacOS and iOS SmartSDR applications written by Marcus Roskosch and the (free) Windows-only SmartSDR application provided by FlexRadio can be used to connect to the Flex 6400M using SmartLink.

The steps to access the Flex 6400M are as follows.

1. Connect to the VPN

2. Power up the radio via the NARC Node Red server (https://10.10.2.18:1880/ui).

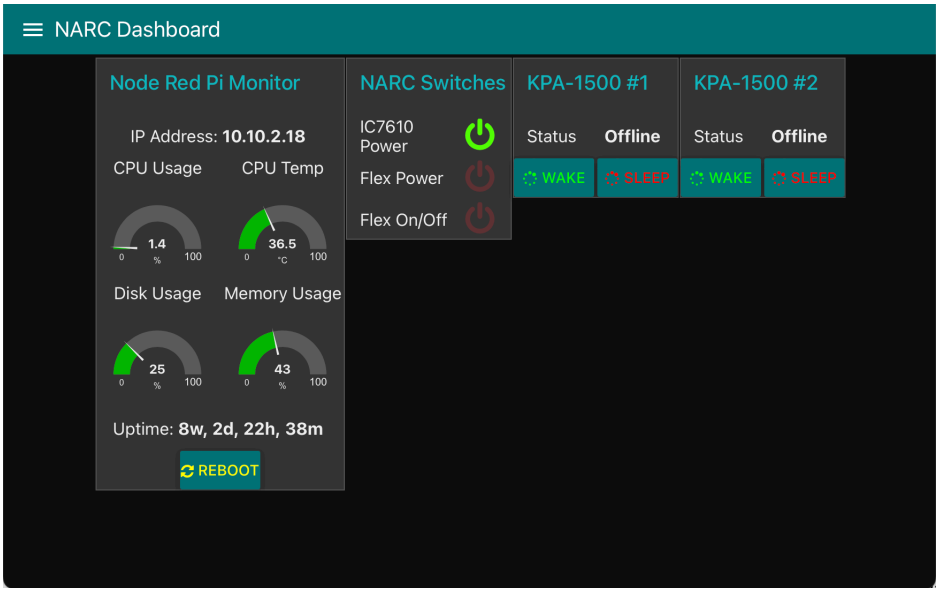


Figure 13.5.: NodeRed Dashboard

The 'Flex Power' button powers up the Astron power supply. 'Flex On/Off' button powers up the radio.

3. Disconnect from the VPN

13.3.1.1. On iOS or MacOS SmartSDR

1. Open SmartSDR

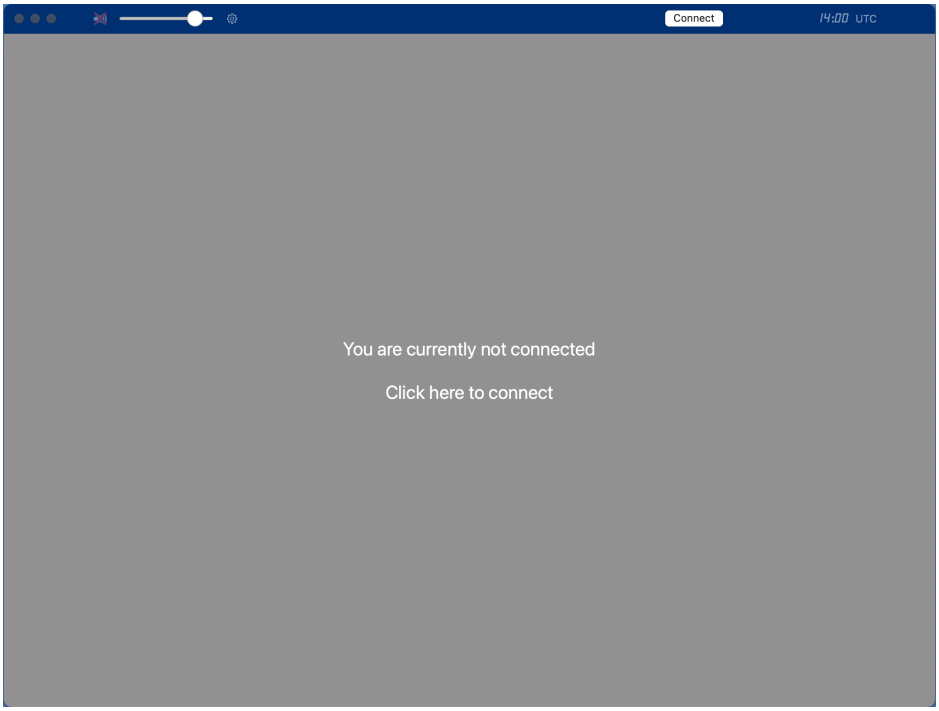
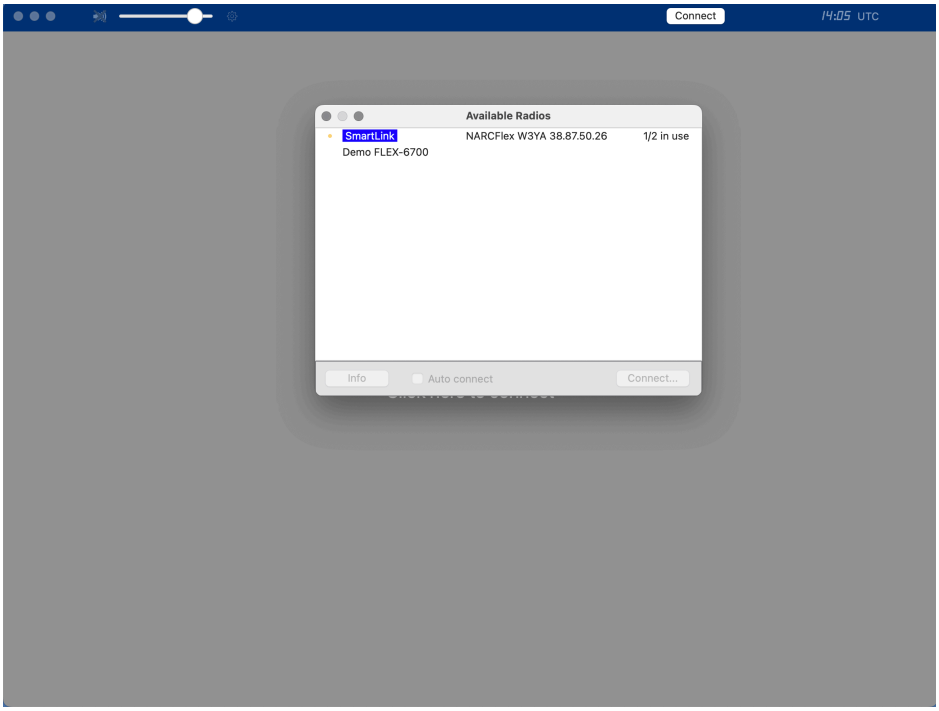


Figure 13.6.: Connection screen from SmartSDR for MacOS

Click on the main window to open a list of available radios.



Note the blue “SmartLink” indicator and the NARCFlex radio. Click on the “SmartLink” line and press the “Connect…” button.

After a few moments, the following window may appear.

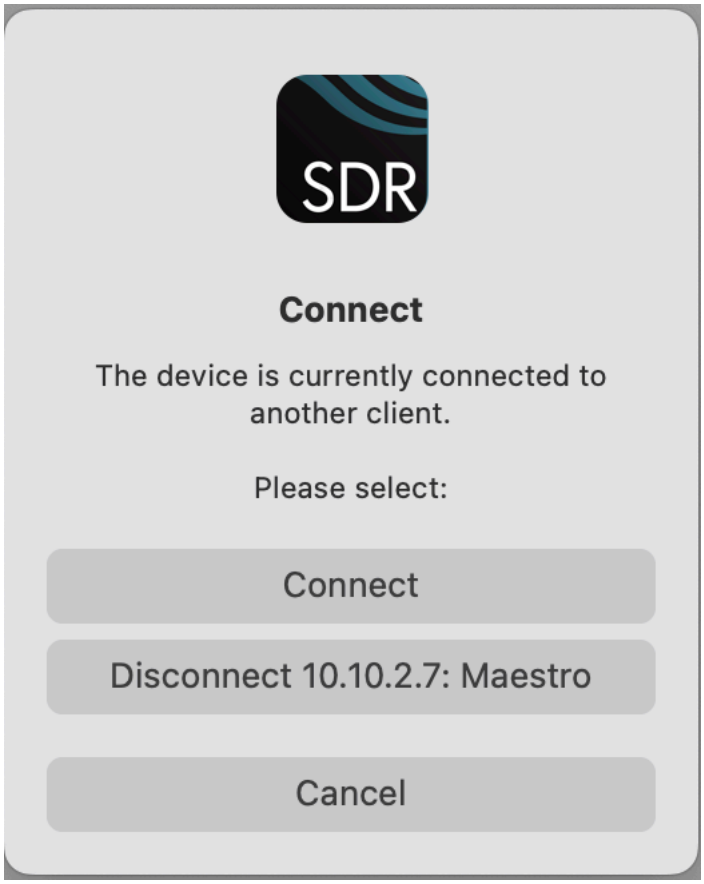
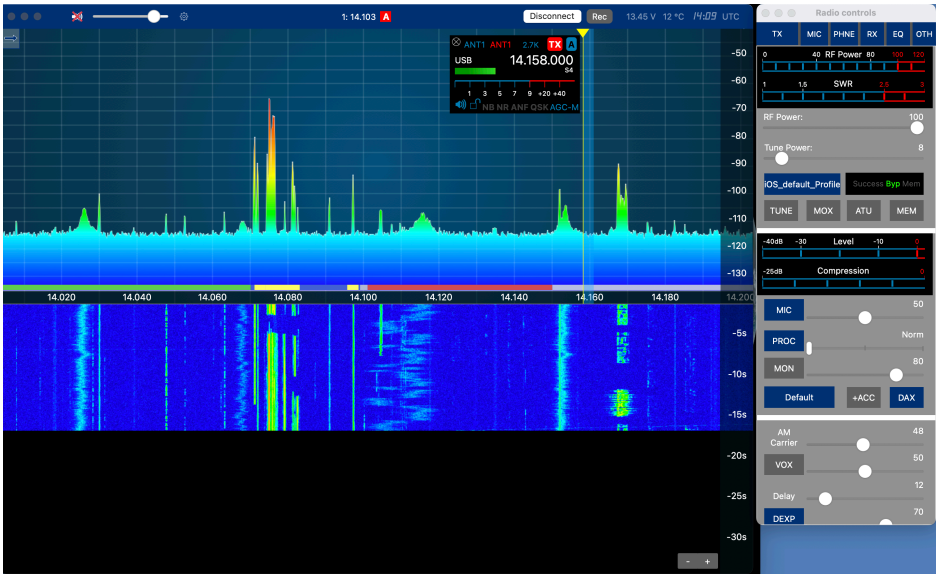


Figure 13.7.: Window to connect to Flex 6400M as a second client or disconnect the local Maestro client

Press the “Connect” button.

After a moment or two, the radio control panel appears.



Shutting down

The steps to shut down are as follows:

1. Press the white “Disconnect” button in the upper panel of SmartSDR.

2. Connect to the NARC VPN.

3. Power down via the NARC Node Red server (https://10.10.2.18:1880/ui).

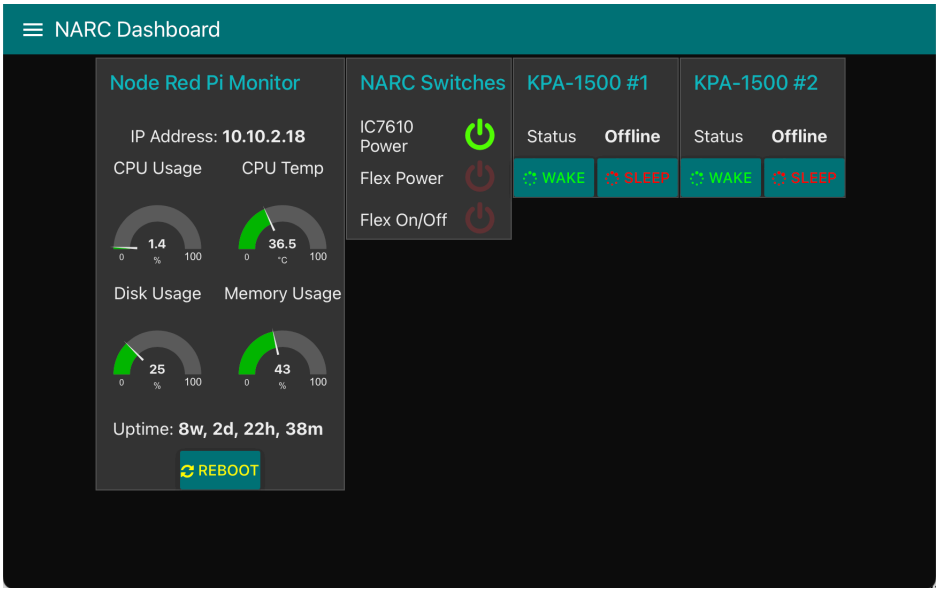


Figure 13.8.: NodeRed Dashboard

Power-down the Flex first: Press “Flex On/Off”.

Wait about 15 seconds.

Then power-down the power supply by pressing “Flex Power”.

4. Disconnect from the NARC VPN.

13.3.2. Access via NARC-2 computer

> **Note**
>
> TODO: Complete this section

14. Test Suites

This chapter describes the suite of tests that we use to make sure that our stations remain in good operating condition.

14.1. Monthly

W3TM tries and usually succeeds in running these steps on both NARC1 and NARC2 once a month. The results of the tests are captured in a Google doc.

14.1.1. Power-up

- Connect rig to a suitable antenna or dummy load
- Power-up the Astron power supply
- Power-up the rig
- Log-on to the computer using the appropriate user name and password

14.1.2. Phone operations

- Set power to 100 W or less
- Call CQ or answer a CQ
  - On the IC-7610, use Icom SM-30 desk mic with embedded push-to-talk (PTT) switch or the footswitch.

  - On the Flex 6400M, use the Yaesu mic or headset with the footswitch for PTT.

14.1.3. Logging programs

14.1.3.1. Amateur Contact Log (N3FJP)

- Check https://www.n3fjp.com/ to determine latest version of software.
- Download and install if there is an update.
- Open Amateur Contact Log; a shortcut is on the PC desktop
- Confirm version and record it.
- Confirm that ACL tracks of frequency changes & mode changes
- Close application

14.1.3.2. N1MM+

- Start-up N1MM+; update if prompted
- Confirm version
- Confirm that N1MM+ follows frequency changes.
- Close N1MM+.

14.1.4. Digital mode operations

14.1.4.1. WSJT-X

- Open WSJT-X
- Confirm version.
- Select W3YA configuration
- Test WSJT-X receive
- Switch to suitable band for antenna from within WSTJ-X application

- Confirm that rig follows software band change
- Turn RF power to 10 W
- Test WSJT-X CQ transmit
  - Click Enable Tx button
  - Permit 3 xmit cycles
  - If no one responds to CQ, check https://pskreporter.info
- If not checking JTAlert, Close WSJT-X

14.1.4.2. JTAlert, https://hamapps.com/JTAlert/

- Check application site, update as needed.
- Open JTAlert
- Confirm version.
- Confirm that received CQs appear in green in JTAlert window
- Test xmit from JTAlert
  - Click on green CQ button to initiate QSO
- Close JTAlert

> **Note**
>
> TODO: More complete steps

14.1.4.3. JS8Call

- Open JS8Call
- Confirm version.
- Select W3YA configuration
- Test JS8Call receive
- Switch to suitable band for antenna (most JS8Call activity is on 40 m)

- Confirm rig follows software band change
- Confirm RF power is 10 W
- Test JS8Call heartbeat transmit

> **Note**
>
> TODO: Complete steps

- If stations respond to heartbeat, all is well.
- Check pskreporter.info to confirm: W3YA _____ was/_____ was not heard.
- Close JS8Call

14.1.4.4. Fldigi, http://www.w1hkj.com/

- Check site and update fldigi, flrig, or other applications, as needed
- Open fldigi
- Confirm version.
- On IC-7610, confirm that flrig opens and shows current operating frequency

> Operating parameters for IC-7610:
>
> *Rig*: IC-7610 *COM3 Baud*: 38400 *Stop bits*: 1 stop bit *CI-V*: 0x98

> Operating parameters for Flex-6400M
>
> TODO: Add these.

- 7.070 MHz is a watering hole for PSK31 activity on 40m. You might look there to test receive and transmit.
- Check transmit

  - Create test message (e.g., “de w3ya w3ya testing testing”)
  - Transmit message

- Wait 1-2 mins and check pskreporter.info: W3YA _____ was/_____ was not heard.
- Close flrig and fldigi.

14.1.4.5. Winlink Express/VARA

- Open Winlink Express
- Update forms and software if prompted
- Confirm Winlink (not forms) version.
- Select Telnet Winlink session and open session, then start the session to retrieve any messages.
- If connection succeeds, send test message to W3TM@winlink.org.
- Select Vara HF Winlink session
- If prompted, update VARA HF
  - Download
  - Install (as administrator)
- Confirm VARA HF version.
- Select an HF target station
- When the channel is clear, start the session
- Close Winlink Express/VARA

14.1.4.6. VarAC

- Open VarAC
- Confirm that VARA HF opens along with VarAC window.
- Confirm verson.
- Use VarAC window to confirm that rig follows band/freq changes.
- Test transmit
- Confirm rig RF power is 10 W

- Transmit beacon
- Wait 1-2 mins then check pskreporter.info: W3YA _____ was/_____ was not heard

14.1.4.7. YONIQ (SSTV)

- Open YONIQ
- Tune to SSTV frequency (e.g., 14.230 MHz)

> **Note**
>
> TODO: Finish test suite

14.1.5. Win4IcomSuite

- NARC1/IC-7610 station only
- Open Win4Icom
- Confirm program tracks frequency and mode
- Close Win4Icom

14.1.6. KPA1500 Amplifier

- Power on amplifier
- Test ATU
  - Rig to 10% power (~10W). Press MULTI knob(press RF POWER and rotate MULTI knob to read HF 10%)
  - Rig mode to RTTY (touch mode on touchscreen, select RTTY)
  - Amp in standby mode (short press on MODE/PF1) button until yellow STDBY indicator illuminates
  - Amp to ATU mode (short press on ATU TUNE button)
  - Transmit (press TRANSMIT on rig or PTT on mic to send RF)

  - When ATU cycle ends (after a few seconds), Press TRANSMIT again to end test transmission.

- Test amplification
  - Set amp to operate (short press on OPER/STDBY)
  - Transmit (press TRANSMIT or PTT on mic) on rig
  - **NOTE** ~10 W drive should generate about 4-500 W out)
  - Press TRANSMIT again to end test transmission
  - Set amplifier back to stand-by (short press on MODE/PF1)
- Power down amplifier
- Return rig to SSB mode (press mode indicator on touch screen, select SSB)

14.2. Contest/Field Day

14.2.1. Test networked logging

- Rig1 in phone mode, log contact
- Rig2 in phone mode, log contact
- Change Rig1 band
- Change Rig2 band
- Change Rig1 to CW, log contact
- Change Rig2 to CW, log contact
- For each digital mode that will be used…
  - On Rig1, open digital app, attempt to make contact and log it
  - On Rig2, open digital app, attempt to make contact and log it
- Close all apps
- Check log file

15. Software

> **Note**
>
> These sections are generated by parsing a CSV data file in `include/csv/software_versions.csv`.
> TODO: Put in a Google sheet and pull the data from there.
> The code is hidden in the output for aesthetic reasons, but may be revealed by examining the source code file.

15.1. Operating System

station	software	version	date
narc1	MS Windows	10	2024-05-22
narc2	MS Windows	10	2024-06-08

15.2. Digital modes

station	software	version	date
narc1	GridTracker	1.24.0512	2024-05-22
narc1	JS8Call	2.2.0	2024-05-22
narc2	JS8Call	2.2.0	2024-06-08

station	software	version	date
narc1	JTAlert	2.50.0	2024-05-22
narc2	JTAlert	2.60.2	2024-06-08
narc2	MTTY	1.71K	2024-06-14
narc1	VARA HF	4.8.7	2024-05-22
narc2	VARA HF	4.8.7	2024-06-08
narc1	VarAC	9.1.0	2024-05-22
narc2	VarAC	9.1.0	2024-06-08
narc2	WSJT-X	2.5.4	2024-06-08
narc1	WSTJ-X	2.5.4	2024-05-22
narc1	Winlink Express	1.7.15.0	2024-05-22
narc2	Winlink Express	1.7.16.0	2024-06-08
narc1	Yoniq (SSTV)	1.13	2024-05-22
narc1	fldigi	4.1.26	2024-06-14
narc2	fldigi	4.1.26	2024-06-14
narc2	flrig	2.0.01	2024-06-14

15.3. Logging

station	software	version	date
narc1	ACLog	7.0.10	2024-05-22
narc2	ACLog	7.0.10	2024-06-08
narc1	N1MM+	1.3.10316.0	2024-06-14
narc1	N3FJP Field Day Contest Log	6.6.8	2024-06-14

See the separate chapter on logging for details about how to interface digital logging programs.

15.3.1. Networked logging

Special considerations are required for networked logging of the sort we often do for Field Day. See details in the chapter on logging and specifically Figure 16.1.

15.4. Remote Control

station	software	version	date
narc1	Win4Icom	NA	2024-05-22
narc1	SmartSDR	3.7.4	2024-06-14
narc2	SmartSDR	3.7.4	2024-06-08

16. Logging

16.1. About

This page describes some settings and procedures specific to using logging software. The information is especially relevant to multi-transmitter/operator settings such as Field Day.

16.2. Amateur Contact Log

Amateur Contact Log (AClog) by N3FJP is one of the logging packages installed on the NARC PCs.

Amateur Contact Log has separate programs for general logging and specific contests like Field Day. The club has a license for the software, and this provides access codes for all of the logging programs.

16.2.1. Networked logging

For group contest-style events, it's useful to have multiple rigs generate a single log file. This is called "networked logging". Here is some resources useful for getting this to work for Field Day

http://www.n3fjp.com/FDInfoTips.html

There are two types of networked logging, file share and TCP, we use TCP in almost all circumstances.

For Field Day 2024, we are using TCP. Here is a screenshot of the settings for NARC1:

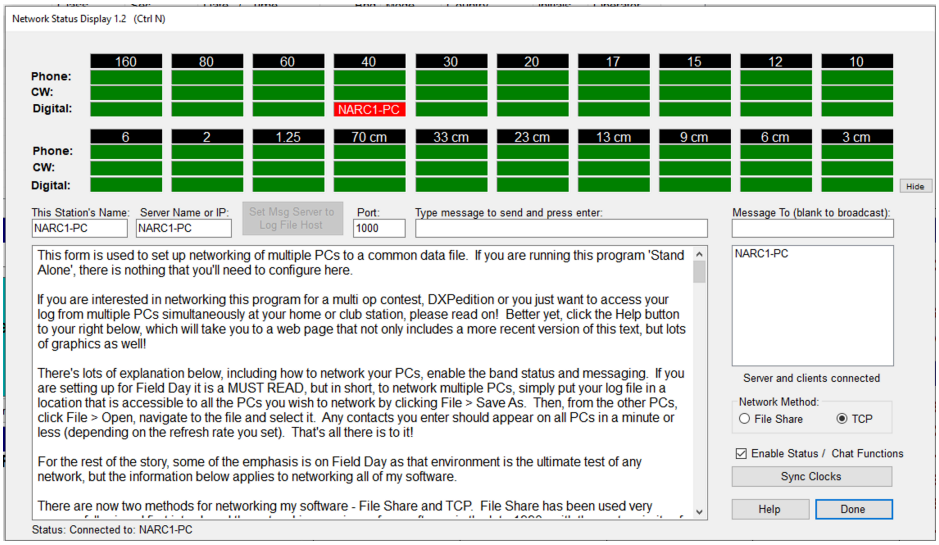


Figure 16.1.: NARC1 N3FJP Field Day Log network settings

In this setup, NARC1 is the log server; NARC2 is a client.

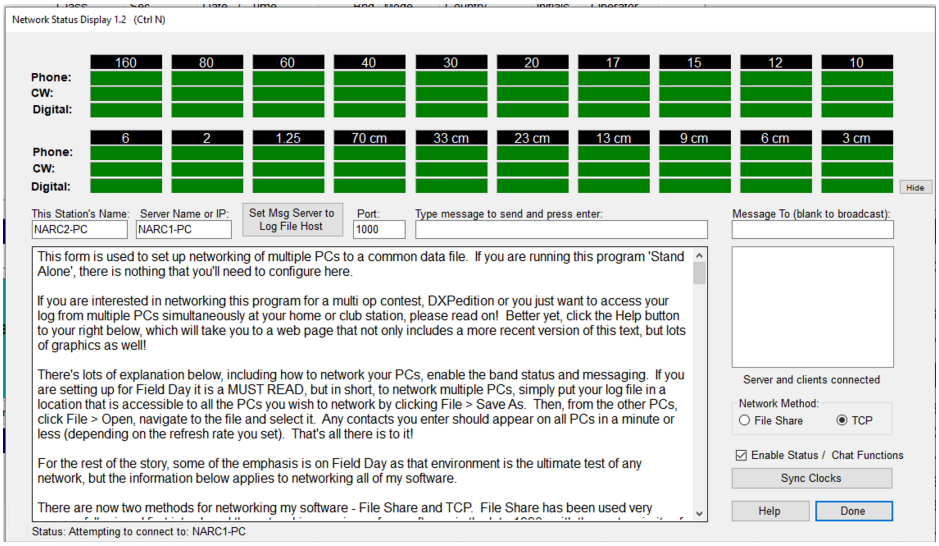


Figure 16.2.: NARC2 N3FJP Field Day Log network settings

Key points for networking N3FJP's Field Day log via TCP

- First coded in July 2013, this option piggybacks on the functionality of the Status and Chat functions, to distribute adds, edits and deletes via TCP.
- All PCs must enable the Status and Chat functions, which connect to the server on port 1000. If you have virus / Internet protection software, you must set your protection software on the server and EVERY client to allow this program to communicate on port 1000.
- Does NOT require each client to navigate to the log file, so you don't have to worry about file share permissions.
- The server should host the file locally on its hard drive, not

over the network, to eliminate any possibility of network file access delays. Choose your PC with the fastest processor and most RAM for the server.

- While loading the file may take longer via TCP, All Adds, Edits and Deletes should appear within one second on all clients.
- ONLY the SERVER will and have the ability to perform many of the File menu options. This can be an advantage or disadvantage, depending on which functions you want the clients to be able to perform.
- If your Network Status Display Form version reads 1.2 or later, in addition to the server, the TCP clients can also be set to write backups.
- All PCs must select the same networking method. You can not mix and match! Either use File Share or TCP for every PC.
- With the TCP method, more will be asked of the server, so processor timed sending of CW may be less precise.

16.2.2. Digital mode logging

To configure select Settings/Application Program Interface (API) from the AC Log menus.

INCLUDE_FIGURE_HERE

As THE FIGURE indicates, click on **TCP API Enabled Server** checkbox and use the default port (1100). Under **WSTJ-X Interface** select **Listen for WSJT-X*

16.2.2.1. WSTJ-X

It's best to use separate configurations for each use case. Here, we will describe our W3YA-FD (Field Day) configuration.

Under the WSJT-X File/Settings… menu there is a multi-tabbed window. Two windows are critical for Field Day logging with AC Log.

With these settings, WSJT-X controls the radio (and the associated COM port), while N3FJP periodically polls the WSTJ-X log and incorporates the data.

16.2.2.2. FIdigi

NARC1 uses flrig for fldigi rig control. Here are some other settings relevant for Field Day logging.

NOTE The figure does *not* have PTT via and checked, but I think it should be.

Also, please note that the "Connect" checkbox in the upper right is selected and the "Connected" indicator should be green.

16.2.2.3. More information

Here are more resources for connecting N3FJP's software to various digital mode programs:

http://www.n3fjp.com/help/digitalsetup.html

> **i** Tips
>
> - Start the N3FJP logging program first, before the digital mode program.

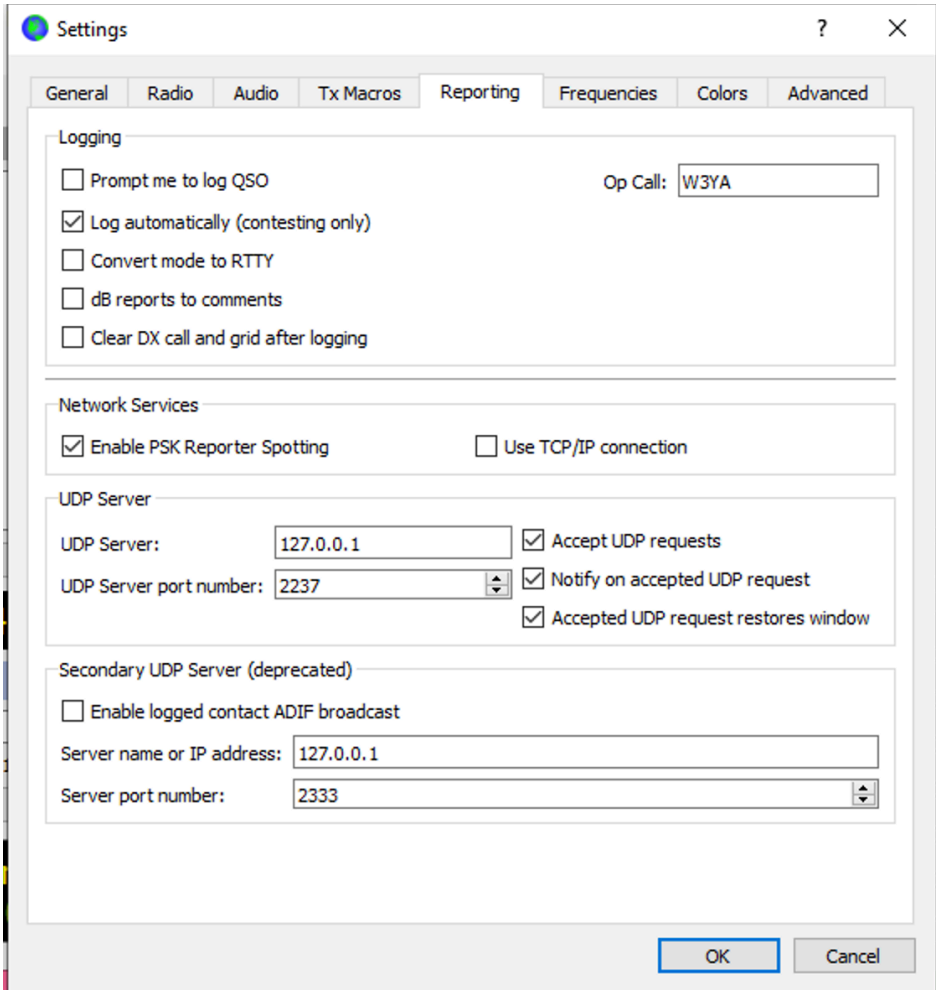


Figure 16.3.: NARC1 W3YA-FD Reporting Tab Settings

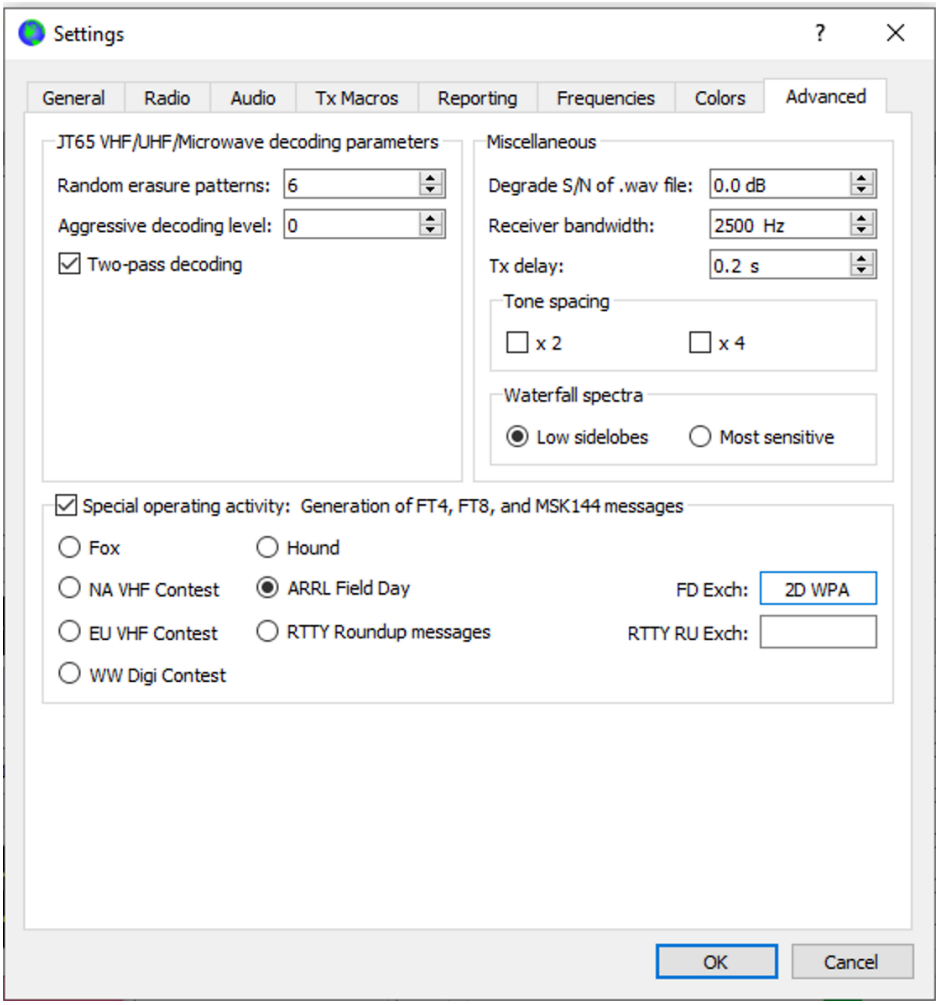


Figure 16.4.: NARC1 W3YA-FD Reporting Tab Settings

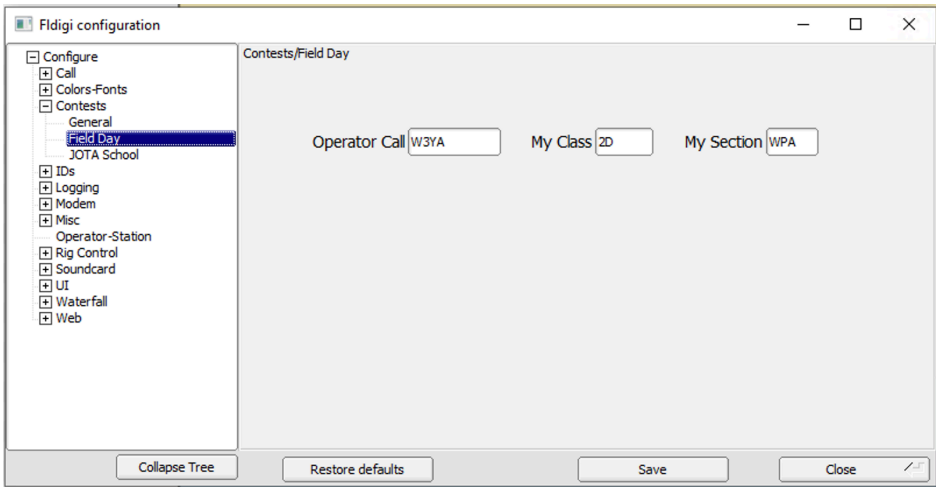


Figure 16.5.: fldigi configuration under Configure/Contests

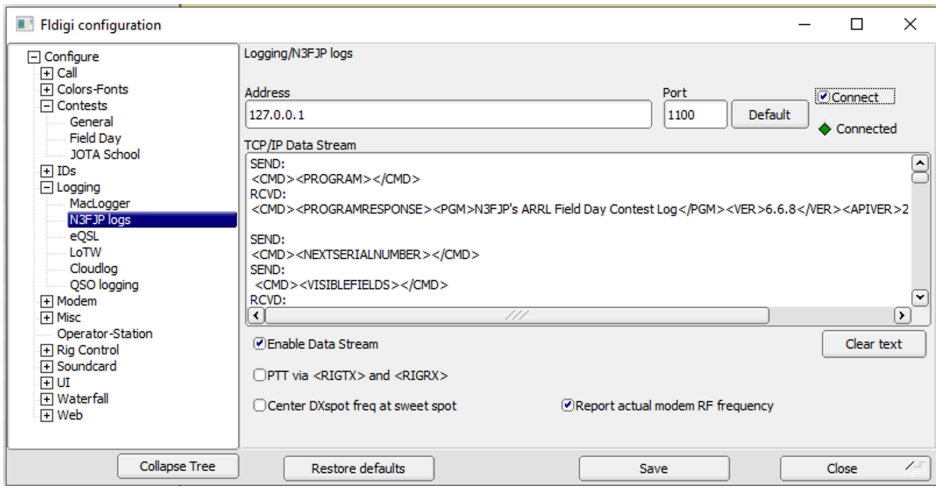


Figure 16.6.: fldigi configuration under Configure/Logging/N3FJP Logs

- From N3FJP Software's menu options click Settings > Application Program Interface and check the upper check box that says TCP API Enabled (Server). Leave the lower check box unchecked.
- Choose whether N3FJP or the digital mode program will control the rig interface.
- Follow these steps for WSJT-X.
- Follow these steps for fldigi
- Follow these steps for GridTracker
- Follow these steps for JTAlert