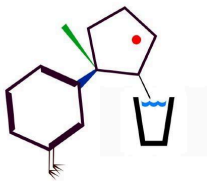


TIDRADIO TD-H3 User Manual for nicFW V2 custom firmware

Currently Written for **nicFW V2.07.06**
(rev 6, updated Feb. 22, 2025)
by Dustin Hawkes

nicFW V2 is a custom firmware written by Marcus Dudley for the TIDRADIO TD-H3. This manual is an effort to create a single point of reference for configuring and using the TIDRADIO TD-H3 running nicFW V2 custom firmware. It is composed of information gathered from the facebook groups nicFW Support and nicFW Development as well as some YouTube videos.

nicFW may damage your radio!!! Use at your own risk!

Along with nicFW V2, Marcus has also created a Windows based software called 'nicFW Programmer' that is used for 'Tuning' the radio's power output displayed on the screen of the radio, setting a 'Band Plan,' configuring radio settings, saving channels (memory banks) for the 198 available slots on the radio, managing channel groups, setting 'Scan Presets', and customizing the radio display and button layout with what is called 'Skinning', among a few other things.

The latest nicFW V2 firmware and corresponding nicFW Programmer can be downloaded from Marcus' webpage. https://nicsure.co.uk/h3/nightly.php
Other useful online tools created by Marcus are also linked at the bottom of his site for your convenience.

Disclaimer: Much of the content in this document has been obtained from the above mentioned Facebook groups from various posts and comments. A majority of the information has come from Marcus' posts and comments, but some information has been taken from the posts and comments of others. Many explanations in this document have been reworded by me, but some direct quotes have been preserved and attributed to the author. Forgive me if I have missed attributing you for your comments.

Left and Right LED Indicators

The Left LED indicates squelch is open, and the Right LED means a signal is present. During scanning, the Left LED blinks when the end of the scan range is reached and the scan starts over. The Right LED still indicates a signal is present when scanning.

Getting Started:

1. Join the facebook groups nicFW Support and nicFW Development. The Support group is for finding help with this custom firmware. It is NOT for help with the stock firmware. The Development group is for the technical development stuff like reporting bugs, so don't expect help there. Know what you're talking about or your post will likely get rejected or deleted. Read all 'Featured' posts in the Facebook groups and watch the related videos first before proceeding. nicFW Support group Featured posts

2. Search diligently for the information you are looking for before posting to the groups. Search for every key word you can think of and read through the comments. If you thought to ask it, someone else likely has as well. Marcus Dudley makes this firmware publicly available for free, however he is not doing this for you; he's doing it for him! But, he's still kind of doing it for you, or you wouldn't have access to his firmware.

3. Now, go buy yourself a TIDRADIO TD-H3. Learn how to use it effectively long before you unlock it and attempt to use nicFW V2 firmware! You need some skills first! This firmware is not designed for beginners and requires extra setup steps to calibrate after installing.

4. Stock Firmware / Software - https://walkietalkiesoftware.com/portal/index/software.html
   You'll need to click 'Login' at the top right followed by 'Register' to create an account before you can download the OEM TIDRADIO software and firmware for your new radio. After you register and login with your new account, go back to the link provided here and click the blue 'Download' button to download the latest software and firmware from TIDRADIO. Make sure to click on the radio marked as 'TD-H3 HAM', 'TD-H3 GMRS', or 'TD-H3 Unlocked' that is associated with the radio you are using.

   Within the downloaded .zip you will find three softwares to install. One is the programming software, the second is for flashing the firmware (both stock and custom), and third is a TXPower Tune software. If you are planning on using the stock firmware or restoring to stock, you'll first want to use these software to collect a stock configuration file and stock power tune file to be able to restore to the radio after flashing the stock firmware again. These two files are your stock CodePlug. Put them in a safe place. Watch this video that is based on nicFW V1, but is still applicable for nicFW V2.

5. Returning your radio to stock firmware or to recover from a bricked/locked radio if the hardware itself hasn't died is pretty easy. Follow the steps in the videos linked below. You can do a basic wipe of the EEPROM in the nicFW Programmer now by right-clicking the 'Write' button at the bottom. Do a full wipe with the EEPROM_WIPE.bin file if you plan to revert to using the stock firmware. Following that, restore your backup of the stock CodePlug.
   https://www.facebook.com/100004985290539/videos/2253878838326249/
   https://www.youtube.com/watch?v=e7iZR8NDtcU

6. To get started with installing nicFW V2, download the latest nicFW V2 .bin firmware file from the Dev Build site, and also download the latest compatible nicFW V2 Programmer. If the value of the firmware is V2.05.xx, nicFW Programmer should also be V2.05.xx for compatibility. Double check the notes next to the nicFW Programmer download link to be sure.

7. **"When you first flash nicFW, it is crucial to initialize your radio correctly to avoid unexpected behavior.**

   Linux and MacOS Users (Using Online Tools):
   Locate the 'default.nfw' file in the nicFW Programmer ZIP.
   Use the online 'CodePlug Manager' to burn this file to the radio.
   This step configures essential defaults, including power calibration and the band plan. Once done, you can proceed with the [online] 'Band Plan Editor' and 'Channel Editor' as needed.

   Windows Users (Using the nicFW Programmer):
   When you launch the programmer, the "default.nfw" file loads automatically. Your first action should be to burn this default state to the radio." -Marcus Dudely

8. Once you have backed up your stock CodePlug, learned how to flash the nicFW firmware with the stock firmware flashing software or with Marcus' online Firmware Flasher tool and have calibrated your radios power output as described in the video linked in Getting Started step 6 above, one of the first things you'll want to do is calibrate or tune your radios frequency TX/RX using Menu 23 on the radio called 'XTAL 671.' Here's some videos on how to do it:
   Freq Calibration video 1 Freq Calibration video 2 Freq Calibration video 3

   Written instructions from Marcus on XTAL 671 are provided below in reference to Menu 23. If not calibrated properly, some things like CTCSS tones and DCS codes will not open a repeater, so don't skip this step

9. nicFW is NOT compatible with CHIRP or ODMASTER for programming. It may never be. Don't ask. Bluetooth on this custom firmware does little more than allow you to interface with a 'Remote' function and programming in the nicFW Programmer. Don't expect more.

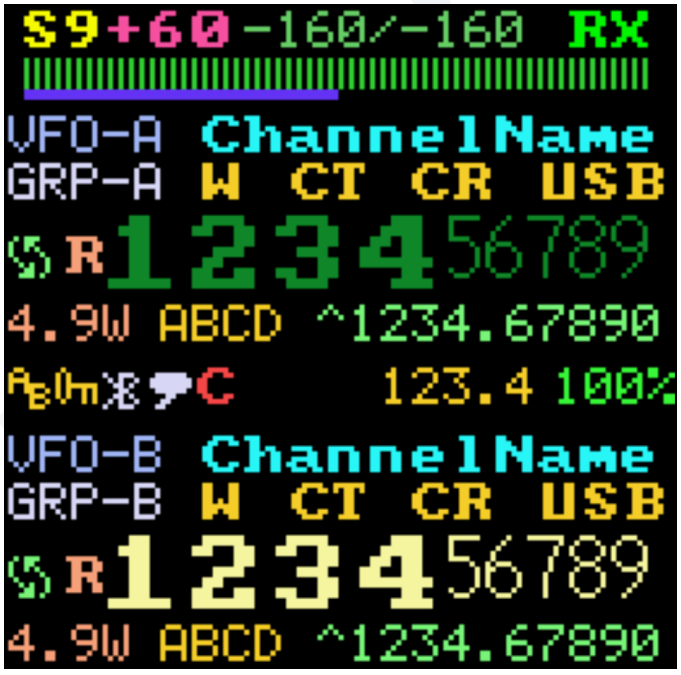
VFO/Channel/Group Modes VFO-A

The radio display presents two frequency configuration areas if set to Dual or Hybrid PTT Mode (Menu 15). The top one is called VFO-A and the bottom one is called VFO-B. Single PTT Mode (Menu 15) only shows whichever VFO is actively selected. You select which VFO is active by using the # A/B button. VFO-A and VFO-B can independently be in one of three main modes.

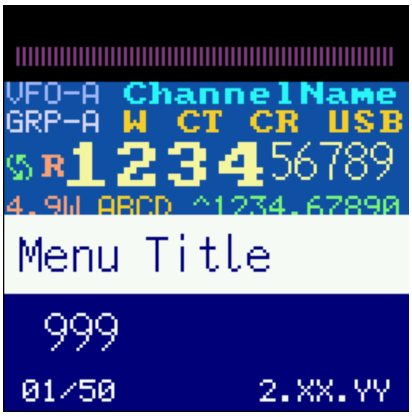
1. VFO (Frequency) Mode 2. Channel (memory bank) Mode 3. Group Mode. These three modes will be referenced many times through this manual. To switch between these modes, repeatedly press V/M.

Terminology

TX	- Transmit
RX	- Receive
VFO	- Variable Frequency Oscillator
LP	- Long Press (of a button)
FM	- Frequency Modulation
AM	- Amplitude Modulation
USB	- Upper Side Band
SIMPLEX	- Single receive/transmit frequency
DUPLEX	- Separate receive/transmit frequencies, usually used by repeaters
CTCSS	- Continuous Tone-Coded Squelch System
DCS	- Digital-Code Squelch
DTMF	- Dual-tone multi-frequency signaling



Menu Options for nicFW V2 on the TD-H3 Radio



Menu 00 (Squelch)

Range (0-9)
Default Value (2)

Signal (Carrier) Squelch is used as a gate to suppress unwanted signals by shutting off the audio amplifier until a strong enough signal is received on the tuned frequency of the VFO. Setting Menu 00 to a lower value such as 1 or 2 will open the gate for weaker signals. Setting it higher to values such as 5-9 will only allow very strong signals to open the Signal Squelch gate. A value of 0 will open the gate continuously. Alternatively, when set between values 1-9, you can LP the lower black Flashlight/Monitor button on the left side of the radio to temporarily open the Signal Squelch. This action will also temporarily open the Noise Gate (Menu 44) which is described later in this document.

Menu 01 (Sq Noise Lev)

Range (45-100)
Default Value (47)

Squelch Noise Level “adjusts the noise threshold for the squelch… you can adjust this to loosen or tighten the squelch noise trigger. Lower values will be tighter and higher values will be looser. Be conservative with how much you adjust it (if at all). Personally I recommend just leaving it on 54, but it's up to you.” -Marcus Dudley

Note: The default value was formerly 54, but was changed in V2.06.04+ to 47. You may need to adjust your setting if you updated from a previous release and kept your old settings.

Menu 02 (Bandwidth) 

Range (Narrow, Wide)
Default Value (Narrow)

Bandwidth is the size of the frequency bandwidth used when transmitting on a carrier or center frequency.
Wideband: Typically 25 kHz channel spacing with a transmitted signal usually around 16-20 kHz to avoid adjacent channel interference.
Narrowband: Uses 12.5 kHz channel spacing with a transmitted signal generally around 8-11 kHz to avoid adjacent channel interference.

Menu 03 (TX Power) 

Range (off (0) or 1-255)
Default Value (off)

Transmit Power is set to a value between 0 and 255. However, the relative output power in Watts from the radio will depend on the Tx Power calibration you configured in the Tuning tab of the nicFW Programmer. e.g Theoretically, if the programmer was configured to transmit a peak level of 5 Watts for VHF and the corresponding VHF Peak Power setting was set to 200 in the Tuning tab, the radio Menu 03 value will ramp up the Watts from 0-5W as you change the radio setting from 1-200. Anything from 200-255 will output 5 Watts. However, actual power output likely still won't match what is displayed on the screen accurately. To get a more precise representation, you'll need to use a power meter to verify what your radio outputs at each TX Power setting and then adjust the graphs in the Tuning tab of the nicFW Programmer accordingly.

Menu 04 (Modulation) 

Range (FM, AM, USB, Auto)
Default Value (Auto?)

Modulation determines how the radio interprets the signal received by using FM (Frequency Modulation), AM (Amplitude Modulation), or USB (Upper Side Band). With the radio unlocked for full frequency use and when nicFW is loaded, a frequency range can be entered into the VFO from 18-1300MHz. It would be unwise to attempt to transmit outside of the standard HAM and GMRS ranges for VHF and UHF as the radio hardware is not designed for use outside of these ranges and you will be emitting spurious transmissions at best. Most use cases will be with FM. AM is primarily for use in the Aviation Band and cannot be used for transmitting. You also cannot transmit using USB. 'Auto' will default to the modulation value configured in your Band Plan using the nicFW Programmer for each frequency range.

Menu 05 (Busy Lock) 

Range (Off, On)
Default Value (Off)

Busy Lockout is a setting that, when turned on, will prevent the radio from transmitting on the configured frequency when a signal is currently detected. This feature only works when using a simplex frequency and will not actually save a value of 'On' if you have a separate transmit frequency configured, such as in the case of a repeater.

Menu 06 (TX CTCSS) 

Range (Off, various preset subaudible tones in Hz)
Default Value (Off)

Transmit CTCSS (Continuous Tone-Coded Squelch System), sometimes referred to as a PL (Private Line) tone, is the subaudible tone frequency transmitted along with the audio transmission. A receiving radio or repeater can be configured to recognize this transmitted tone which will inhibit the receiving radio from opening the Tone Squelch if the correct CTCSS is not received along with the audio transmission. This prevents the transmission from being played through the audio amplifier or repeated on the TX frequency of a repeater. It is used to eliminate unwanted transmission from being heard, but cannot be used for privacy as the transmission is still heard by any radio not using Tone Squelch.

Note: Menu 23 (XTAL 671) must be used to tune the radios TX and RX frequencies. If this is not done and if the radio is off by more than 2kHz in either direction, CTCSS will likely not function as intended. These radios are not properly aligned by default with nicFW installed.

Menu 07 (TX DCS)

Range (Off, various preset DCS codes)
Default Value (Off)

TX DCS (Digital-Code Squelch) is similar in function and purpose to TX CTCSS, however instead of using subaudible tones, DCS uses digital codes as the name implies. There are far more DCS codes than CTCSS tones, however most repeaters still use CTCSS tones rather than DCS codes. Inverted 'I' codes are remapped 'N' codes. You can select an 'I' code in nicFW by pressing  while the code is selected in the menu to flip it to 'I'.

Note: Menu 23 (XTAL 671) must be used to tune the radios TX and RX frequencies. If this is not done and if the radio is off by more than 300Hz in either direction, DCS will likely not function as intended. These radios are not properly aligned by default.

Menu 08 (RX CTCSS) CR

Range (Off, various preset subaudible tones in Hz)
Default Value (Off)

RX CTCSS is only used on a receiving radio under two conditions. One, you intend to receive transmissions from another radio or repeater that is transmitting the same CTCSS tone. Two, you intend to eliminate signals on the same carrier frequency that are not using the same CTCSS tone. See TX CTCSS (Menu 06) for more details.

Note: Menu 23 (XTAL 671) must be used to tune the radios TX and RX frequencies. If this is not done and if the radio is off by more than 2kHz in either direction, CTCSS will likely not function as intended. These radios are not properly aligned by default.

Menu 09 (RX DCS)

Range (Off, various preset DCS codes)
Default Value (Off)

RX DCS is only used on a receiving radio under two conditions. One, you intend to receive transmissions from another radio or repeater that is transmitting the same DCS code. Two, you intend to eliminate signals on the same carrier frequency that are not using the same DCS code. See TX DCS (Menu 07) for more details.

Note: Menu 23 (XTAL 671) must be used to tune the radios TX and RX frequencies. If this is not done and if the radio is off by more than 300Hz in either direction, DCS will likely not function as intended. These radios are not properly aligned by default.

Menu 10 (Add Group) GRP-A ABCD

Range (Cancel, A-O)
Default Value (Cancel)

Add Group is a menu option only for Channel or Group mode (not VFO) and is for adding Group Letter assignments, one at a time, to a currently selected channel (memory bank). nicFW V2 allows for each of the 198 available channels (memory banks) to be part of [up to] 4 channel groups. The radio is cycled from VFO mode to Channel mode to Group mode by repeatedly pressing V/M. There are 15 possible groups, each of which is assigned a Group Letter of ‘A-O’. The nicFW Programmer can be used to assign labels to each of these 15 groups if desired. Each channel may be part of no group, one group, two groups, three groups, or four groups.

Menu 11 (Remove Group) GRP-A ABCD

Range (Cancel, A-O)
Default Value (Cancel)

Remove Group is used to remove a Group Letter from the current channel when in either Channel mode or Group mode (not VFO). Please see Add Group (Menu 10) above for further details.

Menu 12 (Tone Monitor) 123.4

Range (Off, On, Clone)
Default Value (Off)

Tone Monitor is a function of the firmware that, when set to 'On,' allows the radio to monitor a signal on a selected frequency and to detect either a transmitted CTCSS tone or a DCS code and displays it on the screen for reference. This is useful for discovering the tone or code required to open tone squelch of the radio that is transmitting. You would then be able to manually enter the same value in either the TX CTCSS or TX DCS menu options of the radio. You can also use the clone option to save the detected tone to the currently selected VFO automatically. This does NOT work to clone in channel or group mode.

Note: sometimes the tone monitor gets the tone or code wrong, particularly if XTAL 671 (Menu 23) is not calibrated. If clone is enabled, the wrong tone or code may get saved as the TX CTCSS or TX DCS value.

Menu 13 (Dual Watch) A B

Range (Off, On)
Default Value (Off)

Dual Watch, when enabled, will monitor VFO-A and VFO-B at the same time for an incoming signal. If a signal is strong enough to open squelch in either VFO-A or VFO-B, the radio pauses on the VFO with the active signal. Once the signal is lost, the radio will again monitor for another signal on both VFOs. If a signal is heard on one VFO first and a second signal is received on the second VFO after, only the first signal will be heard until it concludes. There is only a single receiver in this radio. LP 9 DW to enable/disable DualWatch.

Note: Unlike most radios, by default, the VFO you select to be active will not remain the active VFO if a signal is heard on the other VFO. eg. If VFO-A is active with Dual Watch on and a signal is received on VFO-B, VFO-B becomes the active VFO for menu settings or your next transmission if PTT Mode (Menu 15) is set to Single or Hybrid or if you use a speaker-mic PTT (Push to Talk) button that only transmits on the currently active VFO similar to Hybrid mode.

To overcome this, you can now lock to VFO-A or VFO-B for transmission when Dual Watch is enabled by enabling the VFO-Lock feature. You must be using Single or Hybrid PTT mode (Menu 15). LP  to switch to the shifted LP bank as indicated by the  flag and then LP  to enable VFO-Lock. The  flag will change to either an 'A' or a 'B' to indicate which VFO is locked for transmitting. Use  to switch between active VFOs. VFO-Lock will remain on (with no flag shown) if you disable Dual Watch and will be used the next time Dual Watch is enabled.

If you transmit by pressing the PTT button while using Dual Watch, the radio will hold on to that VFO for 1 second by default to wait for responding traffic before proceeding to monitor with Dual Watch on both VFOs again. See DualWatch Dealy (Menu 54) to adjust this delay value.

Menu 14 (Step)

Range (0.01-500 kHz)
Default Value (unsure, 12.5 recommended)

Step Size is the amount the carrier frequency configured in the VFO will change, either up or down, when using  /  on the keypad. This is also the value that the frequency will shift up in steps as the radio scans in VFO mode or during a Scan Preset selection unless a different Step size is configured as part of the Scan Preset. Scan Presets can be configured in the nicFW Programmer in the Scan Preset tab. Scan Presets will change the Step size and will remain changed in the radio settings when you exit scanning.

Menu 15 (PTT Mode)

Range (Dual, Single, Hybrid)
Default Value (Dual)

PTT Mode configures both the screen layout as well as which way the upper and lower PTT buttons on the left side of the radio work.

In **Dual mode**, both VFO-A and VFO-B are displayed on the screen at the same time with VFO-A being on top and VFO-B being on the bottom of the screen. In Dual Mode, the upper PTT button switches to and transmits on VFO-A, while the lower PTT button switches to and transmits on VFO-B.

In **Single mode**, the screen displays only the active VFO, either A or B. Either PTT button will only transmit on the active VFO displayed. Use  to switch which VFO is active.

In **Hybrid mode**, the screen displays both VFO's like Dual mode does, but both PTT buttons will only transmit on the currently active VFO.

Note: a speaker-mic plugged into the K-port (Kenwood style jack) will act as if in Hybrid mode. It transmits on whichever VFO is currently active unless you use VFO-Lock as described in the note for Menu 13.

Menu 16 (TX Mod Meter)

Range (Off, On)
Default Value (Off)

TX Modulation Meter, when enabled, displays an audio frequency (AF) modulation meter below the RSSI bar during transmission. This allows the user to see a visual representation of the audio level being transmitted.

Menu 17 (Mic Gain)

Range (0-31)
Default Value (25)

Mic Gain allows the user to adjust the mic gain value up or down from the default of 25. This is used to fine tune the quality and loudness of the audio sent during a transmission to improve audio on the receiving radio.

Menu 18 (TX Deviation)

Range (0-99)
Default Value (64)

Transmit Frequency Deviation is where "the carrier is modulated by slightly adjusting the frequency above and below the principle [carrier frequency], the extent of how far the frequency moves from the principle [carrier frequency] is the deviation. The TX Deviation setting controls the extent of this. 64 is the value used by the stock firmware. 70 is probably about as high as [one] should go as going. Too high and you'll deviate into adjacent frequency slots (over deviate)." -Marcus Dudley

Menu 19 (TX Timeout)

Range (Off, 1-250 sec)
Default Value (Off)

Transmit Timeout is used to prevent continuous transmission or keying the mic. This sets the number of seconds that the radio will actively transmit by pressing the PTT button before it stops transmitting. A value of 120 [seconds] would allow for up to 2 minutes of transmission before needing to re-key the mic with the PTT button.

Menu 20 (DTMF Volume)

Range (0-127)
Default Value (32)

DTMF Volume is used to set the volume at which the DTMF (Dual-tone multi-frequency signaling) transmits. If the receiving radio or repeater is not properly interpreting DTMF tones, you may want to try adjusting this value.

Menu 21 (DTMF Speed)

Range (0-20)
Default Value (0)

DTMF Speed changes the speed at which DTMF tones are sent through the radio when preconfigured to send multiple tones automatically. These present DTMF entries are configured with the nicFW Programmer.

Menu 22 (Repeater Tone)

Range (100-4000 Hz)
Default Value (1750)

Repeater Tone is the frequency for a tone some repeaters require to be received as a burst to open the repeater. This tone can be sent at the beginning of a transmission. If your repeater requires it, press the PTT button to start transmitting and then press the Flashlight/Monitor button on the side of the radio to send the tone burst. This is not commonly used.

Menu 23 (XTAL 671)

Range (-128 - +127)

Default Value (0, recommend 34 as a starting point for most radios)

“XTAL 671 represents the amount of frequency adjustment that should be applied to a frequency of 671.08864 MHz. Now I know that sounds kind of arbitrary, but there's reason behind that value. It makes the math involved for the firmware to compute the required adjustment at any frequency far easier and efficient. We're talking about 32 bit division and multiplication, which for an 8bit MCU is a pretty heavy operation. By choosing a reference frequency of 671.08864 it allows me to replace the division operations with bit shift operations which are far more efficient.
(to see why, try converting 67,108,864 to binary)
-
So here's how it works. You need to perform a regular frequency calibration operation as described in the two videos I have previously released. [See Getting Started step 8 above] It doesn't matter what frequency you perform this calibration on, but the higher the better. You will end up with an offset value such as 23 or -17 or whatever. Typically it'll be a two digit value. Then you need to do a bit of math…

(offset / freqMHz) * 671.08864
This will give you the value that needs to go into 'XTAL 671'. Let's do a few examples.

Example 1:
Calibration Frequency: 445.5 MHz
Calibration Offset: 23
23 / 445.5 = 0.0516273849607183
* 671.08864 = 34.64655156004489
Thus the value you set in 'XTAL 671' is 35

Example 2:
Calibration Frequency: 551.25 MHz
Calibration Offset: -16
-16 / 551.25 = -0.0290249433106576
* 671.08864 = -19.4783097324263
Thus the value you set in 'XTAL 671' is -19

Example 3: (stock firmware default tuning)
Calibration Frequency: 400 MHz
Calibration Offset: 20
20 / 400 = 0.05
0.05 * 671.08864 = 33.554432

So to set nicFW to the same tuning as most factory H3's you would set 'XTAL 671' to 34. This will be fine for the majority of users as most radios seem to be in this area. So you only need to worry about calibrating if a value of 34 here isn't cutting the cloth.
An alternative method would be to adjust 'XTAL 671' during the USB calibration method, until you find the null point." -Marcus Dudley

Menu 24 (RX VHF->UHF)

Range (200-400)

Default Value (280.0)

Receive VHF->UHF is the frequency threshold determining the appropriate selection of the receive front end filter lineup between VHF and UHF. You likely won't want to adjust this.

Menu 25 (TX VHF->UHF)

Range (200-400)

Default Value (280.0)

Transmit VHF->UHF is the frequency threshold determining the appropriate selection of the transmit front end filter lineup between VHF and UHF. You likely won't want to adjust this.

Menu 26 (Batt Style) 

Range (Off, Icon, Percent, Volts)
Default Value (Icon)

Battery Style changes the display option for the battery status. It can be off, set to a battery icon, an estimated remaining battery value in percent, or the current battery voltage.

Menu 27 (Scan Range) 

Range (.01 to 600 MHz)
Default Value (10 MHz)

Scan Range is used to set how many MHz the radio will scan above the starting frequency set in VFO (frequency) Mode before it starts over at the starting frequency.

Menu 28 (Scan Persist) 

Range (0.0 - 20)
Default Value (0)

Scan Persist determines the hold time (in seconds) during a scan after a signal is lost before resuming the scan.

Menu 29 (Scan Resume) 

Range (Off, 1-250)
Default Value (0 Off)

Scan Resume determines the hold time (in seconds) that a scan will stay stopped on an active signal before resuming to scan even if the signal is not lost first.

Menu 30 (Scan Ultra) 

Range (Off, 1-20)
Default Value (0 Off)

Scan Ultra (UltraScan) “is a signal rejection algorithm. The BK4819 requires around 15 ms after switching to a new frequency to "lock" to it. This means any signal reading you take before this time is not going to be a true reading. BUT the early reading you do get back is enough to make an early determination of whether it is worth bothering to wait for the rest of the time. The Ultrascan setting sets how high this "early" reading needs to be in order to not skip the frequency and do a full reading on it, i.e. waiting the full amount of time.
A lower value will match more signals that do not qualify, thus slowing it down, a higher value will match less thus speeding it up, but at the cost of potentially missing some. The correct balance is achieved by watching the right (V1) or left (V2) green LED blinking. You want to try to find a level where the flash rate is inconsistent, then knock it up 1 at a time until it flashes mostly quickly.” -Marcus Dudley

Menu 31 (Scan Update)

Range (Off, 1-50)
Default Value (0 Off)

Scan Update is simply a visual display reference to cycling through frequencies during a scan by visually refreshing the frequencies being scanned. Fastest scans are achieved with this value set to 0 and not refreshing on screen. Setting to 1 will refresh the displayed frequency most often, but also slows down scans the most.

Menu 32 (LCD Brightness)

Range (0-28)
Default Value (28)

LCD Brightness adjusts the full brightness value of the display active. 28 is the brightest value. 0 will not fully disable the display, but will be very dim.

Menu 33 (Dim Brightness)

Range (Off, 1-14)
Default Value (0 Off)

Dim Brightness is the value of how bright the display will be after no input is received by the radio from the user and no signal opens squelch for a certain LCD Timeout (Menu 35) value. Heartbeat (Menu 36) may be used if Dim Brightness is set to 0 to allow the user to be alerted that the radio is still on by flashing the keypad backlight periodically.

Menu 34 (LCD Gamma)

Range (0-3)
Default Value (0)

LCD Gamma adjusts the gamma value of the LCD display. Adjust to your visual preference. Impact may be different depending on the color scheme used in the Skinning process in the nicFW Programmer.

Menu 35 (LCD Timeout)

Range (Off, 1-250)
Default Value (0 Off)

LCD Timeout determines how long the display stays on (in seconds) after there is no user input to the radio and no signal breaks squelch. This timeout does not disable the display if you are in the menu screen of the radio, so remember to exit the menu.

Menu 36 (Heartbeat)

Range (Off, 1-30)
Default Value (0 Off)

Heartbeat (formerly Breathe) is how frequently in seconds that the keypad backlight LED will blink to remind the user that the radio is still on in case the display has turned off.

Menu 37 (Power Save)

Range (Off, 1-20)

Default Value (0 Off)

Power Save will “put the radio to sleep for a period of time in 10ths of a second units. It turns the radio chip off, the audio amplifier is turned off, bluetooth turned off, [and] filters are disengaged. So a value of 10 means a sleep period of 1 second. After that the radio wakes up, checks for signals etc.. then it goes back to sleep. The larger this value, the more power saving you get, but the less responsive the radio becomes to detecting signals etc.. This only occurs when the LCD turns off.” -Marcus Dudley

Menu 38 (Key Tones)

Range (Off, On, Differential, Voice)
Default Value (0 Off)

Key Tones either enable audible tones or a voice when available to indicate inputs by the user on the keypad and in the menu.

Menu 39 (Sq Tail Elim)

Range (Off, RX, TX, Both)
Default Value (Off)

Squelch Tail Elimination is used to eliminate the open squelch noise (static) that is heard after a transmission. This has the potential to cut off part of the audio transmission if the TX and RX radios are not configured with the corresponding values. If audio is being cut off, consider turning off this setting.

Menu 40 (RF Gain)

Range (AGC, 1-42)
Default Value (AGC - Automatic Gain Control)

Radio Frequency Gain can be used to manually adjust the Radio Frequency Gain rather than allowing the radio to do it automatically. This may help if strong signals are jamming the receiver open. You can try lowering the RF Gain to get better control.

Menu 41 (S-Bar Style)

Range (Segment, Stepped, Solid)
Default Value (Segment)

Signal Meter - Bar Style is used to change the way the signal meter is displayed. Try all three and see which one you like the look of best.

Menu 42 (VOX) 

Range (Off, 1-15)
Default Value (0 Off)

Voice Operated Transmit (VOX) can be set to a sensitivity level of 1-15 which will change how easily audio input into the mic will activate the transmitter.

Menu 43 (VOX Tail) 

Range (0.5-5)
Default Value (2.0)

VOX Tail is the amount of time in seconds that VOX will remain transmitting after audio input into the mic is no longer received above the level set in VOX (Menu 42) before it stops transmitting.

Menu 44 (Noise Gate)

Range (Off, On)
Default Value (0 Off)

Noise Gate is similar to the Signal Squelch Gate (Menu 01), but instead of opening/closing squelch based on signal strength, when enabled, it opens when the noise level drops below a set threshold, indicating the presence of a modulated signal.

“Noise Gate and Sq Noise Lev (Menu 01) do have similarities but are distinct. Sq Noise Lev (Menu 01) controls the noise level required to trigger the squelch response specifically, and is adjustable to make the squelch response tighter or looser. Noise Gate simply mutes the audio at the EXTREME end of the noise level.” - Marcus Dudely

Menu 45 (ASL Support) 

Range (Off, COS, USB, I-COS)
Default Value (Off)

AllStar Linking is used for connecting to AllStar nodes and repeaters.

“AllStarLink Node in Serial Mode
When the Menu "ASL Support" is set to USB, this is designed to operate a node via serial commands. It still requires audio to be connected to the node in the normal way but eliminates the need for a special interface.

Note: This is not supported over bluetooth, only wired serial, Bluetooth is far too unreliable. It is also recommended that the USB-C is used for this rather than the K-Port as serial data on the K-Port gets corrupted by audio.

Squelch (COS)
In this mode, when the squelch opens on the radio, a byte (0x11) is sent over the serial link, the node should consider this a COS signal. When squelch closes a byte (0x10) is sent, the node should consider this a loss of COS signal.

PTT
In order for the node to engage PTT it should send the following sequence of bytes over serial.
0x4c, 0x4d, 0x90
To release PTT the node should send this sequence.
0x4c, 0x4d, 0xff

General ASL Node Configuration suggestion
Configure BOTH VFOs exactly the same way.
You should have only one programmed channel which is a member of group A. Configure this channel the same as the VFOs.
Operate in Single PTT mode.
VFO/Channel/Group mode shouldn't matter as everything should be configured exactly the same way, but I would recommend channel mode.”

- Marcus Dudely

Menu 46 (Wireless Copy)

Range (Cancel, Receive, Send)
Default Value (Cancel)

Wireless Copy is used for wirelessly cloning one nicFW V2 radio to another nicFW v2 radio. Values like TX Power Calibration and XTAL 671 tuning may not be copied as these are unique for each radio based on its hardware. These should be set on each radio first.

To use Wireless Copy, set the receiving radio to ‘Receive’ and press BT. The screen will change to a cloning screen with three zeros. Set the sending radio to ‘Send’ and press BT which will also show a screen with three zeros. Now, on the receiving radio, press the BT once more to start receiving and then press BT on the sending radio. Both screens will start showing a counter increasing and the audio from the sending radio will be a bunch of garbled tones. Once finished, the receiving radio should reset and the settings should be copied. You can exit the sending screen of the sending radio if needed with V/M. Here is a video using the V1 firmware to clone the radios.

Menu 47 (Disable FMT)

Range (No, Yes)
Default Value (No)

Disable Broadcast FM Tuner is used to disable the tuner that allows the playback of broadcast FM radio, usually between 88 and 108 MHz. LP 8 FM on the keypad to start FMT.

Note: you also need to make sure that you have this frequency range included in your Band Plan configured from the nicFW Programmer and that the modulation is set to FM Tuner or you will not be able to listen to broadcast FM radio even if Menu 47 is set to ‘No’.

Menu 48 (PIN)

Range (1000-9999)
Default Value (9999)

PIN is used in conjunction with the PIN Action (Menu 49). When pin action is set to anything other than ‘Off’, the PIN value set in Menu 48 will be required to unlock the radio keypad for changing settings or frequencies.

Note: If you forget your PIN value, you may need to flash back to stock following instructions listed in the Getting Started section number 5.

Menu 49 (PIN Action)

Range (Off, On, Power On)
Default Value (Off)

PIN Action, when enabled, requires the PIN set in Menu 48 to be required to unlock the keypad after it has been manually locked by a LP of * or upon every time the radio powers on in a locked state.

Menu 50 (AF Filters)

Range (0-8)
Default Value (0)

Audio Frequency Filters can be used to disable certain audio frequency filters for testing purposes.
0 All Default
1 Band Pass Only
2 De-Emphasis + High Pass
3 High Pass Only
4 De-Emphasis + Low Pass
5 Low Pass Only
6 De-Emphasis Only
7 None
8 Unsure

Menu 51 (IF (kHz))

Range (8.46, 7.25, 6.35, 5.64, 5.08, 4.62, 4.23)
Default Value (8.46)

IF (kHz) "It's to do with manipulating the center frequency, which means altering the Q factor ; which equals slightly more or less bandwidth depending on lowering or raising the Q value. Looks like here it's to eliminate possibly close side band interference or slightly improve the gain of a signal?"
-Andrew Davies

"Andrew seems to have nailed it. The concept with this is to try to give options to reduce receive deafening caused by strong transmissions close to the received frequency at the expense of receive quality. RF Gain can be used for the same purpose as well." -Marcus Dudley

Menu 52 (SBar AlwaysOn) 

Range (Off, On)
Default Value (Off)

Signal Meter Bar AlwaysOn is used to keep the signal meter bar on the screen, even when not currently receiving an active signal.

Menu 53 (PTT ID)

Range (Off, BoT, EoT, Both)
Default Value (Off ?)

PTT ID was recently implemented and it appears that if you set the last DTMF preset (slot 19) in the nicFW Programmer, it will be used to send the ID at the BoT (Beginning of Transmission), EoT (End of Transmission), or both (BoT and EoT).

Menu 54 (DualWatch Delay)

Range (1-30 Sec)
Default Value (1)

Dual Watch Delay is used to create a short delay between 1 and 30 seconds after you use the PTT button to TX before Dual Watch actively begins scanning both VFO's for an active signal to monitor. This can help manage a two way conversation while running Dual Watch without having to disable it.

Menu Options - Quick Reference

#	Label	Values	Default	Notes
00	Squelch	0-9	2	Squelch threshold level setting
01	Sq Noise Lev	45 – 100	47	Squelch noise level setting
02	Bandwidth	Narrow, Wide	Narrow	FM TX deviation and RX discriminator bandwidth
03	TX Power	Off (0),1 – 255	Off	Transmit power levels. Examples : 60=2.0W, 120=4W, 150-152=5W displayed values.
04	Modulation	FM, AM, USB, Auto	Auto	TX/RX carrier modulation / demodulation mode
05	Busy Lock	Off, On	Off	Busy channel lockout (TX Inhibit)
06	TX CTCSS	Off, or values in Hz	Off	UP/DN for fixed look-up table values, or any value at 0.1 Hz resolution
07	TX DCS	Off, or DCS code values	Off	Digital Coded Squelch TX encoder value
08	RX CTCSS	Off, or values in Hz	Off	UP/DN for fixed look-up table values, or any value at 0.1 Hz resolution
09	RX DCS	Off, or DCS code values	Off	Digital Coded Squelch RX decoder value
10	Add Group	Cancel, A – O	Cancel	Add current channel to a Group. A-O (15 values) 4 Groups max. N/A in VFO mode.
11	Remove Group	Cancel, A – O	Cancel	Remove current channel from a Group. A-O (15 values) 4 Groups max. N/A in VFO mode.
12	Tone Monitor	Off, On, Clone	Off	Decodes CTCSS / DCS and displays value on screen
13	Dual Watch	Off, On	Off	Dual Watch mode. On state is annotated by the ‘AB’ flag on the screen
14	Step	10 Hz – 500 kHz	12.5 kHz	Tuning step interval when in VFO mode. Typical values for Europe are 12.5kHz & 25kHz
15	PTT Mode	Single, Dual, Hybrid	Dual	PTT operation. External mic always functions in hybrid mode, regardless of the setting
16	TX Mod Meter	Off, On	Off	When On, an AF modulation meter appears beneath the RSSI during TX
17	Mic Gain	0 – 31	25	Microphone gain. 0.5dB steps
18	TX Deviation	0 – 99	64	FM TX deviation width
19	TX Timeout	Off (0), 1 – 250	Off	TX time out timer (TOT) in seconds
20	DTMF Volume	0 – 127	32	DTMF sidetone volume. Value 0 does not fully mute
21	DTMF Speed	0 – 20	0	DTMF sending speed
22	Repeater Tone	100 – 4000 Hz	1750	Frequency of repeater access tone burst when pressing [LAMP / Monitor] key during TX.
23	XTAL 671	-128 – +127	0	Frequency Δ - Recommended set to +34 for most radios.
24	RX VHF→UHF	280.0 MHz	280	Frequency threshold determining the appropriate selection of RX front end filter lineup
25	TX VHF→UHF	280.0 MHz	280	Frequency threshold determining the appropriate selection of TX output filter lineup
26	Batt Style	Off, Icon, Pecent, Volts	Icon	On-screen battery level indication style
27	VFO Scan Range	10 kHz – 600 MHz	10 MHz	Range of upward scan in VFO mode (MHz)
28	Scan Persist	0.0 – 20.0	0	Scan hold time after carrier hs dropped (seconds)
29	Scan Resume	Off (0), 1 – 250	Off	Scan dwell time before resume (seconds). Countdown on screen
30	UltraScan	Off (0), 1 – 20	Off	Ultra fast scan
31	Scan Update	Off (0), 1 – 50	Off	Displays current channel / frequency under scrutiny during a scan routine. 1=fastest update
32	LCD Brightness	0 – 28	28	Default brightness of LCD screen
33	Dim Brightness	Off (0), 1 – 14	Off	LCD brigtness level after LCD Timeout. Equivalent values to LCD Brightness. 0=backlight off

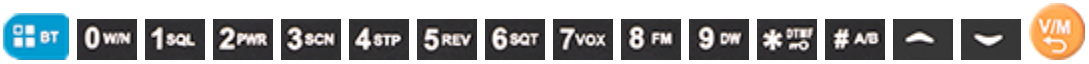
34	LCD Gamma	0 – 3	0	LCD screen gamma
35	LCD Timeout	Off (0), 1 – 250	Off	LCD screen timeout in seconds since last activiy
36	Heartbeat	Off (0), 1 – 30	Off	Keypad LEDs will blink at interval set in seconds when in power saving mode
37	Power Save	Off (0), 1 – 20	Off	Power save mode depth
38	Key Tones	On, Off, Differental, Voice	Off	Keypad confirmation tones or voice prompts where available
39	Sq Tail Elim	Off, RX,TX, Both	Off	Squelch tail elimination (STE)
40	RF Gain	AGC, 1 – 42	AGC	Automatic Gain control (AGC) , or manual RF gain setting
41	S-Bar Style	Segment, Stepped, Solid	Segment	RSSI on-screen display style
42	VOX	Off, 1 – 15	Off	Voice operated TX (VOX) sound level trigger threshold
43	VOX Tail	0.1 – 5s	2	Voice operated TX (VOX) dwell time in seconds
44	Noise Gate	Off, On	Off	Noise Gate
45	ASL Support	Off, COS, USB, I-COS	Off	AllStar Linking
46	Wireless Copy	Cancel, Receive, Send	Cancel	Wireless Copy
47	Disable FMT	No, Yes	No	Disables switching to broadcast bandwidth when in the FM broadcast band
48	PIN	1000 – 9999	9999	PIN (security passcode)
49	PIN Action	Off, On, Power On	Off	PIN (security passcode) action
50	AF Filters	0 – 8	0	Disable Audio Frequency Filters
51	IF (kHz)	4.23, 4.62, 5.08, 5.64, 6.35, 7.25, 8.46 kHz	8.46	Intermediate Frequency Value (RX)
52	SBar AlwaysOn	Off, On	Off	Keeps Singal Meter always on
53	PTT ID	Off, BoT, EoT, Both	Off	PTT ID Uses last DTMF Preset (slot 19)
54	DualWatch Delay	1 – 30	1	Delays restarting Dual Watch after PTT is used to TX

Long Press (LP) Button Actions

“A second bank of long press (LP) functions are implemented as a ‘Shift’ system. The default LP for shifting is LP  but all of these can be re-assigned in the [nicFW] Programmer. When "Shifted" you will see  displayed on screen where the key-lock  symbol is usually displayed.

IMPORTANT: If re-arranging the long press function, make sure ‘Keypad Lock’ is assigned to the same key in [LP] (both banks) or you will lock yourself out of the radio when locking it.”
-Marcus Dudely

Changes to LP assignments can be made using the nicFW Programmer in the Skinning tab where you must right click the LP assignment you want to make to see the submenu of available options. You can export the saved LP configuration for later use.



Default LP assignments (without Skinning)
***Bold shows LP default values that are different in the Shifted Bank**:*

Flag icon when shifted

Non Shifted

- **LP_EDIT-FREQ_ENTERGRP, //** 0 W/N
- **LP_EDIT-CH-NAME, //** 1 SQL
- **LP_DTMF-INPUT, //** 2 PWR
- LP_SCAN, // 3 SCN
- LP_SCAN-PRESET_VFO, // 4 STP
- LP_LCD-INVERT_CHANNEL, // 4 STP
- **LP_FREQ-REVERSE, //** 5 REV
- LP_RFI-COMP, // 6 SQT
- **LP_FREQ-COUNT, //** 7 VOX
- **LP_FM-TUNER, //** 8 FM
- **LP_DUAL-WATCH, //** 9 DW
- LP_LP-SHIFT, // BT
- LP_TX-ENTER, // V/M
- *LP_KEYLOCK*, // * DTMF
- LP_DTMF-PRESETS, // # A/B

Shifted

- **LP_DUALWATCH_VFOLOCK, //** 0 W/N
- **LP_BLUETOOTH, //** 1 SQL
- **LP_SCOPE, //** 2 PWR
- LP_SCAN, // 3 SCN
- LP_SCAN-PRESET_VFO, // 4 STP
- LP_LCD-INVERT_CHANNEL, // 4 STP
- **LP_FIX-REVERSE, //** 5 REV
- LP_RFI-COMP, // 6 SQT
- **LP_DUAL-PTT, //** 7 VOX
- **LP_SINGLE-PTT, //** 8 FM
- **LP_HYBRID-PTT, //** 9 DW
- LP_LP-SHIFT, // BT
- LP_TX-ENTER, // V/M
- *LP_KEYLOCK*, // * DTMF
- LP_DTMF-PRESETS, // # A/B

Configurations from the Keypad and other useful info

1- Reading and Writing CodePlug with nicFW Programmer

The nicFW Programmer is used to 'Read' settings and stored channel information from the radio into the Programmer. Adjustments can be made to the current settings and channels in the Programmer and saved for later restoration of settings to the radio. This file containing your configurations and channels is considered to be your CodePlug.
You also use the nicFW Programmer to 'Write' the CodePlug to the radio. A poor quality USB-C or USB-to-K-port cable or connection will lead to issues with reading/writing from or to the radio and also with flashing new firmware to the radio. Although the programmer is designed to disable the radio chip during communication with the radio, it is still a good idea to tune to a frequency not likely to receive a transmission or to remove the antenna of the radio during these operations. Remember not to transmit without the antenna attached as this may damage your radio.

2- Good Flash Verification

To verify that the nicFW V2 firmware flashed successfully, open the menu (any menu option) by pressing 

and then press the Flashlight/Monitor button once.
A 'CRC' will present itself at the bottom of the menu and then shortly after it will say 'OK' next to it. If the flash was bad, it would say 'BAD'.

Note: if you have used the Skinner tool in the nicFW Programmer to modify your Skin colors or layout, the CRC will always come back with a value of 'BAD'. If you've been flashing successfully up to this point, you can likely disregard this 'BAD' reading.

3- Verify which nicFW you are running

To verify which version of nicFW V2 you are running on the radio, open the menu and the value will be at the bottom of the screen.

4- Switch active VFO between A and B

To quickly switch the active VFO, either key the associated PTT button if in Dual PTT Mode or quickly press the 

at any time to switch.

5- Edit Channel Frequency 

If you are in Channel mode and want to change the RX frequency of the selected channel, LP 

and enter the RX frequency you want followed by 

or 

to confirm and save the value to the channel.

6- Edit Channel name in Channel or Group modes 

To edit a channel name, LP 1 SQL and use the '1-9' buttons to cycle through character values. Press BT to save the channel name.

7- Edit TX Frequency and using the Orange Exit/Back (V/M) button

V/M can be used to exit most menu and setting screens. If you LP V/M in VFO, Channel, or Group mode, you can **edit the TX frequency.**  is displayed next to the TX frequency you are editing. Either type in the frequency using * DTMF as a decimal point and # A/B to complete the entry, or type in an offset value such as .6 or 5 and use ▲/▼ to make it a +/- value. Pressing BT will save the value with an up  or down  symbol to the left of the TX frequency indicating if it's positive or negative relative to the RX frequency. If you wish to remove the TX frequency, press the Flashlight/Monitor button while editing the TX frequency to clear it. 

8- Reverse RX/TX frequencies 

LP 5 REV to reverse the RX/TX frequencies. You need to already have a TX frequency configured. A letter 'R' will be shown on the screen to show the values are reversed. You can read the radio configuration into the nicFW Programmer and uncheck the reverse box for a given channel and write it back to the radio to keep the frequencies reversed without the 'R' on the screen any longer or use the shifted LP 5 function to remove the 'R', leaving the TX and RX frequencies reversed.

9- Using Group Mode

When in Group mode, you can cycle from Groups A-O. * DTMF moves up and 0 W/N moves down. LP 0 W/N and use buttons '1-9' to select group A-O. Use BT or # A/B to confirm your selection.

10- Changing Channels in Channel Mode or Group Mode

When in Channel Mode, use ▲/▼ to shift up or down channels or type in the 1, 2, or 3 digit channel value followed by # A/B. If the channel you enter does not currently have a saved configuration, the radio will drop to the next lowest saved channel. In Group Mode, you can similarly type in the 1, 2, or 3 digit channel value followed by # A/B, but the radio will not display any saved channels that are not assigned to the currently active channel group. Entering 0 W/N before a 2 or 3 digit channel number will not work.

11- Save VFO config to Channel / Deleting a Channel

Find a channel number you plan to save to. While in VFO Mode, set the VFO frequency and other settings. Enter the 1, 2 or 3 digit channel number you're saving to and LP BT to copy the VFO values to the channel. To delete a channel in VFO Mode, enter the 1, 2, or 3 digit channel number and LP V/M to delete it. To delete a Channel while in Channel Mode, LP 0 W/N first.

12- Copy Channel to another Channel

Go to the channel you want to copy to another channel while in Channel mode. LP 0 W/N and enter the channel number you want to copy to. LP BT to finish the copy.

13- Dual Watch / VFO-Lock

LP 9 DW to quickly enable the Dual Watch function. See the Dual Watch (Menu 13) option above for further details. You can lock to VFO-A or VFO-B for transmission when Dual Watch is enabled. <u>You must be using Single or Hybrid PTT mode</u> (Menu 15). LP BT to switch to the LP shifted bank and then LP 0 W/N to enable VFO-Lock. The A/B Dual Watch flag will change to either an 'A' or a 'B' to indicate which VFO is locked for transmitting. You can use # A/B to switch between which VFO is the active transmit VFO while Dual Watch is enabled. VFO-Lock will remain on (with no flag shown) even if you disable Dual Watch and will be used the next time Dual Watch is enabled.

14- Enable Bluetooth

Bluetooth isn't used for much on nicFW V2. It's mainly used for the Remote function built into the nicFW Programmer. To enable bluetooth, LP BT to shift the LP bank and then LP 1 SQL.

15- Broadcast FM Radio Tuner

As long as you have the 88-108MHz frequencies added to your Band Plan in the nicFW Programmer with the modulation set to FM Tuner, you can enter a frequency in that range to enable the FMT(Frequency Modulation Tuner) Broadcast FM radio. You can use channels to store FMT presets.

16- Screen Lock

LP * DTMF to lock the keypad. PTT buttons still work. LP * DTMF again to unlock. PIN may be needed. Default is 9999 or whatever you set in Menu 48.

17- Enter DTMF tone

LP 2PWR and use the keypad to enter the DTMF tone values. Press the PTT button to transmit the DTMF tones. Press V/M to exit early. You can also press and hold the PTT button and then use the keypad to dial the DTMF tones manually.

18- DTMF Presets

LP #A/B to access the DTMF preset values configured with the nicFW Programmer. Use ^ / v to cycle through the saved values or numbers on the keypad if you know which preset you want and then press the PTT button to transmit the selected DTMF tones. Use Flashlight/Monitor button or V/M to backspace or exit.

19- Scanning VFO, Channel, or Group modes

LP 3SCN to start scanning. Press V/M or PTT button to stop scanning. #A/B will exclude the frequency of the last detected signal from the current scan. Starting a new scan will restore excluded frequencies. ^ will continue the scan. During a Group Mode scan, use *DTMF and 0W/N to to cycle up and down through groups.

The Menu button BT will still function to open the menu during a scan.
After exiting a scan, the VFO will be on the channel/frequency of the last detected signal. In VFO mode, once you exit a scan, so long as you do not adjust the frequency in any way, restarting the scan will resume from where you stopped and the start/end frequencies will remain unchanged.

20- Scan Presets

LP 4STP in VFO mode to access Scan Presets configured in the nicFW Programmer. You can select multiple Scan Presets to scan at once by pressing *DTMF on each Scan Preset. A Scanning icon will be displayed next to the Scan Preset name when selecting to scan multiple Scan Presets at once. To start Scanning a Scan Preset or selected Scan Presets marked with the icon, press BT. LP 4STP in Channel or Group mode and screen colors will invert instead of opening the Scan Presets menu.

21- Frequency Counter

In VFO Mode, LP 7VOX to start the Frequency Counter. This is similar to a scan and will lock to a frequency from a strong signal and start receiving the signal. This can be used to also find your XTAL 671 value and it will also show the CTCSS tone or DCS code on this screen if you have Tone Monitor enabled. If Tone Monitor is set to Clone, you can set the active VFO to the Frequency Counter frequency and decoded CTCSS tone or DCS Code. This VFO can then be used to save to a channel (memory bank).

22- LCD RFI Compensation Toggle @

RX on some frequencies will produce a helicopter rotor type stutter during reception due to the S-Meter refresh rate on the LCD. LP 6 SQT to change to a second preset S-Meter refresh value. This will shift the harmonic interference to other frequencies for the time being. When enabled, a @ will appear in the same location as the ASL (AllStarLink) usually appears.

23- Using the Spectrum Scope

To access the Scope, you'll need to shift to the LP shifted bank by a LP of BT and then a LP of 2 PWR.

To use the Spectrum Scope, make sure you're only in VFO mode (not Channel or Group Mode). If started while in Single PTT mode (Menu 15), the radio will switch to Dual PTT mode automatically. The scope uses the inactive VFO space to display the Scope. TX is disabled while using the Scope. You cannot switch to Single PTT mode while the Scope is in use.

and buttons will Step up and down the RX frequency in the active VFO based on the Step (Menu 14) value. Using * DTMF and 0 WX will Step up or down 10x the Step value. # A/B will center on the strongest signal in the scope.

There are three frequency values listed on screen with the Scope. The two side by side frequencies are the upper and lower values of the displayed scope. The third frequency is the strongest signal within the Scope range.

Many menu options will be available during Scope use, but don't try to Scan, or do other things that likely wouldn't be compatible with the Scope function. Audio is not heard while using the Scope. You cannot TX or switch to Single PTT mode with the scope enabled. To exit the Scope, use V/M.

24- NOAA Alert Tone NOAA

"To enable NOAA alert tone, you set the RX CTCSS (Menu 08) to a custom value of 105.0 (needs to be keyed in). When set, squelch remains closed until a 1050 Hz tone is heard and from that point squelch remains open until signal loss or user interaction." -Marcus Dudely

Testing NOAA - Transmitting a TX CTCSS tone of 105.0 Hz from another radio will not open the squelch on the receiving nicFW radio configured to RX CTCSS tone 105.0 Hz on a NOAA broadcast frequency. Instead, you would set the Repeater Tone (Menu 22) to 1050 Hz on the transmitting radio and while pressing the PTT button to transmit, you press the Flashlight/Monitor button to transmit the 1050 Hz tone. The RX CTCSS tones is not actually using 105.0 Hz. It's a 1050 hz tone, but the RX CTCSS menu options is used to enable this for NOAA reception.

You can learn more about what NOAA weather RX frequencies to configure here.
https://en.m.wikipedia.org/wiki/NOAA_Weather_Radio

25- Reset Radio Settings

This is not as complete as wiping the EEPROM with the EEPROM_WIPE.bin file, but may be useful to solve self induced problems. Hold down the Flashlight/Monitor button while you power on the radio. This will reset most radio settings. Hopefully you backed up your working CodePlug with the nicFW Programmer beforehand so you can easily restore it. You can also right-click the 'Write' button in the nicFW Programmer to do the same type of wipe. Flashing the EEPROM_WIPE.bin file will erase everything and you'll need to re-install the firmware. This has helped some clear up issues with the using the USB-C port for Writing configurations to the radio.

26- Using the Activity Scanner built into the nicFW Programmer 

A. Connect the radio to the nicFW Programmer with the USB cable.
B. Define a Scan Preset in the nicFW Programmer and write preset to radio.
C. Switch radio to VFO mode.
D. Start the activity scanner on the programmer.
E. LP  on the radio.
F. Select a preset and start it scanning.
G. While the scan is running press  on the radio to switch the scanner into Activity Mode. While in this mode, the radio will not monitor active signals or open squelch. The active signals discovered will instead be recorded in the nicFW Programmer and can be used for saving channels.

27- Skinning with nicFW Programmer

"Skinning isn't for the faint of heart—it can be a meticulous and challenging process. The interface, while functional, can feel a bit clunky at times. At its core, a skin is a modification of the firmware .bin file that adjusts the position and color of display elements. You can move most of these elements to wherever you want, as well as change their colors. [LP button functions can also be reconfigured here]

Getting Started with Skinning

Open the programmer and go to the 'Skinning' tab.
Click on "Load Firmware" and select a compatible firmware binary. You can check the nightly page for the latest versions of both the programmer and firmware, along with compatibility details.
You'll now see the default layout. From here, you can:

1. Move elements and adjust their colors using the controls on the right side of the preview. The preview will update as you make changes.

2. Import a pre-made skin by clicking the "Import Skin" button and selecting the appropriate skin CSV file.
3. Switch to the Single PTT preview by checking the ‘Single PTT’ box.
4. Preview different VFO background colors by checking the RX, TX, and Scan boxes.
5. Preview the menu appearance and various editing modes within the menu.

Saving Your Changes

Once you’re satisfied with your edits, you can:

- Apply the changes to the firmware binary by clicking the "Save Firmware" button. This will save the modified .bin file, which you can flash to your radio.
- Export your skin to a CSV to save your edits and share them with others. It’s also a good idea to save the skin CSV for quickly applying your custom skin to newer firmware versions.

Understanding Element Positioning

Most elements have both vertical and horizontal components, but some only have one. For example, the global flags bar (the one with icons like battery, tone monitor, dual watch, etc.) is a full-width bar defined by just a vertical position. The individual elements within this bar only have horizontal values, as their vertical positions are determined by the overall position of the flags bar.

The VFO (Variable Frequency Oscillator) is similarly relative. You set the vertical position for the 45-pixel tall VFOs, and then you can adjust the elements within the VFO relative to that. In Single PTT mode, the VFO height increases to 90 pixels, and the elements are spaced vertically. There are also values specific to Dual/Single PTT modes. The positions of VFO-A and VFO-B only apply in Dual/Hybrid PTT mode. In Single PTT mode, the VFO’s vertical position is controlled by the “Single VFO Vertical” setting. Likewise, the flags bar has separate settings for Dual and Single PTT modes.

The Preview Image

The preview image is designed to display elements in the same order as the firmware does on the radio. This ensures proper overlap handling, as elements drawn later will overwrite earlier ones. With careful overlap, you can "remove" elements by layering others on top.

Switch Entries

Entries labeled as "SWITCH" represent boolean values, where 0 means OFF, and any non-zero value means ON. For simplicity, use 1 for ON and 0 for OFF.

Some entries are marked as "MSWITCH", which stands for "Multi-Switch". These have more than two possible values. For example, the "Inactive VFO Dimming" switch is an MSWITCH because it offers three options:

- 0 = No Dimming
- 1 = Dark Background Dimming
- 2 = Light Background Dimming

Long Press Functions

These options, found at the end of the Positional Data section, are not part of a skin. However, they have been included in this tab for convenience, as it simplifies their application to the firmware binary and allows the use of the existing skin editor functionality. Each option corresponds to a specific function assigned to a key when long-pressed.
To modify a long-press function, right-click on the desired key and select a function from the menu that appears.
While long-press configurations are written to the firmware binary alongside the skin settings, they are not included in a skin CSV export. However, you can import and export long-press data separately using the **‘Import LPs’** and **‘Export LPs’** buttons.”

- Marcus Dudely

28- CodePlug separation between Radio Settings and Power Tuning

When using the nicFW Programmer, you might notice that if you have more than one radio, you can’t just use the same CodePlug for both radios unless their Power Tuning parameters happen to be the same (you should test with a meter). In this case, it may be helpful to only include the Radio Settings when you ‘Write’ to the radio or perhaps just the Power Tuning configuration. To do this, you can right-click the following buttons in the nicFW Programmer to access additional submenus for their associated actions.
‘Load’ // ‘Read’ // ‘Write’