TD-H3 with nicFW for GCARC EmComm

nicsure's custom firmware for the original TIDRADIO TD-H3, and our plan to program it for ARES, AuxComm and emcomm use with the GCARC Frequency Guide v0.2

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Kyle, this paper explains why we settled on the TD-H3 running nicFW, how the guide's fifteen zones map onto the radio, and exactly how we intend to program the two radios that arrive Sunday, 22 November 2026. Nothing in it has been written to a radio yet. The plan, the CSV files and the scripts are drafts, and I would like your eyes on them before the first write.

1. What nicFW is, and why we chose it

nicFW is a free, replacement firmware for the TIDRADIO TD-H3, written by Marcus Dudley (nicsure).[6] The current H3 build is **nicFW H3 V2.52.22**, posted 22 June 2025 as a firmware-only "leveling" release; the matching programmer is the one shipped with V2.52.15.[2][3] I found no newer H3 release in nicsure's post index as of this month, since his recent work has moved to the Radtel radios.[10] The firmware is for the **original TD-H3 only**. nicsure states plainly that the TD-H3 Plus is a completely different radio, and nicFW will not run on it.[2]

The V2.5 codeplug is an 8 KB EEPROM image. nicsure's own documentation defines 198 memory channels, each with a 12-character name and membership in up to four of fifteen groups, A through O. Each group can carry a label of up to five characters.[1] The radio has three operating modes (VFO, Channel and Group), and in Group mode it shows only the channels in the active group.[6]

Why not the other radios we looked at

Radio / firmware	How it handles a 15-zone guide
Quansheng UV-K5 (EGZUMER)	No zones. Two scan lists only, so the guide had to be laid out as fixed 16-slot memory blocks that you page through by number.
Baofeng UV-5R Mini	No zones at all.
BTECH UV-Pro	Six groups. Fifteen zones would have to be squeezed into six.
TIDRADIO TD-H3 (nicFW)	**Fifteen groups, A–O, one for each of the guide's fifteen zones.** A channel can sit in up to four groups without being duplicated.

The deciding point is that one-for-one match. A member who knows that Zone 7 is the deployment zone finds the same channels under group G, labeled `DIST`, in the same order as the printed guide. No translation table is needed under stress.

2. Features that matter for emcomm

- **Groups with labels.** Fifteen named groups and up to four groups per channel, set in the codeplug or from the radio (Menu 10 Add Group, Menu 11 Remove Group).[1][6]
- **Group scanning.** A long press starts a scan in VFO, Channel or Group mode. In a Group-mode scan the arrow keys step through the groups, so you scan one group at a time.[6] Scan Persist, Scan Resume and UltraScan tune the scan behavior.
- **Per-channel no-transmit.** Transmit power is a raw byte from 0 to 255, and 0 means N/T: the channel cannot transmit.[1][8] We use this for every monitor-only channel.
- **Editable band plan.** Twenty band-plan entries, each with its own transmit-allowed flag, maximum power, modulation and bandwidth.[1] nicsure's default plan (in `default25.nfw`) allows transmit on 137–174, 219–

225 and 400–520 MHz, and receive only on 88–108 (broadcast FM), 108–137 (AM airband) and a wide 18–1300 MHz entry.[7]

- **CTCSS and DCS** on transmit and receive, with normal and inverted DCS.[1] Tone Monitor (Menu 12) decodes and displays an unknown tone or code, which helps when a repeater's PL is in doubt.[6]
- **Dual Watch** of VFO A and VFO B, with VFO-Lock for a fixed transmit side and a Dual Watch Delay after PTT.[6]
- **Operating safeguards:** Busy Lock (no transmit on a busy channel), a TX timeout of up to 250 seconds, a 1750 Hz repeater tone, DTMF presets and PTT ID.[6]
- **Frequency calibration.** XTAL 671 (Menu 23) trims the reference oscillator. The manual warns that without it, CTCSS and DCS may fail to open repeaters.[6] Power tuning tables are stored per radio in the codeplug.[1]
- **Browser tools.** nicsure's online Flasher and Codeplug Manager run in Chrome or Edge over Web Serial, so no Windows PC is required.[4][5] The source is public on GitHub.[12]

> A caution about the manual: Dustin Hawkes's user manual is written for nicFW V2.07.06, and V2.52 has changed some things since then. For example, V2.52.15 split the menu into User and Advanced halves (the **#** key switches them) and added a Noise Ceiling setting, which nicsure recommends setting to 55 after flashing.[3] [6] Menu numbers in this paper come from the manual; check them on the radio.

3. Our channel plan

The plan follows the GCARC Frequency Guide v0.2 zone by zone and in guide order. It uses **141 of the 198 channels, leaving 57 free** (slots 142–198). The guide lists 208 entries, but many of them are the same channel appearing in several zones. nicFW lets one slot belong to several groups, so a shared channel takes a single slot and carries several group letters. Thirty-two slots belong to more than one group; for example, slot 1, GCARC2M (147.180, PL 131.8), is in both A and B.

Grp	Label	Guide zone	Chans	Notes
A	GCPRI	Z1 GC Primary	16	Go-kit zone
B	GCNR	Z2 GC + Near	15	
C	CAMDN	Z3 Camden Metro	16	
D	SALCU	Z4 Salem + Cumberland	16	
E	PA	Z5 PA Cross-River	16	
F	DEL	Z6 Delaware	16	Includes second copies in slots 77–78
G	DIST	Z7 Distant / Mutual	16	
H	SMPLX	Z8 Simplex / Tactical	16	Includes Burlington TAC1–TAC3
I	DIGI	Z9 Digital / Winlink	5	HF Winlink rows dropped; duplicate 145.030 and 144.390 entries merged
J	DMR	Z10 DMR	0	Empty: the H3 has no DMR
K	GMRSR	Z11 GMRS Repeaters	6	Repeater outputs only, on the same slots as group L; receive only
L	GMRS	Z12 GMRS / FRS	15	Receive only
M	INTOP	Z13 Monitor: Interop	16	Part 90; receive only
N	WXMUR	Z14 Monitor: WX / MURS	12	Receive only
O	OTHER	Z15 Other Bands	0	Empty: 6 m, 33 cm and 23 cm

Group membership adds up to 197 because of the shared slots. One limit bit us: a channel can belong to at most four groups. Two calling channels, **146.535 GCSMPX** (the county ARES tactical simplex) and **146.520 2MCALL**,

appear in five zones each. Slots 4 and 5 carry groups A, B, D and H, and second copies in **slots 77 and 78** carry group F, so they also appear in the Delaware group.

What is left out

- **DMR** (Z10): the H3 is an analog radio, so group J is empty.
- **HF**: the two 7.1015 MHz VARA Winlink gateways in Z9 are outside the radio's range.
- **GMRS repeater inputs** (Z11): we program only the repeater outputs, as receive-only channels that share the group L simplex slots.
- **33 cm and 23 cm** (Z15), along with the 6 m entries in the same zone. Group O is empty and held in reserve.

Power settings are raw nicFW values: 130 (about 5 W) on simplex and most repeaters, and 58 (about 2 W) on five repeaters within 10 miles. Those watt figures come from the community power-calibration guide,[8] and real output depends on each radio's tuning. We will measure it.

4. Safety choices

> **220 MHz is receive-only for now.** All 13 channels on 1.25 m (the club's 224.660 machine, 223.500 calling, the WL220 Winlink gateway and ten regional 220 repeaters) are set to N/T. nicsure's default band plan does permit 219–225 MHz transmit,[7] but TIDRADIO does not specify the TD-H3 for 220 transmit. Until we have measured the H3's output on 220 into a dummy load, and ideally looked at its harmonics, we will not key it there. Enabling it later is a one-line change in the build script (`TX220=True`) and a rebuild.

- **GMRS and FRS are no-transmit.** All 15 GMRS/FRS channels are N/T. The guide is explicit that GMRS needs a separate license and a Part 95 radio. Because the default band plan allows transmit anywhere from 400 to 520 MHz, the N/T setting is the only thing preventing a 462 MHz transmission.
- **Interop, NOAA and MURS are no-transmit.** The 16 interop and JEMS channels are Part 90 and are monitor-only for hams, per the guide's licensing section. NOAA is receive-only for everyone, and MURS requires a MURS-certified radio. In all, 56 of the 141 channels are N/T.
- **We may narrow the band plan.** One option is to limit transmit to 144–148, 222–225 and 420–450 MHz so that the radio itself refuses out-of-band transmissions, even on a channel or VFO entry that someone misprograms. We have not decided this yet. It changes only the band-plan block, which our script does not touch, so it would be a separate, deliberate edit in the Codeplug Manager.

5. Programming method, and why

The manual is blunt that nicFW is not compatible with CHIRP.[6] A third-party CHIRP driver for V2.5 does exist (jnyer27's adapter),[8] and it reads the radio well. I tested its write path against nicsure's default codeplug, and it is not safe to use for this plan:

- CHIRP crashes on CSV import and paste, and again on save, because the driver's power list includes "N/T".
- It stores DCS codes as decimal instead of octal; D174 is written as 0x80AE rather than 0x807C.
- Its channel flag bits are reversed relative to nicfw2docs, so modulation reads back as "Auto", and a write would set PTT ID bits.
- It rejects 220 MHz entirely.

The older EA5JQP driver on chirpmyradio.com targets the V2.0x codeplug (little-endian, a different settings magic) and does not match V2.5.

So we use nicsure's own tools for the radio I/O and a small script for the channels. The **Codeplug Manager** reads the full 8 KB codeplug from the radio and saves it as a `.nfw` file.[5] Our script, `apply_plan_to_codeplug.py`, takes that file and rewrites **only** the 198 channel slots and the 15 group labels, using the layout in nicfw2docs.[1] It refuses any file that is not 8192 bytes or lacks the V2.5 settings magic (0xD82F). VFO A and B, the settings block,

band plan, scan presets, DTMF presets, XTAL value and power tables are copied through unchanged. On the box, all 141 channels decode back with the right frequency, offset, tones, DCS, power, bandwidth and groups, and no bytes outside the channel and label areas change.

> Because calibration lives in the codeplug, every radio is processed from **its own** backup. We never write one radio's file to another, and we never write the demo file `EXAMPLE-default25-with-plan.nfw`, which carries nicsure's default calibration.

6. Procedure for each radio

We will do this twice on Sunday, once per radio, labeling the radios H3-1 and H3-2 and naming every file with that label. I will press the buttons and confirm before each write.

1. **Back up the stock radio.** From TIDRADIO's software portal, download the "TD-H3 HAM" package (an account is required).[9] Use the programming software and the TXPower Tune tool to save the stock configuration file and the stock power-tune file. Together they are the stock codeplug, and they are what we would need to return to stock.[6]
2. **Flash nicFW.** Open the online Flasher in Chrome[4] and load the V2.52.22 `.bin`. Following the Flasher's prompt, turn the radio off, hold **PTT**, and turn it on with PTT still held. Then select the USB serial port and flash. The screen stays blank while it flashes. (nicsure's TDH3Flash is a command-line alternative.[11])
3. **Load the defaults and calibrate.** Write `default.nfw` with the Codeplug Manager; the manual calls this initialization crucial.[6] Then tune transmit power and set XTAL 671 (Menu 23) against a known-accurate reference, and set Noise Ceiling to 55.[3]
4. **Save the codeplug.** In the Codeplug Manager, read the radio and save it as `H3-1-cal.nfw`. This file is the radio's calibrated baseline. Keep it.
5. **Apply the plan.** Run `python3 apply_plan_to_codeplug.py H3-1-cal.nfw H3-1-gcarc.nfw`. This replaces all 198 channels, including nicsure's default GMRS, PMR and NOAA set.
6. **Write it.** Load `H3-1-gcarc.nfw` into the Codeplug Manager and write it to the radio.
7. **Verify.** Read the radio back, save it as `H3-1-readback.nfw`, and compare its channel and label areas against `H3-1-gcarc.nfw`. On the radio, check that the group labels appear, that a Group-mode scan stays within the active group, and that an N/T channel (220, GMRS or interop) will not key. Then make a short on-air test through the club 2 m machine, and keep the readback file with the radio's other files.

7. Open items

RepeaterBook spot checks (17 November 2026)

- **442.400 N3KZ** (slot 62, N3KZPH) and **147.120 KC2DUX** (slot 20) are shown as off the air.
- **442.150 Camden** (slot 27, CAMSEC) is listed under K2EOC as P25 only, so FM access may not work.
- **449.975 W2FHO** (GCSKYW, county SKYWARN) and **146.475 W2RM** (GCOEM, county OEM) could not be found on RepeaterBook. Both are new in v0.2.
- TABERN is programmed as 445.33125; the guide prints 445.331. 145.150 K2AX is named LINDEN in Z2 and WINSLW in Z3; we use LINDEN.
- K2GOD 446.625: the guide says FM is normally off. The status of W2SCR, MILLVL and N3KZDE is unknown.

Questions for the guide's working group

- **146.560 or 146.565** for Camden simplex (CAMSMP, slot 46, in Z4 and Z8). The Section EOP says .565, and the online listing says .560. We programmed .560, as printed.
- **147.255 Cumberland** (CUMARE, slot 36): the callsign and location conflict. The sources give KC2TXB in Bridgeton, KC2TXR in Vineland, and Rosenhayn.

- The MEDIA 146.940 double listing, and 146.535 being shared with Burlington TAC4.

On the bench

- Measure each radio's output on 220 (and its real output at power 130 and 58 on 2 m and 70 cm) before enabling 220 transmit.
- Decide whether to narrow the band plan.
- Confirm on the radio that a Group-mode scan covers only the active group. The manual implies it, but I did not find a sentence that states it outright.

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Appendix: All 141 channels by slot

Dup: + / – repeater offset (600 kHz on 2 m, 1.6 MHz on 220, 5 MHz on 70 cm), S simplex, RX receive-only. Tone: a bare number is the transmit PL; T = tone squelch on transmit and receive; D = DCS. Pwr: H = 130 (about 5 W), L = 58 (about 2 W), NT = no transmit. Slots 142–198 are empty. Source: `plan.json`, draft of 18 November 2026.

#	Name	MHz	Dup	Tone	Pwr	Grp
1	GCARC2M	147.180	+	131.8	L	AB
2	GCARC70	442.100	+	131.8	L	AB
3	GCARC22	224.660	–	131.8	NT	AB
4	GCSMPX	146.535	S		H	ABDH
5	2MCALL	146.520	S		H	ABDH
6	70CALL	446.000	S		H	AFH
7	220CAL	223.500	S		NT	AH
8	APRS	144.390	S		H	AHI
9	WLVHF	145.030	S		H	AI
10	WL220	223.580	S		NT	AI
11	WLSNJ	145.010	S		H	AI
12	SJTRAF	147.345	+	127.3	H	AC
13	NJOEM	147.570	S		H	AGH
14	CAMARE	146.895	–	91.5	H	AC
15	WXPHL	162.475	RX		NT	AN
16	WXACY	162.400	RX		NT	ADN
17	GCSKYW	449.975	–	131.8	L	B
18	GCOEM	146.475	+	162.2	H	B
19	WC2K	145.390	–	91.5	H	B
20	KC2DUX	147.120	+	123.0	L	B
21	SALARE	146.625	–	131.8	L	BD
22	K2UK2M	146.865	–	131.8	H	BC
23	K2UK70	442.350	+	131.8	H	BC
24	RUNNMD	147.225	+	192.8	H	BC
25	NJ2GC	447.775	–	146.2	H	BC
26	LINDEN	145.150	–	91.5	H	BC
27	CAMSEC	442.150	+	156.7	H	C
28	CHERRY	145.370	–	91.5	H	C
29	W2FLY	145.210	–	D174	H	C
30	N3KZ2M	145.430	–	79.7	H	C
31	W2MX22	224.620	–		NT	C
32	KA2PFL	442.300	+	131.8	H	C
33	N3KZ70	442.700	+	131.8	H	C
34	WB3EHB	444.300	+	131.8	H	C
35	K3RJC	444.900	+	131.8	H	C
36	CUMARE	147.255	+	179.9	H	D
37	VINELD	145.490	–	179.9	H	D
38	SALEM22	224.460	–	74.4	NT	D
39	MILLVL	223.960	–	179.9	NT	D
40	BRIDGE	447.275	–	131.8	H	D
41	GREENW	443.700	+	131.8	H	D
42	K2GOD	446.625	–	94.8	H	D
43	W2SCR	449.625	–	123.0	H	D
44	SALSMP	147.555	S		H	DH
45	CUMSMP	147.540	S		H	DH
46	CAMSMP	146.560	S		H	DH
47	WLCUMB	145.070	S		H	DI
48	PHLARE	147.030	+	91.5	H	E
49	DELCO	446.775	–	88.5	H	E
50	MEDIA	146.940	–	131.8	H	E
51	DARBY	147.360	+	131.8	H	E
52	NEWTWN	147.060	+	131.8	H	E
53	W3DI2M	147.195	+	100.0	H	E
54	WM3PEN	146.685	–	146.2	H	E
55	KD3WT	145.410	–	127.3	H	E
56	CHESTR	224.700	–	131.8	NT	E
57	BOOTHS	223.940	–	88.5	NT	E
58	DARB22	224.500	–	131.8	NT	E
59	KM3W70	444.700	+	131.8	H	E
60	DARB70	444.050	+	131.8	H	E
61	W3DI70	442.250	+	131.8	H	E
62	N3KZPH	442.400	+	131.8	H	E
63	KD3W70	446.875	–	131.8	H	E
64	W3CER	444.400	+	100.0	H	F
65	W3DRA1	146.955	–	131.8	H	F
66	W3DRA2	146.730	–	131.8	H	F
67	W3DR22	224.520	–	131.8	NT	F
68	KA3WOW	224.400	–	131.8	NT	F
69	N3KZDE	442.000	+	131.8	H	F
70	W3DR70	448.375	–	131.8	H	F
71	N3JLH	448.825	–	131.8	H	F
72	W3CER2	444.950	+	100.0	H	F
73	W3UD	145.310	–	141.3	H	F
74	W3DRA3	146.700	–	131.8	H	F
75	W3DR49	449.025	–	131.8	H	F
76	W3CER3	442.500	+	100.0	H	F
77	GCSMPX	146.535	S		H	F
78	2MCALL	146.520	S		H	F
79	BURARE	147.150	+	127.3	H	G
80	ATLARE	146.745	–	146.2	H	G
81	CAPARE	147.240	+	146.2	H	G
82	MERARE	147.105	+	123.0	H	G
83	OCNARE	449.825	–	131.8	H	G
84	K2AA	145.290	–	91.5	H	G
85	MTLAUR	223.920	–	127.3	NT	G
86	CINNAM	445.625	–	127.3	H	G
87	MINOTL	146.805	–	118.8	H	G
88	MINO70	448.125	–	192.8	H	G
89	HAMMON	444.875	+	162.2	H	G
90	TABERN	445.33125	–	127.3	H	G
91	WILLBO	146.925	–	131.8	H	G
92	W2NJR	445.075	–	141.3	H	G
93	NJOEM2	224.320	–	67.0	NT	G
94	TAC1	147.495	S		H	H
95	TAC2	147.505	S		H	H
96	TAC3	147.515	S		H	H
97	446025	446.025	S		H	H
98	446050	446.050	S		H	H
99	445950	445.950	S		H	H
100	445975	445.975	S		H	H
101	G15/462550	462.550	RX		NT	KL
102	G16/462575	462.575	RX		NT	L
103	G17/462600	462.600	RX		NT	KL
104	G18/462625	462.625	RX		NT	KL
105	G19/462650	462.650	RX		NT	KL
106	G20/462675	462.675	RX		NT	L
107	G21/462700	462.700	RX		NT	KL
108	G22/462725	462.725	RX		NT	KL
109	F1/462562	462.5625	RX		NT	L
110	F2/462587	462.5875	RX		NT	L
111	F3/462612	462.6125	RX		NT	L
112	F4/462637	462.6375	RX		NT	L
113	F5/462662	462.6625	RX		NT	L
114	F6/462687	462.6875	RX		NT	L
115	F7/462712	462.7125	RX		NT	L
116	VCALL10	155.7525	RX	T156.7	NT	M
117	VTAC11	151.1375	RX	T156.7	NT	M
118	VTAC12	154.4525	RX	T156.7	NT	M
119	VTAC13	158.7375	RX	T156.7	NT	M
120	VTAC14	159.4725	RX	T156.7	NT	M
121	UCALL40	453.2125	RX	T156.7	NT	M
122	UTAC41	453.4625	RX	T156.7	NT	M
123	UTAC42	453.7125	RX	T156.7	NT	M
124	UTAC43	453.8625	RX	T156.7	NT	M
125	VFIRE21	154.280	RX		NT	M
126	VFIRE22	154.265	RX		NT	M
127	VLAW31	155.475	RX		NT	M
128	VSAR16	155.160	RX	T127.3	NT	M
129	JEMS2	155.340	RX		NT	M
130	JEMS3	155.280	RX		NT	M
131	JEMS4	153.785	RX		NT	M
132	WX2	162.425	RX		NT	N
133	WX3	162.450	RX		NT	N
134	WX5	162.500	RX		NT	N
135	WX6	162.525	RX		NT	N
136	WX7	162.550	RX		NT	N
137	MURS1	151.820	RX		NT	N
138	MURS2	151.880	RX		NT	N
139	MURS3	151.940	RX		NT	N
140	MURS4	154.570	RX		NT	N
141	MURS5	154.600	RX		NT	N