The WACRS brief introduction to VK-DMR & the Alinco DJ-MD5

Which buttons do I push first?

- The arrow keys select ZONES (or banks) that change the VKDMR repeaters you want to access along with traditional memory banks for analog repeaters or simplex. (see page 3 & 4)

- The top left knob selects TALKGROUPS (or channels) ***within the Zones***.
(see page 3 & 4) There are approximately 50 Talkgroups in the VKDMR system. They are not labelled in a contiguous manner though. (1,3,5,8,9,13,30,53,80,113,123, etc.)

- **Talkgroup 505 on timeslot 2** is the nationwide call channel. Every repeater in Australia listens on this talkgroup.
- **TG 9 on timeslot 1** is the complete opposite – it is linked nowhere. Use TG 9 like a traditional local repeater but digital.
- The rest are all "**User Activated**" talkgroups.
- All talkgroups on VKDMR are located on timeslot 1 except for 505 and the parrot. WACRS Alinco's are set for the correct slot per talkgroup.

There are two programmable function buttons on the left side. The top one is PF1 and the lower one is PF2 (even though PF1 has two dots moulded into it and PF2 has one)

- Momentarily press PF1 to make the MAIN or SUB band active.
- Press and HOLD PF1 to hide the SUB band, but you can still toggle between MAIN and SUB.
- Momentarily press PF2 to change power.
- Press and HOLD PF2 to toggle between VFO and memory. (see page 5 & 6)

**** Radio ID ****

Although it's not illegal or forbidden by the ACMA to operate digital modes with anything other than your own callsign, a unique ID is necessary to enable routing of your transmission on a network such as VKDMR.

You could enter into the programming software a random ID number or one that belongs to someone else, but you would soon be found out and shot down. There is a central management service called https://radioid.net which handles DMR ID number allocations and is trusted by the different digital networks around the world. You need to go here and create an account and then submit a request for an ID number, which also requires you to submit evidence such as a recent license renewal from the ACMA. ***Once you receive your number, you must program this into your radio.***

The Dashboard.

An important online web portal or "dashboard" for troubleshooting and checking where the hell you are at any time is at:

http://rpt.vkdmr.com

As long as you are in range of a VKDMR repeater, you can key your radio and see where you are being routed in real time. GREEN is the origin of a transmission and ORANGE is the destination. This is your first stop for nailing down issues and understanding everything that's happening in the background.

The central website for VK-DMR is at https://vkdmr.com

DMR is a digital mode for government, safety and emergency services as well as the private sector. In those environments, radios are programmed by professional technicians and then given to end-users who are not hams, CBer's or people who have any interest in radio.

The end user isn't concerned with the sophistication of what is happening in the background because their radio systems are custom designed by people paid to create and program complex, linked radio systems at government/enterprise level. The difficulty hams come up against with DMR is that the radio has to be programmed essentially by the end user – that be you. The software (when you eventually find it) contains the same bewildering detail that is common in industry level two-way radio systems. Added to that, the software varies among all the different models and brands of radios.

Companies that sell DMR radios can't predict the network design they'll eventually be used for. But they can still sell radios that adhere to the base protocol and vaguely point us to the software required to finish the job off. For someone opening the software to program their newly acquired DMR radio for the first time, it can be a steep learning curve because of all the variables and how they bind together.

Zones and Talkgroups – The basic structure.

40 or 80 channels is nowhere near enough for professional two-way radio systems. Motorola build radios that have thousands of channels that are grouped into memory banks except Motorola term the banks as "Zones" and the channels as "Talkgroups". From this, the design of a DMR based network takes shape.

VK-DMR – ***Please NOTE: Retevis RT90 radios with OpenGD77 firmware are programmed differently. Please see seperate docs for that rig. The following relates to the Alinco and also somewhat AnyTone's.***

The VK-DMR network has around 50 Talkgroups. CB radios have 40 or 80 channels. So what's the big deal and why do we need to consider grouping these Talkgroups into Zones? ***It's because all 50 of these Talkgroups can be accessed through ONE repeater.*** The Zones on VK-DMR represent different repeaters and you duplicate the exact same 50 Talkgroups across multiple repeaters connected to the same network. So Maddens Plains is one Zone containing the 50 known Talkgroups. Hi Range, Dural, Big Box Trig, Yass, Somersby, etc, all have the exact same 50 Talkgroups available. If you're in range of Dural, you select the Zone called Dural and then pick your Talkgroup.

What we need to then understand is how Talkgroups relate to what are known as Timeslot 1 and Timeslot 2 because ***in most cases, only one Talkgroup can be active on a Timeslot at any one time.***

Switching Zones switches repeaters. Then select the specific Talkgroup that VKDMR has available.The same 50 Talkgroups are available on all the different repeaters.

Zone Layout

No.	Name	Zone Channels
1	ZO-1 Canberra	50
2	ZO-2 Somersby	50
3	ZO-3 Orange	50
4	ZO-4 Bombala	50
5	ZO-5 Garland	50
6	ZO-6 GPT	50
7	ZO-7 Bindo	50
8	ZO-8 Goulburn	50
9	ZO-9 Hi Range	50
10	ZO-10 Chatswood	50
11	ZO-11 Engadine	50
12	ZO-12 Terrey	50
13	ZO-13 Maddens	50
14	ZO-14 Dural	50
15	ZO-15 Yass	50
17	70cm Repeaters	75
18	70cm Simplex	23
19	2m Repeaters	40
20	2m Simplex	32
21	FAVOURITES	4

Note the Zones described here and programmed into this radio represent only a portion of the VK-DMR repeater's installed in NSW.

This document and radio programming can change without notice.

TG 505 = Static TG.
TG 9 = local only.
The rest are User Activated.

Static TG's are always active on their assigned repeaters. But from time to time, you'll see TG's become active on the dashboard that don't appear elsewhere. They'll be user activated and you can drop into any of these by selecting that TG and then keying your rig for about three seconds. You should now hear the traffic on that TG and it will remain active for around fifteen minutes if left idle.

The 3801 -> 3808 series of TG's that were once upon a time statically linked and regarded as state based and were on slot 2 are now uncoordinated UA talkgroups on SLOT 1.

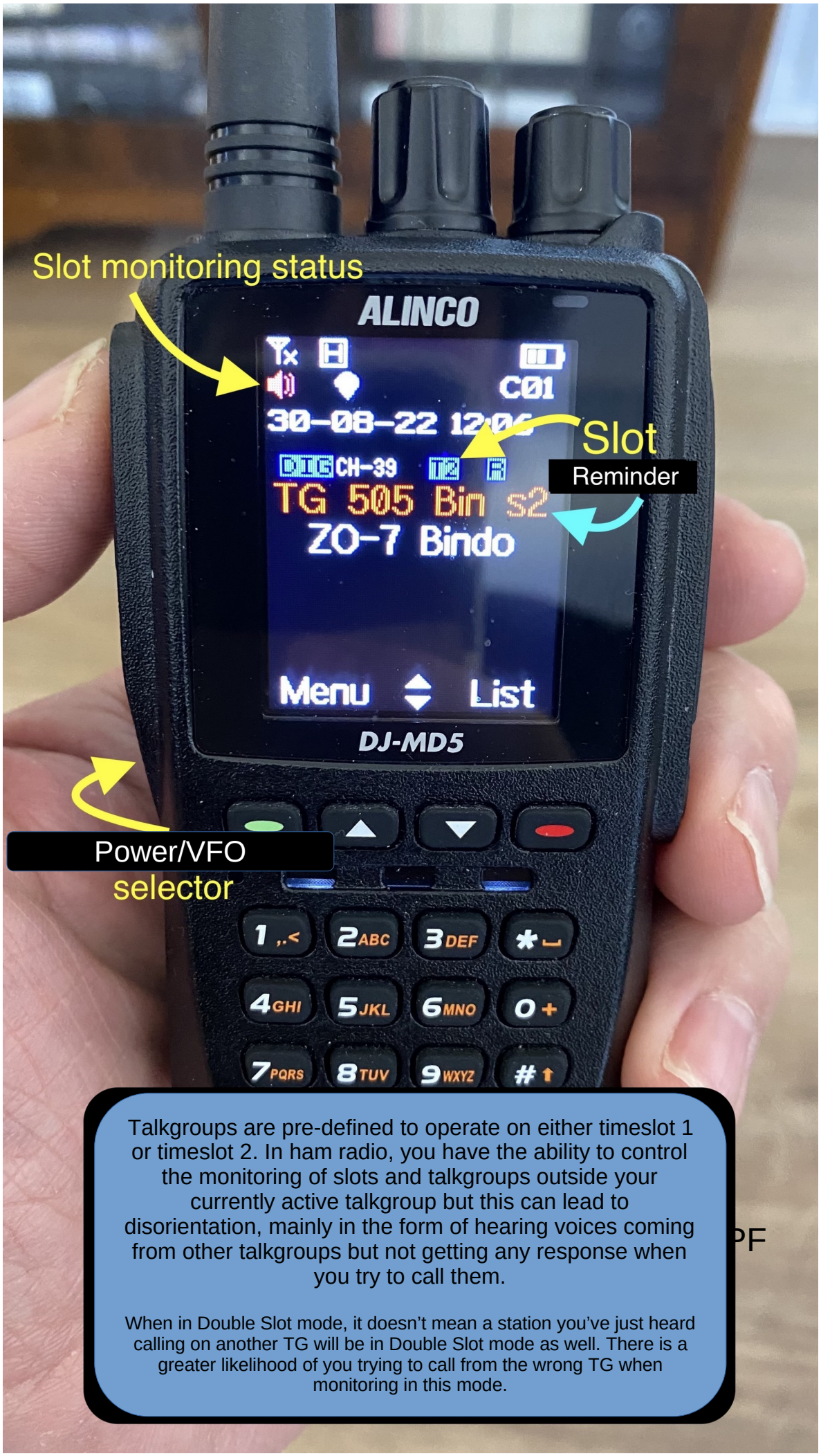
Direct Keypad Entry

Because the TG's are numbered anywhere from 1 to 9990, Alinco's stock firmware only allows direct entry via the channel/sequence number and must be three digits, so to go to TG1, directly enter into the keypad 001.To go to 505 enter 018. To go to 3809 enter 040, etc. The sequence numbers are listed over here --->

Just add one or two zeros in front of the numbers ---->

VK-DMR Talkgroups

No.	TG/DMR ID	Name
1	1	TG 1 WW Slot 1
2	3	TG 3 USA 1
3	5	TG 5 VK NETS 1
4	8	TG 8 STATE LKD 1
5	9	TG 9 Slot 1
6	13	TG 13 WWE 1
7	30	JOTA
8	53	TG 53 UserAc 1
9	80	TG 80 UK UA 1
10	113	TG 113 UA 1
11	123	TG 123 UA 1
12	133	TG 133 USA UA 1
13	143	EnglishTAC UA 1
14	153	EnglishTAC UA 1
15	310	USA TAC UA 1
16	320	TG 320 XLX1 1
17	321	TG 321 XLX2 1
18	505	TG 505 Slot 2
19	530	TG 530 UA ZL 1
20	870	TG 870 UAWales 1
21	880	NthIreland UA 1
22	1910	ARNSW Linked 1
23	1911	FNQ Linked 1
24	1921	ScoutsVIC UA 1
25	1922	ScoutsVIC UA 1
26	1923	ScoutsVIC UA 1
27	1924	ScoutsVIC UA 1
28	2351	UK Call UA 1
29	3167	USA Allstar UA 1
30	3191	Digi Rad UA 1
31	3199	SkyWX UA 1
32	3800	TG 3800/4800UA 2
33	3801	TG 3801 UA 1
34	3802	TG 3802 UA 1
35	3803	TG 3803 UA 1
36	3804	TG 3804 UA 1
37	3805	TG 3805 UA 1
38	3806	TS 3806 UA 1
39	3807	TG 3807 UA 1
40	3808	TG 3808 UA 1
41	3809	3809 UA 1
42	3810	WICEN UA 1
43	8406	MARC Net UA 1
44	8409	UK TG4409 UA
45	8454	XLX600E Peanut
46	8509	VK/ZL Sport UA 1
47	8540	XLX313ACons UA 1
48	8555	SthPacific UA 1
49	50589	TG50589VKD-VKF2
50	9990	TG 9990 Parrot 2



Talkgroups are pre-defined to operate on either timeslot 1 or timeslot 2. In ham radio, you have the ability to control the monitoring of slots and talkgroups outside your currently active talkgroup but this can lead to disorientation, mainly in the form of hearing voices coming from other talkgroups but not getting any response when you try to call them.

When in Double Slot mode, it doesn't mean a station you've just heard calling on another TG will be in Double Slot mode as well. There is a greater likelihood of you trying to call from the wrong TG when monitoring in this mode.

Timeslots are Digital "Carriers"?

While comparisons about the difference in audio quality between digital and analog voice transmissions is vitally important, the use of digital modes in commercial two-way radio is more about bandwidth. DMR packs as much information into the smallest amount of bandwidth possible because of the finite nature and cost of RF spectrum. There was once a time when a company had to purchase 5 frequencies for five simplex channels. Imagine how that adds up when you're the Rural Fire Service. With digital, you can multi-channel on one frequency (or frequency pair for a repeater) by dividing up and sequencing data.

DMR radios use TDMA (Time Division Multiple Access) to achieve 6.25kHz "equivalency" with an actual 12.5kHz FM carrier by rapidly transmitting in alternating 30ms bursts. The bursts represent 1 of 2 time slots. Your radio will be on a talkgroup that uses one slot or the other. Another radio can be transmitting on the second time slot at the same time into a repeater where the data from both slots is interweaved into a data stream carrying information about what Talkgroup is going where with the digitised audio embedded along with it. This is where things get tricky because you can essentially only have one Talkgroup operate at a time in each slot.

However, If you have multiple repeaters or Zones individually identified and sequenced by a master server, then it's possible say for Queensland to have a QSO among themselves while VK3 has one as well and all on the one timeslot. It's at this point that the network can flare into a complex trunked radio system which is different for every organisation that uses two-way radio. The variables are mind boggling and what the end-user is handed, isn't even half the story.

The VK-DMR network is fairly straightforward with one little catch that's often programmed out of commercial end-user radios: The ability to openly monitor and switch the two time slots. AKA "promiscuous" mode. WACRS codeplugs discourage this and require you to traverse the menus to change digital monitoring.

The programming of this radio should put you on the correct slot but it's important to understand the tell-tale signs that you're where you should be. On a very tightly programmed radio, you'll only hear and transmit on a specific Talkgroup located on its particular slot but in amateur radio, you have the freedom to program your radio to monitor everything that's going on in the system.

TX/RX Indicator status.

Transmitting.

Almost limitless variables include not being able to transmit because no repeater was detected on initial key-up or the frequency is already active.

Transmitting on a slot not configured for the currently selected Talkgroup will not be conveyed past the repeater. The repeater will just open up and not forward data into the system. You can see the effect of this scenario by watching the dashboard.

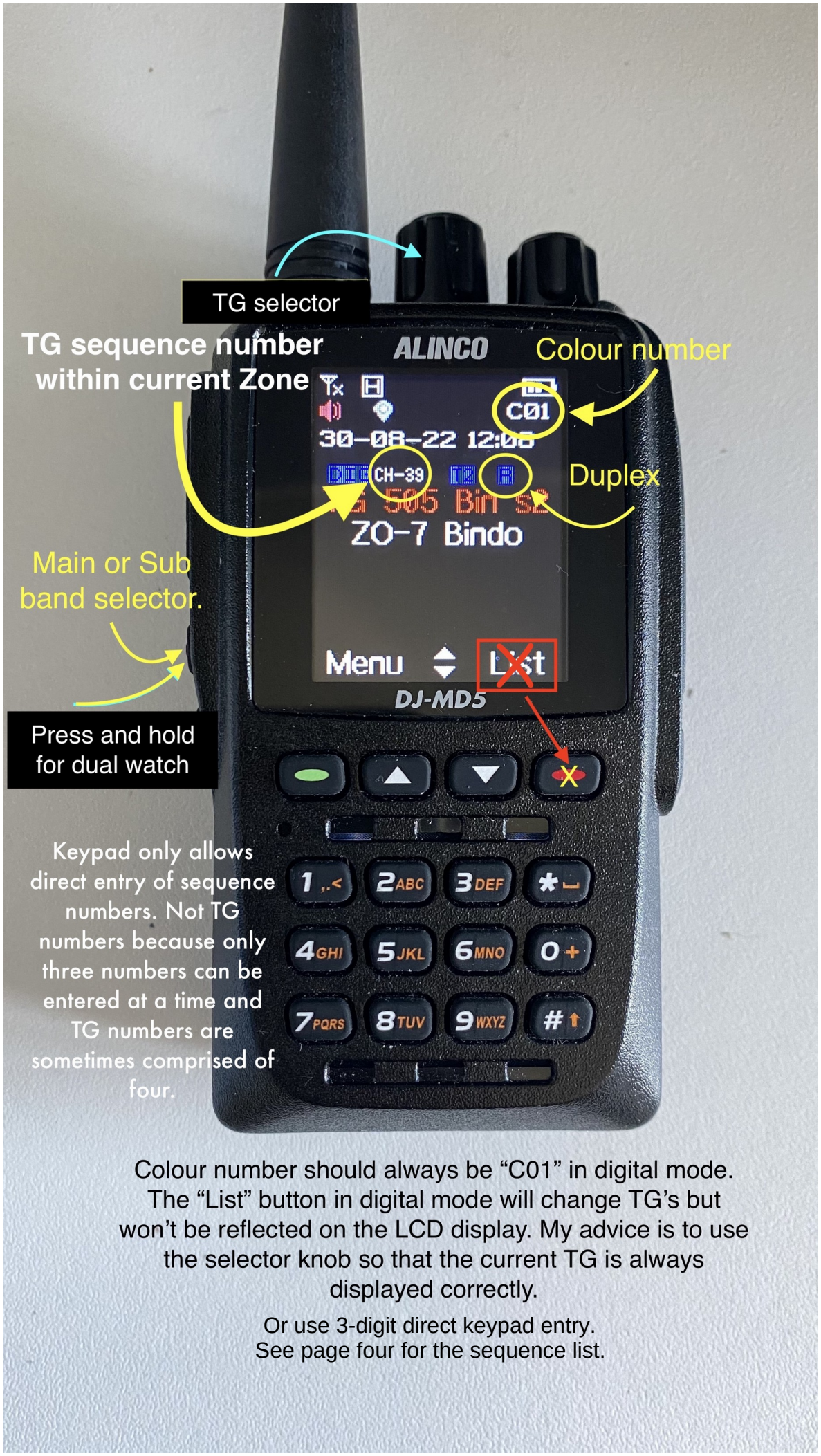
There's something being received but on a Talkgroup or slot other than the one I have selected, but I won't know unless I'm promiscuous.

On a tightly controlled radio, you'll be barred from transmitting and you won't be able to hear the activity.

On the money.

Signal being received is on your selected Talkgroup and the correct slot.

There are two important variables available to a promiscuously enabled radio. The first is the ability to change slots you're transmitting on and the other is being able to openly monitor slots for activity on Talkgroups other than what you have currently selected.



Colour number should always be “C01” in digital mode. The “List” button in digital mode will change TG’s but won’t be reflected on the LCD display. My advice is to use the selector knob so that the current TG is always displayed correctly.

Or use 3-digit direct keypad entry.
See page four for the sequence list.

2m Repeaters

CH	Name	SEL	Frequency					
			Operating Freq	DUP	Offset Freq	Mode	DATA	Filter
1	Goul/Byron/Narra		146.625000	-DUP	0.600000	FM		1
2	Bindo/Moree		146.650000	-DUP	0.600000	FM		1
3	Knights/Others		146.675000	-DUP	0.600000	FM		1
4	Ora/Now/PortMac		146.700000	-DUP	0.600000	FM		1
5	Somersby/Others		146.725000	-DUP	0.600000	FM		1
6	Mumbulla/Others		146.750000	-DUP	0.600000	FM		1
7	Bethungra/Sugar		146.775000	-DUP	0.600000	FM		1
8	Engadine		146.800000	-DUP	0.600000	FM		1
9	HiRge/Craw/Other		146.825000	-DUP	0.600000	FM		1
10	Maddens/Coffs/Ot		146.850000	-DUP	0.600000	FM		1
11	Terrey/Others		146.875000	-DUP	0.600000	FM		1
12	Sug/Boona/Tidbin		146.900000	-DUP	0.600000	FM		1
13	Penrith/Walcha		146.925000	-DUP	0.600000	FM		1
14	Ginini/GlenInnes		146.950000	-DUP	0.600000	FM		1
15	Knights/Sugar		146.975000	-DUP	0.600000	FM		1
16	Dural/Others		147.000000	-DUP	0.600000	FM		1
17	Paddo/Others		147.025000	+DUP	0.600000	FM		1
18	Lawson		147.050000	+DUP	0.600000	FM		1
19	Winmalee/Hovells		147.075000	+DUP	0.600000	FM		1
20	Bula/Gren/Others		147.100000	+DUP	0.600000	FM		1
21	WI/Somers DMR BM		147.125000	+DUP	0.600000	FM		1
22	WI/Chats		147.150000	+DUP	0.600000	FM		1
23	WI/Bulls DMR BM		147.175000	+DUP	0.600000	FM		1
24	Orange/Others		147.200000	+DUP	0.600000	FM		1
25	Rylstone/Albury		147.225000	+DUP	0.600000	FM		1
26	Asquith/Moonimba		147.250000	+DUP	0.600000	FM		1
27	Razor/Warwick		147.275000	+DUP	0.600000	FM		1
28	WI/Linden		147.300000	-DUP	1.600000	FM		1
29	Lawson		147.325000	+DUP	0.600000	FM		1
30	B		147.350000	+DUP	0.600000	FM		1
31	Snowy/Tenter		147.375000	+DUP	0.600000	FM		1
32	Goulburn		147.925000	-DUP	0.600000	FM		1
33	HiGoulKely VKDMR		144.925000	-DUP	0.600000	FM		1
34	New R		144.950000	-DUP	0.600000	FM		1
35	New R		144.975000	-DUP	0.600000	FM		1
36	New R		145.000000	-DUP	0.600000	FM		1
37	New R		145.025000	-DUP	0.600000	FM		1
38	New R		145.050000	-DUP	0.600000	FM		1
40	2m Simplex							
1	Simplex A		145.075000		0.600000	FM		1
2	RTTY etc		145.100000		0.600000	FM		1
3	Simplex A		145.125000		0.600000	FM		1
4	Simplex A		145.150000		0.600000	FM		1
5	APRS		145.175000		0.600000	FM		1
6	WICEN		145.200000		0.600000	FM		1
7	Simplex A		145.225000		0.600000	FM		1
8	CW Practice/Info		145.250000		0.600000	FM		1
9	Simplex A		145.275000		0.600000	FM		1
10	ARDF		145.300000		0.600000	FM		1
11	Gateway		145.325000		0.600000	FM		1
12	Gateway		145.350000		0.600000	FM		1
13	Gateway		145.375000		0.600000	FM		1
14	FringeInput/CHAT		145.400000		0.600000	FM		1
15	INPUT/ ex Gaz		145.550000		0.600000	FM		1

2m Simplex cont...

CH	Name	SEL	Frequency					
			Operating Freq	DUP	Offset Freq	Mode	DATA	Filter
16	Simplex B		146.425000		0.600000	FM		1
17	Simplex B		146.450000		0.600000	FM		1
18	Simplex B		146.475000		0.600000	FM		1
19	National CALL		146.500000		0.600000	FM		1
20	Simplex B		146.525000		0.600000	FM		1
21	Simplex B		146.550000		0.600000	FM		1
22	Simplex B		146.575000		0.600000	FM		1
23	Simplex B		146.600000		0.600000	FM		1
24	ATV Liason/C		147.400000		0.600000	FM		1
25	Simplex C		147.425000		0.600000	FM		1
26	Simplex C		147.450000		0.600000	FM		1
27	Simplex C		147.475000		0.600000	FM		1
28	Simplex C		147.500000		0.600000	FM		1
29	Gateway		147.525000		0.600000	FM		1
30	Gateway		147.550000		0.600000	FM		1
31	Simplex C		147.575000		0.600000	FM		1
32	Simplex C		147.600000		0.600000	FM		1

70cm Repeaters

CH	Name	SEL	Frequency					
			Operating Freq	DUP	Offset Freq	Mode	DATA	Filter
1	Sugar/Hi/Wag		438.025000	-DUP	5.000000	FM		1
2	Ginini		438.050000	-DUP	5.000000	FM		1
3	Somers		438.075000	-DUP	5.000000	FM		1
4	Dural VKDMR		438.100000	-DUP	5.000000	FM		1
5	Wyee DMR BM		438.125000	-DUP	5.000000	FM		1
6	A		438.150000	-DUP	5.000000	FM		1
7	Terrey Mix		438.175000	-DUP	5.000000	FM		1
8	GPT P25		438.200000	-DUP	5.000000	FM		1
9	Dural		438.225000	-DUP	5.000000	FM		1
10	A		438.250000	-DUP	5.000000	FM		1
11	-5.4 Berowra		438.275000	-DUP	5.400000	FM		1
12	A		438.300000	-DUP	5.000000	FM		1
13	Somersby DMR BM		438.325000	-DUP	7.000000	FM		1
14	Chats Mix		438.350000	-DUP	5.400000	FM		1
15	Lawson FU		438.375000	-DUP	5.000000	FM		1
16	Terrey VKDMR		438.400000	-DUP	5.000000	FM		1
17	Engadine VKDMR		438.425000	-DUP	5.000000	FM		1
18	Carli Mix		438.450000	-DUP	5.000000	FM		1
19	Craw/Lake DMR BM		438.475000	-DUP	7.000000	FM		1
20	Bondi		438.500000	-DUP	5.000000	FM		1
21	Dural		438.525000	-DUP	5.000000	FM		1
22	A		438.550000	-DUP	5.000000	FM		1
23	Paddo Mix		438.575000	-DUP	5.000000	FM		1
24	Dural VKDMR		438.600000	-DUP	5.000000	FM		1
25	Newc/Goul DMR BM		438.625000	-DUP	5.000000	FM		1
26	-7 Camp FU		438.650000	-DUP	7.000000	FM		1
27	Sugar		438.675000	-DUP	5.000000	FM		1
28	A		438.700000	-DUP	5.000000	FM		1
29	Maddens DMR BM		438.725000	-DUP	5.000000	FM		1
30	Group B Start		439.275000	-DUP	5.000000	FM		1
31	Kariong		439.300000	-DUP	5.000000	FM		1
32	B		439.325000	-DUP	5.000000	FM		1
33	B		439.350000	-DUP	5.000000	FM		1
34	Alpine		439.375000	-DUP	5.000000	FM		1
35	B		439.400000	-DUP	5.000000	FM		1
36	Winmalee		439.425000	-DUP	5.000000	FM		1
37	B		439.450000	-DUP	5.000000	FM		1
38	Glenwood		439.475000	-DUP	5.000000	FM		1
39	GPT VKDMR		439.500000	-DUP	5.000000	FM		1
40	WICEN Port		439.525000	-DUP	5.000000	FM		1
41	B		439.550000	-DUP	5.000000	FM		1
42	Mt Riv		439.575000	-DUP	5.000000	FM		1
43	B		439.600000	-DUP	5.000000	FM		1
44	WICEN Por/DMR BM		439.625000	-DUP	5.000000	FM		1
45	B		439.650000	-DUP	5.000000	FM		1
46	Orange DMR BM		439.675000	-DUP	5.000000	FM		1
47	Parkes DMR BM		439.700000	-DUP	5.000000	FM		1
48	Somersby		439.725000	-DUP	5.000000	FM		1
49	Horsley DMR BM		439.750000	-DUP	5.000000	FM		1
50	Glenbrook		439.775000	-DUP	5.000000	FM		1
51	GPT		439.800000	-DUP	5.000000	FM		1
52	WI/KurraMix		439.825000	-DUP	5.000000	FM		1
53	B		439.850000	-DUP	5.000000	FM		1
54	WICENWyee DMR BM		439.875000	-DUP	5.000000	FM		1
55	Hi Range VKDMR		439.900000	-DUP	5.000000	FM		1

70cm Repeaters cont...

CH	Name	SEL	Frequency					
			Operating Freq	DUP	Offset Freq	Mode	DATA	Filter
56	NthR/ParDMR BM		439.925000	-DUP	5.000000	FM		1
57	Somers DMR BM		439.950000	-DUP	5.000000	FM		1
58	Berowra		439.975000	-DUP	5.000000	FM		1
59	-5.4 GPT Fu		438.112500	-DUP	5.400000	FM		1
60	HETERO-X		430.200000		5.000000	FM		1
61	Newc DMR BM		438.750000	-DUP	7.000000	FM		1
62	NEWRPO		438.775000	-DUP	7.000000	FM		1
63	-7 Somersby		438.800000	-DUP	7.000000	FM		1
64	Box/NelsonBayDMR		438.825000	-DUP	7.000000	FM		1
65	NEWRPO		438.850000	-DUP	7.000000	FM		1
66	-7 Somersby		438.875000	-DUP	7.000000	FM		1
67	NEWRPO		438.900000	-DUP	7.000000	FM		1
68	NEWRPO		438.925000	-DUP	7.000000	FM		1

70cm Simplex

CH								
1	Simplex A		433.775000		5.000000	FM		1
2	Simplex A		433.800000		5.000000	FM		1
3	Simplex A		433.825000		5.000000	FM		1
4	Simplex A		433.850000		5.000000	FM		1
5	Simplex A		433.875000		5.000000	FM		1
6	Simplex A		433.900000		5.000000	FM		1
7	Simplex A		433.925000		5.000000	FM		1
8	Simplex A		433.950000		5.000000	FM		1
9	Simplex A		433.975000		5.000000	FM		1
10	Simplex B WICEN		438.950000		5.000000	FM		1
11	Simplex B		438.975000		5.000000	FM		1
12	Nat Call		439.000000		5.000000	FM		1
13	Simplex B		439.025000		5.000000	FM		1
14	Simplex B		439.050000		5.000000	FM		1
15	Simplex B		439.075000		5.000000	FM		1
16	APRS		439.100000		5.000000	FM		1
17	Gate		439.125000		5.000000	FM		1
18	Gate		439.150000		5.000000	FM		1
19	Simplex B		439.175000		5.000000	FM		1
20	Digi Call		439.200000		5.000000	FM		1
21	Simplex B		439.225000		5.000000	FM		1
22	Simplex B		439.250000		5.000000	FM		1
23	ARDF		439.400000		5.000000	FM		1