Radioddity GD-77

Tuning & alignment project

Alignment, tweaks, and flash memory corruption recovery for your Radioddity GD-77

This information is primarily intended for amateur 'ham' radio operators who wish to maintain and adjust their GD-77. Any regulatory authority approval (e.g. FCC certification) may become invalid by the use of this information. Users should ensure their radios are operating in accordance with their licence conditions. In any case, the user alone accepts all responsibility and risk from the use of this information and tools provided here.

The Radioddity GD-77 is becoming quite a popular entry level dual band DMR handheld for amateur 'ham' radio use. The GD-77 family takes it's design cues from DMR radios designed for purely commercial or business two way radio usage. In that arena, should a problem develop with the equipment, the user would return the radio to their supplier for repair. The very low cost of the GD-77 means repair isn't generally feasible, and so replacement rather than repair is the most cost effective strategy.

Ham radio operators don't have this time/cost constraint. We often prefer to repair our own radio equipment, and have the time to experiment, tinker, and adjust the equipment until it is 'just so' for our needs. The GD-77 tuning project was born of this philosophy. The only problem was that there were no tools, information or references to enable us to maintain the GD-77. Seeing the need for this information inspired Roger VK3KYY, Colin G4EML and Jason VK7ZJA to put the GD-77 under the microscope in order to derive the tools necessary for hams to maintain the GD-77

This information and tools have come about by deep investigation and experimentation. Radioddity have their own tuning process for the GD-77, something that is mentioned in the FCC certification documents, but is hidden from the general public in order not to reveal anything commercially sensitive. Since Radioddity don't have a repair facility, presenting this information isn't going to deprive Radioddity of any revenue. Indeed, the very availability of this information could improve the appeal of the GD-77 to the amateur radio community and might even result in increased sales for Radioddity, in a similar way to how MD380 Toolz must have caused an explosion of sales for TYT. I know of some ham radio operators who refuse to own any equipment for which they can't obtain service manuals or other information necessary to maintain that equipment.

In order for you to read, change and write tuning data to the GD-77, a tool called Flash Manager has been produced.

CAUTION: The GD-77 Flash Manager software is a very low level tool and can cause serious and unrecoverable damage to your radio. Indiscriminate use can ruin both the software and hardware of your radio. Make sure you understand exactly what it is you are doing, and use with care.

Download links:

Download GD-77 Flash Manager here (81kb)

Download supporting DLL file here; must be in same directory as Flash Manager executable. (96kb) **If you update your Flash Manager executable, you MUST re-download this DLL file as well**

If you need a good hex editor, download HxD in your preferred language here (about 860kb)

There are four types of memory in the GD-77:
1) EEPROM 64kbyte: half of the codeplug is stored here.
2) External flash memory 1Mbyte: the other half of the codeplug, DMR IDs written by ActiveClient.exe, RF alignment data and even display character font data is stored here.
3) Internal MCU flash memory 512kbyte: this is where the radio firmware lives.
4) Internal MCU RAM 128kbyte: used by the MCU for it's own internal operational use.

The GD-77 Flash Manager operates with the external flash memory. All 1Mbyte (8Mbits) of this flash memory are readable and almost all of the flash memory is writeable with this tool. Flash Manager can't write any data to flash addresses 0x0000 to 0xFFFF but there is no active data stored there anyway, so this will not matter. You could edit half of the codeplug or the DMR IDs, though it would be easier to use the CPS software and ActiveClient.exe respectively to edit those.

The data of particular interest to us here is the RF alignment data. This lives in flash memory at addresses 0x08F000 to 0x08F0DF. If you are browsing other parts of flash memory, you might also find other copies of the RF alignment data at other locations, but the 'active' data is always located at 0x08F000-0x08F0DF. Having other copies of this RF alignment data is quite handy, especially if the active data becomes corrupt. More on this later.

Your first step should be to take a backup of the entire flash memory and save it to file, so you have a copy to fall back on should something go wrong at some point. Begin by turning the GD-77 off, plug in the programming cable, and turn on the GD-77 while holding down the following key combination: side blue key, green menu button and the * (lock symbol) key. The radio will power up normally with no other unusual visible indication.
Start up Flash Manager and carefully note the warning message, and click 'yes' to proceed. Enter the Start address (hex) as 0, and enter the Length (hex) as 100000- that is a one and five zeroes. Click Read. You should now see the display of the GD-77 respond with 'Memory Prog' and the top panel LED flash red, and a percentage progress bar on your PC increase. To read the entire flash will take around five and a half minutes. Then Save File and give it a .bin extension, and keep the file somewhere safe.

In order to begin changing parameters, refer to the table below that displays what byte (or bits) at each address in flash is used for. When altering these values, you need to keep in mind that flash memory is not like EEPROM, you can't just overwrite data. The data you are changing first needs to be erased. Flash memory can be erased in 4, 32 or 64kbyte blocks. The GD-77 firmware performs a 64kbyte block erase for this area of flash, which means if you want to change just one byte, the flash memory will erase that 64kbyte block and you'll need to re-write that 64kbyte entirely. With that in mind, your first step is to read the 64kbyte block of data that contains the RF alignment data. As above, put the GD-77 into the special flash read/write mode with the following power up sequence:
Blue side button + green menu button + * (lock) button held down while powering up the radio.

Begin reading at address 80000 (hex) and read for 10000 (hex) bytes. Save this block of data to a file if you like. Scroll down to address 8F000 and you should see data beginning with bytes A0 0F C0 12 A0 0F C0 12. Change the parameter you want, then write the data, again using 80000 as the start address and 10000 as the length. Each read or write for this 64kbyte block will take around 25 seconds to complete.

There are a few handy features in the Flash Manager to assist you manipulate the data:
Ctrl-F is a find feature, where you can search for data from the cursors present position onwards. Hex or ASCII strings can be searched for. F3 will find the next occurrence.
Ctrl-G will go to an address that you specify in hex, which can save a lot of scrolling in large fields of memory displays.
Alt-F12 will make visible three new buttons to read, adjust and write calibration data. The adjust calibration button will give an easy interface to adjust RF tuning parameters without having to edit raw hex data. Be aware this feature is still under development and may not work completely as intended.

SERIOUS WARNING: carelessly altering certain parameters can be hazardous to your radio. For example, setting RF output power to a level significantly higher than what is already calibrated for your individual radio might well give increased RF output, but it will also dramatically increase the risk of RF PA burnout. Altering DMR I&Q parameters will definitely cause your DMR transmitted signal to become corrupted.
YOUR USE OF THIS INFORMATION AND TOOLS PROVIDED IS ENTIRELY AT YOUR OWN RISK.

Address in flash memory	Typical value	Usage	Notes
		UHF SECTION	
8F000	A0	Not known, must be set to this value for UHF transmitter to work	
8F001	0F	Not known, must be set to this value for UHF transmitter to work	
8F002	C0	Not known, must be set to this value for UHF transmitter to work	
8F003	12	Not known, must be set to this value for UHF transmitter to work	
8F004	A0	Not known, must be set to this value for UHF transmitter to work	
8F005	0F	Not known, must be set to this value for UHF transmitter to work	
8F006	C0	Not known, must be set to this value for UHF transmitter to work	
8F007	12	Not known, must be set to this value for UHF transmitter to work	
8F008	E8	DAC word for frequency reference oscillator at UHF, fine tune. Adjust this value first	Complex interaction between these two bytes
8F009	03	DAC word for frequency reference oscillator at UHF, tuning. Adjust this value only if you can't get enough tuning range by adjusting value in address 8F008 alone.	Complex interaction between these two bytes

8F00A	E9	Unknown	
8F00B	83	Low RF power output setting, UHF freq 400 MHz	00=lower power, FF=higher power
8F00C	C6	High RF power output setting, UHF freq 400 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F00D	82	Low RF power output setting, UHF freq 405 MHz	Suggestion: lower value to 40 hex gives about 30mW output, value of 20 gives no detectable output.
8F00E	C5	High RF power output setting, UHF freq 405 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F00F	81	Low RF power output setting, UHF freq 410 MHz	
8F010	C6	High RF power output setting, UHF freq 410 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F011	81	Low RF power output setting, UHF freq 415 MHz	
8F012	C7	High RF power output setting, UHF freq 415 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F013	80	Low RF power output setting, UHF freq 420 MHz	
8F014	C9	High RF power output setting, UHF freq 420 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F015	80	Low RF power output setting, UHF freq 425 MHz	
8F016	CA	High RF power output setting, UHF freq 425 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F017	81	Low RF power output setting, UHF freq 430 MHz	
8F018	CB	High RF power output setting, UHF freq 430 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F019	81	Low RF power output setting, UHF freq 435 MHz	
8F01A	CB	High RF power output setting, UHF freq 435 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F01B	81	Low RF power output setting, UHF freq 440 MHz	
8F01C	C8	High RF power output setting, UHF freq 440 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F01D	81	Low RF power output setting, UHF freq 445 MHz	
8F01E	C6	High RF power output setting, UHF freq 445 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F01F	81	Low RF power output setting, UHF freq 450 MHz	

8F020	C5	High RF power output setting, UHF freq 450 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F021	81	Low RF power output setting, UHF freq 455 MHz	
8F022	C5	High RF power output setting, UHF freq 455 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F023	7F	Low RF power output setting, UHF freq 460 MHz	
8F024	C4	High RF power output setting, UHF freq 460 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F025	7E	Low RF power output setting, UHF freq 465 MHz	
8F026	C6	High RF power output setting, UHF freq 465 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F027	7D	Low RF power output setting, UHF freq 470 MHz	
8F028	C6	High RF power output setting, UHF freq 470 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F029	7D	Low RF power output setting, UHF freq 475 MHz	
8F02A	C6	High RF power output setting, UHF freq 475 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F02B	3D	Unknown	
8F02C	3B	Unknown	
8F02D	3A	Unknown	
8F02E	38	Unknown	
8F02F	37	Unknown	
8F030	36	Unknown	
8F031	35	Unknown	
8F032	A9	Unknown	
8F033	1D	Unknown	
8F034	0D	Unknown	
8F035	0D	Unknown	
8F036	11	Unknown	
8F037	11	Unknown	

8F038	0B	Unknown	
8F039	0B	Unknown	
8F03A	0F	Unknown	
8F03B	00	Unknown	
8F03C	00	Unknown	
8F03D	00	Unknown	
8F03E	00	Unknown	
8F03F	18	Unknown	
8F040	16	Unknown	
8F041	14	Unknown	
8F042	13	Unknown	
8F043	16	Unknown	
8F044	14	Unknown	
8F045	15	Unknown	
8F046	12	Squelch sensitivity gain. Lower value=more sensitive squelch. Do not go below value 08.	
8F047	3E	UHF Mute strict, wideband, close	Higher value=lower RF level / more sensitive. NB: Strict and normal values interact somewhat
8F048	3C	UHF Mute strict, wideband, open	
8F049	3E	Unknown	
8F04A	3A	Unknown	
8F04B	53	UHF Mute normal, wideband, close	
8F04C	51	UHF Mute normal, wideband, open	
8F04D	34	UHF Mute strict, narrowband, close	Higher value=lower RF level / more sensitive. NB: Strict and normal values interact somewhat
8F04E	32	UHF Mute strict, narrowband, open	
8F04F	34	Unknown	
8F050	32	Unknown	

8F051	53	UHF Mute normal, narrowband, close	
8F052	51	UHF Mute normal, narrowband, open	
8F053	1C	UHF Received signal meter, low end	Suggestion: leave as is
8F054	20	UHF Received signal meter, high end	Suggestion: set to 60 for more realistic RSSI indication. 1 bar= -113dBm, 2 bars= -95dBm, 3 bars= -80dBm
8F055	3C	UHF 405 MHz DMR TX I&Q balance	Don't adjust
8F056	3A	UHF 415 MHz DMR TX I&Q balance	Don't adjust
8F057	39	UHF 425 MHz DMR TX I&Q balance	Don't adjust
8F058	38	UHF 435 MHz DMR TX I&Q balance	Don't adjust
8F059	36	UHF 445 MHz DMR TX I&Q balance	Don't adjust
8F05A	35	UHF 455 MHz DMR TX I&Q balance	Don't adjust
8F05B	34	UHF 465 MHz DMR TX I&Q balance	Don't adjust
8F05C	33	UHF 475 MHz DMR TX I&Q balance	Don't adjust
8F05D	1D	UHF DMR receive audio gain & beep volumes (not independantly adjustable)	Higher value=more gain
8F05E	0F	UHF TX DTMF deviation	Higher value=more deviation
8F05F	0D	UHF TX 1750Hz tone burst deviation	Higher value=more deviation
8F060	11	UHF TX CTCSS deviation, wideband	Higher value=more deviation
8F061	11	UHF TX CTCSS deviation, narrowband	Higher value=more deviation
8F062	0B	UHF TX DCS deviation, wideband	Higher value=more deviation
8F063	0B	UHF TX DCS deviation, narrowband	Higher value=more deviation
8F064	0F	Unknown, but do not adjust - affects both RF power out and modulation in all modes	Do not adjust
8F065	0E	Unknown, but do not adjust - affects both RF power out and modulation in all modes	Do not adjust
8F066	31	UHF analogue only mic gain (both wide & narrow band) do not exceed value 7F	Higher value=more gain
8F067	05	Unknown	
8F068	27	UHF analog overall (CTCSS, DCS, DTMF & voice) deviation, wideband, fine setting	Higher value=more deviation

8F069	00	UHF analog overall (CTCSS, DCS, DTMF & voice) deviation, wideband coarse setting. Should be no need to set above 00	Higher value=more deviation
8F06A	27	UHF analog overall (CTCSS, DCS, DTMF & voice) deviation, narrowband, fine setting	Higher value=more deviation
8F06B	00	UHF analog overall (CTCSS, DCS, DTMF & voice) deviation, narrowband coarse setting. Should be no need to set above 00	Higher value=more deviation
8F06C	0F	UHF analog only receive audio gain. Valid range 00 to 0F.	8F06C & 8F06D are added to give total gain value
8F06D	0E	UHF analog only receive audio gain. Valid range 00 to 0F.	Higher value=more gain
8F06E	00	Unknown	
8F06F	00	Unknown	

VHF SECTION

8F070	50	Not known, must be set to this value for VHF transmitter to work	
8F071	05	Not known, must be set to this value for VHF transmitter to work	
8F072	CC	Not known, must be set to this value for VHF transmitter to work	
8F073	06	Not known, must be set to this value for VHF transmitter to work	
8F074	50	Not known, must be set to this value for VHF transmitter to work	
8F075	05	Not known, must be set to this value for VHF transmitter to work	
8F076	CC	Not known, must be set to this value for VHF transmitter to work	
8F077	06	Not known, must be set to this value for VHF transmitter to work	
8F078	EB	DAC word for frequency reference oscillator at VHF, fine tune. Adjust this value first	Complex interaction between these two bytes
8F079	03	DAC word for frequency reference oscillator at VHF, tuning. Adjust this value only if you can’t get enough tuning range by adjusting value in address 8F079 alone.	Complex interaction between these two bytes
8F07A	EE	Unknown	

8F07B	40	Low RF power output setting, VHF freq 136 MHz	00=lower power, FF=higher power
8F07C	AA	High RF power output setting, VHF freq 136 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F07D	41	Low RF power output setting, VHF freq 140 MHz	Suggestion: lower value to 40 hex gives about 125mW output, value of 20 gives no detectable output.
8F07E	BD	High RF power output setting, VHF freq 140 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F07F	4E	Low RF power output setting, VHF freq 145 MHz	
8F080	BE	High RF power output setting, VHF freq 145 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F081	55	Low RF power output setting, VHF freq 150 MHz	
8F082	B6	High RF power output setting, VHF freq 150 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F083	56	Low RF power output setting, VHF freq 155 MHz	
8F084	B1	High RF power output setting, VHF freq 155 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F085	56	Low RF power output setting, VHF freq 160 MHz	
8F086	B5	High RF power output setting, VHF freq 160 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F087	59	Low RF power output setting, VHF freq 165 MHz	
8F088	B8	High RF power output setting, VHF freq 165 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F089	5C	Low RF power output setting, VHF freq 172 MHz	
8F08A	B8	High RF power output setting, VHF freq 172 MHz	**CAUTION: Excessively high settings will burn out electronics**
8F08B	FF	Not applicable	
8F08C	FF	Not applicable	
8F08D	FF	Not applicable	
8F08E	FF	Not applicable	
8F08F	FF	Not applicable	
8F090	FF	Not applicable	
8F091	FF	Not applicable	

8F092	FF	Not applicable
8F093	FF	Not applicable
8F094	FF	Not applicable
8F095	FF	Not applicable
8F096	FF	Not applicable
8F097	FF	Not applicable
8F098	FF	Not applicable
8F099	FF	Not applicable
8F09A	FF	Not applicable
8F09B	40	Unknown
8F09C	F0	Unknown
8F09D	40	Unknown
8F09E	F0	Unknown
8F09F	40	Unknown
8F090	F0	Unknown
8F0A1	FF	Not applicable
8F0A2	FF	Not applicable
8F0A3	0F	Unknown
8F0A4	0F	Unknown
8F0A5	0F	Unknown
8F0A6	1B	Unknown
8F0A7	1B	Unknown
8F0A8	1B	Unknown
8F0A9	FF	Not applicable
8F0AA	FF	Not applicable
8F0AB	00	Unknown
8F0AC	00	Unknown

8F0AD	00	Unknown	
8F0AE	00	Unknown	
8F0AF	1D	Unknown	
8F0B0	1D	Unknown	
8F0B1	1D	Unknown	
8F0B2	1C	Unknown	
8F0B3	1C	Unknown	
8F0B4	1C	Unknown	
8F0B5	1B	Unknown	
8F0B6	1B	Squelch sensitivity gain. Lower value=more sensitive squelch. Do not go below value 08.	
8F0B7	3E	VHF Mute strict, wideband, close	Higher value=lower RF level / more sensitive. NB: Strict and normal values interact somewhat
8F0B8	3C	VHF Mute strict, wideband, open	
8F0B9	3D	Unknown	
8F0BA	3A	Unknown	
8F0BB	53	VHF Mute normal, wideband, close	
8F0BC	51	VHF Mute normal, wideband, open	
8F0BD	34	VHF Mute strict, narrowband, close	Higher value=lower RF level / more sensitive. NB: Strict and normal values interact somewhat
8F0BE	32	VHF Mute strict, narrowband, open	
8F0BF	34	Unknown	
8F0C0	32	Unknown	
8F0C1	53	VHF Mute normal, narrowband, close	
8F0C2	51	VHF Mute normal, narrowband, open	
8F0C3	20	VHF Received signal meter, low end	Suggestion: leave as is
8F0C4	27	VHF Received signal meter, high end	Suggestion: set to 5D for more realistic RSSI indication. 1 bar=

			-113dBm, 2 bars= -95dBm, 3 bars= -80dBm
8F0C5	B1	VHF 136 MHz DMR TX I&Q balance	Don't adjust
8F0C6	AB	VHF 140 MHz DMR TX I&Q balance	Don't adjust
8F0C7	A5	VHF 145 MHz DMR TX I&Q balance	Don't adjust
8F0C8	A0	VHF 150 MHz DMR TX I&Q balance	Don't adjust
8F0C9	9B	VHF 155 MHz DMR TX I&Q balance	Don't adjust
8F0CA	95	VHF 160 MHz DMR TX I&Q balance	Don't adjust
8F0CB	90	VHF 165 MHz DMR TX I&Q balance	Don't adjust
8F0CC	8E	VHF 172 MHz DMR TX I&Q balance	Don't adjust
8F0CD	1D	VHF DMR receive audio gain & suspected beep volumes (not independantly adjustable)	Higher value=more gain
8F0CE	10	VHF TX DTMF deviation	Higher value=more deviation
8F0CF	0D	VHF TX 1750 Hz tone burst deviation	Higher value=more deviation
8F0D0	11	VHF TX CTCSS deviation, wideband	Higher value=more deviation
8F0D1	11	VHF TX CTCSS deviation, narrowband	Higher value=more deviation
8F0D2	0B	VHF TX DCS deviation, wideband	Higher value=more deviation
8F0D3	0B	VHF TX DCS deviation, narrowband	
8F0D4	08	Unknown, but do not adjust - affects both RF power out and modulation in all modes	Do not adjust
8F0D5	0E	Unknown, but do not adjust - affects both RF power out and modulation in all modes	Do not adjust
8F0D6	31	VHF analog only mic gain (both wide & narrow band) do not exceed value of 7F	Higher value=more gain
8F0D7	05	Unknown	
8F0D8	27	VHF analog overall (CTCSS, DCS, DTMF & voice) deviation, wideband, fine setting	Higher value=more deviation
8F0D9	00	VHF analog overall (CTCSS, DCS, DTMF & voice) deviation, wideband coarse setting. Should be no need to set above 00	Higher value=more deviation
8F0DA	27	VHF analog overall (CTCSS, DCS, DTMF & voice) deviation, narrowband, fine setting	Higher value=more deviation

8F0DB	00	VHF analog overall (CTCSS, DCS, DTMF & voice) deviation, narrowband coarse setting. Should be no need to set above 00	Higher value=more deviation
8F0DC	0F	VHF analog only receive audio gain. Valid range 00 to 0F.	8F0DC & 8F0DD are added to give total gain value
8F0DD	0F	VHF analog only receive audio gain. Valid range 00 to 0F.	Higher value=more gain
8F0DE	00	Unknown	
8F0DF	00	Unknown	

If you manage to work out what some of the unknown use parameters do, please let me know via e-mail: vk7zja at gmail dot com

RECOVERY FROM DATA CORRUPTION AFTER MEMORY / FACTORY RESETTING

Memory and / or factory resetting the GD-77 can corrupt information in the RF alignment data block at address 8F000 onward. Typical symptoms are very low or no RF output from the radio, in either analogue FM or digital DMR modes. Previously some users have been able to recover from this corruption by downgrading to earlier firmware versions and then performing a memory reset and re-upgrading again. This may or may not work for more recent firmware versions, reports of success vary from user to user, and I suspect it may have something to do with pre-existing conditions within the flash memory.
Described here is a method of restoring the corruption, which is both more reliable and quicker than the previous downgrade-reset-upgrade method of recovery.

As always, use these tools and information with caution, as serious damage can result from careless use.

Step 1: Download Flash Manager, it's support DLL file, and if you don't already have a hex editor, download and install HxD. Download links are given above.

Step 2: Turn off the corrupted GD-77, connect programming cable to the radio and to the PC. Do not turn on the GD-77 yet.

Step 3: Hold down the side blue key, green menu key (above left arrow button) and the * / lock key (just below the right arrow button) while turning on the GD-77. The radio will appear to power up normally.

Step 4: Launch Flash Manager.

Step 5: Read the entire flash. Set Start address (hex) to 0, and set Length (hex) to 100000 - that's one followed by five zeroes. Click the Read button, and wait about 5-6 minutes for the read to complete.

Step 6: Export the read data to a file using the Save File button. Call the file something like corruptGD77.bin In Windows the file should show as being 1.0 Mbyte in size.

Step 7: Launch HxD or your favourite hex editor. Open the file you just saved from Flash Manager.

Step 8: Now search for other copies of RF alignment data that should be hiding in other locations of the dump of flash memory. We are relying on the fact that some RF alignment data never changes from radio to radio. One such item of data shows up as an ASCII string of SQ4242 (note upper case / capital letters SQ). So perform a search from the beginning, looking for the ASCII string SQ4242

Step 9: Once you've found this occurrence, look at the data around it. About 75 (decimal) bytes prior to this SQ4242 sequence, there should be a set of repeating bytes A0 0F C0 12 A0 0F C0 12. If you do find this, then you have very likely found a valid and uncorrupted copy of your radios RF alignment data. If you don't find this, continue searching until you do find valid RF alignment data. A common address to find such data is typically 50100 to 501DF (hex)

Step 10: From the start of the sequence of bytes A0 0F C0 12 A0 0F C0 12, copy a block of 224 bytes. So if you do find valid alignment data starting at address 50100, copy the data from address 50100 to 501DF, and paste that data into address beginning at 8F000. You can highlight, copy and paste in HxD which is very handy.

Step 11: Once you're satisfied that you have valid RF alignment data copied over to address 8F000 to 8F0DF, save the file to disk, calling it something like repairedGD77.bin Again, the file should show as being 1.0 Mbyte in size under Windows.

Step 12: Back in Flash Manager, use the Open File button to load your repairedGD77.bin file. Scroll down to, or use the Ctrl-G feature to jump directly to address 8F000 and confirm that valid RF alignment data is present. As above, it will begin with bytes A0 0F C0 12 A0 0F C0 12. If it does not appear there, something has not gone quite right and you should go back to step 7 above and try again.

Step 13: Turn off your GD-77 and power it back on with the special power up sequence again, same as step 3.

Step 14: Now it is time to write the valid RF alignment data back to the radio. We don't need to write the entire flash contents, but do need to write at least a 64kbyte block for this to work. Enter Start address (hex) of 80000 - that's eight followed by four zeroes, and enter Length (hex) as 10000 - that's one followed by four zeroes. Click Write and wait about 25 seconds for the write to complete.

Step 15: Turn off your GD-77, remove the programming cable, and power on normally, and test. Your GD-77 should be working nominally now.

It is not recommended to use the typical values in the table above to reconstruct a new RF alignment data block from scratch unless used as a last resort. The reason for this is that some parameters can be quite critical, especially the frequency tuning and DMR I&Q values. It is always best to find copies of the RF alignment data that is specific and unique to your radio. The typical values are given as a guide only and give some context to potential adjustments you may wish to make.

Other useful links for the GD-77:

GD-77 Modifications

GD-77 Frequently Asked Questions FAQ & answers

Absolute beginners guide to DMR

GD-77 Review

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