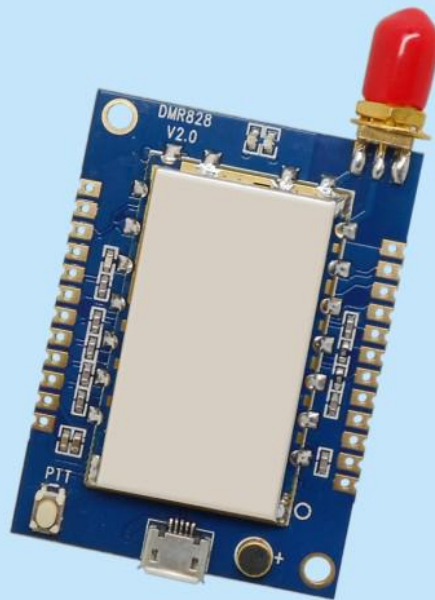


2W all-in-one DMR walkie talkie module

Product Specification



Catalogue

1. Description.....	- 3 -
2. Features.....	- 3 -
3. Application.....	- 4 -
4. Block Diagram.....	- 4 -
5. Electrical Characteristics.....	- 5 -
6. Typical Schematic Circuit.....	- 5 -
7. Functions descriptions.....	- 6 -
1) Parameter configuration.....	- 6 -
2) Serial communication protocol.....	- 6 -
8. Accessories.....	- 8 -
9. Pin Assignment.....	- 9 -
10. Mechanism Dimension.....	- 10 -
Appendix -1: Display and Sending Table of CTCSS/CDCSS.....	- 11 -

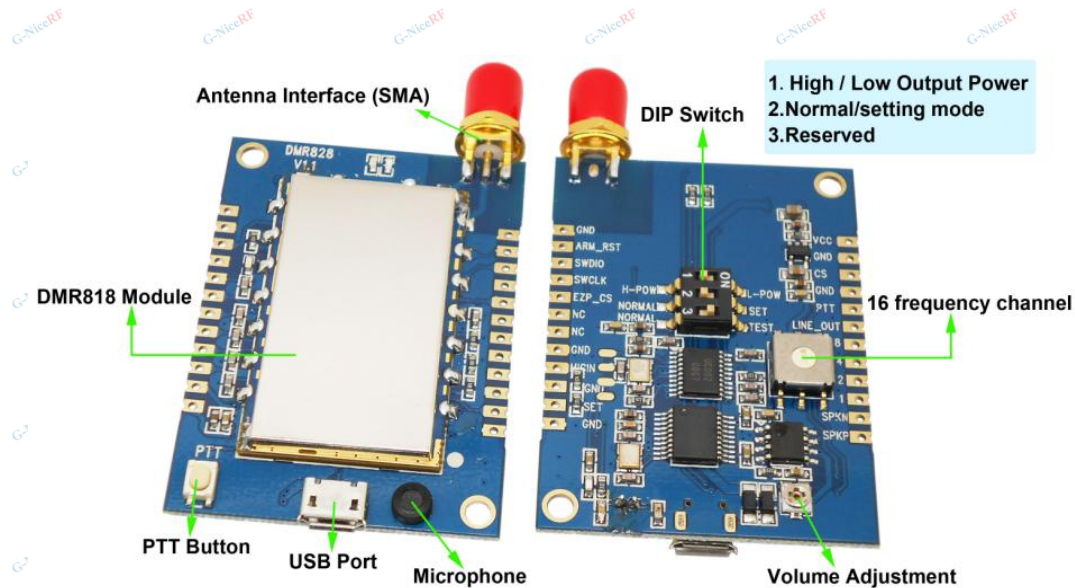
Note: Revision History

Revision	Date	Comment
V1.0	2016-06	First release
V1.1	2017-03	Bandwidth updated
V1.2	2017-06	Logo updated

1. Description

DMR828 is a 2W long distance all-in-one DMR walkie talkie module. Only need external power supply and speaker, it is easy to become a professional digital walkie talkie. Simplified interface and Ultra small size make this module widely used in various applications and conveniently embedded into various handheld device.

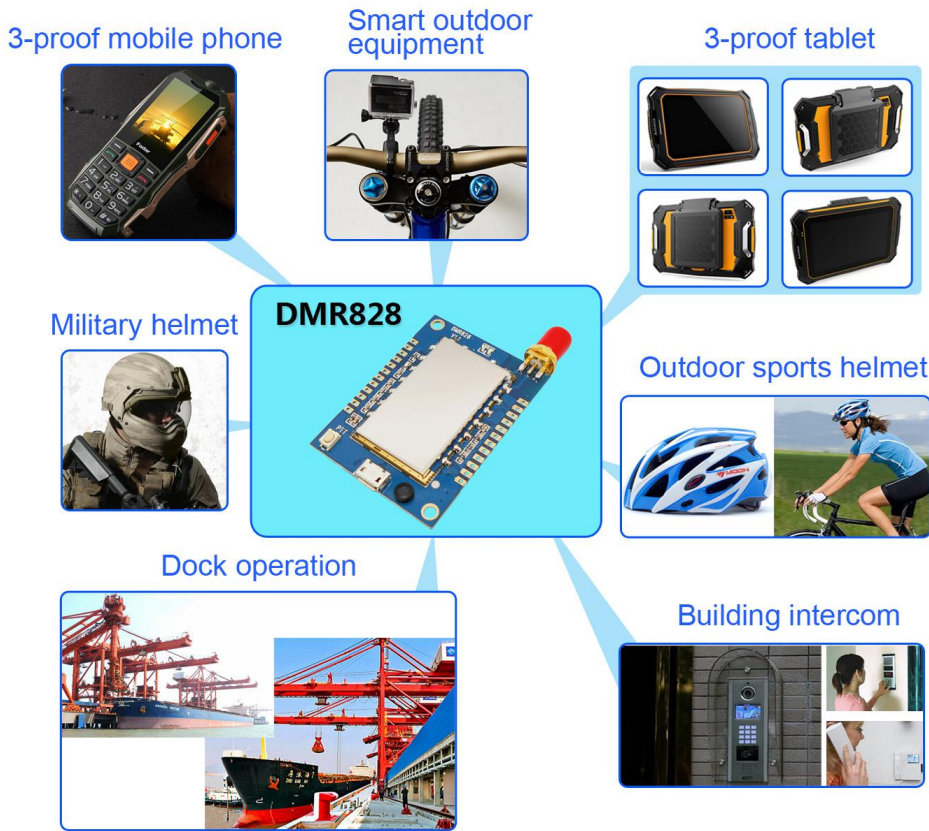
Note:DMR828 has two vocoder versions:DMR828-AVOC & DMR828-AMBE



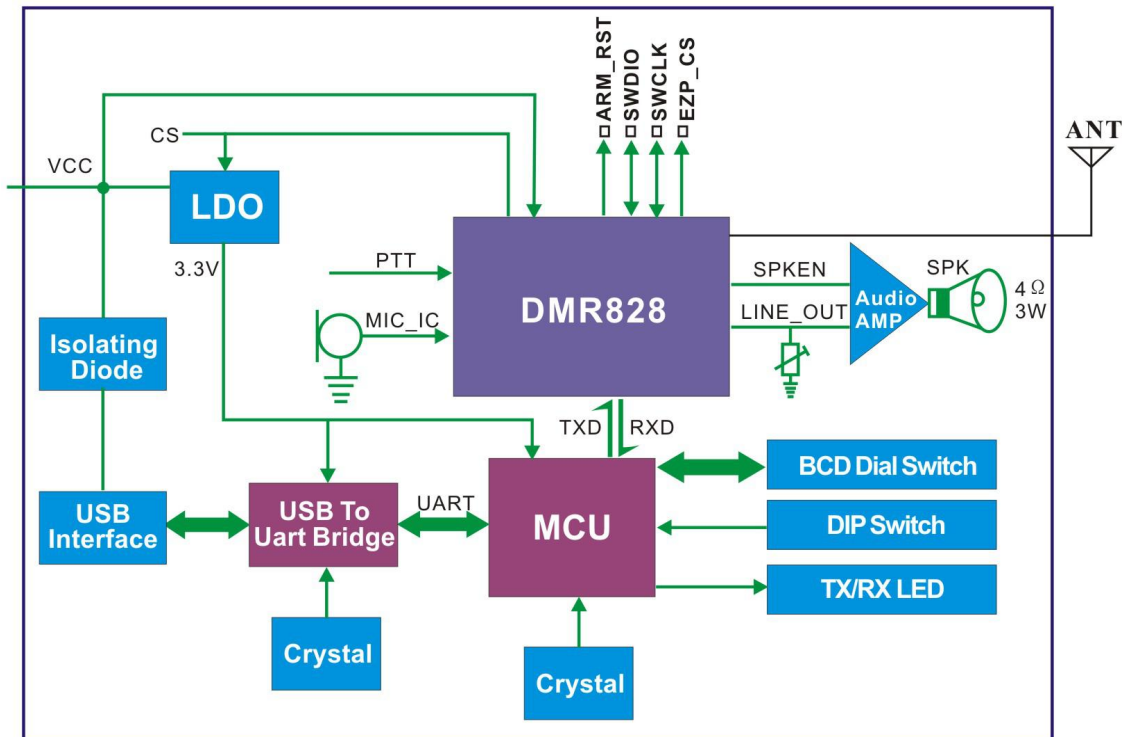
2. Features

- UHF band frequency: 400~470 MHZ
- Distance up to 8Km
- Max power output to 2W, low power to 0.5W
- High Sensitivity:-124dBm
- Bit error rate down to 1% under -121dBm
- Independent frequency for Tx and Rx
- Analog Bandwidth: 12.5 / 25 KHz
- Digital Bandwidth: 6.25KHz
- Voice and text messages communication
- Reminder for input calling, calling status checking
- DMR /Analog walkie talkie
- Message transmission and reception
- Built-in EEPROM, data saved even powered off
- 1ppm TCXO crystal
- 51 CTCSS
- 166 CDCSS
- 9 adjustable volume
- Enhanced encryption of Voice and Text message

3. Application



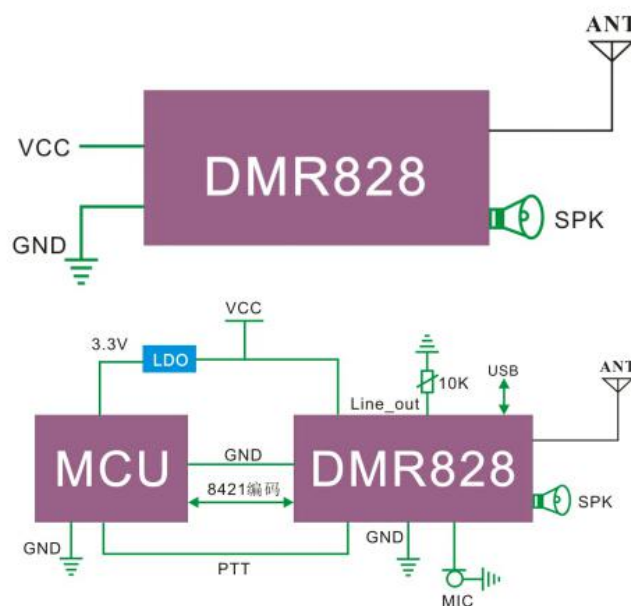
4. Block Diagram



5. Electrical Characteristics

Parameters	Test condition	Min.	Typ.	Max.	Unit.
Voltage range		3.0	4.0	5.0	V
Operating Temperature		-20	25	60	°C
Frequency range		400		470	MHZ
Uart baud rate			9600		bps
Current consumption					
Sleep current			75		uA
Rx current			< 135		mA
Tx current (high power)	@VCC=5.0V,2W		< 1.1		A
Tx current (high power)	@VCC=4.0V,1.5W		< 950		mA
Tx current (low power)	@VCC=4.0V, 27dBm		< 500		mA
Tx power (low power)	@VCC=4.0V		1.5		W
Tx power (low power)			500		mW
Mic input voltage			0.1	1.6	Vpp
Sensitivity			-124		dBm
Receiving BER(DMR modulation)	@ -121dBm		1		%
Audio output amplitude			2		V
Audio Output impedance			8		KOhm

6. Typical Schematic Circuit



7. Functions descriptions

DMR828 has default 16 channels, CH0~CH7 in DMR mode, CH8~CHF in analog mode. All the parameters can be configured by serial instructions.

1) Parameter configuration

DMR828 Module offers standard serial port, users can configure and read the related parameters by sending serial instructions. Module has built-in memory, all configured parameters can be saved even power off. Meanwhile, we offer PC software to customers free of charge. DMR828 can be connected with computer via USB cable or UART interface, in this way, users can configure the parameters on PC software or their own device. The connection as shown in the figure below:



Walkie Talkie Module TTL Interface Diagram

- a) Install the USB Driver and PC software in computer.
- b) Connect the DMR828 module with computer via a specialized USB cable
- c) Module has been into setting Module at this time, show as above.

2) Serial communication protocol

Commands Format:

After module running, the standard setting of serial port as below:

Baud Rate: 9600 bps Date Bit: 8 Stop: 1 Parity: None

Instruction return format:

Return true: OK\r\n, Return false: ERROR\r\n

Frame format Definition:

Hex is used in communication protocol

★ **Note:** CDCSS can be checked in Appendix1

➤ Read Module Name and Version Number

Format: AA FA AA

Return Value: DMRxxx_VERx.x\r\n

Example: AA FA AA

Return: "DMR828_VER1.0\r\n"

➤ Setup Analog channel command:

Description: parameter setting commands for analog CH8~CHF

Format: AA FA 03 CH TFV RFV TX_CTCSS RX_CTCSS

Parameter Description:

CH : Channel number (0x08~0x0f) , 1byte

TFV: Transmission frequency (0x17D78400~0x1C03A180) , 4bytes

RFV: Reception frequency (0x17D78400~0x1C03A180) , 4 bytes

TX_CTCSS: Transmission of CTCSS Value (0x00~0xD9)

RX_SUBAUDIO: Reception of CTCSS Value (0x00~0xD9)

Note 1: The frequency value of TFV and RFV are sent in hex. For example: 409.7500M, the Hex code is 0x186C49F0(409750000)

Note 2: Transmission and reception can be different on CTCSS.

0: no CDCSS & no CTCSS

(Please check the appendix for the code of CDCSS and CTCSS)

For example: The command is below if CH9 is set as 409.75MHz, both CTCSS for TX and RX is 0

AA FA 03 09 18 6C 49 F0 18 6C 49 F0 00 00

➤ Setup digital channel command:

Description: Set the parameters of digital channels(Only CH0~CH7 are digital channels)

Format: AA FA 03 CH TFV RFV Parameter Description:

CH : Channel number (0x00~0x07) , 1byte

TFV: Transmission frequency (0x17D78400~0x1C03A180) , 4 bytes

RFV: Reception frequency (0x17D78400~0x1C03A180) , 4 bytes

Note: The frequency value of TFV and RFV are sent in hex. For example: 409.7500M, the Hex code is 0x186C49F0(409750000)

For example: The command is below if CH7 is set as 409.75MHz ,

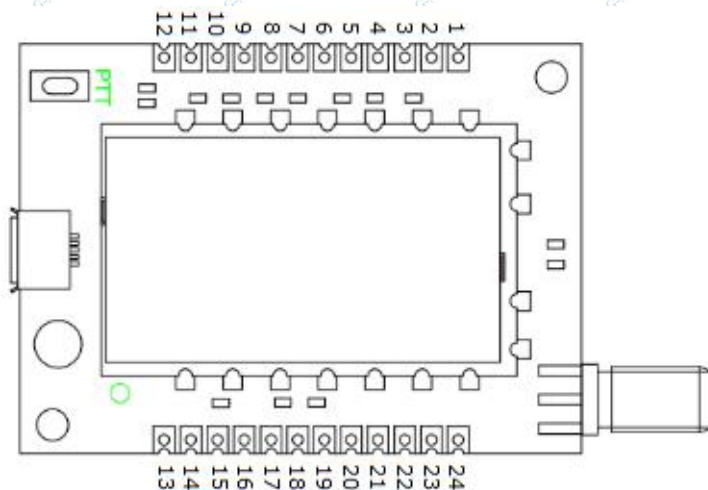
AA FA 03 07 18 6C 49 F0 18 6C 49 F0

8. Accessories

The antenna is very important for RF communication, Its performance will affect the Communication, The module requires the antenna with 50Ω impedance. Universal antennas are Rod antenna, sucker antenna and telescopic antenna, User can choose the right antenna according to their application. We advise to use antennas listed on our website to get better performance.

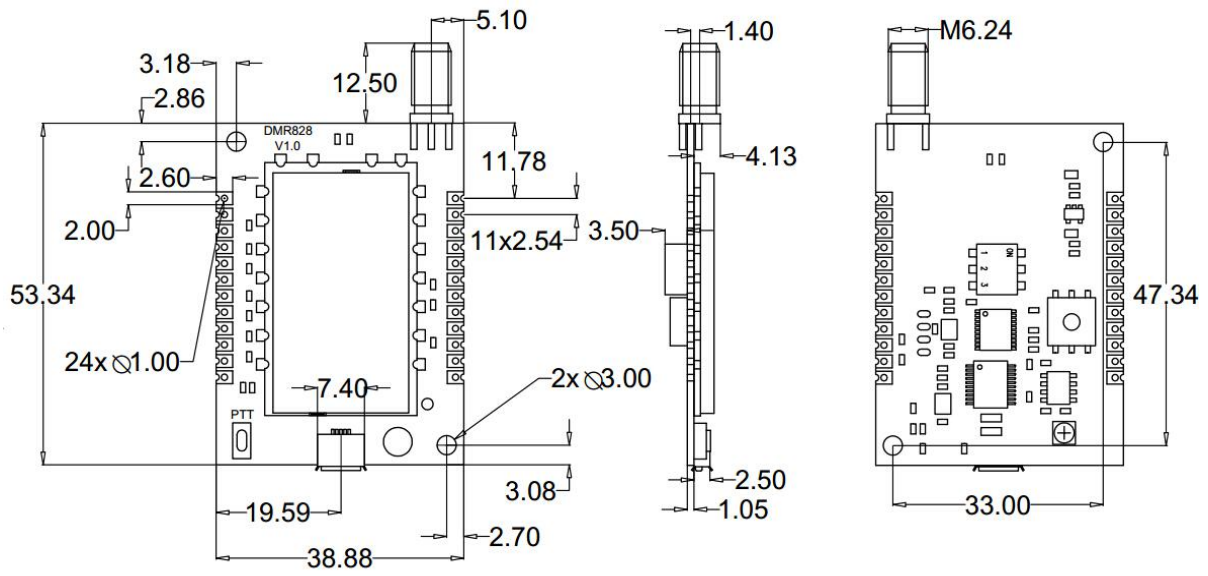


9. Pin Assignment



Pin NO.	Pin name	Description
1	VCC	Positive supply
2,4	GND	Ground
3	CS	Leave Open or high level for normal working, pull low to enter sleeping mode
5	PTT	Module Input, Transmitting/receiving control, pull low to force the module to enter TX state; pull high for Rx state
6	LINE_OUT	Audio output without amplified
7	8	16 Channels, Code 8421, 8th, default output "1"
8	4	16 Channels, Code 8421, 2th, default output "1"
9	2	16 Channels, Code 8421, 2nd, default output "1"
10	1	16 Channels, Code 8421, 1st, default output "1"
11	SPKN	Audio output, connect to speaker 8Ω 2W
12	SPKP	Audio output, connect to speaker 8Ω 2W
13,15,17,24	GND	Ground
14	SET	Configuration mode enable (low to enter into the setting mode, leave open or connect high level to exit setting mode). Valid when CS Pin is high or leave open.
16	MIC_IN	Microphone or line in
18	UART-TX	TXD of the module and connect to external RXD
19	UART-RX	RXD of the module and connect to external TXD
20	EZP_CS	Reserved
21	SWCLK	Reserved
22	SWDIO	Reserved
23	ARM_RST	Reserved

10. Mechanism Dimension



Appendix 1: Display and Sending Table of CTCSS/CDCSS

CTCSS No.	CTCSS Freq.		Inverse CDCSS	CTCSS Freq.		CDCSS No	CTCSS Freq.
0	No CTCSS		0	No CTCSS		0	No CTCSS
1	62.5		1	023I		1	023N
2	67		2	025I		2	025N
3	69.3		3	026I		3	026N
4	71.9		4	031I		4	031N
5	74.4		5	032I		5	032N
6	77		6	043I		6	043N
7	79.7		7	047I		7	047N
8	82.5		8	051I		8	051N
9	85.4		9	054I		9	054N
10	88.5		10	065I		10	065N
11	91.5		11	071I		11	071N
12	94.8		12	072I		12	072N
13	97.4		13	073I		13	073N
14	100		14	074I		14	074N
15	103.5		15	114I		15	114N
16	107.2		16	115I		16	115N
17	110.9		17	116I		17	116N
18	114.8		18	125I		18	125N
19	118.8		19	131I		19	131N
20	123		20	132I		20	132N
21	127.3		21	134I		21	134N
22	131.8		22	143I		22	143N
23	136.5		23	152I		23	152N
24	141.3		24	155I		24	155N
25	146.2		25	156I		25	156N

26	151.4		26	162I		26	162N
27	156.7		27	165I		27	165N
28	159.8		28	172I		28	172N
29	162.2		29	174I		29	174N
30	165.5		30	205I		30	205N
31	167.9		31	223I		31	223N
32	171.3		32	226I		32	226N
33	173.8		33	243I		33	243N
34	177.3		34	244I		34	244N
35	179.9		35	245I		35	245N
36	183.5		36	251I		36	251N
37	186.2		37	261I		37	261N
38	189.9		38	263I		38	263N
39	192.8		39	265I		39	265N
40	196.6		40	271I		40	271N
41	199.5		41	306I		41	306N
42	203.5		42	311I		42	311N
43	206.5		43	315I		43	315N
44	210.7		44	331I		44	331N
45	218.1		45	343I		45	343N
46	225.7		46	346I		46	346N
47	229.1		47	351I		47	351N
48	233.6		48	364I		48	364N
49	241.8		49	365I		49	365N
50	250.3		50	371I		50	371N
51	254.1		51	411I		51	411N
			52	412I		52	412N
			53	413I		53	413N
			54	423I		54	423N

			55	431I		55	431N
			56	432I		56	432N
			57	445I		57	445N
			58	464I		58	464N
			59	465I		59	465N
			60	466I		60	466N
			61	503I		61	503N
			62	506I		62	506N
			63	516I		63	516N
			64	532I		64	532N
			65	546I		65	546N
			66	565I		66	565N
			67	606I		67	606N
			68	612I		68	612N
			69	624I		69	624N
			70	627I		70	627N
			71	631I		71	631N
			72	632I		72	632N
			73	654I		73	654N
			74	662I		74	662N
			75	664I		75	664N
			76	703I		76	703N
			77	712I		77	712N
			78	723I		78	723N
			79	731I		79	731N
			80	732I		80	732N
			81	734I		81	734N
			82	743I		82	743N
			83	754I		83	754N