

So, you are building a Hytera 982i DMR Repeater?



Well, you have chosen a great radio, especially for DMR service. But, this is a build that is not like any other repeater build you have done. For that reason alone, I have created some screen shots and hints that I have found while building mine.

First, of course, is obtaining the programming cable (do yourself a favor and purchase the PC-47 cable as it will make it easier to do both firmware updates as well as programming), the latest firmware updates (at least version 8 – see my notes about this later in this article) and the programming software. Please reach out to Terry Gillard, NX7R, who is a Hytera dealer in Henderson, Nevada to purchase these items. Terry was a tremendous help in helping me with my many questions and is a great resource.



Authorized Dealer
Powerwerx

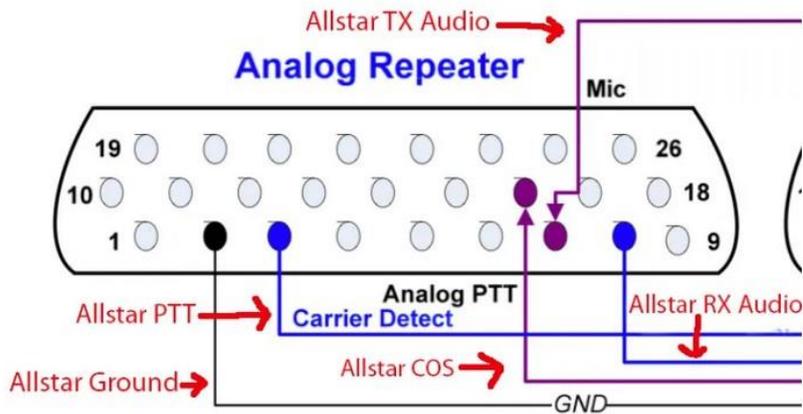


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As I was building this primarily as a DMR repeater, the addition of a controller was not considered (it has a built-in CW ID). The 26 pin (3 row) accessory port on the rear has the outputs needed. However, unlike most repeaters, you cannot place this repeater in a “base station” mode for the controller to take over all repeater functions. This may limit what your controller can do. However, the following pinout is provided by Chris Hood (<https://www.chrishoodblog.com/add-allstar-to-hytera-982-repeater/>) and shows the necessary connections. For my specific build, nothing was connected to this port.



In order to use your DMR repeater on a network, such as BrandMeister or any other system, the IP Multi Site Entitlement key MUST be installed (this can be emailed to you. You install it yourself using the PC-47 cable).

The analog side is 12.5 KHz. If you wish to change this to 25 KHz for local amateurs to have analog ability (Dynamic Mixed Mode - Both Analog and DMR Simultaneously), then you will also need to purchase the WB Entitlement key (This must be implemented at a Hytera Dealers Shop using specialized dealer service software). Both these items may be purchased through Terry Gillard.

Now, if you haven't already, you need to get a 6 digit repeater ID number from <http://RadioID.Net>. If you are connecting to BrandMeister, you will also need to create an account. This can be the same account as your DMR hotspot unless this is going to be a club repeater, in which you may want to create a new one. Once your repeater is functional and sending to BrandMeister (your repeater ID will show up in the general repeater area), then open a support ticket for the BrandMeister team to give you admin privileges connected to your account.

The following screens will help you with how I programmed the repeater. Note: I am not an expert and I'm sure there may be some changes that should be made.... this is what works for me. Along with some of the screens, I will make some comments that may help.

Serial Number	14321A0837
Model Name	RD982i
Model Number	RD982-00000000-00000i-U1-0-F
Model Type	Repeater
Frequency Range [MHz]	400-470
Radio Data Version	D9.02.02.000.iN
Firmware Version	A9.02.02.000
Last Programmed Date	2021.11.26

Be sure you have the latest firmware (at least A8.???.???.??). But, DO NOT upgrade past v8.05 if you still wish to utilize the RDAC (Repeater Data and Control) software, as the newer software precludes its use. The New XNMS software is not supported by BrandMeister!

Basic

Radio Alias	KC4MHH
High Tx Power [W]	50
Low Tx Power [W]	5
Squelch Open Level	2
Squelch Normal Level	3
Squelch Tight Level	9
Language	English(United States)
CTCSS/CDCSS Deviation(25KHz)[Hz]	700
CTCSS/CDCSS Deviation(20KHz)[Hz]	550
CTCSS/CDCSS Deviation(12.5KHz)[Hz]	400
Repeater Operation Mode	Conventional Repeater

Password

CPS Write Lock	<input type="checkbox"/>
Write Password	••••••••
Write Password Tries	Infinite
CPS Read Lock	<input type="checkbox"/>
Read Password	••••••••
Read Password Tries	Infinite
Radio Block	<input type="checkbox"/>

Repeater Mode Control

Conventional Analog&Digital Mode

Conventional Feature in Repeater

- IP Multi-site Connect
- Full Encrypt-Hytera
- Full Encrypt-DMRA
- Scrambler
- Basic Encrypt

Common Feature

- Only Narrow Band
- Regional Code 0

Feature Check

You should see the necessary options checked. You will definitely need "IP Multi-site Connect" in order to connect to the BrandMeister network. This box will automatically be checked when you install the Entitlement Key.

Microphone

Internal Mic Gain [dB] 14.0

External Mic Gain [dB] 12.0

Volume

Max Volume 8

Min Volume Off

Power On Volume 3

Keypad Lock

Keypad Auto Lock

Backlight

Backlight Timed

Backlight Time [s] 20

Basic Setting

Accessory Port UART Baudrate 115200

Parity Bit None

Data Bit 8

Stop Bit 1

Basic Setting

Analog Call Hang Time [s] 3.0

Repeat Gain [dB] 0.0

Low Operating Voltage Mode

Repeat TOT Time[s] Infinite

TOT Pre-alert Time[s] 30

TOT Pre-alert Interval Time[s] 10

TOT Re-Repeat Time[s] 5

LocalPTT TOT Time[s] Infinite

Hardware Protection Setting

Fan on User Temperature [°C] 50

Fan off User Temperature [°C] 40

Low Forward Power [W] 0

Alarm Setting

Over Temperature

Forward Power

VSWR

Tx Unlock

Rx Unlock

Over/Low Voltage

Power On

Designated Power-on Channel

Power on Channel  444.850 MIXED

I have seen several blogs asking to uncheck all of the Alarm Setting boxes. Leaving them checked seems to send unnecessary alarms to BrandMeister.

GPIO Pins

UART Transfer

Slot1 Audio Output

Slot2 Audio Output

Digital Audio Monitor Close

Audio Type Filtered Squelch

Debounce Duration [ms] 200

Repeater Backup

Network Abnormal Backup Enable

	Active Level	Feature	Debounce
Pin#3	Low <input type="button" value="v"/>	Ext Mic PTT <input type="button" value="v"/>	<input checked="" type="checkbox"/>
Pin#12	Low <input type="button" value="v"/>	None <input type="button" value="v"/>	<input checked="" type="checkbox"/>
Pin#16	Low <input type="button" value="v"/>	None <input type="button" value="v"/>	<input checked="" type="checkbox"/>
Pin#20	Low <input type="button" value="v"/>	None <input type="button" value="v"/>	<input checked="" type="checkbox"/>
Pin#22	Low <input type="button" value="v"/>	None <input type="button" value="v"/>	<input checked="" type="checkbox"/>
Pin#23	Low <input type="button" value="v"/>	None <input type="button" value="v"/>	<input checked="" type="checkbox"/>

Pins Preview

The settings of these pins may be necessary if you are using the rear accessory port.

Priority control

phone Priority

Path Priority Repeat Request ▾

PTT Priority External PTT ▾

Repeat Request Priority IP Connect Repeating ▾

Beacon Info

No.	UUID	UUID Code
1	00000000000000000000000000000000	001

Add

Insert

Delete

There are some “programmable” buttons on the front of the repeater:

P1 Short None ▾

P2 Short None ▾

P3 Short None ▾

P4 Short None ▾

P1 Long None ▾

P2 Long None ▾

P3 Long None ▾

P4 Long None ▾

Long Press Duration [s] 2.0 ▾

Telemetry Enable

No.	Feature	Action	Pulse Time[ms]	Digital Call	Target VIO	Quick Text
1	Telemetry VIO1	None	200	None	None	None
2	Telemetry VIO2	None	200	None	None	None
3	Telemetry VIO3	None	200	None	None	None
4	Telemetry VIO4	None	200	None	None	None

<

Common Menu

- Radio Info
- Channel Info
- Network Info
- Exit

Digital Menu

- Digital Speaker

Analog Menu

- Scan

Main Table

No.	Decode	Encode
1		
2	123.0	123.0
3	123.0	123.0
4	None	None
5	None	None
6	None	None
7	None	None
8	None	None
9	None	None
10	None	None
11	None	None
12	None	None
13	None	None
14	None	None
15	None	None
16	None	None

Basic Setting

DHCP

Ethernet IP 192 . 168 . 1 . 5

Gateway IP 192 . 168 . 1 . 1

Netmask 255 . 255 . 255 . 0

Manual Set DNS On/Off

DNS Server IP 8 . 8 . 8 . 8

MAC Address 64 69 BC 04 79 CD

If at all possible, use a static IP connection (see my notes at the end of these screens).

IP Connect Configuration

Repeater Type Slave

Jitter Buffer Length 8

Network Authentication Key *****

Master IP 0 . 0 . 0 . 0

Master UDP Port 50000

IP Connect Networking UDP Port 50000

P2P Firewall Open Timer[sec] 6

Voice & Data Service

Voice & Data UDP Port 50001

RDAC Service

RDAC UDP Port 50002

Master Domain Name On/Off

Domain Names 3104.repeater.net

The "Network Authentication Key" needs to be blank. The best way (according to the many blogs and sites I have seen), is to enter some random numbers, save it, delete them and save again.

SubMaster/Slave Parameters

Master IP

Master UDP Port

IP Connect Networking UDP Port

Voice & Data Service

Voice & Data UDP Port

RDAC Service

RDAC UDP Port

Application Programming Interface

Third Party Connect Mode

RTP Packet Buffer Length

Forward to PC

Third Party Server IP

API interface Mode

Radio RRS Slot1 Port

Radio RRS Slot2 Port

Radio GPS Slot1 Port

Radio GPS Slot2 Port

Radio Telemetry Slot1 Port

Radio Telemetry Slot2 Port

Radio TMS Slot1 Port

Radio TMS Slot2 Port

Radio Call Control Slot1 Port

Radio Call Control Slot2 Port

Radio Voice Service Slot1 Port	30012	<input checked="" type="checkbox"/>
Radio Voice Service Slot2 Port	30014	<input checked="" type="checkbox"/>
Analog Call Control port	30015	<input checked="" type="checkbox"/>
Analog Voice Service port	30016	<input checked="" type="checkbox"/>
E2E Slot1 Port	30017	<input checked="" type="checkbox"/>
E2E Slot2 Port	30018	<input checked="" type="checkbox"/>
Self-Defined Message Slot1 Port	3017	<input checked="" type="checkbox"/>
Self-Defined Message Slot2 Port	3018	<input checked="" type="checkbox"/>
RRS Port Identifier	115	
GPS Port Identifier	116	
Telemetry Port Identifier	117	
Self-Defined Message Port Identifier	120	
RCP Port Identifier	119	
OTAP Enable	<input type="checkbox"/>	
OTAP Server IP	0 . 0 . 0 . 0	
OTAP Slot1 Port	30050	

OTAP Slot2 Port 30052

Backup Third Party Server IP Enable

Backup Third Party Server IP 0 . 0 . 0 . 0

Remote Upgrade Service

Remote Upgrade Enable

Remote Upgrade Service IP 0 . 0 . 0 . 0

Remote Upgrade Service UDP Port 69

Remote Upgrade Local UDP Port 69

Remote Upgrade Firewall Open Time[S] 30

SNMP

SNMP Trap Port 162

SNMP Trap IP 0 . 0 . 0 . 0

SNMP Trap Interval 10

SNMP Local Port 161

BroadCast Trap Enable

GPS Trap Enable

Local Machine Info Trap Enable

SNMP

SNMP Trap Port 162

SNMP Trap IP 0 . 0 . 0 . 0

SNMP Trap Interval 10

SNMP Local Port 161

BroadCast Trap Enable

GPS Trap Enable

Local Machine Info Trap Enable

XNMS Access Code *****

Do not make any changes to the "XNMS Access Code"

Local Access Management

Local Access Management

No.	Start ID	End ID
1	1	100
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0

Multisite Access Management

Multisite Access Management Disable 

Expand Capacity Disable 

No.	Call Type	Start ID	End ID
 1	Group Call	1	100
 2			
 3			

Channel Alias (The actual display may change, See the Help for details)

Color Code

Slot Operation

Digital IP Multi-site Connect

Rx

Receive Frequency [MHz]

Offset [MHz]

Tx

Transmit Frequency [MHz]

Tx Contact Name

Power Level

Encrypt

Slot1 Encrypt

Slot1 Encrypt Type

Slot1 Encrypt Key

Slot1 multi-key Decrypt

Slot2 Encrypt

Slot2 Encrypt Type

Slot2 Encrypt Key

Slot2 multi-key Decrypt

Channel Alias (The actual display may change, See the Help for details)

Channel Spacing [KHz]

CTCSS Tail Revert Option [Radians]

Repeat Path

Scan List

Auto Start Scan

Analog Speaker

Emp De-emp

Scrambler

Flat Audio

Multi CTC/CDC

CTCSS Tail Revert

Carrier Sync

Rx

Receive Frequency [MHz]

Rx CTCSS/CDCSS Type

CTCSS

CDCSS

Offset [MHz]

Tx

Transmit Frequency [MHz]

Tx CTCSS/CDCSS Type

CTCSS

CDCSS

Internal Speaker Unmute Rule

Monitor Squelch Mode

Carrier Squelch Level

Power Level

Channel Alias (The actual display may change, See the Help for details)

Color Code

Channel Spacing [KHz]

Slot Operation

CTCSS Tail Revert Option [Radians]

Digital IP Multi-site Connect

Analog Speaker

Emp De-emp

Scrambler

Flat Audio

Multi CTC/CDC

CTCSS Tail Revert

Carrier Sync

Rx		Offset [MHz]	Tx	
Receive Frequency	<input type="text" value="449.850000"/>	<input type="text" value="0.000000"/>	Transmit Frequency	<input type="text" value="444.850000"/>
Rx CTCSS/CDCSS Type	<input type="text" value="CTCSS"/>	<input type="button" value="Copy"/>	Tx CTCSS/CDCSS Type	<input type="text" value="CTCSS"/>
CTCSS	<input type="text" value="123.0"/>		CTCSS	<input type="text" value="123.0"/>
CDCSS	<input type="text" value="023"/>		CDCSS	<input type="text" value="023"/>

Encrypt

Slot1 Encrypt

Slot1 Encrypt Type

Slot1 Encrypt Key

Slot1 multi-key Decrypt

Slot2 Encrypt

Slot2 Encrypt Type

Slot2 Encrypt Key

Slot2 multi-key Decrypt

TX Contacts Name

Power Level

PTT Tx Channel Type

Internal Speaker Unmute Rule

Carrier Squelch Level

Basic Setting

Radio ID

Increase After Written

Dial Rules

Province NP

Police NP

Tx Preamble Duration [ms]

Group Call Hang Time [s]

Private Call Hang Time [s]

Emergency Call Hang Time [s]

SIT [s]

Beacon Tx Mode

Beacon Duration[ms]

Beacon Interval[s]

Authentication

Air Interface Authentication Key

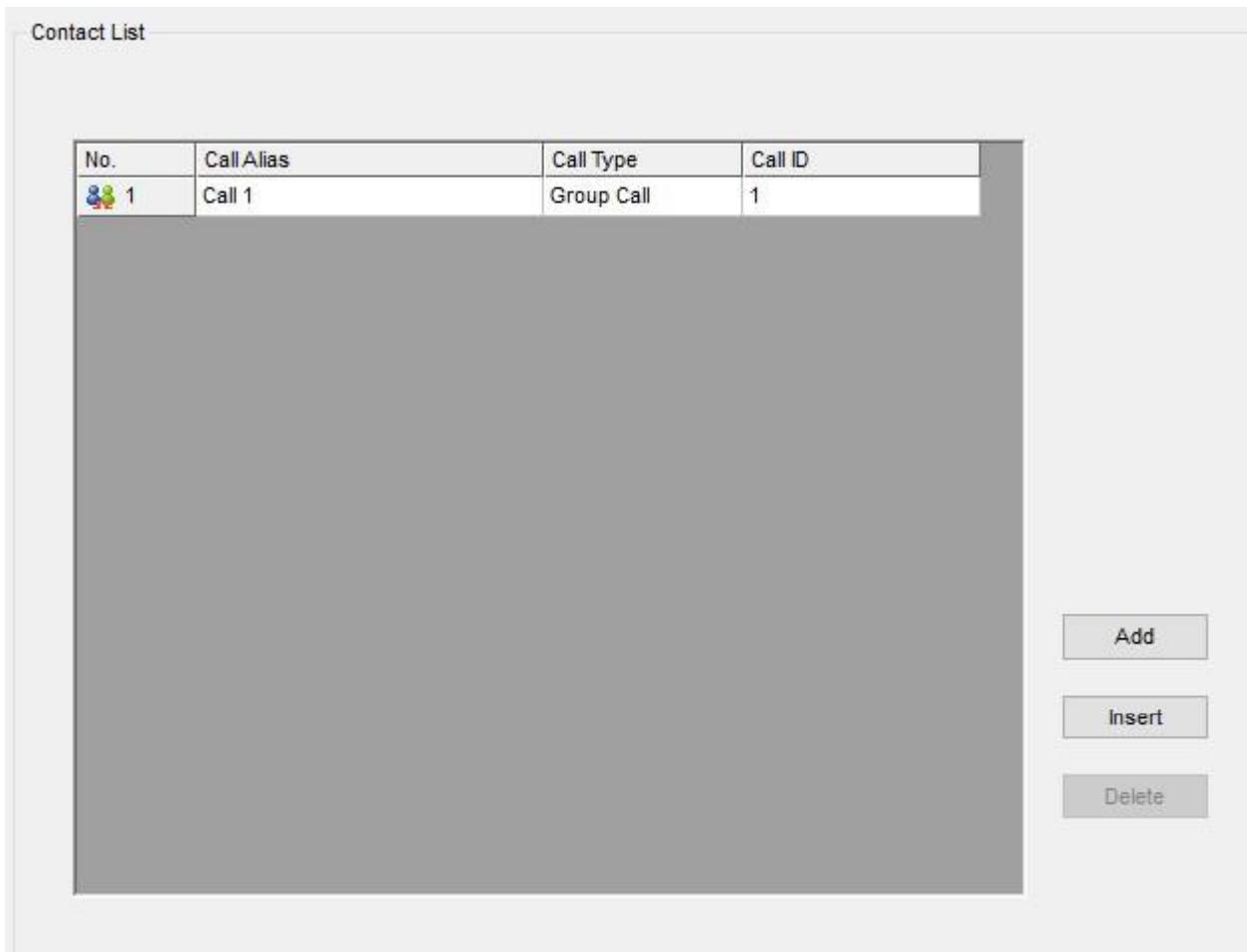
Do not make any changes to the "Air Interface Authentication Key"

Miscellaneous

Data Bearer Service

Repeater MOR Mode

Enhanced Channel Access



Note: You will notice I have the Default "Power On" mode set to DMM (Dynamic Mixed Mode) to allow my repeater to operate in Narrow Band FM or DMR. Check that you have the default set to the mode you wish to be using (saves you a lot of headaches later). Also, you must have Slot 1 and Slot 2 in the channel setups selected for IP Connect use.

A problem that has been reported on several sites involve internet access. The Hytera seems to work much more reliable with a static IP assigned. Otherwise, when the DHCP lease expires, you will need to reboot the repeater.

In my case, it was cost prohibitive to install a static IP connection from the local cable company. An inexpensive solution was to obtain a cellular hotspot (in my case T-Mobile) and convert this to a static connection for the repeater.

I purchased an Alcatel Linkzone 2, 4G LTE Hotspot. Using a BrosTrend AC1200 Dual Band WiFi Extender (I got mine on Amazon), I was able to connect the ethernet cable to the WAN input of a router. The router then provides a static IP address for the repeater. So far, it seems to be working!

I certainly hope this information makes putting the Hytera RD-982i online much easier. Enjoy and 73's.