SY4050-LM DMR/FM Terminal

User Manual

Date	Prepared by	Checked by	Approved by
04-Mar-2015			

SAMYOUNG TECH. CO.,LTD

110 Gumdan-ro, Seo-gu, Incheon 404-300 Korea

TEL : +82-32-561-6700

FAX : +82-70-4694-9646
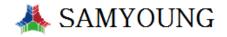
http:/ www.sytcl.co.kr

Revision History

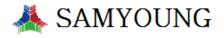| Revision	Date	Author	Status/Comments
1.0	04-Mar-2015		Initial Release
1.1	01-June-2015		Minor update
1.2	17-June-2015		Add specification

CONTENTS

==

==

1. Radio Overview

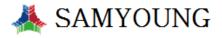| No.	Part Name	No.	Part Name	No.	Part Name	No.	Part Name
1	PTT Key	6	Speaker	11	Back Key	16	Belt Clip
2	Soft Key-1	7	LCD	12	Microphone	17	Battery
3	Soft Key-2	8	Menu/Enter/OK Key	13	Power/Volume Control Knob	18	Battery Latch
4	Antenna	9	Down Key	14	Emergency Alarm Key		
5	LED Indicator	10	Up Key	15	Accessory Jack		

2. Status Indication

2.1 LED Indicator
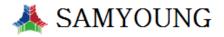
The top LED indicator will help you easily identify the current radio status.

LED Indicator	Radio Status
Blinks YELLOW	Receiving, Carrier detected
Glows YELLOW	Receiving, Call match
Blinks ORANGE	Channel scanning
Glows RED	Transmitting

2.2 LCD Icons

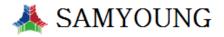| Icon Name	Icon	Radio Status
RSSI		The number of bars represents the radio signal strength
Tx Power Level	L	Low power level of the current channel
	H	High power level of the current channel
Operation Mode	DM	Direct Mode(Talkaround) operation: Radios communicates with each other directly
	RM	Repeater Mode operation: Radios communicates with each other via a repeater
Scan		Radio is under scanning channels
		Radio detects activity on a channel
Unread Message		Indicate the unread incoming message in Inbox
Secure		Privacy feature is enabled
Battery		The number of bars represents the charge remaining in battery
Zone		Indicates the current zone number
Channel		Indicates the current channel number of Dual-mode ● Digital DMR channel is displayed with D(ex, D009) ● Analog channel is displayed with A(ex, A001) ● Digital and Analog mixed channel is displayed with M(ex, M003)
Call		Indicates Outgoing Individual Call
		Indicates Incoming Individual Call
		Indicates Outgoing Group Call
		Indicates Incoming Group Call
		Indicates Outgoing All Call
		Indicates Incoming All Call

3. Menu Navigation

The following menu list shows all the menus of the radio.

To select and confirm the options shown in the menu, press **Menu/Enter** key and then press **Up** or **Down** key to select your needed option, finally press **Menu/Enter** key. To move back the path of menu, press **Back** key

1st	2nd	3rd	Remarks
Contacts	List of Contacts		Max 32
Messages	Quick Text	Message list in Quick Text	Max 10
	Inbox	Message list in Inbox	Max 10
		Delete All	
	Outbox	Message list in Outbox	Max 10
		Delete All	
Call Log	Outgoing	Call logs in Outgoing	Max 10
		Delete All	
	Incoming	Call logs in Incoming	Max 10
		Delete All	
Scan	Scan on/off	On	
		Off	
	Scan List	Scan list	Max 10
Zone	List of Zones		Max 32
Settings	Radio settings	Power Level	High/Low
		SQ Level	Normal/Open/Tight
		Keypad Lock	On/Off
		Backlight	Off/On/Timed
		LED	Off/On
		Tone	Off/On
		Language	English/Chinese
	Radio Info	Radio Id	
		Serial Number	
		Model Name	
		Model Number	
		Freq Range	
		SW Ver	
		BB Ver	
		Last Pro Date	

4. Basic Operation

4.1 Power On/Off

Rotate the Radio **On-Off/Volume Control knob** clockwise until a click is heard to turn on the radio. The LED lights up solid red and the beeper indication is played
To turn off the radio, rotate the same knob counterclockwise until a click is heard

4.2 Adjust Volume

After turning on the radio, rotate the Radio **On-Off/Volume Control knob** clockwise to increase the volume, or counterclockwise to decrease the volume.

4.3 Selecting a zone

A zone is a group of channels. User can include a group of channels into a zone. The radio supports 32 zones, each of which consists of up to 16 channels. User can select a zone via one of the following ways;

- Via Menu: Go to Menu > Zone, press Up/Down key to select an appropriate zone, and then press the Menu/OK key to confirm the selection
- Via Programmable key: User can toggle the appropriate zone by pressing the programmed Zone key preset by your dealer

4.4 Selecting a Channel

Once the zone is selected, press **Up/Down** key to select a desired channel.
Note: "A" character prior on channel number indicates a conventional Analog channel and "D" character indicates a conventional Digital channel

5. Call Services

After the radio is powered on, you can make and receive calls. To ensure optimal volume of the receiving radio, keep the microphone about 2.5 to 5 centimeters away from your mouth when transmitting.

- **Individual call**
  It is a voice call between an individual user and another individual user.

● **Group call**

It is a voice call between one individual user and a predefined group of users. All parties in the group can communicate with each other.

● **All call**

It is a one-way voice call from any user to all users on a channel.

User can initiate an individual call, group call or all call on a digital channel through the same operation

5.1 Make a voice call on Digital channel through Preset contacts

User may ask a dealer to preset a regular individual call, group call and all call contacts for each digital channel.

1. Select the channel with the active subscriber ID or alias
2. Press and hold down PTT key to make a call. The LED lights up solid red. The second LCD line shows the outgoing individual/group/all call icon at the left corner and also shows the target user alias or number.
3. Speak clearly into the microphone
4. The target user can receive the call without any operation. On receiving a call, The LED lights up solid green. The second LCD line shows the incoming individual/group/all call icon at the left corner and also shows the originating user alias or number.
5. If the target user does not respond the individual call in the confirmed mode, the radio will display an appropriate indication-Call Failure.
6. Release PTT key to listen.
7. If there is no voice activity for a predefined period of time(Call Hang Time), the call ends.

5.2 Make a voice call on Digital channel through Contacts or Call Log

1. Select a channel
2. Radio-1 accesses the Contacts list vis "Menu > Contacts > Contacts List" or "Menu >Call Log > Outgoing/Incoming"
3. Radio-1 press Up/Down key to select a target user, for example, Radio-2
4. Radio-1 press and hold down PTT key to make a call. The LED lights up solid red. The second LCD line shows the outgoing individual/group call icon at the left corner and also shows the target user alias or number.
5. Radio-1 speak clearly into the microphone

6. Radio-2 can receive the call without any operation. On receiving a call, The LED lights up solid green. The second LCD line shows the incoming individual/group call icon at the left corner and also shows Radio-1 user alias or number.

7. Release PTT key to listen.

8. If there is no voice activity for a predefined period of time(Call Hang Time), the call ends.

5.3 Make a voice call on Analog channel

The call operation is same as on the digital channel but the called parties are all the users on the channel rather than the preset contacts for the channel due to no signaling on the analog channel.

6. Features and Operations

6.1 Scanning channels

The Scan feature allows you to listen to communication activities on other channels so that you can keep a close track of your team members. You can enable and disable the Scan feature, select and view the Scan List via the following operations:

- To enable the Scan feature, go to "Menu -> Scan -> Scan On/Off" and select "On". To view or select a scan list, go to "Menu -> Scan -> Scan List".
- In the Home screen user can press the programmed Scan key to turn scan on or off.

During scanning channel, The LED blinks red slowly and the scan icon is displayed on the first line of LCD

6.2 Sending an emergency alarm

Press Emergency key to activate emergency alarm mode. The Emergency icon appears in LCD
When Emergency alarm acknowledgement is received, the Emergency tone sounds and the LCD shows "SOS Sent"
If the radio doesn't receive an Emergency alarm acknowledgement and after all retries have been exhausted, a tone sounds and the LCD shows "SOS Fail"
The radio exits the Emergency Alarm mode and returns to the Home screen in the predefined period by CPS

6.3 Sending a Quick text message

The radio supports a maximum of 10 Quick Text messages which are preset by a dealer or CPS SW.

1. User can select a Quick Text message by going to "Menu > Messages > Quick Text"
2. Press Up/Down key to the required Quick Text and press **Menu/Enter** key to select.
3. Press Up/Down key to the required alias or ID of Contacts and press **Menu/Enter** key to select.
4. The LCD shows the progress of sending a message
5. If the message is sent, a tone sounds and the LCD shows a positive notice, "Send Success"
6. If the message is not sent, a tone sounds and the LCD shows a negative notice, "Send Fail"

6.4 Contacts

You can manage the contacts via the "Contacts" menu. The Contacts is used to save the Call Alias (name), Call ID of Private Call and Group Call contacts which is preset by a dealer or CPS(PC SW.)
In the "Contacts" menu, you can check the detailed contact information (such as Call ID).

6.5 Messages

In the Inbox, you can read all received messages, and in the Outbox, you can also read all sent messages.

6.6 Call Log

The radio keeps track of all recent outgoing and incoming calls
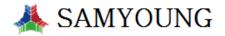It can store up to 10 call logs. When the Call Log is full, the earliest call log will be overwritten by the latest one automatically.

6.7 Settings
6.7.1 Radio Settings

User can optimize the operation of your radio via the following configuration according to your actual needs and preferences.
- Tx Power Level
- SQ Level(note, applicable in Analog FM mode only)
- Keypad Lock
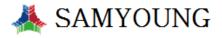- Backlight

- LED
- Tones
- Language

6.7.2 Device Info

User can check the basic information of the radio, including Radio Own Id, Serial Number, Model Name, SW Version, BB Version, etc.

7. Specifications
7.1 General

Frequency range	UHF:400-406, 406.1-440MHz
Channel	512 channels
Channel spacing	12.5kHz
Zone	Max 32 zones, Max 16 channels per zone
Scan list	Max 10 scan lists, Max 16 channels per list
Operating voltage	7.4V
Operating temperature	-30°C~+60°C
Store temperature	-40°C~+85°C
Antenna impeadence	50Ω
Audio output power	≤1000mW@16Ω
Battery capacity	7.4V 2600mAh standard Li-ion battery
LCD	2 lines BW graphic
ESD	IEC61000-4-2 level3
Dust & Water proof	IEC60529-IP67
Dimension(H*W*D)	105*51*33mm(not including antenna)
Weight	270g

7.2 Transmitter

RF Output power	High: ≤5W Low: ≤2W
FSK error	1.5% (typ.)
Magnitude error	<0.3%
Symbol deviation error	1944Hz (±10%)
Adjacent channel power	60dB
Adjacent channel transient power(up/down)	50dB
Modulation limiting	±2.5KHz
FM hum & noise	-40dB
Conducted radiated spurious emission	<-36dBm
Frequency error	±1.0ppm
Audio distortion	3%
Digital protocol	ETSI TS 102 361-1, -2, -3
Vocoder type	AMBE+2

7.3 Receiver

Digital sensitivity(5% BER)	0.22uV
Adjacent channel selectivity	>63dB
Intermodulation distortion	>70dB
Spurious rejection	>70dB
Blocking	>90dB
Hum and noise	-40dB
Audio response	+1dB ~ -3dB
Conducted spurious emission	-57dBm

Attention In case of Use

This transceiver works on frequencies which are not generally permitted.

For frequency allocation, apply for a licence at your local spectrum management authority.

For actual usage contact your dealer or sales shop in order to get your transceiver adjusted to the al-located frequency range.

Important Notice for North American Users Regarding 406 MHz Guard Band

The U.S. Coast Guard and National Oceanographic and Atmospheric Administration have requested the cooperation of the U.S. Federal Communications Commission in preserving the integrity of the protected frequency range 406.0 to 406.1 MHz, which is reserved for use by distress beacons. Do not attempt to program this apparatus, under any circumstances, for operation in the frequency range 406.0 - 406.1 MHz if the apparatus is to be used in or near North America.

Warning - Frequency band 406 - 406.1 MHz is reserved for use ONLY as a distress beacon by the US Coast Guard and NOAA. Under no circumstance should this frequency band be part of the preprogrammed operating frequencies of this radio.

Warning! FCC RF Exposure Requirements

This Radio has been tested and complies with the Federal Communications Commission (FCC) RF exposure limits for Occupational Use/Controlled exposure environment. In addition, it complies with the following Standards and Guidelines:

- FCC 96-326, Guidelines for Evaluating the Environmental Effects of Radio-Frequency Radiation.
- FCC 47C.F.R 2.1091, 2.1093, 1.1310, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
- ANSI/IEEE C95.1-1992, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz.

ANSI/IEEE C95.3-1992, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields-RF and Microwave.

WARNING: This radio generates RF electromagnetic energy during transmit mode. This radio is designed for and classified as *Occupational Use Only*, meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards. This radio is not intended for use by the *General Population* in an uncontrolled environment.
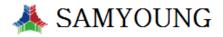
Operational Instructions and Training Guidelines

CAUTION: To ensure that your expose to RF electromagnetic energy is within the FCC allowable limits for occupational use, always adhere to the following guidelines:

- Please read this manual carefully to become familiar with the features of this transceiver.
- Do not transmit the radio without an antenna connected.
- This radio is NOT approved for use by the general population in an uncontrolled environment. This radio is restricted to occupational use, work related operations only where the radio operator must have the knowledge to control its RF exposure conditions.
- When transmitting, hold the radio in a vertical position with its microphone 1 to 2 inches (2.5 to 5 cm) away from your mouth and keep the antenna at least 1 inch (2.5cm) away from your head and body.
- The radio must be used with a maximum operating duty cycle not exceeding 50 %, in typical Push-to-Talk (PTT) configurations. DO NOT transmit for more than 50 % of total radio use time (50 % duty cycle). Transmitting more than 50 % of the time can cause FCC RF exposure compliance requirements to be exceeded.
  The radio is transmitting when the red LED on the top of the radio is illuminated. You can cause the radio to transmit by pressing the PTT button.
- When operate the radio with the belt-clip, make the transmission time as short as possible, to keep the Body Worn configuration.
- Battery Pack shall not be exposed to excessive heat such as sunshine, fire or the like.
- Always use Samyoung Co.,Ltd authorized accessories.
-

The information listed above provides the user with the information needed to make him or her aware of RF exposure, and what to do to assure that this radio operates with the FCC RF exposure limits of this radio.

Electromagnetic Interference/Compatibility

During transmissions, this radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so.
Do not operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals, health care facilities, aircraft, and blasting sites.

FCC License Information

This radio operates on communications frequencies which are subject to FCC (Federal Communications Commission) Rules and Regulations. FCC Rules require that all operators using Private Land Mobile radio frequencies obtain a radio license before operating their equipment.

FCC Information

For a Class B digital device or peripheral:
the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications to this transceiver, not expressly approved by Samyoung co.,Ltd, could void your authority to operate this transceiver under FCC regulations.