SINCGARS NON-ICOM GROUND RADIO OPERATOR'S POCKET GUIDE



RADIO SETS

MANPACK RADIO AN/PRC-119) (NSN: N/A) (EIC: N/A)

VEHICULAR (AN/VRC-87 THRU AN/VRC-92)

(NSN: N/A) (EIC: N/A)

OPERATOR ROADMAP

FLOW CHARTS

JAMMING/ANTIJAMMING

TROUBLESHOOTING CHECKLIST

Approved for public release; distribution is unlimited.

Headquarters, Department of the Army

1 SEPTEMBER 1992

♣SAFETY STEPS**♣**

- DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL.
- IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL.
- SEND FOR HELP AS SOON AS POSSIBLE.
- AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION.
- FOR ARTIFICIAL RESPIRATION, REFER TO FM21-11.

WARNING

RF ENERGY IS PRESENT NEAR ANTENNA DURING TRANS-MISSION MAINTAIN AT LEAST 30 INCHES BETWEEN VEH-ICULAR ANTENNA AND PERSONNEL DURING TRANSMIS-SIONS . WARNING



HIGH VOLTAGE

EXISTS AT CONNECTOR J1 ON VEHICULAR MOUNTING ADAPTER. AVOID PERSONAL INJURY: BE SURE J1 IS COVERED OR CAPPED WHEN NOT IN USE.

DEATH OR SERIOUS INJURY CAN RESULT:

- When antenna tip caps are not installed on antennas.
- When a tied-down antenna hits a fixed object such as an overhead bridge, tree limb, etc. Flying antenna parts might strike nearby personnel.

	TABLE OF CONTENTS	
<u>SUBJECT</u>		PAGE
Front Panel	Illustration	2
Operator Roadn	nap	3
Flow Charts		
TASK 1	Single Channel Frequencies	4
TASK 2	Local Fills	6
TASK 3	Net Opening	11
TASK 4	Communicate In FH Net	. 13
TASK 5	Maintain Net	14
Jamming and A	ntijamming	16
Operator Troub	leshooting Checklist	24
Abbreviations U	Jsed	25

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SCOPE

This pocket guide is intended for use by trained SINCGARS Ground NON-ICOM radio Operators.

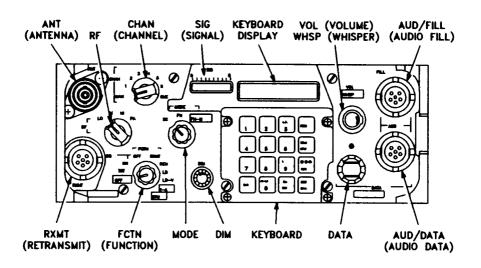
It covers Operator tasks and provides flow charts showing steps required to perform Operator functions. It serves as a handy memory jogger to help trained Operators follow required procedures.

It also provides guidance on how to respond to jamming and an Operator Troubleshooting Checklist.

Whenever more Information is needed, or when performing Pre-Mission Checks, refer to the Operator's Manual (TM 11-5820-890-10-3).

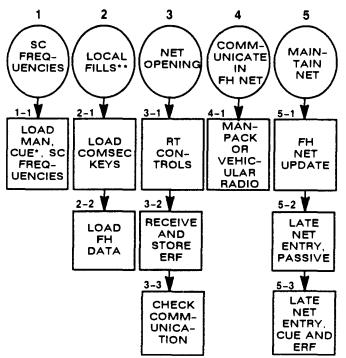
This manual supersedes TM 11-5820-890-10-4, dated 1 October 1989

RT FRONT PANEL





OPERATOR ROADMAP



- * (WHEN DESIGNATED BY COMMANDER)
- ** (UNIT SOP MAY CALL FOR LOCAL FILL TASKS TO BE PERFORMED BY COMMUNICATIONS SPECIALISTS OR KEY NCO'S)

TASK 1: SC FREQUENCIES		
TASK 1-1	ACTIONS	RESULTS
LOAD: MAN. CUE*, or SC frequencies	(1) <u>Get:</u> Frequencies from SOI or NCS	* (When desig- nated by com- mander)
SC FH FH-M	Set: MODE to SC	
SQ OFF ROUT ON REM IST LD LD-V	FCTN to Z-A	Display shows "GOOD" (or contact unit maintenance)
 	FCTN to LD	
CHAN 2 5 6 CUE	CHAN to MAN. CUE. or 1 thru 6	Note: ("STO X and "XXXXX" indicate num- bers obtained from NCS or SOI).

TASK 1: SC FREQUENCIES		
TASK 1-1	ACTIONS	RESULTS
1 2 3 ms 6 4 3 6 ms 7 8 ms 6 ms	(2) Press: FREQ FREQ CLR CLR XXXXX (Frequency from NCS or SOI)	Display shows "00000" or "30000" Display shows " Display shows "XXXXX"
	(3) Press: Sto ENT Sto/ENT	Display bilnks*
SQ — FCTN — OFF RXMIT ON LD LD-V F-A	(4) <u>Set:</u> FCTN to SQ ON	SC loading is complete Indicates data is stored

FLOW CHART				
TA	TASK 2: LOCAL FILLS			
TASK 2-1	ACTIONS	RESULTS		
LOAD: KY-57	(1) <u>Install:</u> KY-57 battery (manpack only)	(If required)		
	KY-57 in vehic- ular mounting base			
	(2) <u>Connect:</u> KY-57 to radio	(If required)		
	(3) <u>Set:</u> KY-57 COMSEC to C and register to a numbered position			
	(4) <u>Turn:</u> KY-57 power to ON	COMSEC alarm is heard		
FUNCTION SWITCH FILL CABLE				

TASK 2: LOCAL FILLS		
TASK 2-1	ACTIONS	RESULTS
	(5) Press: Handset push- to talk 2 times	COMSEC alarm changes to a steady tone
	(6) <u>Set:</u> KY-57 MODE to LD	
	(7) Connect: KYK-13 to KY-57 using fill cable	
	(8) <u>Turn:</u> KYK-13 ON and fill register to a numbered position	
	(9) <u>Press:</u> Handset PTT switch	Hear beep in handset and KYK-13 lamp blinks
	(10) <u>Turn:</u> KYK-13 OFF and disconnect from KY-57	
	(11) <u>Set:</u> KY-57 MODE to C	

TASK 2: LOCAL FILLS			
TASK 2-2	ACTIONS	RESULTS	
LOAD: FH data	(1) <u>Turn:</u> Fill device to OFF		
	(2) Connect: Fill device to RT AUD/FILL conn- ector using fill cable		
SELECT CONNECTOR SWITCH			
FUNCTION SWITCH			
FILL DEVICE	FILL	AUD/DATA CONNECTOR	
SQ TOFF RXMT ON REM TST LD			
DFF LD-V	(3) <u>Set:</u> FCTN to LD-V		

TASK 2: LOCAL FILLS		
TASK 2-2	ACTIONS	RESULTS
SC FH FH-M	(4) <u>Set:</u> MODE to FH	Display shows "FILL t" and tone is heard
CHAN 2 3 4 5 MAN CUE	(5) <u>Set:</u> CHAN to MAN	
13 0 0 3 12 0 4 11 0 0 5 10 0 0 6	(6) <u>Set:</u> Fill device to T1 or T2 (per NCS or SOI)	
ON ZA	(7) <u>Turn:</u> Fill device to ON	
	(8) <u>Press:</u> H-Ld button H-Ld O	Display shows "LOAd" then "Sto t" and a beep is heard: then "Cold"*

TASK 2: LOCAL FILLS		
TASK 2-2	ACTIONS	RESULTS
	(9) <u>Iurn:</u>	
	FCTN to LD	
	(10) <u>Turn:</u>	
	Fill device OFF and disconnect	
	(11) <u>Turn:</u>	
	MODE to SC	Display shows MAN frequency XXXXX
	(12) <u>Turn:</u>	
	MODE to FH	Display reads "Cold" Ready to re- ceive ERF from NCS

TASK 3: NET OPENING		
TASK 3-1	ACTIONS	RESULTS
SET: RT controls	(1) <u>Follow:</u> NCS directions	
ON OFF RXMT ON REM TST OFF LD LD-V	(2) <u>Set:</u> FCTN to LD	
Z-A STW CHAN 2 5	CHAN to MAN	
MAN CUE	MODE to FH	Display shows "COId" *
SC FH FH-M		* When display shows "COId" RT is ready to receive ERF
TASK 3-2	ACTIONS	RESULTS
RECEIVE: ERF STORE: ERF where directed/desired	(1) Walt: For NCS to send ERF When ERF is received	Display shows "HF XXX" or "HL XXX"
1 2 3 FREO (5) 4 5 6 SW 7 8 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	(2) Press: Sto/ENT Number 1 **	Display shows "Sto_" Display shows "Sto 1" and

^{**} Your own primary net is normally stored in CHAN 1. When entering other nets, use CHAN 2-6 as desired.

TASK 3-3 CHECK: Communications (1) Set: FCTN to SQ ON (2) Change: CHAN switch to channel 1 CHAN SIG COMMUNICATION ANT CHAN SIG KEYBOARD VOL (VOLUME) AUD/FILL) (ANTENNA) RF (CHANNEL) (SIGNAL) DISPLAY WHSP (WHISPER) (AUDIO FILL) REMAIN FCTN MODE DIM KEYBOARD DATA (AUDIO DATA) (RETRANSMIT) (FUNCTION)	TASK 3: NET OPENING		
CHAN 2 3 4 5 6 CHAN switch to Channel 1 Display shows "F XXX" CHAN SWITCH TO CHAN SWITCH TO CHANNEL COMMUNICATION WHEN NCS calls net CHAN SWITCH TO DISPLAY WHEN COMMUNICATION OF ERF complete Note: If NCS falls to contact you, set CHAN to MAN and stand by ANT CHAN SKG KEYBOARD VOL (VOLUME) AUD/FILL OF THE CHANNEL	TASK 3-3	ACTIONS	RESULTS
CHAN switch to channel 1 CHAN switch to channel 7 ERCEPTION OF ERF complete Note: If NCS falls to contact you, set CHAN to MAN and stand by CHAN SKG KEYBOARD VOL (VOLUME) (AUDIO FILL) CHAN SWITCH IN SKG KEYBOARD VOL (VOLUME) (AUDIO FILL) CHAN SWITCH IN SKG COMMUNICATION OF THE CHANNEL IN SKG CHANNEL I		(1) <u>Set:</u> FCTN to SQ ON	
Communication when NCS calls net Note: If NCS falls to contact you, set CHAN to MAN and stand by ANT CHAN SIG KEYBOARD VOL (YOLUME) AUD/FILL (ANTENNA) RF (CHANNEL) (SIGNAL) DISPLAY WHISP (WHISPER) (AUDIO FILL) REMIT FCTN MODE DIM KEYBOARD DATA AUD/DATA	CHAN 2 6	CHAN switch to	
fails to contact you, set CHAN to MAN and stand by ANT CHAN SIG KEYBOARD VOL (VOLUME) AUD/FILL (ANTENNA) RF (CHANNEL) (SIGNAL) DISPLAY WHSP (WHISPER) (AUDIO FILL) RXMT FCTN MODE DIM KEYBOARD DATA AUD/DATA	CUE	Communication	ERF complete
(ANTENNA) RF (CHANNEL) (SIGNAL) DISPLAY WHISP (WHISPER) (AUDIO FILL)		net	fails to contact you, set CHAN to MAN and
functionally for contains			

TASK 4: COMMUNICATE IN FH NET		
TASK 4-1	ACTIONS	RESULTS
Manpack or veh- lcular radio	(1) Push-to-talk	Message sent
	(2) Adjust volume to hear	Message re- celved
	(3) <u>Seek:</u> Line-of-sight	Avoid loss of communication
HILL, ETC. (POOR LOS)		
GOOD		
	(4) React if jammed (see pages 16 thru 21)	Avoid loss of communication

TASK 5: MAINTAIN NET		
TASK 5-1	ACTIONS	RESULTS
RECEIVE: FH net update ⊢FCTN ¬	(1) <u>Follow:</u> NCS directions	
SO OFF RXMT ON REM LD LD-V ET-A	(2) <u>Set:</u> RT FCTN to LD	
	(3) <u>Walt:</u> For NCS to send ERF	Display shows "HF XXX" or "HL XXX"
125 R	(4) Press: Sto/ENT Sto	Display shows "Sto_"
	Number as directed	Display shows "STO X" and blinks
	(5) <u>Turn:</u> To channel where ERF Is stored	Display shows

TASK 5: MAINTAIN NET								
TASK 5-3		ACTIONS	RESULTS					
LATE NET ENTRY: CUE and ERF	(1)	Turn:						
method		KY-57 to OFF						
CHAN 2 3 4 5	(2)	Set:	* NOTE: Load					
MAN 6 CUE		CHAN to CUE	proper CUE and MAN fre- quencles for net to be con-					
- FCTN -		FCTN to SQ OFF	tacted.					
SQ — OFF RXMT ON REM		RF o HI						
OFF LD	(3)	Press: Handset push- to-talk for 4 seconds						
LO M HI		THEN, AT ONCE						
RF PA	(4)	Turn:						
		KY-57 to ON	Hear beeping tone					
			NOTE: Reload own unit MAN frequency upon leaving net en- tered by CUE and ERF.					

TASK 5: MAINTAIN NET							
TASK 5-3	ACTIONS	RESULTS					
	(5) <u>Press:</u> PTT switch and release	KY-57 alarm is cleared					
	(6) <u>Wait:</u>						
	For answer	NCS/alternate NCS will re- spond on CUE frequency					
]]	(7) Repeat:						
	After 15 seconds until CUE call is answered	Note: Turn KY-57 to OFF for CUE then to ON for response					
	(8) <u>Follow:</u>						
	Procedures as directed for receiving ERF	CUE and ERF late net entry is complete					

JAMMING AND ANTIJAMMING

JAMMING. Jamming is the Intentional transmission of signals that interrupt your ability to receive needed signals. Interference is the accidental transmission of signals that also interrupt your ability to receive needed signals. If you are being jammen, the might sound like strong static, misleading signals, or random noise: or the net may be quiet with no signals heard. These signals depend upon the type of jamming signals and whether your net is operating in single channel (SC) or frequency hopping (FH) mode. The source of jamming could be power generators, radar sets, high power RF radio sets, or intentional enemy jammers.

SINGLE CHANNEL OPERATION.

SYMPTOM

SIG marker is lit and showing a signal higher than 3. You hear no traffic or noise and you are not transmitting.

POSSIBILITIES

- (1) You have a bad handset if you disconnect the handset and the lighted signal goes away (stuck or "hot" mike).
- (2) You are being jammed if you set RT FCTN switch to SQ OFF and hear strong static or random noise. You can confirm this by disconnecting the antenna (MP) or antenna cable (vehicular). The SIG marker will drop and the noise will go awav or be reduced.

ACTION

- (1) Try to free-up the stuck mike by pressing push-to-talk 2 or 3 times, Remove faulty handset and replace with one that is good.
- (2) Change your tactical location. Try to mask your RT/antenna by placing hills, rocks, buildings, etc. between you and the enemy. Notify your supervisor and prepare a MIJI feeder report.

SYMPTOM

POSSIBILITIES

(3) You may have faulty or "locked-up" RT if you try removing the antenna (MP) or antenna cable (vehicular) and the SIG marker remains higher than 3.

ACTION

(3) Set RT FCTN switch off then to SQ ON. If the problem still exists, contact unit maintenance.

SIG marker is lit and showing a signal higher than 3 You hear random radio traffic or radio signals. You have enemy or friendly radio interference.

Set RT FCTN to SQ OFF and listen for radio traffic. Try to identify a friendly call sign if you can determine friendly signals. If you determine that jamming is from an enemy source. change location and use terrain to mask your RT from jamming enemy source. Switch to a better antenna (If using a manpack. switch to a vehicular or OE-254), Contact NCS and your supervisor.

JAMMING AND ANTIJAMMING Continued

SINGLE CHANNEL OPERATION. Continued

SYMPTOM

SIG marker is lit and showing a signal higher than 3, The SIG marker may light on and off at regular intervals (pulsing) or in a random cycle. You may or may not hear any noise.

POSSIBILITIES

(1) You may have enemy sweep jamming.

ACTION

- (1) Set RT FCTN to SQ OFF. You may hear a very high-pitched noise or static each time the marker lights. Use terrain to mask your RT from the enemy's suspected location. Contact NCS and your supervisor.
- (2) You may have radio or radar interference.
- (2) Symptoms or actions are similar to sweep jamming (above) except that signals will be coming from a friendly source (maybe). Use terrain to mask your RT from suspected location. source Contact NCS and your supervisor.

FREQUENCY HOPPING OPERATION.

SYMPTOM

SIG marker is lit and showing a signal higher than 3. The signal marker may light on and off at regular intervals (pulsing) or light steady. There is strong static when you attempt to hear net traffic.

POSSIBILITIES

(1) You are being jammed if you disconnect the antenna (MP) or antenna cable (vehicular) and the SIG marker is reduced or drops to 3 and the noise is reduced.

ACTION

(1) Reconnect the antenna. Use terrain to mask your RT from the suspected enemy location. Contact NCS and your supervisor.

- (2) You may be receiving interference from a nearby high-power communication system (this is a co-site problem)
 - (2) If possible, obfain authorization to have the interfering equipment turned off (this determines if you are receiving interference or if you are being jammed by the enemy). Move awav from source of interference by using terrain to mask vour from source. Attempt to remotely locate vour antenna(s) or RTs. separating antennas bv least 50 meters. Use one RT at a time.

JAMMING AND ANTIJAMMING Continued

FREQUENCY HOPPING OPERATION. Continued

SYMPTOM

SIG marker is lit and showing a signal higher than 3. You hear a constant hiss or backaround noise in the handset, but no real noise or radio traffic.

POSSIBILITIES

- (1) There is a compromised or captured RT in your net. The compromised RT is conto act as a iammer.
- stantly transmitting
- (2) There is a stuck mike or bad handset in your net that locked in the transmit (push-totalk) position.
- (3) Your RT has a stuck handset if you blow or speak into the mike and vou hear sidetone.

ACTION

- (1) Press handset push-to-talk times. If voice or data transmissions return, continue to operate. Contact NCS or refer to SOL Use authentication procedures.
- (2) Push handset push-to-talk 2 times. Contact NCS. Use authentication procedures.
- (3) Disconnect handset from RT and the SIG marker drops to LO or below. Press handset push-to-talk several times to free the switch. If you reconnect the handset and the SIG marker lights, replace the bad handset with one that is good.

<u>SYMPTOM</u>

Your net is not in a silence directive and you haven't heard traffic for a period of time.

<u>POSSIBILITIES</u>

Your RT is out of FH sync time.

ACTION

Attempt to contact NCS or another member 2 or 3 times. If unsuccessful, perform passive late net entry. If late net entry is unsuccessful, perform CUE and ERF procedure. Follow NCS direction.

SIG marker steadily flickers. You can communicate, but there is background popping or static when you are receiving. You notice your RT communication range is reduced

Co-site interference from another

If possible, ask the interfering radio operator to stand by or to reduce RF power. Attempt to move your RT or antenna 50 meters or more. Contact NCS.

Note: When a station operating in plain text calls one operating in cipher text, the receiving operator can hear the message and the beeping in the background. This tells the receiving operator that the sender is broadcasting in plain text.

OPERATOR'S TROUBLESHOOTING CHECKLIST If you have difficulty communicating, take the time to perform the following checks before you decide that there is something wrong with your radio.

- Make sure you have all the switches set properly.
- Check all cable connections to ensure that they are tight.
- Make sure that the antenna is properly connected and positioned.
- Try to verify that you have LOS with other stations.
- Change position to see if communications improve.
- If you have not heard net traffic in some time, perform passive late net entry.
- Make sure your radio has adequate power (especially manpack).
- Look and see if another net station is co-located in your area (called co-site interference).
- Determine if you are being jammed by the enemy.
 If so, take appropriate action.
- Should your radio give you a strange, unexplained message which does not automatically clear:

 (1) Set FCTN to OFF, then to SQ ON. This action may clear your problem.
 (2) If it does not, and the situation permits, set FCTN to Z-A and wait for GOOD, then to STW and wait for GOOD. Now run self-test. If GOOD results, reload radio and and re-enter net. If problem still exists. contact unit maintenance.

If you still cannot communicate, there maybe something wrong with your radio. However, any one of the above operator trouble-shooting actions may put you back into communications. They are well worth trying.

ABBREVIATIONS USED

CHAN Channel CLR Clear

COMSEC Communication Security

CT Cipher Text

ECCM Electronic Counter-Counter Measures

ENT Enter

ERF Electronic Remote Fill

FCTN Function

FH Frequency Hopping
HUB Hold Up Battery
KEK COMSEC Key

LD Load

LD-V Load Variable

LO Low

LOS Line of Sight Medium

NCS Net Control Station
PA Power Amplifier

PT Plain Text REM Remote

RF (PWR) Radio Frequency Power
RT Receiver-Transmitter
RV Receive Variable
RXMT Retransmit

SC Single Channel

SIG Signal

SOI Signal Operating Instructions

SQ ON Squelch On STO Store

STO Store Stow

SYNC Synchronization
TD Time Delay
TEK COMSEC Key

 TST
 Test

 VOL
 Volume

 WHSP
 Whisper

 Z
 Zero

WARNING

- A lithium battery used with your manpack radio contains pressurized sulfur dioxide gas. The gas is toxic, and the battery MUST NOT be abused in any way which may cause the battery to rupture.
- DO NOT heat, short circuit, crush, puncture, mutilate, or disassemble batteries.
- DO NOT USE any battery which shows signs of damage, such as bulging, swelling, disfigurement, a brown liquid in the plastic wrap, a swollen wrap, etc.
- DO NOT test lithium batteries for capacity.
- DO NOT recharge lithium batteries.
- DO NOT dispose of lithium batteries with ordinary trash/ refuse. Turn in discharged batteries to local supply.
- If the battery compartment becomes hot to the touch, if you hear a hissing or burping (i.e. battery venting), or smell irritating gas (sulfur dioxide), IMMEDIATELY TURN OFF the equipment and leave the area.
 - 1. Allow the equipment to cool at least one hour.
 - 2. Remove and replace the battery after the equipment has cooled to the touch,
 - If there is a safety incident, or if you believe a safety hazard exists, notify your local Safety Office/Officer, file a Product Quality Deficiency Report. SF Form 368, and notify the CECOM Safety Office, Ft. Monmouth, NJ at AV 995-3112.
- DO NOT use a Halon type fire extinguisher on a lithium battery fire.
- In the event of a fire near a lithium battery (ies), rapid cooling of the battery (ies) is important. Flood the equipment with water, or use a carbon dioxide (CO₂) extinguisher. Control of the equipment fire and cooling may prevent the battery from venting and potentially exposing lithium metal. In the event that the lithium metal becomes involved in fire, the use of a graphite based Class D fire extinguisher is recommended.
- DO NOT store batteries in unused equipment.
- DO NOT store lithium batteries with other hazardous materials. Keep them away from open flame or heat.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN

General, United States Army Chief of Staff

Official:

Mitter St. Samuelle

Administrative Assistant to the Secretary of the Army

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