

TECHNICAL MANUAL

**OPERATOR, ORGANIZATIONAL,
DIRECT SUPPORT, GENERAL SUPPORT, AND
DEPOT MAINTENANCE MANUAL**

**RADIO SET AN/FRC-109 (V)
(NSN 5820-00-192-2372)**

**(LENKURT ELECTRIC 76-CLASS
MICROWAVE RADIO ASSEMBLIES)**

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OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

RADIO SET AN/FRC- 109(V) (NSN 582-00-192-2372) (LENKURT ELECTRIC 76-CLASS MICROWAVE RADIO ASSEMBLIES)

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This technical manual is an authentication of the manufacturer's commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

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E-9	AFC balance check, test setup.....	E-14
E-10	RF power monitor unit, test equipment setup	E-15

LIST OF DRAWINGS

Drawing No	Caption	Fold-Out No
AA-39006 (Sheets 1 through 4)	76CI-39006 Microwave Terminal Assembly.	FO-1
AS-39006-M1	76C1-39006 Model 1 Microwave Terminal Assembly.	FO-2
AW-39006-M1 (Sheets 1 through 8)	76C1-39006 Model 1 Microwave Terminal Assembly.	FO-3
AW-39025 (Sheets 1 through 11)	76-39025 Microwave Assembly.	FO-4
BL-39006 (Sheets 1 through 8)	76C1-39006 Microwave Terminal Assembly Block and Level Drawing.	FO-5
BL-39025 (Sheets 1 through 9)	76-39025 Microwave Terminal Assembly Block and Level Drawing.	FO-6
EAS-28408-M1 (Sheets 1 through 3)	28408 Model I DC Power Supply.	FO-7
EAS-28411-M1	28411 Model 1 Transmit Pilot Detector Unit.	FO-8
EAS-28412-M1	28412 Model I Modulating Amplifier Unit.	FO-9
EAS-28413-M1	28413 Model I Receive Pilot Detector Unit.	FO-10
EAS-28414-M1 (Sheets 1 and 2)	28414 Model 1 Noise Mute Unit.	FO-11
EAS-28416-M1 (Sheets 1 and 2)	28416 Model 1 Transmit Pilot Detector Unit.	FO-12
EAS-28417 (Sheets 1 through 3)	28417 Model 1 IF Amplifier Unit.	FO-13
EAS-28418-M2 (Sheets 1 through 3)	28418 Model 2 Limiter Discriminator Unit.	FO-14
EAS-28419-M2	28419 Model 2 Receiver Automatic Frequency Control Unit.	FO-15

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Drawing No	Caption	Fold-Out No
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EAS-28428-M1 (Sheets 1 and 2)	28428 Model 1 Auxiliary Amplifier Unit.	FO-18
EAS-28430-M1	28430 Model 1 TransM1t Pre-emphasis Unit.	FO-19
EAS-28439-M1	28439 Model 1 Receive De-emphasis Unit.	FO-20
EAS-28443-M1	28443 Model 1 Pad Unit.	FO-21
EAS-28449-M1	28449 Model 1 Pilot Oscillator Unit.	FO-22
EAS-28452-M1 (Sheets 1 through 3)	28452 Model 1 48 VDC Regulator/Filament Power Unit.	FO-23
EAS-28453-M1 (Sheets 1 through 4)	28453 Model 1 High Voltage Power Unit.	FO-24
EAS-28454-M1 (Sheets 1 and 2)	28454 Model 1 48 VDC Converter/Low Voltage Power Unit.	FO-25
EAS-28461-M1	28461 Model 1 Rectifier Panel.	FO-26
EAS-28474-M1 (Sheets 1 through 4)	28474 Model 1 WR-112 Waveguide Accessory Equipment.	FO-27
EAS-37400-M2 (Sheets 1 and 2)	37400 Model 2 Transmitter Shelf.	FO-28
EAS-37401-M1 (Sheets 1 through 3)	37401 Model 1 Receiver Shelf.	FO-29
EAS-37409-M1 (Sheets 1 through 4)	37409 Model 1 Combiner Unit.	FO-30

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Drawing No	Caption	Fold-Out No
EAS-37420-M1 (Sheets 1 through 3)	37420 Model 1 Equipment Shelf.	FO-31
EAS-37431-M1 (Sheets 1 through 5)	37431 Model 1 Baseband Filter Unit.	FO-32
EAS-37434-M1	37434 Model 1 Supervisory Hybrid Unit.	FO-33
EAS-37440-M1	37440 Model 1 6w-4w Bridge Unit.	FO-34
EAS-37441-M1 (Sheets 1 through 3)	37441 Model 1 Supervisory Filter Unit.,	FO-35
EAS-37442-M2 (Sheets 1 through 3)	37442 Model 2 Patching Unit.	FO-36
EAS-37443-M1	37443 Model 1 Noise Filter Unit.	FO-37
EAS-37444-M1 (Sheets 1 through 3)	37444 Model 1 Auxiliary Amplifier Unit.	FO-38
EAS -37445-M1	37445 Model 1 Receive Pilot Detector Unit	FO-39
EAS-37450-M1	37450 Model 1 Alarm Display Unit.	FO-40
EAS-37453-M1 (Sheets 1 and 2)	37453 Model 1 Relay Unit.	FO-41
EAS-37456-M1	37456 Model 1 RF Power Monitor Unit.	FO-42
EAS-37457-M1 (Sheets 1 and 2)	37457 Model 1 Combiner Unit.	FO-43
EAS-37460-M1 (Sheets 1 and 2)	37460 Model 1 4W-4W Bridge Unit.	FO-44
EAS-37463-M1	37463 Model 1 TransM1t Waveguide Panel.	FO-45

LIST OF DRAWINGS (Cont.)

Drawing No	Caption	Fold-Out No
EAS-37464-M1 (Sheets 1 and 2)	37464 Model 1 Receive Waveguide Panel.	FO-46
EAS-37490-M1 (Sheets 1 and 2)	37490 Model 1 DC Power Supply Shelf.	FO-47
EAS-37492-M2 (Sheets 1 and 2)	37492 Model 2 48V Regulator-Inverter Power Unit.	FO-48
EAS-37493-M1 (Sheets.1 and 2)	37493 Model 1 Low Voltage Power Unit.	FO-49
EAS-37494-M2 (Sheets 1 and 2)	37494 Model 2 High Voltage Power Unit.	FO-50
EAS-44872-M1	44872 Model 1 Waveguide Switch Panel.	FO-51

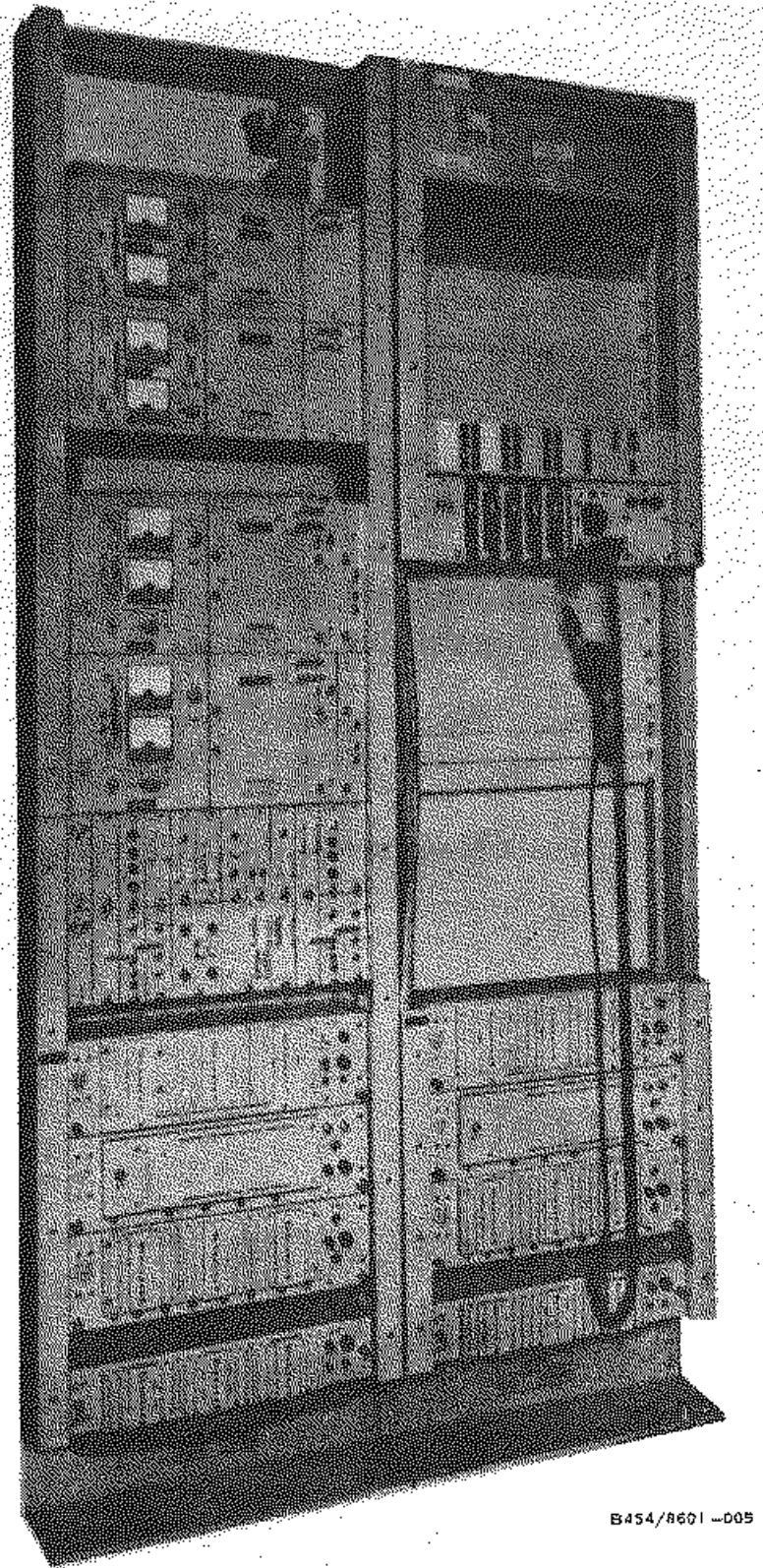


Figure 1-1. Radio Set AN/FRC-109(V), Typical Terminal

CHAPTER 1

INTRODUCTION

SECTION I. GENERAL

1-1. Scope

This manual describes Radio Set AN/FRC-109(V) as used in the Integrated Wideband Communications System, Southeast Asia, hereafter referred to as the Lenkurt 76-Class Microwave Radio Assembly. It includes installation and alignment instructions, and covers operator's, organizational, direct support (DS), general support (GS), and depot maintenance.

1-2. Index of Technical Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment.

1-3. Maintenance Forms, Records, and Reports

- a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used v for equipment maintenance will be those described by TM 38-750, The Army Maintenance Management System.
- b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMAT- INST 4355.73/AFR 400-54/MCO 4430.3E.
- c. Discrepancy in Shipment Report (DISREP) (SF361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUP- INST 461 0.33B/AFR 75-1 8/MCO 4610.1 9C/DLAR 4500.15.

1-3.1. Reporting Errors and Recommending Improvements

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), direct to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. In either case a reply will be furnished direct to you.

1-3.2. Reporting Equipment Improvement Recommendations (EIR)

If your Radio Set AN/FRC-109(V) need improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 386 (Quality Deficiency Report.) Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. We'll send you a reply.

SECTION II

DESCRIPTION AND DATA

1-4. General

This Section describes the Lenkurt 76-class microwave radio assembly and is principally concerned with the 76C1-39006 Terminal Assembly.

The 76-class microwave radio comprises a family of broadband FM systems for operation in the Common Carrier, Industrial, Government, and Auxiliary Broadcast Bands within the frequency range between 5.925 GHz and 13.250 GHz. A series of five assembly designators, 76A, 76B, 76C0 76D, and 76E, identifies equipment which operates within specific microwave frequency bands.

The radio can accept for transmission information contained in a baseband ranging from 20 Hz to 8.5 MHz, providing for up to 960 single-sideband suppressed-carrier (SSBSC) v-f channels, or a color television signal, or the equivalent load in other forms of signals. The transmission characteristics of the radio equipment are compatible with recommendations of the EIA, Bell System, and CCIR as to operating frequencies, impedances, levels, deviation, and emphasis networks.

In areas under jurisdiction of the Federal Communications Commission, the 76B radio is restricted to a maximum load of 420 SSBSC v-f channels at the standard deviation of 200 kHz rms per channel, or the equivalent load in other forms of signals.

One-way and two-way systems are available in a variety of equipment arrangements. These include single-channel, hot-standby, space-diversity, frequency-diversity, and crossband-diversity arrangements. Assemblies can be tailored as required for terminal locations and for repeater locations. When incorporated into a Lenkurt 57B Broadband Path Protection System, one microwave channel can serve as back up for one, two, or three additional parallel channels; only one channel need be two-way.

The radio equipment is of solid-state design, except for the transmitting and local oscillator klystrons. The basic transmitter and receiver are individual shelves. In many assembly configurations the waveguide panel of the individual transmitters and/or receivers are connected together to form a vertical manifold to which the antenna connection is made.

The baseband equipment is designed for plug-in installation and mounts in a shelf (or shelves) separate from the basic transmitter and receiver. This equipment includes various lowpass and highpass filters for frequency separation within the baseband spectrum, auxiliary amplifiers, emphasis networks, receiver combining or transfer equipment, program channel equipment,