ELECTRONICS FACILITIES IN CUBA

ANNEX 2C

CATALOGS OF RCA AND GE EQUIPMENT
USED ON
THE BASIC FIXED RADIO RELAY SYSTEM
1956-60

CIA/RR EP60-73-S2C
November 1960

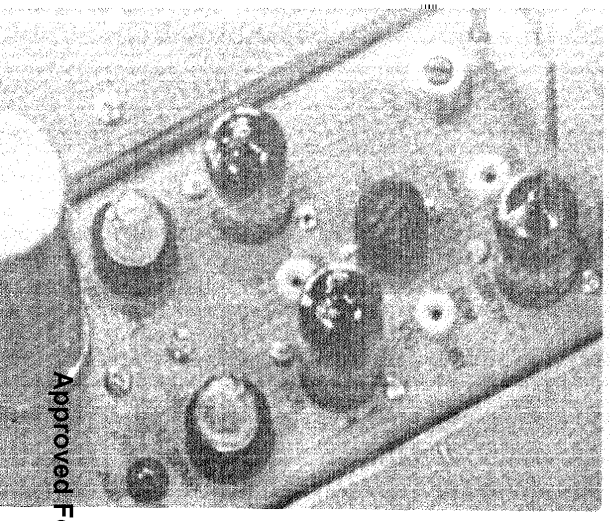
CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

CONTENTS

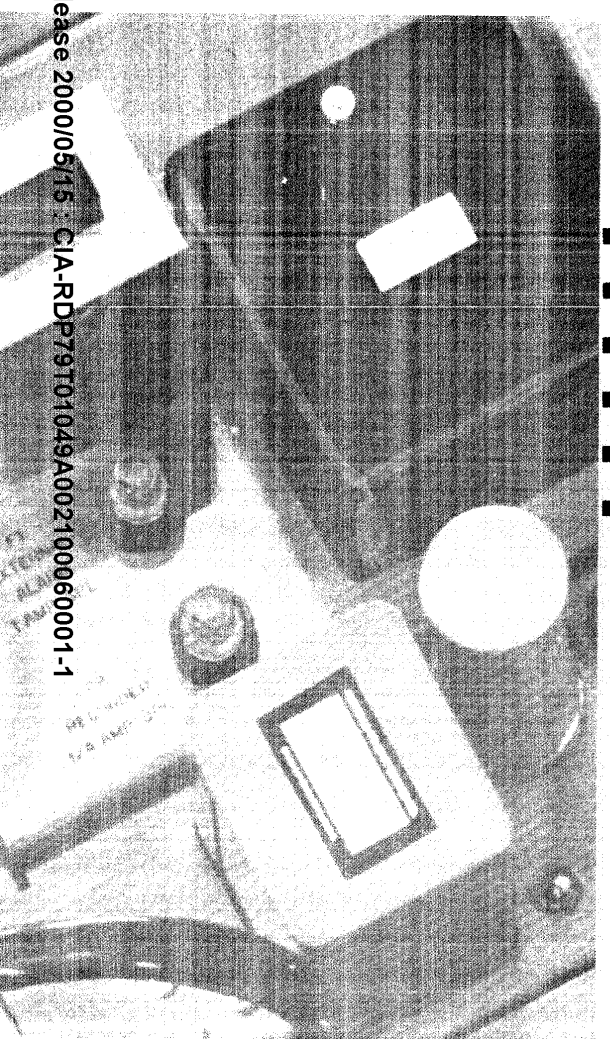
Available, but not included in this Annex, are two copies each of the following equipment brochures

For a diagram of the basic network, see Figure 2 of CIA/RR EP 60-73



2 KMC CHANNEL FACILITY

General Electric MICROWAVE



FEATURES

- Identical Channel Units
- Plug-in Channel Facilities
- Built-in Power Supplies
- External Channel Selectors
- Performance Independent of Loading
- Easily Serviced Swing-out Units

GENERAL ELECTRIC

GENERAL

General Electric Channel Facilities equipment enables all communications and control data to enter and leave the microwave radio system. Channel Facilities are the "doors" through which information comes into and departs from the microwave carrier. At any station where it is desired to transmit or receive information a Channel Facility is required.

APPLICATION

General Electric Channel Facilities are used at microwave stations in accordance with the Application Table. To apply the proper Facility —select the type of station (shown in the diagrams) at which service is required. Next, determine the type of information that is to be transmitted or received (Telephone, V.H.F. Control, Teletype, Telegraph, etc.). Then determine the type of end device to be used (common battery telephone, V.H.F. base station, duplex teletype, etc.). When these three items have been decided the Application Table enables you to select the proper Channel Facility to satisfy your requirements. The Application Table lists the most commonly used Channel Facilities. However, many others are available. If you have a requirement that is not covered by the Application Table consult your Microwave District Sales Manager.

DESCRIPTION

General Electric Channel Facilities consists of three basic components—a channel selector unit, a channel unit, and a termination unit which are combined in various configurations to satisfy station requirements.

1 The channel selector assigns each channel a slot in the microwave transmission and keeps multi-channel information separated throughout the system. The channel selector is an entirely passive device consisting of a

Description continued on next page . . .

Approved For Release 2000/05/15 : CIA-RDP79T01049A002100060001-1

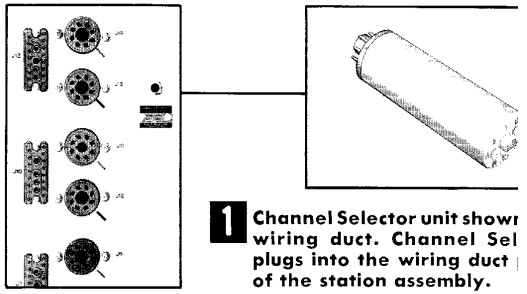
resistor network and a coupling capacitor mounted on a non-keyed socket. This assembly is covered by an aluminum can 1½ inches in diameter and 4 inches high. The can is marked with the assembly model number and the channel designation covered by the assembly. Only four different selector assemblies are required to provide complete 25 channel selection. Channel changes are accomplished simply by rotating the selector assembly until the desired channel designation is aligned with an index mark on the wiring duct. Two identical channel selector assemblies are supplied with each Channel Facility. One is for the modulator or transmission side of the channel and one is for the demodulator or receiver portion.

The channel unit contains its own power supply and performs the dual function of a modulator and demodulator in one chassis. It accepts information from the end device generating the intelligence . . . telephone, teletype, data transmitter, etc. . . . and presents it to the radio equipment for transmission. At a receiving end the channel unit removes the information, that is intended for that station, from the radio equipment and presents it to the end device corresponding to the originating transmitting device.

Termination units are designed specifically to provide the necessary hybrids, signaling relays, connecting blocks and other circuitry necessary to match various end devices to the channel unit. The termination unit consists of two parts: a basic chassis which provides the common circuits and connecting blocks to enable connection to the channel unit, and a module which provides the signaling relays, connections and circuits necessary to allow connection of particular end devices to the channel units. This type of construction allows easy and rapid conversion of channels to meet permanent changes in system requirements and to satisfy a need to temporarily change system loading to meet seasonal or operational peaks. Such changes in channel allocation may be made without interrupting systems operation. When special requirements arise for channel usage, the design of the necessary circuits to meet these requirements is facilitated by the module concept.

TONES

The Application Table shows how services such as Teletype, Telemetry, Supervisory Control and Telegraph are applied to a microwave carrier when these functions are assigned one function per channel. This type of operation is often desired and holds advantages for systems where channel loading is not a problem. However, if a system is to be heavily loaded, individual microwave channels may be sub-multiplexed through use of tones to provide multiple functions on one channel. This sub-multiplexing is accomplished through the use of tone equipment to generate a signal within the voice channel that may be used to carry Teletype, Telemetry, Supervisory Control, Telegraph and other types of information while using only a small portion of the channel for each function. It is possible to put 15 to 18 different pieces of information on the same channel. A 4-Wire continuously inserted Channel Facility is used whenever sub-multiplexing is desired. Tone equipment such as General Electric Type 8 or Type 10 Frequency Shift Tone or Type 9 AM Tone can be used to supply these subcarriers. Such application enables maximum use of each individual channel. This in turn permits maximum system loading. For application data on tone equipment refer to General Electric bulletins ECM32A, ECR321B, ECR322A, ECR323A, ECR324A, and ECR326A.



1 **Channel Selector unit shown wiring duct. Channel Sel plugs into the wiring duct of the station assembly.**

CHANNEL FACI

The following table lists the more commo channel facilities. Channel facilities may be by selecting desired facility from table, a 4029501 prefix to the G = from table. St

	TERMINAL Fig 1	REPE Fig 2
TELEPHONE		
2 Wire 20 Cycle code ring	G2	G2
2 Wire Dial Selective Calling	G3	G3
2 Wire Dial Standard Subscriber	G6	G6
2 Wire Dial Standard Exchange	G7	G7
2 Wire CB Subscriber	G8	G8
2 Wire CB Exchange	G9	G9
2 Wire Local Battery Ringdown	G201	G201
4 Wire Local Battery Ringdown	G273	G273
E & M Between exchanges	G203	G203
VHF CONTROL		
2 Wire VHF Control End	G4	G4
4 Wire VHF Base End	G5	G5
4 Wire VHF Base End w/timer	G211	G211
TELETAPE, TELEMETRY, SUPERVISORY, RELAYING		
4 Wire Continuously Inserted Channel	G1	G1
2 Wire DC Simplex & 4 Wire Duplex Teletype	G10	G10
Impulse Telemetry	G207	G207
Supervisory Control	G207	G207
Directional Relaying	G206	G206
Phase Comparison Relaying	G205	G205
POWER LINE CARRIER EXTENSIONS		
4 Wire Push to talk (4KCA33B1 Carrier)	G268	G268
2 Wire modified for 60 cps ringing	G270	G270
4 Wire with 20 cps ring out	G272	G272

Channel Selector units are automatically furnished with Channe Facilities when channel assignment is made. The four Channe Selectors cover the 25 channels as follows:

CHANNEL SELECTOR	CHANNELS DESIGNATED
4UE4A1	1 6 8 13 15 20 22
4UE4A2	2 5 9 12 16 19 23
4UE4A3	3 4 10 11 17 18 24 2
4UE4A4	7 14 21

NOMINAL MULTIPLEX SPECIFICATIONS

Number of channels	1 to 25 Voice Channels or 1 to 24 Voice plus Service Channels or 1 to 23 Voice plus Service & Alarm
Minimum audio input for 100% modulation	
2 Wire	−18 dbm
4 Wire	−24 dbm
Input Impedance	
2 Wire	600 ohms balanced
4 Wire	600/300/150 ohms balanced
Maximum Audio Output at 100% modulation	
2 Wire	+1 dbm
4 Wire	+7 dbm
Output Impedance	
2 Wire	600 ohms balanced
4 Wire	600/300/150 ohms balanced
Frequency Response referenced to 1000 cycles	
2 Wire	300-2000 cps +.5 to −2 db
4 Wire	200-3000 cps +.5 to −2 db
1000 cycle distortion at 0 dbm output	3% maximum
Signaling	
AC Ringdown	16⅔ − 20 cps, 70-120V
D.C. Loop Signaling	
Battery Voltage (1200 ohm loop)	48V
(400 ohm loop)	24V
Internal loop impedance	400 ohms
Max external loop impedance	1200 ohms
Dialing Speed	15 pulses per second max.
Crosstalk (below 100% modulation)	−55 db

SYSTEMS PERFORMANCES

Assuming that all R.F. paths in a system are designed to provide at least −78 dbw input to each receiver (30 db fade margin) the above specifications will provide the following system performance:

SIGNAL-TO-NOISE (receiver input at least −78 dbw) F1A WEIGHTED

No repeater stations	57.5 db
One repeater station	56 db
Seven repeater stations	54 db
Fifteen repeater stations	52.5 db

TUBE COMPLEMENT

Tubes are only used in the Channel Unit. None are required in the Termination Unit or Channel Selector.

TUBE TYPE	QUANTITY
6BJ7	1
6BK7	4
6U8	1

POWER REQUIREMENTS

115 volts ±5%, 50/60 cps, 0.3 amps
−250 volts ±5%, 0.8 ma

ADDITIONAL INFORMATION

Request these bulletins
Terminal Equipment—ECM-59 RF Repeater Equipment—ECM-65 Multiplex Repeater Equipment—ECM-66

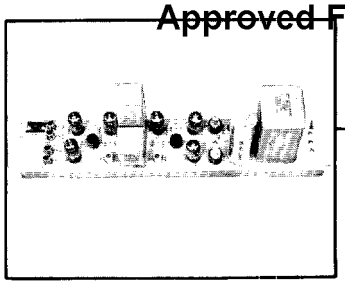
COMMUNICATION PRODUCTS DEPARTMENT

GENERAL ELECTRIC

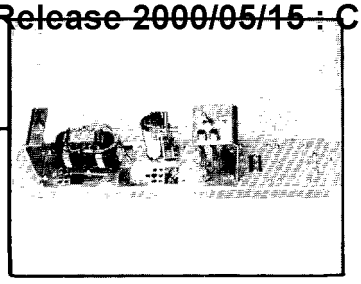
MOUNTAIN VIEW ROAD • LYNCHBURG, VIRGINIA

(In Canada, Canadian General Electric Company, Ltd., Toronto, Ont. Outside the U.S.A., and Canada, by: International General Electric Company, Electronic Sales, 150 East 42nd St., New York, N. Y., U.S.A.)

Printed in U.S.A.



2 Channel unit



3 Termination unit with protective cover removed.

APPLICATION TABLE

ure numbers refer to straight line diagrams on the right of this sheet. Innumerable other channel facilities are available for special requirements and may be ordered by advising application and requirements.

	3 WAY JUNCTION			4 WAY JUNCTION	
Fig 4	*Fig 5*	*Fig 6*	*Fig 7*	*Fig 8*	*Fig 9*
G51-56	G32-56	G62-56	G72-56	G92-116	G102-116
G51-56	G33-57	G62-56	G73-57	G92-116	G103-117
G51-56	G36-58	G62-56	G76-58	G92-116	G106-118
G51-56	G37-57	G62-56	G77-57	G92-116	G107-117
G51-56	G38-58	G62-56	G78-58	G92-116	G108-118
G51-56	G39-57	G62-56	G79-57	G92-116	G109-117
G51-56	G216-58	G236-56	*	*	*
*	*	G236-56	*	*	*
G51-56	*	*	*	G92-116	*
G51-56	G34-56	G62-56	G74-56	G92-116	G104-116
G51-56	G35-57	G62-56	G75-57	G92-116	G105-117
G51-56	*	G62-56	*	G92-116	*
G56-56	G31-56	G61-56	G71-56	G91-116	G101-116
G51-56	*	*	*	*	*
G51-56	*	*	*	*	*
G51-56	*	*	*	*	*
G51-56	*	*	*	*	*
*	*	*	*	*	*
*	*	*	*	*	*
*	*	*	*	*	*
*	*	G23-56	*	*	*

***Function not normally supplied at these stations. May be provided by adopting standard termination units to satisfy system requirements.**

DIMENSIONS

	Channel Unit	*Termination Unit*
Rack Units Space	2	2
Front Depth	4⅛"	4"
Back Depth	4¾"	4½"
Weight	8 lbs.	3-10 lbs.

CHANNEL FACILITY DIAGRAMS

TERMINAL STATION

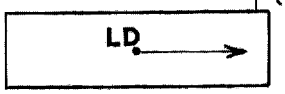


FIG. 1. — Channel access for transmission and reception in one direction.

MULTIPLEX REPEATER STATION

FIG. 2 — Channel access on a private line basis to allow transmission and reception of information in one of two directions . . . one facility required, or transmission and reception of two pieces of information in opposite directions . . . two facilities required.

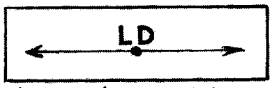


FIG. 3 — Channels access for transmission and reception in both directions on a party line basis.

3-WAY JUNCTION STATION

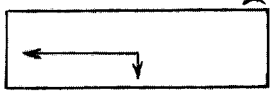


FIG. 4 — Channel Facility allowing information from either direction to be turned and fed to spur station.

FIG. 5 — Channel access provided at the junction station.

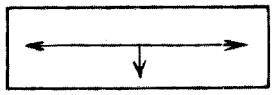


FIG. 6 — Channel Facility allowing information from both directions to be turned and fed to spur station.

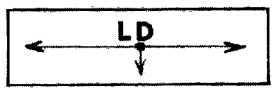


FIG. 7 — Channel access provided at the junction station.

4-WAY JUNCTION STATION

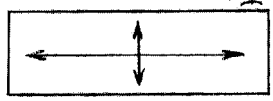


FIG. 8 — Channel Facility allowing information to be fed in two new directions to spur stations.

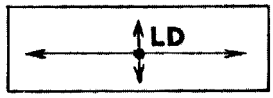


FIG. 9 — Channel access provided at the junction station.

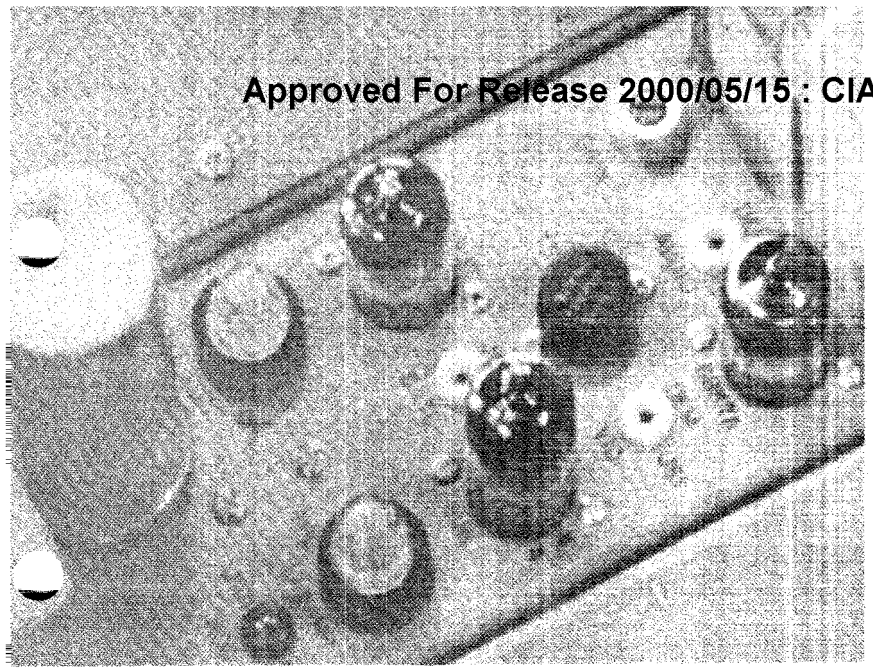
LEGEND

. . . station.

. . . direction of transmission on this channel — reception is in opposite direction.

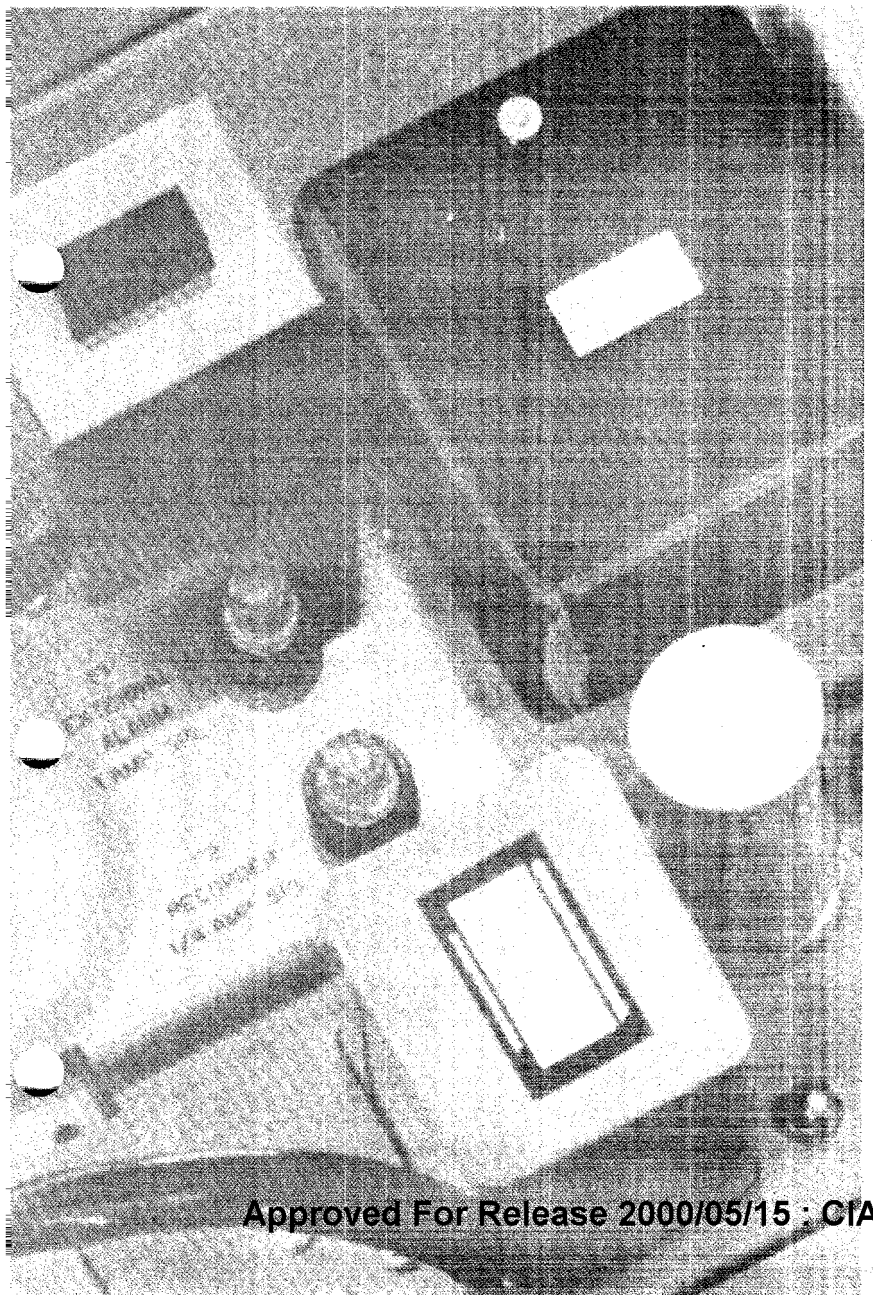
LD . . . access to the channel is available at this point.

The absence of the "dot" on the line indicates that information is passing through the station but is not accessible. By changing the Channel Facility at such a station access can be provided.



2 KMC TERMINAL EQUIPMENT

General Electric MICROWAVE



FEATURES

- Crystal Controlled Transmitter and Receiver
- Conventional, Inexpensive, Dependable Tubes
- Transmitter and Receiver Use Same Antenna
- Higher Power For Greater Reliability
- Swing-out Units, Easily Serviced
- Compact Assembly Requiring Minimum Space

GENERAL ELECTRIC

GENERAL

General Electric 2 KMC Microwave is designed to provide a wide range of communication facilities with maximum dependability.

Standard assemblies are Terminal, Multiplex Repeater and RF Repeater Stations. Details of these assemblies are shown in this series of descriptive bulletins.

Standard 2 KMC Microwave equipment type UA-1-D operates in the F.C.C. designated bands of 1700 to 1850 MC and 1850 to 1990 MC.

Standard equipment has provision for 25 Voice communication channels, or 375 Supervisory, Telemetering, Teletype or other Data and Control channels or 125 Protective Relaying channels or a combination of these facilities.

APPLICATION

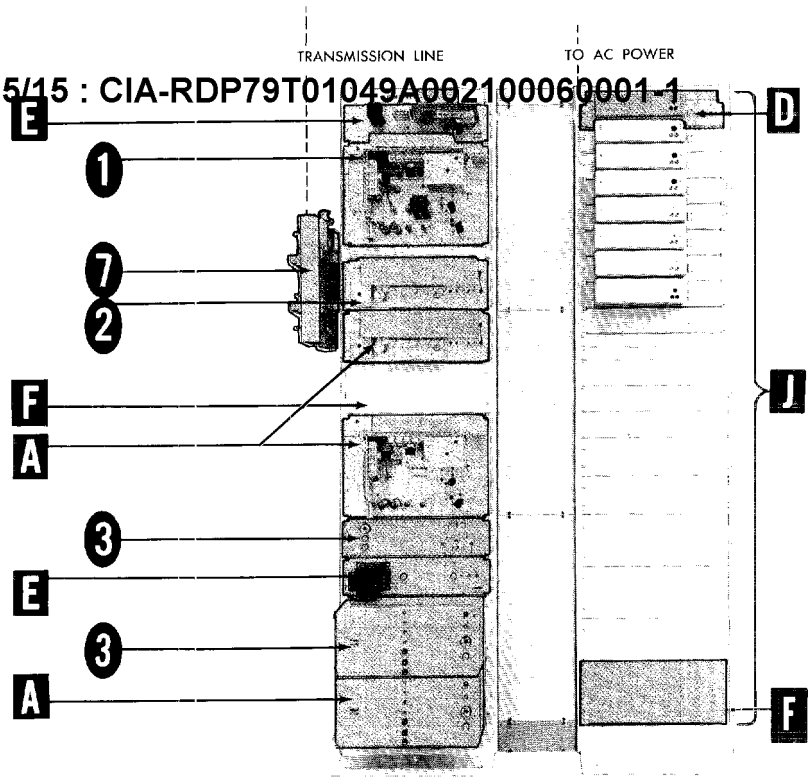
Terminal Equipment is utilized at the terminating ends of a microwave system. If additional stations are required between the two end points of a system they usually take the form of Multiplex Repeater or RF Repeater Stations. To provide microwave spurs from a system, Microwave Terminal Equipment is combined with Microwave Multiplex Repeater Equipment to form a Junction Station.

DESCRIPTION

The General Electric Type UA-1-D Microwave Terminal station is supplied as a complete functional assembly with the basic radio frequency and multiplex equipment. The basic station is wired for and equipped with the following equipment:

1. Primary R.F. Transmitter
2. Primary R.F. Receiver
3. Primary R.F. Power Supply & Control
4. Basic Multiplex Units
5. Basic Multiplex Power Units
6. Wiring duct for 1 to 17 channels
7. Duplexer

In addition the assembly will accommodate optional items A through J. These options may be supplied at the time of initial installation or at any time thereafter since the basic stations are wired to accommodate additional units with no changes to equipment wiring. All interconnection wiring is available through the wiring duct and can be exposed for servicing by removing the 3 duct covers shown in illustration above front side.



FRONT VIEW

EQUIPMENT ILLUSTRATED

OPTIONS

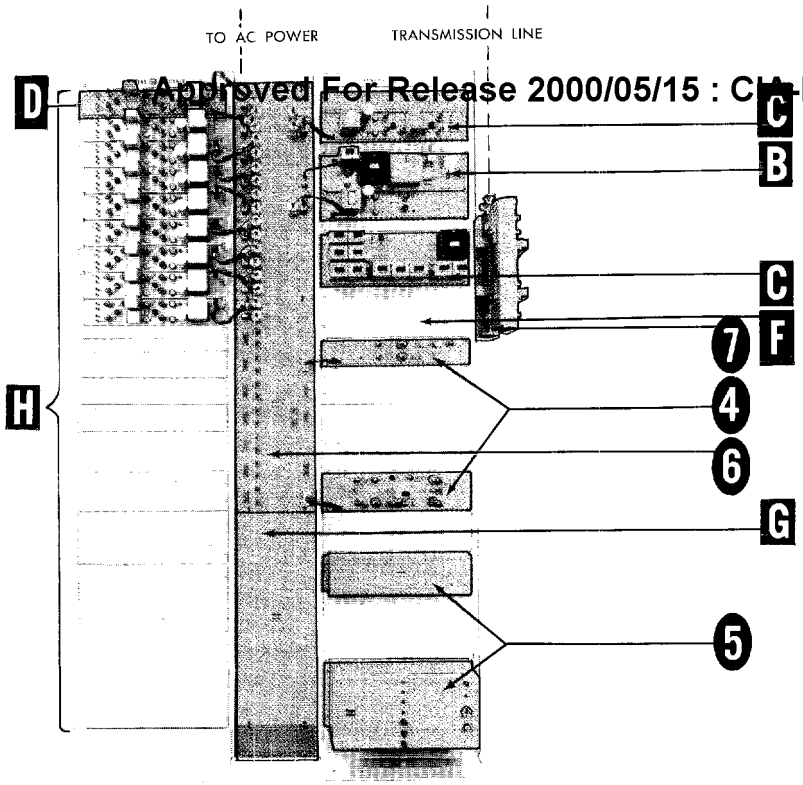
In addition to the basic equipment, various optional functions are available to increase the utility of the system:

A The RF Standby Option — Includes the necessary RF equipment to provide the basic terminal with standby RF equipment which is automatically placed in operation upon failure of the primary equipment. The standby equipment comes into operation 45 seconds after failure of the normal equipment unless the standby equipments are continuously energized, in which case the transfer is accomplished in 20 milliseconds.

B The Alarm Recording Option — Includes the necessary equipment to detect and make a permanent record of station and function codes received. Provision is made for the operation of a remotely located 115 v alarm annunciator during the reception of an alarm. This option may be mounted in the basic station or in a separate rack or cabinet at some remote point if specifically requested.

C The Alarm Transmit Option — Includes the necessary equipment to encode and transmit the station identifier code and up to 6 function codes. Normally, one of these codes is assigned to indicate operation from auxiliary or emergency power and another to indicate restoration of primary power. Another of these codes is normally used to indicate transfer to RF standby when this option is elected. Thus, depending on the system, 2 or 3 fault codes are unassigned and may be wired by the user for such items as tower light failure, illegal building entry or any other function he chooses.

D The Service Channel Option — Includes the necessary equipment to provide a service channel telephone facility with push-button 20-cycle signalling. The telephone included is a standard desk type instrument with push-to-talk and ring out button and requires two wires for voice and two wires for signalling between microwave terminal and telephone. A source of talking (48 volts DC) and ringing (20 cycle AC) voltages must be available. (If specified, a wall-type telephone instrument may be substituted.)



BACK VIEW

The terminal cabinetry consists of two racks, 22", separated by a wiring duct. Mounted in the racks are the basic units previously listed in "Description" in addition to the optional items described below.

E The Power Amplifier and Cabling Option —Includes the necessary equipment to increase the power output of the standard primary transmitter in the basic terminal by 6 db, to 80 watts. This option is applied only to the primary RF. Thus when operating from standby RF, the power output is reduced by 6 db until restoration to the primary RF is made.

F The Diversity Reception and Overlay Cabling Option — Includes the necessary RF equipment, less antennas and transmission line, to equip the basic terminal for space diversity reception. This option uses the Primary Receiver, and an additional Diversity Receiver, a Receiving Combining Unit and a Diversity Power Supply. Mounting spaces are identified above.

G Channel Expansion Option — The basic assembly provides wiring for 1 to 17 channels. This option provides the wiring for 8 additional channel facilities.

H Channel Unit Option — In the basic assembly, wiring is provided for 1 to 17 channel units. After Option G is added, a total of 25 can be accommodated. See accompanying Multiplex Bulletin for further details on channel facilities.

I Termination Unit Option — In the basic assembly, wiring is provided for 1 to 17 termination units. After Option G is added, a total of 25 can be accommodated. See accompanying Multiplex Bulletin for further details on termination facilities.

In addition the assembly will accommodate optional items A through J. These options may be supplied at the time of initial installation or at any time thereafter since the basic stations are wired to accommodate additional units with no changes to equipment wiring. All interconnection wiring is available through the wiring duct and can be exposed for servicing by removing the 3 duct covers shown in illustrations above.

SPECIFICATIONS

Nominal Specifications

RF Equipment

Frequency Range	1700-1990 megacycles
Type of Modulation	Pulse Position Modulation
Peak Power Output	20 watts
Carrier frequency control	quartz crystal
Carrier frequency stability	0.01% of carrier
Receiver Bandwidths at 3 db points	8 MC
Receiver Noise Figure	11 db
Sensitivity at multiplex threshold	−108 dbw

Operating Conditions

Temperature	−20°C to +55°C
Humidity	up to 95% R.H.
Primary Power	115 V ±5% 50/60 cycles

Dimensions—Terminal PL 5497750G1

Height	91.00"
Width	51.25" (plus 10" for Duplexer)
Depth	29.30"

Power Consumption		Weight
500 watts	Basic Terminal	530 lbs.
285 watts	RF Standby	102 lbs.
170 watts	Alarm Recording	15 lbs.
165 watts	Alarm Transmitting	16 lbs.
33 watts	Service Channel	17 lbs.
150 watts	Power Amp. & Cabling	45 lbs.
200 watts	Diversity Reception	71 lbs.

specifications continued on next page . . .

. . . *specifications continued*

Tube Complement Specifications

Type UA-1-D Microwave Equipment-Terminal Station & Options

Tube Type	G1	G7	G9	G10	G11	G12	G13
6BJ7	1			1	1		
6BK7A	4	1	1	4	4		1
6BL7	2	2					
6BX7	5						
6CB6	5	5					1
5687	1	1					
6524	1	1					
6678/6U8	9	4	1	1	1		2
6679/12AT7	1	3					1
GL6897	3	3				1	

FCC Filing Data: Data on file with FCC — File #633

Transmitter Type UT-2-C

(1) Frequencies	(3) Maximum Power (watts)	(4) Emission	(5) Modulating Frequency
1700-1990 MC	40 watts peak power to antenna	7000P3f	5,000,000

Power amplifier, Group 12, added to the UT-2-C transmitter changes the transmitter to Type UT-1-E and data remains the same except (3) above which becomes "100 watts peak power to antenna".

ORDERING INFORMATION

OPTION	DESCRIPTION	ORDER NUMBER
	Basic Terminal	PL5497750G1
A	R F Standby Option	PL5497750G7
B	Alarm Recording Option	PL5497750G9
C	Alarm Transit Option	PL5497750G10
D	Service Channel Option	PL5497750G11
E	Power Amplifier and Cabling Option	PL5497750G12
F	Diversity Reception and Overlay Cabling Option	PL5497750G13
G	Channel Expansion Option	PL5497750G6
H	Channel Unit Option	See Channel Facilities Bulletin
J	Termination Unit Option	See Channel Facilities Bulletin

ADDITIONAL INFORMATION

See bulletins on Multiplex Repeater, RF Repeater, and Channel Facilities.

COMMUNICATION PRODUCTS DEPARTMENT

GENERAL ELECTRIC

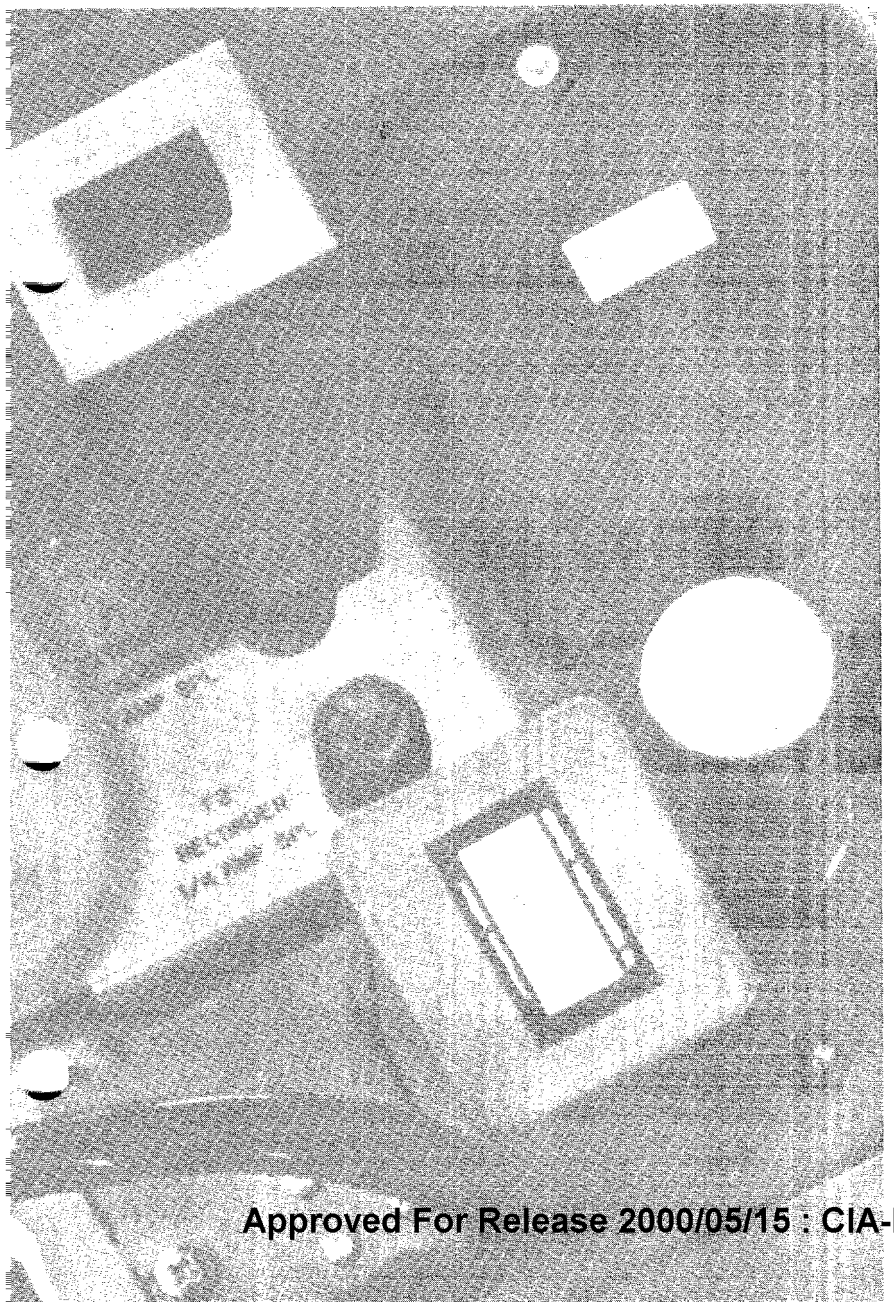
MOUNTAIN VIEW ROAD • LYNCHBURG, VIRGINIA

(In Canada, Canadian General Electric Company, Ltd., Toronto, Ont. Outside the U.S.A., and Canada, by: International General Electric Company, Inc., 1 Broadway, New York, N.Y. 10004)

2 KMC

RF REPEATER EQUIPMENT

General Electric MICROWAVE



FEATURES

- Crystal Controlled Transmitter and Receiver
- Conventional, Inexpensive, Dependable Tubes
- Transmitter and Receiver Use Same Antenna
- Higher Power For Greater Reliability
- Swing-out Units, Easily Serviced
- Compact Assembly Requiring Minimum Space

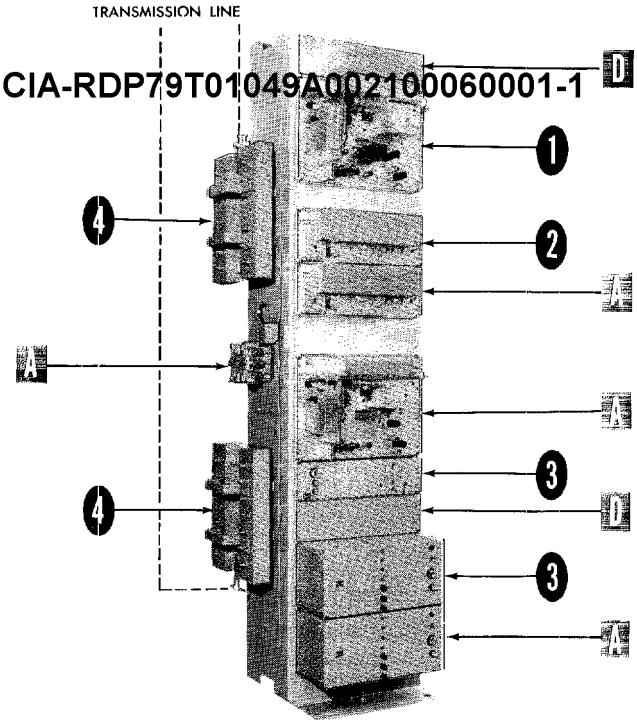
GENERAL ELECTRIC

GENERAL

General Electric 2KMC Microwave is designed to provide a wide range of communication facilities with maximum dependability.

Standard assemblies are Terminal, Multiplex Repeater and *RF Repeater* Stations. Details of these assemblies are shown in this series of descriptive bulletins.

Standard 2 KMC Microwave equipment Type UA-1-D operates in the F.C.C. designated bands of 1700 to 1850 MC and 1850 to 1990 MC.



FRONT VIEW

APPLICATION

RF Repeater Equipment is utilized at stations between the end terminals of a system where only service and alarm channel facilities are required.

If additional channel facilities are required other than service and alarm, then Multiplex Repeaters must be installed at these locations. See accompanying bulletin on this station arrangement. RF Repeaters can be converted with ease to Multiplex Repeater stations.

DESCRIPTION

The General Electric Type UA-1-D Microwave RF Repeater station is supplied as a complete functional assembly with the basic radio frequency equipment. The basic station is wired for and equipped with the following equipment:

1. 2-Primary R.F. Transmitters
2. 2-Primary R.F. Receivers
3. 2-Primary R.F. Power Supplies and Control
4. 2-Duplexers

In addition, the assembly will accommodate optional items A through E. These options may be supplied at the time of initial installation or at any time thereafter since the basic stations are wired to accommodate additional units with no changes to equipment wiring. Inter-connection wiring can be exposed by swinging out individual unit panels on their hinges.

EQUIPMENT ILLUSTRATED

OPTIONS

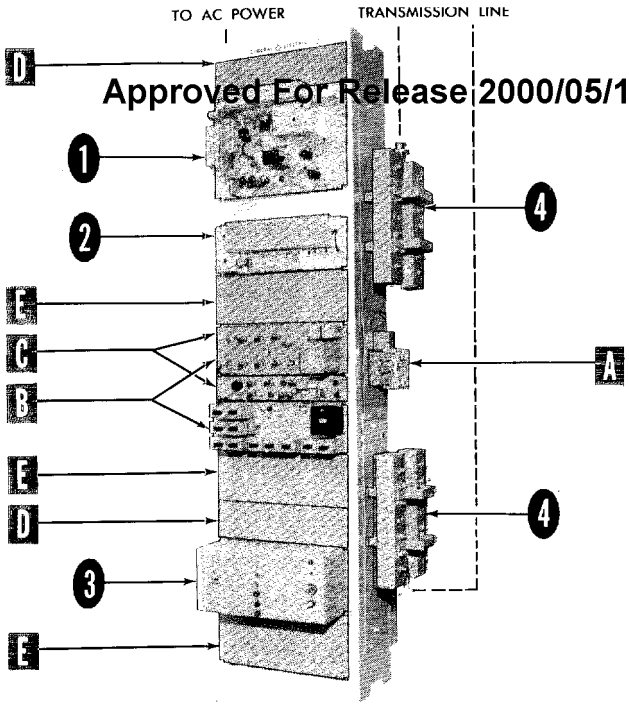
In addition to the basic equipment, various optional functions are available to increase the utility of the system.

A The RF Standby Option:

Includes the necessary RF equipment to provide the basic repeater with one standby RF combination equipment which is automatically placed in operation upon failure of either one of the primary transmitter-receiver combinations. The standby equipment comes into operation 45 seconds after failure of the normal equipment unless the standby equipments are continuously energized, in which case the transfer is accomplished in 20 milliseconds.

B The Alarm Transmit Option:

Includes the necessary equipment to encode and transmit the station identifier code and up to 6 function codes in both directions from station. Channel 1 is assigned to this function. Normally, one of these codes is assigned to indicate operation from auxiliary or emergency power and another to indicate restoration of primary power. One additional code is normally used to indicate transfer to RF standby when this option is elected. Thus, depending on the system, 3 or 4 fault codes are unassigned and may be wired by the user for such items as tower light failure, illegal building entry or any other function he chooses.



BACK VIEW

The repeater assembly consists of one rack. Mounted in the rack are the basic units previously listed in addition to the optional items described below.

C The Service Channel Option:

The directional service channel option furnishes equipment to provide a service channel facility and includes the telephone instrument with a push-to-talk switch, push-button signalling and a buzzer for indication of incoming ringing. Channel 2 is assigned to this service. Communication and signalling is to and from one direction at a time with a switch provided to control the desired direction of communication.

D The Power Amplifier and Cabling Option:

Includes the necessary equipment to increase the power output of a standard primary transmitter in the basic repeater by 6 db to 80 watts. This option is applied only to the primary RF. Thus, when operating from standby RF the power output is reduced by 6 db until restoration to the primary RF is made. Mounting spaces are indicated above.

E The Diversity Reception and Overlay Cabling Option:

Includes the necessary RF equipment, less antennas and transmission line to equip the basic terminal for space diversity reception in one direction only. This option uses the Primary Receiver and an additional Diversity Receiver, a Receiver Combining unit and a Diversity Power Supply. Mounting spaces are indicated above.

SPECIFICATIONS

Nominal Specifications

RF Equipment

Frequency range	1700-1990 megacycles
Type of modulation	Pulse position modulation
Peak power output	20 watts
Carrier frequency control	Quartz crystal
Carrier frequency stability	0.01% of carrier
Receiver bandwidths at 3 db points	8 MC
Receiver noise figure	11 db
Sensitivity at multiplex threshold	— 108 dbw

Operating Conditions

Temperature	−20°C to +55°C
Humidity	up to 95% R.H.
Primary Power	115 v ± 5%, 50/60 cycles

Dimensions—RF Repeater

Height	91.00″
Width	20.50″ (plus 10″ for Duplexers)
Depth	29.30″

Power Consumption	Equipment	Weight
550 watts	Basic RF Repeater	375 pounds
285 watts	RF Standby	102 pounds
92 watts	Directional Svc. Channel with Phone	17 pounds
200 watts	Alarm Transmit	28 pounds
238 watts	Directional Svc. Channel and Alarm Transmit	34 pounds
150 watts	Power Amplifier	45 pounds
200 watts	Diversity	71 pounds

Specifications continued on next page . . .

Tube Complement Specifications

Tube Type	G71	G76	G77	G78	G79	G80 or G81	G82 or G83
OB2							2
6BJ7			1		1		
6BK7A	2	1	8	6	8		1
6BL7	4	2					
6CB6	10	5					1
12AV7							4
5687	2	1					
6524	2	1					
6678/6U8	8	4					2
6679/12AT7	2	1	3		3		1
GL6897	6	3				1	

FCC Filing Data: Data on file with FCC—File #633

Transmitter Type UT-2-C

(1) Frequencies	(3) Maximum Power (watts)	(4) Emission	(5) Modulating Freq.
1700-1990 MC	40 watts peak power to antenna	7000P3f	5,000,000

Power amplifier, Groups 80 or 81, added to the UT-2-C transmitter changes the transmitter to type UT-1-E and data remains the same except (3) above which becomes "100 watts peak power to antenna."

Transmitter frequency and associated receiver frequency must be separated by exactly 60 mc. (For example, 1855 Transmit and 1905 Receive.)

In most system applications, only *two* frequencies are required.

ORDERING INFORMATION

Option	Description	Order Number
	Basic RF Repeater	**PL5497750G71**
A	**RF Standby**	**PL5497750G76**
C	**Directional Service Channel with Phone**	**PL5497750G77**
	-or-	
B	**Alarm Transmit**	**PL5497750G78**
	-or-	
B & C	**Directional Service Channel and Alarm Transmit**	**PL5497750G79**
D	**Power Amplifier (East)**	**PL5497750G80**
D	**Power Amplifier (West)**	**PL5497750G81**
E	**Diversity (East)**	**PL5497750G82**
	-or-	
E	**Diversity (West)**	**PL5497750G83**

ADDITIONAL DATA

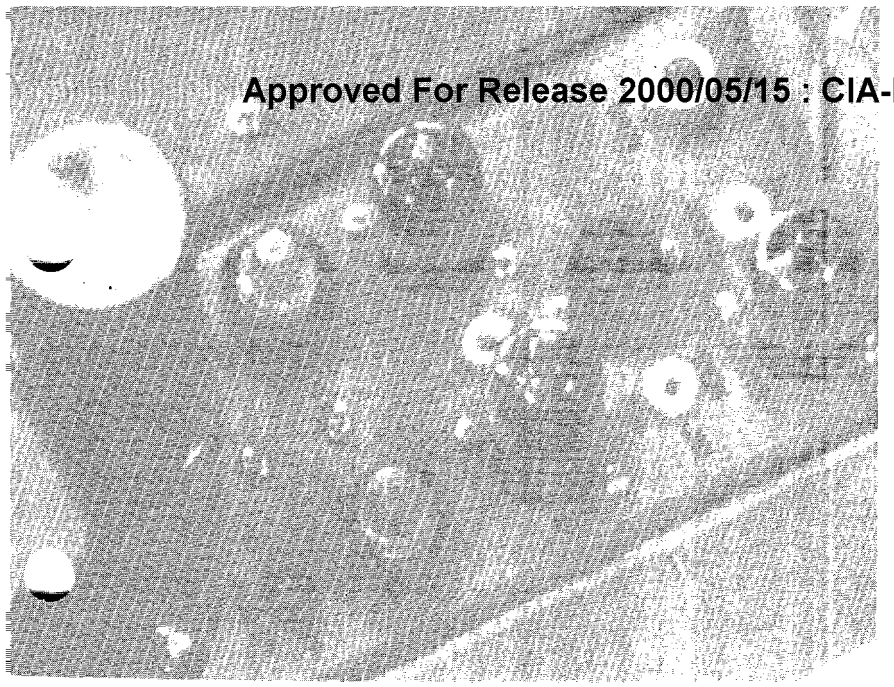
See Bulletins on Terminal, Multiplex Repeater and Channel Facilities.

COMMUNICATION PRODUCTS DEPARTMENT

GENERAL ELECTRIC

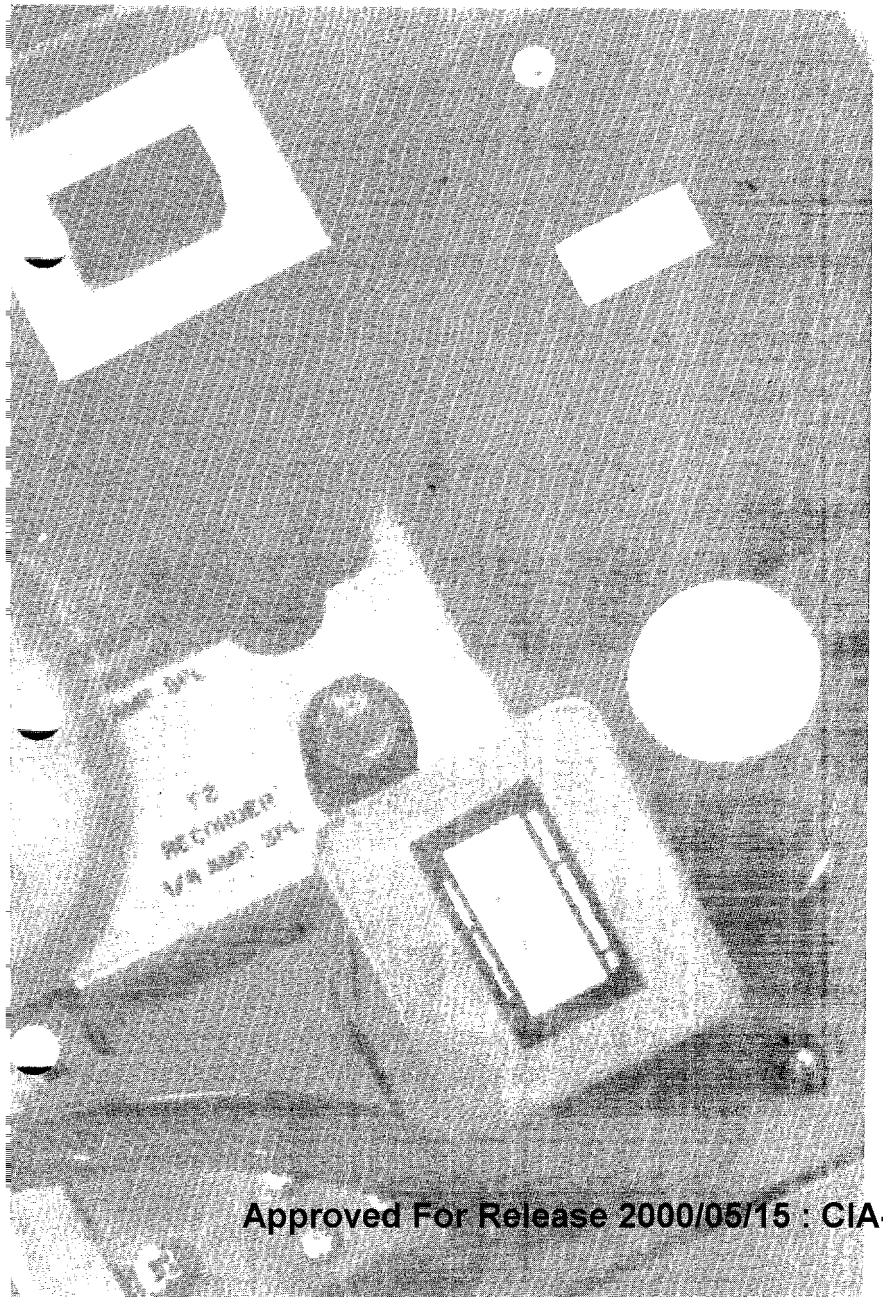
MOUNTAIN VIEW ROAD • LYNCHBURG, VIRGINIA

(In Canada, Canadian General Electric Company, Ltd., Toronto, Ont. Overseas, International General Electric Company, Electronic Sales, 150 East 42nd St., New York, N. Y., U.S.A.),



2 KMC MULTIPLEX REPEATER EQUIPMENT

General Electric MICROWAVE



FEATURES

- Crystal Controlled Transmitter and Receiver
- Conventional, Inexpensive, Dependable Tubes
- Transmitter and Receiver Use Same Antenna
- Higher Power For Greater Reliability
- Swing-out Units, Easily Serviced
- Compact Assembly Requiring Minimum Space

GENERAL ELECTRIC

Approved For Release 2000/05/15 : CIA-RDP79T01049A002100060001-1

GENERAL

General Electric 2 KMC Microwave is designed to provide a wide range of communication facilities with maximum dependability.

Standard assemblies are Terminal, *Multiplex Repeaters* and RF Repeater Stations. Details of these assemblies are shown in this series of descriptive bulletins.

Standard 2 KMC Microwave equipment, Type UA-1-D, operates in the F.C.C. designated bands of 1700 to 1850 MC and 1850 to 1990 MC.

Standard equipment has provision for 25 Voice communication channels, or 375 Supervisory, Telemetering, Teletype or other Data and Control channels or 125 Protective Relaying channels or a combination of these facilities in each direction from the repeater.

APPLICATION

Multiplex Repeater Equipment is utilized at stations between the end terminals of a system where channel facilities in addition to or other than service and alarm are required.

This assembly also forms part of a junction station along with a terminal assembly to provide a microwave spur from the main system.

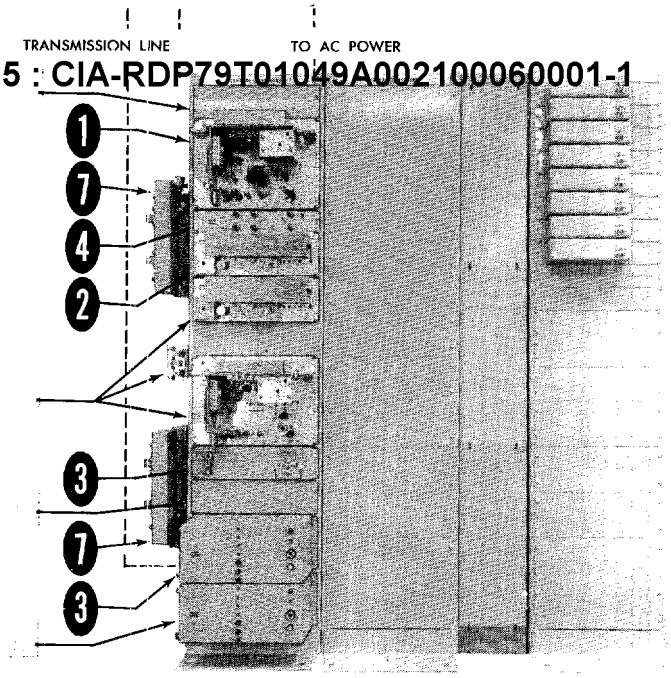
If no communications other than service and alarm are required, then use RF Repeaters at these locations. See accompanying bulletin on this station arrangement.

DESCRIPTION

The General Electric Type UA-1-D Microwave Multiplex Repeater station is supplied as a complete functional assembly with the basic radio frequency and multiplex equipment. The basic station is wired for and equipped with the following equipment:

1. 2-Primary R.F. Transmitters
2. 2-Primary R.F. Receivers
3. 2-Primary R.F. Power Supplies and Control
4. Basic Multiplex Units
5. Basic Multiplex Power Units
6. Wiring duct for 1 to 26 individual channels or 13 party lines or a combination thereof.
7. 2-Duplexers

In addition, the assembly will accommodate optional items A through K. These options may be supplied at the time of initial installation or at any time thereafter since the basic stations are wired to accommodate additional units with no changes to equipment wiring. All inter-connection wiring is available through the wiring duct and can be exposed by removing the 3 duct covers shown in illustration above front side.



FRONT VIEW

EQUIPMENT ILLUSTRATED

OPTIONS

In addition to the basic equipment, various optional functions are available to increase the utility of the system.

The RF Standby Option:

Includes the necessary RF equipment to provide the basic repeater with one standby RF combination equipment which is automatically placed in operation upon failure of either one of the primary transmitter-receiver combinations. The standby equipment comes into operation 45 seconds after failure of the normal equipment unless the standby equipments are continuously energized, in which case the transfer is accomplished in 20 milliseconds.

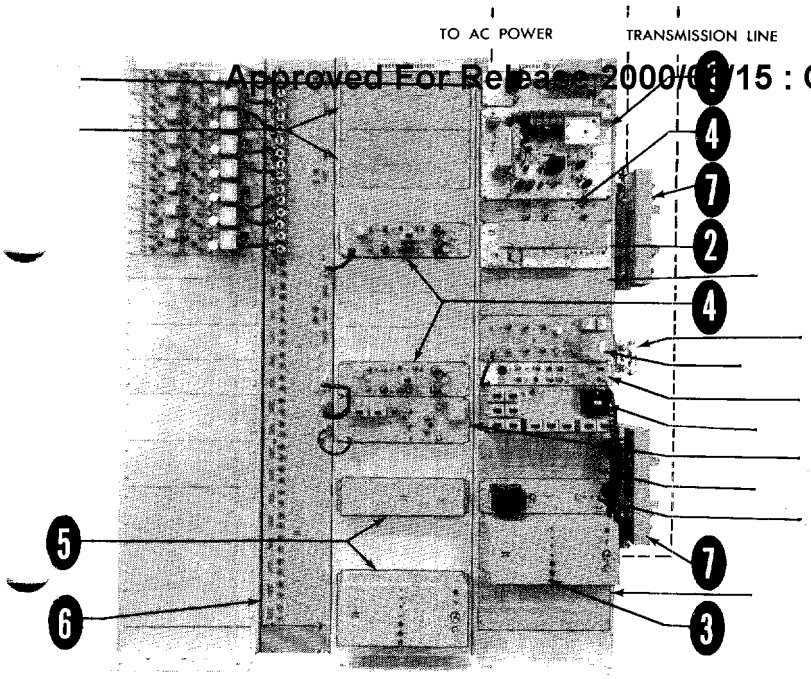
The Alarm Recording Option:

Includes the necessary equipment to detect and make a permanent record of station and function codes received from one direction. Provision is made for the operation of a remotely located 115 v alarm annunciator during the reception of an alarm. This option may be mounted in the basic station or in a separate rack or cabinet at some remote point if specifically requested.

The option can be duplicated in order to receive and record alarms from both directions. Mounting spaces are indicated above.

The Alarm Transmit Option:

Includes the necessary equipment to encode and transmit the station identifier code and up to 6 function codes in both directions from the station. Channel 1 is assigned to this function. Normally, one of these codes is assigned to indicate operation from auxiliary or emergency power and another to indicate restoration of primary power. Two other codes are normally used to indicate transfer to RF standby and Pulse restoration when these options are elected. Thus, depending on the system, 2 or 3 fault codes are unassigned and may be wired by the user for such items as tower light failure, illegal entry or any other function he chooses. This option is applicable also when the multiplex repeater station is part of a junction station.



BACK VIEW

The repeater assembly consists of 3 racks and a wiring duct. Mounted in the racks are the basic units previously listed in addition to the optional items described below.

The Service Channel Option:

The directional service channel option furnishes equipment to provide a service channel facility and includes the telephone instrument ith a push-to-talk switch, push-button signalling and a buzzer for indication of incoming ringing. Channel 2 is assigned to this service. Communication and signalling is to and from one direction at a time with a switch provided to control the desired direction of communication. This option is not applicable when this multiplex repeater is used as part of a junction station.

The Power Amplifier and Cabling Option:

Includes the necessary equipment to increase the power output of a standard primary transmitter in the basic repeater by 6 db to 80 watts. This option is applied only to the primary RF. Thus, when operating from standby RF the power output is reduced by 6 db until restoration to the primary RF is made. This option is shown installed for one direction of transmission and mounting spaces are indicated for the other direction.

The Diversity Reception and Overlay Cabling Option:

Includes the necessary RF equipment, less antennas and transmission line to equip the basic terminal for space diversity reception in one direction only. This option uses the Primary Receiver and an additional Diversity Receiver, a Receiver Combining unit and a Diversity Power Supply. Mounting spaces are indicated above.

Channel Unit Option:

The basic assembly provides wiring for 1 to 26 individual channels or 13 party line channels. These options provide the wiring and rack for 24 additional individual channel facilities or 12 additional party line channels.

Channel Expansion Option:

In the basic assembly, wiring is provided for 1 to 26 channel units. After Option G is added a total of 50 channel units can be accommodated. See accompanying Channel Facilities Bulletin for further details.

SPECIFICATIONS

Nominal Specifications

RF Equipment

Frequency range	1700-1990 megacycles
Type of modulation	Pulse position modulation
Peak power output	20 watts
Carrier frequency control	Quartz crystal
Carrier frequency stability	0.01% of carrier
Receiver bandwidths at 3 db points	8 MC
Receiver noise figure	11 db
Sensitivity at multiplex threshold	− 108 dbw

Operating Conditions

Temperature	− 20°C to + 55°C
Humidity	up to 95% R.H.
Primary Power	115v ± 5%, 50/60 cycles

Dimensions—Multiplex Repeater PL5497750G37

Height	91.00″
Width	71.75″ (plus 10″ for Duplexers)*
Depth	29.30″

*Option G increases this dimension by 32″.

Power Consumption	Equipment	Weight
820 watts	Basic Multiplex Repeater	800 pounds
285 watts	R.F. Standby	102 pounds
92 watts	Directional Svc. Channel with Phone	17 pounds
200 watts	Alarm Transmit	28 pounds
238 watts	Directional Svc. Channel and Alarm Transmit	34 pounds
170 watts	Alarm Record One-Way	16 pounds
340 watts	Alarm Record Two-Way	32 pounds
50 watts	Pulse Restorqtion	12 pounds
150 watts	Power Amplifier	45 pounds
200 watts	Diversity	71 pounds

Specifications continued on next page . . .

Termination Unit Option:

In the basic assembly, wiring is provided for 1 to 26 termination units. After Option G is added, a total of 50 can be accommodated. See accompanying Channel Facilities Bulletin for further details.

The Pulse Restoration Options:

Provide equipment to detect excessive noise on the videc signal or complete loss of signal and to reinsert synchronizing pulses in either direction, thereby permitting continued operation of the system outside of the fculty section. Group 54 provides immediate pulse restoration and alarm, Group 55 provides immediate restoration and delayed alarm and Group 56 provides delayed restoration and alarm. The normal delay is five minutes but other delays to intervals as short as ten seconds may be supplied if required. The group number and length of delay, if used, should be determined from the individual requirements of the system.

Tube Complement Specifications

Tube Type	Basic G37	G46	G48	G49	G50	G51	G52	G54, 55, 56	G57, 58	G59, 60
OB2										2
6BJ7	2		1		1					
6BK7A	10	1	8	6	8	1	2	4		1
6BL7	4	2								
6BX7	6									
6CB6	10	5								1
12AV7										4
5687	2	1								
5965								1		
6524	2	1								
6678/6U8	16	4				1	2			2
6679/12AT7	10	5	3		3					1
GL6897	6	3							1	

FCC Filing Data: Data on file with FCC — File No. 633

Transmitter Type UT-2-C

(1) Frequencies	(3) Maximum Power (watts)	(4) Emission	(5) Modulating Frequency
1700-1990 MC	40 watts peak power to antenna	7000P3f	5,000,000

Power amplifier/s, Group 57 and/or 58, added to the UT-2-C transmitter changes the transmitter to type UT-1-E and data remains the same except (3) above which becomes "100 watts peak power to antenna."

Transmitter frequency and associated receiver frequency must be separated by exactly 60 mc. (For example, 1855 Transmit and 1905 Receive.) In most system applications only two frequencies are required.

ORDERING INFORMATION

OPTION	DESCRIPTION	ORDER NUMBER
	Basic Multiplex Repeater	PL5497750G37
A	R.F. Standby	PL5497750G46
B	Alarm Record One-Way	PL5497750G51
	-or-	
B	Alarm Record Two-Way	PL5497750G52
C	Alarm Transmit	PL5497750G49
D	Directional Service Channel with Phone	PL5497750G48
D and C	Directional Service Channel and Alarm Transmit	PL5497750G50
E	Power Amplifier (East)	PL5497750G57
E	Power Amplifier (West)	PL5497750G58
F	Diversity (East)	PL5497750G59
	-or-	
F	Diversity (West)	PL5497750G60
G	Channel Expansion	PL5497750G44
H	Channel Unit	See Channel Facilities Bulletin
J	Termination Unit	See Channel Facilities Bulletin
K	Pulse Restoration, Immediate Restoration and Alarm	PL5497750G54
K	Pulse Restoration, Immediate Restoration and Delayed Alarm	PL5497750G55
K	Pulse Restoration, Delayed Restoration and Alarm	PL5 97750G56

ADDITIONAL DATA

See Bulletins on Terminal, RF Repeater and Channel Facilities.

COMMUNICATION PRODUCTS DEPARTMENT

GENERAL ELECTRIC

LYNCHBURG, VIRGINIA

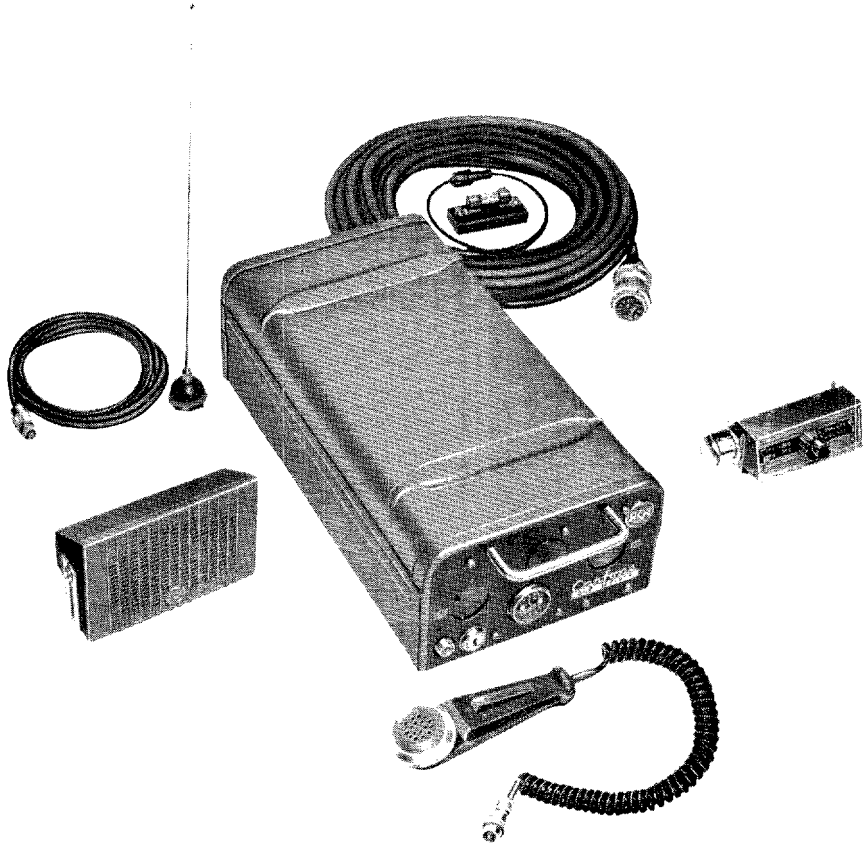
(In Canada, Canadian General Electric Company, Ltd., Toronto, Ont. Outside the U.S.A., and Canada, by: International General Electric Company, Electronic Sales, 150 East 42nd St., New York, N. Y., U.S.A.)

Carfone ONE FIFTY

FM RADIO COMMUNICATIONS
20 WATT MOBILE

Type CMC-20A Series • Vibrator Power 148-174 MC • 6/12 Volt • * Split/Wide Channel

catalog C.3107



PROTECTED INVESTMENT

- Split Channel Equipment Meets FCC Rules Effective November 1, 1958
- Complete 6/12 Volt Convertibility
- "Sealed Selectivity" IF Filter Provides Easy Conversion of Wide Channel Equipment to Split Channel Operation
- Operates on Any Frequency in the 148-174 MC Band—to Change Frequency Merely Replace Crystals and Retune

LOWER OPERATING COSTS

- Low Tube Replacement Cost
- Few Tube Types—Less Tube Inventory
- Color Directed "Rainbow Tuning" Cuts Maintenance Time and Cost

DESCRIPTION

The RCA "Carfone 150" FM Mobile Radio is a two-way (transmitting-receiving) unit designed for installation in a car, truck or other vehicle. It is used to communicate with other vehicles or a fixed station located in an office or other dispatch point.

Separate transmitter, receiver and power supply units are assembled in a sturdy, compact drawer-type case which provides easy access for maintenance. A built-in lock is provided to prevent unauthorized entry. Power is obtained from the vehicle battery through flame-proof cables. The radio is operated from an attractive dash-mounted control, hand-held transistorized reluctance microphone with plug-in cable and universal mounting high efficiency eliptical loudspeaker. A whip antenna is mounted on the vehicle to complete the over-all operating unit.

A wide range of equipment is offered to meet individual needs including selection of split or wide channel equipment, single or multiple frequency operation and oven or non-oven crystals—Choice of 5 microphone models, 2 antenna types and 3 kinds of speakers. This equipment flexibility provides a system designed to meet all types of operational requirements.

* Split Channel equipment operates on 30 kc spacing in accordance with the rules of the Federal Communications Commission effective November 1, 1958. Wide channel equipment is available for integration into existing systems operating on 60 kc spacing and is readily converted to split channel operation.

MODERN FUNCTIONAL DESIGN

- Distinctive Microphone—Easy to Grasp and Operate. High Impact Bakelite Construction. Built-in Transistor Pre-amplifier with Reluctance Element Provides Highest Speech Quality
- Compact Drawer Type Case with Handle and Lock
- Speaker Design Offers Mounting Versatility. Rugged, High Impact Molded Case
- Compact Control Unit Provides Mounting Flexibility. Combined On-Off, Volume and Squelch Control

RADIO CORPORATION OF AMERICA
Communications Equipment • Camden, N. J.

SPECIFICATIONS

GENERAL

Frequency Range	148-174 mc
Supply Voltage	6 or 12 volts
Battery Drain:	
Standby	11.0 amps. (6.6 volts) 5.5 amps. (13.8 volts)
Transmit	33.0 amps. (6.3 volts) 16.5 amps. (13.6 volts)
Temperature Rating	−22° to +140° (−30° to +60° C.)
Metering	Multiple pin test sockets
Dimensions:	
Transmitter/Receiver	5½" high x 9 1/32" wide x 17¾" long
Weight: (Complete Unit)	
Net	41 lbs.
Shipping	65 lbs.
Finish	Hammeroid umber gray baked enamel over zinc plate and primer

TRANSMITTER

R-f Power Output	20 watts
Modulation (Phase):	
Split Channel (30 kc)	±5 kc for 100%
Wide Channel (60 kc)	±15 kc for 100%
Spurious Emission	−70 db everywhere
Frequency Stability:	
Split Channel (30 kc)	±.0005% (oven crystal)
Wide Channel (60 kc)	±.003% (non-oven crystal)
or, Optionally	±.0005% (oven crystal)
Type Crystal	Hermetically sealed
Frequencies Possible	2, maximum spacing 500 kc
Audio Input	Carbon or RCA transistorized microphone
Duty Cycle	Intermittent (EIA)
Power Supply	Vibrator
Tube Complement:	
(2) 6CB6, (2) 12AX7, (1) 12AT7, (1) 6CL6, (1) 2E26, (1) 6146	
FCC Designation	
Split Channel	CT2-30CH
Wide Channel	CT2-30B

RECEIVER

Type of Circuit	Crystal controlled, fixed frequency, double superheterodyne
Sensitivity	0.6 microvolts for 20 db noise quieting (Single Frequency Operation)
Selectivity:	
Split Channel (30 kc)	100 db down for ±18 kc
Wide Channel (60 kc)	100 db down for ±45 kc
Spurious Response	More than −100 db
Stability:	
Split Channel (30 kc)	±.0005% (oven crystal)
Wide Channel (60 kc)	±.003% (non-oven crystal)
or, Optionally	±.0005% (oven crystal)
Type Crystal	Hermetically sealed
Frequencies Possible	2, maximum spacing 600 kc
Squelch	0.2 to 0.5 microvolts
Audio Output	1 watt at 4 or 600 ohms impedance
Power Supply	Vibrator
Duty Cycle	Continuous
Tube Complement:	
(8) 6BH6, (1) 6AN4, (1) 6AL5, (1) 6AK6, (3) 12AT7, (2) 12AX7	

ORDERING INFORMATION

Equipment includes transmitter, receiver, power supply, one set of tubes and crystals in case, hand-held transistorized reluctance microphone, loudspeaker and case, control head, roof-top antenna with 12 ft. coaxial cable, 18 ft. battery and control cables with fuse block, installation hardware, and instruction book. Equipment shipped tuned to frequency, ready for installation and operation. Order by TYPE NUMBER specifying any ALTERNATE or SUPPLEMENTARY ITEM desired.

(Note: To convert 6 or 12 volt equipment from one to the other, simply rotate vibrators, interchange two voltage-changing plugs and change system fuse.)

TYPE NUMBERS

Single Frequency Operation

CMC-20A7(H)	6 volt, SPLIT CHANNEL
CMC20A8(H)	12 volt, SPLIT CHANNEL
CMC-20A3	6 volt, WIDE CHANNEL
CMC-20A4	12 volt, WIDE CHANNEL

Multiple frequency operation should be specified by adding suffix to type number; i.e., (DT), (DR), or (DTR), and designating frequency priority. Add the suffix (H) to the type number for oven type crystals.

SUFFIX NOTATIONS

(DT)	Dual trans. frequency, single rec. frequency
(DR)	Single trans. frequency, dual rec. frequency
(DTR)	Dual trans. frequency, dual rec. frequency
(H)	Oven type crystals (±0.0005% stability)

ALTERNATE ITEMS

RCA Carbon	CX-40A
Handset Microphone and Hang-up Cup	MI-31019-C/31638
Handset Microphone and Hang-up Holder with Speaker Muting	MI-31019-C/31568-C
Noise Cancelling Microphone and and Hang-up Clip	MI-31736/31545-C
Weatherproof Loudspeaker (Bulkhead Mount)	MI-6317-D4
Weatherproof Loudspeaker (Adjustable Mount)	MI-14859-4
Bumper Mount Antenna	Type 206V(E)
Mounting Brackets	BDP-3620
Cable Connector	MI-31654-4

SUPPLEMENTARY ITEMS

Quiet Channel	CCM-4A
Vertical Mounting Kit (incl. 6 shock mounts)	MI-31281
Horizontal Mounting Kit (incl. 4 shock mounts)	MI-31749
Swivel Mount (for electric truck installations)	MI-31735-A
Battery Ground Return Cable	MI-31263
Front Mount:	
Mounting Brackets	MI-31828
Combination Speaker/Control Head	MI-31462-DX
Battery and Control Cables (8 ft.)	MI-31218-X

Carfone ONE FIFTY

FM RADIO COMMUNICATIONS
60 WATT DESK STATION

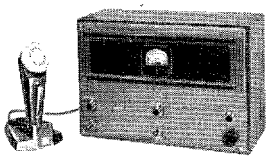
Type CSC-60B Series 148-174 MC · 117 Volts A.C. · Local/Remote Control · *Split/Wide Channel

catalog

C-3811

PROTECTED INVESTMENT

- Split Channel Equipment Meets FCC Rules for 30 kc Channel Assignments
- "Sealed Selectivity" IF Filter Provides Easy Conversion of Wide Channel Equipment to Split Channel Operation
- Operates on Any Frequency in the 148-174 mc Band—To Change Frequency Merely Replace Crystals and Retune



AVAILABLE WITH
REMOTE CONTROL UNIT

SUPERIOR PERFORMANCE

- RCA Reluctance Microphone with Transistor Pre-Amplifier Provides Highest Speech Quality
- High-Efficiency Elliptical Loudspeaker Provides Three Times More Acoustical Power

LOWER OPERATING COSTS

- "Rainbow Color Directed Tuning" Cuts Maintenance Time and Costs
- Few Tube Types—Less Inventory—Low Cost Replacement

* Split Channel equipment operates on 30 kc spacing in accordance with the rules of the Federal Communications Commission. Wide Channel equipment is available for integration into existing systems operating on 60 kc spacing and is readily converted to split channel operation.

RCA INTERNATIONAL DIVISION
RADIO CORPORATION of AMERICA
30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y., U.S.A.
PRINTED

DESCRIPTION

The "Carfone 150" FM Desk Station is used as the central dispatching base station to provide two-way radio communication between a fixed location and mobile units. This equipment is available for either split or wide channel operation. Wide channel equipment is readily converted in the field to meet split channel requirements.

The separate transmitter, receiver, and power supply are housed in an attractive dynamically styled desk cabinet which requires comparatively little space on a desk or table. Maintenance is facilitated by "all top tuning." Built-in metering sockets and tuning adjustments are available by merely lifting the cabinet lid.

High quality voice transmission is assured by use of the RCA transistorized microphone which features a reluctanace type voice element which works into a "balanced feedback" transistor amplifier built into the microphone case.

Remote control and multiple frequency units are optional. Equipment is shipped tuned to a specified frequency complete with a desk microphone, ready for installation and operation.

SPECIFICATIONS

GENERAL

Frequency Range	148 to 174 mc
Supply Voltage	117 volts, 50/60 cycles
Power Consumption:	
Standby	136 watts
Transmit	370 watts
Temperature Rating	−22° to +122° F. (−30° to +50 C.)
Metering	Multiple pin sockets
Dimensions	Height 10¼", Width 19⅜", Depth 18⅝"
Weight (Complete Unit):	
Net	76 lbs.
Shipping	125 lbs.
Finish	Umber gray Hammeroid baked enamel over zinc plate and primer
Power Supply	(1) 6AX5GT, (2) 5U4GB

TRANSMITTER

R-f Power Output	55-60 watts
Modulation (Phase):	
Split Channel	±5 kc for 100%
Wide Channel	±15 kc for 100%
Spurious Emission	−70 db everywhere
Frequency Stability:	
Split Channel (30 kc)	±.0005% (oven crystal)
Wide Channel (60 kc)	±.003% (non-oven crystal)
Optional	±.0005% (oven crystal)
Type Crystal	Hermetically sealed
Frequencies Possible	2, maximum spacing 250 kc
Audio Input	Carbon, RCA transistorized microphone, or 600 ohms with added line termination panel
Duty Cycle	Intermittent (EIA)
Tube Complement:	(2) 6CB6, (1) 6U8, (1) 6CL6, (2) 12AX7, (1) 5763, (1) 2526, (2) 6146
FCC Type Designation:	
Split Channel (30 kc)	CT2-60BH
Wide Channel (60 kc)	CT2-60B

RECEIVER

Type of Circuit	Crystal controlled, fixed frequency, double superheterodyne
Sensitivity	0.6 microvolts for 20 db quieting (Single frequency operation)
Selectivity:	
Split Channel (30 kc)	100 db down at ±18 kc
Wide Channel (60 kc)	100 db down at ±45 kc
Spurious Response	More than −100 db
Frequency Stability:	
Split Channel (30 kc)	±.0005% (oven crystal)
Wide Channel (60 kc)	±.003% (non-oven crystal)
Optional	±.0005% (oven crystal)
Type Crystal	Hermetically sealed
Frequencies Possible	2, maximum spacing 600 kc
Squelch	0.2 to 0.5 microvolts
Audio Output	1 watt at 4 or 600 ohms impedance
Duty Cycle	Continuous
Tube Complement:	(8) 6BH6, (1) 6AN4, (1) 6AL5, (1) 6AK6, (3) 12AT7, (2) 12AX7

ORDERING INFORMATION

Equipment includes transmitter, receiver, power supply, one set of tubes and crystals mounted in desk housing, plus an RCA transistorized desk microphone (Type CX-55B), and instruction book. Equipment shipped tuned to frequency ready for installation and operation. Order by Type Number, specifying any Alternate or Supplementary Items desired.

TYPE NUMBERS

(Single Frequency Operation—Local Control)

Type CSC-60B3(H)	Split Channel
Type CSC-60B2	Wide Channel

Multiple frequency operation should be specified by adding suffix to type number, i.e., (DT), (DR), or (DTR), and designating frequency priority. Add the suffix (H) to the type number for oven type crystals.

Add the suffix R when remote control over a telephone line is desired. Additional equipment supplied for this type operation includes a line termination panel (MI-31859-A) installed in the desk cabinet, test handset (MI-31019-E) with hang-up cup (MI-31638) and a remote control unit (Type CC-8A2).

SUFFIX NOTATIONS

R	Remote control operation
(DT)	Dual frequency transmitter, single frequency receiver
(DR)	Single frequency transmitter, dual frequency receiver
(DTR)	Dual frequency transmitter, dual frequency receiver
(H)	Oven type crystals (±.0005% stability)

ACCESSORY MICROPHONES

Transistorized Reluctance:	
*Aero-Style with Desk Stand	CX-56S
*Aero-Style with Dazor Stand	CX-56D
Carbon:	
Desk Stand	CX-45B
Handset and Stand	MI-31505-D
Handset and Hang-up Assembly for Wall or Desk Mounting	CX-34A

* Requires Foot Switch (MI-31635-A).

SUPPLEMENTARY ITEMS

Quiet Channel	CCM-4B
Foot Switch	MI-31635-A
RCA Conelrad Radio Alert Receiver	CR-17B
Audio Level Compensating Kit (for use when two or more remote control units are used in conjunction with the same base station)	MI-17473

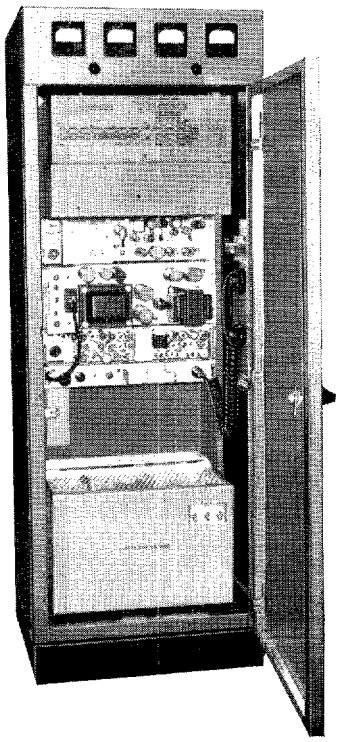
Carfone ONE FIFTY

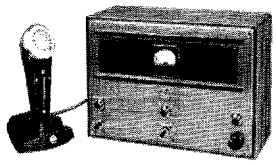
FM RADIO COMMUNICATIONS

250 WATT STATION • RACK CABINET

CSC-250BR Series 152-174 MC • 117 Volts A. C. • Local/Remote Control • *Split/Wide Channel

C.3913





REMOTE CONTROL UNIT

FEATURES

- **Split Channel Equipment Meets FCC Rules for 30 kc Channel Assignments**
- **"Sealed" Selectivity Tuned IF Filter Provides Easy Conversion of Wide Channel Equipment to Split Channel Operation**
- **Operates on Any Frequency in the 152-174 mc Band—To Change Frequency Merely Change Crystals and Retune**

DESCRIPTION

The RCA Carfone 150 FM Rack Cabinet Station is designed to provide two-way radio communication between a fixed location and mobile units where maximum coverage is required.

Separate transmitter, receiver, power amplifier, "built-in" meters and power supply are housed in a heavy-gauge steel cabinet provided with front and rear access doors for ease of maintenance and locks to prevent unauthorized entry. The station may be installed in the vicinity of the control equipment or located up to a distance of ten miles away—such as at the top of a tall building or high elevation—in order to take advantage of height for maximum signal coverage and reception.

An attractively styled, compact Remote Control Unit can be conveniently located on a desk, table or shelf to remotely control the station over a pair of telephone lines. Remote Control Units may be connected in parallel at several dispatch points with one unit serving as the master control.

* Split Channel equipment operates on 30 kc spacing in accordance with the rules of the Federal Communications Commission. Wide Channel equipment is available for integration into existing systems operating on 60 kc spacing and is readily converted to split channel operation.

7KC

RCA INTERNATIONAL DIVISION
RADIO CORPORATION of AMERICA
30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y., U.S.A.

BASE STATION HOUSING SPECIFICATIONS

Constructed of heavy gauge steel, the 63" and 84" rack cabinets are provided with front and rear doors for ease of maintenance and locks to prevent unauthorized entry. Both cabinets are identical in construction; however, the 84" rack provides greater mounting space for additional standard 19" relay type panels. Built-in meters indicate line voltage and power amplifier plate current, plate voltage and grid voltage. Vents in the top, front and rear of the cabinets provide adequate ventilation. Pilot lights indicate "power on" and "transmitter on" conditions. The rear door is equipped with interlocks which remove all high voltage when the door is opened.

Dimensions:
- 63" Rack ..... Height 63", Width 22", Depth 20½"
- 84" Rack ..... Height 84", Width 28", Depth 20½"

Extra Rack Mounting Space available for standard 19" relay-type panel:
- 63" Rack ..... 6"
- 84" Rack ..... 27"

Weight:	Net	Shipping
63" Rack	400 lbs.	600 lbs.
84" Rack	420 lbs.	620 lbs.

Finish ..... Umber gray hammeroid baked enamel over primer

BASE STATION SPECIFICATIONS
TYPE CSC-250BR

GENERAL

Frequency Range ..... 152-174 mc
Supply Voltage ..... 117 volts, 50-60 cycles
Power Consumption:
- Standby ..... 275 watts
- Transmit ..... 1500 watts

Temperature Rating ..... —22° to +122° F (—30° to +50° C)

Metering:
1) Multiple pin test socket
2) Front panel meters for power amplifier, plate current, plate voltage, grid voltage and a-c line voltage

Power Supply Tube Complement ..... (1) 6AX5GT, (2) 5U4G, (2) 866A

TRANSMITTER

R-f Power Output ..... 250 watts
Modulation (Phase):
- Split Channel (30 kc) ..... ±5 kc for 100%
- Wide Channel (60 kc) ..... ±15 kc for 100%

Spurious Emission ..... —70 db everywhere
Frequency Stability:
- Split Channel (30 kc) ..... ±.0005% (oven crystal)
- Wide Channel (60 kc) ..... ±.003% (non-oven crystal)
- Optional ..... ±.0005% (oven crystal)

Type Crystal ..... Hermetically sealed
Frequencies Possible ..... 2, maximum spacing 250 kc
Audio Input ..... Carbon, RCA transistorized microphone, or 600 ohms
Duty Cycle ..... Intermittent (EIA)
Tube Complement:
(2) 6CB6, (1) 6U8, (1) 6CL6, (2) 12AX7, (1) 5763, (1) 2E26, (2) 6146, (2) 4-125A

FCC Type Designation
- Split Channel (30 kc) CT2-250BH
- Wide Channel (60 kc) CT2-250B
- For Part 21 of Rules CT2-250BHL

RECEIVER

Type of Circuit ..... Crystal controlled, fixed frequency, double superheterodyne
Sensitivity ..... 0.6 microvolts for 20 db quieting (Single frequency operation)
Selectivity:
- Split Channel (30 kc) ..... 100 db down at ±18 kc
- Wide Channel (60 kc) ..... 100 db down at ±45 kc

Spurious Response ..... More than —100 db
Frequency Stability:
- Split Channel (30 kc) ..... ±.0005% (oven crystal)
- Wide Channel (60 kc) ..... ±.003% (non-oven crystal)
- Optional ..... ±.0005% (oven crystal)

Type Crystal ..... Hermetically sealed
Frequencies Possible ..... 2, maximum spacing 600 kc
Squelch ..... 0.2 to 0.5 microvolts
Audio Output ..... 1 watt at 4 or 600 ohms impedance
Duty Cycle ..... Continuous
Tube Complement:
(8) 6BH6, (1) 6AN4, (1) 6AL5, (1) 6AK6, (3) 12AT7, (2) 12AX7

ORDERING INFORMATION

Standard equipment includes (1) CC-8A2 Remote Control Unit; (2) Type CSC-250BR Base Station consisting of separate transmitter, receiver, power amplifier, power supply, built-in meters, line termination panel, one set of tubes and crystals, loudspeaker and handset with hang-up cup all mounted in a 63" or 84" rack cabinet; and (3) instruction book. Equipment is shipped tuned to specified frequency ready for installation and operation upon connection to a suitable antenna and power source. Order by TYPE NUMBER specifying any ALTERNATE, SUPPLEMENTARY or OPTIONAL ITEMS desired.

TYPE NUMBERS
(Single Frequency Operation—Local or Remote Control)

63" Cabinet	84" Cabinet	
CSC-250B5R(H)	CSC-250B6R(H)	Split Channel
CSC-250B2R	CSC-250B4R	Wide Channel

OPTIONAL MULTIPLE FREQUENCY OPERATION

Dual frequency transmit, single frequency receive ..... Add suffix *(DT)* to Type Number

OVEN CRYSTALS

Add suffix *(H)* to Type Number (±.0005% frequency stability).

ALTERNATE FOOT SWITCH

Foot switch for use when two or more CC-8A2 desk units are employed to control the same base station. Specify "Substitute Foot Switch MI-31635-B for MI-31635-A."

SUPPLEMENTARY ITEMS

Quiet Channel CCM-4B
Meter Panel with plug to mate multiple test socket MI-31756
RCA Conelrad Radio Alert Receiver CR-17B
Audio Level Compensating Kit (for use when two or more remote amplifiers are used in conjunction with the same base station) MI-17473

TERMINAL STATION ASSEMBLIES

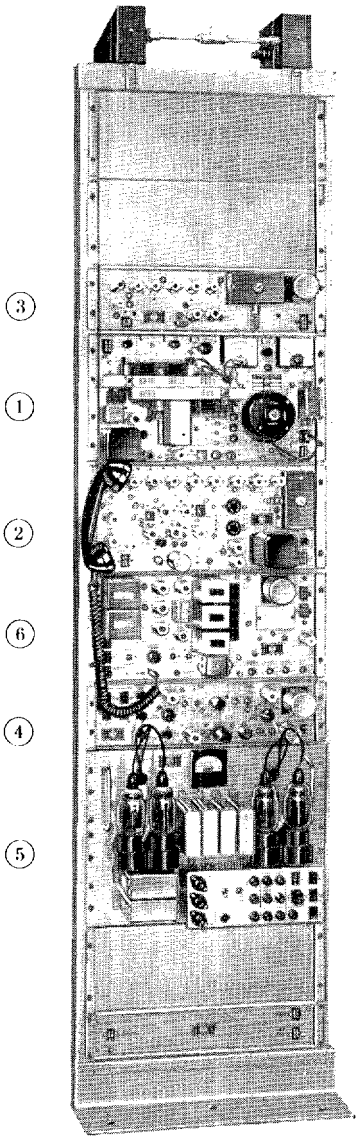
T1 and T2

For RCA CW-20 2000 mc Microwave Radio Relay Communications Systems

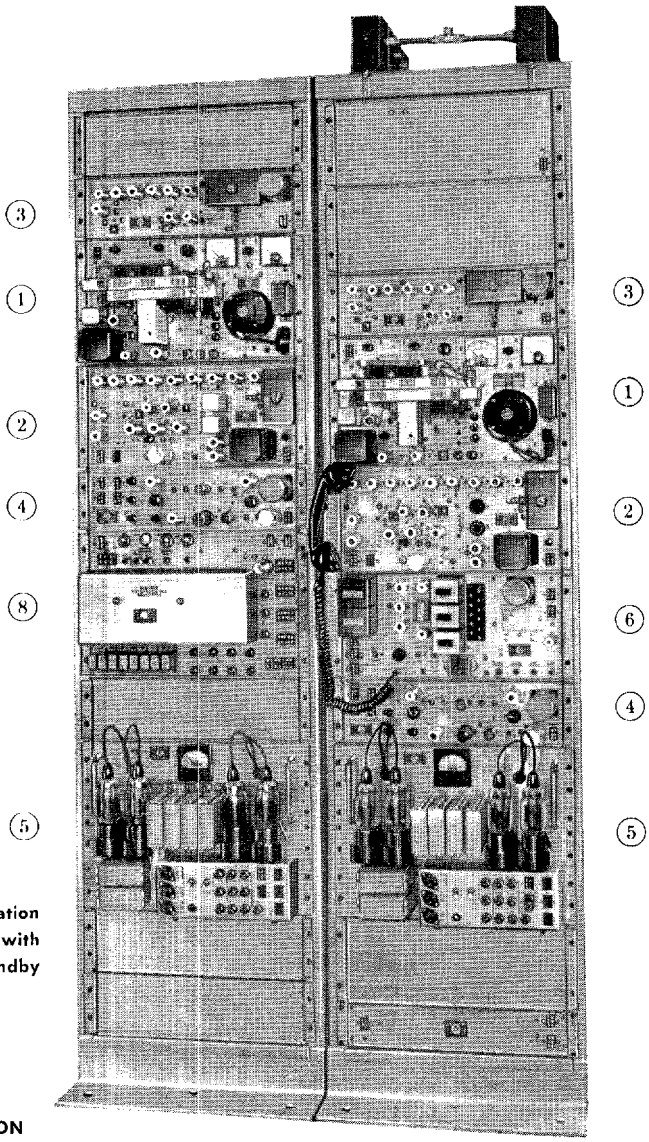
C.5101

FEATURES

- Heterodyne stages used exclusively
- Power amplifier which acts as r-f buffer
- Designed for single sideband frequency division multiplexing
- Frequency stability of ±0.02%
- Automatic fault indication
- Service channel facilities with signaling



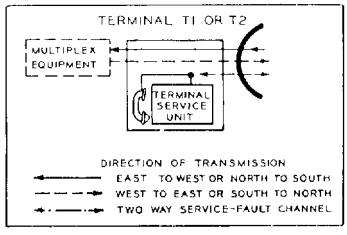
T1 Terminal Station Assembly



T2 Terminal Station Assembly with Standby

EQUIPMENT IDENTIFICATION

(1) Transmitter
(2) Receiver/Modulator
(3) Terminal AFC
(4) 160-KC Baseband Unit or 500-KC Baseband Unit
(5) Power Supply
(6) Terminal Service Unit or Indicon Decoder
(7) Terminal Switching Unit



APPLICATION

Assemblies T1 and T2 are designed for use at terminal locations normally attended by service personnel. Each station assembly includes a Terminal Service Unit which provides automatic fault indication facilities. An audible buzzing tone will call the attention of station attendants to any incoming fault signal. Service channel facilities with signaling are also provided in both station types.

RADIO CORPORATION OF AMERICA
Communications Equipment • Camden, N. J.
Tmk(s) ®

DESCRIPTION

The T1 and T2 terminal station assemblies are typical of the new RCA series of microwave stations which have proved outstanding in performance and reliability. Station assemblies T1 and T2 incorporate the most recent advanced developments in microwave communications engineering, and include such features as frequency modulation, heterodyne type operation, an output amplifier which functions as an r-f buffer, and is designed for single sideband suppressed carrier frequency division multiplexing. Although these stations are shown housed in standard 84″ open frame type racks, the same station types are also available in stylized racks with front doors and in RCA standard 84″ cabinets.

STANDARD BUILDING BLOCK UNITS

Stations are composed of standard building block units, which are readily interchangeable with other units of the same type, for convenient maintenance and system versatility. Power and other inter-unit connections are made by cables terminating in plugs, thereby facilitating quick and easy unit changing. Circuit components are easily accessible for speedy circuit tracing. Stations are easily installed, tuned, and adjusted. Once tuned, radio and channeling units rarely need retuning. Frequency control networks insure constant on-frequency operation at accuracies within ±0.02%. Every design consideration has been given to reliable performance and continuous uninterrupted service.

AVAILABLE FREQUENCIES—Assemblies T1 and T2 are available for operation at the following transmitting and receiving frequencies:

OPERATIONAL FIXED BAND RECOMMENDED FREQUENCY ASSIGNMENTS*

Frequency Designation	Frequency of Transmitter (in Mc)	Frequency of Receiver (in Mc)
1	1855	1895
2	1895	1855
3	1865	1905
4	1905	1865
5	1875	1915
6	1915	1875
7	1965	1925
8	1925	1965
9	1975	1935
10	1935	1975
11	1985	1945
12	1945	1985

* Similar frequency assignments are available for the 1700-1850 mc Government Band.

SPECIFICATIONS

Frequency Range ..... 1700-1990 mc
Type of Modulation ..... Frequency modulation
Type of Associated Multiplex Equipment: Single sideband suppressed carrier frequency division
Total Peak Deviation ..... ±1.5 mc
Transmitter Power Output ..... 3 watts
Frequency Stability ..... ±0.02%
Baseband Modulation Frequency Range (Narrow Band) ..... 3 kc to 160 kc
Baseband Modulation Frequency Range (Wide Band) ..... 3 kc to 500 kc
Service Channel Frequency Range ..... 300 cycles to 3 kc
Baseband Impedance (NB) ..... 600 ohms
Baseband Impedance (WB) ..... 135 ohms
Receiver Bandwidth ..... 6 mc
Type of Frequency Control ..... Quartz crystal reference AFC
Number of Channels (NB) ..... Up to 30 telephone and 1 service channel*
Number of Channels (WB) ..... Up to 120 telephone and 1 service channel*
Nominal Receiving Output Level per Channel (NB) ..... −10 dbm
Nominal Receiving Output Level per Channel (WB) ..... −20 dbm
Nominal Transmitting Modulation Sensitivity per Channel ..... −26 dbm
Nominal Receiving Output Level per Channel ..... −10 dbm
Receiver Noise Figure ..... 12 db
Frequency Spacing between Transmitter and Receiver ..... 40 mc
A-c Power Source ..... Adjustable taps for inputs of 95 to 125 volts rms, 50/60 cycles, 1,000 watts. Permissible voltage variation on selected tap of ±5%
Temperature Range ..... −20° C. to +50° C.

Power Consumption (approx.): T1 ..... 550 watts T2 ..... 575 watts

Weight and Dimensions:

	T1		T2	
	Rack	Cabinet	Rack	Cabinet
Height (including filters)	88″	88½″	88″	88½″
Width	21″	22″	42″	44″
Depth	18″	25″	18″	25″
Net Weight (approx.)	436 lbs.	541 lbs.	988 lbs.	1092 lbs.

Ordering Information

Terminal Station Assemblies are shipped from the factory completely assembled, tuned to operating frequencies, and ready for installation and operation. When ordering, please specify the following information:

Type No. CW-20
Assembly No. ..... T1 or T2
Mounting ..... Rack (R) or Cabinet (C)
Frequency Designation ..... See table

(An example of a full ordering number: CW-20 T1R-3)

* Modulation space is also available for up to 18-20 additional signaling or teletype channels.

In order to improve either the design or performance of the equipment, the above specifications are subject to change without notice.

DROP REPEATER STATION ASSEMBLIES D1 and D2

For RCA CW-20 2000 mc Microwave Radio Relay Communications Systems

C.5110

FEATURES

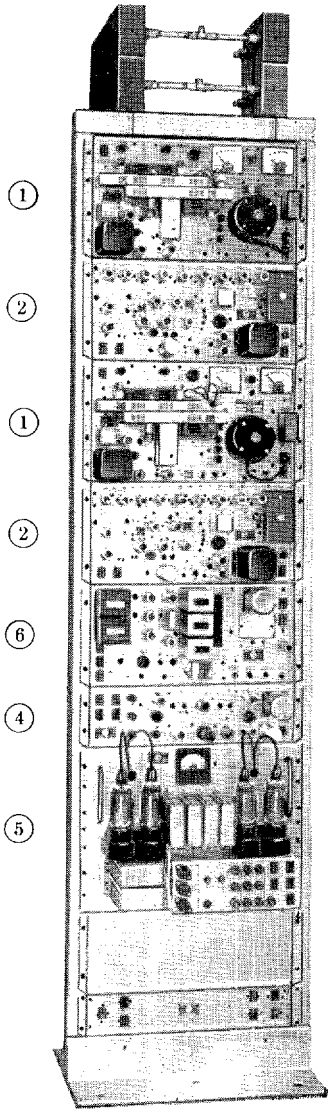
Heterodyne repeater operation

Convenient channel dropping and insertion

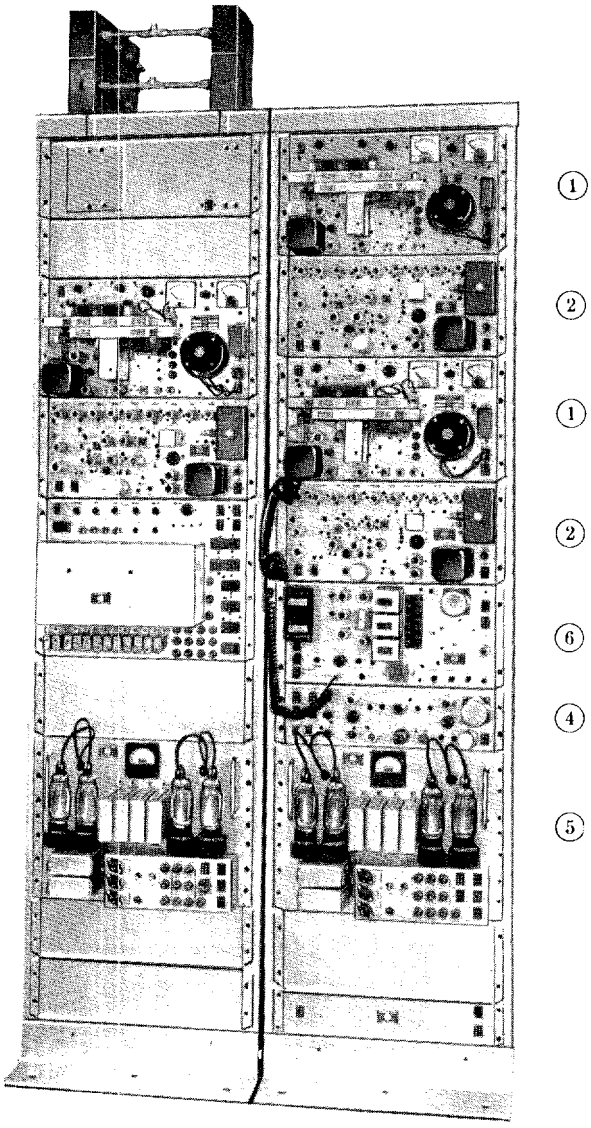
Automatic fault indication

Service channel facilities with signaling

Operates in conjunction with single sideband frequency division multiplexing equipment



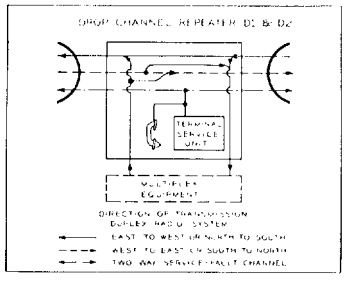
D1 Drop Channel Repeater Station Assembly



D2 Drop Channel Repeater Station Assembly with Standby

EQUIPMENT IDENTIFICATION

(1) Transmitter
(2) Receiver
(4) 160-KC Baseband Unit or 500-KC Baseband Unit
(5) Power Supply
(6) Terminal Service Unit or Indicon Decoder
(8) Repeater Switching Unit



APPLICATION

Assemblies D1 and D2 are especially applicable for attended stations of long-haul sytems where one or more baseband channels are to be dropped, inserted, or both. An important feature of these assemblies is a Terminal Service Unit which provides automatic fault indication, as well as service channel facilities with signaling.

Both assembles are identical except that the D2 contains an additional rack of standby equipment. Assemblies D1 and D2 are available in open frame racks (as shown), and in enclosed cabinets.

RADIO CORPORATION OF AMERICA
Communications Equipment • Camden, N. J.

DESCRIPTION

The D1 assembly contains two transmitters and two receivers for duplex radio operation. Special filter design enables one antenna to serve both a transmitter and a receiver. Moreover, antennas can be located several hundred feet away from the source of signals at the transmitter without the introduction of 'frequency pulling' effects.

Convenient Channel Dropping and Insertion—Heterodyne-repeater operation makes it possible to relay each channel at radio frequencies without the necessity of demodulating to the baseband. This feature results in a minimum of audio distortion and a minimum of variation in audio levels along the system. Channels can be conveniently inserted and dropped without interfering in any way with the channels passing through.

Available Frequencies—Assemblies D1 and D2 are available for operation at any one of the following frequency combinations. Note that both transmitters operate on a single frequency, and both receivers operate on a single frequency, for greater spectrum economy.

OPERATIONAL FIXED BAND RECOMMENDED FREQUENCY ASSIGNMENTS*

Frequency Designation	Frequency of Transmitters (in MC)	Frequency of Receivers (in MC)
1	1855	1895
2	1895	1855
3	1865	1905
4	1905	1865
5	1875	1915
6	1915	1875
7	1965	1925
8	1925	1965
9	1975	1935
10	1935	1975
11	1985	1945
12	1945	1985

* Similar frequency assignments are available for the 1700-1850 mc Government Band.

SPECIFICATIONS

Frequency Range ..... 1700-1990 mc
Type of Modulation ..... Frequency Modulation
Type of Associated Multiplex Equipment:
Single Sideband Suppressed Carrier Frequency Division
Total Peak Deviation ..... ±1.5 mc
Transmitter Power Output ..... 3 watts
Frequency Stability ..... ±0.02%
Baseband Modulation Frequency Range (Narrow Band) ..... 3 kc to 160 kc
Baseband Modulation Frequency Range (Wide Band) ..... 3 kc to 500 kc
Baseband Impedance (NB) ..... 600 ohms
Baseband Impedance (WB) ..... 135 ohms
Receiver Bandwidth ..... 6 mc
Method of Operation ..... Heterodyne Repeater
Number of Channels (NB) ..... Up to 30 telephone channels and 1 service channel*
Number of Channels (WB) ..... Up to 120 telephone channels and 1 service channel*
Nominal Receiving Output Level per Channel (NB) ..... −10 dbm
Nominal Receiving Output Level per Channel (WB) ..... −20 dbm
Nominal Transmitter Modulation Sensitivity per Voice Channel ..... −26 dbm
Nominal Receiving Output Level per Voice Channel ..... −10 dbm

* Modulation space is also available for up to 18-20 additional signaling or teletype channels.

Receiver Noise Figure ..... 12 db

A-C Power Source ..... Adjustable taps for inputs of 95 to 125 volts rms, 50/60 cycles, 1,000 watts. Permissible voltage variation on selected tap ±5%

Power Consumption (approx.):
D1 ..... 800 watts D2 ..... 825 watts

Weight and Dimensions:	D1		D2	
	Rack	Cabinet	Rack	Cabinet
Height (including filters)	92½"	93"	92½"	93"
Width	21"	22"	42"	44"
Depth	18"	25"	18"	25"
Net Weight (approx.)	478 lbs.	580 lbs.	927 lbs.	1141 lbs.

Ordering Information

Drop Repeater assemblies are shipped from the factory completely assembled, tuned to operating frequencies, and ready for installation and operation. When ordering please specify the following information:

Type No. CW-20
Assembly No. ..... D1 or D2
Mounting ..... Rack (R) or Cabinet (C)
Frequency Designation ..... See table

(An example of a full ordering number: CW-20 D1C-3)

In order to improve either the design or performance of the equipment, the above specifications are subject to change without notice.

DROP REPEATER STATION ASSEMBLIES D3 and D4

For RCA CW-20 2000 mc Microwave Radio Relay Communications Systems

catalog

C.5112

FEATURES

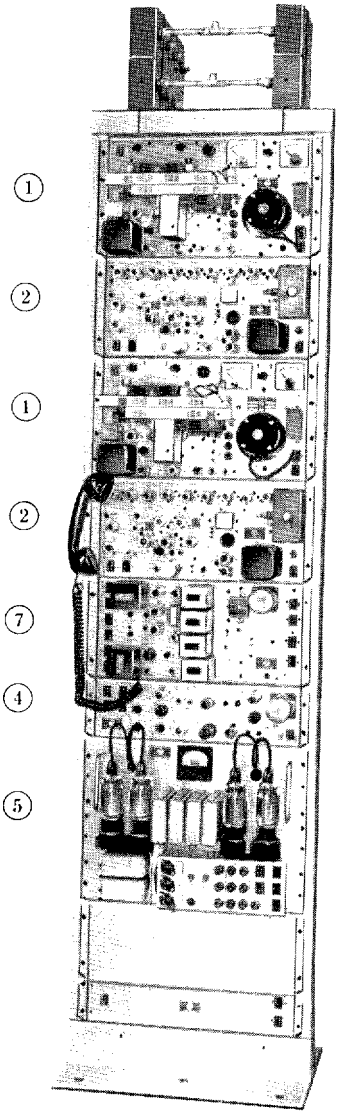
Heterodyne repeater operation

Convenient channel dropping and insertion

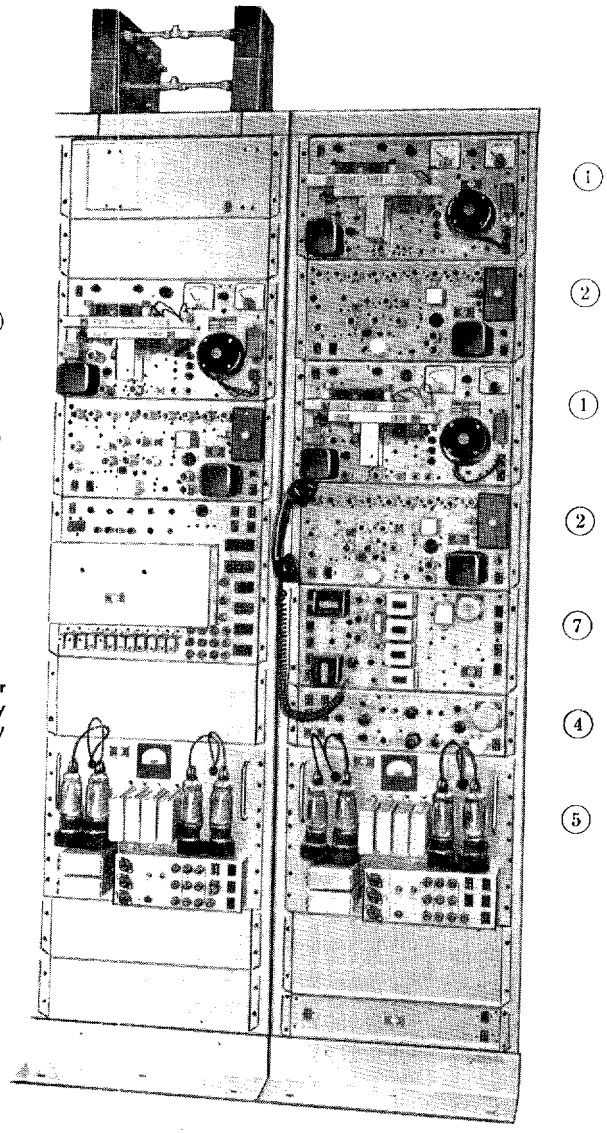
Automatic fault reporting

Service channel facilities with signaling

Operates in conjunction with single sideband frequency division multiplying equipment



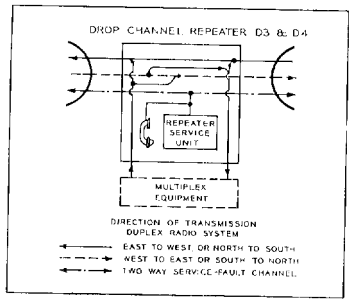
D3 Drop Channel Repeater Station Assembly



D4 Drop Channel Repeater Station Assembly with Standby

EQUIPMENT IDENTIFICATION

1. Transmitter
2. Receiver
4. 160-KC Baseband Unit or 500-KC Baseband Unit
5. Power Supply
7. Repeater Service Unit or Indicon Coder
9. Repeater Switching Unit



APPLICATION

Assemblies D3 and D4 are especially applicable for unattended stations where one or more voice or signal channels are to be dropped, inserted, or both. An important feature is a Repeater Service Unit which provides automatic fault reporting, as well as service channel facilities with signaling.

Both assemblies are identical except that the D4 contains an additional rack of standby equipment. Assemblies D3 and D4 are available in open frame racks (as shown) and in enclosed cabinets.

RADIO CORPORATION OF AMERICA
Communications Equipment • Camden, N. J.

DESCRIPTION

The D3 assembly contains two transmitters and two receivers for duplex radio operation. Special filter design enables one transmitter and one receiver to use the same antenna. Moreover, antennas can be located several hundred feet away from the source of signals at the transmitter without the introduction of 'frequency pulling' effects.

Convenient Channel Insertion and Dropping—Heterodyne-repeater operation makes it possible to relay each channel at radio frequencies without the necessity of demodulating to the baseband. This feature results in a minimum of audio distortion and a minimum of variation in audio levels along the system. Channels can be conveniently inserted and dropped without interfering in any way with the channels passing through.

Available Frequencies—Assemblies D3 and D4 are available for operation at any one of the following combinations of transmitting and receiving frequencies. For greater spectrum economy, note that both transmitters operate on a single frequency, and both receivers operate on a single frequency.

OPERATIONAL FIXED BAND RECOMMENDED FREQUENCY ASSIGNMENTS*

Frequency Designation	Frequency of Transmitters (in MC)	Frequency of Receivers (in MC)
1	1855	1895
2	1895	1855
3	1865	1905
4	1905	1865
5	1875	1915
6	1915	1875
7	1965	1925
8	1925	1965
9	1975	1935
10	1935	1975
11	1985	1945
12	1945	1985

* Similar frequency assignments are available for the 1700-1850 mc Government Band.

SPECIFICATIONS

Frequency Range ..... 1700-1990 mc
Type of Modulation ..... Frequency Modulation
Type of Associated Multiplex Equipment:
Single Sideband Suppressed Carrier Frequency Division
Total Peak Deviation ..... ±1.5 mc
Transmitter Power Output ..... 3 watts
Frequency Stability ..... ±0.02%
Baseband Modulation Frequency Range (Narrow Band) ..... 3 kc to 160 kc
Baseband Modulation Frequency Range (Wide Band) ..... 3 kc to 500 kc
Baseband Impedance (NB) ..... 600 ohms
Baseband Impedance (WB) ..... 135 ohms
Method of Operation ..... Heterodyne Repeater
Number of Channels (NB) ..... Up to 30 telephone channels and 1 service channel*
Number of Channels (WB) ..... Up to 120 telephone channels and 1 service channel*
Nominal Receiving Output Level per Channel (NB) ..... —10 dbm
Nominal Receiving Output Level per Channel (WB) ..... —20 dbm
Nominal Transmitter Modulation Sensitivity per Voice Channel ..... —26 dbm
Nominal Receiving Output Level per Voice Channel ..... —10 dbm
Receiver Noise Figure ..... 12 db

* Modulation space is also available for up to 18-20 additional signaling or teletype channels.

A-C Power Source ..... Adjustable taps for inputs of 95 to 125 volts rms, 50/60 cycles, 1,000 watts. Permissible voltage variation on selected tap of ±5%
Power Consumption (approx.):
D3 ..... 800 watts
D4 ..... 825 watts

Weight and Dimensions:

	D3		D4	
	Rack	Cabinet	Rack	Cabinet
Height (including filters)	92½"	93"	92½"	93"
Width	21"	22"	42"	44"
Depth	18"	25"	18"	25"
Net Weight (approx.)	478 lbs.	580 lbs.	937 lbs.	1141 lbs.

Ordering Information

Drop Repeater assemblies are shipped from the factory completely assembled, tuned to operating frequencies, and ready for installation and operation. When ordering please specify the following information:
Type No. CW-20
Assembly No. ..... D3 or D4
Mounting ..... Rack (R) or Cabinet (C)
Frequency Designation ..... See table
(An example of a full ordering number: CW-20 D3R-1)

In order to improve either the design or performance of the equipment, the above specifications are subject to change without notice.

THROUGH REPEATER STATION ASSEMBLIES R3 and R4

For RCA CW-20 2000 mc Microwave Radio Relay Communications Systems

FEATURES

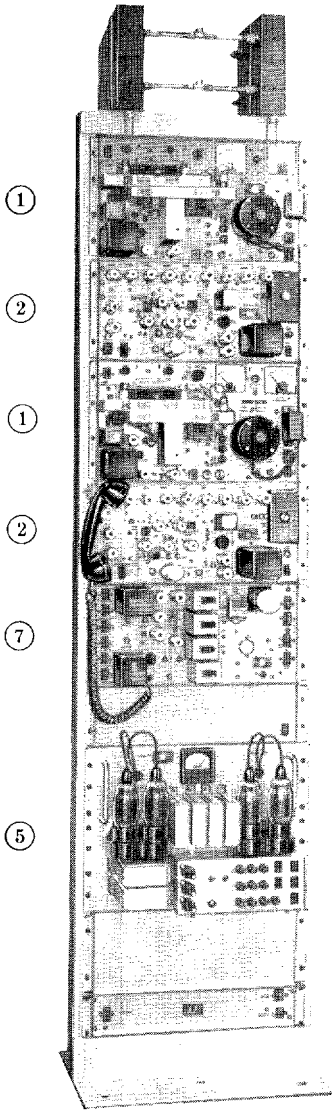
Heterodyne repeater operation avoids demodulation and remodulation of through signals

Frequency controlled by terminal station

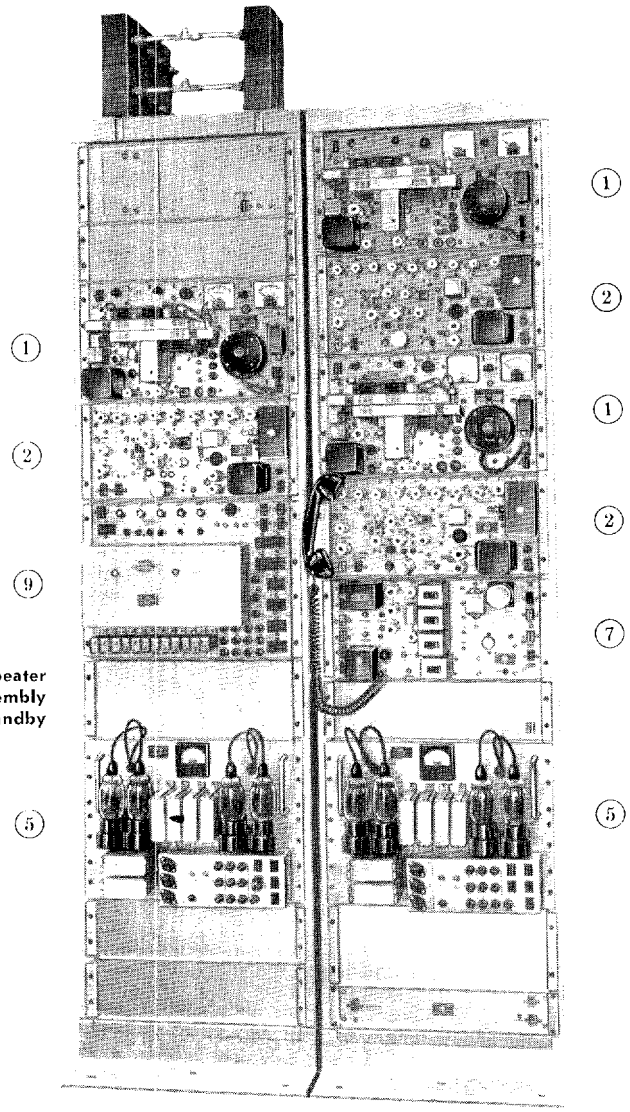
Automatic fault reporting simplifies maintenance

Service channel facilities with signaling

Easily converted to drop channel repeater



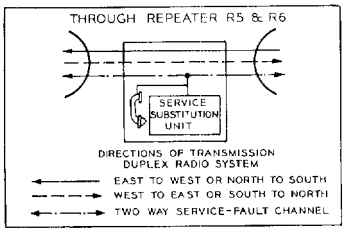
R3 Through Repeater Station Assembly



R4 Through Repeater Station Assembly with Standby

EQUIPMENT IDENTIFICATION

1. Transmitter
2. Receiver/Modulator
3. Power Supply
4. Repeater Service Unit or Indicon Coder
5. Repeater Switching Unit



APPLICATION

Assemblies R3 and R4 are designed for use at unattended stations requiring fault reporting facilities. When a fault occurs it is automatically reported to an attended location for servicing. As an additional aid to maintenance, service channel facilities with signaling are provided.

Both of these assemblies are identical except that the R4 contains standby equipment. Assemblies R3 and R4 are available in sturdy open frame racks (as shown) and in enclosed cabinets.

RADIO CORPORATION OF AMERICA
Communications Equipment • Camden, N. J.

DESCRIPTION

The R3 assembly contains two transmitters and two receivers for duplex radio operation. Special filter design enables one antenna to serve both a transmitter and a receiver. Antennas can be located several hundred feet away from the source of signals at the transmitter without the introduction of 'frequency pulling' effects.

All the power requirements of one rack are met by a single heavy duty power supply. The radio equipment is especially designed to be insensitive to power variations.

Of special importance, the heterodyne repeater method of operation used in these station assemblies avoids the use of frequency control units at repeater stations, as transmitter frequencies are effectively controlled at all times by received frequencies.

Standard Building Block Units—All assemblies are composed of standard building block units. These Through Repeater station assemblies can be converted to Drop Repeater station assemblies by the simple addition of a Baseband Unit. Because units are readily interchangeable, the cost of maintenance and the stocking of spare parts is minimized.

Available Frequencies—Assemblies R3 and R4 are adjusted at the factory to operate at any one of the frequency combinations shown in the accompanying table. Note that both transmitters operate on the same frequency and both receivers operate on the same frequency. This means greater spectrum economy.

OPERATIONAL FIXED BAND RECOMMENDED FREQUENCY ASSIGNMENTS*

Frequency Designation	Frequency of Transmitters (in MC)	Frequency of Receivers (in MC)
1	1855	1895
2	1895	1855
3	1865	1905
4	1905	1865
5	1875	1915
6	1915	1875
7	1965	1925
8	1925	1965
9	1975	1935
10	1935	1975
11	1985	1945
12	1945	1985

* Similar frequency assignments are available for the 1700-1850 mc Government Band.

SPECIFICATIONS

Frequency Range ..... 1700-1990 mc
Type of Modulation ..... Frequency modulation
Method of Operation ..... Heterodyne Repeater
Type of Associated Multiplex Equipment: Single sideband suppressed carrier frequency division
Total Peak Deviation ..... ±1.5 mc
Transmitter Power Output ..... 3 watts
Frequency Stability ..... ±0.02%
Service Channel Frequency Range ..... 300 cycles to 3 kc
Receiver Bandwidth ..... 6 mc
Receiver Noise Figure ..... 12 db
A-C Power Source ... Adjustable taps for inputs of 95 to 125 volts rms, 50/60 cycles, 1,000 watts. Permissible voltage variation on selected tap of ±5%
Frequency Spacing between Transmitter and Receiver ..... 40 mc
Temperature Range ..... −20° C to +50° C
Power Consumption (approx.)
R3 ..... 800 watts
R4 ..... 825 watts

Weight and Dimensions:

	R3		R4	
	Rack	Cabinet	Rack	Cabinet
Height (including filters)	92½"	93"	92½"	93"
Width	21"	22"	42"	44"
Depth	18"	25"	18"	25"
Net Weight (approx.)	470 lbs.	572 lbs.	921 lbs.	1135 lbs.

Ordering Information

Through Repeater Station Assemblies can be ordered from microwave stock, completely assembled, tuned to required operating frequencies, and ready for convenient installation and operation.

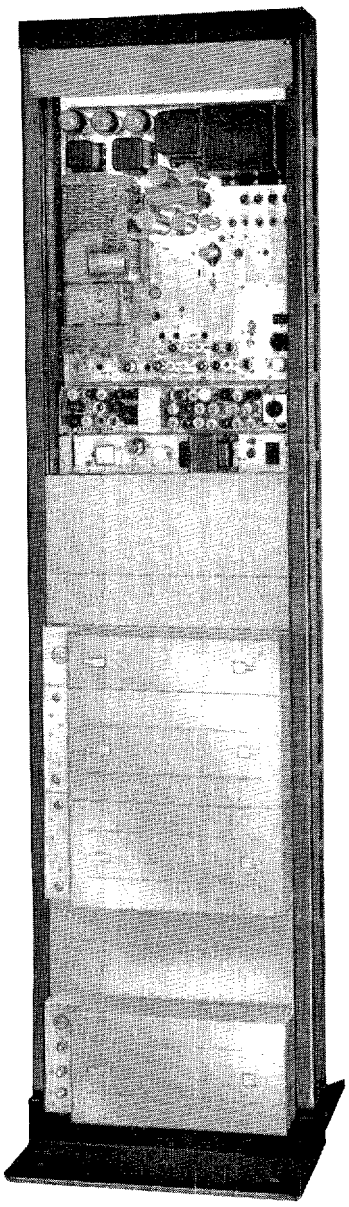
When ordering please indicate the following information:
Type No. CW-20
Assembly No. ..... R3 or R4
Mounting ..... Rack (R) or Cabinet (C)
Frequency Designation ..... See Table
(Example of a complete ordering number: CW-20 R4C-5)

In order to improve either the design or performance of the equipment, the above specifications are subject to change without notice.

MM-2A VHF RADIO RELAY COMMUNICATIONS SYSTEM

For Operation in 152-174 MC Band

C.5450



A typical rack of MM-2A Equipment, showing (from top) transmitter, receiver, and power supply. The rack provides adequate room for optional equipment such as the RCA MV-124 Multiplex Channels shown.

FEATURES

- Modulation bandwidth from 300 cps to 28 kc
- 60 watt transmitter output
- Crystal control
- Carrier operated relay control
- Designed for continuous unattended service
- Durable and compact design
- Designed for use with single sideband multiplex equipment

APPLICATION

OPERATES IN THE VHF SPECTRUM

The MM-2A operates in the 152 to 174 mc band and is ideally suited for both multiplex telephone and telegraph circuits. The modulation bandwidth from 300 cps to 28 kcs provides for a maximum of five 3 kc carrier derived telephone channels plus one voice frequency channel. Each channel in turn may be further multiplexed for high speed voice frequency carrier telegraph circuits or for manual telegraph, telemetering and control channels.

5611C

RADIO CORPORATION OF AMERICA
Communications Equipment • Camden, N. J.

DESCRIPTION

MINIMUM OF EQUIPMENT

The basic equipment consists of a Transmitter with built in power supply, a Receiver and Receiver Power Supply. These units mount in a standard 19" width cabinet or rack where tubes, components, and adjustment controls are readily accessible for maintenance purposes. The Transmitter unit, featuring crystal control and phase modulation, provides a power output of 60 watts to the transmission line. When used in conjunction with a directional type antenna, the effective power radiated in one direction may be further increased.

The Receiver makes use of two crystal controlled local oscillators in a double conversion superheterodyne circuit.

TRANSMITTER

Identification MI-31388

ELECTRICAL CHARACTERISTICS

Type of Transmission	Phase Modulation
Power Output (into Transmission Line)	60 watts
Carrier Frequency Range	152 to 174 mc
Carrier Frequency Stability	±.003%
Peak Deviation for 100% Modulation	±25 kc
RF Output Impedance	50 ohms unbalanced
Audio Pre-emphasis	50 micro-sec.
Input Level for ±25 kc Peak Deviation (Input level adjustable over 25 db range)	—26 dbm at 10 kc
Power Input Requirements	105 to 125 volts, 50 to 60 cycles, 415 watts nominal
Duty Cycle	Continuous
Tube Complement	5—6AU6, 2—5763, 1—2E26, 1—4-65A or PL-6549PA, 1—12AY7, 3—5R4GYA

RECEIVER

Identification:

Including Power Supply and Relay Panel	MI-31395-1
Receiver Alone	MI-31287-1
Power Supply Alone	MI-31288-1

Electrical Characteristics:

Type of Reception	Frequency Modulation
Carrier Frequency Range	152 to 174 mc
Overall Transmitter and Receiver Response	±1 db from 4 to 28 kc (10 kc reference) ±2 db from 300 to 4000 cps (1 kc reference)
Noise Figure	8 db max.
I.F. Bandwidth (3 db points)	150 kc
I.F. Bandwidth (100 db points)	440 kc
Intermediate Frequencies	2 mc and 13.6 mc
Local Osc. Stability	±.003%
Baseband Output Level	20 dbm max.
Audio Output Impedance	600 ohms C.T. balanced
Power Input Requirements	105 to 125 volts, 50 to 60 cycles, 62 watts
Tube Complement	5—12AT7, 1—6AN4, 8—6BH6, 1—6AL5, 1—6AK6

MECHANICAL CHARACTERISTICS

Transmitter:

Width	19"
Height	21"
Depth	21½"
Net Weight	79 lbs.

Receiver Unit (containing Power Supply):

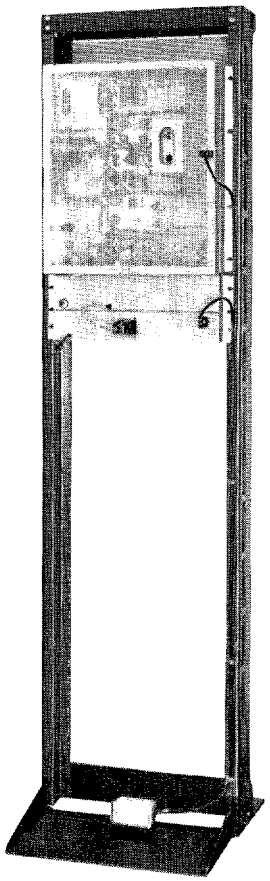
Width	19"
Height	7"
Depth	5⅝"
Net Weight	18 lbs.

ACCESSORIES AVAILABLE

Termination Panel	MI-15602-2
Rack	MI-31130-10

ORDERING INFORMATION

When ordering please specify the type number—MM-2A—as well as the stock identification numbers of individual units. Where specific customer requirements are to be met, the services of RCA Communications specialists are available to assist in system planning.



Rear view of rack mounted MM-2A Equipment. Note mesh screen on rear of transmitter which provides for heat dissipation.

FULL STANDBY REPEATER STATION

for RCA CW-20 and MM-26 Microwave Relay Systems

C-5580

FEATURES

- **Individual or Simultaneous Switch-In for Two Directions of Transmission**
- **'Hot Standby' Provisions Available**
- **Provides all Features and Advantages of Heterodyne Repeater Operation**
- **Dependable Automatic Operation**
- **Similar Full Standby Arrangements Available for All RCA Standard Stations**
- **Designed for Single Sideband Suppressed Carrier Frequency Division Multiplex Operation**
- **Rack or Cabinet Options**

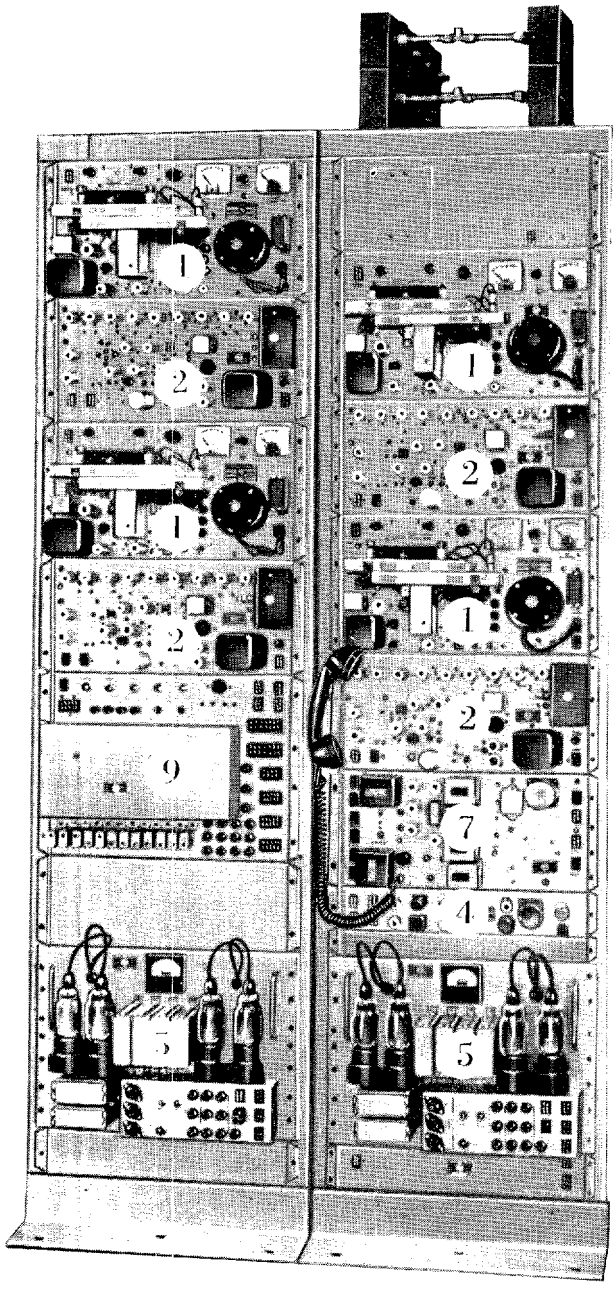
DESCRIPTION

Full Standby Repeater Stations can be made available upon special order to Microwave systems users who desire either simultaneous standby switch-in facilities for two directions of transmission or individual switch-in for either direction of transmission. In place of the one additional receiver and transmitter provided in normal standby arrangements, the Full Standby Station provides two of each of these units. Each of these standby R-f sections is associated with one direction of transmission. One or both standby sections will switch in automatically, as required, to maintain the continuity of transmission at a repeater station. Also included is a standby power supply which is energized only if the primary power supply fails. This assures that a properly operating power supply is not switched-out unnecessarily.

An optional 'hot standby' arrangement can be used to keep tube filaments of standby equipment near operating potential. Using this method, the switching time can be reduced to a minimum.

EQUIPMENT IDENTIFICATION

① Transmitter
② Receiver
④ Baseband Unit
⑥ Power Supply
⑦ Repeater Service Unit
⑨ Repeater Switching Unit



A typical MM-26 Full Standby Repeater Station is shown above. Similar Full Standby arrangements can be made available for other RCA MM-26 and CW-20 Standard Stations.

5512C

RADIO CORPORATION OF AMERICA

Communications Equipment • Camden, N. J.

Approved For Release 2000/05/15 : CIA-RDP79T01049A002100060001-1

DESCRIPTION CONTD.

Where Full Standby Operation is indicated, a systems engineering study is usually required in order to achieve the full benefits of such operation. The services of RCA communications specialists are available for this purpose to users of microwave systems.

CW-20 OPERATIONAL FIXED BAND RECOMMENDED FREQUENCY ASSIGNMENTS*

Frequency Designation	Frequency of Transmitters (in MC)	Frequency of Receivers (in MC)
1	1855	1895
2	1895	1855
3	1865	1905
4	1905	1865
5	1875	1915
6	1915	1875
7	1965	1925
8	1925	1965
9	1975	1935
10	1935	1975
11	1985	1945
12	1945	1985

* Similar frequency assignments are available for the 1700-1850 mc Government Band.

MM-26 OPERATIONAL FIXED BAND RECOMMENDED FREQUENCY ASSIGNMENTS

Frequency Designation	Frequency of Transmitter (in MC)	Frequency of Receiver (in MC)
A65	2455	2495
A66	2495	2455
A67	2505	2545
A68	2545	2505
A69	2515	2555
A70	2555	2515
A71	2525	2565
A72	2565	2525
A73	2535	2575
A74	2575	2535
A75	2585	2625
A76	2625	2585
A77	2595	2635
A78	2635	2595
A79	2605	2645
A80	2645	2605
A81	2615	2655
A82	2655	2615

SPECIFICATIONS

Frequency Range:
- CW-20 ..... 1700-1990 mc
- MM-26 ..... 2450-2700 mc

Type of Modulation ..... Frequency Modulation

Type of Associated Multiplex Equipment ..... Single Sideband Suppressed Carrier Frequency Division

Total Peak Deviation ..... ±1.5 mc

Transmitter Power Output:
- (MM-26) ..... 1.5 watts
- (CW-20) ..... 3 watts

Frequency Stability ..... ±0.05%

Baseband Modulation Frequency Range ..... 3 kc to 160* kc

Service Channel Frequency Range ..... 300 cycles to 3 kc

Receiver Bandwidth ..... 6 mc

Method of Operation ..... Heterodyne Repeater

Number of Channels ..... 30 telephone channels and 1 service channel**

Nominal Transmitter Modulation Sensitivity per Voice Channel ..... −26 dbm

Nominal Receiving Output Level per Voice Channel ..... −10 dbm

Receiver Noise Figure ..... 12 db

A-C Power Source ..... Adjustable taps for inputs of 95 to 125 volts rms, 50/60 cycles, 1,000 watts. Permissible voltage variation on selected tap ±5%.

Power Consumption (approx.) ..... 825 watts

Power Consumption-Hot Standby ..... 1200 watts

Weight and Dimensions of Typical Full Standby Assembly:	Rack	Cabinet
Height (including filters)	92½"	93"
Width	42"	44"
Depth	18"	25"
Net Weight (approx.)	977 lbs.	1190 lbs.

ORDERING INFORMATION

The services of RCA microwave specialists are available to assist in determining Full Standby requirements for specific installations in order to achieve the full benefits of such operation.

Assemblies are shipped from the factory completely assembled, tuned to operating frequencies and ready for installation and operation. When ordering, please designate Full Standby operation and specify the following information:

Type Number ..... CW-20 or MM-26

Mounting ..... Rack (R), Stylized Rack (S) or Cabinet (C)

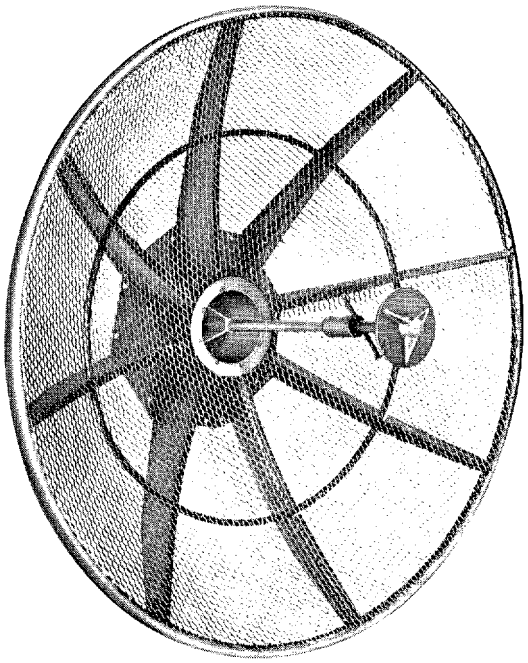
Frequency Designation ..... See tables above

* Additional range available on special order.

** Modulation space is also available for up to 18-20 additional signaling or teletype chanels.

PARABOLIC REFLECTOR ANTENNAS
1700-1850 mc • MI-31045

C.7202



FEATURES

Lightweight

Low wind resistance

High gain

Low VSWR of 1.5/1 maximum

Low side lobe radiation

Specifically designed for greater gain in the 1700-1850 mc portion of the microwave spectrum, these highly directional antennas provide maximum energy transfer between successive microwave stations. Three sizes are available to meet individual gain requirements.

Size	Ordering Number	Gain at 1780 mc in db*
4′	MI-31045-B3	25.5
6′	MI-31045-C3	29.2
10′	MI-31045-D3	33.4

* Gain relative to an isotropic radiator.

Dec. 1954

DESCRIPTION

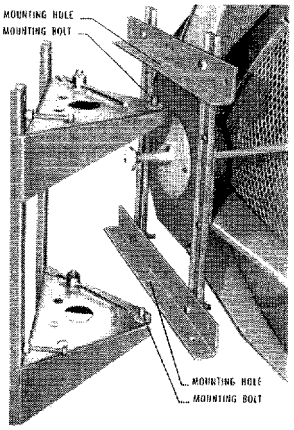
Sturdy and Lightweight — Aluminum construction contributes to the unusual lightness of these antennas. Mesh design also keeps the weight down while reducing wind resistance by 40 percent. Despite their light weight a sturdy rib frame enables the antennas to withstand wind loads of 90 mph directed at an angle 45 degrees to normal.

These 'dish' type parabolas concentrate the transmitted microwave energy into highly directive beams. When used for receiving purposes, all the available energy is concentrated toward the dipole for maximum system gain and better reception. The precision workmanship of the antennas contributes to a low VSWR of 1.5/1 maximum, and low side lobe radiation characteristics.

Easily Installed — Antennas are designed in accordance with RCA specifications based upon years of field experience. Lightweight construction contributes to easy installation. One man at the top of a tower can easily align the 4 foot, 6 foot or 10 foot models. The dipole, designed as a separate assembly, is easily accessible from the rear for convenient installation and orientation. A standard 7/8" RETMA flange fitting with bleeder port connects the dipole directly to the transmission line.

Exclusive "Gas-Block" Feature—All the parabolic reflector antennas in this series feature a Teflon insulator 'gas-block' with double "O"-ring seal which weather seals the transmission line at the dipole. The transmission line is thus permanently protected from the effects of rain and humidity at all temperatures—while the use of a dipole covering is avoided.

Conveniently Mounted—The mesh type antenna easily mounts on wall mounting bracket MI-31041-W, which can be installed on standard guyed towers. When desirable, these antennas can also be installed on standard pipe mounting brackets MI-31041-A.

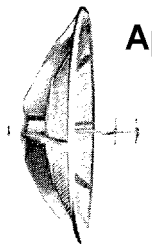


Back of Antenna showing accessory wall mount bracket. To install, two mounting holes are slipped over the mounting bolts projecting from the accessory mounting bracket. It is then only necessary to install the dipole, orient the antenna, and clamp the bracing rods.

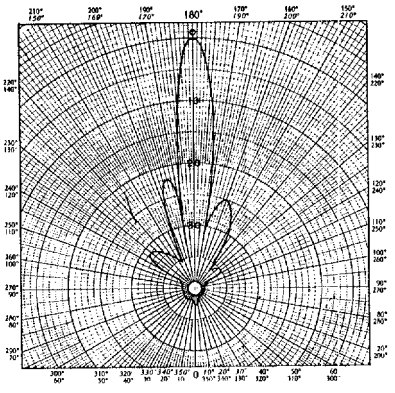
RADIO CORPORATION OF AMERICA

Communications Equipment • Camden, N. J.

C.7202

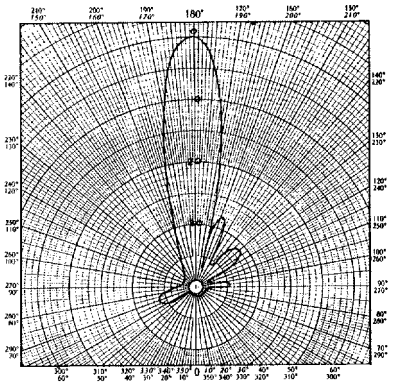


6' ANTENNAS

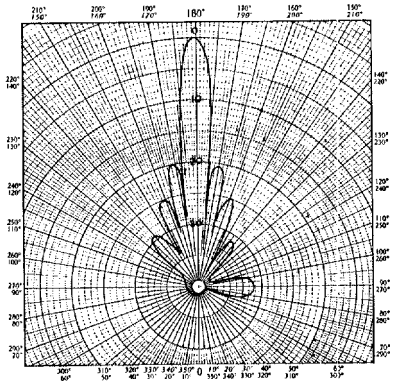


E PLANE, 5.3 degrees

4' ANTENNAS

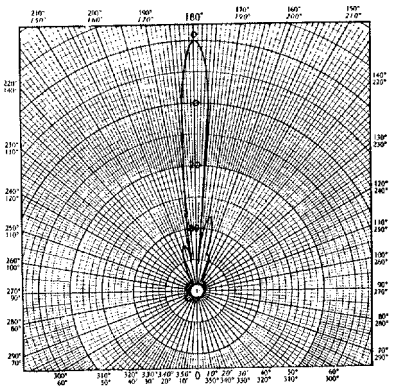


E PLANE, 9.7 degrees

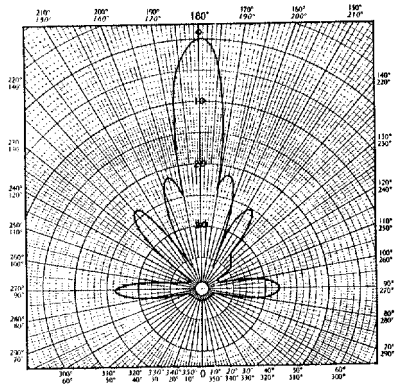


H PLANE, 5.4 degrees

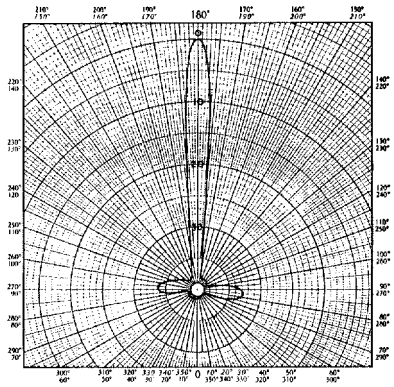
10' ANTENNAS



E PLANE, 4.6 degrees



H PLANE, 8.5 degrees



H PLANE, 4.7 degrees

Beam Widths at 3 db down measured at 1780 mc

The above radiation patterns show the high directivity and low side lobe characteristics of these antennas. Beam widths are shown at various relative power levels and at the 3 db down half power points. E Plane and H Plane patterns are shown, as an aid in microwave system planning. The E Plane patterns can be used when horizontal polarization is desired, and the H Plane patterns can be used when vertical polarization is desired.

Frequency Range	1700-1850 mc
Input Impedance	50 ohms
Input Connector	7/8" RETMA flange fitting (with female center conductor)
VSWR (Voltage Standing Wave Ratio)	1.5/1 maximum
Polarization	Dipole can be rotated to either vertical or horizontal plane

Accessories:

Wall Mount Bracket	MI-31041-W
Pipe Mount Bracket	MI-31041-A

Weight (with hardware):	Net Weight	Shipping Weight
4 foot antenna	36 lbs.	105 lbs.
6 foot antenna	60 lbs.	195 lbs.
10 foot antenna	167 lbs.	460 lbs.

Ordering Information

When ordering please specify the following ordering numbers:

4 foot antenna	MI-31045-B3
6 foot antenna	MI-31045-C3
10 foot antenna	MI-31045-D3

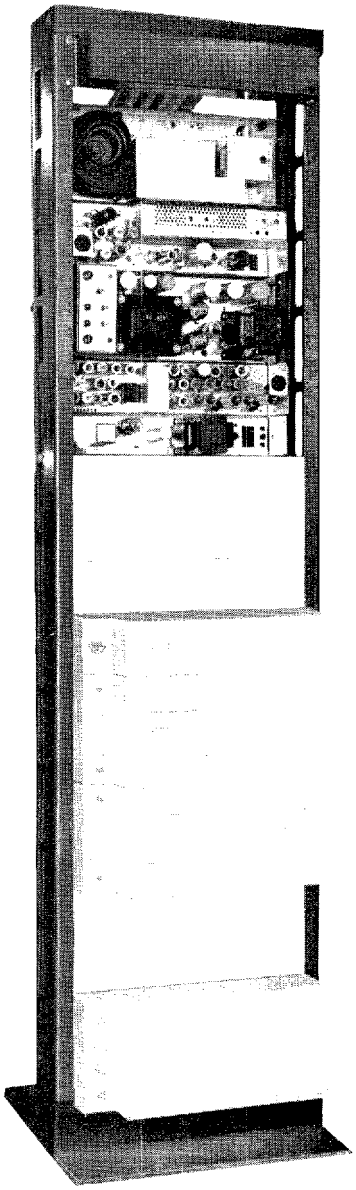
The shipment includes the reflector and dipole, required mounting hardware and an installation drawing; but does not include the mounting bracket.

In addition, the 10 foot antenna is shipped with a metal mounting frame and the 6 foot and 4 foot antennas are shipped with two mounting channels. These items are used to install the antenna on the accessory mounting bracket.

MM-5A UHF RADIO RELAY COMMUNICATIONS SYSTEM

FOR OPERATION IN 450-470 MC BAND

C.9005



A standard rack of MM-5A Equipment, showing (from top) termination panel, blower panel, transmitter and power supply, receiver and power supply. The rack provides adequate room for the mounting of optional equipment as shown in above photograph.

FEATURES

- Modulation bandwidth from 300 cps to 28 kc
- 15 watt transmitter output
- Crystal control
- Carrier operated relay control
- Designed for continuous unattended service
- Durable and compact design
- Designed for use with single sideband multiplex equipment

APPLICATION

OPERATES IN THE UHF SPECTRUM

The MM-5A operates in the 450 to 470 mc band and is ideally suited for both multiplex telephone and telegraph circuits. The modulation bandwidth from 300 cps to 28 kcs provides for a maximum of six carrier derived telephone channels with 4 kc spacing plus one voice frequency channel. Each channel in turn may be further multiplexed for high speed voice frequency carrier telegraph circuits or for manual telegraph, telemetering and control channels.

5811

RCA INTERNATIONAL DIVISION
RADIO CORPORATION of AMERICA
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y., U. S. A.

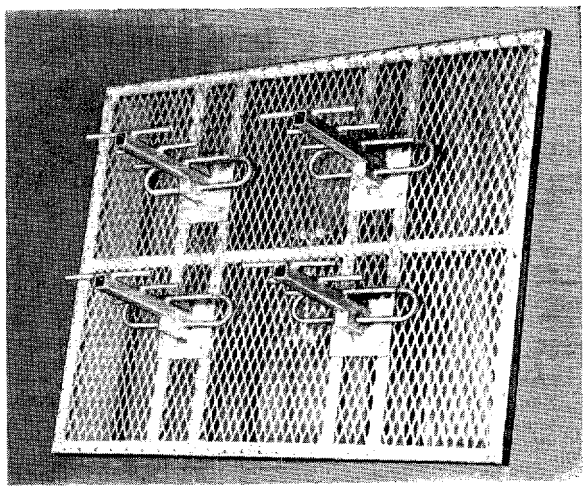
DESCRIPTION

MINIMUM OF EQUIPMENT

The basic equipment consists of a Transmitter and Power Supply, a Receiver and Power Supply. These units mount in a standard 19" width rack where tubes, components, and adjustment controls are readily accessible for maintenance purposes. The Transmitter unit, featuring crystal control and phase modulation, provides a power output of 15 watts to the transmission line. When used in conjunction with a directional type antenna, the effective power radiated in one direction may be further increased.

The Receiver makes use of two crystal controlled local oscillators in a double conversion superheterodyne circuit.

ANTENNA FOR USE WITH MM-5A



MI-850055

TYPE

Screen reflector with four fully welded four-element Yagis mounted on the screen, providing maximum front-to-back performance. Screen is expanded aluminum welded to an aluminum tubing framework.

CHARACTERISTICS

450-470 mc Band

500 Watts Rating

12.5 db Gain, minimum over half-wave dipole

PHYSICAL DIMENSIONS

Weight	25 lbs.
Screen	48" x 36"
Depth	15"

SPECIFICATIONS

TRANSMITTER

Electrical Characteristics	
Type of Transmission	Phase Modulation
Power Output (into Transmission Line)	15 watts
Carrier Frequency Range	450 to 470 mc
Carrier Frequency Stability	±.003%
Peak Deviation for 100% Modulation	±25 kc
RF Output Impedance	50 ohms unbalanced
Audio Pre-emphasis	50 micro-sec.
Input Level for ±25 kc Peak Deviation (Input level adjustable over 25 db range)	—26 dbm at 10 kc
Power Input Requirements	105 to 125 volts, 50 to 60 cycles, 475 watts nominal
Duty Cycle	Continuous
Tube Compliment	2—6AU6, 1—6U8, 1—5763, 1—6360, 2—5894A, 1—12AY7, 2—5U4GB, 1—6AX5GT

RECEIVER

Electrical Characteristics:	
Type of Reception	Frequency Modulation
Carrier Frequency Range	450 to 470 mc
Overall Transmitter and Receiver Response	±1 db from 4 to 28 kc (10 kc reference) ±2 db from 300 to 4000 cps (1 kc reference)
Noise Figure	10 db max.
I.F. Bandwidth (3 db points)	140 kc
I.F. Bandwidth (100 db points)	440 kc
Intermediate Frequencies	2 mc and 15.145 mc
Local Osc. Stability	±.003%
Baseband Output Level	20 dbm max.
Audio Output Impedance	600 ohms C.T. balanced
Power Input Requirements	105 to 125 volts, 50 to 60 cycles, 55 watts
Tube Complement	6—12AT7, 2—6AM4, 6—6BH6 1—6AL5, 1—6AK6, 1—5Y3WGT

GENERAL SPECIFICATIONS

Temperature Range, Operating	—20°C to +50°C
Relative Humidity	95%
Altitude	3048 meters

ORDERING INFORMATION

When ordering please specify the type number—MM-5A. Where specific requirements are to be met, the assistance of RCA Specialists is available.

PORTABLE FM COMMUNICATION EQUIPMENT

C.9205

For Use With All RCA VHF FM Communications Equipment and Minipak and Packmaster Intercommunications

Minipak* and Packmaster*

FEATURES

- **Designed for use with all RCA VHF FM communications equipment**
- **Lightweight, portable, compact and rugged construction**
- **Practical and attractive styling**

DESCRIPTION

The Minipak Model 1160 is an unusually dependable portable unit designed to operate in conjunction with RCA FM Communications equipment. Its extremely light, compact and rugged construction will greatly increase the flexibility of any communications system. The use of the sub-miniature tubes provides extra long battery life and outstanding performance.

The complete MINIPAK communication unit consists of:

1 FM receiver
1 FM transmitter
1 Handset
1 Antenna, demountable whip
1 Battery pack
1 Carrying strap

Available accessory items include wet cell battery packs, canvas carrying cases, two frequency transmitters, or receivers, loudspeaker and squelch control.

SPECIFICATIONS

Frequency Bands.....30 to 50 mcs.; and 150 to 170 mcs.

Nominal Power.....Receiver total power input .8 watt
Transmitter total power input 4.5 watts

Power Supply.....Self-contained dry batteries. Battery complement: One 1.5 volt "A" battery type VS141 or equiv. and three 45 volt "B" batteries VSO55 or equiv. (wet battery supply also available). Normal operating life of batteries: 8 hours.

Dimensions.....8 7/16" high (including handset) x 11 1/4" wide x 3" deep

Weight.....8 lbs. (including handset, power supply and antenna)

TRANSMITTER

RF Power Output.....1.2 watts on 30 to 50 mcs
.4 watt on 150-170 mc

Stability and Temperature Range.....±2 kc over −30 to +60°C

Modulation.....FM ±15 kc deviation

RECEIVER

Sensitivity.....4 microvolts or less for 20 db quieting (30-50 mcs)
1.0 microvolt or less for 20 db quieting (150-170 mcs)

Selectivity.....Attenuation of 85 db or more 80 kc from the desired frequency

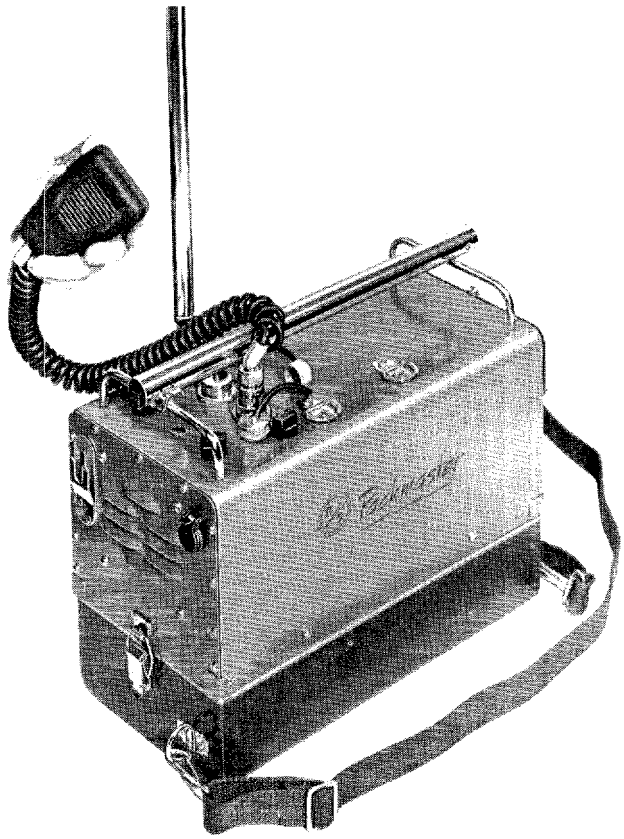
Spurious Response....All spurious responses attenuated 80 db or more

Stability and Temperature Range.....±2 kc over −30 to +60°C

* Manufactured by: Radio Specialty Mfg. Co., Portland, Oregon, U.S.A. for RCA Intl. Div.

RCA INTERNATIONAL DIVISION
RADIO CORPORATION of AMERICA
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y., U. S. A.

C.9205



DESCRIPTION

The PACKMASTER was designed and engineered to meet the requirements of all portable radio users. The unit is supplied complete with microphone, antenna, medium duty batteries, and carrying strap.

It is a complete communication unit offering the special features usually available only in larger, permanent or mobile type equipment. Because of its unique plug-in power supply section that will operate on either AC power or 6-12 volt battery (automatically selects polarity) it can be used for all types of service, High Power main station, Truck or Car station, or Portable station used with dry battery power unit.

The PACKMASTER operates either loudspeaker or headphones and can be used with its own whip antenna, or with a more permanent type base station antenna. All controls are weatherproofed and conveniently located on top of unit. An automatic squelch circuit is incorporated in the equipment.

Terrain, atmospheric conditions, and many other factors determine the coverage of all radio communication systems. PACKMASTERS have been known to communicate over distances of a 100 miles, but there have been other instances when several miles was the limit. However, Packmaster coverage will equal or surpass any other similar FM Radio Communication unit under the same circumstances.

SPECIFICATIONS

FM Frequency Bands..... 30-50 mcs, 152-174 mcs
Receiver Sensitivity.....4 microvolt signal or less will produce 20 db noise quieting on 30-50 mcs; 1 microvolt on 152-174 mcs
Receiver Audio Output..... In excess of 100 milliwatts with less than 10% distortion
Transmitter Modulation..... ±15 kc
Transmitter Power Output:
Hi Power (optional)..... 7.5 watts on 30-40 mcs, 6 watts on 40-50 mcs
Lo Power (Dry Battery Operation)..... 1.5 watts on 30-40 mcs, 1 watt on 40-50 mcs, .5 watt on 152-174 mcs
162-174 mcs
Dimension.....6 9/16" wide x 13½" deep x 11½" high, Including medium duty battery tray
Weight..... 19 lbs. 8 oz. with light duty batteries (15 hour operation, minimum); 28 lbs. 2 oz. with medium duty batteries (68 hour operation, minimum); set of batteries consists of 2 RCA VSOO4 and 3 RCA VSO13 batteries (medium duty).
Housing.....Waterproofed, holds either two receivers and one transmitter, or two transmitters and one receiver with appropriate controls. Compartment stores carrying straps, and microphone. Detachable battery compartment is also included in housing.
Antenna..... Telescoping antenna loaded into 50 ohms impedance, slides into carrying handle when not in use. Several other type fixed antennas can be used to provide maximum transmitting range.
Microphone.....Hand-held military type equipped with retractable coil cord
Controls .....On top for easy access. Splash proof design with splash proof covers.
Optional Power Supplies:
Light duty battery tray (15 hour operation, minimum) OR medium duty battery tray (68 hour operation, minimum) OR Power unit which can be plugged into either 6 or 12 volt car battery (automatically selects polarity) or 117 volts AC. All units plug-in type.

ORDERING INFORMATION

Each Minipak and Packmaster unit is supplied complete with tubes, crystals, microphone, antenna, batteries and carrying strap and is tuned and tested on specified frequency. Delivery will be expedited by providing complete ordering information including frequency of operation, type of battery supply, optional equipment such as carrying case and spare batteries, if desired.

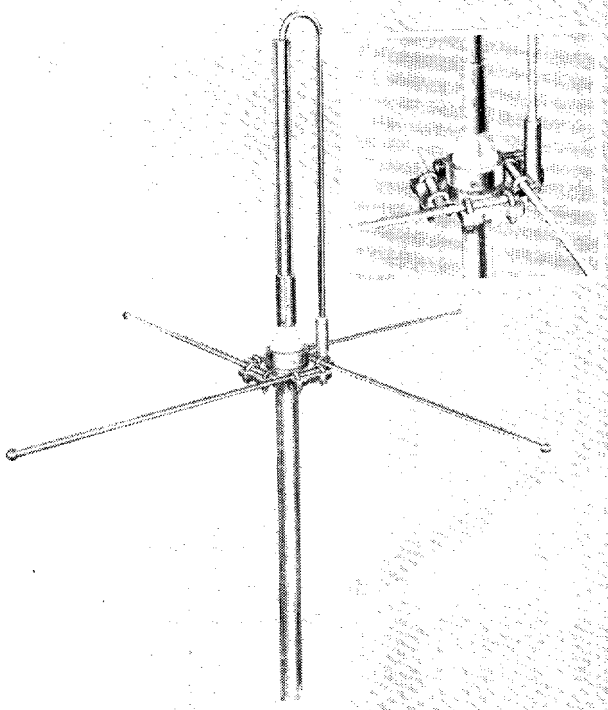
STATION ANTENNA

MODEL CP-128 — FREQUENCY RANGE 30-175 Mc*

CATALOG C.9402

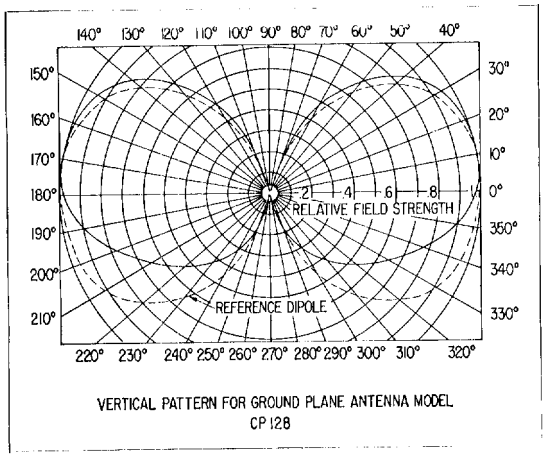
FEATURES

- Low Cost
- Complete lightning protection—all elements grounded
- Constant Pattern
- Simple Installation
- Factory cut to exact operation frequency—requires no adjustment upon installation



DESCRIPTION

The RCA Model CP-128 ground plane antenna is designed to provide uniform coverage from a VHF base station. The antenna consists of a 1/4 wave folded vertical radiator with ground plane elements spaced at intervals of 90°. The entire unit is ruggedly constructed and will withstand the most severe weather conditions. Due to the unique design of the antenna, the entire assembly is at ground potential, thus providing safe lightning protection. This also provides an excellent static drain, which is extremely important when the antenna is used for receiving purposes.



VERTICAL PATTERN FOR GROUND PLANE ANTENNA MODEL CP128

SPECIFICATIONS

ELECTRICAL	30-100 Mc	100-175 Mc
VSWR (using 50 ohm cable)	1.3:1	1.3:1
Bandwidth (under 2:1 VSWR)	±4%	±4%
Max. power input det. by feed cable size		
Internal feedline	RG-8A/U	RG-8A/U
Nominal input imped.	50 ohms	50 ohms
Lightning protection	Direct ground	
MECHANICAL		
Support tube diam.	1 5/16"	1 5/16"
Support tube material	Hot galvanized steel	
Support tube length	24"	12"
Radiating element	Heat treated aluminum	
Ground plane element	Heat treated aluminum	
Antenna weight approximate	40 lbs. max.	25 lbs. max.
Rated wind load	100 MPH	125 MPH

*Exact frequency must be specified

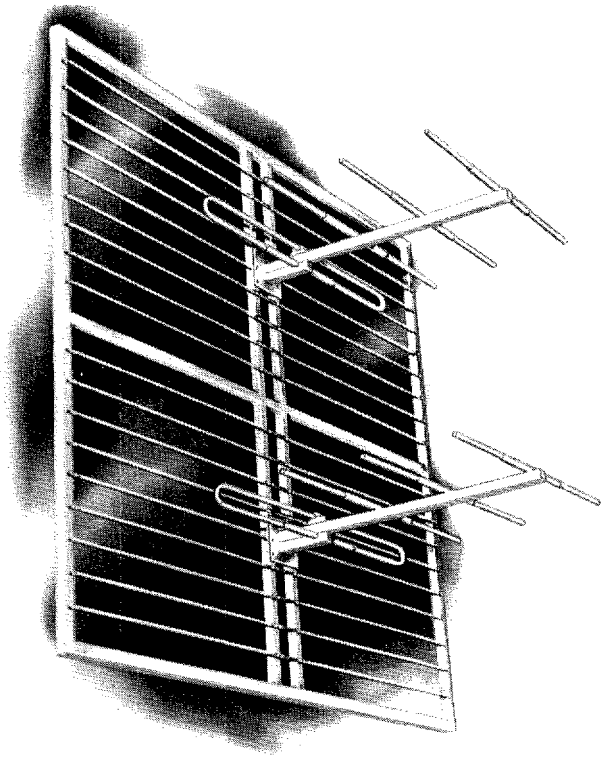
RCA INTERNATIONAL DIVISION
RADIO CORPORATION OF AMERICA
30 Rockefeller Plaza, New York 20, N. Y.

YAGI TYPE ANTENNAS WITH SCREEN REFLECTOR

132 - 174 mc • MI-22680 and MI-22681

For RCA Microwave Radio Relay Communication Systems

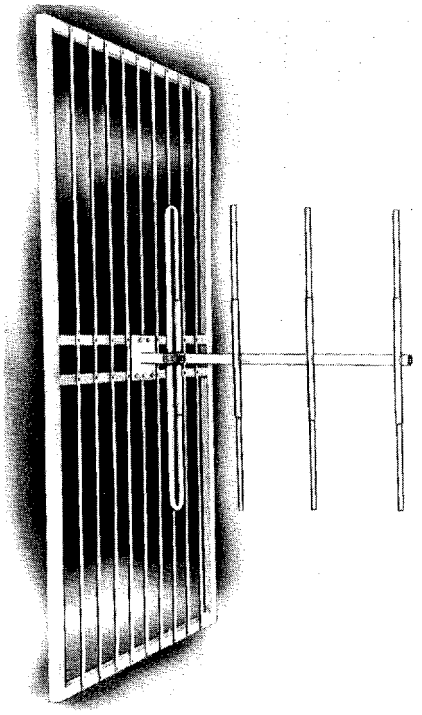
C.9740



MI-22681 DOUBLE TYPE SY-41-B

FEATURES

- Heavy duty welded construction.
- Sturdy and Light weight.
- Low VSWR, High Gain.
- Factory Calibrated, Field Adjustments not required.
- Side Tower Mount Allows Orientation in any direction.
- Can be mounted for either horizontal or vertical polarization.
- Stackable for additional gains.



MI-22680 SINGLE TYPE SY-41-A

USES

Designed for use with RCA Type MM-1 and MM-2 Radio Relay Systems. Also suitable for use with other equipment operating in the frequency range 132 - 174 MC where stability and ruggedness is required for all-weather operation of essential communications service.

DESCRIPTION

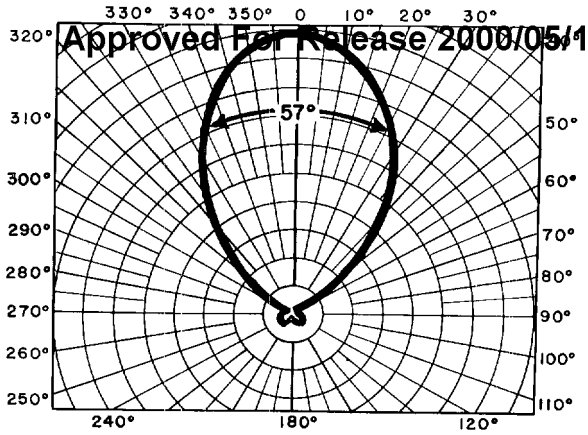
Type 6061T6 aluminum alloy was selected for this antenna because of its high tensile strength, light weight and weldability. The Yagi elements are heavy wall ½" tubing with sleeve telescoping section of ⅝" aluminum. A teflon cable inside the folded dipole tubing acts as a matching section and the connection for the antenna feed. There are no wires, cables or screw terminals open to the weather and external baluns are not required with this unique design. Gas-expanded foam plastic is used inside the antenna feed system to prevent the accumulation of water. Stainless steel hardware is used to fasten the Yagi to the screen framework.

ELECTRICAL DESIGN: The screen type Yagi has electrical advantages over a conventional Yagi, since a perfect screen reflector produces a gain of 6 db, whereas, a reflector for a 5 element Yagi can contribute only 1 db to the overall gain. The screen Yagi has a front to back ratio many times that of a conventional Yagi. Antennas can be mounted for either horizontal or vertical polarization, increased isolation is realized between adjacent antennas.

STACKING ANTENNAS FOR INCREASED GAIN: Two type SY-41B antennas with 80" x 80" screen can be mounted vertically one above the other for increased gain. The measured performance for this system is given in the tables on reverse side of this sheet. A gain of 13.5 db over a half-wave dipole is obtained with this arrangement, extremely high for antennas in the frequency range of 150 MC.

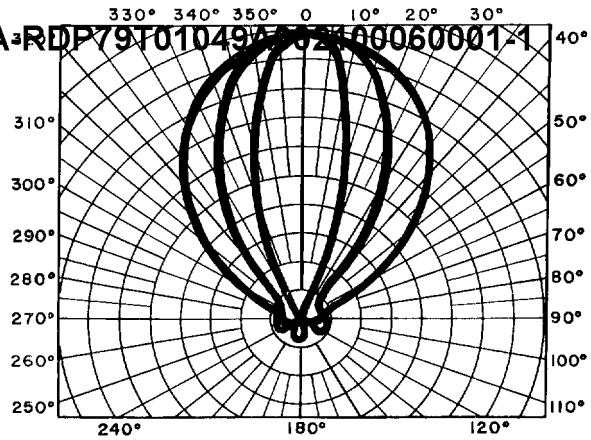
MOUNTING

The mounting kit SY-41-M consists of a tower mounting bracket all the parts necessary to fasten either one 40" x 80" screen (SY-41-A) or one 80" x 80" screen (SY-41-B) to a tower. The mounting kit is not supplied as part of the antenna and [illegible] required.



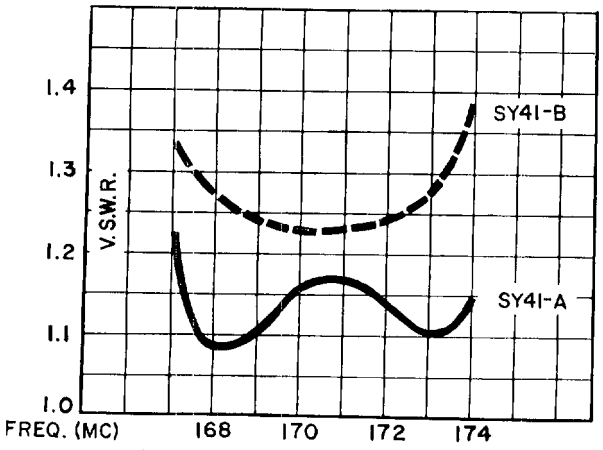
HORIZONTAL "E" PLANE VOLTAGE PATTERN AT 170 MC

SY-41A	57°	½ power
SY-41B	57°	½ power

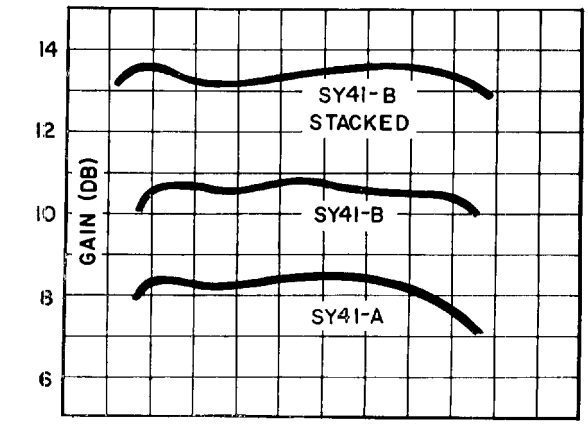


VERTICAL "H" PLANE VOLTAGE PATTERN AT 170 MC

SY-41A	74°	½ power
SY-41B	45°	½ power
SY-41B (stacked)	22°	½ power



ANTENNA IMPEDANCE (VSWR)



MEASURED GAIN OVER A TUNED REFERENCE HALF-WAVE DIPOLE

SPECIFICATIONS

Frequency Ranges	132 - 174 MC
Nominal Impedance	50 Ohms
SY-41A Typical VSWR Under 1.25	
SY-41B Typical VSWR Under 1.4	
Typical Rear Rejection	SY-41A 28 DB
	SY-41B 28 DB
Input Connector	Type "N"
Average Gain	SY-41A 8 DB
	SY-41B 10.5 DB
	Stacked SY-41B 13.5 DB
Internal Matching Cable	Teflon RG-141/U
Power Capacity	SY-41A 550 Watts
	SY-41B 1000 Watts
Polarization	Horizontal or Vertical
Construction	Welded and Riveted
Hardware	Stainless Steel
Finish:	
Irridite with Chromate Primer and Air Dry Enamel Sealer	
Wind Load (without ice):	Max. Vel.
	SY-41A 250 MPH
	SY-41B 250 MPH

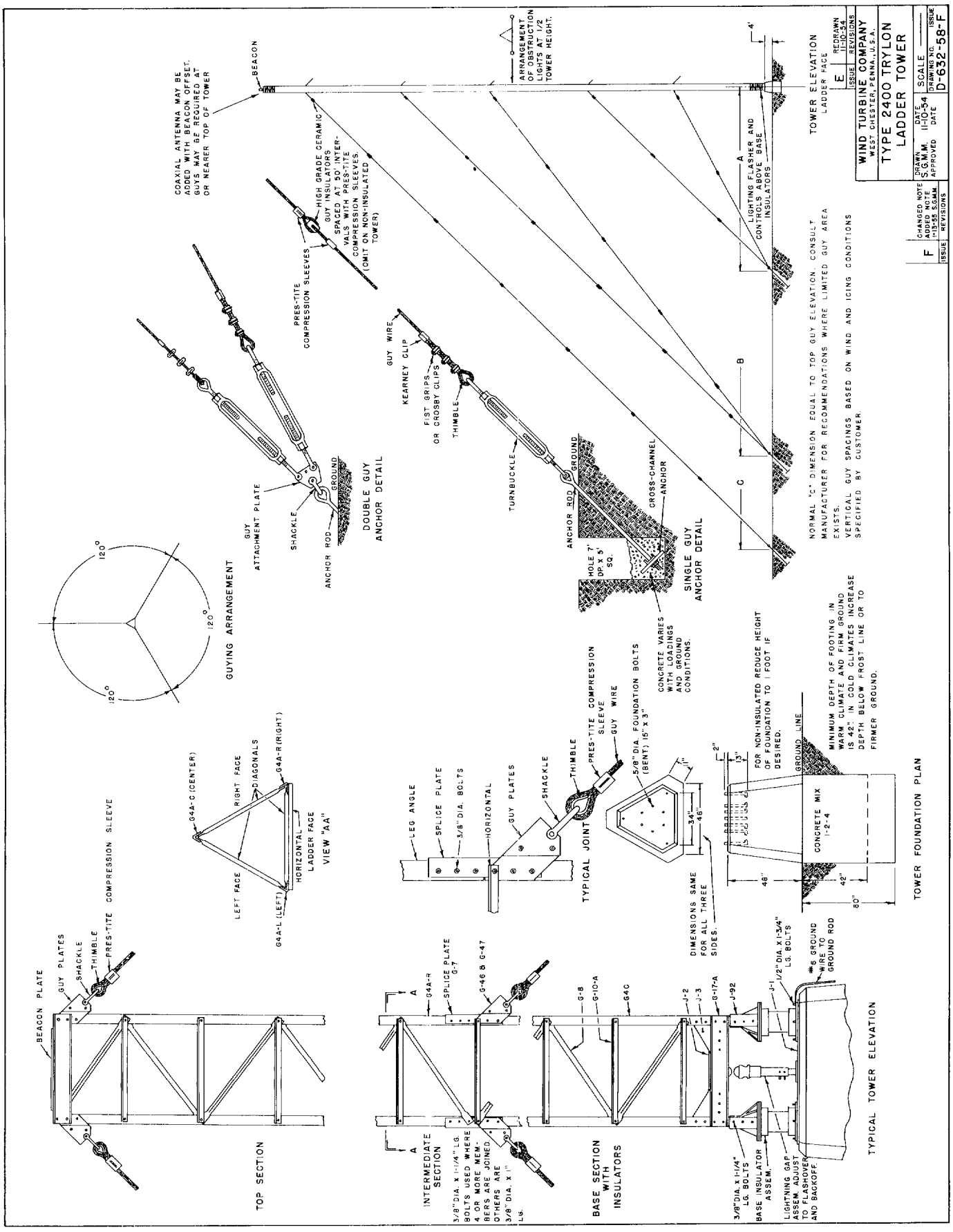
ORDERING INFORMATION

Six standard sizes of the SY-41 A and B antennas cover the frequency range 132-174 MC. One of the following frequency ranges should be specified when ordering:

132 - 138	148 - 154	160 - 167
138 - 144	154 - 160	167 - 174

MI NUMBER	TYPE NUMBER		SHIPPING WEIGHT	NET WEIGHT
MI-22680	SY-41A	Yagi with 40" x 80" screen. Painted — Less mounting kit	48½ lbs.	17¼ lbs.
MI-22681	SY-41B	Two Yagis with matching harness and 80" x 80" screen	73½ lbs.	32½ lbs.
MI-22682	SY-41SL	Stacking harness to combine two SY-41B	1½ lbs.	1 lb.
MI-22683	SY-41M	Mounting kit for one SY-41A or SY-41B antenna	12 lbs.	8 lbs.

RCA INTERNATIONAL DIVISION
RADIO CORPORATION OF AMERICA



ELECTRONICS FACILITIES IN CUBA

ANNEX 2C

CATALOGS OF RCA AND GE EQUIPMENT USED ON THE BASIC FIXED RADIO RELAY SYSTEM 1956–60

Approved For Release 2000/05/15 : CIA-RDP79T01049A002100060001-1

OFFICE OF RESEARCH AND REPORTS

Publications Staff

Control Sheet

FOR OFFICIAL USE ONLY

Series Number CIA/RR EP 60-73-S2C
Date of Document November 1960

Classification ~~CEP INTERNAL USE ONLY~~
Number of Copies ~~45~~ 35
20 copies return 29 Oct 62

Copy No.	Recipient	Date	Returned
1	STATINTL [redacted]	25 Oct 60	see below
2	[redacted], O/C, 1602 Alcott Hall	"	
3	[redacted] 827, T-32 (x-6973)	"	
4	STATINTL [redacted] OCI/SpInt, 2169 Que	"	STATINTL
5	[redacted] OCI/SpInt for NSA	"	
6-7	[redacted], S/COM	"	1 Nov 60
8	[redacted], O/COM for Mr. Vannoy, US Army Signal Intelligence Agency, A Bldg., Arl. Hall	"	
9	STATINTL St/P/C - File Copy	"	
6	[redacted]	1 Nov 60	
7		"	
10-15		"	
~~24~~	~~AD/OI~~	"	
~~25~~	~~RI/OS~~ STATINTL	"	
~~26~~	~~O/DDI~~	"	
~~27~~	~~VMR~~ [redacted]	"	
~~28~~	~~AD/SI~~	"	
~~29~~	~~Director, O/C~~	"	
~~30~~	~~Extra copy, filed in St/P/C~~	"	
1,16	ONI 92Y4 via [redacted] STATINTL	3 Jan 61	
16	~~CINCLANT Hdqtrs, Norfolk Va. via CCI Reg~~	~~1 Nov 62~~	
17	~~18th Airborne Corps, Ft. Bragg, NC via CCI Reg~~	~~1 Nov 62~~	
18	~~9th Air Force, Seymour Johnson AFB, NC via CCI Reg~~	"	8 Jan 62
19	~~Navy, CNO (OPerations) via CCI Reg~~	~~1 Nov 62~~	
STATINTL 20	~~Army, DCS/Military Operations via CCI Reg~~	~~1 Nov 62~~	
21	~~Air Force, DCS/Operations via CCI Reg~~	~~1 Nov 62~~	23 Jan 63
22	~~DDP Task Force W (Attn: Mr. Kitchener) via CCI Reg~~	"	
STATINTL 23	[redacted] ~~MS/COM~~	~~1 Nov 62~~	
24-35	Filed in St/P/C [redacted] STATINTL	1 Nov 62	STATINTL
STATINTL 25	[redacted]	DDP 5 Jan 62	20 Jan 62
35		m/m 10 Nov 62	10 Nov 62
35	OCI Reg. file [redacted]	[redacted]	
27-30	OCI Reg. for [redacted]	St/P/C	19 May 61

STATINTL

STATINTL