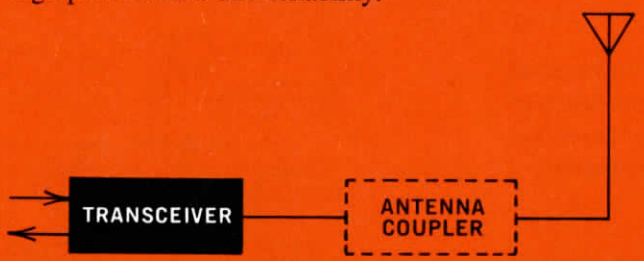
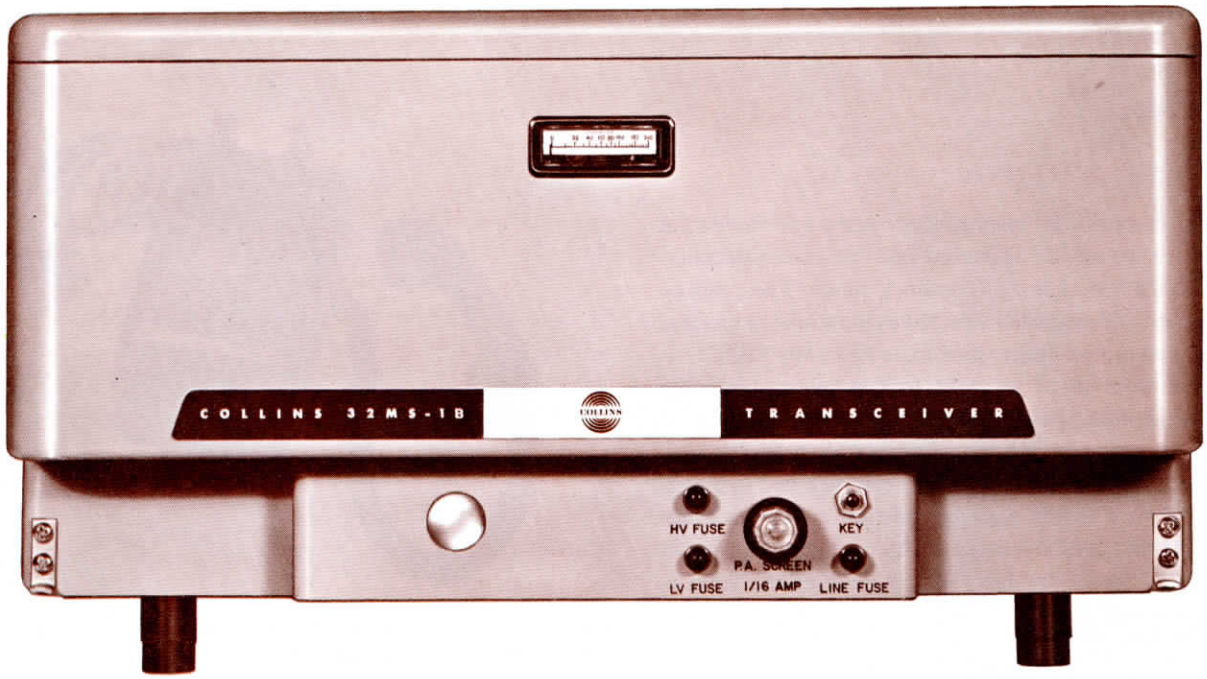
Transceivers

A complete line of HF single sideband transceivers for both general purpose requirements and specialized needs is available from Collins. Equipment for airborne, fixed station, mobile, transportable and military field pack applications is included. Each transceiver is especially designed for the intended environment and will provide consistently high performance and reliability.



32MS-1B 100 Watt Mobile Transceiver



Features	Applications
Four Pretuned Channels	*Petroleum*
Stable Signals	*Lumbering*
Simplified Controls	*Maritime Service*
Power Source Options	*Highway Construction*
	Civil Defense
	Aircraft
	Vehicle Fleet

The 32MS-1B Mobile Transceiver, with an output power of 100 watts PEP, provides SSB voice communication on four channels which can be preset to any frequency in the 1.6-15.0 mc range. All functions, including pushbutton channel selection, are controlled from a small remote unit. The 32MS-1B is especially suited for use in private autos, trucks, military vehicles, aircraft and marine installations.

SIMPLIFIED OPERATION

Proven SSB circuitry with a minimum number of controls facilitates use by nontechnical personnel. Each channel frequency employs separate sets of inductors to insure optimum selectivity.

Speech clipping is used on both positive and negative peaks to provide increased effective modulation. RF feedback is used in the RF amplifier section to maintain high linearity.

EASILY MAINTAINED

All tubes and controls for initial adjustments and tuning are reached by removing the top and bottom cover. Tune-up requires no external test equipment. The technician is not directly exposed to any high voltage circuits while maintaining the equipment.

High stability frequency generation circuits, common to the transmitter and receiver sections, simplify over-all circuitry and operation, and insure transmission and reception of signals on identical frequencies, with no manual adjustment.

OPTIONAL POWER SUPPLY

Plug-in supplies permit operation from 12 v dc, 28 v dc or 115 v or 230 v, 50-400 cps, single phase sources, and facilitate use of the 32MS-1B in land or maritime mobile, fixed station or airborne applications.

ADEQUATE COOLING

The 32MS-1B is housed in a welded aluminum case. Cooling is by convection. When transmitting, a blower forces air directly on the PA tubes and effects general air circulation throughout the cabinet.

Additional forced air can be employed in accordance with ARINC standards for installations where normal ambient air circulation is restricted.

RAPID INSTALLATION

The transceiver, together with control unit, antenna tuner and associated antenna, is easily installed. A separate antenna tuner is not required if the Collins 437P-1 Mobile Antenna is used. Plugs or cable connectors are employed for all wiring between system components.

Accessories

437P-1 MOBILE ANTENNA

The 437P-1 is a tunable, vertical whip antenna for vehicular use. It can be preset for operation on four communication channels in the 1.6-15.0 mc frequency range. The prepositioned taps are automatically selected as the transmit channel is selected. Power handling capability is 100 watts PEP.

The antenna consists of an eight foot stainless steel whip mounted on a tubular base loading coil assembly. Tuning and matching are preset by means of adjustable taps for each channel. A motor driven Autopositioner® included in the assembly operates a switch upon completion of a ground circuit. The antenna can be mounted with a standard universal mount located on the bumper or rear deck of the vehicle. Weight is 6 lbs. (2.72 kg).

48A-1SW DESK SET CONTROL

The 48A-1SW Desk Set provides pushbutton control of all 32MS-1B operating functions, including channel selection and mode choice. It includes a transistor monitor amplifier with separate volume level control. Push-to-talk control of the transmit function is provided by a switch in the handset.

48B-2SW MOBILE CONTROL

The 48B-2SW Control for mobile installations allows pushbutton selection of the desired operating channel and mode of operation. An adjustable mounting bracket permits the control unit to be positioned for maximum ease of use. An integral transistor amplifier and speaker can be used for receiver monitoring.

313W-1 REMOTE CONTROL

The 313W-1 Remote Control functions include channel selection, audio level control and mode selection together with an on-off control. Primarily intended for use where audio output and input amplifiers are available as in aircraft installations. The unit has jacks on the rear for direct use of microphone and headset.

Specifications

PRIMARY POWER: Power supplies available for operation from either 115 v or 230 v, 50-400 cps, 28 v dc or 12 v dc.

POWER REQUIREMENTS: At 117 v ac — nominal transmitting test tone, 3 amps; transmitting average speech, 2.4 amps; receive, 1.2 amps. At 14 v dc — transmitting test tone, 22.5 amps nominal; transmitting average speech, 17 amps; receive, 7 amps. At 28 v dc—transmitting test tone, 11.5 amps; nominal; transmitting average speech, 9 amps; receive, 3.8 amps.

ENVIRONMENTAL CONDITIONS: Ambient temperature range (operating) — from −20° to +55° C. Altitude — 30,000 ft. (9,144 meters). Humidity—0%-95%. Vibration—mounted on 390L-1A Shockmount and vibrated according to MIL-E-5400-E Curves 1 and 3, Fig. 5, up to 250 cps; i.e., suitable for aircraft use.

MODE: Single sideband or AM with reinserted carrier.

STABILITY: ±1 part per million.

TRANSMIT POWER OUTPUT: SSB — 100 watts PEP with two-tone input, using the ac power supply, or 80 watts PEP with two-tone input, using dc power supplies. Compatible AM with single tone input — either 50 watts average using ac power supply, or 40 watts average using dc power supply.

TRANSMIT OUTPUT IMPEDANCE: 52 ohms with SWR of less than 2.5:1.

HARMONIC AND OTHER SPURIOUS RADIATION: Second harmonic — at least 45 db below rated PEP. Carrier — at least 50 db below rated PEP static. Unwanted sideband — at least 60 db below rated PEP. Two-tone distortion products — at least 27 db below rated PEP. All other spurious radiation — at least 50 db down from rated PEP.

TRANSMIT AUDIO INPUT: Telephone handset at control box or balanced 600 ohm input with 0 dbm input level.

SPEECH CLIPPING LEVEL: −3 dbm on AM; +8 dbm on SSB.

AUDIO FREQUENCY RESPONSE: Transmitter, over-all, ±3 db, 400-2700 cps measured across 52 ohm resistive load.

NOISE LEVEL: More than 40 db below rated power output.

AUTOMATIC LOAD CONTROL: Capable of maintaining at least 6 db compression.

RECEIVER BANDWIDTH: SSB — 3 kc, determined by Mechanical Filter. AM — 6 kc, nominal.

RECEIVER SENSITIVITY: Less than 1 uv input signal for 10 db signal-to-noise ratio in SSB service; less than 3 uv signal, modulated 30% with 1000 cps tone for 10 db signal-to-noise ratio in AM service.

AGC CHARACTERISTICS: Output audio change is less than 6 db for input variation from 10-100,000 uv.

RECEIVER IMAGE REJECTION: 1.6-12.0 mc, more than 50 db; 12-15 mc, more than 40 db.

RECEIVER AUDIO OUTPUT POWER: SSB—0 dbm output for 1 uv input; or AM — 0 dbm output for 3 uv, 30% modulation, 1000 cps.

RECEIVER AUDIO DISTORTION: Less than 10% harmonic distortion at audio output.

RECEIVER AUDIO FIDELITY: Over-all ±3 db, 400-2700 cps for SSB; ±3 db, 300-3000 cps for AM.

SIZE: 15⅜" W, 7½" H, 21⅝" D (39.05 cm W, 19.05 cm H, 54.93 cm D).

WEIGHT: With ac supply, 48¾ lbs. (22.11 kg); with 28 v dc supply, 36¾ lbs. (16.67 kg); with 12 v dc supply, 36½ lbs. (16.56 kg).

Related Equipment

180V-2 Antenna Coupler, p. 43

32RS-1 100 Watt Transceiver

Features	Applications
Four Pretuned Channels	*Petroleum*
Stable Signals	*Lumbering*
Simplified Controls	*Maritime Service*
Voice Operation (VOX)	*Highway Construction*
	Civil Defense
	Mining
	Widespread Business

The 32RS-1 is a compact SSB voice transmitter-receiver for fixed base industrial use. It has 100 watt PEP output on any of four pretuned channels in the 1.6-15.0 mc frequency range. Seven basic operating controls permit operation by nontechnical personnel. A front panel meter indicates transmitter output and incoming signal strength.

CIRCUIT FEATURES

Each communication channel employs separate sets of inductors to insure optimum frequency selectivity. RF feedback maintains high RF amplifier linearity. Automatic load control circuitry provides a high level of "talking power" by compensating for changes in voice levels. High stability frequency generation circuits, common to both transmitter and receiver, achieve circuit simplification and eliminate the need for frequency trimming adjustments.

VOICE OPERATE CONTROL

An integral voice operated relay (VOX) automatically switches the unit from receive function to transmit whenever the operator speaks into the handset. If desired, VOX can be over-ridden by depressing a push-to-talk button in the handset or by grounding the key terminal.

The VOX control facilitates operation with ordinary telephone extensions or through a telephone switchboard. An accessory "hybrid" termination unit is available for convenient connection of the 32RS-1 Transceiver to existing 2-wire telephone circuits.

EASY TUNE-UP

The panel meter can be employed for transmitter tuning functions and a self-contained audio oscillator permits rapid set up of new operating channels. All adjustments are continuous and the technician is protected from high voltage.

SIMPLE INSTALLATION

The 32RS-1, together with associated antenna and optional antenna tuner, is interconnected by plug-in cables. An accessory panel, located at the top of the transceiver, will accommodate the 152J-1 Phone Patch or 302E-2 Directional Wattmeter, as well as other switches and controls.

Accessories

302E-2 DIRECTIONAL WATTMETER

The 302E-2 can be mounted directly in the 32RS-1 accessory panel. It can be easily removed for use at the antenna site. A direct reading 0-200 watt scale indicates either forward or reflected power.

Size: 5″ W, 3″ H, 5¼″ D (12.7 cm W, 7.62 cm H, 13.34 cm D). *Weight:* 3 lbs. (1.36 kg).

152J-1 PHONE PATCH

The 152J-1 uses a resistance hybrid circuit to match a 600 ohm telephone line to the unbalanced transmit and receive audio terminations. It effectively isolates receiver and transmitter functions.

When the phone patch is in operation, the 32RS-1 handset is left on its cradle and the station telephone is used. The line

level is monitored using the station phone. A position is provided to "disconnect" the 32RS-1 when only telephone usage is desired.

The station operator has complete supervisory control by means of a switch which allows either transmit, receive or VOX operation.

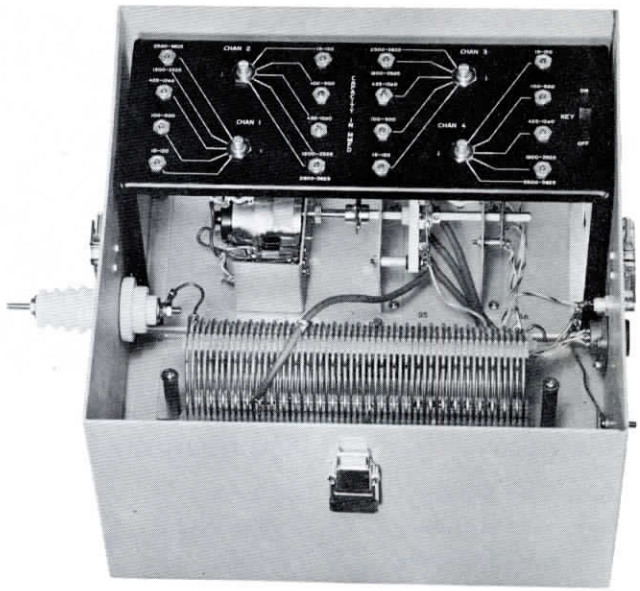
Size: 5″ W, 3″ H, 6⅝″ D (12.7 cm W, 7.62 cm H, 16.83 cm D). *Weight:* 3 lbs. (1.36 kg).

180V-2 ANTENNA COUPLER

The 180V-2 will load single wire or whip antennas longer than 50 ft. over the 1.6-15.0 mc range or longer than 30 ft. over the 2.5-15.0 mc range. The circuit design is a modified reversible "L" type matching network, which allows the use of either low or high impedance antennas.

The 302E-2 Directional Wattmeter can be used directly at the coupler site to facilitate adjustment for minimum reflected power. A remote key-switch allows operation of the transmitter during tuning.

The 180V-2 is weatherproof, permitting installation at the base of the antenna for maximum RF radiation efficiency. *Size:* 12″ W, 7½″ H, 12″ D (30.48 cm W, 19.05 cm H, 30.48 cm D). *Weight:* 15 lbs. (6.80 kg).



180V-2 Antenna Coupler

Specifications

GENERAL CHARACTERISTICS

FREQUENCY RANGE: 1.6-15.0 mc.

CHANNEL SELECTION: 4 crystal-controlled channels chosen by channel selector switch.

FREQUENCY STABILITY: 1 part in 10^6 (0.0001%).

AMBIENT TEMPERATURE RANGE: −15° C to +55° C.

AMBIENT HUMIDITY RANGE: 0%-90%.

POWER SOURCE: 115 v or 230 v, 50-60 cps, single phase.

POWER REQUIREMENTS: 175 watts, receive only; 230 watts, standby; 350 watts for full power transmit (average speech) and 450 watts for full power transmit (2-tone test).

SIZE: 22″ W, 24½″ H, 14¾″ D (55.88 cm W, 62.23 cm H, 37.47 cm D).

WEIGHT: 97 lbs. (44 kg).

TRANSMITTING CHARACTERISTICS

POWER OUTPUT: 100 watts PEP.

OPERATING MODES: Either upper sideband or lower sideband voice operation can be specified (USB is standard); RTTY by means of optional FSK keyer-converter.

OUTPUT IMPEDANCE: 52 ohms, capable of tuning a VSWR of 2.5:1.

HARMONIC AND OTHER SPURIOUS SUPPRESSION: Carrier — at least 50 db below peak output. Unwanted sideband — at least 50 db below peak output. Second harmonic — at least 45 db below peak output into 52 ohm load. Spurious radiation — 1.6-9.0 mc, down 60 db; 9-12 mc, down 45 db; 12-15 mc, transmit image down 40 db.

AUDIO INPUT: Telephone handset with provision for external 4-wire telephone connection, or with accessory hybrid, 2-wire telephone connection.

OVER-ALL RESPONSE: ±3 db, 350-3000 cps.

AUDIO FREQUENCY DISTORTION: Less than 6% with 100 watt PEP output.

AUTOMATIC LOAD CONTROL: Capable of at least 6 db compression level.

RECEIVING CHARACTERISTICS

SELECTIVITY: 3 kc nominal, determined by the Mechanical Filter.

SENSITIVITY: Less than 1 uv for 10 db signal-to-noise ratio.

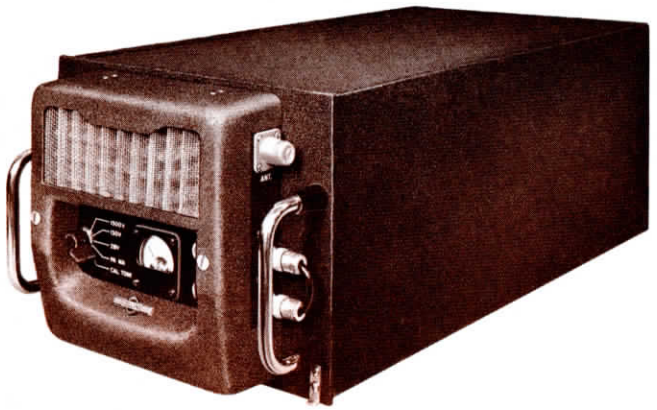
IMAGE REJECTION: −50 db, 1.6-12.0 mc; −40 db, 12-13 mc; −30 db, 13-15 mc.

AUDIO OUTPUT POWER: 2 watts maximum, undistorted. More than 50 mw output for a 1 uv input signal, 1.6-12.0 mc. More than 25 mw output for a 1 uv signal 12-15 mc.

OVER-ALL RESPONSE: ±3 db, 350-3000 cps.

RECEIVER DISTORTION: Less than 10% harmonic distortion and −30 db intermodulation distortion at 0.5 watt audio output level.

618T HF Transceiver *including HF-101, HF-102, HF-103, AN/ARC-94 and AN/ARC-102 Systems*



Features	Applications
Automatic Tuning	*Airborne*
Frequency Accuracy	*Transportable*
SELCAL Monitoring	*Mobile*
Teletypewriter Capability	*Shipboard*
Modular Construction	*Fixed Station*

The 618T is a compact HF single sideband transceiver for voice, CW, data or compatible AM communication in the 2.0-29.999 mc frequency range. It is automatically tuned in 28,000 1 kc channel increments by means of an operator's control unit.

The operating frequency is indicated directly in a digital-type presentation. Nominal transmit power is 400 watts PEP in SSB or 100 watts in compatible AM.

APPLICATIONS

A choice of optional accessory antenna tuners permits its use in a wide range of aircraft with peak performance at all frequencies. A retrofit adapter is available to facilitate installation in an airframe which has been wired for a Collins 618S HF AM system.

The 618T, while primarily designed as an airborne transceiver, is ideally suited for transportable, mobile, shipboard and semifixed station applications. Simplified automatic tuning permits it to be operated by nontechnical personnel. Instant on-frequency operation is assured by a temperature-compensated frequency standard with a stability of 0.8 part per million per month.

Mission performance under a wide range of environments has been greatly enhanced by an extensive reliability testing program. It is housed in a 1 ATR case and weighs only 52 lbs., simplifying installation requirements.

DATA TRANSMISSION

For voice transmission, a very minute frequency error can be allowed. Accurate reproduction of the transmitted frequency components for data and signaling systems is either unnecessary for 100 word per minute teletypewriters or can be accommodated by accessory units. This concept results in simplicity for the voice transceiver and adds automatic frequency control complexity only when required by high speed data systems.

SELECTIVE CALLING

The use of a selective calling (SELCAL) system on AM is facilitated by a special audio output, which allows signals to be monitored regardless of the mode selection switch setting.

COOLING OPTIONS

Filtered air from a front panel blower is distributed to all portions of the transceiver requiring forced air cooling. The air is metered by vents of the proper size in the main chassis. An exhaust port is provided for use with central cooling systems in accordance with ARINC Specification 404, if desired.

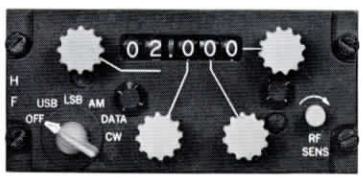
EASY MAINTENANCE

Low maintenance costs are achieved by the use of plug-in modular assemblies. Transistor circuitry employed wherever applicable results in a high degree of reliability, together with minimum weight and power consumption.

TRANSCEIVER SYSTEMS

The 618T Transceiver is available in the following system configurations for airborne applications:

HF-101 — 618T-1 Transceiver and 714E-2 Control with ex-



714E-3 Control Unit

516H-1 Power Supply (optional)

ternal 516H-1 Power Supply for operation from 27.5 v dc, 35 amp and 115 v, 1 phase, 400 cps, 2 amp power source.

HF-102 — 618T-2 Transceiver and 714E-2 Control with self-contained power supply for operation from 27.5 v dc, 4 amp and 208 v, 3 phase, 400 cps, 800 watt source.

HF-103 — 618T-3 Transceiver and 714E-2 Control with self-contained power supply for operation from a 27.5 v dc, 35 amp, and 115 v, 1 phase, 400 cps, 1 amp source.

AN/ARC-94 — 618T-2 Transceiver and 714E-2 Control with self-contained power supply for operation from a 27.5 v dc, 4 amp, and 208 v, 3 phase, 400 cps, 800 watt source.

AN/ARC-102 — 618T-3 Transceiver and 714E-2 Control with self-contained power supply for operation from a 27.5 v dc, 35 amp, and 115 v, 1 phase, 400 cps, 1 amp source.

Specifications

FREQUENCY RANGE: 2.0-29.999 mc.

NUMBER OF CHANNELS: 28,000.

TYPE OF FREQUENCY CONTROL: Crystal oscillator.

METHOD OF FREQUENCY CHANGE: Autopositioner®-type, remotely controlled switching mechanisms. Automatic resonating power amplifier and antenna matching circuits.

POWER SOURCE:

618T-1 and 516H-1 — 27.5 v dc and 115 v, 400 cps, single phase.

618T-2 — 27.5 v dc and 115 v, 400 cps, 3 phase.

618T-3 — 27.5 v dc and 115 v, 400 cps, single phase.

Note: 618T-2 is 208 v (208 v line to line), 3 phase, wye connected with grounded neutral.

POWER REQUIREMENTS: Receive — 180 watts. Transmit SSB — 800 watts. Transmit AM — 1050 watts.

FREQUENCY STABILITY: 0.8 part per million per month.

NOMINAL CHANNEL CHANGE TIME: 618T — 8 seconds; 30 seconds including antenna tuner.

AMBIENT TEMPERATURE RANGE: −40° C to + 55° C with 30 minute operation at +70° C.

AMBIENT HUMIDITY RANGE: Up to 95% relative humidity at 50° for 48 hours.

ALTITUDE RANGE: Pressure equivalent of 30,000 feet.

TRANSMITTING CHARACTERISTICS

RF POWER OUTPUT: SSB — 400 watts PEP; AM — 100 watt carrier.

RF OUTPUT IMPEDANCE: 52 ohms.

VSWR: Transmitter shall provide specified power output into 52 ohm load with SWR not to exceed 1.3:1.

AUDIO INPUT IMPEDANCE: 100 ohms unbalanced; 600 ohms balanced.

AUDIO FREQUENCY RESPONSE: 5 db peak-to-valley ratio from 300-3000 cps.

DISTORTION: SSB — Third order products down at least 30 db. AM — Less than 20% at 85% modulation.

RECEIVING CHARACTERISTICS

SENSITIVITY: SSB — 1 uv for a 10 db S+N/N ratio. AM — 3 uv modulated 30% at 1,000 cps for a 6 db S+N/N ratio.

SELECTIVITY: SSB — 2.85 kc, 6 db down; 6.0 kc, 60 db down. AM — 5.5 kc, 6 db down; 14.0 kc, 60 db down.

AGC CHARACTERISTICS: Maximum variation of audio output is 6 db for signals from 10-100,000 uv. No overload below 1 v signal input.

IF REJECTION: 80 db minimum.

AUDIO OUTPUT POWER: 100 mw into a 300 ohm load.

AUDIO DISTORTION: Less than 10%.

AUDIO FREQUENCY RESPONSE: 5 db peak-to-valley ratio from 300-3,000 cps.

SIZE AND WEIGHT:

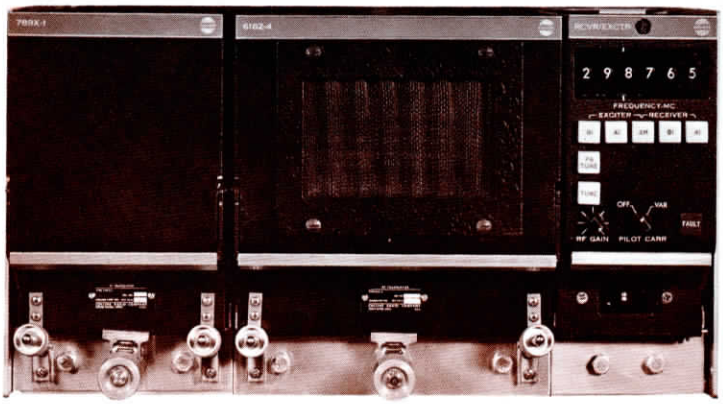
	Size			*Weight*
	W	*H*	*D*	
618T-1 transceiver	10⅛" 25.7 cm	7⅝" 19.4 cm	22 3/16" 56.4 cm	50.0 lbs. 22.68 kg
618T-2 transceiver	10⅛" 25.7 cm	7⅝" 19.4 cm	22 3/16" 56.4 cm	52.0 lbs. 23.59 kg
618T-3 transceiver	10⅛" 25.7 cm	7⅝" 19.4 cm	22 3/16" 56.4 cm	50.0 lbs. 22.68 kg
714E control*	5¾" 14.6 cm	2⅝" 6.67 cm	4⅜" 11.1 cm	2.0 lbs. 0.91 kg

*Add ¾" (1.9 cm) to length of 714E-2, and ½" (1.27 cm) to length of 714E-3 for connector.

Related Equipment

180L-3A Antenna Coupler, p. 101
180R-4/309A-1 Antenna Coupler and Control, p. 101, 102
180R-6/309A-2D Antenna Coupler and Control, p. 102, 103
180R-12/309A-9 Antenna Coupler and Control, p. 103, 104
618T Test Equipment, p. 131, 132
488A-2 Inverter, p. 108

671B-1 universal radio group Receiver-Exciter



Features	Applications
Automatic Tuning	*Fixed Station*
Installation Flexibility	*Transportable*
Compact Packaging	*Shipboard*
Telephone Compatibility	*Mobile*
Remote Operation	

The 671B-1 is a shelf mounted receiver-exciter, covering the 2.0-29.9999 mc frequency range in either 28,000 1.0 kc or 280,000 0.1 kc channel increments. It is part of the Collins Universal Radio Group of building block equipments which can be selected to meet a wide range of communication requirements. A complete HF transceiver consists of a 671B-1 and an automatically tuned linear amplifier of the desired power level. Mode choice includes upper sideband, lower sideband, or independent sideband with nominal 3 kc or 6 kc bandwidths. Compatible AM is available with 3 kc or 6 kc bandwidth in transmit and 3 kc in receive.

SYSTEM APPLICATION

The URG receiver-exciter is suitable for continuous operation in fixed station, transportable or shipboard applications. Either local or remote telephone-dial control systems can be used. Audio terminations are compatible with telephone industry standards, allowing control of all necessary functions over ordinary wire lines.

HIGH STABILITY

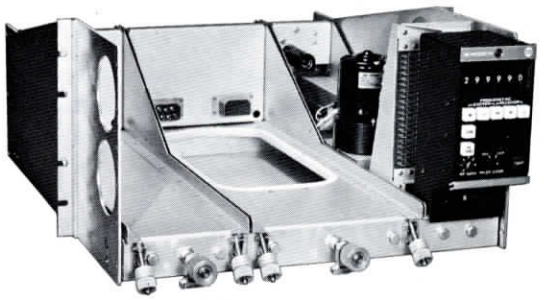
An internal frequency standard offers stability of one part in 10^8 per day; however, an optional external standard is available for applications which require extreme accuracy.

CONTROLS

A simplified control system uses ground-on-line command in a two-out-of-five coding system for frequency selection.

EASE OF MAINTENANCE

Transistor and semiconductor circuitry is used wherever applicable to reduce size, minimize power consumption and increase reliability. Unit construction and circuit modules permit maximum accessibility for routine maintenance and simplify spare parts logistics in larger communication systems.



Easily removed subunits

MECHANICAL CONFIGURATIONS

The basic receiver-exciter consists of an IF translator unit, RF translator unit and mounting shelf.

The IF translator, containing the IF and audio circuits, employs card cage construction to permit a choice of modes and audio requirements by plug-in circuit cards. This arrangement also facilitates modification as communication needs change. In receive, it converts the 500 kc signal from the RF translator to audio, and functioning as an exciter, it converts the audio input to a 500 kc signal for the RF translator.

The RF translator contains the RF tuner frequency generating circuits, frequency stabilization circuit, voltage regulator and power supply. In receive function, the RF translator accepts the RF signal and converts it to the 500 kc frequency required by the IF translator. As an exciter, it converts the 500 kc signal from the IF translator to the desired RF output frequency. An integral mounting shelf with wiring distribution frame and a cooling air plenum is compatible with both Unistrut racking and attractive cabinet enclosures. A modified shelf is also available for use in standard 19″ racks.

BASIC CONFIGURATION

The 671B-1 is normally supplied with an internal frequency standard, upper sideband 3 kc bandwidth and 1 kc RF channel increments for operation from a 27.5 v dc power source. Also included is the 499L-3 Mounting Shelf with cooling air plenum, distribution frame and circuit breaker.

OPTIONAL CONFIGURATIONS

Mode Options The following choices are available to meet other specific operating requirements: LSB, 3 kc bandwidth; LSB, 6 kc bandwidth; USB, 6 kc bandwidth; and AM.

Tenth KC Channel Increment Option The number of RF channels can be increased to 280,000, allowing more effective utilization of the RF spectrum allocation.

Line Amplifier Options Plug-in audio line amplifiers can be used on the incoming line in transmit and the audio output in receive if higher levels are needed. Single input or output line amplifiers for one channel systems, as well as dual amplifiers for systems using channels on both USB and LSB, are available.

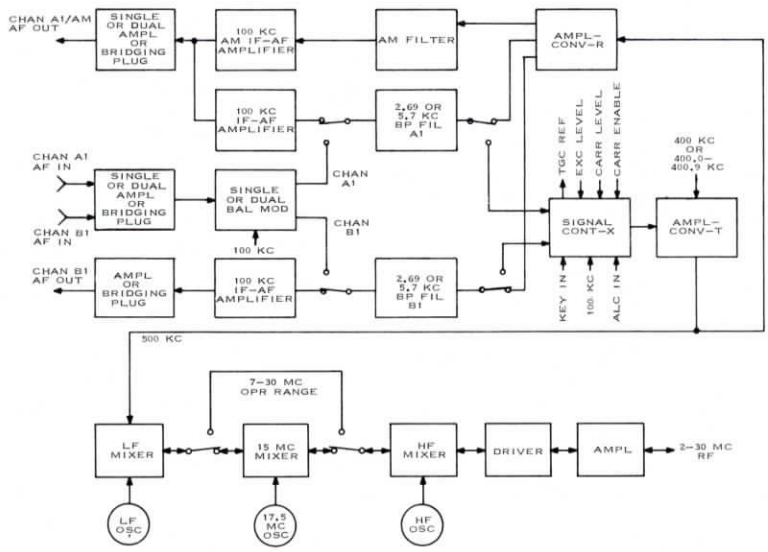
External Frequency Standard Option This option offers extremely high frequency stability when a standard such as the Collins 40N-1 is used.

Memory Matrix Option The memory matrix is necessary only in systems using 0.1 kc tuning option which share frequency control information between equipments. The 0.1 kc digit information is retained in the absence of continuous information after tuning is completed until a new frequency is selected. It is primarily intended for installations using the 313 series of wire line control equipments.

Power Supply Option An internal power supply enables operation from 115 v or 230 v, 45-450 cps power sources in lieu of the standard 27.5 v dc.

Mounting Shelf Options A 499L-3 22″ (55.25 cm) wide shelf with distribution frame and local control unit and cooling air plenum for central rack cooling; 499L-3 19″ (48.34 cm) wide shelf with distribution frame and blower in lieu of plenum; or a 499L-3 19″ (48.26 cm) wide shelf with distribution frame, blower and control unit.

Functional Circuits



Specifications

FREQUENCY RANGE: 2.0-29.999 mc or 2.0-29.9999 mc with 1.0 kc or 0.1 kc channel increments.

TYPES OF EMISSION: SSB — USB, LSB, ISB (3 kc or 6 kc nominal bandwidths) or conventional AM in receive and compatible AM in transmit.

TUNING TIME: Not more than 8 seconds after selection of channel frequency.

STABILITY: Internal standard — 1 part in 10^8 per day due to aging; rms stability factor does not exceed 1 part in 10^8 in any 10 minute period.

FREQUENCY CONTROL: All injection sources are phase locked to an internal standard (or external standard, if used).

POWER REQUIREMENTS: 24.0-30.25 v dc negative ground with no more than 0.5 v peak ripple; 170 watts nominal. Can be implemented for 115 v or 230 v, 45-450 cps.

SELECTIVITY:

Filter	*±1 DB Maximum Ripple From*	*60 DB Attenuation Points*
A-1 (nominal 3 kc)	100.35-103.04 kc	NLT 99.925 kc NMT 103.30 kc
B-1 (nominal 3 kc)	96.96-99.65 kc	NLT 96.70 kc NMT 100.075 kc
A-1 (nominal 6 kc)	100.30-106.00 kc	NLT 99.70 kc NMT 107.00 kc
B-1 (nominal 6 kc)	94.00-99.70 kc	NLT 93.00 kc NMT 100.30 kc
AM (nominal 6 kc)	97.15-102.85 kc	NLT 96.55 kc NMT 103.45 kc

Filter passband response — 1.0 db from +15° C to +65° C; 1.5 db from −30° C to +15° C; 3.0 db from −40° C to −30° C.

RECEIVING CHARACTERISTICS

RF INPUT: 0.5 uv to 1 v.

AF OUTPUT: Nominal −10 dbm; can be amplified internally to +10 dbm nominal into 600 ohms for single tone input above AGC threshold.

SENSITIVITY: SSB — Not less than 10 db S+N/N ratio for a standard test signal of 0.5 uv, single tone signal-on to signal-off. AM — Not less than 10 db S+N/N ratio for a standard 30% modulated test signal of 2 uv, modulation-on to modulation-off.

SPURIOUS RESPONSE: Not less than 60 db below response to inband signals.

INTERMODULATION DISTORTION: All intermodulation products at audio output are not less than 40 db down from one of two equal test signals applied to input terminals at 1000 uv level and at +10 dbm audio output level.

AUDIO OUTPUT: Nominal −10 dbm and can be amplified internally to +10 dbm with a single tone RF input above AGC threshold. Optional +10 dbm line amplifiers when implemented in IF translator.

HUM AND NOISE: For each 10 db increase of input signal the S+N/N ratio increases 10 ±1 db up to not less than 50 db below rated SSB output and not less than 40 db below rated AM output; with F1A noise filter weighting on SSB, not less than 60 db below rated output.

HARMONIC DISTORTION: Not more than 1% (2000 uv CW input, 1500 cps audio output).

AGC THRESHOLD: SSB — 1 uv nominal. AM — 2 uv nominal.

AGC AUDIO RISE: SSB — not more than 4 db increase in audio output when the RF input is increased from threshold to 1 v. AM — not more than 6 db increase in audio output when the RF input is increased from threshold to 200 mv.

AGC TIME CONSTANTS: All times are referred to within 3 db of equilibrium levels. SSB — rise time 8 milliseconds; decay time 0.15 second.

TRANSMITTING CHARACTERISTICS

RF OUTPUT: 0.4 watt PEP minimum.

AF INPUT: Test tone level — 26 dbm, nominal on 600 ohms each channel; −6 dbm nominal on 600 ohms when not implemented with line amplifiers. Voice −34 VU nominal each channel; −14 VU when not implemented with line amplifiers.

CARRIER SUPPRESSION: Electrically controlled (both stepped and continuous) from 0-30 db, below PEV as measured by standard two-tone test; carrier leak suppression not less than 55 db in SSB.

HARMONIC EMISSION: At least 50 db below PEV level.

TRANSMIT GAIN CONTROL: In response to dc levels of 4 v or more derived from the output of the IF translator and the output of the RF translator or power amplifier, an infinite memory AGC will maintain the dc levels proportional within ±1 db by bias control of the RF translator gain.

HUM: Not less than 50 db below one tone of a two-tone 0.4 watt PEP test signal.

AUTOMATIC LOAD CONTROL: Input voltage in the range 0 to −10 v will cause the exciter output to be reduced at least 20 db. Minimum distortion requirements are met with up to 10 db reduction in gain. Application of ALC will not affect carrier output in the AM or reduced carrier modes and will not affect the TGC.

SPURIOUS EMISSIONS: 40 db below nominal PEV.

AUDIO INPUT: A −6 dbm, single tone input will produce maximum RF output with the exciter gain control full on and no ALC/TGC input. Specified distortion characteristics are maintained with a two-tone input each having −6 dbm level with ALC voltage applied to maintain output level at 0.2 watt PEP. With the addition of line amplifiers, tones at −26 dbm will meet the same output requirements.

SIZE:

	W	*H*	*D*
Cabinet shelf	21¾″ 55.25 cm	9½″ 24.13 cm	23½″ 59.69 cm
Standard 19″ shelf	19 1/32″ 48.34 cm	9 7/16″ 23.97 cm	25 9/16″ 64.93 cm

WEIGHT: 72 lbs. (32.66 kg) minimum implementation; 95 lbs. (43.09 kg) maximum implementation, including shelf.

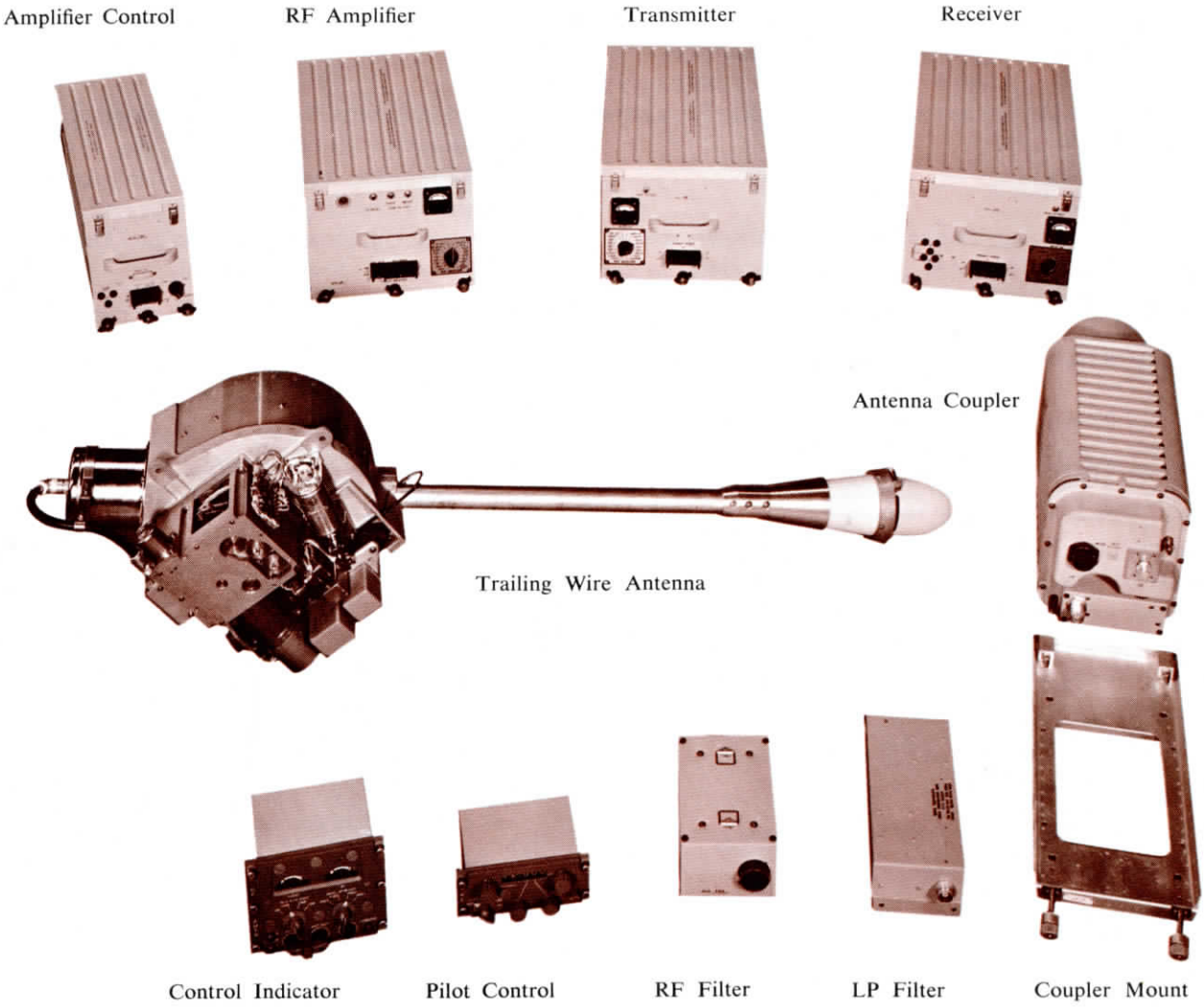
Basic Units

789X-1 IF Translator, p. 88-90
618Z-4 RF Translator, p. 87

Related Equipment

Power Amplifiers, p. 28-37
313 Series Controls, p. 83-85
Racks and Cabinets, p. 91

AN/ARC-80 Airborne HF Communication System



Features

Automatic Tuning
Data Capability
Frequency Calibration
Simplified Maintenance
Reduced Weight

Applications

Airborne

The AN/ARC-80 HF Airborne Communication System is especially suited for data handling. It consists of a transmitter, RF amplifier, receiver, antenna coupler with shock-mount, trailing wire antenna, amplifier control unit, and line and harmonic filters. Mode and frequency selectors are on the radio set control unit, while PA plate power and trailing wire antenna controls are located on the control indicator unit. The system provides 1 kc channel increments over the 2.0-29.999 mc frequency range with 900 watts PEP output under normal conditions.

Data communication can be used in upper sideband, lower sideband or independent sideband, and voice in upper sideband mode. Other modes available with a minor change in the amplifier-control unit include CW, AM, FSK/teletypewriter and voice on lower sideband.

Frequency variations can be adjusted to zero with a received standard signal by means of a front panel control.

TRAILING WIRE ANTENNA AND ANTENNA COUPLER

A trailing wire antenna is automatically positioned to the required length for the frequency selected. It can be operated at aircraft speeds up to 300 knots. The associated antenna coupler requires no cooling in environments up to 55° C.

Forward and reflected output power is monitored by a meter located on the control-indicator unit. Indicator lights denote antenna wire torque limits.

Interlocks prevent transmission at full power during tuning cycle. The normal 30 second tuning sequence is indicated by a flashing lamp that remains lighted when tuning operation is completed.

SIMPLIFIED INSTALLATION

Mounting plenums are available for the transmitter, RF am-

Available only on a production contract.

plifier, receiver group and the amplifier-control and any associated equipment. The mountings provide shock and vibration isolation together with distribution of cooling air to the equipment. Cable ducts are included for installation of interconnecting wiring. These mounts are normally not supplied with the AN/ARC-80 system but are available for custom requirements.

MODULAR CONSTRUCTION

The units employ modular construction to simplify maintenance and to facilitate upgrading of the equipment as dictated by future technical advances. Self-test and fault isolation features permit monitoring of in-flight performance and rapid determination of a malfunctioning unit or module.

CIRCUIT PROTECTION

Protective features include devices to guard against cooling air loss, excessively high or low voltages, an open or short in the RF amplifier output circuits, unretracted trailing wire antennas as landing gear is lowered or landing hook is down, and snagged antenna or loss of drogue. The antenna protective devices are optional.

Specifications

FREQUENCY RANGE: 2.0-29.999 mc.

NUMBER OF CHANNELS: 28,000.

MODES: LSB, USB, ISB, data and voice.

POWER REQUIREMENTS: 208 v, 380-420 cps, 3 phase, wye connected. Standby — 609 va. Receive — 667 va continuous, 1069 va tune. Transmit — 2520 va continuous, 2626 va tune. 25-29 v dc. Tune only — 15 amps. Antenna-jettison only — 28 amps. Panel illumination — 5.0 v at 3 amps.

AMBIENT TEMPERATURE RANGE: Data mode — −12° C to +55° C. Voice mode — −28° C to +55° C.

SERVICE CONDITIONS: MIL-E-5400.

ALTITUDE: 15,000 ft., operating; 50,000 ft., nonoperating.

TRANSMITTING CHARACTERISTICS

RF POWER OUTPUT: 900 watts PEP standard conditions; 800 watts, minimum power.

FREQUENCY STABILITY: 5 parts in 10^8 per 7 hr. period.

AUDIO INPUT: 3.0 PEV, 600 ohms.

VOICE INPUT: 0.25 v, carbon microphone.

INTERMODULATION DISTORTION: 36 db below PEP.

SPURIOUS OUTPUT: 0.15-2.0 mc, +5 dbm; 2-40 mc, +17 dbm; 40-60 mc, −10 dbm; 60-100 mc, −5 dbm; 100-225 mc, +5 dbm; 225-450 mc, −50 dbm; 450-1000 mc, −23 dbm.

RECEIVING CHARACTERISTICS

SENSITIVITY: 2 uv for 10 db S+N/N.

INTERMODULATION DISTORTION: 46 db below PEV.

FRONT END REJECTION: 80 db or greater.

AUDIO OUTPUT: 3 PEV, 600 ohms.

VOICE OUTPUT: 12 PEV, 600 ohms.

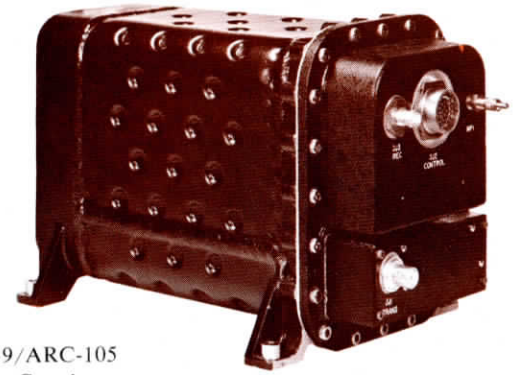
DYNAMIC RANGE: 100 db.

FREQUENCY STABILITY: 5 parts in 10^8 per 7 hr. period.

SIZE AND WEIGHT:

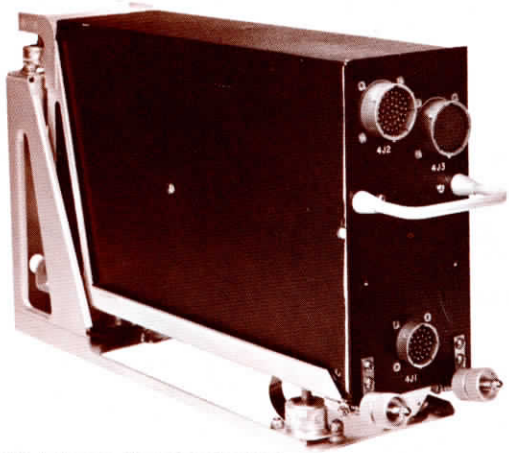
Unit	*Size* W	H	D	*Weight*
AM-3536/URC RF amplifier	10⅞" 27.62 cm	8 43/64" 22.03 cm	20 25/64" 51.79 cm	51 lbs. 23.14 kg
R-1153/URC receiver	10⅞" 27.62 cm	8 43/64" 22.03 cm	20 25/64" 51.79 cm	40½ lbs. 18.38 kg
AM-3535 amplifier-control	6⅜" 16.19 cm	8 43/64" 22.03 cm	20 25/64" 51.79 cm	24 lbs. 10.89 kg
AS-1331 trailing wire antenna	14" 35.56 cm	11" 27.94 cm	50" 127.0 cm	38 lbs. 17.24 kg
CU-1094 antenna coupler	7⅛" 18.10 cm	8 11/32" 21.20 cm	21½" 54.61 cm	27½ lbs. 12.47 kg
T-899/URC transmitter	10⅞" 27.62 cm	8 43/64" 22.03 cm	20 25/64" 51.79 cm	41 lbs. 18.60 kg
C-4368 control unit	5¾" 14.61 cm	2⅝" 6.67 cm	4 13/16" 12.22 cm	2¼ lbs. 1.02 kg
ID-1066 control-indicator	5¾" 14.61 cm	5¼" 13.34 cm	5 3/16" 13.18 cm	3 lbs. 1.36 kg
F-775 RF interference filter	4½" 11.43 cm	3¼" 8.26 cm	6¼" 15.88 cm	2 lbs. 0.91 kg
F-776 low-pass filter	10 3/16" 25.88 cm	2" 5.08 cm	4" 10.16 cm	4 lbs. 1.81 kg
MT-290 mounting, antenna coupler	7⅛" 18.10 cm	2" 5.08 cm	17" 43.18 cm	1¾ lbs. 0.79 kg

AN/ARC-105 Airborne HF Communication System



CU-1239/ARC-105
Antenna Coupler

C-4958/ARC-105 Control



C-4959/ARC-105 Antenna Coupler Control

RT-712/ARC-105 Transceiver

Features	Applications
Simplicity of Operation	*Airborne*
Automatic Tuning	
Frequency Stability	
System Design	
Increased Reliability	
Ease of Maintenance	

The AN/ARC-105 is a pressurized HF SSB voice communication system covering the 2.0-29.999 mc frequency range in 28,000 1 kc channel increments. It was specifically designed for use in tactical jet aircraft, such as the McDonnell RF4C. The AN/ARC-105 provides the pilot the capability to operate either upper sideband, lower sideband, or AM. The transmitter power output is 400 watts PEP in sideband or 100 watts in AM. Operating frequency is selected directly by the pilot with his control unit, which displays the selected frequency as a digital readout. The RF characteristics of the flush-type shunt antenna are automatically matched at the selected operating frequency by an antenna coupler.

SYSTEM COMPONENTS

The AN/ARC-105 system consists of an HF receiver-transmitter, antenna coupler, antenna coupler control unit, pilot's control unit and associated mountings and RF transmission line accessories.

The RT-712/ARC-105 Receiver-Transmitter Unit features plug-in modules for all major circuits. It is housed in a pressurized case. The C-4958/ARC-105 Control Unit permits frequency and mode selection. It also includes a receiver RF gain control and push-to-test indicator. The CU-1239 Antenna Coupler matches the RF characteristics to the shunt antenna, and the antenna tuning logic and servo control circuitry is contained in the C-4959/ARC-105 Control Unit. This arrangement allows the coupler to be installed directly at the feed point of the antenna.

OPERATIONAL CHECK

An RF test switch located on the pilot's control box permits a simple check of over-all system operation and provides a means of isolating a malfunction to a particular unit. A sidetone circuit in the receiver-transmitter provides an audible check of over-all system operation in transmit.

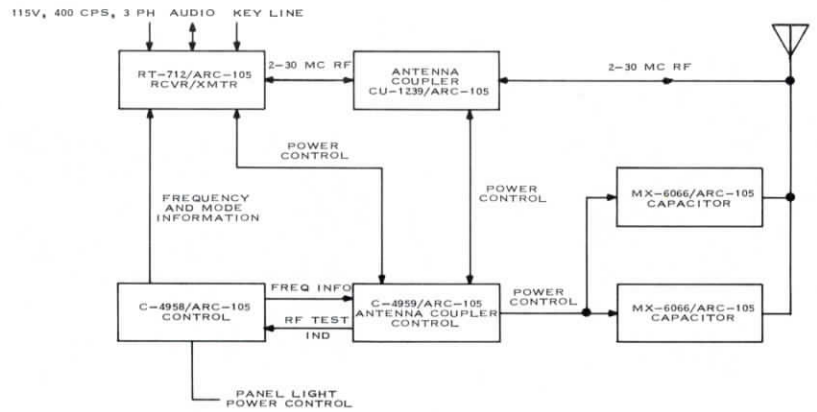
HIGH RELIABILITY

Modular construction and transistor circuitry wherever applicable provide a high degree of reliability, together with minimum weight and power consumption. A temperature-compensated frequency standard using no oven assures frequency stability at 0.8 part per million per month.

Mission performance under a wide range of environments has been greatly enhanced by an extensive reliability testing program of the AN/ARC-105 and related HF transceivers.

Available only on a production contract.

Functional Circuits



Specifications

FREQUENCY RANGE: 2.0-29.999 mc.

NUMBER OF CHANNELS: 28,000.

MODES: Upper sideband, lower sideband, AM.

POWER REQUIREMENTS: 115 v (line to neutral), 400 cps, 3 phase, 4-wire, 1039 watts maximum.

FREQUENCY STABILITY: 0.8 part per million per month.

TUNING TIME: 25 seconds maximum.

TRANSMITTING CHARACTERISTICS

DUTY CYCLE: 5 minutes transmit, 5 minutes receive.

RF POWER OUTPUT: SSB — 400 watts PEP; AM — 100 watts.

RF OUTPUT IMPEDANCE: 52 ohms unbalanced.

VSWR: 1.3:1 maximum.

AUDIO INPUT IMPEDANCE: 100 ohms unbalanced; 600 ohms balanced.

AUDIO FREQUENCY RESPONSE: ±5 db, 300-3000 cps.

DISTORTION: Third order products —30 db. Second harmonic emission —35 db. Carrier suppression —40 db. Opposite sideband suppression —30 db.

NOISE: —40 db minimum.

RECEIVING CHARACTERISTICS

SENSITIVITY: SSB — 1 uv for a 10 db S+N/N ratio. AM — 3 uv modulated 30% at 1000 cps for a 6 db S+N/N ratio.

SELECTIVITY: SSB — not more than 6 db down at 300 cps and 3000 cps; not less than 15 db down at 0 and 3500 cps; not less than 60 db down at —1350 cps and +4650 cps. AM — 6 kc, 6 db down; 14 kc, 60 db down.

AGC CHARACTERISTICS: Maximum variation of audio output is 6 db for signals from 10-100,000 uv. No overload with signals to 0.5 v. Attack time, 50 milliseconds maximum. Release time, 800 milliseconds maximum.

IF REJECTION: 80 db minimum.

AUDIO OUTPUT POWER: 50 mw with 5 uv RF input.

AUDIO OUTPUT IMPEDANCE: 300 ohms unbalanced.

AUDIO DISTORTION: 10% maximum with 80% modulation at 1000 cps.

AUDIO FREQUENCY RESPONSE: ±5 db from 300-3000 cps.

SIZE AND WEIGHT:

	Size			*Weight*
	W	*H*	*D*	
RT-712/ ARC-105 transceiver	11.44" 29.06 cm	10.25" 26.04 cm	22.77" 57.84 cm	66.0 lbs. 29.94 kg
MT-3094/ ARC-105 mounting	12.19" 30.96 cm	5.23" 13.28 cm	24.98" 63.45 cm	6.0 lbs. 2.72kg
C-4958/ ARC-105 control	5.75" 14.61 cm	2.63" 6.68 cm	4.88" 12.4 cm	1.8 lbs. 0.82 kg
C-4959/ ARC-105 antenna coupler control	3.69" 9.37 cm	7.72" 19.61 cm	14.47" 36.75 cm	10.4 lbs. 4.72 kg
MT-3095/ ARC-105 mounting	4.59" 11.66 cm	8.81" 22.38 cm	16.2" 41.15 cm	1.4 lbs. 0.64 kg
CU-1239/ ARC-105 antenna coupler	8.5" 21.59 cm	8.5" 21.59 cm	14.41" 36.6 cm	17.4 lbs. 7.89 kg
CG-2755/ ARC-105 RF transmission line	5.88" 14.94 cm	5.88" 14.94 cm	24.03" 61.04 cm	2.0 lbs. 0.91 kg
MX-6066/ ARC-105 vacuum capacitor	4.13" 10.49 cm	7.5" 19.05 cm	5.88" 14.94 cm	15.0 lbs. 6.8 kg
MX-6067/ ARC-105 feed line capacitor	1.88" 4.78 cm	2.75" 6.99 cm	16.25" 41.28 cm	0.5 lbs. 0.23 kg
MX-6068/ ARC-105 interconnect capacitor	2.33" 5.92 cm	0.5" 1.27 cm	11.02" 27.99 cm	0.2 lbs. 0.09 kg

AN/PRC-38 40 Watt SSB-FM Man Pack Transceiver

Features	Applications
Multimode Communication	*Man Pack*
Simplified Operation	*Vehicular*
Spectrum Utilization	*Aircraft*
HF/VHF/SSB or FM Compatibility	*Shipboard*
Easily Maintained	*Semifixed*

The AN/PRC-38 is a man pack transceiver with 40 watts PEP output and a choice of single sideband or FM modes in the 20.0-69.99 mc frequency range. Suitable in man pack, vehicular, aircraft, shipboard or semifixed station applications, it fulfills a distinct need for compatible SSB or FM short range military communication. The number of available channels is increased tenfold using 7.5 kc SSB channels, spaced 10 kc, compared with conventional FM.

COMMUNICATION COMPATIBILITY

Compatibility with currently used FM modes, as well as SSB, permits routine communication with activities using the following equipment: AN/ARC-44, AN/ARC-54, AN/ARC-58, AN/ARC-94, AN/GRC-3, AN/GRC-5, AN/GRC-7, AN/MRC-36, AN/MRC-37, AN/MRC-38, AN/MRC-83, AN/MRC-87, AN/MRC-94, AN/MRC-95, AN/PRC-8, AN/PRC-9, AN/PRC-10, AN/PRC-25, AN/TRC-91, AN/TSC-15, AN/TSC-38, AN/URC-20, AN/URC-21, AN/URC-32, AN/VRC-12 and other military communication equipment.

SIMPLIFIED OPERATION

A straightforward, digital-type tuning system, with a dial that indicates frequency directly, reduces the possibility of operator error. A unique frequency synthesis system gener-

Available only on a production contract.

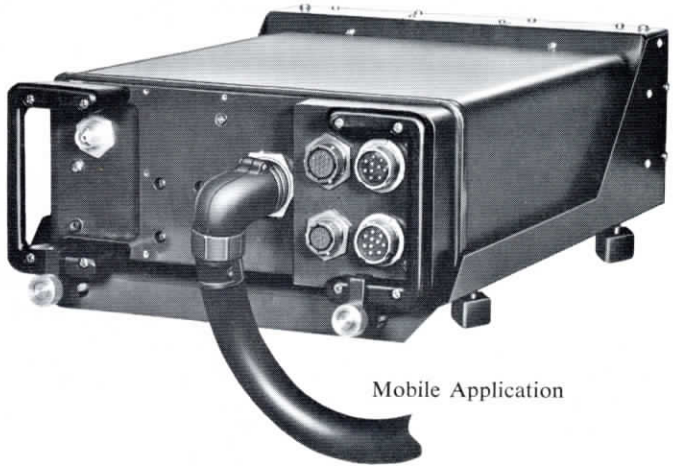
ates the high stability injection signals required for SSB operation, with excellent accuracy over a wide range of temperature and humidity conditions. Reference frequencies are maintained within one-half cycle per megacycle by a temperature-sensitive network, with no crystal oven.

REDUCED POWER REQUIREMENTS

Low power consumption results in lower operating temperature and extended component life. Transistor circuits are used wherever applicable. IF and low level RF circuits common to both transmit and receive functions effect maximum power economy. Magnetic latching relays are used for emission switching to conserve power.

The AN/PRC-38 uses the same battery, type BB-451/U, as the AN/PRC-41 UHF Transceiver and the AN/PRC-47 HF Transceiver. It can be operated directly from the vehicle battery in mobile applications.

For pack set use the AN/PRC-38 is carried in a rucksack frame. An optional shockmount is available for mobile applications. Test points are available to allow rapid isolation of any malfunctioning subassembly. Operation can be restored immediately by replacement of the easily removable subassemblies.



Mobile Application

Control Unit

Specifications

FREQUENCY RANGE: 20.0-69.99 mc.

NUMBER OF CHANNELS: 5000 available.

FREQUENCY STABILITY: ±0.5 part per million.

POWER SOURCE: 22-28 v dc; 24 v dc nominal.

POWER CONSUMPTION: Transmit — not more than 260 watts. Receive — not more than 23 watts.

DUTY CYCLE: 9 minutes receive; 1 minute transmit.

ANTENNA REQUIREMENTS: Automatic coupler will match a 5 ft. whip antenna, 50 ohms, or any antenna impedance falling within a 5:1 VSWR.

AMBIENT TEMPERATURE RANGE: −40° C to +60° C.

AMBIENT HUMIDITY RANGE: 0%-100%.

ALTITUDE RANGE: Sea level to 10,000 ft. (3048 meters).

TRANSMITTING CHARACTERISTICS

MODULATION: FM or SSB.

TRANSMIT POWER OUTPUT: 40 watts PEP on SSB; 20 watts average on FM.

TRANSMIT FM DEVIATION: ±15 kc nominal.

RECEIVING CHARACTERISTICS

RECEIVE SENSITIVITY: On SSB, an S+N/N ratio of at least 10 db with a 0.5 uv RF input to antenna. On FM, an S+N/N ratio of at least 10 db with 0.5 uv RF input, ±8 kc deviation to antenna.

RECEIVER AUDIO OUTPUT: 300 mw maximum capability, 300 ohm output impedance.

ACCESSORY AUDIO EQUIPMENT: The AN/PRC-38 works with H-33E/PT or equivalent and with H-138/PT or equivalent.

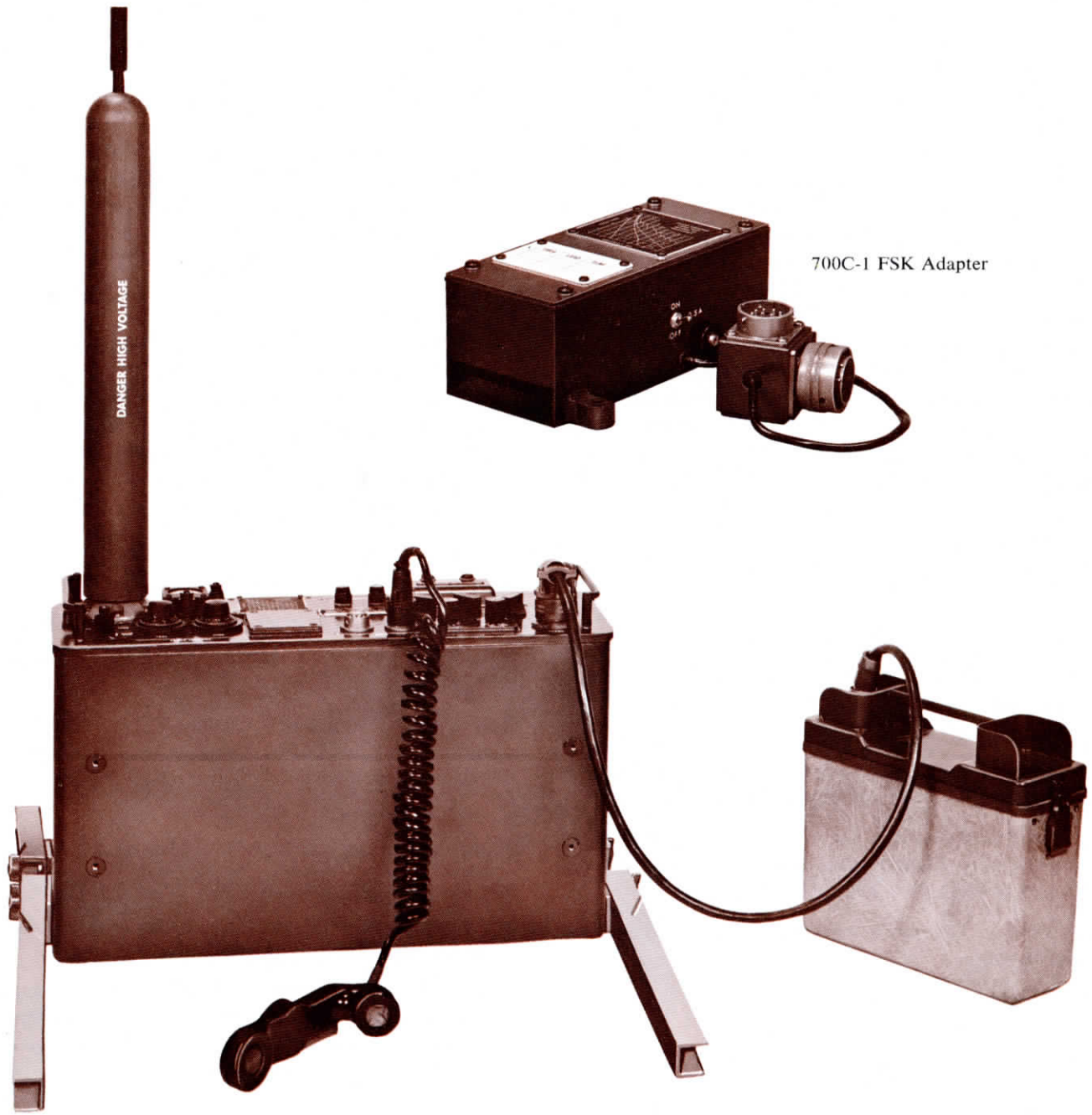
SIZE:

	W	*H*	*D*
AN/PRC-38 without battery	11¾″ 29.85 cm	15″ 38.1 cm	4⅝″ 11.7 cm
AN/PRC-38 with battery	11¾″ 29.85 cm	22½ cm 57.15 cm	4⅝″ 11.7 cm

WEIGHT:

AN/PRC-38 only	28 lbs.	12.7 kg
Battery, BB-451/U	16 lbs.	7.26 kg

AN/PRC-47 100 Watt Man Pack HF Transceiver



700C-1 FSK Adapter

Features

Simplified Tuning
No Oven Warm-up
Speech Processing
Submersible Case

Applications

Man Pack
Semifixed
Mobile

The AN/PRC-47 is a two-man team pack transceiver for CW or SSB voice communication in the 2.0-11.999 mc frequency range. It features simplified digital tuning in 10,000 channel increments with the operating frequency indicated directly on an illuminated dial. Transmit power output level is 100 watts PEP. An optional external 199Q-1 cooling blower can be used for continuous duty operation. An external 700C-1 FSK adapter permits teletypewriter communication and also provides forced air cooling for the receiver-transmitter unit. The AN/PRC-47 can be operated from either a 24 v military pack set battery, a 24 v vehicle battery or a 115 v, single phase, 400 cps source.

Available only on a production contract.

APPLICATION CONFIGURATIONS

The AN/PRC-47 can be used for forward echelon combat control, guiding air supply or paratroop drops, long range reconnaissance missions, front line administration or tactical networks. It can be mounted on a Jeep for rear echelon or front line employment.

Two rucksack frames facilitate man pack use: one is used to carry the transceiver; the other, the battery supply, antenna and accessories. The AN/PRC-47 is also ideally suited to the vibration environments of vehicular operation and can be installed quickly by the use of optional mounting clamps. Power can be obtained from the vehicle battery-generator system, and it can use either the antenna supplied or a mobile whip. The transceiver is operationally compatible with the AN/MRC-83, AN/MRC-87, AN/MRC-94, AN/MRC-95, AN/TRC-69, AN/TRC-75, AN/TRC-91, AN/TSC-15, AN/TSC-38 and other similar single sideband equipment.

The AN/PRC-47 can be set up for operation by a two-man team in a few minutes. In operation, a leg attaches to each of the four corners of the case to give stability. Wire radials are unwound and connected to the transceiver case to form a ground plane for the antenna. A 15-foot sectional whip antenna, which fastens directly to an insulator on the transceiver front panel, completes the installation. For storage or vehicular transport, a watertight case accommodates the entire system.

CIRCUITRY

The AN/PRC-47 uses a stabilized master oscillator with no oven. This reduces power drain and requires no warm-up. Balanced modulators and Mechanical Filters for sideband separation in transmit give excellent carrier suppression and negligible interchannel cross-talk.

Tuning and loading of the power amplifier are facilitated by a visual power output indicator. An audio channel circuit can be used for a sidetone signal. The AN/PRC-47 Transceiver uses a standard military H-33G/PT handset.

MODULAR CONSTRUCTION

Major circuits are arranged in six modules — RF oscillator, signal data-translator, amplifier-modulator, oscillator control, audio amplifier and power supply. Mechanical connections, where required, permit easy module removal. Test points for all significant circuit voltages are located on the top of each module to facilitate rapid trouble isolation.

Specifications

FREQUENCY RANGE: 2.0-11.999 mc.

FREQUENCY STABILITY: ±25 cps.

NUMBER OF CHANNELS: 10,000 1 kc channels.

MODES: USB — Voice, MCW or FSK.

IMPEDANCES: Receiver RF input 50 ohms. Transmitter output network capable of matching a 15-foot whip antenna or a 50 ohm resistive load. Receiver audio output 300 ohms.

EXTERNAL POWER SOURCE: 24 v dc or 115 v, 400 cps nominal. Negative ground battery is interchangeable with the one used in the AN/PRC-38 or AN/PRC-41 Radio Set.

INPUT POWER: Transmit, less than 320 watts; receive, less than 18 watts.

SIZE:

	W	*H*	*D*
Transceiver	23⅛" 58.74 cm	13 11/16" 34.77 cm	6 15/16" 17.62 cm
Battery case	4" 10.16 cm	9⅞" 25.08 cm	11 9/16" 29.37 cm

WEIGHT: Transceiver — Approx. 41 lbs. (18.6 kg). Battery and case — 17 lbs. (7.71 kg).

TRANSMITTING CHARACTERISTICS

POWER OUTPUT: Choice of 100 watt or 20 watt PEP levels.

AUDIO FIDELITY: ±6 db from 300-3000 cps, relative to 1700 cps.

DISTORTION: Third order intermodulation products 30 db down from either of two equal test tones at 100 watts PEP using voice modulation.

CARRIER SUPPRESSION: 40 db down.

SPURIOUS OUTPUT: At least 50 db down from desired output.

RECEIVING CHARACTERISTICS

SENSITIVITY: 2 uv for 10 db signal-plus-noise-to-noise ratio; 50 mw minimum audio output.

SELECTIVITY: At −6 db — 300-3000 cps above channel frequency (with response at 1700 cps above channel frequency as reference). At −60 db — 1000 cps below channel frequency to 4600 cps above channel frequency.

AVC CHARACTERISTICS: Less than 10 db audio output variation for input signals from 5-100,000 uv.

AUDIO OUTPUT: 500 milliwatts, 1000 uv input.

AUDIO DISTORTION: Less than 15%.

Related Equipment

700C-1 FSK Adapter, p. 123

AN/URC-32 HF Transceiver

Features	Applications
28,000 Channels	*Shipboard Communication*
Digital Tuning	*Fixed Station*
Excellent Stability	
Optional Shockmounts	
Complete Accessibility	

The AN/URC-32, a rack mounted single sideband transceiver, provides simplex operation in the 2-30 mc frequency range with 500 watts PEP output. Continuous coverage is provided in 1 kc increments with channel frequency indicated directly on an illuminated counter-type dial. Frequency coverage in 0.1 kc steps is optionally available. A choice of modes includes upper sideband, lower sideband, independent sideband (separate channels on each sideband), AM, RTTY or CW.

SYSTEM APPLICATIONS

The AN/URC-32 is well suited for shipboard, fixed or transportable communication systems. Shockmounts which provide excellent isolation for shipboard installation are available for the equipment rack.

HIGH FREQUENCY STABILITY

On-frequency channel selection, without searching or fine tuning, is assured by an integral transistorized frequency standard with a stability of one part in 10^6 per month. An external Collins 40N-1 Frequency Standard can be used in installations requiring stabilities of one part in 10^8 per day. Manual tuning of the transmitter places the receive circuits in proper adjustment when reception on the same frequency is desired.

MAXIMUM ACCESSIBILITY

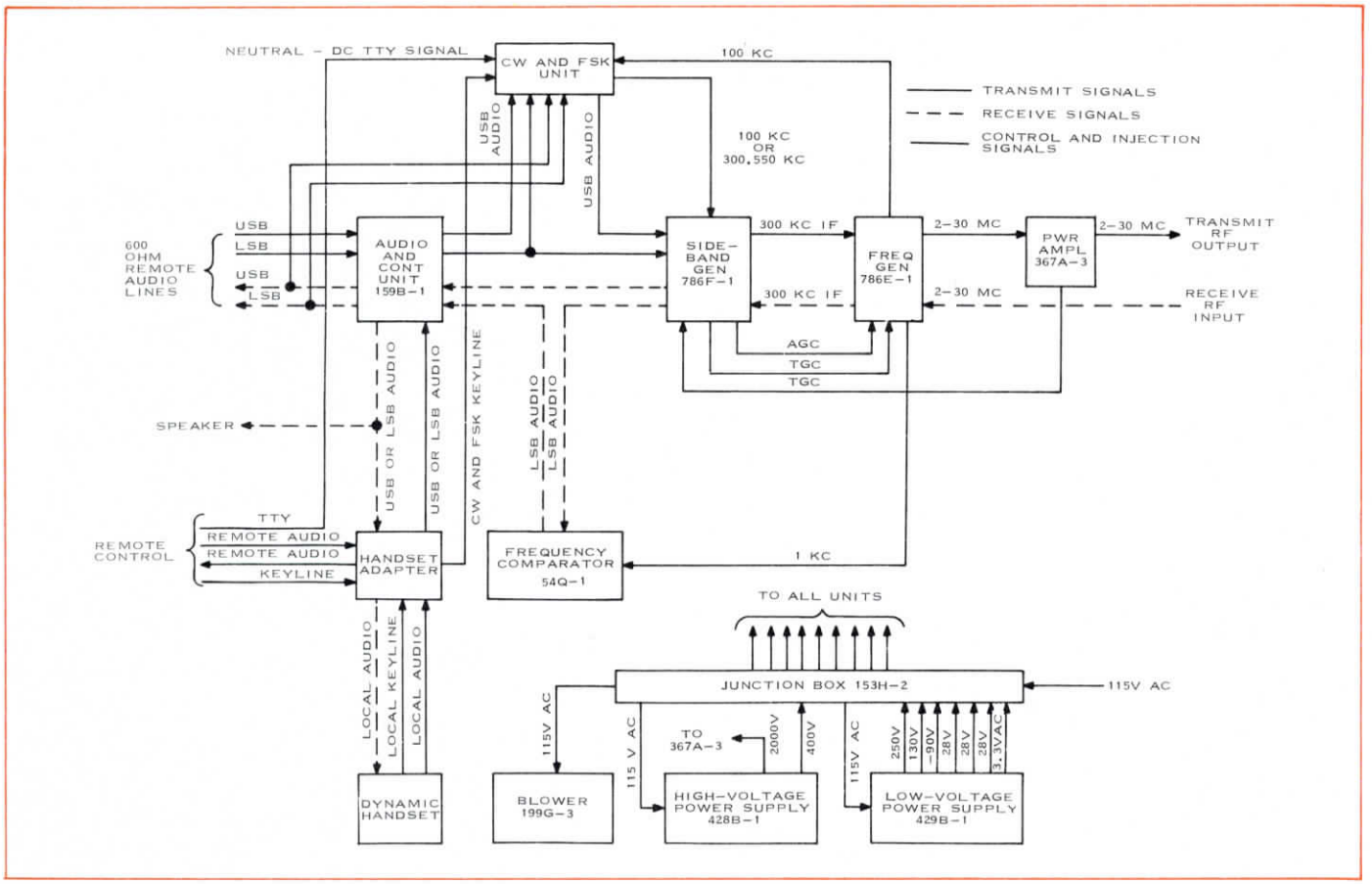
Circuitry is divided into logical groups on individual chassis which feature quick disconnect devices. Each chassis is mounted on the rack with swing-out type hinges providing complete access to all components and wiring. Many of the units have plug-in modules or subunits to further facilitate inspection and maintenance.

MODERN CIRCUITRY

Receiver and exciter circuits employ double conversion above 3.7 mc. Balanced modulators and Mechanical Filters provide excellent carrier suppression and negligible interchannel cross-talk. The power amplifier is a two-stage, four-band unit with excellent linearity. Included is a frequency comparator that can be used to check the received signal with an external standard if desired.

Available only on a production contract.

Functional Circuits



Specifications

FREQUENCY COVERAGE: 2-30 mc in 1 kc steps manually tuned; variable 1 kc BFO on CW; 0.1 kc steps available with optional module.

FREQUENCY STABILITY: 1 part in 10^6 for one month, or 1 part in 10^8 per day with external 40N-1 standard.

MODES OF OPERATION: USB; LSB; ISB; AM; CW as 1.0 kc or 1.5 kc audio tone on USB; teletypewriter using ± 425 cps shift FSK on USB.

POWER SOURCE: 115 v or 230 v, single phase, 50-60 cps; 1500 watts maximum, transmit; 420 watts, receive (with PA in transmit standby).

RF TERMINATION: 52 ohms. Type N coaxial fitting.

ANTENNA REQUIRED: Shipboard whip antenna with 180T-2 antenna coupler.

SIZE: 21 7/8″ W, 73″ H, 20 7/8″ D (55.56 cm W, 185.42 cm H, 53.02 cm D), including rack.

WEIGHT: Approx. 350 lbs. (158.9 kg), including rack.

TRANSMITTING CHARACTERISTICS

POWER OUTPUT: SSB — 500 watts PEP; compatible AM — 125 watts carrier.

AUDIO INPUT: Dynamic handset, two 600 ohm balanced lines at −38 to +8 dbm, or audio input from shipboard remote radiophone unit.

SSB DISTORTION: At full PEP, third order distortion products 35 db below either of two equal test tones.

SPURIOUS SIGNALS: Undesired sideband, at least 40 db below rated PEP level.

AUDIO RESPONSE: 4 db, 350-3,000 cps; down 60 db at 4,000 cps. Distortion less than 5%.

KEYING RATE: 100 wpm, FSK; 35 wpm, CW.

NOISE: More than 40 db below either of two equal tones when transmitter is driven to full output.

RECEIVING CHARACTERISTICS

SENSITIVITY: 1 uv for 10 db signal-to-noise-plus-noise ratio in SSB operation; 2 uv for 10 db signal-to-noise-plus-noise ratio in AM operation.

SELECTIVITY: 3 kc bandwidth, SSB; 6 kc bandwidth, AM.

AUDIO OUTPUT: Loudspeaker at 2 watts, headphones, handset, two 600 ohm lines at −34 to +14 dbm. Can also be used with a shipboard remote radiotelephone unit.

Related Equipment

180T-2 Antenna Coupler, p. 104, 105