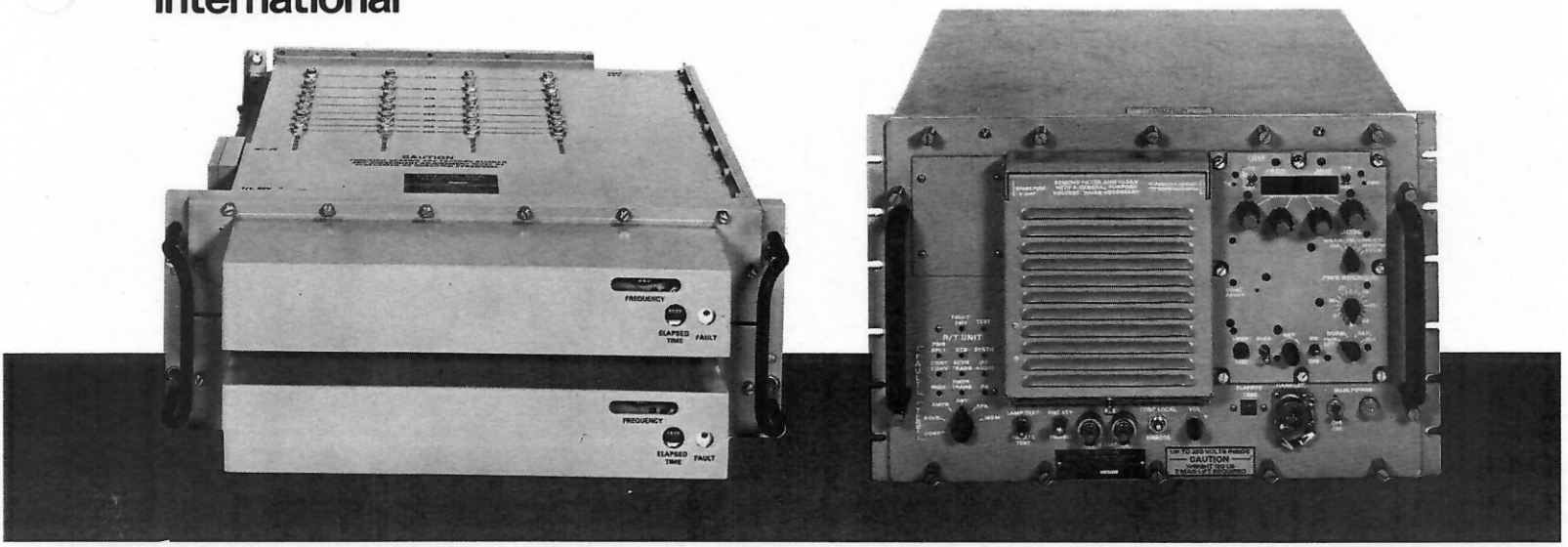
Rockwell International

AN/URC-93(V)

Transceiver and Filters



Collins Telecommunications Products Division, Rockwell International, has developed and is producing the AN/URC-93(V) (SATCOM — LOS VOICE — DATA LINK — ECCM) under contract to the US Navy. Navy Growth Radio is a versatile family of uhf radios and filters operating on 7,000 channels (25-kHz channel spacing) in the 225- to 400-MHz frequency range. This US Navy transceiver group presently consists of four shipboard versions and two airborne versions for voice, data, and wide-band communications.

- *Superior Performance*
- *USN Airborne/Shipboard Commonality*
- *DOD Standardization*
- *State-of-the-Art Design*
- *High MTBF*
- *Low MTTR*

The AN/URC-93(V) can do more than any other modular radio group on the market. These transceivers provide, through module substitution, capabilities ranging from 30 watts AM to 30/100 watts AM/FM/FSK/ECCM spread spectrum systems and satellite communications.

Control and monitoring of the AN/URC-93(V) are via a serial data stream from either a local or a remote control unit. The built-in test feature can be activated from either the local or remote position. The remote control unit contains a plated wire, 20-channel preset memory with pushbutton channel storage.

FEATURES

- *7000 Channels, 25-kHz Spacing*
- *All Solid-State*
- *Family of Modular Growth UHF Transceivers (Field Reconfiguration Capability)*
- *From 30 Watts AM to 30/100 Watts AM/FM/FSK/ECCM and SATCOM Capabilities*
- *10-MHz Bandwidth and Power Level Control for Covert/AJ*
- *Nuclear Survivability*
- *70-MHz Interface (Allows Use With a Variety of Satellite and LOS Modems)*
- *Full Function Remote Control*
- *Pulse Blanker*
- *Auto Relay in All LOS Modes*
- *3-Microvolt Receiver Sensitivity*
- *Life Cycle Cost Savings*
- *High Reliability (TX/ER/MIL-M-38510 Parts)*
- *Built-in Test (Remote or Local Using Automatic Sequence)*
- *Secure Voice Compatible*

SPECIFICATIONS

TRANSCEIVER

General

Four versions, all convertible to each other.
MIL-E-16400 design.
Tilt and lock, ±90 degrees, ±45 degrees.
225 to 400 MHz, 7,000 channels in 25-kHz increments.
Local remote, auto relay operation.
50 to 400 Hz, 115-230 volts, single phase.

Receiver sensitivity .....AM - 3 μV for 10 dB (s+n)/n.
FM - 3 μV for 20 dB (s+n)/n.

Size .....Width, 19.00 in. (rack mount); height, 12.25 in.; depth 22.5 in.

Weight .....125 lb maximum.

Performance

Front-end overload protection (3.25 watts).
Pulse blanking capability (protects against radars).
Internal frequency standard - 1 MHz, 3 parts in 10^7 (oven/dual); 1 part in 10^6 (tcxo).
1 ms T/R time for Link 4.
Fault isolation to module level.
MTTR 15 minutes.
MTBF, 2150 hours (MIL-STD-781 at 50 °C).

FILTER

General

The bandpass filter is a high performance 100-watt antenna filter that provides additional rf selectivity, resulting in reduced cross modulation in receiver plus reduced spurious outputs from the transmitter. The filter is a basic building block and can be configured as one, two, three, or four channel using the appropriate multiflexer.

Rack Mounted

Serial remote control auto tuning in 4 seconds.

28 V dc or 115 V ac 400 Hz single phase.

Selectivity .....3 dB bandwidth — 600 kHz minimum.

60 dB bandwidth — 7.5 MHz maximum.

Power rating .....100 watts average 200-watt peak continuous input power per channel.

Input impedance .....50 ohms 2.5:1 vswr maximum with 50-ohm output termination.

Insertion loss .....2.5 dB normal conditions.

Size .....Width 19 inches (rack mount)
Height 1-3.375 in.
2-7.0 in.
3-10.4 in.
4-13.9 in.
Depth 21 inches
Weight 1-24 lb
2-54 lb
3-79 lb
4-104 lb

Specifications subject to change without notice.

Collins Telecommunications Products Division
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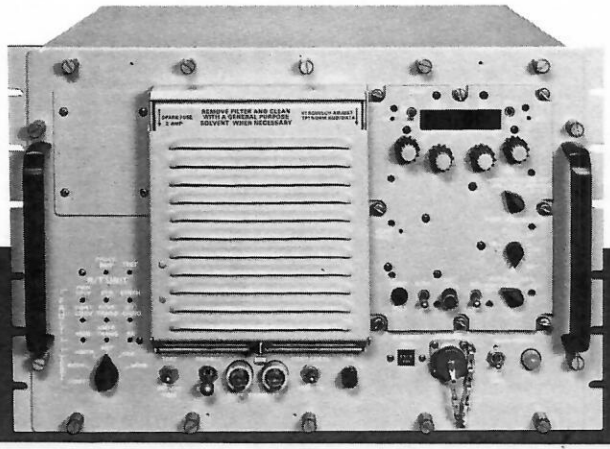
Cedar Rapids, Iowa 52406

Rockwell International

OR-176(V)

Radio Sets



The OR-176(V) type of modular transceivers are designed to provide a versatile, flexible family of uhf radios with 7000-channel capability in the 225.000- to 399.975-MHz frequency range (25-kHz channel spacing). This Navy-developed and service-approved communications equipment is easily reconfigured by the selection and use of the proper complement of plug-in modules retaining one common chassis. This concept satisfies all present communications requirements with already designed and service tested modules and allows simplified growth to satisfy new communications requirements by limiting new design. Equipment reconfiguration and/or maintenance requires no realignment or readjustment upon module replacement. Existing radio configurations offer the following capabilities: Link 4, Link 4A, Link 11, AM/FM voice, secure voice/data, WBAM, SATCOM, and antijam, LPI, spread spectrum systems.

FEATURES:

All versions of OR-176(V) uhf radios offer the following features:

- *Primary Power — 115 V ac or 220 V ac (strappable option), single phase, 50 to 400 Hz.*
- *Self-Contained Cooling — continuous operation with or without assistance of a rack cooling system.*
- *Built-in-Test — effective and simply operated, provides isolation to the module level.*
- *Nuclear Survivable*
- *Versatile Control Characteristics — serial control data ensures direct use of standard ships wiring and switching techniques. No increase in cabling or switching devices relative to replaced equipment.*

Control options include one or combinations of the following control capabilities:

a. *Local (front panel) control.*
b. *Full (or limited function) remote control of one to eight radios with a single control unit.*
c. *Remote selection of operating channel (20 channels of frequency storage).*
d. *Rack panel control — one control panel per rack of radio equipment.*
e. *Computer control utilizing addressing techniques over a common control bus.*

- *Interface Compatibilities — interfaces are compatible with standard shipboard equipments, including:*

a. *Link 11 modems, AN/USQ-36, AN/USQ-59, AN/SSQ-29*
b. *Link 4 modems, AN/SSW-1*
c. *Handsets, H-169, TA-840*
d. *External filter/multicouplers, SRA-33, TD( )*
e. *Secure speech equipment, KY-8, KY-65/75, KY-57/58, SA-1499*
f. *Remote control, C-1138*
g. *Switchboards, SB-32661, SB-863, SB-973*
h. *SATCOM modems, OM-43B, 960S-1*
i. *Modem, AN/UCC-1*
j. *General purpose modem MD( )(V)/U*
k. *OE-82B or OE-158 antenna, standard uhf antenna*

- *Fast Frequency Change — no more than 1 millisecond for any frequency change within the uhf band.*
- *Standard Frequency Interfaces — 1 MHz reference (in or out) 70 MHz if's, in and out (for operation with satellite/data modems).*

SPECIFICATIONS

Environmental .....MIL-E-16400, Class IV.

Electromagnetic.....MIL-STD-461, Notice 1.

Physical:

- Weight .....140 lb max.
- Size .....L = 22.5 in.
W = 19.0 in.
H = 12.27 in.
- Materials/ processes/parts .....MIL-E-16400 and MIL-M-38510.

Maintainability:

- Repair concept .....Module replacement.
- Built-in-test .....Automatic fault isolation to a replaceable module, continuous monitor and operator initiated.
- MTTR .....15 minutes.

Reliability:

- MTBF (MIL-STD-781) .....2150 hours.

Primary power requirements ...115 V ac or 230 V ac, 50 to 400 Hz, 1250 watts max.

Duty cycle .....Continuous transmit.

Antenna .....Two or single antenna (internal t/r switch).

General:

- Frequency range .....225.000 to 399.975 MHz, 7000 channels in 25-kHz increments.
- Frequency accuracy: .....±3 parts in 10^7 (SATCOM)
±1 kHz (LOS, baseband)
±1 part in 10^6 (70 MHz interface).
- Frequency stability .....1 part in 10^8 (10 ms avg).
3 parts in 10^9 (1 second avg).
- Frequency agility .....1 ms maximum for any in-band frequency change, OR-176(V)1, 2, 3. 10 ms maximum, OR-176(V)4.
- T/R Time:
  - Receive-to-transmit .....160 μs, FDX (not AM); 100 ms. AM; 1 ms, all other modes.
  - Transmit-to-receive .....100 ms AM; 1 ms all other modes.
- Rf bandwidth .....±5 MHz, 2 dB receive, 4 dB transmit; OR-176(V)1 ±500 kHz, 1 dB; OR-176(V)2, 3, 4.
- Frequency stability ..... 1 part in 10^8 (10 ms avg).
3 parts in 10^9 (1 second avg).

Receiver

Sensitivity:

- AM .....3.5 μV for 10 dB (s+n)/n.
- FM .....3.0 μV for 20 dB (s+n)/n.

Selectivity:

- AM/FM voice .....16/32 kHz at 6/60 dB points.
- Secure voice/data .....70/140 kHz at 6/60 dB points.
- Overload/protection .....Operative up to 4 watts into receiver.

Spurious rejection .....60 dB inside 5% BW.
80 dB outside 5% BW.

Transmitter

Power Output.

- AM .....30 watts, unmodulated.
- FM .....100 watts.

Vswr protection/operation .....-2 dB max degradation into 2.5:1.
23 watts min into 5:1.
No damage at any vswr.

Harmonic emissions .....-70 dB.

Spurious emissions .....-60 dB inside 5% BW.
-80 dB outside 5% BW.

Noise floor .....-97 dBm/Hz ≥ MHz from carrier.
-120 dBm/Hz ≥ 30 MHz from carrier.

Specifications subject to change without notice.

Collins Telecommunications Products Division
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Cedar Rapids, Iowa 52406

AN/URC-93(V)
uhf shipboard communication system

AN/URC-93(V) COMMUNICATION SYSTEM

The AN/URC-93(V) family of uhf equipments provides flexible configurations of filters, multicouplers, controls and radios with 7000-channel capability in the 225.000- to 399.975-MHz frequency range. Through proper implementation of plug-in modules in the rt, the following operational capabilities can be implemented: Link 4, Link 4A, Link 11, AM/FM voice, secure voice/data, WBAM, and SATCOM. All versions of the radio feature self-contained cooling and built-in test (BIT) to the module level. Primary power is 115- or 220-V single-phase, 50 to 400 Hz. The radio is controlled and monitored via a serial data stream from either a local or remote control unit. A digital frequency synthesizer (two for fdx) generates injection frequencies for both receive and transmit and is capable of changing frequency in less than 1 millisecond. The frequency reference is either a tcxo or an oven-controlled standard. The radio provides a 1-MHz reference output and also is capable of utilizing an external 1-MHz reference. A 70-MHz interface, allowing use with a variety of satellite or line-of-sight modems, is provided. The 1-dB bandwidth of this interface is 500 kHz or 10 MHz (dependent on configuration). The radio also has an optional pulse blanker module to protect against shipboard radar emissions.

The AN/URC-93(V) has an optional filter or multiplexer. The associated filter or multiplexer limits transmitter or receiver bandwidth to eliminate radiation or reception of undesired signals. In addition, the multiplexer (2, 3, or 4 channel) allows use of a single antenna for multiple transmitters, receivers and/or transceivers. The associated filter or multiplexer automatically tunes to the associated equipment frequency by extracting pertinent tuning information from the associated serial control word.

TYPE	DESCRIPTION	PART NUMBER	LIST PRICE
OR-176(V)1	30/100-W AM/FM, R/T secure voice, Link 4, Link 4A, Link 11, autorelay, SATCOM, ECCM, spread spectrum, full duplex.	622-2187-001	*
OR-176(V)2	30/100-W AM/FM, R/T secure voice, Link 4, Link 4A, Link 11, autorelay, SATCOM, ECCM, full duplex.	622-2188-002	*
OR-176(V)3	30/100-W AM/FM, R/T secure voice, Link 4, Link 4A, Link 11, autorelay, SATCOM, ECCM, half duplex.	622-2189-001	*
OR-176(V)4	30/100-W AM/FM, R/T secure voice, Link 4, Link 4A, Link 11, autorelay, SATCOM, ECCM, simplex.	622-2190-001	*
F-1478	Single channel filter.	622-4354-001	*
TD-1280	Dual channel filter.	622-4356-001	*
NTN	Local control.	Determined by application.	*
NTN	Remote control.	Determined by application.	*
NTN	Rt connector set.	Determined by application.	*
NTN	Filter connector set.	Determined by application.	*