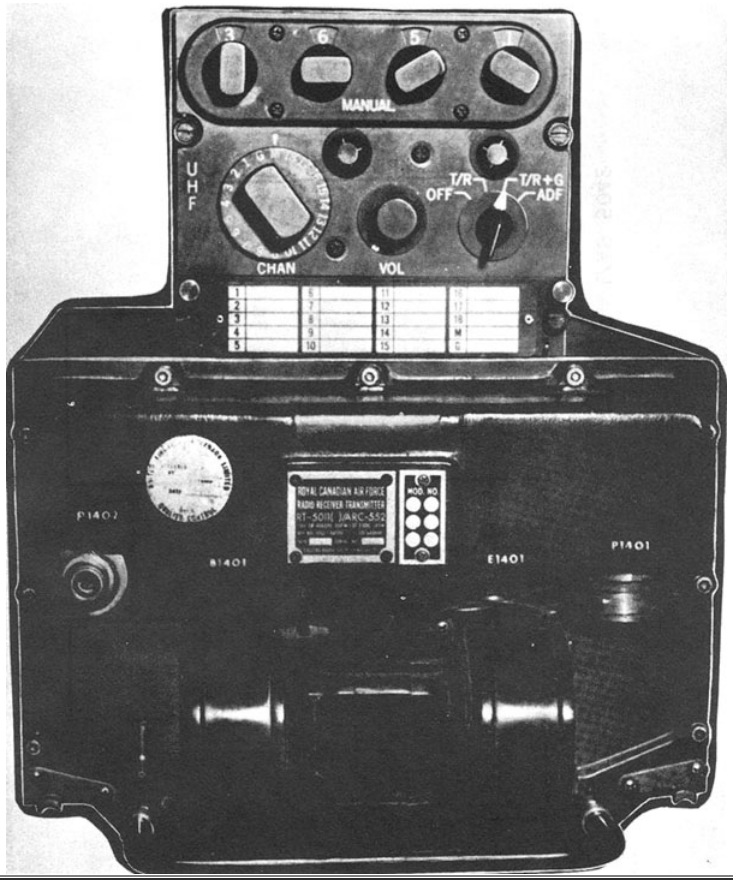
AOR/Annapolis/IRE/Iroquois/Mackenzie/St. Laurent Classes
VHF/UHF Satellite Equipment

VHF/UHF TRANSCEIVERS EQUIPMENT SUMMARY LISTINGS		
The equipment is listed in the identical order to that of the source material.		
Model	**Description**	**Comments**
OE 5012	Antenna Coupler Group	Also see details in Feature Section.
MX5130/SRA-504	VHF/UHF Adapter	To adapt input and output of VHF and UHF equipment to the AN/SRA-504 remote operate system fitted on DDH280 and AOR classes.
AN/SRA-501	9 channel VHF/UHF antenna coupler.	See details in Feature Section.
AN/SRA-503	Coupler	
AN/ARC-552	Transceiver	See details in Feature Section.
C 5062/ARC-552	Radio set control	See details in Feature Section.
AN/VRC-49	Transceiver	See details in Feature Section.
AN/SRC-509	aka Sealand 66. FM Transceiver. 66 channels	See details in Feature Section.
AN/SRC-510	aka Sealand 30. FM Transceiver. 30 channels	See details in Feature Section.
AN/SRC 27	Transceiver	
AN/SRC-522	Transceiver	
AN/SRC-503	VHF/UHF Transceiver	General purpose. See details in Feature Section.
AN/WRC-501	Transceiver	See details in Feature Section.
Guard Rx P/O WRC	Receiver	See WRC 501 details in Feature Section.
C5301	WRC Remote control	See WRC 501 details in Feature Section.
AN/URT-502	Transmitter - 4 crystal controlled channels	200-400 MHz ; 18 watts
AN/URR-35	Receiver - 1 crystal controlled channel	200-400 MHz
NESTOR	Crypto	Used with UHF radios
KY-58 VINSON	Crypto	Used with UHF radios
SB 5122	Patch Panel	Provides patching between UHF equipment and secure voice or remote system.
WSC-3	VHF/UHF Transceiver	See details in Feature Section.
SATCOM CONTAINING:		See details in Feature Section.
SSR1A	Receiver	
WSC3 (V2)	Transceiver	
AS 2815/SSR1	Antenna	
AS 3018/WSC1	Transceiver	
CV 3333	Vocoder	
KG 34	Voice Crypto	

EQUIPMENT HOLDINGS PER SHIP (1985)			
List 18	List 19	List 20	
LEGEND: ISL= Improved St. Laurent Class IRE= Improved Restigouche Class MACK= Mackenzie Class		ANS= Annapolis Class TRIBAL = 280 Class AOR = Supply ships SUB= Submarine	

FEATURED EQUIPMENT

AN/ARC-552



ARC-552 general purpose AM transmitter/receiver designed for ship to aircraft line of sight communications. It is similar to the ARC-27.*(Photo courtesy Canadian Navy)*

NOTE: The control head is NOT an integral part of this transceiver. It has simply been placed on top of the case for this particular photo. Because of lack of contrast, the eye is easily fooled into believing the control head is integral to the radio.

Frequency range: 225 to 400 MHz with independent Guard receiver for 243 MHZ.
Power output: 15 watts minimum ; 20 watts average over frequency range.
Mode: Voice and MCW
Primary Power: 115VAC 400 Hz 3 phase, 4 wire or 27.5 VDC, 155 watts.
Physical: 8-1/16 inches high by 11-13/16 inches wide by 22-3/4 inches deep and weighs 56.7 lb.
Components:

1 Radio Receiver-Transmitter RT-5011/ ARC-552	#5821-21-802-0552
1 Mounting Tray MT-1477/ARC	#5821-00-612-7048
1 Control Unit C-5064/ARC-552	#5821-21-800-8992

Handbook: MICN 8-30ARC552-11

BRIEF TECHNICAL DESCRIPTION

The circuitry of the AN/ARC-552 Radio Set consists of a high-level, modulated transmitter; a tunable, double-conversion, superhetrodyne receiver; a single-channel guard receiver; frequency generating circuits and a power supply.

Tuning is accomplished by an autopositioner which drives a mechanical linkage and accurately positions the tuning elements in the frequency generating and RF circuits as dictated by the control unit in use. Injection frequencies for both transmit and receive functions are obtained from the same crystal controlled oscillators.

The guard receiver is a single frequency receiver which operates on a pre-determined frequency between 238 megacycles and 248 megacycles. The guard frequency normally assigned is 243 megacycles. The guard receiver is separate from the main receiver; however, both receivers use the same audio output stage.

CONTROL CIRCUITS

Radio Set Control Unit C-5062/ ARC-552. This unit provides full control of the AN/ARC-552 without any additional control units. It is equipped with four frequency selecting controls, a channel selector, a function switch. a volume control and indicating lights. The channel selector switch has 18 channel positions. plus guard and manual positions. Each of the 18 channels may be assigned to specific frequencies by setting up frequency selector pins in the bottom of the unit. After the initial setting up is complete, the channel selector may be switched to any channel and the auto positioner in the Receiver-Transmitter will automatically tune the equipment to the assigned frequency.
Frequencies not assigned to channels may be set up by placing the channel selector in manual and rotating the four frequency selector knobs until the desired frequency appears in windows beside the knobs. The guard position of the channel selector monitors the guard frequency. The function switch allows selection of transmit/receive, transmit/ receive plus guard receiver "On". ADF output and "Off" functions.

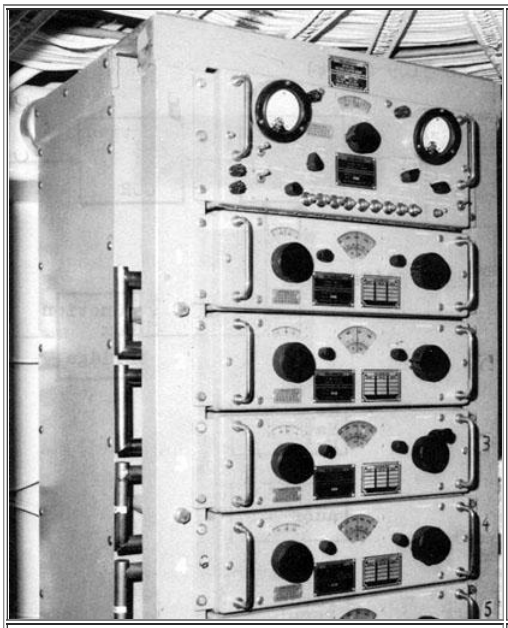
This article from the September 1957 issue of Flighglobal complements the above information.

An order for airborne U.H.F. communications radios worth no less than $8.3m has been placed by the R.C.A.F. with Collins Radio Company of Canada, Ltd. The equipment involved is the
AN/ARC-552, which is a direct Canadian adaptation of the American Collins AN/ARC-52. The R.C.A.F. is now undergoing a planned conversion from V.H.F. to U.H.F. for air-to-air and
air-to-ground communications radio.

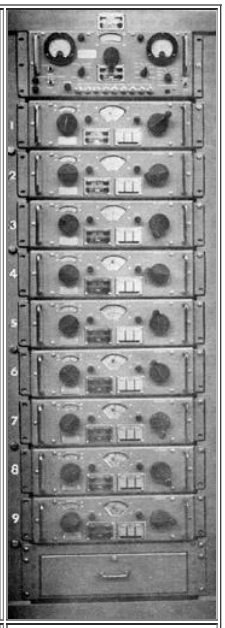
The ARC-552 and 52 offer a total of 1,750 channels in the the frequency band 225 MHz to 400 MHz. While all these are available to the pilot, nineteen of them are pre-set and can be selected for immediate use. An entirely separate guard channel is also available for emergency. ARC-52 and ARC-552 are completely interchangeable for installation purposes. The new Collins equipment offers considerable advantages over its widely used predecessor, the AN/ARC-27. It has 20 per cent fewer tubes; and its weight, at 51.5 lb, is 35% lower. The volume has also been reduced by 51 per

cent. The ARC-552 is pressurized for operation at heights up to 70,000ft; printed circuitry and modular construction with standardized subassemblies are used; and all components are conservatively rated to increase their service life.

AN/SRA501



AN/SRA501. Up to nine manually tuned CU-5044 couplers enable a maximum of nine transceivers to operate into one antenna in the 225 to 400 MHz band. Only four couplers are shown in the photo. A 1% frequency separation is required. At the top is one TS 5035 RF power test set. *(Photo courtesy Canadian Navy)*



The full system. *(Photo courtesy Canadian Navy)*

The Antenna Coupler Group AN /SRA-501 is a VHF multicoupler used to provide electrical isolation between nine transmitters, nine receivers, nine transmitter-receiver groups or a combination of these operating simultaneously into a single broadband antenna.

SPECIFICATIONS

Frequency Range: 225 to 400 MHz
Impedance: 50 ohms
VSWR: Less than 1.3 to 1 over frequency range covered
Power Rating: 250 watt (100% AM)
Isolation between Channels: At 400 MHz +/- 3 megacycles - Greater than 60. 5 db
At 225 MHz +/- 2 megacycles - Greater than 65.5 db
Insertion Loss at Resonance: Approx. 0.5 db additional loss
Physical: 74.5 in High by 26 in (30 in over junction cable) Wide by 28.5 in Deep.
Weight: 811 lb.
Power Consumption : 117 volts nominal, 60 Hz, 1 phase
Manufacturer: Sinclair Radio Labratories
Antenna System: AS-101B/URC or similar.
Handbook: BRCN 4264

UNIT DESCRIPTION

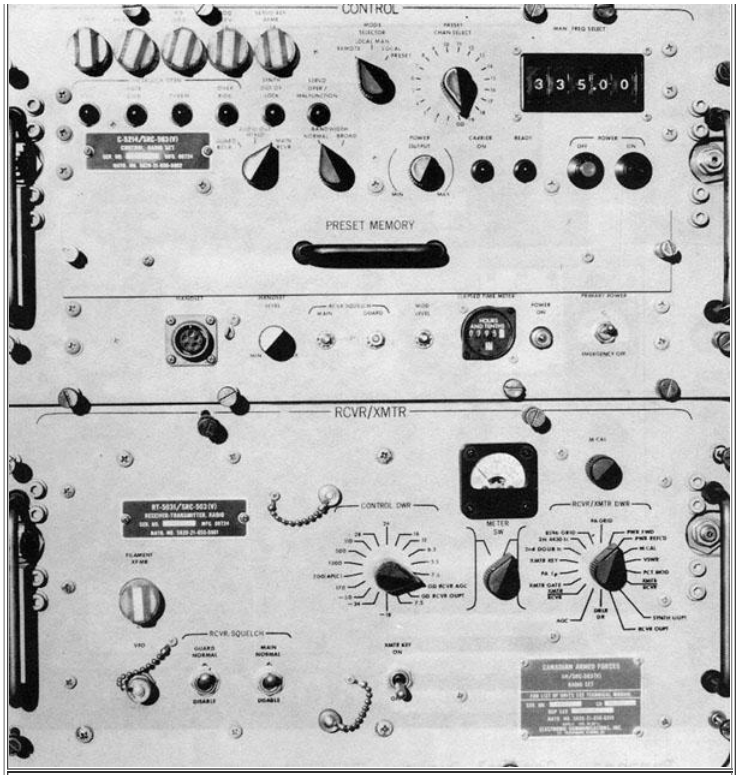
1 Rack, Electrical Equipment MT-5068/SRA-501 Stock # 5985-21-041-2232
1 RF Power Test Set CU-5035/SRA-501 Stock #5985-21-041-2231
9 Antenna Coupler Channels CU-5044/SRA-501 Stock # 5985-21-041-2233
8 Junction Cables - 7/8" Rigid Coaxial
1 Junction Cable (Extra Long) - 7/8" Rigid Coaxial
2 Coaxial Adapters 'N'-7/8" EIA

The Test Set and the nine Coupler Channels are mounted in the rack by means of chassis track slides. The Test Set is located at the top of the rack and the nine coupler channels are stacked consecutively from one to nine downward from the Test Set. A stowage drawer for spares is located at the bottom of the rack.Type 'N' input and 7/8 inch EIA output connectors are provided at the rear of each coupler channel. The outputs of each coupler are interconnected by the rigid coaxial junction cables. All controls and the metering panel of the Test Set are accessible from the front of the equipment.

BRIEF TECHNICAL DESCRIPTION

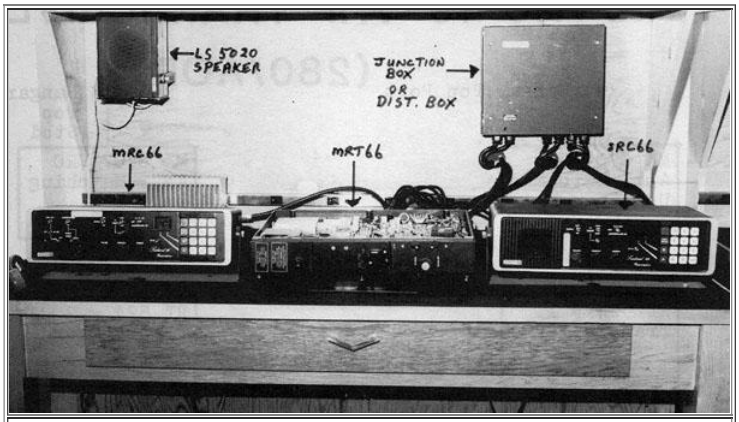
Each antenna coupler consists of three silver-plated, cascade-connected, quarter-wavelength coaxial cavities. Transfer of energy is accomplished by fixed input and output loops in conjunction with ports or apertures between cavities. Tuning of the channel takes place when the telescoping centre conductors located in each cavity are increased or decreased in length. A system of spring loaded gears mechanically couples the centre conductors to a manual crank. The frequency to which the channel is tuned is indicated by a direct reading dial on the front panel. The nine coupler channels are connected in cascade, by means of nine coupling units, into a common coaxial terminal to which the antenna is connected. The RF Power Test Set provides indicators for tuning and metering the individual or combined outputs of the nine coupler channels. Nine switches on the Test Set, in conjunction with nine coaxial relays and nine low power VHF dummy loads, permit the associated transmitters to be pretuned during periods of radio silence.

AN/SRC503



AN/SRC-503. Frequency Range: 225 to 400 MHz. Modes: Voice, AM Wide Band Secure. Power Output: 10 to 100 watts variable. Some units were fitted with the Guard receiver module for 243 MHz. For remote control operation the C5215 unit (not shown) needs to be fitted. *(Photo courtesy Canadian Navy)*

AN/SRC-509 (SEALAND 66)



AN/SRC-509 (Sealand 66) VHF FM Voice Transceiver. *(Photo courtesy Canadian Navy)*

Frequency Range - 156.025 to 158.5 MHz in transmit ; 156.3 to 163.0 MHz in receive.
Channels - Sealand 66 has 66 channels. Sealand 30 has 30 channels
Power Output - LOW position less than 1 watt ; HIGH position 20 to 25 watts
Modes - Voice Frequency Modulated

Associated Units:

SRC 66 (Standard control unit) provides remote facilities for selection of the channel, high/low power, and dual watch operation of any two channels. (Normally located on the bridge)

MRC 66 (Master Control Unit) provides facilities for local operation or remote operation. When using the SRC 66 the MRC must be in position 1. When using through the ships remote system the MFC must be in Local or Position 1.

MRT 66 (Transmitter /Receiver) contains main transmitter and receiver.

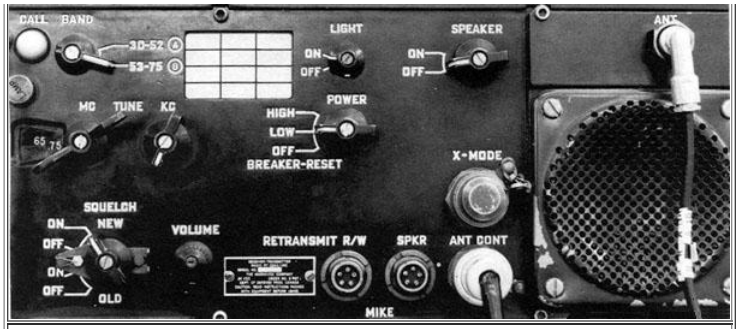
AMPLIFIER- (Not shown). Audio amplifier for use when receiving into the ship's remote system.
Was not used on DDH280 and AOR class.

DIST. BOX provides a junction box or all cables.

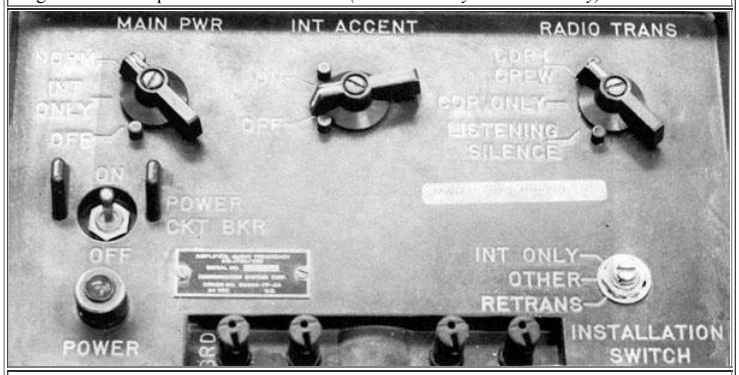
KEYLINE MATCHING UNIT (Not shown) enables the key line from AN/SRA 504 remote system to be adapted to the Sealand equipment. Used only on DDH 280 and AOR classes.

Manufacturer: Redifon Telecommunications Ltd., London England.
Vintage: 1976
Handbook Reference: 1000-1

AN/VRC49

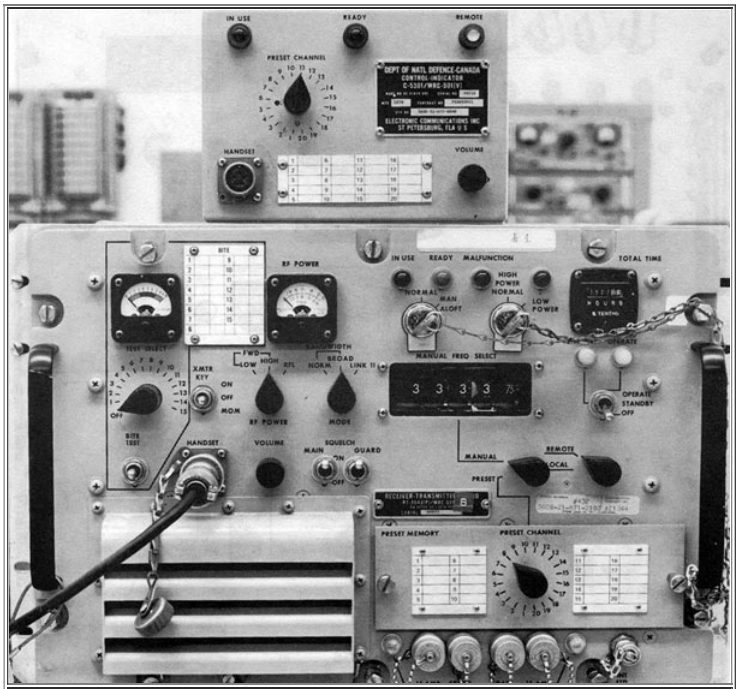


RT 524/VRC 49 transceiver. 30 to 75.95 MHz;. FM voice; 35 watts (high) and 1 to 3 watts (low). The 280 class ships had two units and their antennas were fitted to the top of the hanger on both the port and starboard sides. *(Photo courtesy Canadian Navy)*



AN/1780/VRC 49 audio amplifier for above. *(Photo courtesy Canadian Navy)*

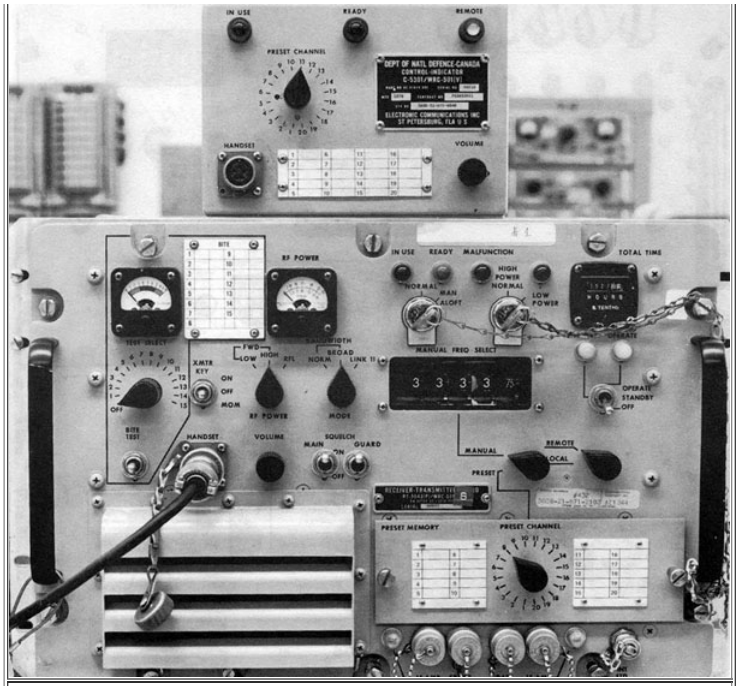
RT-5043(P)/WRC 501(V)



Above: **C5301/WRC-501(V)** Control Indicator is used for remote control operation. Vintage 1976 *(Photo courtesy Canadian Navy)*

Below: **RT-5043/WRC-501** (225 to 400 MHz) general purpose transceiver.
Power Output: (High) AM 34 watts; Link 11 100 watts; (Low) 0.1 watt.
Modes: DSB Voice, Wide Band Secure Voice, FM (optional module) for Link 11
Channels: 7,000; 25 kHz spacing
Stability: 1 part in 10^7.
Power: 1056 to 124VAC @10.9 qamps max; 57 to 63Hz.
Vintage: November 1977
Weight 145 lbs.
Manual Reference: C51-377-000/MF-001& 2

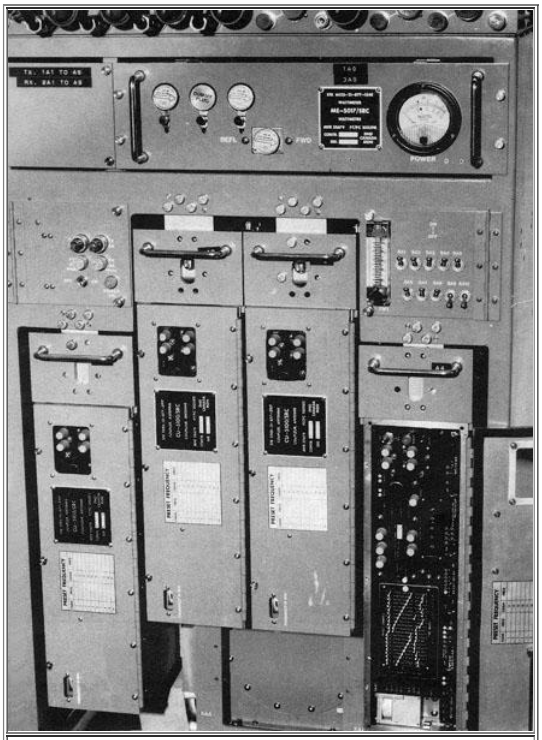
AN/WSC-3



Above: **C9351A/WSC-3** (V) Control Indicator for remote control operation

Below: **AN/WSC-3** (225 to 400 MHz) general purpose transceiver.
Power Output: 1 to 100 watts adjustable for FM and Link 11 operation. 30 watts for AM.
Modes: AM plain voice, AM secure voice, FM plain voice, FM secure voice. Link 11 (FM mode). *(Photo courtesy Canadian Navy)*

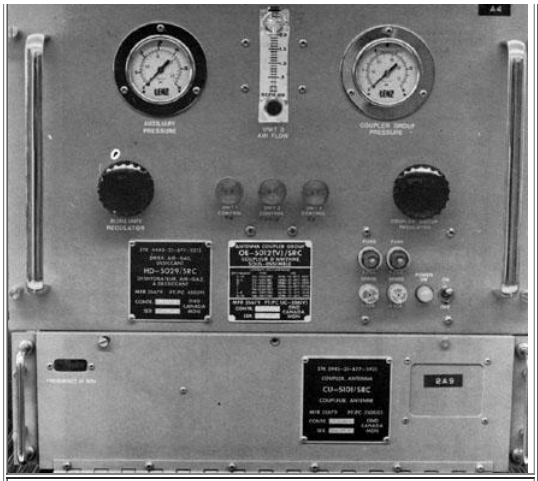
OE 5012/VRC ANTENNA COUPLER GROUP



OE 5012 (V) /SRC VHF-UHF Antenna Coupler Group. Only a partial transmit group is shown. This device enables the connection of up to eight VHF/UHF transceivers to a single antenna. Tuning separation between channels must be 1 MHz minimum. *(Photo courtesy Canadian Navy)*

Each group consists of :
Transmit coupler group - 8 couplers and a wattmeter.
Receive coupler group - 8 and a guard coupler
Single coupler with a wattmeter
Air Dryer

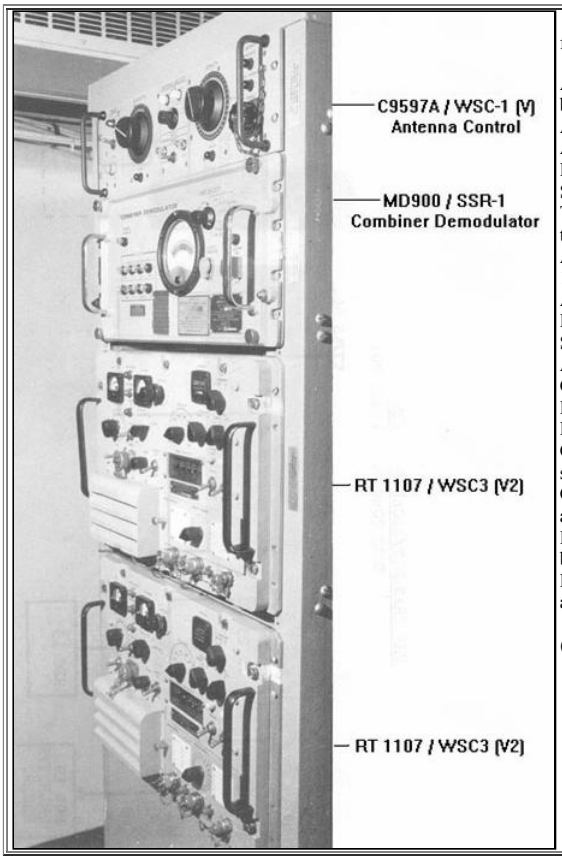
Frequency Range 200 to 400 MHz.
No. of presettable channels :20
Tuning time: 10 seconds
Vintage: 1982
Manual Reference: C-51-475/MS-001 (most current)



Top: HD5029/SRC Air Dryer (part of OE 5012). This unit purifies the ship's air for use in the OE 5012 couplers and the feed line to various other antennas and for the satcom antenna as well.

Bottom: CU 5101/SRC Guard Receive Coupler (part of OE 5012). Its installed in the cabinet of the OE 5012 and is used to guard the 243 MHz UHF distress frequency. Tuneable from 238 to 248 MHz. *(Photo courtesy Canadian Navy)*

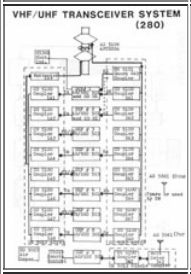
SATCOM

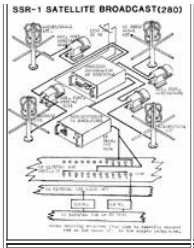
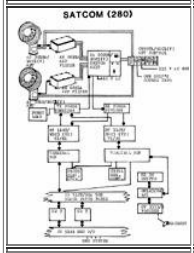
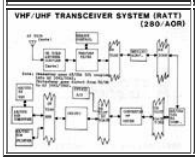


Satcom system cabinet. The entire system consists of the following components.

AS 2815/SSR-1 ANTENNA (4 fitted) - Stationary antenna for broadcast reception.
AM 6534/SSR-1 AMPLIFIER CONVERTER (4 fitted) - Amplifier for Broadcast.
MD 900/SSR-1 COMBINER DEMODULATOR (1 Fitted) - Satellite broadcast receiver.
TD 1063A/SSR-1 DEMULTIPLXOR (1 fitted) - Demodulates the broadcast.
AS 3018/WSC1(V) ANTENNA (2 fitted) - Ship shore antenna. 12 DB gain in transmit.
AM 6691A/WSC1(V) AMPLIFIER FILTER (2 fitted) - Provides 26 DB gain in receive.
SA 2000A/WSC1(V) SWITCHING UNIT (1 Fitted) - Automatic switching from one AS 3018 for best gain.
C9597A/WSC1(V) ANTENNA CONTROL (1 fitted) - Provides control of elevation and azimuth settings of AS 3018.
KG 34 CRYPTO (1 fitted) - Secure voice equipment.
ON 143 (V4) USQ POWER SUPPLY (1 fitted) - Power supply for secure voice equipment.
CV 3333/U VOCODER (1 fitted) - Analog to Digital converter and digital to analog converter.
RT 1107/WSC3 (V2) UHF TRANSCEIVER Normally 1 fitted but 2 on Iroquois class
Frequency Range - 225 to 400 MHZ Power Output -100 W adjustable Modes - FM, FSK, PSK, AM (NB), AM (WB)

(Photo courtesy Canadian Navy)

VHF/UHF/Satellite Systems Sample Block Diagrams - Mid 1980s' vintage	
Click to enlarge	
	**280 Class VHF/UHF System.** This block diagram illustrates the interconnection of many of the devices featured above. Note the number of VHF and UHF transmitters which are feeding a single AS-5104 antenna through the couplers. If it wasn't for the couplers, imagine the nightmare of antennae which would have to be mounted on yardarms to support nine VHF/UHF radio circuits! *(Diagram courtesy Canadian Navy)*
	280 Class Satellite Broadcast block diagram. Four AS2815 SSR-1 antennas feed the MD900 Combiner /Demodulator. It is believed this is satellite diversity reception scheme. From there, the signal is applied to the TD 1063A/SSRI demultiplexor which extracts the16 data channels. Following that, the data is patched to the crypto system, decoded and applied to the SB-5110 Black patch panel for further distribution. *(Diagram courtesy Canadian Navy)*

	
	**280 Class SATCOM** (2 way). Two AS-3018 satcom antennas are used in pairs for receiving and transmitting. Connecting to this system, at the bottom of the diagram, are two KW-7 crypto units for the data and one KG-34 crypto box for the voice. The CV-3333 VOCODER converts voice from analog to digital and vice versa. *(Diagram courtesy Canadian Navy)*
	**280/AOR Class VHF/UHF RADIOTELETYPE.** After the RATT signal was converted into Baudot code, it was applied to the crypto unit for decoding. The resultant plain text message was then handled by the Message Handling System consisting of the AN/UYK-502 computer. *(Diagram courtesy Canadian Navy)*

Contributors and Credits:

1) RCN's AOR/TRBL/ISL/265/IRE/MACK Class Equipment Handout. September 1985.
2) Tom Brent <tgb(at)telus.net>
3) RCN's NE TECH TQ6B Training Manual
4) ARC-552 article http://www.flightglobal.com/pdfarchive/view/1957/1957%20-%201395.html

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