V.H.F. BAND AUTOMATIC DIRECTION FINDER
MODEL ADFS-320

PRODUCT BULLETIN 1-75

The O.A.R. Model ADFS-320 Automatic Direction Finder is a new, advanced receiver designed for locating narrow-band F.M. or A.M. radio signals in the 148 to 174MHz frequency range. The system is capable of tracking low-power radio beacon or communication type transmitters in cities, rural land areas, and at sea. Applications include search-and-rescue operations as well as location of offshore platforms, buoys, fishing boats, remote work sites, animals, marked vehicles, illegal transmitters, and radio interference sources.

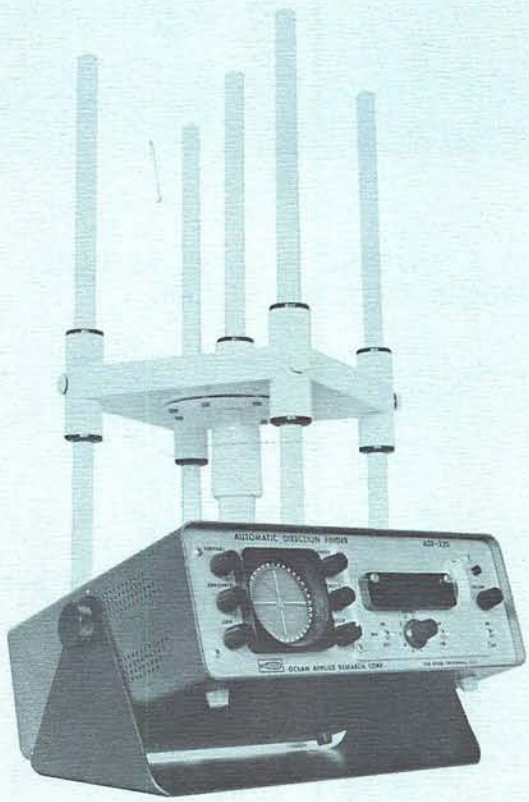
Model ADFS-320 consists of a portable receiver/indicator unit, antenna array, and interconnecting cable. The receiver/indicator unit contains a CRT direction display, field-strength and audio indicators, 10 plug-in crystal positions, operating controls, and power input/antenna cable connections. The standard Adcock type antenna array is for ship-board or fixed-station installation. It has no moving parts and is comprised of 4 vertical dipole elements, a central whip for sense reference and special signal pre-processing electronics. Two cables are used between the receiver and the antenna, one for power and one for signal return. The length of the cable is not critical.

Operation of the Model ADFS-320 Direction Finder is extremely simple requiring only channel selection and ON/OFF switching. A received signal is displayed, instantaneously, as a relative compass bearing on the circular cathode ray tube. Bearings are indicated by a thin line trace running from the center of the CRT to a calibrated compass bezel around the outer edge. Signal-strength level and audio characteristics are monitored by the panel meter and speaker provided. The narrow "noise"-bandwidth of the video display produces a clear direction indication on the CRT even at minimal signal strengths.

Direction information displayed by the ADFS-320 is straightforward and easily interpreted, even by inexperienced operators. The unique circuit design employed eliminates the need for a manual "sense" function to resolve 180° ambiguity, and thus results in instant readout of bearings. Controls have been simplified by eliminating phase adjustments found on earlier O.A.R. models. The 320 system will operate on any frequency channel between 148 and 174 MHz without any adjustments except switching of crystals. Standard options available with the 320 system to increase operational flexibility include a programmable scanner for automatic monitoring of 1 to 10 pre-set frequency channels, and a digital synthesizer that permits dialing in any desired frequency setting on one of the 10 channel positions instead of changing crystals.

The Model ADFS-320 system uses all solid state electronics (except CRT) and features compact, rugged construction for field use. The receiver operates from unregulated 12VDC power. 110VAC, 220VAC, and 24VDC power options are available as well as special antenna arrays for installation on land vehicles and aircraft (limited to ± 1 to ± 2% bandwidth coverage at present time). Accessories include a swivel type mounting base for the receiver chassis, a hood (light shield) for the CRT display, and a digital bearing readout unit with BCD and/or analog outputs (Model DBR-410).

ADF designs similar to the Model 320 can be furnished by O.A.R. for coverage of other V.H.F. and U.H.F. bands.



- COMPLETE COVERAGE OF 148 TO 174 MHz PUBLIC SERVICE/GOVERNMENT FREQUENCY BANDS
- "TRUE-DIRECTION" READOUT OF RELATIVE COMPASS BEARINGS ON CRT DISPLAY
- SIMPLIFIED OPERATING CONTROLS
- INSTANT RESPONSE TO SHORT SIGNAL TRANSMISSIONS
- SENSITIVE RECEPTION IN HIGH NOISE ENVIRONMENTS
- CRYSTAL TUNING WITH SYNTHESIZER AND SCANNER OPTIONS
- DC OR AC POWER/FIXED-STATION, SHIP, AUTO, AND AIRCRAFT ANTENNA MOUNTS/DIGITAL READOUT ACCESSORY

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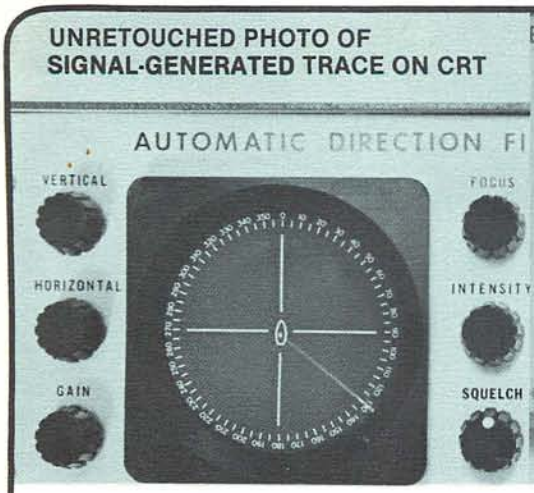
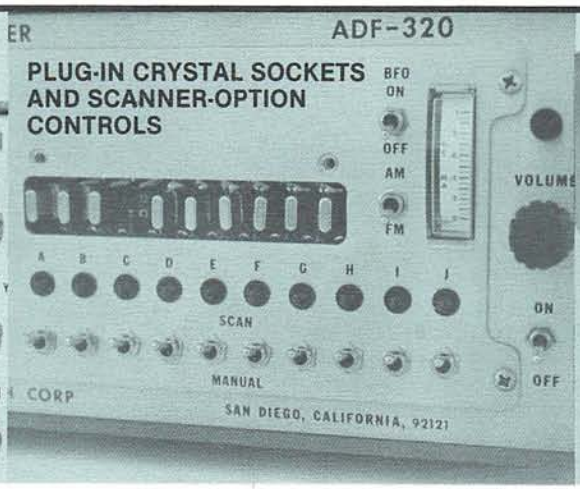
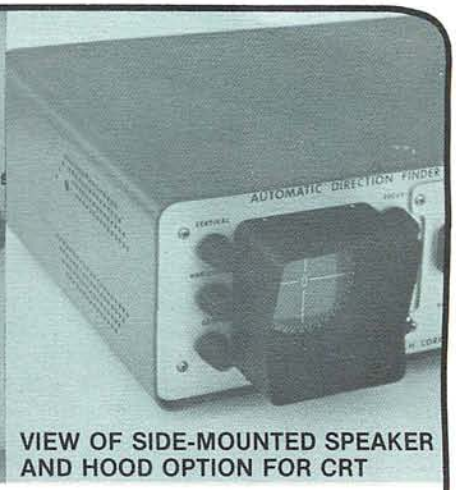


UNRETOUCHED PHOTO OF SIGNAL-GENERATED TRACE ON CRT

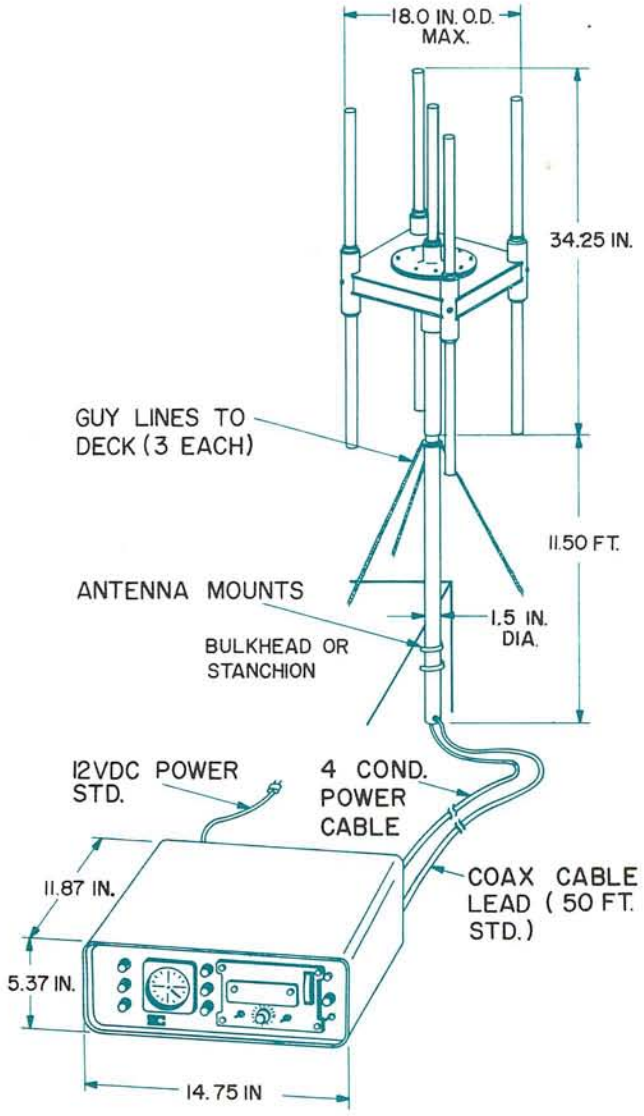


PLUG-IN CRYSTAL SOCKETS AND SCANNER-OPTION CONTROLS



VIEW OF SIDE-MOUNTED SPEAKER AND HOOD OPTION FOR CRT

ADCOCK ANTENNA & MAST ASSEMBLY SHIPBOARD OR FIXED STATION



ADF-320 RECEIVER INDICATOR UNIT

SPECIFICATIONS

SYSTEM PERFORMANCE

System Bandwidth:	148 to 174 MHz.
Modulation Detection:	Narrow-band F.M., A.M., and CW.
Operation:	Fully automatic, including sense-channel for "true direction" determination. Fixed non-rotating type antenna with no moving parts.
Output:	Unambiguous relative compass bearing between antenna axis and location of transmitter, full 360° coverage.
Display:	Narrow-line trace from center to outer edge of circular cathode ray tube, plus audio and field-strength indicators.
Response Time:	Instant display of signal transmissions 150 milli-seconds or longer in duration received from any direction.
Bearing Accuracy*:	± 1° at zero calibration heading, ± 2 to 3° on other headings, under clear line-of-sight conditions.
Signal Detection Range:	Nominally line-of-sight.
Receiver Sensitivity:	Better than 1 microvolt at input terminals for usable direction display.
Selectivity:	± 6.5 KHz at 6db, ± 22.5 KHz at 60db.
I.F. Bandwidth:	13 KHz.
Noise-Bandwidth [Display]:	Less than 100 Hz/channel.

[*Note: Accuracy stated is for ideal conditions. Adcock antenna arrays such as used with this system are subject to as much as a ± 4° error in addition to spec. above if significant horizontal polarization is present.)

RECEIVER/INDICATOR UNIT

Construction:	Epoxy coated aluminum cabinet with splash-proof sealing; lastest solid-state elements except CRT.
Cabinet Mounting Directions:	See drawing.
Assembly Weight:	Approximately 12 pounds.
Signal Indicators:	3-inch CRT with graduated compass rose; 3-inch speaker; field-strength meter.
Tuning:	
Standard—	10 plug-in crystal channels.
Optional—	a) 10-channel scanner (programmed by std. 10 crystals or 9 crystals plus synthesizer option).
	b) Frequency synthesizer, 148-174 MHz in 5 KHz increments with ± 2.5 KHz fine tuning (replaces 1 of 10 std. crystal channels).
Controls:	ON/OFF, crystal selection, BFO, and AM/FM detector switches; receiver volume, squelch, and CRT adjustments.
Power Requirements:	
Standard—	12VDC (10-14 VDC range) at 1.2 amperes.
Optional—	a) 110 or 220 VAC/50-60 Hz (in addition to std. 12 VDC).
	b)24/28 VDC (in lieu of std. 12VDC).
Fittings:	Power input and antenna cable connections on rear panel.
Accessories:	
Included—	12VDC power cable and std. 50 foot long set of 2 antenna cables (JA412CCJF or RG59U coax; specify type).
Optional—	a) Addl. antenna cable length b) Hood for CRT c) Mounting bracket for chassis d) DBR-410 digital bearing readout unit

ANTENNA

Type:	
Standard—	AA-363 Adcock array with 4 dipole elements, integral sense channel, and support mast with guy-lines (for fixed station or shipboard mounting; complete 148-174 MHz bandwidth coverage).
Special Order—	a) FAA-369 Adcock array with 4 monopoles and whiptype sense (for auto roof mounting; ± 1 to 2% bandwidth limitation).
	b) ADFA-317 crossed loops with integral/low-profile sense (for aircraft with retractable landing gear; ± 1 to 2% bandwidth limitation).
Construction:	Metallic with weatherproof sealing and corrosion-resistant coating.
Dimensions:	
Standard AA-363—	See drawing
Special FAA-369—	Flat plate approx. 22 inches square with 17 inches tall by 0.25 inches in diameter monopole and sense elements.
Special ADFA-317—	12.78 inches tall with 6.2 inches in diameter loop array and 8 inches square mounting plate.
Assembly Weight:	
Standard AA-363—	Approximately 15 pounds.
Special FAA-369 and ADFA-317—	Approximatley 5 and 7.5 pounds, respectively.

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