

RF-590 RECEIVER

INSTRUCTION MANUAL

HARRIS
RF COMMUNICATIONS



RF-590 Receiver

SECTION 1

INTRODUCTION

1.1 INTRODUCTION

This manual contains information necessary to install, operate, maintain, and repair the RF-590 HF-SSB Synthesized Receiver. This manual is subdivided into the five following sections.

- Section 1: Introduction. Contains an introduction to the RF-590. Includes RF-590 basic description, feature highlights, optional auxiliary equipment, etc.
- Section 2: Installation. Includes site selection, power requirements, mechanical installation, interconnect requirements, initial setup and power on, and a functional checkout.
- Section 3: Operation. Includes general operating instructions, control, and indicator descriptions.
- Section 4: Technical Description. Contains general receiver characteristics, receiver block diagram, AGC-gain distribution chart, and signal path and synthesizer functional descriptions.
- Section 5: Maintenance. Contains general repair techniques, component handling techniques, self-test (BITE) descriptions and error code listings, receiver performance test procedures, and component data sheets.

Also included, as subsections, are all subassembly and main chassis descriptions, schematics, parts lists, component location details, and subassembly test procedures.

1.2 GENERAL DESCRIPTION

The RF-590 is a high performance synthesized communications receiver designed to tune AM, CW, FM, USB, LSB, and ISB (optional) signals from 10 kHz to 30 MHz (in 1 Hz increments) utilizing digital tuning techniques. Up to 100 channels of frequency, detection mode, filter bandwidth, AGC mode, and BFO offset can be stored in memory, and recalled individually, or scanned sequentially or in groups. The receiver contains a comprehensive built-in test equipment (BITE) network which allows extensive microprocessor controlled self-testing to isolate faults at the modular level.

Manual tuning and channel selection is activated via a front panel touch pad or tuning knob. Operating parameters such as detection mode and filter bandwidth (typically: CW - .3 kHz, 1 kHz; AM - 3 kHz, 6 kHz, 16 kHz; USB/LSB - 3 kHz; FM-16 kHz.) and AGC mode (slow, medium, fast, off) are push-button selectable. Receiver operating parameters and self-testing results are displayed on two front panel

numeric and alphanumeric displays. Full remote control capability is accomplished with an optional remote control system compatible with MIL-STD-188C, EIA Standard RS-232-C, or RS-422 formats.

The rear panel contains BNC 50 ohm connectors for the following inputs/outputs: RF antenna input, filtered 455 kHz IF output, unfiltered 455 kHz DSB output, ISB output, 1, 5 or 10 MHz frequency standard input, and frequency standard output. Additionally, other connectors allow access to 600 ohm line audio outputs, AGC input or output, speaker mute, local control lines, and other functions (see table 2-2 and 2-3).

The receiver is entirely modular in design to facilitate maintenance. The unit may be rack mounted with the following considerations.

- Dimension — 5.25H x 19.0W x 20.5D inches maximum (13.3H x 48.3W x 52.1D, cm)
- Weight — 40 pounds (18.1 kg)
- Power requirements — 115/230 Vac, 47-420 Hz, 75 watts typically, 85 watts maximum (with all options)

Note that a complete listing of all RF-590 specifications may be found at the beginning of this manual.

1.3 RF-590 RECEIVER FEATURES

The RF-590 is a modern high performance HF-SSB receiver utilizing the latest device technology and circuit techniques. The use of a microprocessor as the central control unit allows a cost effective design offering many versatile features. These features include:

- Synthesized digital tuning and readout in 1 Hz steps from 10 kHz to 30 MHz.
- Keyboard control
- Continuous single knob tuning
- Full remote control by digital asynchronous commands with a wide variety of standards and rates.
- Built-in test equipment (BITE) fault isolation to replaceable module level.
- Preset channel memory — Up to 100 front panel programmable channels can be stored in a nonvolatile memory. Frequency and mode are stored in memory for instant recall.
- Channel scanning — Automatically searches preprogrammed channels, with a selectable dwell time.

- Synthesized variable BFO – ± 9.99 kHz in 10 Hz steps.
- Diversity capability – With external RF-575 Diversity Combiner.
- Multimode operation – Including USB, LSB, CW, AM, and FM. (ISB and FSK optional).
- Squelch – Syllabic rate (AM, SSB, CW) or noise operated (FM), operated from a common front panel control.
- Plug in subassemblies – All subassemblies can be replaced using common hand tools.

1.4 COMPATIBILITY

The RF-590 HF Receiver is compatible with the following RF products.

- RF-551A Preselector (requires a RF-553-01 option)
- RF-575 Quad Diversity Combiner
- RF-130, RF-1130, and RF-745 Transmitters

1.5 CUSTOMER OPTIONS

Table 1-1 is a list of RF-590 optional equipment.

Table 1-1. RF-590 Optional Equipment

Number	Name	Part No.	Description	Publication No.
RF-518	Earphones	724-0075	For reduction of ambient noise levels or to utilize private listening.	None
RF-553-01	Remote Control Interface	10073-6910	Permits the RF-590 to remotely control the RF-551A Preselector.	SU-10073-6911 (supplement)
RF-567	High Impedance RF Input Transformer	1920-1450	Improves reception when untuned antennas are used.	1920-1452 (Instruction Sheet)
RF-575	Diversity Combiner	7634-0000	Selects audio from the receiver with the strongest signal.	7634-1030
RF-592	Remote Control	10073-6210	Provides complete remote control of Frequency, Mode IF/BW,	SU-10073-0017 (supplement)

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Table 1-1. RF-590 Optional Equipment (Cont.)

Number	Name	Part No.	Description	Publication No.
RF-592 (Cont.)			AGC Speed, BFO, BITE/Fault Status, Scan, RF/IF Gain Control, Channel Select and Channel Load.	
RF-593	High Stability Frequency Option	759-3906	1 MHz frequency standard with proportional temperature control. 1 part in 10 ⁸ stability.	10073-0020 A12/A21 section
RF-594-01	Rack Mount	10073-0055	Includes slides and related hardware for rack mounting applications.	10073-0020 (installation section)
RF-594-02	Desk Top Case	10073-0045	Enclosed case for desk top installation.	10073-0020 (installation section)
RF-594-03	Stack Mount	10073-0035	Includes hardware for standard stack mounting applications.	10073-0020 (installation section)
RF-595-01	ISB Option	10073-6310	Allows simultaneous operation in USB and LSB modes.	SU-10073-0018 (supplement)
RF-595-02	Delay Compensated ISB Option	10073-6360	Delay compensated filtering for critical data communications. Provides less than 500 u/sec. differential time delay from 400 Hz to 2900 Hz. Offers less than 2 dB ripple in the 300 Hz to 3 kHz passband.	SU-10073-0022 (supplement)
RF-596-01	Half Octave Filter	10073-6410	Offers filtering protection from 2 to 30 MHz in 8 half-octave band filters. Also, for frequencies below 2 MHz, Low Pass filtering is provided.	SU-10073-0019-1 (supplement)
RF-596-02	Digital Tuned Bandpass Filter	10073-6510	Provides over 20 dB of selectivity at ±10% of tuned frequency. Reduces interference from close transmitters.	SU-10073-0019-2 (supplement)

Table 1-1. RF-590 Optional Equipment (Cont.)

Number	Name	Part No.	Description	Publication No.
RF-597	Noise Blanker	10073-6800	The Noise Blanker removes impulse type noise from received signals. Adjusts automatically to received signal level changes.	10073-6808 (supplement)
RF-598	4ISB Option	10141-5010	Provides simultaneous operation on four independent sidebands.	10141-5020
RF-651-02	Receiver Multicoupler (2 port)	RF-651-002	Permits operation of two receivers from a common antenna. At the same time, it provides isolation between receivers.	7733-000
RF-651-04	Receiver Multicoupler (4 port)	RF-651-004	Same as RF-651-002, but with 4 ports.	7733-000
RF-651-08	Receiver Multicoupler (8 port)	RF-651-008	Same as RF-651-002, but with 8 ports.	7733-000

1.6 SPECIALIZED REQUIREMENTS

Harris/RF Communications Group Systems Division specializes in translating exacting customer needs into complete systems packages. No job is too small or too large. Contact the following for specialized requirements.

Harris Corporation/RF Communications Group
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