

THE A2
RECEIVER SYSTEM

2-kc to 1200-mc

one million to one
frequency reception,
portable, battery operated
with visual display unit

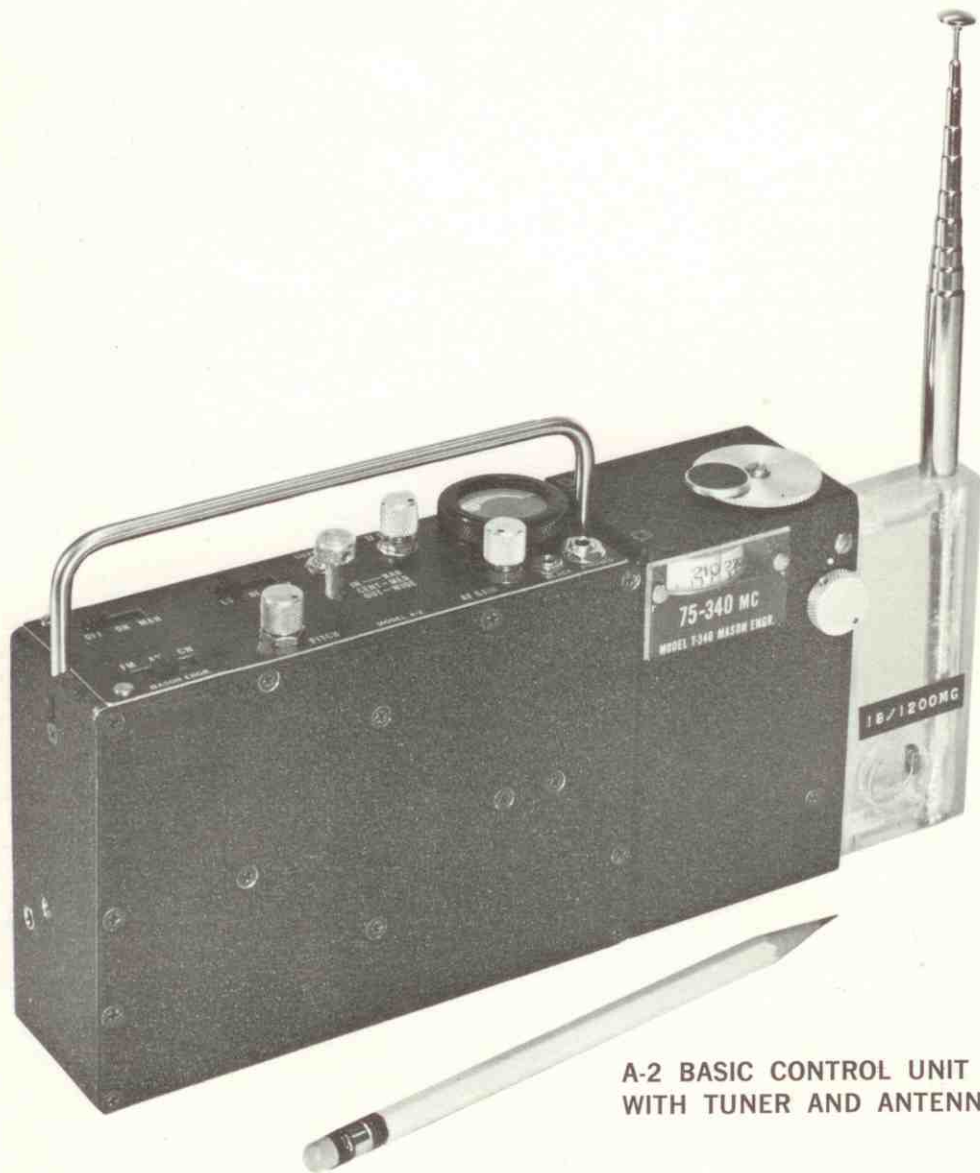


F.G. MASON ENGINEERING INC.

THE F. G. MASON ENGINEERING COMPANY offers a broad range of engineering services and facilities for research, manufacturing and testing all portions of electromagnetic receivers from the antenna through audio and visual outputs.

The company designs and manufactures miniature, solid-state, wide-range, battery-powered surveillance receiving equipment covering the LF range up to UHF. This equipment is widely used throughout the United States.

At present the company is devoting major research efforts to the development of receivers for microwave frequencies and a miniature, general-purpose oscilloscope.



**A-2 BASIC CONTROL UNIT
WITH TUNER AND ANTENNA**

DESIGN FEATURES

PORTABILITY

The Mason A-2 Receiver answers the need for a truly portable, wide-band, surveillance receiver for use in remote areas as well as on aircraft, ships, or other vehicles.

In the Mason A-2 Receiver, the conventional heavy, bulky main chassis has been eliminated. Its building block design permits the complete system to be disassembled easily to fit into a small carrying case.

The small tuning units, each covering a different frequency range, a visual monitor unit, and external power sources are connected simply by plugging them into the basic unit. To change the frequency range, the appropriate tuner unit can be substituted quickly, in a matter of seconds.

Because of their small size and light weight, the tuner units of the A-2 Receiver System can be hand-held while in use and connected by a cable to the basic control unit, which can be mounted on the operator's belt.

To save battery wear, the Receiver System can be used directly from any AC current outlet.



AUDIBLE AND VISUAL OUTPUTS

Lightweight headsets are supplied for normal listening to AM, FM, and CW signals. A signal strength meter is included for visual indication of relative strength of the signals being monitored.

A unique visual monitor aids greatly in signal searching applications. The tuned frequency and adjacent spectra are scanned and presented on the display tube. Signals thus monitored can be analyzed for relative signal strength, type of modulation, and other technical information.

Each tuner unit has a direct frequency-reading tape dial. The dials are individually calibrated.



FASTER AND WIDER FREQUENCY COVERAGE

A total of eleven tuner units cover a frequency range from 2-kc to 1200-mc. Each tuner unit has its own tuning element, specialized circuitry, and calibrated dial. This permits maximum sensitivity and selectivity without compromise. Having separate tuning, control, power and output units allows for simple, in-the-field changes for repair, special setups and future replacement or additional units. As an added feature, antennas are interchangeable and can be plugged into the tuner receptacle.

DESIGN FEATURES

PORTABILITY

The Mason A-2 Receiver answers the need for a truly portable, wide-band, surveillance receiver for use in remote areas as well as on aircraft, ships, or other vehicles.

In the Mason A-2 Receiver, the conventional heavy, bulky main chassis has been eliminated. Its building block design permits the complete system to be disassembled easily to fit into a small carrying case.

The small tuning units, each covering a different frequency range, a visual monitor unit, and external power sources are connected simply by plugging them into the basic unit. To change the frequency range, the appropriate tuner unit can be substituted quickly, in a matter of seconds.

Because of their small size and light weight, the tuner units of the A-2 Receiver System can be hand-held while in use and connected by a cable to the basic control unit, which can be mounted on the operator's belt.

To save battery wear, the Receiver System can be used directly from any AC current outlet.



AUDIBLE AND VISUAL OUTPUTS

Lightweight headsets are supplied for normal listening to AM, FM, and CW signals. A signal strength meter is included for visual indication of relative strength of the signals being monitored.

A unique visual monitor aids greatly in signal searching applications. The tuned frequency and adjacent spectra are scanned and presented on the display tube. Signals thus monitored can be analyzed for relative signal strength, type of modulation, and other technical information.

Each tuner unit has a direct frequency-reading tape dial. The dials are individually calibrated.



FASTER AND WIDER FREQUENCY COVERAGE

A total of eleven tuner units cover a frequency range from 2-kc to 1200-mc. Each tuner unit has its own tuning element, specialized circuitry, and calibrated dial. This permits maximum sensitivity and selectivity without compromise. Having separate tuning, control, power and output units allows for simple, in-the-field changes for repair, special setups and future replacement or additional units. As an added feature, antennas are interchangeable and can be plugged into the tuner receptacle.

SPECIFICATIONS

OVERALL RECEIVER SPECIFICATIONS:

Frequency Range 2kc to 1200mc

Sensitivity Better than 3uv for 10db of $\frac{S+N}{N}$

Reception Type AM, FM, CW demodulated (other signals detected but not demodulated)

Gain Sufficient to read-out thermal noise

Audio Frequency Response 300 to 3000 cps

Visual Scanning 3% of center frequency

Power Consumption 1.5 watts all circuits battery operation

A-2 BASIC CONTROL UNIT / High Frequency

FUNCTIONS: IF amplifiers, detectors, AF amplifier, S-meter, battery power source, BFO.

SPECIFICATIONS:

Size 5 $\frac{5}{8}$ " x 4" x 1 $\frac{1}{4}$ "

Weight Less than 3 lbs.

Intermediate Frequency 23.5 mc

IF Bandwidths 12 kc, 90 kc, 200 kc (other bandwidths on special order)

IF Filters 2 Crystal, one LC

Audio Output Power 30 mw at 1000 ohms impedance

Power Internal batteries provide 35 hr. running time (15 hrs. when visual monitor is used)

Inputs IF (50 ohms at 23.5 mc), external power

Outputs Audio, —18 volts dc, second detector, —12 volts dc regulated

OPERATING CONTROLS INDICATORS:

FM-AM-CW Function Switch Selects AM, FM and CW operating modes

OFF-ON-MANUAL Operation Switch ON position applies power and activates AGC; MANUAL position disables AGC and allows gain to be manually controlled; OFF position disables all power

NAR-MED-WIDE IF Bandwidth Switch Selects desired IF bandwidth

IF GAIN Control Adjusts IF gain when Operation Switch is in MANUAL position

AF GAIN Control Adjusts audio output gain

PITCH Control Varies pitch of CW signal in CW operating mode

LO-HI-TEST Switch Changes meter range for low and high signal strengths. TEST position checks battery voltage

S-Meter Indicates signal strength when LO-HI-TEST Switch is in LO or HI positions;

Indicates battery voltage in TEST position

UNITS ACCEPTED Battery pack, DC regulated voltage supply, visual monitor, T-series tuners and LFB-1 Basic Control Unit

LFB-1 BASIC CONTROL UNIT / Low Frequency

FUNCTIONS: IF amplifier, BFO, detector

SPECIFICATIONS:

Size 4" x 1 $\frac{7}{8}$ " x 1 $\frac{1}{4}$ "

Intermediate Frequency 455 kc

IF Bandwidths 500 cps, 2 kc, 10 kc (other bandwidths on special order)

IF Filters 2 ceramic, 1 mechanical

Inputs IF (50 ohms, 455 kc for TLF-series tuners), sweep drive voltage, 23.5 mc IF feed-in for T-series tuners, power interlock

Outputs Second detector, 23.5 mc IF feed-out for T-series tuners (no amplification), power interlock, AGC, power, sweep drive voltage

OPERATING CONTROLS:

NAR-MED-WIDE Bandwidth Switch Selects desired IF bandwidth

BFO-PITCH-OFF Control Combination pitch control and BFO switch

UNITS ACCEPTED: A-2 Basic Control Unit, LFA-1 Basic Control Unit, TLF-series tuners*, S-1 Visual Monitor*, T-series tuners**. NOTE: When LFB-1 is mounted on A-2 all tuners are accepted by this combination without removal of LFB-1.

* when used with A-2 or LFA-1

** when used with A-2

LFA-1 BASIC CONTROL UNIT / Low Frequency

FUNCTIONS: Audio amplifier, S-meter, battery power source

SPECIFICATIONS:

Size 4" x 3" x 1 $\frac{1}{4}$ "

Weight 2 lbs.

Audio Output Power 30 mw into 1000 ohms impedance

Power 35 hrs. internal battery (15 hrs. with visual monitor operation)

Inputs Audio, external power

Outputs Audio, —12 volts dc regulated, —18 vdc

OPERATING CONTROLS INDICATORS:

OFF-ON Power Switch Turns power on or off

LO-HI-TEST Meter Switch Changes meter range for low and high signal strengths and tests battery voltage

AF GAIN Control Controls audio output

S-Meter Indicates signal strength and battery voltage

UNITS ACCEPTED: TLF-series tuners*, external battery pack, DC regulated power supply, S-1 visual Monitor, LFB-1 Basic Control Unit.

*when used with LFB-1

TUNER UNITS

TLF-SERIES (used with LFB-1 Basic Control Unit)

FUNCTIONS: Local oscillator, mixer, RF, dial

SPECIFICATIONS:

Size 4" x 1 $\frac{1}{2}$ " x 1 $\frac{1}{4}$ "

Weight 0.6 lbs.

Frequency Range 2 kc - 4.5 mc in 6 tuners

Sensitivity Better than 2 uv for 10 db $\frac{S+N}{N}$

IF Frequency Output 455 kc

Tuning Variable capacitance

Bandspread Electrical

Tuning Dial 10" calibrated dial

Antenna Tuned internal ferrite directional antenna coil

Other Antennas Whip, power line, long wire

T-SERIES (used with A-2 Basic Control Unit)

FUNCTIONS: Local oscillator, mixer, RF, dial

SPECIFICATIONS:

VHF Size 4" x 2 $\frac{1}{2}$ " x 1 $\frac{1}{4}$ "

Weight 1 lb.

UHF Size 5" x 2 $\frac{5}{8}$ " x 2 $\frac{1}{4}$ "

Weight 1 $\frac{1}{2}$ lbs.

Frequency Range 50 kc - 1200 mc in 6 tuners

Bandspread Electrical

Sensitivity Better than 3 uv for 10 db $\frac{S+N}{N}$

IF Frequency Output 23.5 mc

Tuning Variable inductance

Tuning Dial At least 23" calibrated tape dial

Antennas Whip, power line, long wire

All tuner units are small enough to be hand-held while operating remotely from the basic control unit.

S-1 VISUAL DISPLAY UNIT

FUNCTIONS: Provides spectrum display of signals adjacent to tuned frequency

SPECIFICATIONS:

Size 10" x 2" x 5 $\frac{1}{4}$ "

Weight Less than 5 lbs.

Sensitivity 3 uv with tuner and basic control unit

Sweep Width Not less than 3% of center frequency

Sweep Rate 6 cps and 60 cps

Max. Resolution 12 kc @ 4.5 mc to 1200 mc (2 kc with A-2 and T-5 tuner); 500 cps @ 2 kc to 4.5 mc (using LFB-1 and TLF-series tuners)

Screen 1" x 3" flat face, green phosphor

Output Sweepdrive voltage plug to electrically sweep tuner local oscillator

Auxiliary Outputs Sweep output jack and signal output jack for use in auxiliary scope

Inputs 18 volts primary power, detected signal

Power Requirement —18 vdc, 30 ma from A-2 or LFA-1 unit; internal, 50 hr. filament battery, 1.4 volts @ 140 ma (total all power 0.8 watts)

OPERATING CONTROLS:

OFF-ON Power Switch Applies or disables —18 vdc and filament battery

SWP WIDTH Control Controls portion of signal spectrum scanned

SWP GAIN Control Controls height of display

SIG GAIN Control Controls amplitude of signal applied to display

FILT-ON-OFF Sweep Switch OFF position disables sweep; ON position activates sweep and allows signal spectra viewing; FILT position enables video filter to screen out unwanted noise for better signal viewing

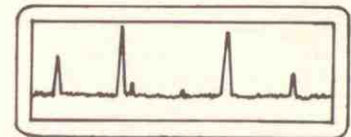
SLOW-FAST SWP RATE Switch Has SLOW and FAST positions to control scan speed (SLOW position allows intelligible listening on earphones)

SIG CENT Control Positions display in direction of center frequency received

SWP CENT Control Positions display in direction of sweep frequency

FOC Control Focuses beam on screen

INT Control Controls brightness of display



SPECTRUM DISPLAY

