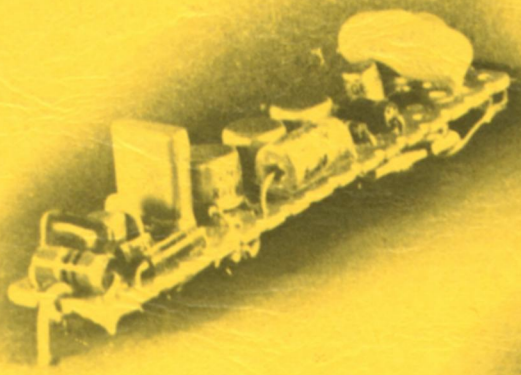
TELEMETRY KITS



ASTRO COMMUNICATIONS
3 COLERIDGE PLACE / PITTSBURGH, PA. 15201

Cat. 711
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The electrical kits described in this catalogue provide the mature model rocketeer with a sophisticated means of extending his hobby to a challenging and meaningful form of activity. They are being used by high school students and NASA engineers alike, for experiments ranging from the measurement of the spin rate of a rocket to the study of meteorology from a gas balloon.

The first prototype of the Foxmitter was flown over four years ago. We have been continually improving it and expanding the scope of model rocket instrumentation ever since. This catalogue offers a wide variety of kits at the lowest possible prices. We hope that you find what you want, and join the group that has experienced the thrill of hearing their own telemetry signals coming from the sky.

Sincerely,

Richard Q. Fox

Marvin B. Lieberman

Richard Q. Fox

Marvin B. Lieberman

THE TELEMETRY SYSTEM

The Astro Communications line of telemetry kits is engineered with the user in mind. All of the transmitters operate on the 27 megacycle Citizen's Band because receivers for this frequency are readily available. The government allows operation of Astro Communications transmitters on this frequency without the use of a license. The circuitry has been carefully designed to avoid bulky transformers and components which require adjustments by the user. The size of the components and their cost have been carefully balanced to provide an optimum device for use in model rocketry.

The basic Foxmitter is a versatile instrument which is capable of converting a number of different types of sensor inputs into an easy-to-interpret telemetry signal. When coupled with one of the plug-in-modules listed in this catalogue, the Foxmitter will transmit an audio signal to the ground, for reception by a walkie-talkie. Typically the rocketeer will tape record the transmission as it is received, and then play it back later for interpretation.

FOXMITTER

The Foxmitter is the heart of our Model Rocket Telemetry System. At $14.95 it is a bargain that can not be matched anywhere, even if the components are purchased individually. The basic Foxmitter kit contains everything you will need to build a working transmitter (except for the construction tools and a receiver). The Foxmitter is a transmitter which operates on the 27 megacycle Citizen's Band at a power of 100 milliwatts. When used with the plug-in sensor modules described in this catalogue, it produces an amplitude modulated radio frequency signal. The signal can be received on the ground by a walkie-talkie or a similar Citizen's Band receiver. The receiver will emit an audio tone which will rise and fall with changes in the signal from the sensor module.

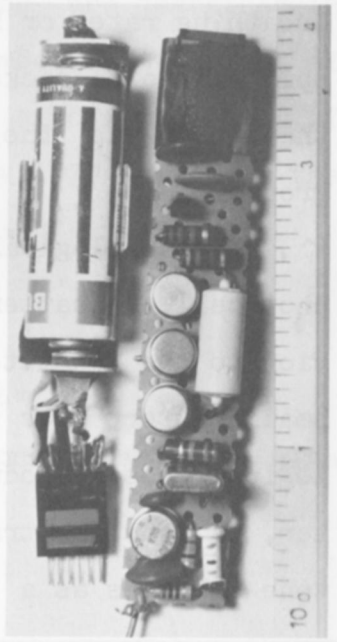
The Foxmitter kit includes the components for the "Beacon Tone Module" which causes the Foxmitter to transmit a steady audio tone to the ground. This tone can be used for testing the transmitter, and for recovering rockets carrying the Foxmitter.

The Foxmitter itself is described in detail in the June 1970 issue of Model Rocketry Magazine. The

TRANSMITTER

circuit consists of an audio oscillator, a three stage amplifier-modulator, and a single transistor r.f. oscillator. The antenna is a 33 inch piece of wire which is allowed to hang behind the rocket.

The kit contains 5 transistors, 4 resistors, 6 capacitors, 2 inductors, a battery, a crystal, a connector for plugging in the modules, a vector board, and a battery holder.



SPECIFICATIONS:

Power Output: 100 milliwatts

Frequency: Any one channel of the 27 m.c. Citizens Band.

Range: One mile in the air. Less on the ground.

Size: 7" x 3/4" x 3/4" including battery and a module.

Weight: Approximately 1/2 ounce without battery.

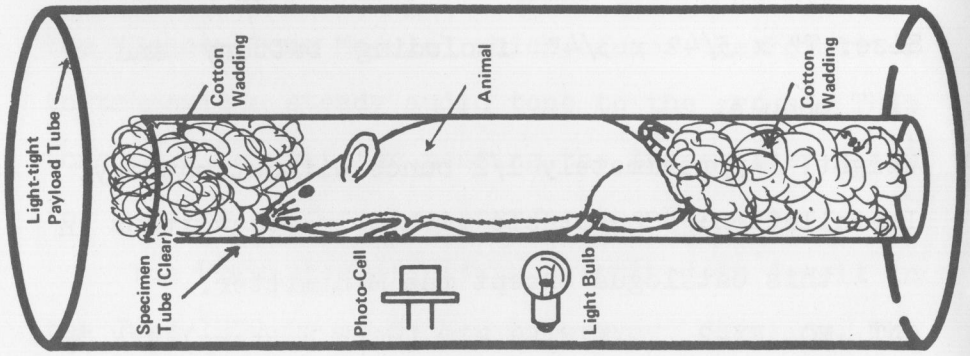
Installation: Compatable with all other items in this catalogue except the Minimitter.

CAT. NO. FX-2 FOXMITTER KIT (with battery) $14.95

BIOLOGICAL and SPIN RATE SENSOR

The Biological Sensor Module is unquestionably the most versatile accessory for the Foxmitter. This one sensor can be used to measure the breathing rate or heartbeat of an animal, or the spin rate of a rocket. In addition, the signal of the sensor is the easiest to interpret on the ground.

The Biological Sensor kit consists of a photocell, a battery holder, a plug for connection to the Foxmitter, a small light bulb, and a small battery for the light bulb. When the Biological Sensor Module is plugged into the Foxmitter, a tone is transmitted to the ground. This tone changes as a function of the intensity of

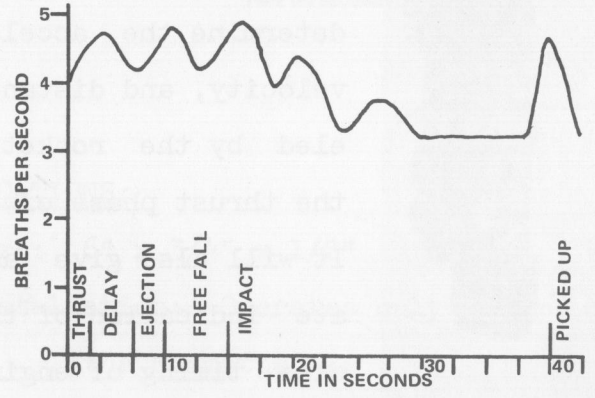


the light striking the photocell. If the light has traveled through an animal's body first, then the tone transmitted by the Foxmitter will rise and fall with each beat of the animal's heart. Applications of the Biological Sensor are described in detail in the August and September 1970 issues of Model Rocketry Magazine. The circuit diagram of the module is shown in the July 1970 issue of the magazine.

SPECIFICATIONS:

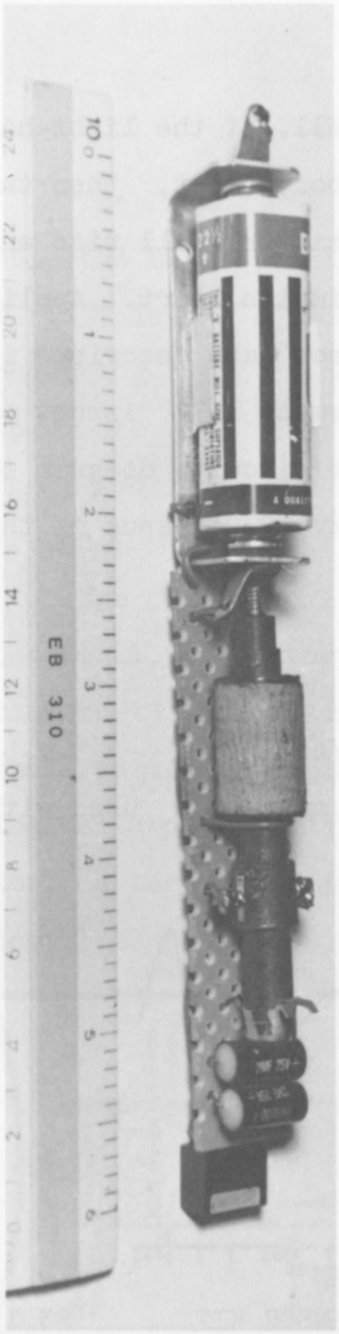
Size: 3 1/4" x 1/2" x 3/4"

Installation: Operates only when used with the Foxmitter-2.



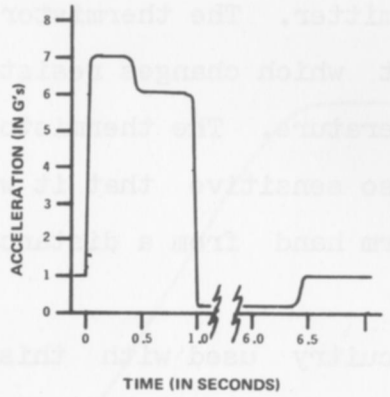
CAT. NO. PS-1 BIOLOGICAL SENSOR KIT $3.15

ACCELEROMETER SENSOR



The Accelerometer Sensor Module provides the serious experimenter with a means of obtaining quantitative data about the performance of his rocket. The module allows the Foxmitter to transmit to the ground a tone whose frequency is a function of the acceleration which the module is experiencing. The data transmitted from this module can be interpreted to determine the acceleration, velocity, and distance traveled by the rocket during the thrust phase of flight. It will also give an accurate indication of the precise timing of engine cutoff, ejection, and landing.

The Accelerometer Sensor Module is described in detail in the September 1970 issue of Model Rocketry Magazine. The kit includes an inductor, two capacitors, a spring, a mounting board, a battery holder, and a connector for plugging the sensor into the Foxmitter.



SPECIFICATIONS:

Size: 6" x 3/4" x 1/2"

Installation: Operates only when used with the Foxmitter-2.

CAT. NO. AS-1 ACCELEROMETER KIT $3.25

TEMPERATURE SENSOR

The Temperature Sensor Module allows the Foxmitter to transmit a temperature reading to the ground. The temperature information can be used to study meteorology, or to measure the temperature of various parts of the rocket during its flight.

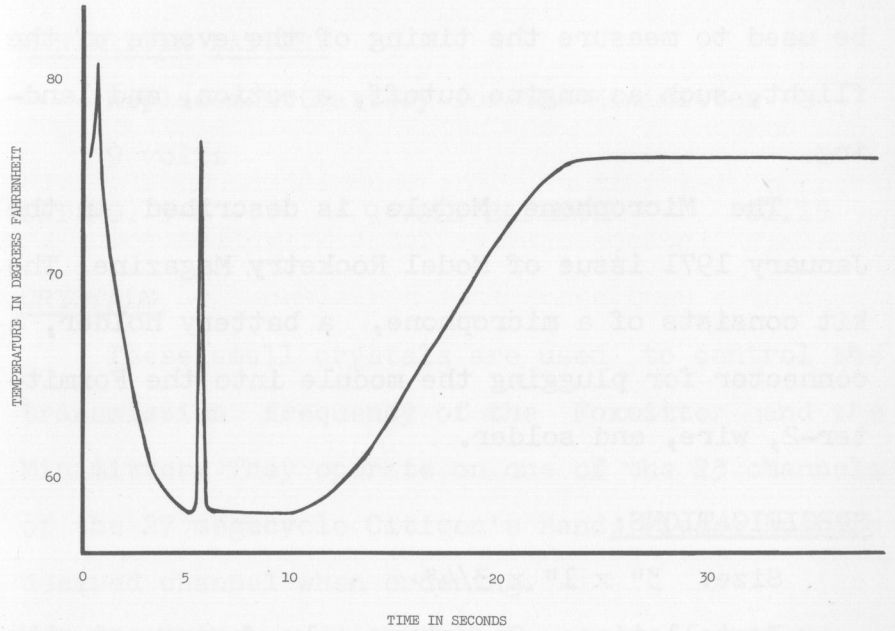
The module consists of a bead thermistor, a battery holder, and a connector to plug the sensor into the Foxmitter. The thermistor is an electrical component which changes resistance as a function of temperature. The thermistor supplied with the kit is so sensitive that it will detect the heat of a warm hand from a distance of one-half inch.

The circuitry used with this module allows the Foxmitter to transmit an audio tone which is proportional to the temperature being sensed. If this signal is tape recorded, it may be played back and converted to quantitative data on the temperatures measured during the flight. The August 1970 issue of Model Rocketry Magazine describes the circuit, some uses, and some examples of the data.

SPECIFICATIONS:

Size: 3 1/4" x 1/2" x 3/4"

Installation: Operates only when used with the Foxmitter-2.



CAT. NO. TS-1 TEMPERATURE SENSOR KIT $3.00

MICROPHONE MODULE

The Microphone Module allows the Foxmitter to transmit the sounds of the flight to the ground. The most spectacular use of this device has been the recording of Sound Color Movies from a model rocket by combining the Foxmitter Microphone Module with the Estes Cineroc. The module can also be used to measure the timing of the events of the flight, such as engine cutoff, ejection, and landing.

The Microphone Module is described in the January 1971 issue of Model Rocketry Magazine. The kit consists of a microphone, a battery holder, a connector for plugging the module into the Foxmitter-2, wire, and solder.

SPECIFICATIONS:

Size: 3" x 1" x 3/4"

Installation: Operates only when used with the Foxmitter. (Please note that this module is not sensitive enough to detect the heartbeat of animals.)

CAT. NO. MS-1 MICROPHONE MODULE KIT $2.50

COMPONENTS

FOXMITTER BATTERY

Replacement battery for the Foxmitter.

22.5 volts

CAT.NO. Y-15 22.5 VOLT BATTERY $1.50

MINIMITTER BATTERY

Replacement battery for the Minimitter

9 volts

CAT.NO. Y-6 9 VOLT BATTERY $1.15

CRYSTALS

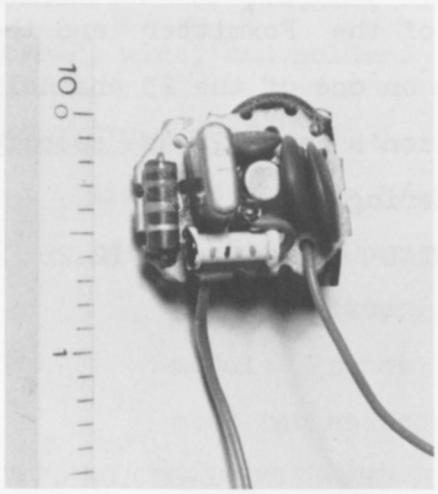
These small crystals are used to control the transmission frequency of the Foxmitter and the Minimitter. They operate on one of the 23 channels of the 27 megacycle Citizen's Band. Please specify desired channel when ordering.

CAT.NO. XTAL-1 CRYSTAL $2.25

MINIMITTER SYSTEM

The Minimitter is a beacon transmitter which is designed to aid in the recovery of important rockets. This very small device is carried aloft as insurance against loss of the rocket or its payload. The Minimitter measures only 3/4" x 3/4" x 1 3/4", and it weighs less than an ounce.

A rocket carrying a Minimitter is recovered by using a walkie-talkie equipped with a direction sensitive antenna, and the Minimitter Decoder. The Decoder converts the signal of the Minimitter into an audio frequency tone which is received by the walkie-talkie. By rotating the direction sensitive antenna, the direction of maximum signal strength, and the rocket, will be found.



The Decoder does not require any physical connections to the receiver. The only requirement is that the receiver have an i.f. frequency of 455 kilocycles. Most quality walkie-talkies fulfill this requirement. The direction sensitive antenna supplied with the kit is an 8 foot loop of wire, which should be connected to the existing antenna of the receiver.

The Minimitter, Decoder, and direction sensitive antenna are described in the October 1970 issue of Model Rocketry Magazine. The Minimitter kit consists of a resistor, 5 capacitors, a transistor, two inductors, a crystal, a battery, and a mounting board.

SPECIFICATIONS:

Power Output: 100 milliwatts on any one channel of the 27 megacycle Citizen's Band.

Range: One mile in air. Less on the ground.

Size: 1 3/4" x 3/4" x 3/4"

Weight: Less than an ounce.

Signal: Unmodulated continuous wave.

Installation: Must be used with the Decoder and a Citizen's Band receiver with an i.f. frequency of 455 kilocycles.

CAT.NO. MX-1	MINIMITTER AND DECODER KITS	$10.95
CAT.NO. MX-2	MINIMITTER KIT ONLY	$ 7.40
CAT.NO. DX-1	DECODER KIT ONLY	$ 3.95

NORMAL MAILING PROCEDURE:

Unless specified otherwise, Astro Communications ships all orders by Third Class Mail, post paid.

FIRST CLASS MAIL:

If you wish your order to be shipped by First Class Mail, mark the order form appropriately. Include an additional five cents for each dollar or fraction of a dollar of your purchase. If your order amounted to $20.35, you would include an additional $1.05 to cover the First Class postage and handling.

C.O.D.:

Astro Communications will accept C.O.D. orders, but the customer will be expected to pay the cost of the C.O.D. charge, and the cost of the postage, in addition to the amount of the order.

TAX:

Pennsylvania residents must include 6% sales tax when calculating the cost of their order.

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Catalogue Number	Quantity	Name of Item	Price Ea.	Total

This Space for Office Use

Total for Goods	
Tax (Pa. Residents)	
Extra Postage for 1st Class Mail	
Total	

Prices are subject to change without notice.

TELEMETRY KITS

The Astro Communications line of telemetry kits opens up new projects and experiments to the model rocketeer, the kits or balloon enthusiast, and the model airplane hobbyist. By supplying a complete kit of parts, instructions, and data reduction information, the kits have simplified a field which has been beyond the reach of the average experimenter.

We suggest that you have some previous experience in electronics before purchasing one of our products. The kits can be successfully built by beginners, however some knowledge of electronics construction techniques is recommended. The kits contain adequate assembly instructions, but not the step by step diagrams which may be needed by those who have little knowledge of electronics. We can not assume responsibility for the failure of an assembled kit, nor can we supply repair service for assembled kits.

LOW COST

Since we buy electronic components in large quantities, we can generally offer our kits for less than the cost of the parts when purchased separately. In addition, we save you the time needed to hunt for components, many of which are difficult to find. We feel that the wide acceptance of the Foxmitter among model rocketeers indicates its value as a miniature telemetry transmitter.

APPLICATIONS

Spin Rate

Animal Breathing Rate

Animal Heart Beat Rate

Meteorology

Engine Casing Temperature

Acceleration and Velocity

Movie Sound Track

Timing of Flight Events

Rocket Recovery

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