

SPECIFICATION AND INSTRUCTION SHEET

FOR THE F & M MIDAS - 2 RECEIVER

Introduction:

The Midas receiver is a ten-channel, superhetrodyne, simultaneous tone receiver using silicon transistors throughout. It is a custom design for R/C use, resulting from the most rigorous and extensive engineering program ever undertaken for model equipment. The Midas is an extremely sensitive receiver, yet one capable of rejecting the many spurious and unwanted signals to operate simultaneously with equipment operating on adjacent R/C channels but will also provide protection from voice communications which may be only 10 kc away.

Channel discrimination is accomplished by use of a resonant reed relay. The reed relay terminates into color coded wires to match the Bonner transmits servo. The Midas uses no relays other than the reed relay. Switching is accomplished by transistors incorporated within the servo unit. This system assures reliability beyond any system produced in the past.

Design Specifications:

Selectivity: 3 kc Nominal (6db)
16 db at 10 kc
80 db at 50 kc

Sensitivity: Better than 2 micro volts

Audio response frequencies: 300 cps minimum, 700 cps maximum

Temperature Operating Range: 0° F 175° F

Operating voltage: 6.2 volts Maximum, 4.8 volts minimum

Operating frequencies: 26.995 mc, 27.045 mc, 27.095 mc, 27.145 mc,
27.195 mc, please specify desired frequency with
order. Due to severe congestion on 27.255 mc, the
Midas will not be available on this frequency.

Physical Specifications:

<u>Weight</u>	<u>Length</u>	<u>Width</u>	<u>Height</u>
4½ oz.	2 7/8"	2"	1"

Case and cover: Aluminum, blue anodized.

Printed circuit board: Photoetched, 1 oz. bonded copper to glass epoxy
Tin lead protective finish.

Transmitter Requirements:

Due to the extreme selectivity of the Midas, it is absolutely necessary that the transmitter used be "on frequency". Only the F & M transmitters are guaranteed to operate the Midas. No guarantee is made concerning the operation of the Midas with any other transmitter.

General Remarks:

The R/C'r can be truly proud of his custom engineered Midas.

Compare the Following Features:

1. The rugged, well made and attractive case and cover.
2. The glass epoxy printed circuit board. The glass epoxy assures an unbreakable base even in sub-freezing temperatures.
3. Relay-less operation for maximum reliability.
4. The guaranteed temperature operating of 0° F to 175° F.
5. The extreme sensitivity, providing more useful range than most super-regenerative type receivers.
6. The extremely reliable local oscillator, featuring rigid stability without tuning coils and controlled by a precision quartz crystal.
7. The extremely sharp selectivity, assuring interference-free operation, to provide the best selectivity possible, the Midas contains 4 IF transformers producing selectivity equal to commercial receivers.
8. The absolutely stable circuitry free from oscillation producing regeneration even at high temperatures. Precision parts placement and printed circuit design aid in achieving this assured stability, in addition to rigorous circuit engineering.
9. The noise shielding of the mixer and IF stages accomplished by large "power filters" and unique printed circuit design. Everything possible has been done to eliminate actuator noise interference.
10. Advanced design in reed circuits producing the most positive simultaneous operation ever produced with less critical adjustments.
11. The high gain transistor detector (collector detection) and expensive transformer coupled audio amplifiers provide a high gain circuit.
12. The F & M exclusive AGC circuit, accomplished without the use of diodes or complex feedback networks, assures reliable, blocking-free close range operation.
13. The use of precision engineered printed circuitry without messy jumpers and the exclusive use of first quality American made components throughout assures a consistent and highly reliable receiver everytime.

OPERATING INSTRUCTIONS

Batteries:

The Midas-2 is designed to be powered by series nickel-cadium batteries! Dry cells are not recommended for use with this receiver.

Antenna:

The antenna length for the Midas is not critical and may vary from 18 to 36 inches. An average antenna (measured from the receiver case) would be 30 inches in length. A vertical piece of piano wire mounted directly behind the wing is recommended. The antenna should be routed as far from other wiring and actuators (especially servo motors) as possible. Some noisy servo motors can radiate strong signals as far as one foot or more.

Installation:

For maximum protection, the Midas should be carefully installed. The following instructions if the recommended method.

Though far from delicate, the Midas is an expensive precision instrument. the few extra minutes spent installing it will be ample rewarded in the event of a crash. Mount the Midas vertical with the antenna leadout upward. The receiver should be mounted base forward against a bulkhead and shock mounted by 1/2 inch of foam rubber placed between the receiver base and the bulkhead. The unit may then be held in place by rubber bands stretched securely over the case of the bulkhead. The power and actuator wiring may now be routed neatly at the bottom of the fuselage and the antenna lead at the top, clear of actuators and other wiring. Leave sufficient slack in the power wires and antenna lead for pulling in the event of a crash.

DUE TO THE SMALL MASS ENCOUNTERED IN THE MIDAS IT IS IMPORTANT THAT THE MOUNTING BE EXTREMELY SOFT OR LIGHT TO PREVENT VIBRATION FROM ACTUATING THE REEDS. DO NOT USE SYNTHETIC FORM OR SPONGE FOR MOUNTING. ALSO DO NOT SECURE THE SERVO CABLES TOO CLOSE TO THE RECEIVER AS VIBRATION CAN BE TRANSMITTER THROUGH THE WIRES AND DEFEAT THE SHOCK MOUNTING.

Refer to drawing for wiring connections:

When soldering connections, always wrap the wire around the connection to be soldered and solder with a good grade of resin core solder. Under no circumstances use acid core solder. Battery holders are not recommended as they can produce noise under vibration, that can render the receiver in-operative. In constructing your own battery pack, solder wires directly to the cells using as little heat as possible to produce a good solder connection.

Refer to drawing for wiring connections; (continued)

Each control terminates in a cable of 6 wires which is color coded to match the Bonner transmits servo. Connect receiver red to servo red wire, receiver white to servo white etc, for all six wires in each control cable. Power to the servo is furnished through this six wire cable. Batteries are connected to five wire power cable only. If servo runs in the wrong direction, switch the orange and yellow wires. So that receiver orange connects to the servo yellow, receiver yellow to servo orange. This color code is only guaranteed with Bonner transmits and any other servo should be checked with their manufacturer for deviations from this standard code.

All power connections are contained in the five wire cable as indicated in the drawing. Three wires require switches, a three pole switch, or a two pole and a single pole switch combination can be used. Any 3 wires can be used to switch the set on and off.

Tuning and Testing:

Upon completion of wiring, double check to make certain that it is correct. A reversed battery polarity or excess voltage could damage the receiver.

The Midas is completely pretuned at the factory. The operating frequency is stamped on the case of the crystal. The reed relay is adjusted and should require no further adjustment. The reed contacts can be cleaned by passing a piece of clean bond paper or a calling card between these contacts. Never use a file or sand paper for cleaning contacts. Do not use cleaning solutions except those that leave no residue on the contacts. In normal operation dust can be removed by using a piece of paper. In dusty areas it would be advisable to seal the receiver can with masking tape.

It is absolutely necessary that the correct F & M crystals be used in both the receiver and transmitter.

NO TUNING OF THE RECEIVER IS NECESSARY OR RECOMMENDED. After completion of a double check on the wiring, position the receiver switch ON and key the transmitter. Response as noted by relay operation (or actuator operation) should be noted. A range check on the equipment should now be performed. If the receiver fails re-check all wiring for errors or bad batteries. If the receiver still fails to function DO NOT TRY TO TUNE BUT INSTEAD RETURN TO FACTORY FOR CORRECTION.

Extra crystals for either the transmitter (price \$4.95) or receiver (price \$6.95) are available for changing operating channels as desired. Both the receiver and transmitter crystals are especially made to F & M specifications and MUST be used exclusively. To change operating channels simply remove the installed crystals and replace with the proper crystals for operation on the desired channel. Transmitter retuning is not required. The receiver RF adjustment need not be changed, and receiver IF retuning is not necessary. If the Midas fails to operate check all batteries and connections. NEVER TRY RETUNING THE IF'S AS THIS WILL NOT BE THE TROUBLE.

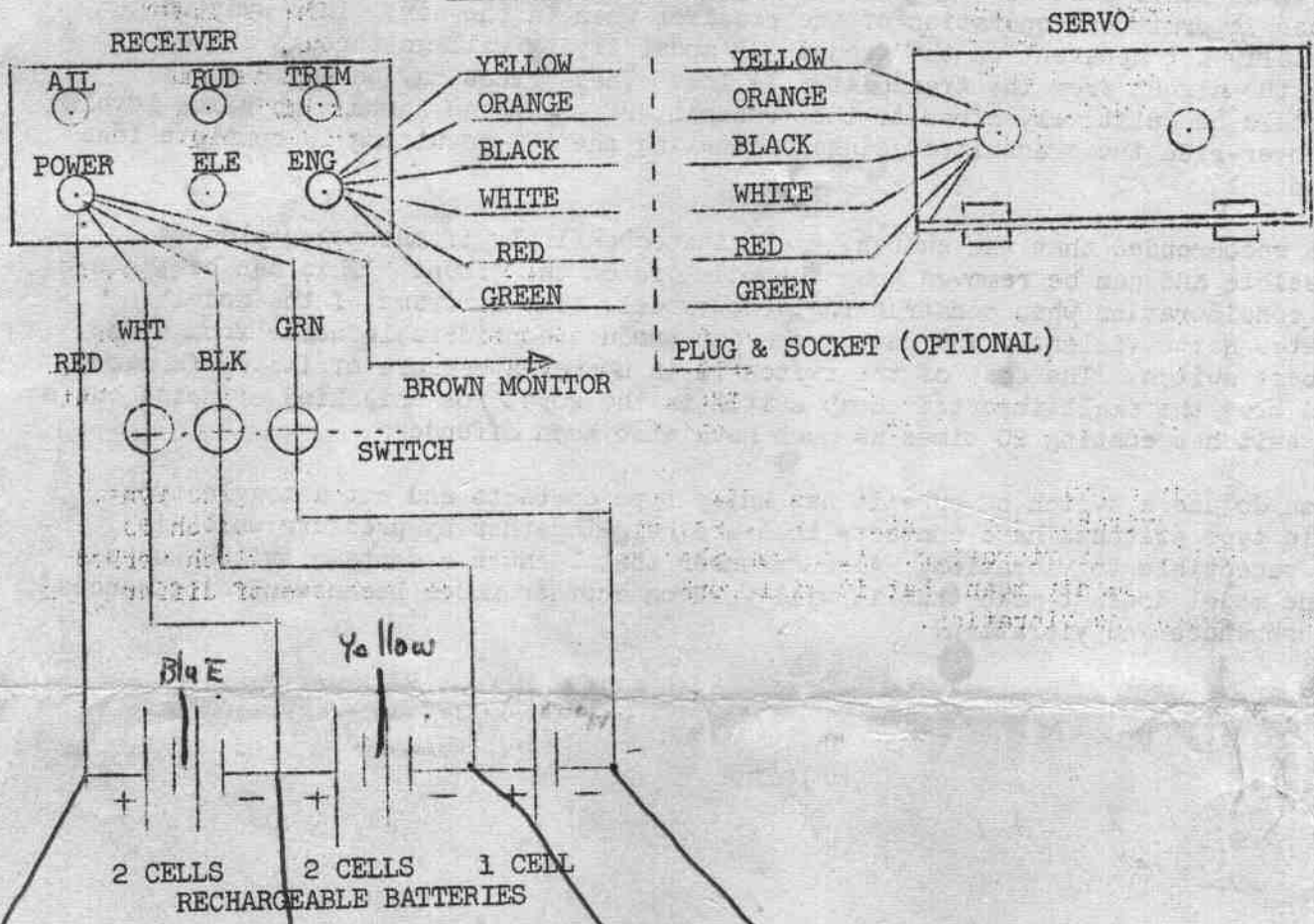
CAUTION

Don't permit the metal parts of servos to touch or vibrate against one another. Keep metal push wires clear so they will not vibrate against the metal parts of a servo or other push wires. In some cases enough noise can be generated to produce intermittent operation of the receiver when in the air. This symptom is usually not apparent on the ground. A model flying will go through areas where the signal from the transmitter is low. These areas may be quite small and could be relatively close to the transmitter. In these spots high noise levels will over-ride the transmitted signal actuating the AGC resulting in complete loss of control.

It is recommended that the switch be eliminated entirely if the power plug is accessible and can be removed when the model is on the ground. This can be taken into consideration when constructing a new model. The airframe of the model vibrates quite violently and resonances can produce considerable noise from even the best switch. The cost of the switch is in no way a measure of its performance. It is true the small imported cheap switch is the worst for this kind of noise but even switches costing 20 times as much have also been offenders.

If you do use a switch be sure it has knife type contacts and not a toggle type. Toggle type switches have contacts that are held together by pressure which is most susceptible to vibration. Also remember that because a certain switch worked on one model doesn't mean that it will work on another model because of differences in resonances and vibration.

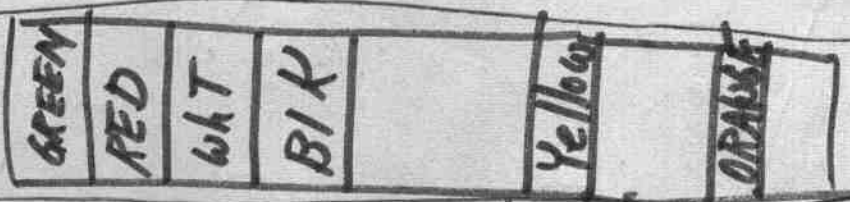
RELAYLESS RECEIVER WIRING



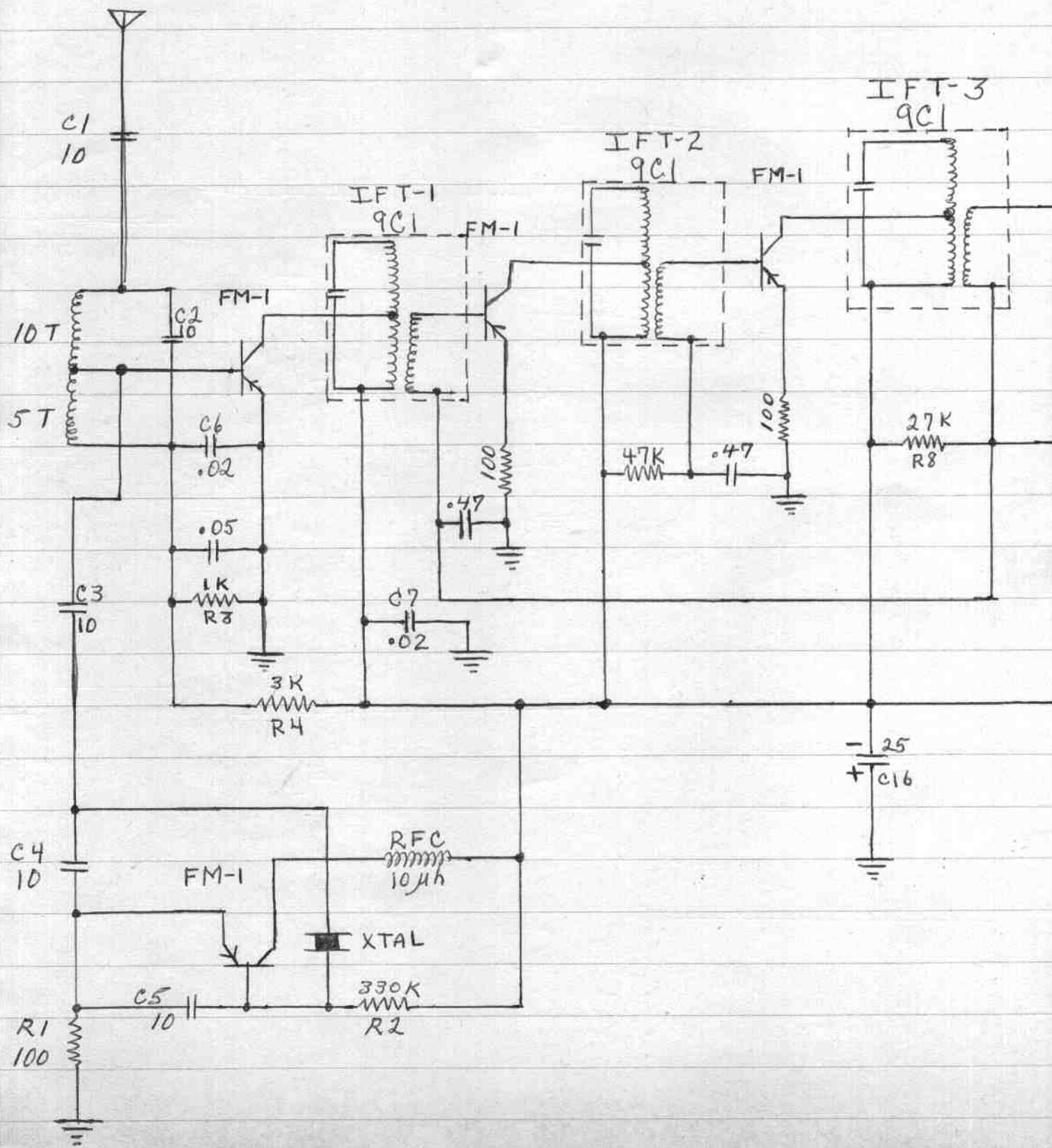
Red - Blue - wht - yellow - BLK - Green

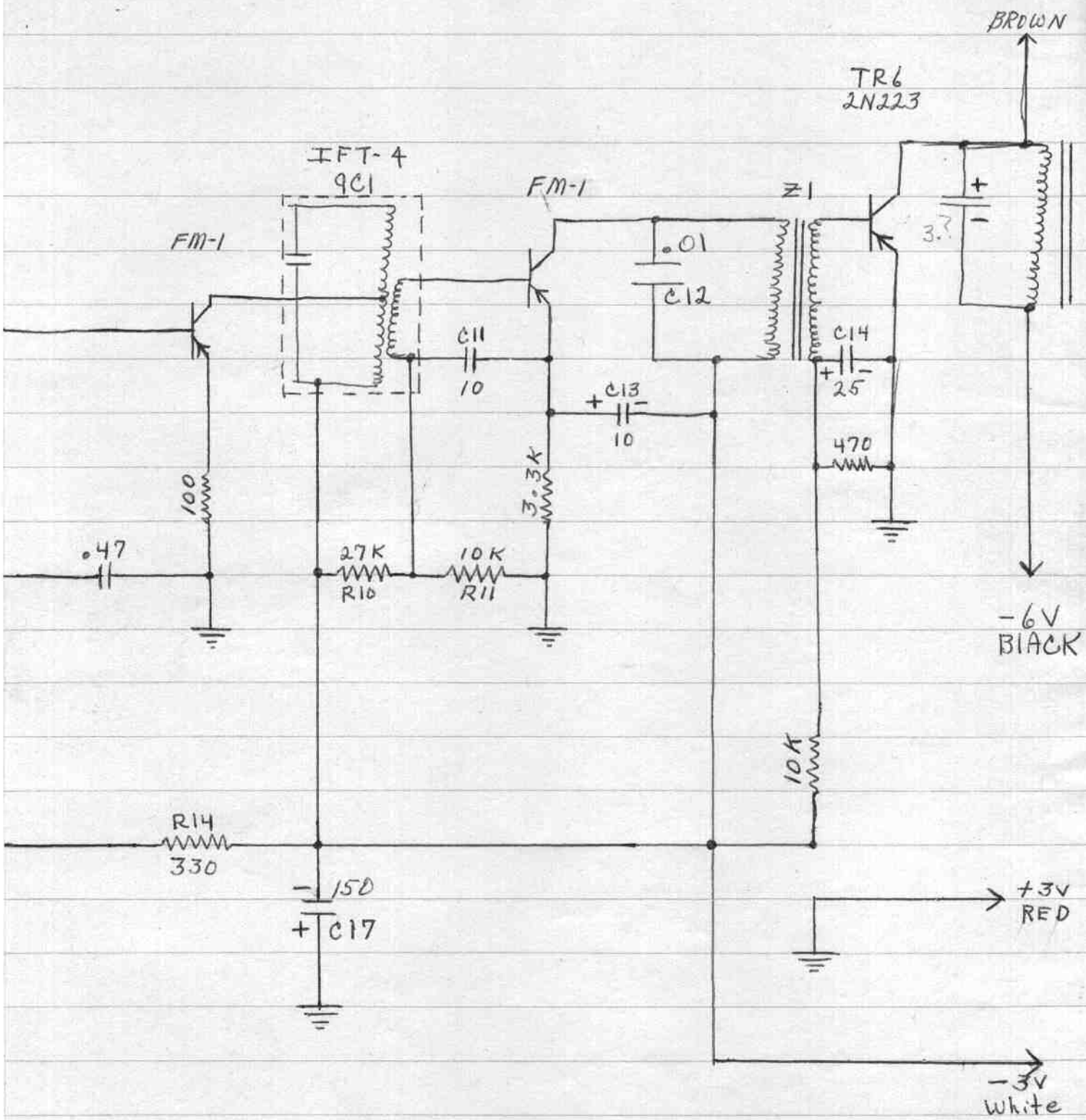
ANTENNA IS THE SINGLE WIRE ON OTHER END OF THE RECEIVER.
 All battery cells are 1.2 volt rechargable cells. OBSERVE POLARITY.
 THE RECEIVER GETS IT'S POWER FROM THE SERVO BATTERY PACK. UNDER NO CIRCUMSTANCES SHOULD ANY COLORS BE INTERCHANGED EXCEPT THE YELLOW AND THE ORANGE.

Discharger hook-up



GRAY	Yellow	White	Blue	BROWN	GREEN	Discharger BATT. PACK
Red	Blue	white	Yellow	Black	GREEN	





FM-1 = 2N2926