SPECIFICATION AND INSTRUCTION SHEET

FOR THE F&M MIDAS RECEIVER

Introduction:

The Midas receiver is a ten-channel, superhetrodyne, simultaneous tone receiver. 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 occuring on the citizens band. This receiver has sufficient selectivity not only 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 transmite 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:	2 to 4 micro volts
Audio response frequencies:	200 cps minimum, 650 cps maximum
Temperature Operating Range:	0°F-130°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:

Weight	Length	Width	Height
4½ oz.	3¼"	2-1/8"	1-1/8"

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 Hercules 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 rugges, well made and attractive case and cover.

2. The glass epoxy printed circuit board. The glass epoxy assures and unbreakable base even in sub-freezing temperatures.

3. Relay-less operation for maximum reliability.

4. The guaranteed temperature operating range of $0^{o}F$ to $130^{o}F$.

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 the smallest, most precision crystal used in the entire R/C industry.

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. Economical lo voltage operation,no expensive or hard-to-get batteries are required. The Midas is designed to be powered by pen-cells or nickel-cadmium batteries. No voltage converters are used.

11. Advanced design in reed circuits producing the most positive simultaneous operation ever produced with less critical adjustments.

12. The high gain transistor detector (collector detection) and expensive transformer coupled audio amplifiers provide a high gain circuit.

13. The F & M exclusive AGC circuit, accomplished without the use of diodes or complex feedback networks, assures reliable, blocking-free close range operation.

14. 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 every time.

OPERATING INSTRUCTIONS

Batteries:

The Midas is designed to be powered by either dry cells or series nickel-cadmium batteries.

Dry Cells:

Pen-cells will supply all the power required by the Midas receiver for many.many flights without replacement. Dry cell batteries should be replaced when their total voltage drops to 4.4 Volts under keyed receiver load. The Midas can be operated from series connected re-chargeable batteries. THE MIDAS IS POWERED BY THE SAME BATTERIES USED IN THE SERVO CIRCUIT.

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 structions if the recommended method.

Though far from delicate, the Midas is an expensive precision instrument. The few extra minutes spent installing it will be amply 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 FOAM 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. Assure that all batteries are secure in their holders such that vibration cannot produce a noisy floating 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 transmite 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 transmite and any other servo should be checked with their manufacturer for deviations from this standard code. Servos other than Bonner were not available for wiring instructions at time of printing this instruction sheet.

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. The green, red, and black wires must be opened when set is not in use as the servos have a constant current drain which would eventually run the batteries down.

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 adviseable 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 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 charging 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 IFs as this will not be the trouble.

WARRANTY:

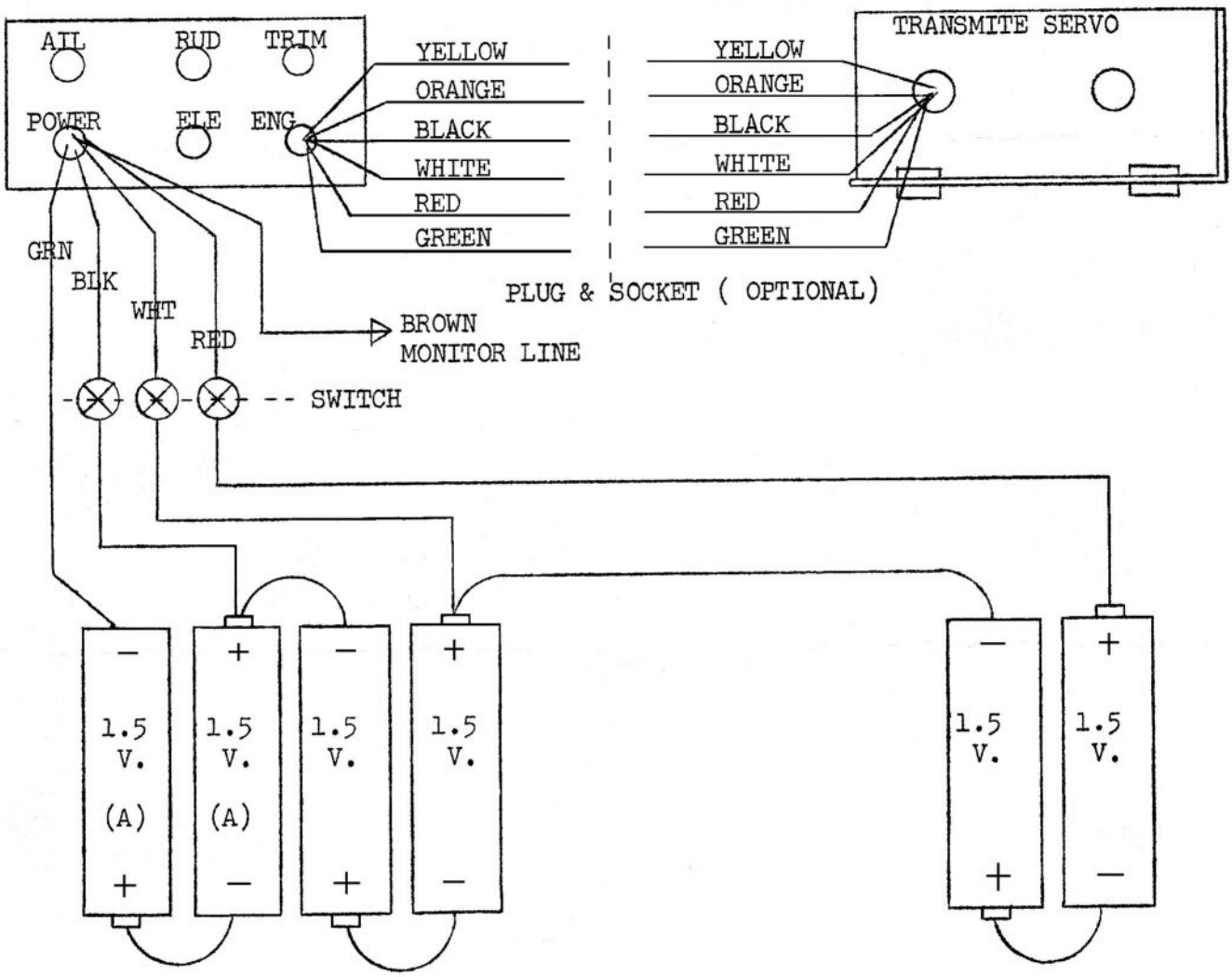
Our standard written 30-day warranty card accompanies each unit. F & M Electronics maintains a fully trained staff for the prompt repair of your F & M equipment. All repair charges are itemized and nominally priced.

IMPORTANT NOTICE

This receiver is equipped with an exclusive F & M feature called Vibro-Loc. In keeping with our policy of giving our customers the latest and most reliable equipment, new developments in existing equipment are incorporated at no additional expense to you.

The Vibro-Loc is an electronic switch to prevent servos from running when vibration closes a reed circuit or when a reed is manually made to close to servo circuit. Only when a tone is received will a servo operate. This is an added safety feature for your protection.

RELAYLESS RECEIVER WIRING

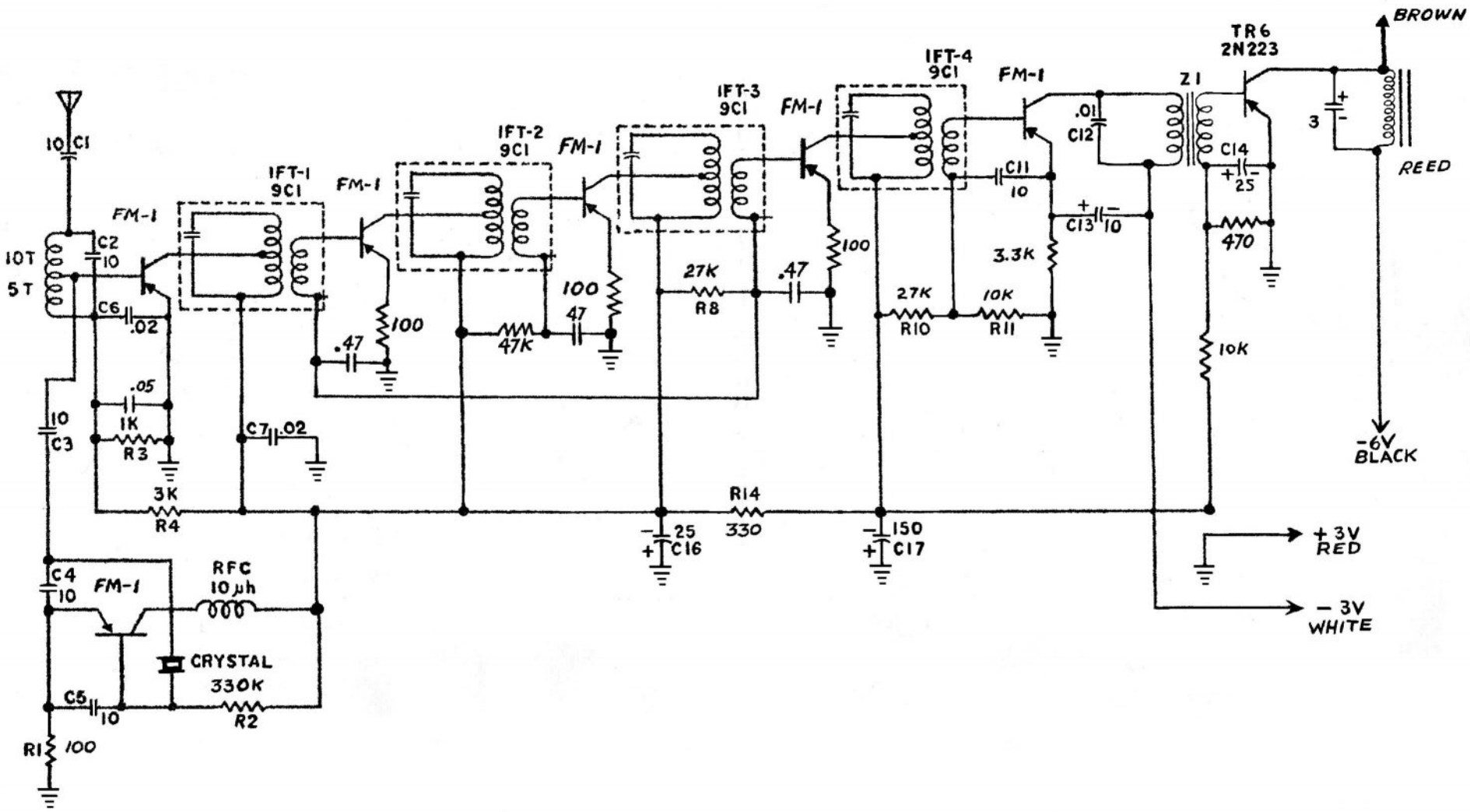


Antenna is the single wire on the other end of the receiver.

All cells may be 1.5 volt pen-light batteries or 1.2 volt rechargeable cells. OBSERVE POLARITY IN EITHER CASE.

Bias batteries marked (A) can be only one cell or two cells as shown.

THE RECEIVER GETS IT'S POWER FROM THE SERVO PACK. UNDER NO CIRCUMSTANCES SHOULD ANY COLORS BE INTERCHANGED EXCEPT THE YELLOW AND ORANGE.


10 C1
10T
5T
C2 10
FM-1
IFT-1 9C1
FM-1
IFT-2 9C1
FM-1
IFT-3 9C1
FM-1
IFT-4 9C1
FM-1
TR6 2N223
Z1
BROWN
REED
-6V BLACK
+3V RED
-3V WHITE
C6 .02
.05
1K
R3
C3 10
C7 .02
3K
R4
.47
100
47K
100
47
27K
R8
.47
100
27K
R10
10K
R11
3.3K
.01
C12
C11 10
C13 10
C14 25
470
10K
3
R14
330
25
C16
150
C17
C4 10
FM-1
RFC 10 µh
CRYSTAL
330K
R2
C5 10
R1 100

"MIDAS"