

INSTRUCTIONS
FOR
GATES' M5214 RDC-10
REMOTE CONTROL & METERING
SYSTEM

IB-888 0255 001

Gates Radio Company
Quincy, Illinois

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M5214 REMOTE CONTROL SYSTEM RDC-10

I SPECIFICATIONS

(A) Electrical

1. Control

- (a) Continuous D.C.
- (b) Number of Functions: File On - Holding Key
Plate On - Momentary
Raise - Momentary
Lower - Momentary
- (c) Additional control functions using Interlocking Relays.

2. Metering

- (a) Ten Metering Positions
- (b) Voltage Standard in OFF Position
- (c) Three 4 inch meters, Dual Scales
- (d) Meters - 100 ua, 10,000 ohms per volt
- (e) Metering selected by Switch Operating Stepper Switch
- (f) Personnel and telephone line protective features

3. Fail Safe Provisions - Continuous DC Voltage holds transmitter On (Required by the F.C.C.)

4. Telephone Line Requirements - Two lines - both providing a continuous D.C. path

5. 115 V. A.C. 60 Cycles

- (a) Studio Unit, Normal 52 watts, Fl - 3 amp. with stepper operating 61 watts.
- (b) Transmitter Unit - Normal 16 watts, Fl - 1 amp. with stepper operating 25 watts

6. All electrical connections to terminal boards on rear-of-chassis.

(B) Mechanical

1. Rack Mounting - Standard 19" Panel Mounting

- (a) Studio Unit 8-3/4" Panel Height
7-1/4" Depth in Rack
- (b) Transmitter Unit - 8-3/4" Panel Height
7-1/4" Depth in Rack

NOTE: Front Panel removable for mounting inside the transmitter

INTRODUCTION

The basic M5214 Remote Control System was designed for controlling and metering of transmitters from a remote point.

The M5214 consists of:

- M5240 - Studio Unit
- M5241 - Transmitter Unit
- M4719 - P.A. Plate Voltage Extension Kit
- M4720 - P.A. Plate Current Extension Kit
- M5143 - Tower Light Indication Current Transformer

The M5214 Remote Control System consists of a voltage supply for control purposes and ten (10) metering positions. By interlocking a control function with a position on the transmitter stepper switch, it is possible to get ten (10) control functions with the Raise-Lower switch. The Plate On position may also be interlocked with a stepper position, giving ten (10) functions with this position. Three positions on the stepper are set up as balanced pairs and may be used for metering, telephone or as a spare program loop.

Ten calibrating controls are provided on the Studio Unit to adjust meter readings. Meters are 10,000 ohms per volt (100 ua.) and normal line variations will not affect accuracy of readings. Meters are provided with dual scales so direct readings may be taken.

A mercury battery is connected in the OFF position of the Position Switch to provide a reference voltage to indicated sources of trouble such as low line voltage at the transmitter, defective telephone lines, or transmitter difficulties. Stepper synchronization is also accomplished in the OFF position by holding the reset button in for a couple of seconds. This sets the stepper switch on the transmitter unit only to calibrate position.

Control is accomplished by using different voltages from each leg of the control line to ground. One leg is used for Filament On and Plate On and the other leg is used for Raise and Lower as well as pulsing voltages for the transmitter stepper operation.

~~The studio unit contains three (3) power supplies, a 6 V. - 8V. D.C. supply for the stepper relay and 2-115V. D.C. supplies for control purposes.~~

The Transmitter Unit contains one (1) 6-8 V.D.C. Supply for operation of the stepper switch. A current transformer is provided for remote indication of the tower lights. The voltage from the current transformer is rectified in the transmitter unit providing a D.C. voltage for remote purposes.

A P.A. Plate Voltage and a P.A. Plate Current Extension Kit is also provided to remote read plate voltage and plate current on the final power amplifier.

Positions 2 to 8 Metering
9 to 11 Balanced pair.

The balanced pairs may be used for some of the following purposes:

1. Telephone
2. Spare Program Loop
3. Remote Metering Kits - For Modulation & Frequency Monitor
4. Transmitter located Receiver Outputs
5. Air Monitor feedback to Studio

All control relay contacts are wired to the normally open contacts. When the control switch is thrown, the relay is energized and the contacts close. Numerous methods of using the Plate On and Raise-Lower Keys may be used.

INSTALLATION

The Gates' Radio Company recommends that only the allowable minimum of control and metering be used, if possible, for the following reasons:

1. Non-technical personnel should not have access to the transmitter controls that could cause damage to the transmitter, or that result in the violation of F.C.C. regulations.
2. Fewer controls result in simpler operating procedure, less transmitter modifications, less maintenance, and more reliable operation.

It is recognized that there are many differences in the large variety of transmitters now in use and the final word on which controls and meters are necessary must come from the Station's Engineering Staff who know the equipment best. In any case the Engineering Department of the Gates Radio Company is always available to give advice or suggestions on special problems encountered either in the initial installation or afterwards in operation.

This instruction book is written using the knowledge gained from hundreds of previous installations of Gates' Remote Control Equipment.

Both units should be unpacked on arrival and inspected for possible damage in shipment. In case of damage the shipping agent should be notified immediately.

I - STUDIO UNIT

The Studio Unit may be mounted in a rack along with the R.F. amplifier, modulation monitor and frequency monitor, or with extension meters, if used, instead of an R.F. amplifier. In some installations it may be desired to use a table cabinet for the studio unit and placing it at the operators position, mounting other items in racks. The studio unit requires an a.c. outlet for 115 volts, 60 cycles. The two telephone lines should be connected to the terminals provided on the rear of the chassis, one line to terminals 1 and 2 identified as Control Line and the other line to terminals 3 and 4 identified as Metering Line. Refer to Drawing G-19326. The metering line must be properly polarized but this can be done on the installation of the transmitter unit. A driven ground rod or water piped ground should be connected to terminal 16. In some instances it is possible to use the telephone ground. Since the reliability of the equipment depends on a good ground connection, it is suggested that two different types of grounds be used at the Studio Unit.

II - INSTALLATION OF TRANSMITTER UNIT

The transmitter unit may be mounted in available rack space at the transmitter and provided with 115 volts a.c.

All connections are to be made to the rear of the chassis. Refer to Drawing C-19323. A good ground should be provided to terminal 25.

(A) Filament Contactor

The F.C.C. requires an automatic means of removing the transmitter from the air in case of failure of the telephone line or remoting equipment. This is accomplished by controlling the transmitter's filament or P.A. Plate Power with a contactor that has no holding contacts and that is continuously energized by the "Filament On" key in a locking position.

For transmitters without contactors the circuit shown can be used, by adding a contactor. See Drawing A-10990.

(B) Plate Contactor

To wire the plate contactor for remote control operation connect wires from terminals 29 and 30 on the transmitter unit in parallel with the plate "ON" button. Do not disconnect the holding contacts. A Plate contactor must be added if one is not in transmitter. See Drawing A-10990.

(C) Motor and Rheostat Assembly

The F.C.C. requires that means must be provided for controlling the transmitter power output from the remote control point. The Gates Radio Company provides one of the following means for controlling the transmitter power output.

- (1) Motor Rheostat Assembly M-4703 to adjust the P.A. Plate Voltage for transmitters of 250 W. to 1 KW.
- (2) Motor and Relay Assembly to motor drive existing transmitter Output Loading Coils.
- (3) Relay assembly to control existing motor driven rheostats or Output Loading Coils.

Space can usually be found on one of the decks or sides to mount the motor rheostat assembly. In some cases, it may be necessary to strap the assembly to power components.

In all instances the rheostat must be on the power supply side of the P.A. Plate Voltage meter multiplier. High voltage cable should be used to connect the rheostat. Packard cable or equal.

The rheostat may be connected as shown on Figure 1, Drawing C-19233 in series with the P.A. Plate Voltage between the Modulation Reactor or transformer and the P.A. Tank or Choke.

If the transmitter has a rheostat for controlling the power output remove one lead and connect the remote control rheostat in series with the transmitter rheostat and set the transmitter rheostat to maximum voltage. Some transmitters have the rheostat connected in the cathode circuit and the remote control rheostat may be connected in series in this case also with the transmitter rheostat left at maximum power output position. Some transmitters meter the P.A. Plate Voltage on the Power Supply side of the Modulation Reactor. It is again necessary to connect the rheostat ahead of the meter multipliers.

Control wiring should be connected as follows: See Drawing B-13417.

Motor Rheostat Assembly, M4703

M5241 Remote Control, TB-2

Terminals	1		26
	2	115V. A.C.	
	3		28
	4		15,16 or 17 as required (See Note on B-13417)
	5	Ground	8 and 25
		115 V. A.C.	27

(D) Plate Voltage Extension Kit, M4719

The Plate Voltage Extension Kit, M4719, should be mounted on the standoff insulators at a convenient point preferably near the high voltage point to which it will be connected. It shall be connected as shown on Fig. 1 of Drawing C-19233. Packard cable or a good high voltage cable should be used to connect terminal marked H.V. to the transmitter. This connection can be made to the hot end of the existing meter multiplier, or to a lug on the high voltage rheostat, if the connection is made to the rheostat the wiring should be made to the Power Amplifier side of the rheostat and not the power supply side.

Terminal marked "G" should be connected to a good ground point in the transmitter. The metering terminal should be connected to terminal #1 on the remote control transmitter unit. The 20K ohm, 10 watt resistor that is furnished should be connected from terminal #1 to ground. This shunt resistor is to prevent high voltage from being applied to the remote control unit in the event the ground connection on the M4719 is accidentally disconnected.

(E) Plate Current Extension Kit M4720

The Plate Current Extension Kit M4720 should be mounted on the standoff insulators at a convenient point preferably near the P.A. Plate Current Meter return to ground. Refer to Figure 3 of drawing C-19233.

It is essential that the kit be wired in at the ground end of the P.A. cathode circuit, and that it does not carry the current of any other stage. The fact that Screen and P.A. Grid current may flow through it will make no difference since they can be compensated for by the calibrate control.

In most transmitters, the overload relay or P.A. Plate Current Meter is at the ground end of the cathode circuit as shown in Figure 3. This ground must be lifted and connected as shown. In some instances, the overload relay is shunted with an adjustable resistor which is located separately. The resistor connection should also be removed from ground and connected in shunt with the relay.

Connect a good transmitter ground to terminal marked "G". A lead can then be connected from the fuse terminal, marked "metering", to terminal number 2 on the remote control unit.

The 1000 ohm resistor, that is furnished is connected from terminal 2 to ground. In case of an open ground connection to the extension kit, the 500 ohm shunt resistor would blow the 1/16 ampere fuse preventing high voltage from being applied to the remote control equipment.

(F) Antenna Current Metering:

A standard antenna diode unit is furnished, and it is installed at the tuning house in series with the present diode or thermocouple. It requires a source of continuous 115 V. A.C. connected to the terminals so marked. See Figure 4, drawing C-19233. Two other sets of terminals are provided, one labeled "remote meter" and the other "local meter". The remote meter terminals are used in conjunction with remote control. It is recommended that the diode unit have its own ground return to the transmitter. The positive terminal is wired to terminal number 3 on the remote control unit. For further information refer to the separate instruction sheet.

(G) Tower Lights Indicator

A M-5143 Current Transformer is furnished to remote read tower lights current. Refer to Figure 2, 3 or 4, drawing C-19381.

The current transformer can be installed in the power box for tower lights by feeding one leg of the tower light circuit through the transformer. The transformer can be disassembled and installed without disconnecting the tower light wiring.

It is recommended that the current transformer have its own ground return back to the remote control unit. Either lead can be connected to ground. The other lead must connect to terminal number 25. If it is desired to read the current of additional towers, a M5145 Tower Light Current Extension Kit is required.

For single small tower installations, it is recommended that the tower light feed line be looped through the opening 3 or 4 times to give additional voltage. Tighten the wing nuts snug for maximum output.

(H) D.C. Overload Relays M5129

Overload relays are usually of three types --

1. Electrical Reset
2. Magnetic Reset
3. Manual Reset

Relays of the first type are usually reset by re-energizing the plate contactor, or they reset automatically if the overload was transient.

Relays of the second type are held open by a latching device after an overload and are reset by energizing an auxiliary coil. This type requires an interlocking relay (6 V. D.C. relay) and the Raise Lower Switch can be used. All of the reset coils can be connected in parallel and energized at once, since there will be no effect on the relays that have not tripped.

Relays of the third type cannot be reset by remote control and must be replaced by one of the other two types. The first type is the best choice in this case, since it does not require an extra relay for reset, and it is more easily adapted to remote control.

Stages in which overload relays are usually used are the Driver, P.A. and Modulator. The relay coil is placed in the cathode circuit of each and shunted with an adjustable resistor to adjust for the desired tripping current.

It is usually recommended to set overload relays to trip with 25% overload on the P.A. and with the modulators, 50% overload above 100% modulation. Some station engineers may prefer other settings.

The normally closed contacts of the overload relays are usually wired in series with the plate contactor. See Figure 1 of Drawing C-19381 for typical wiring of overload relays.

(I) A.C. Overload Relays

Some transmitters with manual operating circuit breakers in the A.C. line trip often and are reset manually. With Remote Control these circuit breakers should be replaced making it possible to electrically reset the overload. See Figure 2 of Drawing C-19233. With 220 volt filament contactors, return the relay E4 to 115 volts or series it with a resistor to give proper operating voltage. With this circuit, to electrically reset after an A.C. overload, turn filament Hold Switch off and back on again.

OPERATION

The Studio Unit consists of three D.C. power supplies for control purposes. One Supply consisting of T1, CR-1 and C1 provides voltages for the following operations:

<u>Function</u>	<u>Adjust</u>	<u>Normal Operation</u>	<u>Measured at</u>
Raise	R2	80 V. D.C.	TB1-2
Lower	R4	38 V. D.C.	TB1-2
Filament On	R3	26 V. D.C.	TB1-1
Plate On	R2	80 V. D.C. (same as Raise)	TB1-1

Stepper Operating Relay Supply consisting of T2, CR-2 and C2, provides voltages for the positioning relays and the pulsing relays. Power Supply T-3, CR-3 and C3 provides 6-8 volts D.C. for the stepper switch coils. The operating relay supply voltage is adjusted by R6 to provide approximately -75 V. D.C. to ground.

I - STEPPER OPERATION

All positions of S1 are connected to corresponding positions on the front level of stepper, K1. Positioning Relay, K-3, is normally energized until S1 is switched. When K3 opens, voltage is applied to the pulsing relay, K2, through the pulsing contacts of the stepper switch. The contacts on relay K2 apply 6-8 volts D.C. to the coil of the stepper switch, K1. The stepper switch makes one step and opens the pulsing contacts returning the stepper to normal. If voltage is still present through relay K3, it will continue to pulse itself until this voltage is removed by K3 being energized with S1 and K1 in the same position. R10 adjusts the voltage to relay K3 and R9 to relay K2. R9 should be set at approximately 1/2 total resistance or 5,000 ohms, and R8 at approximately 1/2 or 2500 ohms. R9 is adjusted so the transmitter stepper switch follows the Studio stepper compensating for telephone line resistance.

The pulsing and reset voltage for the transmitter stepper switch relays is applied through R3 to the Raise-Lower leg of the control line. This voltage is connected through Rectifier CR3 in the transmitter unit to the Reset and Pulsing Relays. Rectifier CR3 polarizes K2 and K3 so they operate only with a negative voltage. This system depends upon an earth ground between the two units for positive return, making a good ground essential at both ends. Reset relay, K3, is shunted with an 8 mfd. capacitor, C2, which is too large to charge up on a momentary pulse and acts as a short circuit. When the reset button is pushed, the voltage is constant charging C2 and then closing K3.

With K3 energized, voltage from power supply T1, CR5 and C1 are applied through one level of contacts on the stepper switch and to the pulsing contacts. The stepper pulses itself until it reaches "OFF" position at which position an arm opens a set of contacts on K1, always stopping it at home position when K3 is energized. By setting the Studio Position Switch in the "OFF" position and pressing the Reset Button for a couples of seconds, the Transmitter stepper will automatically home to "OFF" position synchronizing both Stepper Switches.

II - CONTROL

Control functions are obtained by applying a D.C. voltage to one side of the control line to ground. Different voltages are applied to obtain more than one function on each leg of the telephone line.

On one leg of the line, 26 V. is applied for Filament On operation and this voltage is increased momentarily to 80 V. for Plate On. The Plate On Relay, K5, is shunted with a 2K ohm resistor to prevent it from operating at the lower voltage. The Filament Hold Relay, K4, is shunted with a 16 mfd., capacitor to prevent it from dropping out as switch S3 on the Studio Unit is returned to Filament On (Hold) position. The contacts on this switch break before making. This

assures the dropping out of relay, K5.

On the other leg of the control line, 438 V. is applied to energize "Lower" relay, K6, and 430 V. is applied to energize the "RAISE" relay K7. Relay K7 is shunted with a 2K ohm resistor to prevent it from operating at the lower voltage. The voltage being applied to the RAISE-LOWER Relays is polarized by CR1 to prevent these relays from energizing with negative voltage. Rectifier CR2 is shunted across K6 and K7 to short inductive pulses from the relays in opposite polarity.

This prevents the pulsing of relay K2. The ground return for relays K6 and K7 and rectifier CR2 is through the contacts of the pulsing relay K2 and through the Stepping Switch coil K1 to prevent interaction of the control relays with the pulsing relays.

Provisions should be made to turn off tower lights in conjunction with Conelrad. This can be accomplished by using a 6 V. D.C. relay and a 115 V. A.C. latching relay. By interlocking the 6 V. relay with a stepper position as is done with the motor rheostat assembly, the "Raise-Lower" switch will then apply voltage to either coil of the latching relay turning the lights on or off. Other equipment may be switched off and on in this same manner.

METERING

A Mercury battery is permanently connected in the calibrate position as a voltage standard. This gives a reference voltage to help identify sources of trouble. If all voltages vary including the voltage standard it would be an indication of possible defective telephone lines. If only transmitter voltage varied, it would be an indication of transmitter line voltage variation or possible trouble in the transmitter.

Two of the three levels on the stepper switches are used for metering. Level 2 is the negative and level 3 is the positive side. In the transmitter unit, level 2 metering positions are jumpered together and grounded. In the Studio Unit, level 2 is also jumpered but returns to the common of all three meters through a 50K ohm precision resistor and a meter fuse. The transmitter stepper switch selects the desired voltage to be read and the studio switch selects the desired meters.

I - BASIC

The meters are 10,000 ohms per volt (100 ua) movements and with the 50K series resistor, requires 5 volts to give full scale deflection. The metering kits should be adjusted to give only a small amount of voltage larger than that required to give the proper reading on the scale more nearly matching the meter scale on the transmitter. The

calibrating controls on the rear of the Studio Unit can then be adjusted to read the same as the transmitter meters. Normal variations in telephone line resistance will not affect meter readings.

II - PLATE VOLTAGE EXTENSION KIT

The plate voltage extension kit is a meter multiplier, R1 to R6 in series with dropping resistors R7 and R8. The resistance of the multiplier is calculated on the basis of 2 ma. flowing through it when used in a 6 KV circuit. R1 to R6 are 500K resistors and R7 and R8 are 15K resistors. When the 0-12 KV scale of M1 is used, it will be necessary to connect two extension kits in series.

III - P.A. PLATE CURRENT EXTENSION KIT

The plate current extension kit consists of Resistors R1, R2, R3, Potentiometer R4, and a high voltage protective fuse. For transmitters of 1 KW and under, the kit is used as supplied (R1, R2 and R4 in parallel). For five and ten KW transmitters, R3 is added in shunt. The plate current and plate voltage potentiometers should be set so as to give approximately the correct studio indication when the studio potentiometers are at mid range. Any necessary touch-up adjustment can then be made from the studio.

IV - TOWER LIGHTS CURRENT TRANSFORMER

A small A.C. voltage is sampled from the tower lights circuit and applied to a half wave rectifier on the transmitter unit. Control R5 is provided to adjust the D.C. voltage output of the rectifier. For one tower installations, this control should be set to maximum. If additional voltage is needed, loop the tower light lead through the opening in the current transformer as needed. Since this is only for indication of the condition of the tower lights, one or two volts is all that is necessary. The D.C. voltage is connected to position 4 of the stepper switch.

V - BALANCED POSITIONS

Balanced positions on the stepper may be used for metering by grounding the uneven numbers on the transmitter unit and applying the voltage to the even number. On the Studio Unit, connect a lead from the uneven number to meter common, terminal 11, and a lead from the even terminal to meter plus, 12, 13 or 14 depending upon which meter scale is desired.

MAINTENANCE

I - WEEKLY

All meter readings should be checked for calibration (required by F.C.C.)

II - MONTHLY

Check all relay contacts for corrosion. If necessary, clean carefully with a burnishing tool.

III - QUARTERLY

Check voltages.

Clean and lightly oil the stepping switch contacts with Davenol. Levels 2 and 3 are gold plated to insure stable readings.

Apply a small amount of lubriplate on ratchet teeth of Stepper Switch if needed.

IV - YEARLY

Replace mercury battery. Do not dispose of battery in incinerator.

Clean positioning switch.

Clean all lever key switches.

TYPICAL VOLTAGES

Line Voltage 117 A.C.

Measured with 20K ohms per volt meter to chassis ground.

<u>Transmitter Unit</u>	<u>Measured At</u>	<u>Adjust Studio Unit</u>
Filament On /26.5 Volts	TB1 Terminal #5	R3
Plate On /80 Volts *	TB1 Terminal #5	R2
Lower /38 Volts *	TB1 Terminal #6	R4
Raise /80 Volts *	TB1 Terminal #6	R2
Reset -35 Volts *	TB1 Terminal #6	R8
7-8 V. D.C.	C3	

*While holding momentary Key or Button on.

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RDC10 Remote Control

REMOTE CONTROL PROTECTIONS

It is realized that most Remote Control Transmitters are located at some unattended point and additional protective devices are recommended.

Since most of the transmitter building will be locked, it is advisable to put in some type of ventilation system. An air intake at floor level on one side of the building and a fan at ceiling height on the other side of the room drawing air through the building is usually very satisfactory. An inexpensive disposal type air filter on the air intake to keep dust and dirt out of the transmitter and a building thermostat on the fan should also be used. This gives clean air movement through the transmitter building automatically, at a small cost. It will more than pay for itself in maintenance cost or replacement parts cost due to overheat or dirt.

For fire protection from grass fires and/or other sources, several carbon-tet type fire extinguisher bombs may be hung around the transmitter room. It may also be desired to install a fire alarm system. The Worner Electronic Devices-Smoke Detector would be fine for this application. In case of excessive smoke, the detector would turn the transmitter and exhaust fan off, preventing the fans from drawing smoke and fire into the transmitter or building.

It may also be desirable to install a remoting kit for remoting transmitter building temperature back to the studio.

ORDERING REPLACEMENT PARTS

When ordering replacement components please refer to the parts list in this instruction book. Identify the component by its symbol number and, where given, Gates' Drawing number. The type of equipment in which the part is used and the serial number is also necessary.

This procedure will insure the customer receiving the correct component and at the earliest possible date.

ACCESSORY ITEMS FOR REMOTE CONTROL

EXA-2, M5144 AM RF Amplifier
EXF-1, M4791 FM RF Amplifier
M4703A Motor tuned plate rheostat, 1000 ohm, 100 watts for 250 watt transmitter.
M4703B Motor tuned plate rheostat, 750 ohm, 150 watt, for 500 watt transmitters.
M4703C Motor tuned plate rheostat, 400 ohm, 300 watt for 1000 watt transmitters.
M4800 Motor only for customer's rheostat.
M3873B Tuning motor only for customer's coil or capacitor (requires one M4806)
M4996 One RPM Motor kit for panel mounting.
M4801 Relay assembly to control one, three wire motor.
M4801A Relay assembly to control two, three wire motors.
M4801B Relay assembly to control three, three wire motors.
M4806 Relay assembly to control one, five wire motor.
M5129 D.C. overload relay assembly.
M4719 Plate voltage extension unit.
M4845 FM output power indicator.
M3759 Antenna diode for 1 KW or less.
M2765B Antenna diode for over 1 KW.
M5208 Extension meter for GR 1181A or RCA WF-48A frequency monitors.
M5206 Extension meter for GR 1931A or RCA WM-43A modulation monitors.
M5210 Extension meter for Gates M2639 modulation monitor.
M4610 Extension meter for Gates M2890 frequency monitor.
M5207 Extension meter for RCA 66 series modulation monitors.
M4720 Plate current extension unit

M4848 Output power tuning motor assembly for Gates BC-5B and BC-10B transmitters.

M4850 Adaptor Kit for remote reading GR25A frequency monitor.

M4825 A.C. voltage extension unit.

M5248 Auxiliary relay assembly to provide one on-off holding switching facility.

M5249 Auxiliary relay assembly to provide one on-off momentary switching facility.

Contactor, 2 pole, 25 amperes.

Contactor, 2 pole, 45 amperes.

Contactor, 3 pole, 45 amperes.

Contactor, 3 pole, 90 amperes.

Contactor, 4 pole, 15 amperes.

Overload Relay A.C. (Figure 2, C-19233)

Thermostat for controlling building exhaust fan.

Fire Extinguisher Carbon-Tet, Bomb type - Transmitter Building.

Remote reading building temperature kit.

Smoke detector, Photoelectric Combustion Supervisor to Detect Smoke in Transmitter Building, Model 71B Werner Electronic Devices.

Time Delay Relay Assembly.

ELECTRICAL PARTS LIST FOR RDC-10
REMOTE CONTROL SYSTEM

<u>Symbol No.</u>	<u>Drawing No.</u>	<u>Description</u>
A1		Lamp
C1		Capacitor, 40 mfd., 150 V.
C2		Capacitor, 40 mfd., 150 (W) V.
C3		Capacitor, 3000 mfd., 15 (W) V.
C4		Capacitor, .5 mfd., 200 (W) V.
CR1		Selenium Rectifier
CR2, CR4		Selenium Rectifier
CR3		Selenium Rectifier
F1		Fuse, 2 amp.
F2		Fuse, 1/200 Amp.
K1		Stepper Relay
K2, K3		Relay
M1	A-30567-101	Plate Voltage Meter
M2	A-20566-101	Plate Current Meter
M3	A-30568-101	Antenna Current Meter
R1		Resistor, 50 ohm, 10 W.
R2		Adjustable Resistor, 250 ohm, 25 W.
R3, R4		Adjustable Resistor, 2000 ohm, 10 W.
R5		Resistor, 100 ohm, 10 W.
R6		Adjustable Resistor, 3000 ohm, 10 W.
R7		Resistor, 10 ohm, 10 W.
R8, R10		Adjustable Resistor, 5000 ohm, 25 W.
R9		Adjustable Resistor, 10K ohm, 25 W.
R11		Resistor, 10 ohm, 1 W., 10%
R12		Resistor, 50K ohm, 1/2 W., 1%
R13, R14, R15, R16, R17, R18, R19, R20, R21, R22	A-3404-26	Control, 20K ohm
S1		Selector Switch
S2		Toggle Switch
S3		Lever Switch
S4		Lever Switch, 3 Position, 2 Pole
S5		Pushbutton Switch
T1, T2		Transformer
T3		Transformer
TB1		Terminal Board

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<u>Symbol No.</u>	<u>Drawing No.</u>	<u>Description</u>
W1	A-10307-1	6 Ft. A.C. Line Cord
XA1		Pilot Light Assembly
XF1		Fuseholder
XF2		Meter Fuseholder

TRANSMITTER UNIT

BT1		Mercury Battery
C1		Capacitor, 3000 mfd., 15 V.
C2		Capacitor, 8 mfd., 150 V.
C3		Capacitor, .5 mfd., 200 V.
C4, C6		Capacitor, 40 mfd., 150 V.
C5		Capacitor, 16 mfd., 150 V.
CR1, CR2, CR3, CR4 CR5		Rectifier, 65 ma. Rectifier
F1		Fuse, 1 amp.
K1		Stepper Switch
K2, K3, K4, K5, K6, K7		Relay
R1		Resistor, 10 ohms, 10 W.
R2, R3		Resistor, 2000 ohms, 2 W., 5%
R4		Resistor, 10 ohms, 1 W., 10%
R5	A-3404-27	Control, 25K ohms
S1		Switch
T1		Transformer
TB1		Terminal Board
TB2, TB3		Terminal Board
XF1		Fuseholder

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-2-

RDC10 Remote Control

PLATE VOLTAGE EXTENSION KIT

<u>Symbol No.</u>	<u>Drawing No.</u>	<u>Description</u>
R1, R, R3, R4, R5, R6 R7 R8		Resistor, 500K ohm, 2 W., 1% Resistor, 15K ohm, 10 W. Potentiometer, 10K ohm

PLATE CURRENT EXTENSION KIT

R1		Resistor, 20 ohm, 10 W.
R2		Resistor, 15 ohm; 25 W. Adj.
R3		Resistor, 10 ohm, 25 W. Adj.
F1		Fuse, 1/16 Amp., 5000 V.

TOWER LIGHTS CURRENT TRANSFORMER

M-5143		Tower Lights Current Transformer
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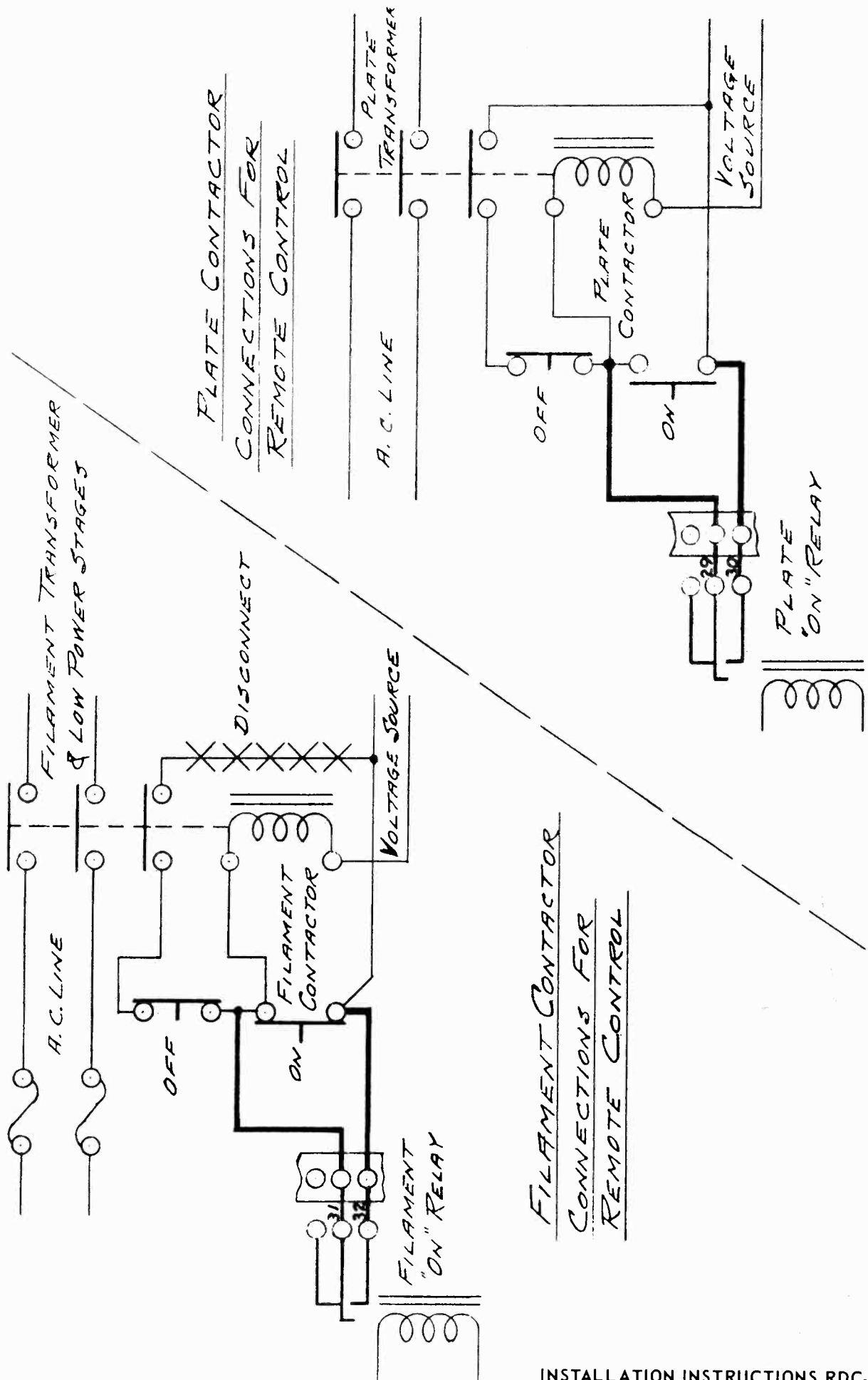
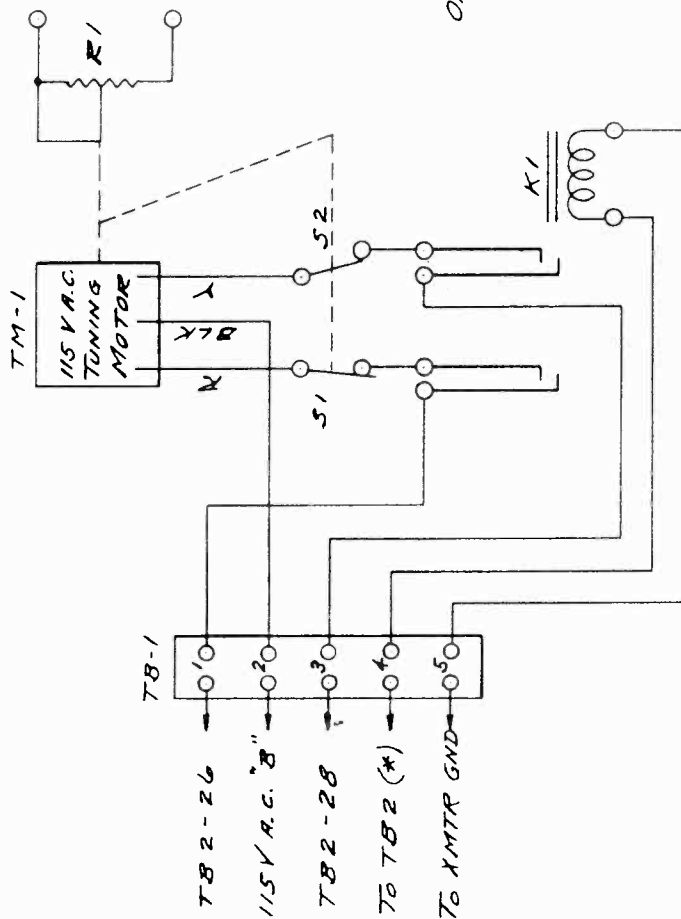


PLATE CONTACTOR CONNECTIONS FOR REMOTE CONTROL

FILAMENT CONTACTOR CONNECTIONS FOR REMOTE CONTROL

M 4703 TUNING MOTOR & RHEOSTAT ASSEMBLY



(*)

THIS SHOULD BE CONNECTED TO TERMINAL CORRESPONDING TO POSITION ON SELECTOR THAT CONTROL IS DESIRED.

EXAMPLE: - IF IT IS DESIRED TO CONTROL MOTOR,

(1) WHILE READING PLATE VOLTAGE, CONNECT TO TB2-15

(2) WHILE READING ANT CURRENT, CONNECT TO TB2-17

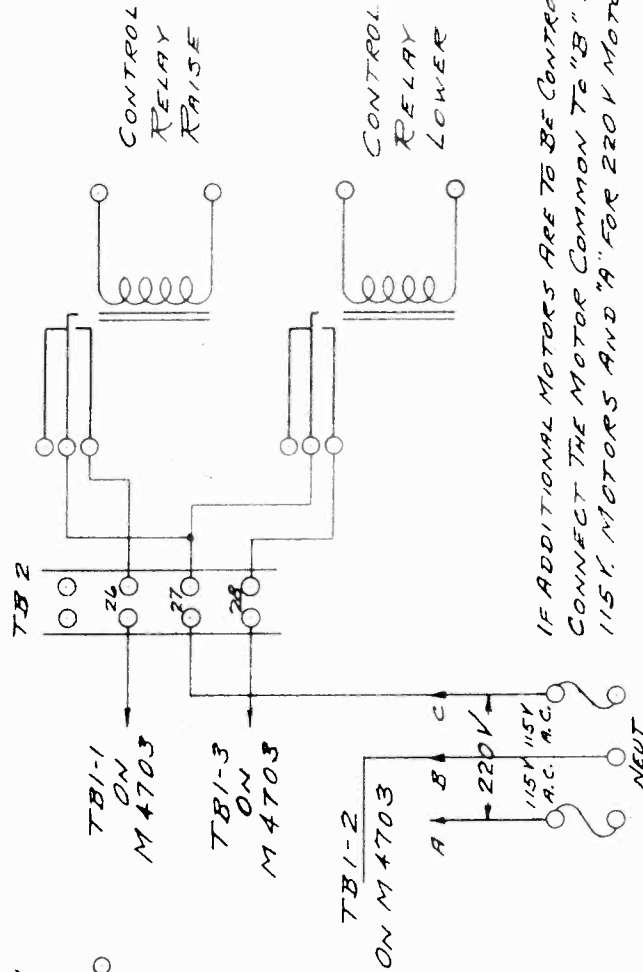
(3) IF IT IS DESIRED TO BE ABLE TO READ EITHER PLATE

VOLTAGE OR ANT CURRENT WHILE CONTROLLING THE

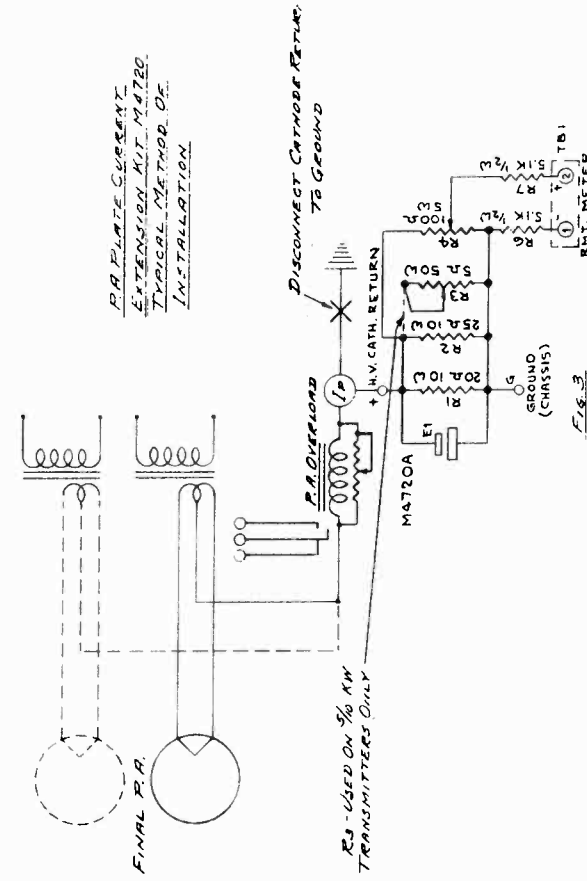
MOTOR, JUMPER TB2-15 TO TB2-17 AND CONNECT TB1-A

ON TUNING MOTOR ASSEMBLY TO TB2-17

M 5214 / M 5862 REMOTE CONTROL SYSTEM

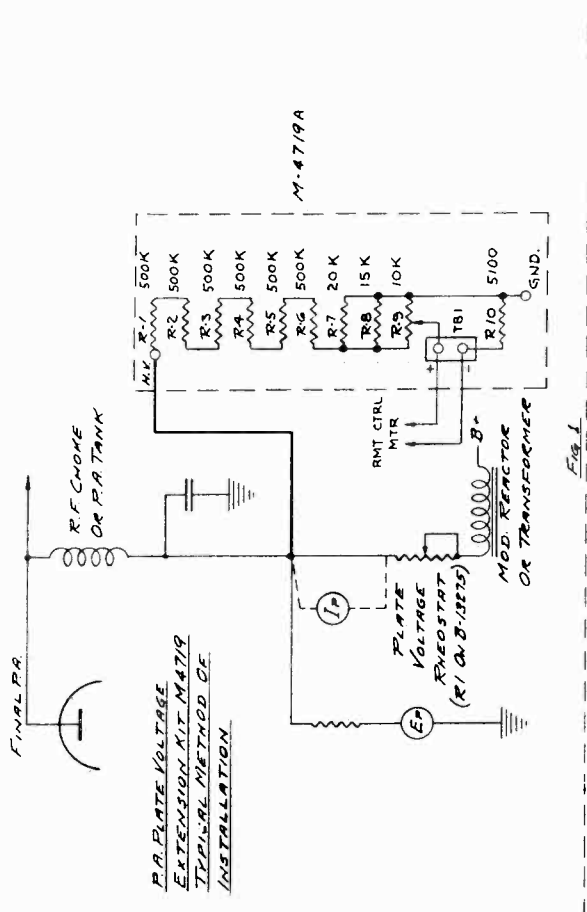


IF ADDITIONAL MOTORS ARE TO BE CONTROLLED CONNECT THE MOTOR COMMON TO "B" FOR 115V. MOTORS AND "A" FOR 220V MOTOR



P.A. PLATE CURRENT
EXTENSION KIT M-4720
TYPICAL METHOD OF
INSTALLATION

DIODE RECTIFIER UNIT
M-611A
TYPICAL INSTALLATION



P.A. PLATE VOLTAGE
EXTENSION KIT M-4719
TYPICAL METHOD OF
INSTALLATION

A.C. CIRCUITRY WITH
ELECTRICAL RESIST.

E1 FILAMENT CONTACTOR
E2 HEINEMAN TYPE C D.I. RELAY
E3 SAME AS E2
E4 D.P.S.T. RELAY, 115V. A.C. COIL

Fig. 2

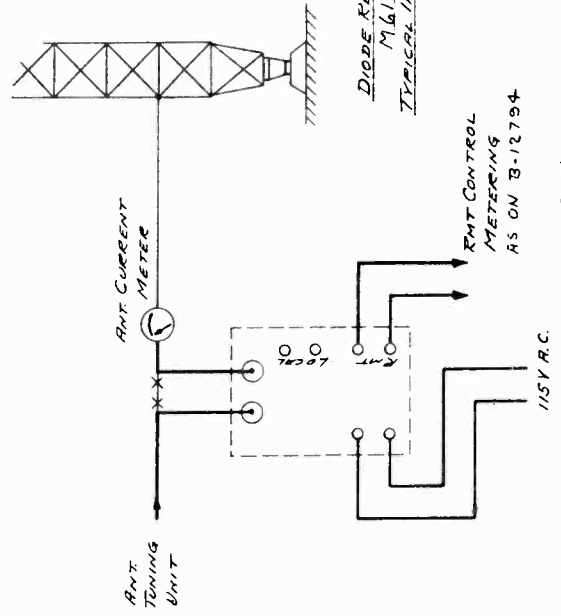
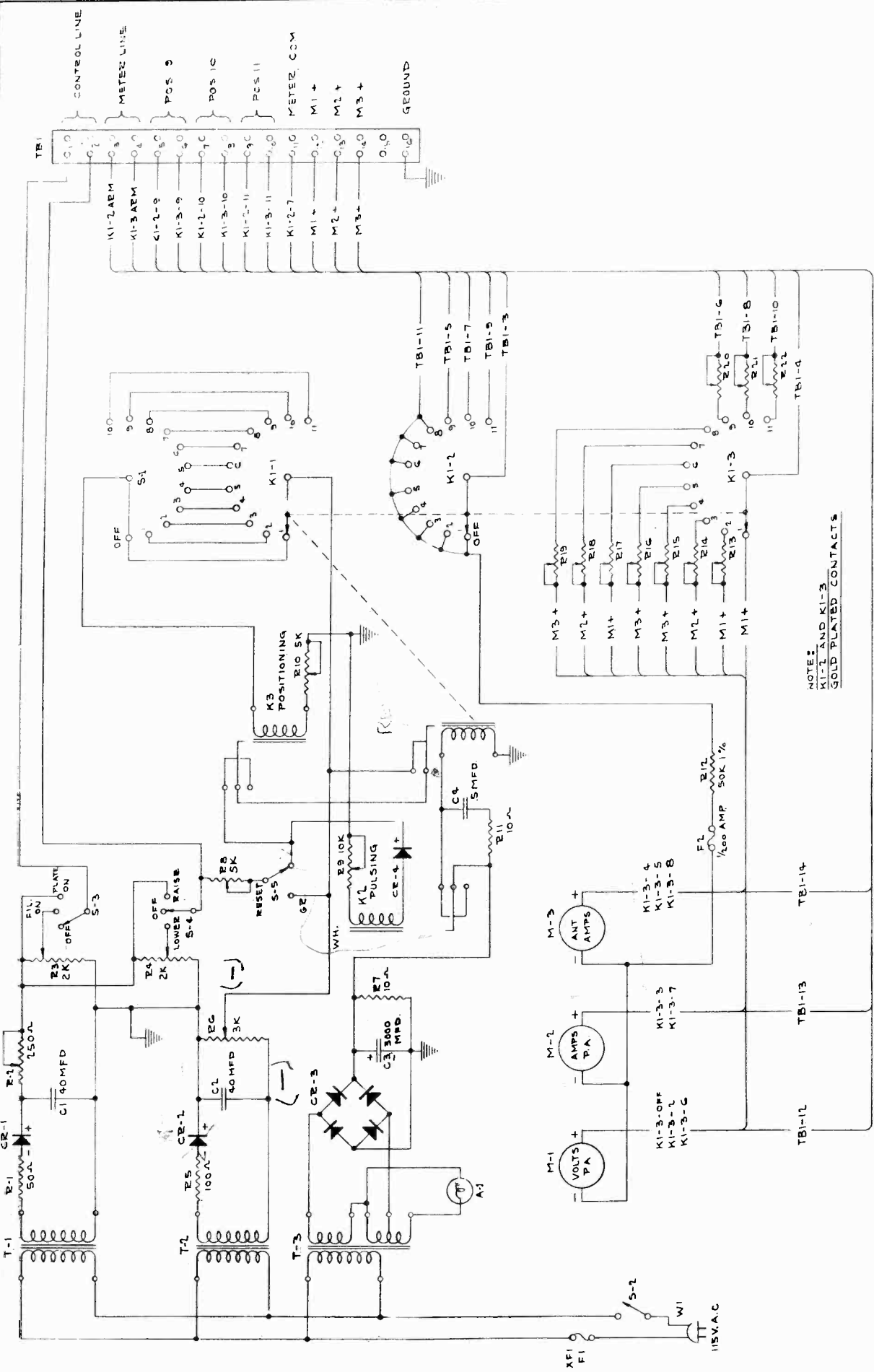


Fig. 4

Drawing Number
C-19326



NOTE:
KI-2 AND KI-3
GOLD PLATED CONTACTS

RDC-10 REMOTE CONTROL
STUDIO UNIT M 5240
GATES RADIO COMPANY
SUNNYVALE, CALIF.

TYPICAL D.C. OVERLOAD RELAYS FOR MODULATORS & POWER AMPLIFIER

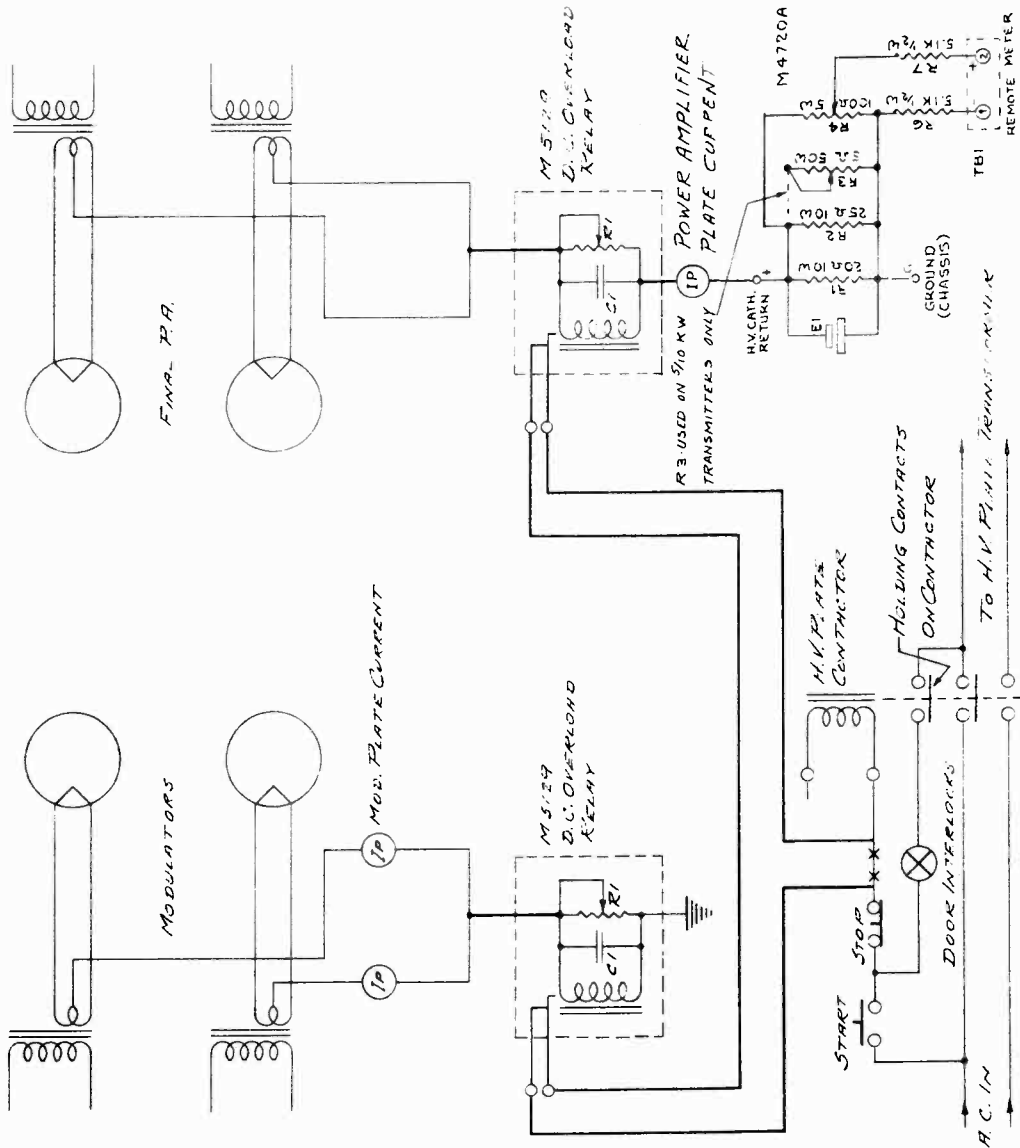


FIG 1

TOWER LIGHTS CURRENT M5143
CURRENT TRANSFORMER OR M5145 TOWER LIGHT EXT. KIT
(M5145 NOT FINISHED WITH BASIC REMOTE CONTROL)
SINGLE TOWER

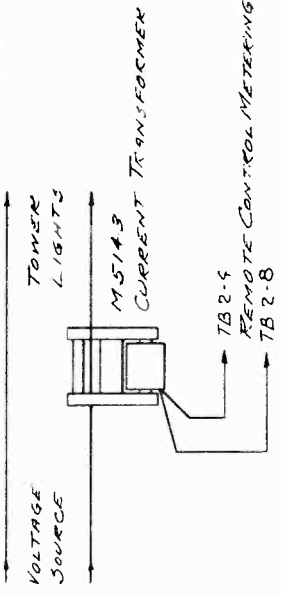


FIG 2

MULTIPLE TOWERS

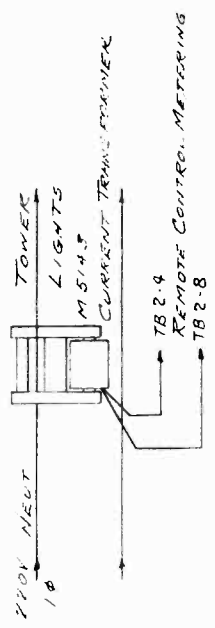


FIG 3

MULTIPLE TOWERS

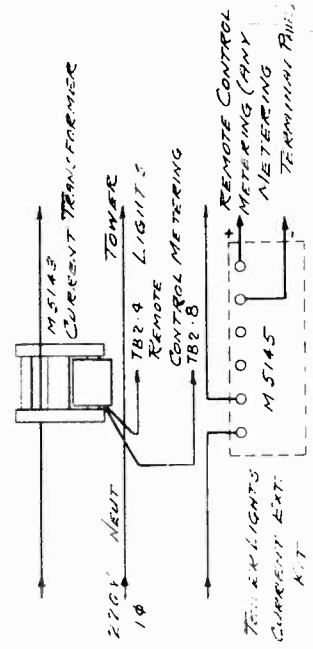
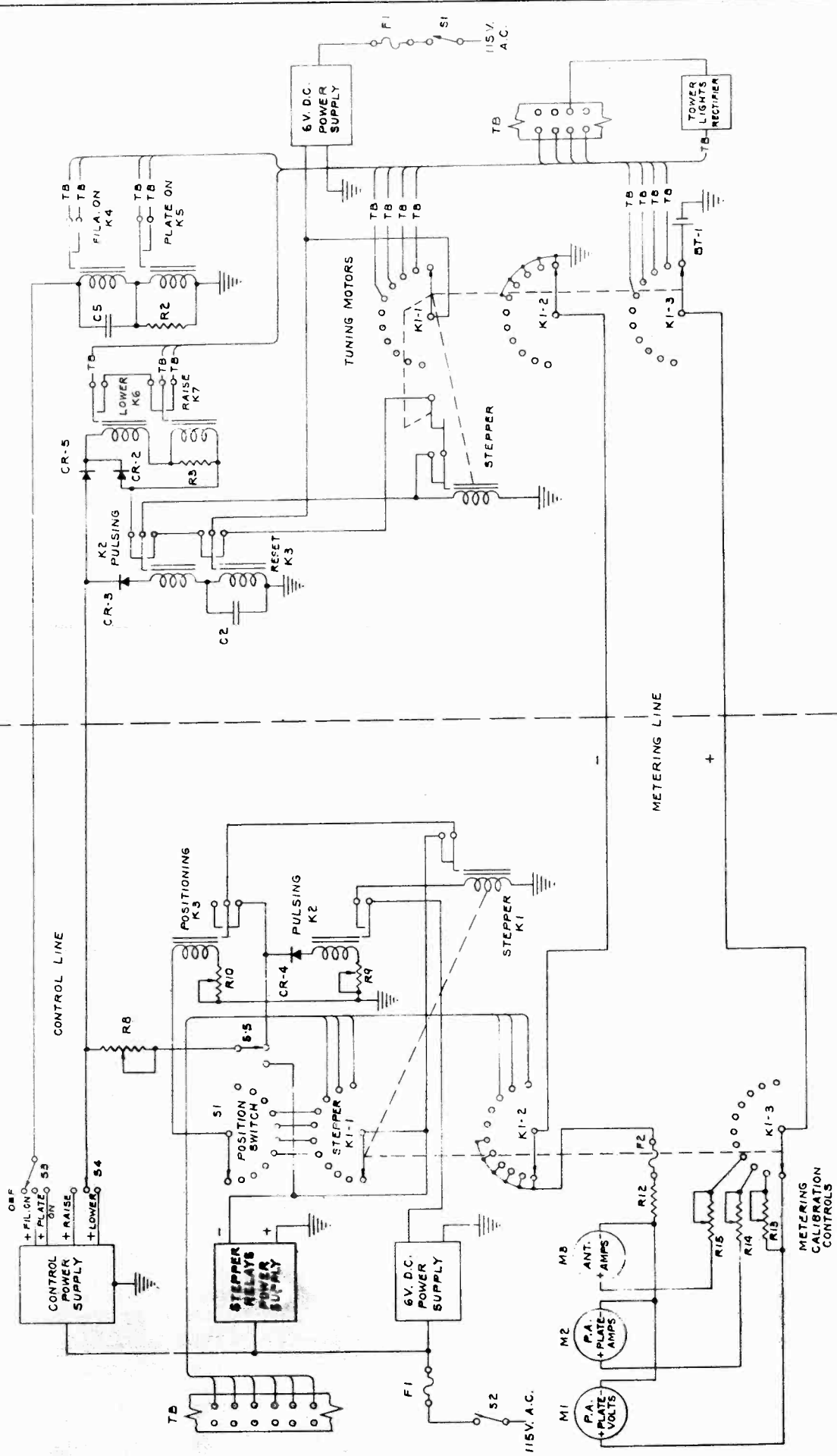


FIG 4

Drawing Number
C-19357

TRANSMITTER UNIT

STUDIO UNIT



FUNCTIONAL DIAGRAM FOR RDC-10
REMOTE CONTROL M5214

DATE	REV.	BY	CHK.
10/1/55	1	J. E. S.	J. E. S.

Drawing Number
C-19357

GATIS RADIO COMPANY
ANN ARBOR, MICH.