# INSTRUCTION MANUAL
for
MODEL PBR-21A
SOLID-STATE
REMOTE CONTROL SYSTEM

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# INSTRUCTION MANUAL
# MODEL PBR-21A
# SOLID-STATE
# REMOTE CONTROL SYSTEM

## Introduction and General Description

The Model PBR-21 Solid-state Remote Control System is designed to control AM, FM, and TV broadcast transmitters. 21 metering and 42 control functions are provided by this system which requires only a single, two-way signal circuit for operation. This may be a wire line, with or without amplification, carrier telephone aparatus, VHF radio links, or aural and TV STL multiplex subcarrier circuits. Because of this design, there is no necessity for a DC path between the transmitter and the remote control point.

All of the transistors and diodes employed in the Model PBR-21 System are silicon devices. The transistors are all of one type and are mounted in sockets. Two spare transistors are provided in both the Studio and Transmitter Control units. A panel containing three illumitated 4" rectangular meters is provided as a standard item with each system. Each of the 21 metering positions can be made to appear on any given meter by changing the jumper wires for the meter lamps and metering signal in the Studio Control Unit. It would be possible, also, to employ 21 separate meters, each one displaying the information corresponding to the selected push-button.

The principles of operation employed in the PBR-21 Remote Control System are straightforward. Three oscillators employing stabilized torodial inductors and silver mica capacitors generate the LOWER, RAISE, and FAIL-SAFE control frequencies. The frequencies are respectively, 1200 Hz, 1440 Hz, and 1720 Hz. The FAIL-SAFE tone is interrupted by a transistor gate to cause the stepper switch in the Transmitter Control Unit to advance and/or to seek its home or calibrate position. A binary counter chain controlled by push-button logic determines the proper sequency of interruption to the FAIL-SAFE tone.

Telemetry is performed by converting DC sampling voltages from the transmitter, tower lights, etc. to a frequency operating in the 400 Hz to 750 Hz spectrum. NOTE: For certain applications when the PBR-21 System is used in radio remote control system, the range of telemetering frequencies is changed to a 22 Hz - 36 Hz instead of 400 Hz - 750 Hz. Operation and functions remain the same. A simple Schmitt trigger circuit and a diode pulse counter converts this frequency back to DC for meter readout at the remote control point.

The Model PBR-21 Remote Control System consists of three separate units. The Studio Control Unit and the three-meter panel are located at the remote control point. The Transmitter Control Unit is placed adjacent to the transmitter or transmitters being controlled. 22 push-buttons are located on the Studio Control Unit. The first push-button is reserved for calibrating the metering system; the remaining twenty-one are for control and metering. The calibration button is red and is located at the upper left-hand side of the push-button bank. A rocking arm switch, with a center off position, is used to transmit LOWER, RAISE (ON or OFF) commands. SLOPE and CALIB. SER controls on the Studio Control Unit permit the calibration of the metering information. A power switch and power line fuse post are also located on the front panel of the Studio Control Unit. Two indicator lamps show the status of the control system. A small push-button enables the operator to quickly confirm the information being received on any push-button selection.

The Transmitter Control Unit contains 21 multiturn calibration controls, one for each of the metering channels. In addition to the power switch, pilot lamp, and fuse holder, three buttons enable an operator at the transmitter site to operate the control system. Fail-safe circuitry is included in this unit and will operate if the control circuit is open for any period exceeding approximately 25 seconds. The output control circuitry of the Model PBR-21 can be likened to one row of 21 SPDT center off switches, with all poles tied together. The selection of these switches is controlled by the push-buttons on the Studio Control Unit, and the position of the selected switch is determined by the operation of the LOWER-RAISE switch, also on the Studio Control Unit. All control, metering, and line connections are made on a barrier strip located on the rear of the chassis.

There are a total of 6 plug-in printed circuit boards containing all of the essential electronic circuitry. Four of these boards, Boards A, B, C, and D, are located in the two card cages mounted on each side of the Studio Control Unit chassis. Boards E and F are mounted in a single cage on the Transmitter Control Unit. The boards are designed so they cannot be inserted into the socket unless properly oriented. CAUTION: It is possible, however, to interchange boards so always be sure that the proper circuit board is plugged into the proper socket. The copper circuitry on each printed board has been electroplated with a thin film of gold to prevent oxidation.

The power supplies, electric-wave filter, stepper switch, and relays are mounted on the chassis of the Model PBR-21 Control System. The relays are of the plug-in type and are held in position with a retaining clamp.

When operating the Model PBR-21 Control System over a radio or STL circuit, the control and metering tone signals are brought out separately on the Studio and Transmitter Control Units.

## Specifications

| | |
|---|---|
| Control Functions | 21 RAISE, 21 LOWER Commands |
| Metering | 21 telemetering channels<br>0 - 3 volts DC (approx.) for full scale deflection |
| Metering Input Impedance | 25,000 ohms |
| Control Relay Rating | 2A/30VDC, 120 VAC, non-inductive load |
| Fail-Safe | Activated when control line interruption exceeds 25 seconds |
| Line Requirements | 20 db allowable loss from 400 Hz - 1800 Hz |
| Calibration Reference | Zener Diode |
| Mechanical | Studio Control Unit 7" X 19"<br>Meter Panel 5 1/4" X 19"<br>Transmitter Control Unit 5 1/4" X 19" |
| Power Requirements | 120/240 VAC, 50 - 60 Hz |
| Finish | Anodized and etched aluminum panels |

## Installation

Prior to bench-testing the equipment or proceeding with the installation, it is recommended that the entire Model PBR-21 be examined for any damage or loose components due to shipping vibrations. In particular, the inside of each printed circuit card cage should be carefully examined. While the transistor sockets used will firmly hold the transistors in place, a visual inspection is suggested and any loose transistor should be well-seated in the socket. NOTE: The transistor sockets are all oriented the same way, and each transistor mounts in the socket in the same relative position.

Before installing the Model PBR-21 Remote Control System, the equipment should be operated on a back-to-back basis so that personnel can familiarize themselves with the operation of the unit. The cable from the meter panel should be connected in the corresponding socket on the rear of the Studio Control Unit. The power cables from the Studio and Transmitter Control Units should be connected to a source of 120 VAC, 50-60 Hz.

CAUTION: If the available power is 240 V, 50-60 Hz, change power transformer primary wiring as shown on schematic diagrams for the Studio and Transmitter Control Units. A pair of wires, or shielded cable, is then used to connect the LINE input terminals of the Studio Control Unit to the LINE input terminals on the Transmitter Control Unit. The power switches on both units should then be turned on. Occasionally the stepper switch may be actuated when the power switch is initially turned on. This is a normal condition and does not indicate any malfunction of the system. Next, depress the red calibration button. This will cause the stepper switch to advance to the calibrate or home position. The lamps in the left-hand meter will turn on after the stepper has stopped and the meter should have an indication near mid-scale. When the LOWER control is actuated, the meter will fall to zero. Also, the lower relay, K804, in the Transmitter Control Unit can be checked for operation. If the meter does not read zero, adjust the CALIB. SET control for zero with the LOWER control command on. Next, release the control button, and adjust the SLOPE control unit until the pointer falls between the two arrows mid-range on the meter scale. The system is now calibrated. When depressing any other push-button, the stepper switch will automatically advance to that position. As this is done, the red CYCLE lamp turns on and remains on until the stepper switch has reached its proper position. At this time, the red CYCLE lamp turns off and the green READ lamp turns on. If the RECYCLE button is pressed, the circuitry will automatically place the stepper switch in the home or calibrate position, and then advance it until it comes to rest on the position corresponding to the depressed push-button.

If the RAISE or LOWER buttons on the Transmitter Control Unit are pressed, the appropriate relays will function. The position of the stepper switch in the Transmitter Control Unit can be changed by pressing the STEPPER button. When this button is pushed for approximately 1 second, the stepper switch will move to the home position. Incremental steps can be made by pressing the STEPPER button for a brief moment. To advance the stepper switch to the 5th position, for example, the operator would press the STEPPER button five times, each time being rather brief. No tally indication is given the operator at the Transmitter Control Unit. A plastic card is mounted on the panel, however, to easily identify each meter position with the parameter it controls or telemeters.

A voltage source, such as available from a volt-ohm meter, can be placed between any given telemetering input and ground barrier point. Next, push the button corresponding to this number on the Studio Control Unit. By adjusting the calibration potentiometer associated with this channel, the deflection of the selected meter on the meter panel can be made to vary. Such back-to-back testing will enable the operator to familiarize himself with the operation of the Model PBR-21 Remote Control System and to understand how the system works before it has been put into service.

The meter panel and Studio Control Unit should be installed in a standard 19" rack at the desired remote control point. The signal control pair should be connected to the appropriate barrier terminals on the rear of the chassis. If the unit is to be used over a radio link, such as the Moseley Model PCL-( ) Aural STL, then the metering input and control output connectors will be separated. These should be connected to the channels assigned to convey the respective information. The meter panel is designed to be mounted directly above the Studio Control Unit. Panel notchings will match standard 19" equipment racks used in broadcast service. A total of 12 1/4" of panel space is required for the studio control equipment.

The 5 1/4" Transmitter Control Unit should be mounted near the transmitter(s) it is to control so metering the control leads can be neatly installed. Power for the LOWER and RAISE output circuitry of the Model PBR-21 is connected to the barrier terminals marked COMMON and 117VAC. Note that this circuit has a separate fuse on the rear panel and that this circuit is not connected in any way to the 117VAC obtained through the power cable. The contacts of the control relays are rated at 60 watts into a resistive load. While two sets of contacts are paralleled, care should be taken not to attempt switching loads exceeding 60 watts. When heavy loads are to be controlled, it is suggested that an appropriate 117VAC power relay be used with properly-rated contacts.

## Line Requirements

The Model PBR-21 is normally manufactured for operation over a single wire or telephone carrier circuit. The equipment is designed to operate with input levels ranging from -20 dbm to +10 dbm. Should amplifiers be used in the circuit, care should be taken to limit the received signal on both the Transmitter and Studio Control Units to this range. If the line noise level or cross talk is unusually high, the LOWER-RAISE control relays may be actuated. This false relay operation will render the control system unreliable.

The output voltage from the telemetering oscillation in the Transmitter Control Unit is normally wired to develop approximately 0 dbm across a 600 ohm line. If it is desirable to increase or decrease this level by 5 db, the output connections on printed circuit Board F should be changed. (Refer to schematic Drawing 91B-6127.)

## Operation

Once installed, it is recommended that the equipment be left on continuously. If the back-to-back bench-test procedure outlined in the previous section was done, operation of the equipment will be quite straightforward. It will be briefly reviewed again. At the remote control point, press the CALIB. push-button on the Studio Control Unit. Next, actuate the LOWER control switch and adjust the CALIB. SET control until the left-hand meter reads zero. Then release the LOWER control switch and adjust the SLOPE control

until the pointer falls between the two arrows. The system is now calibrated. Next, push Button 1. This will cause the stepper at the transmitter site to advance to the first position. (When making a change of only one position, the red lamp may not always operate.) This position is quite often chosen as the PA voltage position. When making the initial installation, the operator at the transmitter should note the value of this parameter for the transmitter and advise the operator at the remote control point. He should then adjust the # 1 CALIBRATE control until the studio operator advises him that the left-hand meter reading corresponds to the actual transmitter PA voltage value. The other channels can be similarly calibrated.

The broadcast transmitter can be placed in a radiate position, for example, by pushing the #1 button and actuating the RAISE command. Likewise, the carrier can be removed by operating the LOWER command when in the #1 position.

Theory of Operation

The control and metering functions of the Model PBR-21 Remote Control System are accomplished using frequencies in the 400 to 1800 Hz spectrum. Three stable oscillators operating at 1200, 1440, and 1720 Hz operate LOWER, RAISE, and CONTROL circuits. As a 1720 Hz control tone is present at all times except when the operator wishes to select another control channel, the control tone also acts as a fail-safe tone. Thus, the 1720 Hz tone may be referred to as either the control or fail-safe signal. The LOWER or RAISE tones are applied to the system only when the operator desires to control any given parameter at the transmitter site.

In addition to the fail-safe or control tone, a metering tone is also present in the system. When wire lines are used, the metering tone varies between 400 and 750 Hz. As indicated earlier, this frequency may be in the 22 to 36 Hz band in the event a radio link is being used to relay control and metering signals associated with standard or FM broadcast transmitters. In operation, DC sampling voltages from the transmitter are converted to tones by a linear voltage-controlled oscillator in the Transmitter Control Unit. These tones are converted back into analog information by a pulse counter in the Studio Control Unit for presentation on the appropriate meter.

The circuits used in the Model PBR-21 when taken individually are basic and simple to understand. However, the combined operation may seem complex unless the operation is thoroughly understood. The circuitry associated with the selection of an individual control channel might, for example, seem rather complex. Before explaining the detailed operation of the circuit, it would be well to briefly describe "AND" and "OR" gate circuits that are used in the Model PBR-21 Control System.

Figure #1 shows a typical "AND" gate with five inputs. In order for there to be any output signal, all five inputs must be present. The waveforms drawn to the left of the five input terminals represent the signals being applied to the "AND" gate. The output waveform shown below the input signals is present only when Inputs #1 and #2 and #3 and #4 and #5 are all on. Hence the name "AND".

Figure #2 shows another common circuit, the "OR" gate. This is a three-input "OR" gate and the output pulse is present when Input #1 or #2 or #3 is present. The name for this circuit is also obvious.

The Studio and Transmitter Control Units of the Model PBR-21 Remote Control System are shown in block diagrams on Drawings SKA-6082 and SKA-6083, respectively. Let us first consider the operation of the Studio Control Unit. Drawing SKA-6082 is divided into two sections: the bottom part, called the Control Section, contains the 1200, 1440 and 1720 Hz oscillators, control tone gate, and summing amplifier. This section also contains the telemetering detector circuitry for converting the metering tones into a DC voltage for meter readout. The 800 Hz low-pass filter prevents the control tones from saturating the input telemetering amplifier. A Schmitt trigger follows the telemetering amplifier and isolates the output DC signal from changes in level of the input metering tone. When the 22 to 36 Hz telemetering frequency range is used, the 800 Hz filter, Part 2-1076, is removed.

The blocks above the dotted line are all part of the logic circuitry which controls the control tone gate. That is, the output of this section turns off (gates) the 1720 Hz oscillator at definite intervals each time the push-button selection bank is operated. It should be repeated that short interruptions of the 1720 Hz control tone will cause the stepper to advance one position. A slightly longer interruption will move the stepper switch to the home or CALIB. position. Thus, the control gate receives two different pulse widths to turn off the 1720 Hz tone, in turn, are used to either advance the stepper switch incrementally or to rapidly advance it to the home position.

The timing information for the binary logic system is derived from a continuously-running 9 Hz clock-oscillator. There are two outputs from the clock. One of these outputs is applied to a trigger switch.

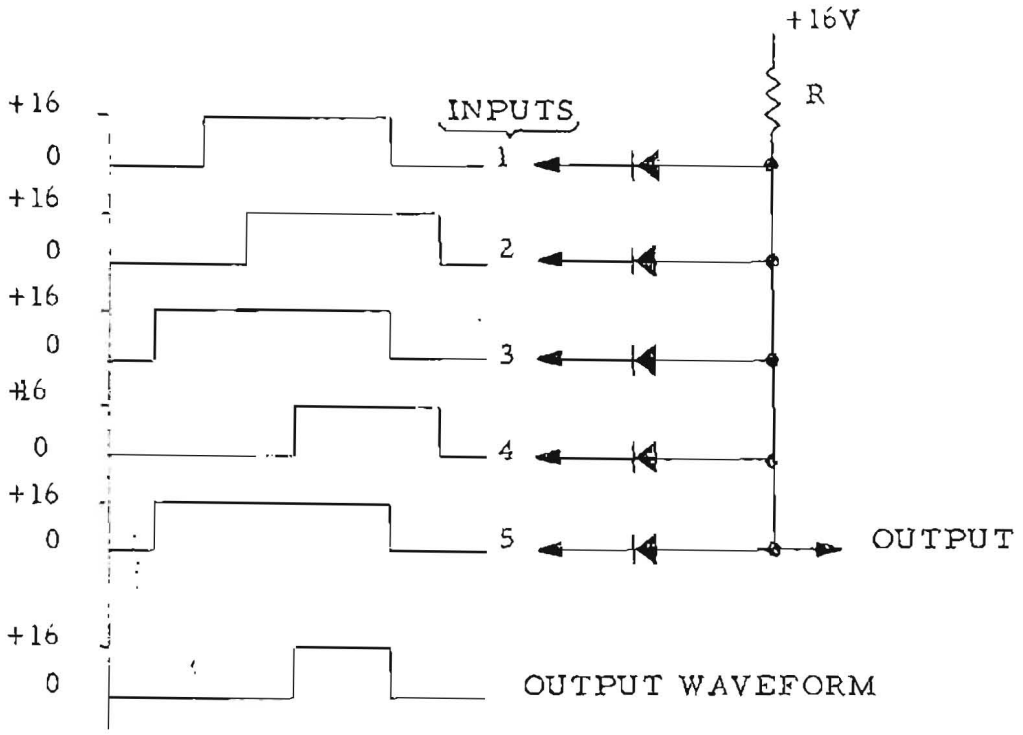



FIGURE 1.

FIVE INPUT "AND" GATE

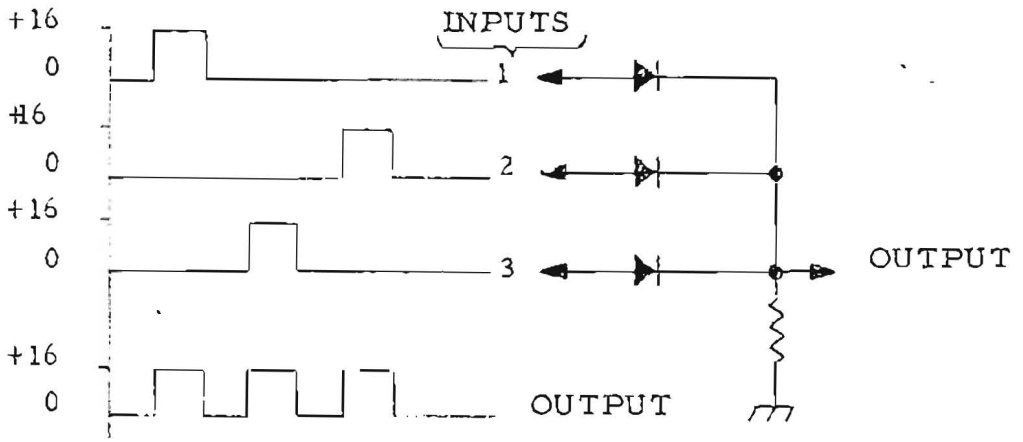



FIGURE 2.

THREE INPUT "OR" GATE

If this switch is open, negative-going pulses from the clock are applied to the input of a five-stage binary divider. A circuit of this type has $2^5$ or 32 different states of condition. That is, each flip-flop will either be in the flip or flop state. For example, the 11th position would occur when the first, second, and fourth stages are conducting in the same transistor while the third and the fifth binary stages are conducting in the opposite transistor. Thus, it is possible to derive a voltage from each collector in all the binary flip-flops, and when properly selected and applied to an "AND" gate, this voltage will produce an output signal which will turn off the trigger switch and prevent additional pulses from advancing the binary divider. As soon as a different push-button is selected, the trigger switch allows clock pulses to advance the binary chain. It will only stop when all five inputs to the "AND" gate, as selected by the push-button assembly, again turn off the trigger switch to stop the clock pulses.

The five binary stages have a capacity to assume 32 different states. However, the stepper switch in the Transmitter Control Unit has only 22 positions, 21 of them for control and metering and the 22nd for the calibration function. Thus, when the binary divider reaches the state corresponding to #23, it must be reset to zero to begin counting again so as to maintain synchronism with the stepper switch. This is accomplished with another five-input "AND" gate. This is essentially the same as having a permanent 23rd push-button which, when activated, applies a pulse to the two-shot reset generator. This generator has two outputs, one slightly longer in duration than the other. The longer of the two outputs is applied to the binary divider to return each state to the zero position. This means that the binary chain is reset. This same pulse is also applied to the trigger switch to prevent clock pulses from entering the binary divider chain.

A two-input "OR" gate is connected to the collectors of the first binary stage so that an output pulse is obtained each time a clock pulse enters the binary system.

The output from this "OR" gate is applied to a bi-stable gate control flip-flop. A pulse from the "OR" gate will shift the bi-stable flip-flop to the other state, which, in turn, controls the control tone gate, causing the 1720 Hz control tone to be turned off. However, a pulse derived from the second output of the 9 Hz clock restores the bi-stable gate to its previous position, 1/2 clock cycle later, thus restoring the output of the 1720 Hz tone to the line. It will be remembered that the two-shot reset generator has two outputs. The long time-duration pulse resets the binary divider chain to zero. The shorter output pulse is applied to the bi-stable gate control flip-flop, which causes the control tone gate to remain closed long enough for the stepper switch in the Transmitter Control Unit to move to the home position. The

longer pulse from the two-shot reset generator assures that the binary divider will not start functioning until all the relays and the stepper in the Transmitter Control Unit have operated.

When the RECYCLE button is pushed, the two-shot reset generator is pulsed just as if the binary chain had advanced to the 23rd position. When this is done, the binary chain is promptly reset, the control gate, which advances the stepper in the Transmitter Control Unit to the home position, is closed, and if the push-button selector is in, for example, the 11th position, the trigger switch will allow clock pulses to enter and advance the binary countdown chain until the 11th state is reached. At this point, the five-input "AND" gate selected by the 11th push-button will produce an output pulse to turn off this trigger switch. Thus, the RECYCLE button which is mounted on the front panel of the Studio Control Unit is a convenient way to quickly reconfirm the position of any depressed button in the Model PBR-21 Control System.

The operation of the Transmitter Control Unit as shown in block diagram SKA-6083 is quite straightforward and needs little explanation. The input signals from the line are passed through a 1100 Hz high-pass filter, limited and amplified, and applied to the LOWER, RAISE, and CONTROL detectors. When a tone of the proper frequency is present, a voltage is obtained to operate a relay-driver amplifier. In the case of the 1720 Hz CONTROL tone, a pulsing and reset relay are employed such that short interruptions of the 1720 Hz signal causes only the pulsing relay to operate. This causes the stepper switch to advance one position. When a longer pulse interruption occurs, such as generated by the two-shot reset generator in the Studio Control Unit, the reset relay also operates. This causes the stepper switch to immediately advance to the home position. If the 1720 Hz signal is not restored within approximately 25 seconds, a time-delay circuit causes the fail-safe relay driver to actuate the FAIL-SAFE relay.

When the 1200 and 1440 Hz tones are applied to the system, the appropriate control relay operates and applied the control voltage through the stepper switch to the barrier strip corresponding to the number of the push-button selected by the operator at the remote control point. Because of the switch employed on the Studio Control Unit, LOWER and RAISE commands may not be given simultaneously.

The DC sampling voltages to be telemetered are applied to the calibration controls mounted on the front panel of the Transmitter Control Unit. A gold-plated switch deck on the stepper selects the output of the desired channel and applies the sampling voltage to a telemeter DC amplifier. The output of this amplifier is used to control the frequency of a voltage-controlled oscillator. When

normal signal circuits are employed, the frequency of the oscillator varies between approximately 400 and 750 Hz (22 to 36 Hz for subaudible telemetering used with radio links). The lower frequency corresponds to ground potential, while the high frequency is produced when a signal of approximately +3 volts DC is applied at the metering input. A low-pass filter removes the harmonic content from the oscillator waveform.

In the home or CALIB. position of the stepper switch, a voltage derived from a Zener reference diode is applied to the input of the telemetering DC amplifier. This will cause the oscillator to assume a frequency approximately midway between the telemetering frequency limits. When the LOWER relay is actuated, this voltage is removed and the voltage-controlled oscillator shifts to the frequency corresponding to a zero potential input.

Schematic Drawings 91B-6122, 91B-6123, 91B-6124, and 91B-6125 show the actual circuits contained on printed Boards A through D respectively. Drawing 91B-6129 shows the power supply, read and recycle relays, filters, and interconnections between the individual plug-in cards. Drawing SKB-6087 shows the manner in which the push-button selector switch is wired. Circuit Board A contains the 9 Hz clock oscillator, bi-stable gate control flip-flop, a time-sharing gate circuit to control the 1720 Hz output, the two-shot reset generator, cycling-read relay control, and summing amplifier. The cycling-read circuit operates a relay which shows the operator when the binary divider chain is being pulsed by turning on the red lamp on the front panel of the Studio Control Unit. This relay is also connected with the telemetering indication relay so that a green panel lamp will turn on after the binary logic is solved and telemetering signal is present. The telemetering detector and relay driver stage are located on Board D. Should the telemetering tone stop, the green lamp will extinguish. This condition also causes the meter to be shorted. Potentiometer R421 is in series with the SLOPE control on the front panel and is used as a coarse metering gain set.

The trigger amplifier, Q201, and the five flip-flops associated with the binary divider chain are located on printed circuit Board B. Diodes CR-203, and CR-204 are the "OR" gate which pulses the bi-stable gate control flip-flop on Board A. Diodes CR202, CR-205, CR206, CR207, and CR208 comprise the five-input "AND" gate to reset the binary divider when it reaches the 23rd state.

Printed circuit Board C contains the three oscillators. The frequency of the oscillation is determined by tuning capacitors C305, C313, and C321. Proper feedback voltage for the oscillators is determined by the transfer characteristics of the bridged-T network between the bases and collectors of transistors Q301, Q303, and Q305. Resistors R307, R319, and R331 determine the Q of the feedback network and hence the stability of the oscillator. Proper setting of this control can be made by finding that point where the circuit just begins to oscillate. Then advance the multiturn potentiometer 1-1/2 turns in the direction that sustains oscillation. A secondary winding on the inductor is used to couple-out energy from the oscillator.

Schematics 91B-6125 and 91B-6127 show the circuits mounted on printed Boards E. and F. Board E contains three detector circuits and relay drivers for the control tones. Note that the detector circuitry is quite similar to the oscillators except that an output winding is not employed. Tuning of the detector is accomplished by the capacitor shunted across the inductor. The sensitivity of the detector is determined by the Q or the bridged- T circuit, which is again controlled by the shunt-resistive element (R503, R517, and R530). The proper setting for these controls is approximately 1-1/2 turns away from the point at which the detectors will oscillate. Emitter-followers are connected to the output of each detector and drive a voltage-doubler rectifier circuit which controls the relay-driver transistor. Circuit Board F contains telemeter DC amplifier, voltage-controlled oscillator, Zener calibration diode, Fail-safe relay driver, and input amplifier to drive the control tone detectors on Board E. The telemeter DC amplifier, Q601, employs two diodes in the base circuit to obtain a double-junction voltage drop to bias the transistor just into the linear conduction region. R610 provides current feedback for stability.

Schematic Drawing 91B-6130 shows the power supply, relays, filters, and interconnection between the two printed circuit sockets located on the Transmitter Control Unit. It should be noted that transistors operating as amplifiers, oscillators, or detectors employ a small capacitor between the base and emitter to eliminate their susceptibility to transient or stray RF fields.

## Maintenance

Being of solid-state design, the Model PBR-21 Remote Control System should require little maintenance. The stepper switch on the Transmitter Control Unit is lubricated at the time of final checkout and should not require additional oiling for 50,000 operations. If it does become exposed to dust and grime to the point where operation is erratic, the stepper switch should be oiled in accordance with the instructions given in an oiling kit, Type PD-9100-1, available from the Automatic Electric Company, Northlake, Illinois. The push-button selector switches are self-wiping and should not require attention. In the event, however, that one set of contacts should become unusable, a spare contact set is provided on each of the 22 push-button positions.

Two spare transistors are mounted on the D and F printed circuit boards. Note that the transistors all plug in the socket in the same relative position and that the socket is wired for the standard transistor base configuration.

A printed circuit extension board is provided with each Model PBR-21 Remote Control System and will allow any given board to be operated out of the cage. It can then be easily checked with appropriate test instruments.

Should it become necessary to let the binary divider on Board B run continuously, removal of Q201 will prevent the trigger switch from being closed by the reset pulse or the logic derived from the push-button selector bank.

Meter Sequence Modification (See Drawing SK3-6135)

Unless otherwise specified, the metering signals and supply voltage for the illuminated meters are wired to the push-button selector switch in the following manner. The CALIB. and control channel #1 information appears on the left-hand meter of the three meter panel. Channel #2 signal and lamp voltages are routed to the middle meter, while all other positions are routed to the right-hand meter. This meter contains a 0 - 140 logging scale as well as a percent output or antenna current scale for FM and AM transmitters, respectively.

If it is desirable to change this sequence, it will be necessary to modify the jumper wiring on the two terminal strips mounted on the rear of the stepper switch assembly. There are 21 individual terminals on each strip. Access to these terminals can be obtained by removing the dust cover over the push-button assembly. When viewing the Studio Control Unit from the rear, the top row of terminals carries the telemetering signals and the lower row carries the 28 volts AC for the meter illumination lamps. The terminals at the right-hand side of the strips are associated with # 1 control channel. The next set of terminals to the left are associated with the second channel. This sequence continues so that the 21st meter and light terminals are on the extreme left-hand side. If control position #11, for example, is to meter and control the plate voltage of an auxiliary transmitter, then the buss wires connected to the 11th metering and light terminals should be removed. These terminals should then be bussed to #1 terminal at the right-hand side. Care should be taken to prevent accidental shorts between terminals when making this modification. It should be noted that the jumper sequence on the upper and lower terminals should be the same; otherwise, the lamp voltage and metering information will not appear on the same meter.

# APPENDIX I

A special alarm circuit has been added to the Model PBR-21 Remote Control System. The purpose of this addition is to provide a visual indication at the control point when any one of several alarm circuits has been actuated at the transmitter site. It may be, for example, to indicate unauthorized entry, overtemperature, excitation failure, etc. Any number of alarms can be paralleled so that any one of them can activate the circuitry to produce the visual indication at the control point. The alarm function is activated when the "ALARM" terminals on the rear of the Transmitter Control Unit have been shorted.

The alarm circuit is an asymmetrical multivibrator which is placed in the free-running mode when the alarm terminals are shorted. The alarm circuitry is located on PC Board F and is shown schematically on Drawing 918-6127. Transistors Q610 and Q611 comprise the basic circuit. The collector of Q610 is coupled through a clamp diode, CR609, to the base of Q605, the telemetering output emitter follower. When the alarm circuit is activated, the base of Q605 is forced to near-ground potential by virtue of its connection to Q610. Thus, the telemetering signal is momentarily reduced to zero when Q610 is conducting. When this occurs, the telemetering indicator relay driver circuit, Q405, on PC Board D in the Studio Control Unit operates and extinguishes the "read" indicator lamp on the Studio Control Unit and the pilot lamps on the meter panel. As the relay operates, the voltage to the meter is also disconnected. Thus, when an alarm condition exists, the READ lamp and meter pilot lamps extinguish, and the meter indication present momentarily falls to zero. This condition exists as long as the alarm terminals at the Transmitter Control Unit are shorted.

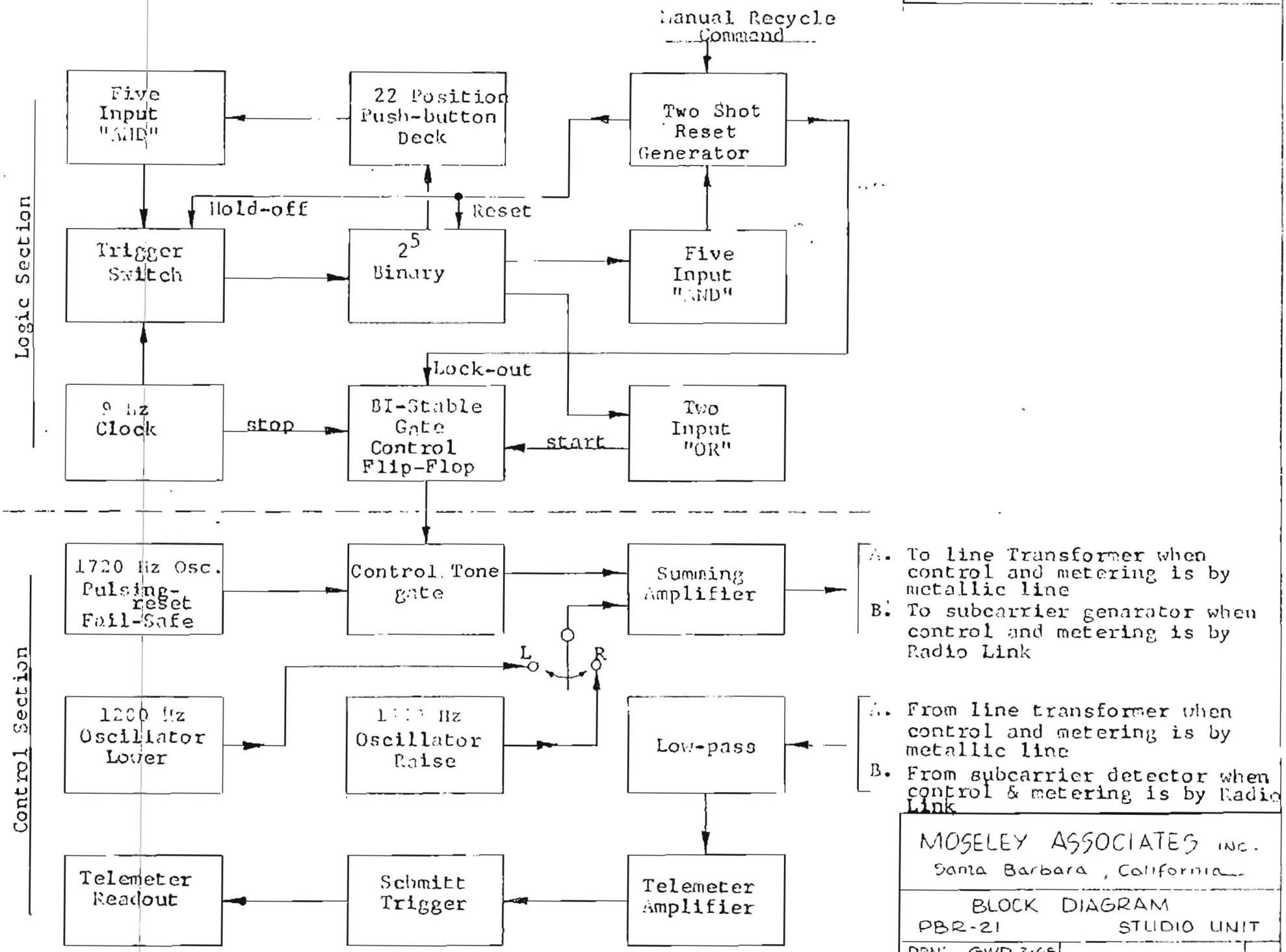
The time constants of the alarm multivibrator circuitry have been chosen so that meter readings may be taken during an alarm condition.

## APPENDIX III

On all Model PBR-21 Remote Control Systems with serial number 1365 and above, two miniature jacks have been added on the rear of the Transmitter Control Unit. These jacks are marked AUX 1 and AUX 2. They are intended to provide a source of regulated 15 volts to power various sampling kits now available from Moseley Associates, Inc. A 680 ohm resistor is wired in series with each of these jacks to prevent the power supply from being overloaded due to a possible short external to the Transmitter Control Unit.

The kits which are intended to be powered by these jacks have a miniature phone plug attached to the cable supplied with the kit. Attach the phone plug to either of these power jacks and attach the remaining wire to the selected telemetry input terminal. As a specific example, the Model TSK-1 Temperature Sensing Kit may be used, with the temperature reading being selected, for instance, on telemetry position 10. Simply plug the miniature phone plug into either of the power jacks and attach the remaining wire to telemetry terminal 10. Then the temperature at the sensing head can be read at the studio by pushing button 10. A second TSK-1 or another kit which requires +15 volts can be added in a similar manner by powering it from the other power jack and connecting it to another telemetry input terminal.

REVISIONS




A. To line Transformer when control and metering is by metallic line
B. To subcarrier genarator when control and metering is by Radio Link

A. From line transformer when control and metering is by metallic line
B. From subcarrier detector when control & metering is by Radio Link

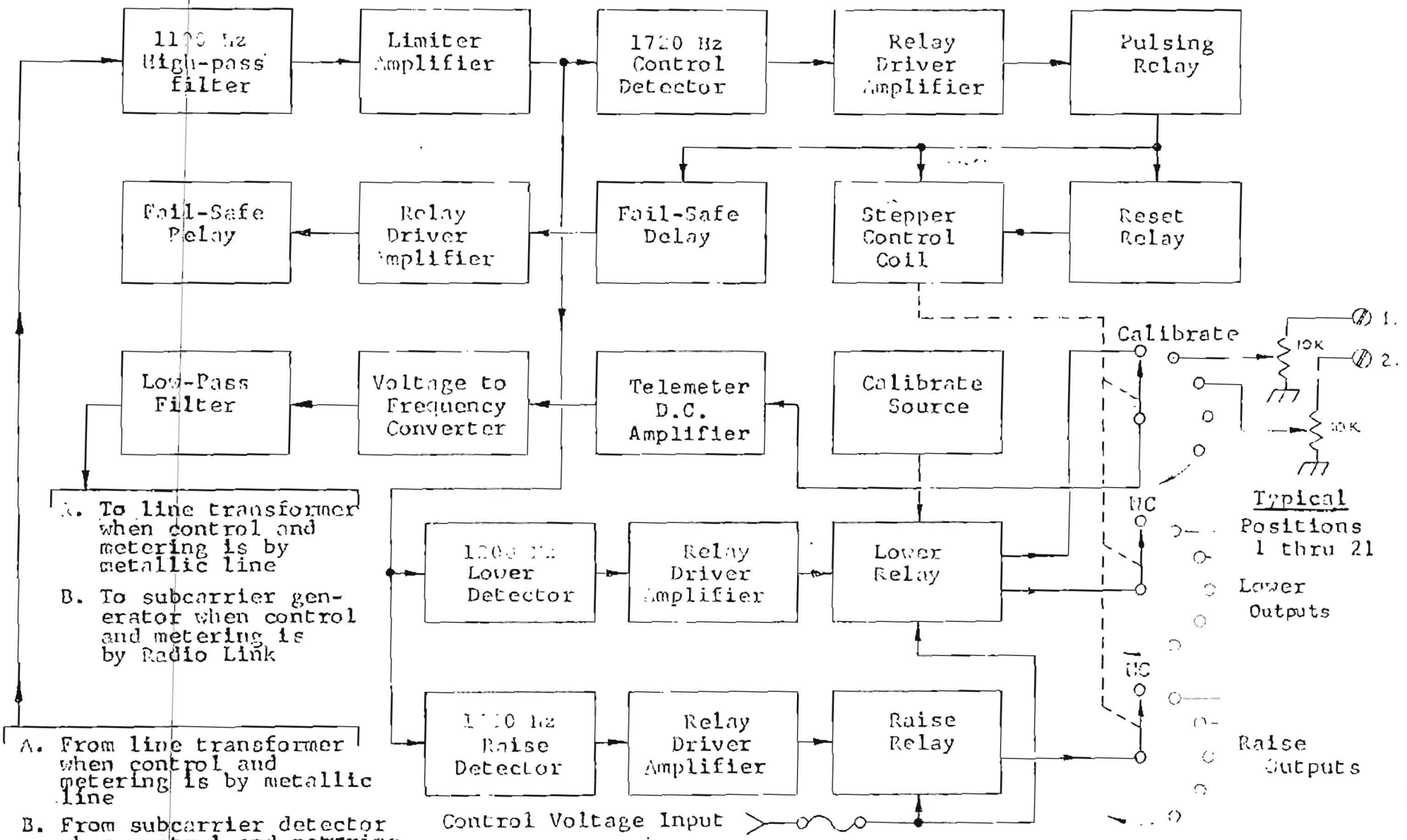
MOSELEY ASSOCIATES INC.
Santa Barbara, California

BLOCK DIAGRAM
PBR-21 STUDIO UNIT

DRN: GWD 2-65
CHK: [illegible] 2-65

SKA-6082

A




REVISIONS

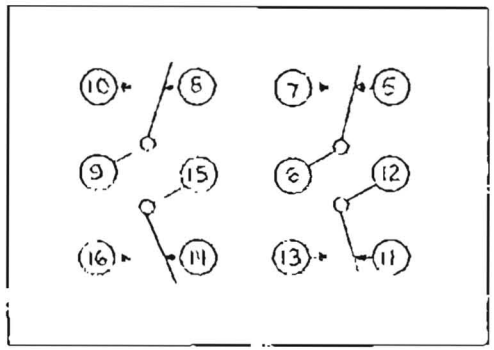
MOSELEY ASSOCIATES INC.
Santa Barbara, California

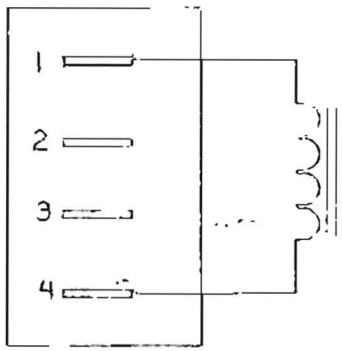
BLOCK DIAGRAM
PBR-21 XMTR. UNIT

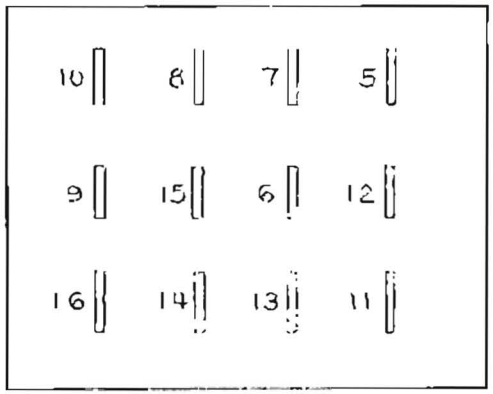
DRN: GWD 2-65
CHK: 2-65

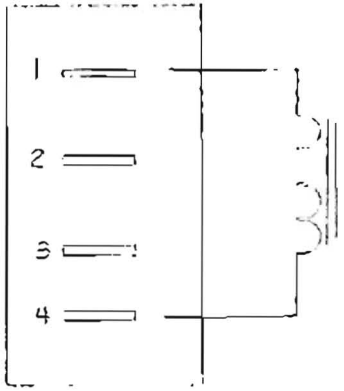
SKA-6083 A

CONTACT ARRANGEMENT
WITH RELAY
DE-ENERGIZED.




COIL RESISTANCE
@ 25°C DC

PICK UP 12 MAX DC
DROP OUT 3 MIN DC

BOTTOM VIEW
(PLUG SOCKET)

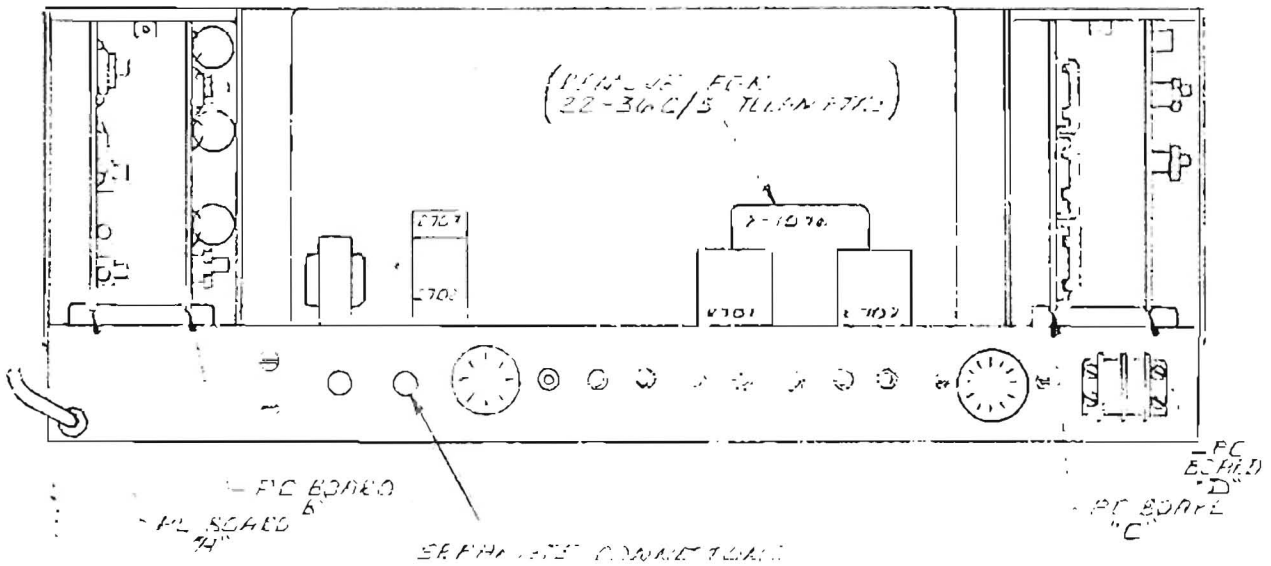
A REVISED 3/66

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

RELAY SOCKET ASSEMBLY

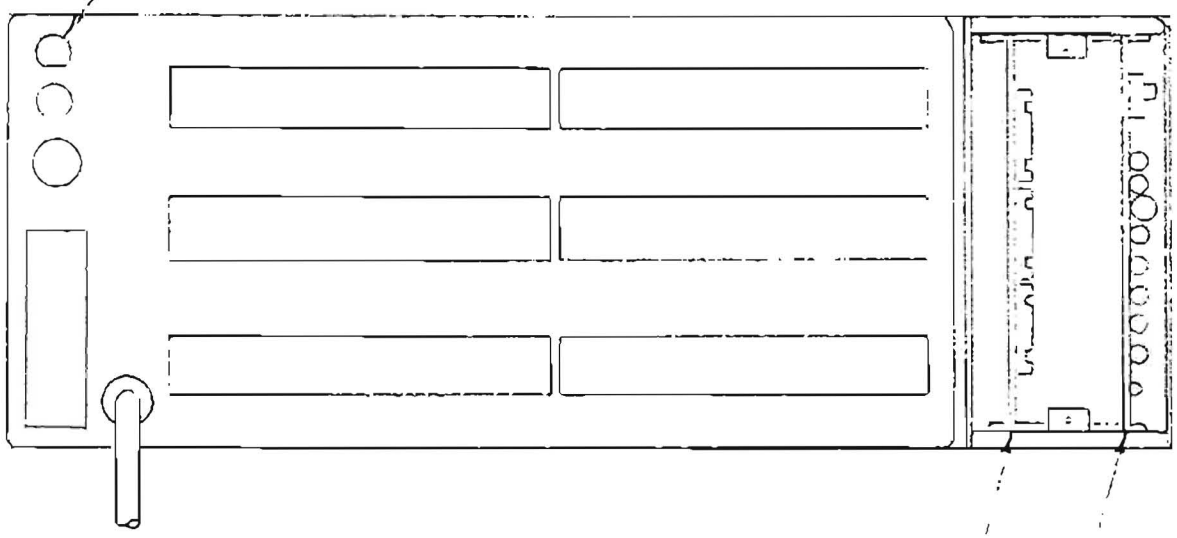
SA 1113

A




SEPARATE CONNECTORS FOR HARD WIRE CONTROL AND REMOTE CONTROL LINKS

TRANSMITTER CONTROL UNIT
REAR VIEW




NOTE:
PRINTED CIRCUIT BOARDS MAY BE INSERTED SO THAT COMPONENTS ARE ON RIGHT HAND SIDE OF PC BOARD WHEN VIEWED FROM REAR.

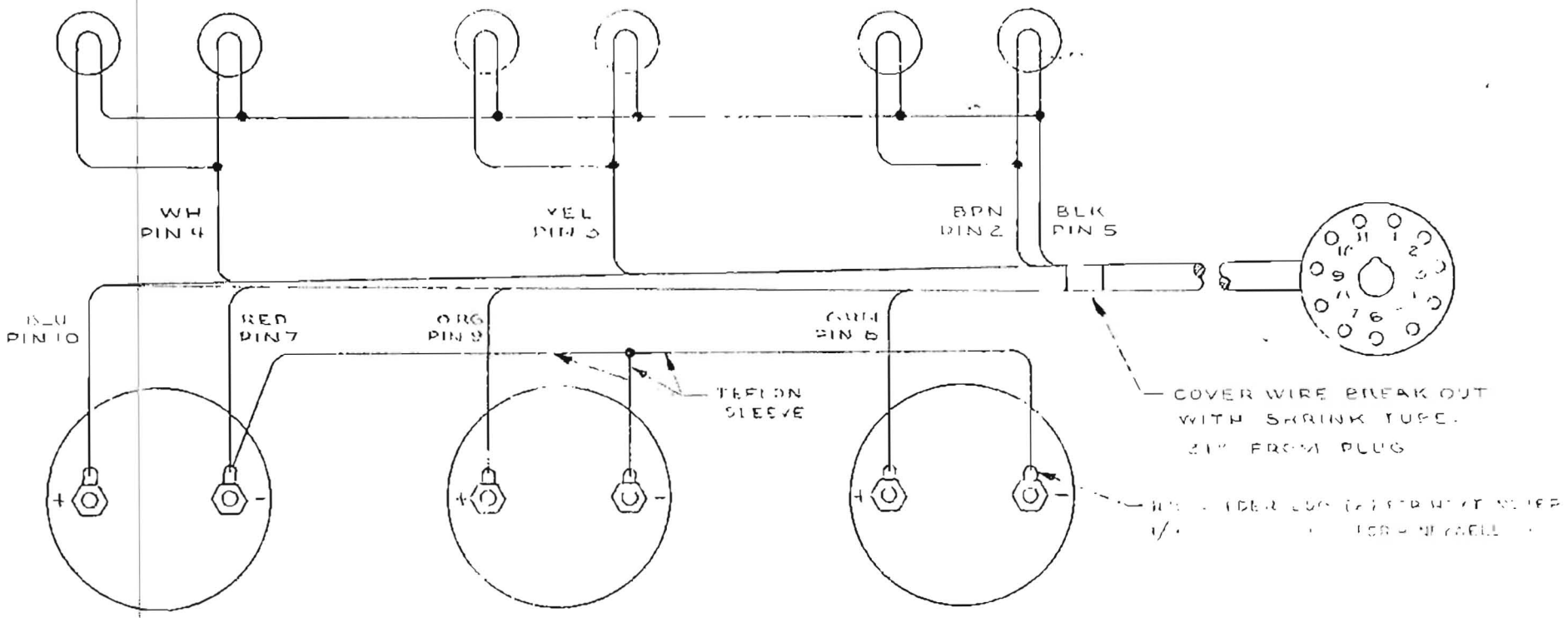
A MARK-ALCO ELECTRONICS

MOSELEY ASSOCIATES INC.
SANTA BARBARA, CALIFORNIA

PC BOARD PLACEMENT
MODEL [illegible]

SA 1113 A

## WIRING REAR VIEW




NOTES:

1. CONNECTOR - 11 PIN AMPHENOL 86PM11-11
2. CABLE - BELDEN 8448 48" GRAY.
3. LAMPS - #1828
4. LAMP SOCKET - LEECRAFT 7-C9

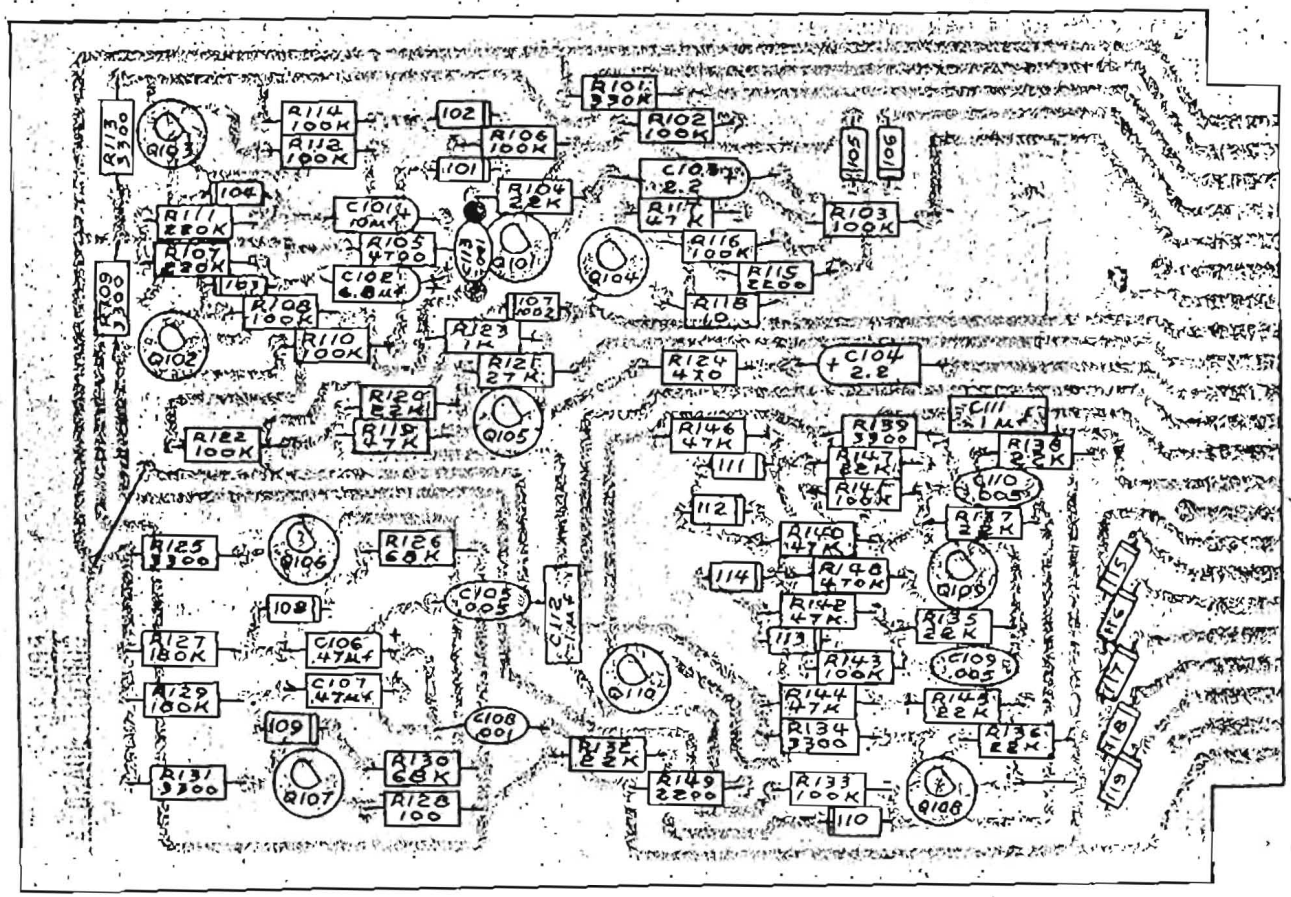
| | | |
|---|---|---|
| B | REDRAWN 8/67 | |
| A | LAMPS WERE #1819 | |

**MOSELEY ASSOCIATES, INC.**
SANTA BARBARA, CALIFORNIA

METER PANEL WIRING DIAGRAM
MODEL PBR-21A PANEL 1077

DWN FXY 8-67
CHK

91A6131 B




NOTES:

1. UNLESS OTHERWISE SPECIFIED
   RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%
   CAP. VALUES ARE IN µf
   TRANSISTORS ARE 2N2924
2. NUMBERED COMPONENTS ARE IN4184 DIODES
   CR107 IS 1002 DIODE
3. SCHEMATIC 9186122
4. THIS DWG. SUPERSEDES DWG. 2A1155

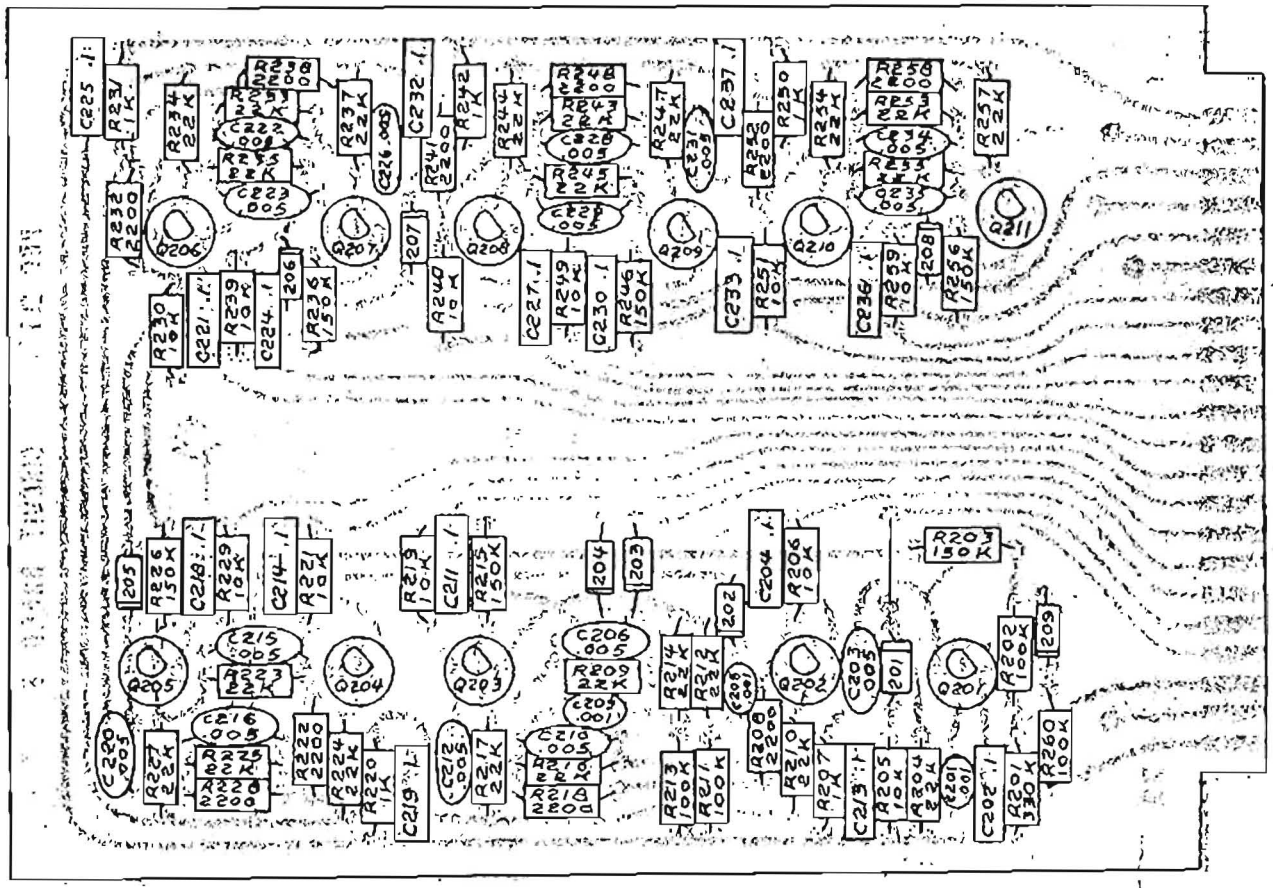
| REVISIONS | DATE | |
|---|---|---|
| C | CR107 WAS SD-6 | 4/68 |
| B | ADD C113 - .001. ECO 93 | 12/67 |
| A | R117 WAS MARKED 4700 | 12-1-67 |

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

# COMPONENT LAYOUT
## PC BOARD A PBR-21A SCU

TOL FRACT ± 1/32, .XX ± 030, .XXX ± .010

| | | | |
|---|---|---|---|
| DWN | F.X.V. | 11/67 | SCALE: FULL |
| CHK | R.V.F. | 11/67 | 20A2055 C |
| ENG | J.C.D. | 11-67 | |



NOTES:

1 UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS, 1/2 W. 10%
CAPACITOR VALUES ARE IN MICROFARADS.
TRANSISTORS ARE 2N2924
NUMBERED COMPONENTS ARE IN4154 DIODES

2 SCHEMATIC 9186123

3 THIS DWG. SUPERSEDES DWG 2A1156

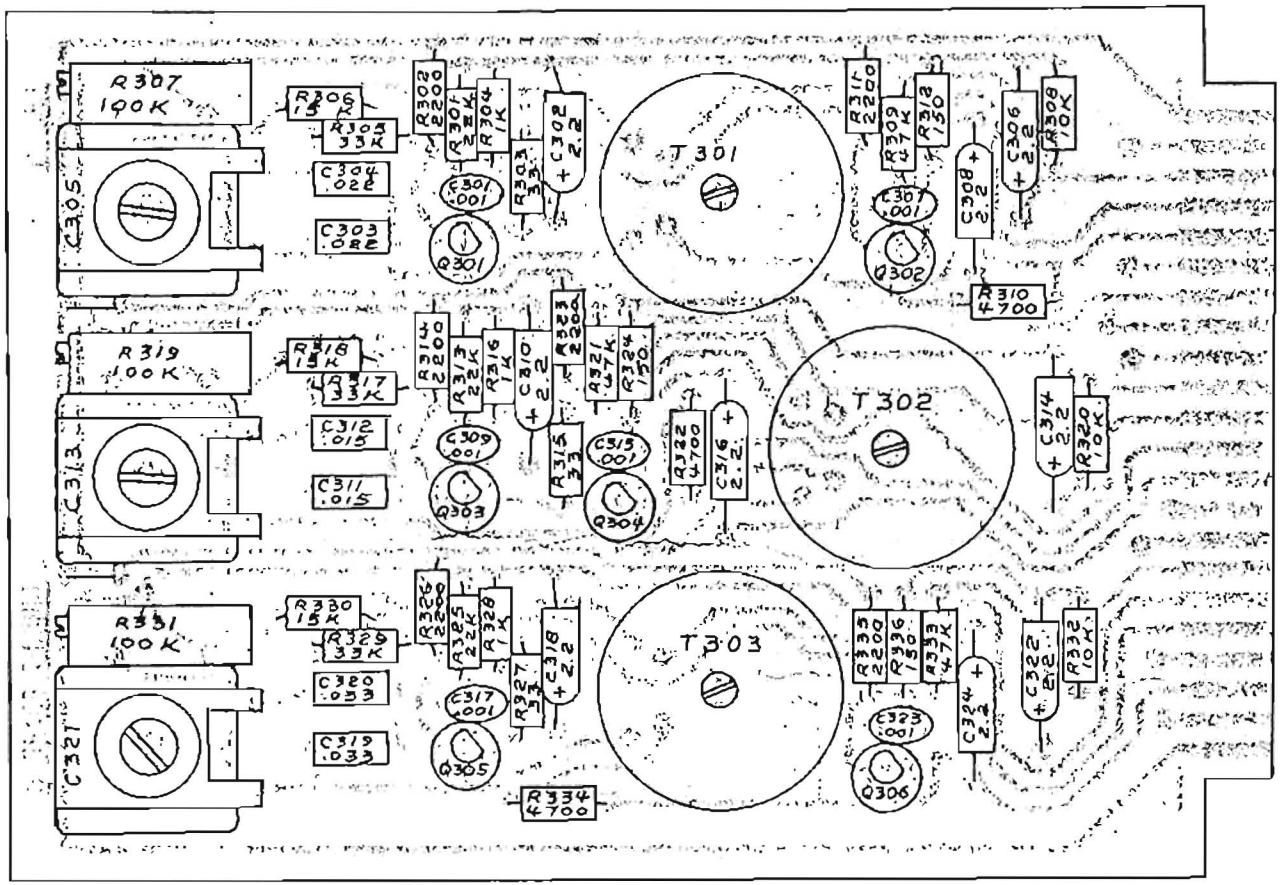
REVISIONS | DATE

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

# COMPONENT LAYOUT
## PC BOARD B PBR-21A SCU

TOL. FRACT ± 1/32. .XX ± .030. XXX ± .010

| | | | |
|---|---|---|---|
| DWN | EXY | 11/67 | SCALE FULL |
| CHK | RVE | 11/67 | 20A2056 |
| ENG | JCP | 11-67 | |




NOTES:

1 UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%
CAPACITOR VALUES ARE IN MICROFARADS.
TRANSISTORS ARE 2N2924

2 SCHEMATIC 91B6124.

3 THIS DWG. SUPERSEDES DWG. 2A1157

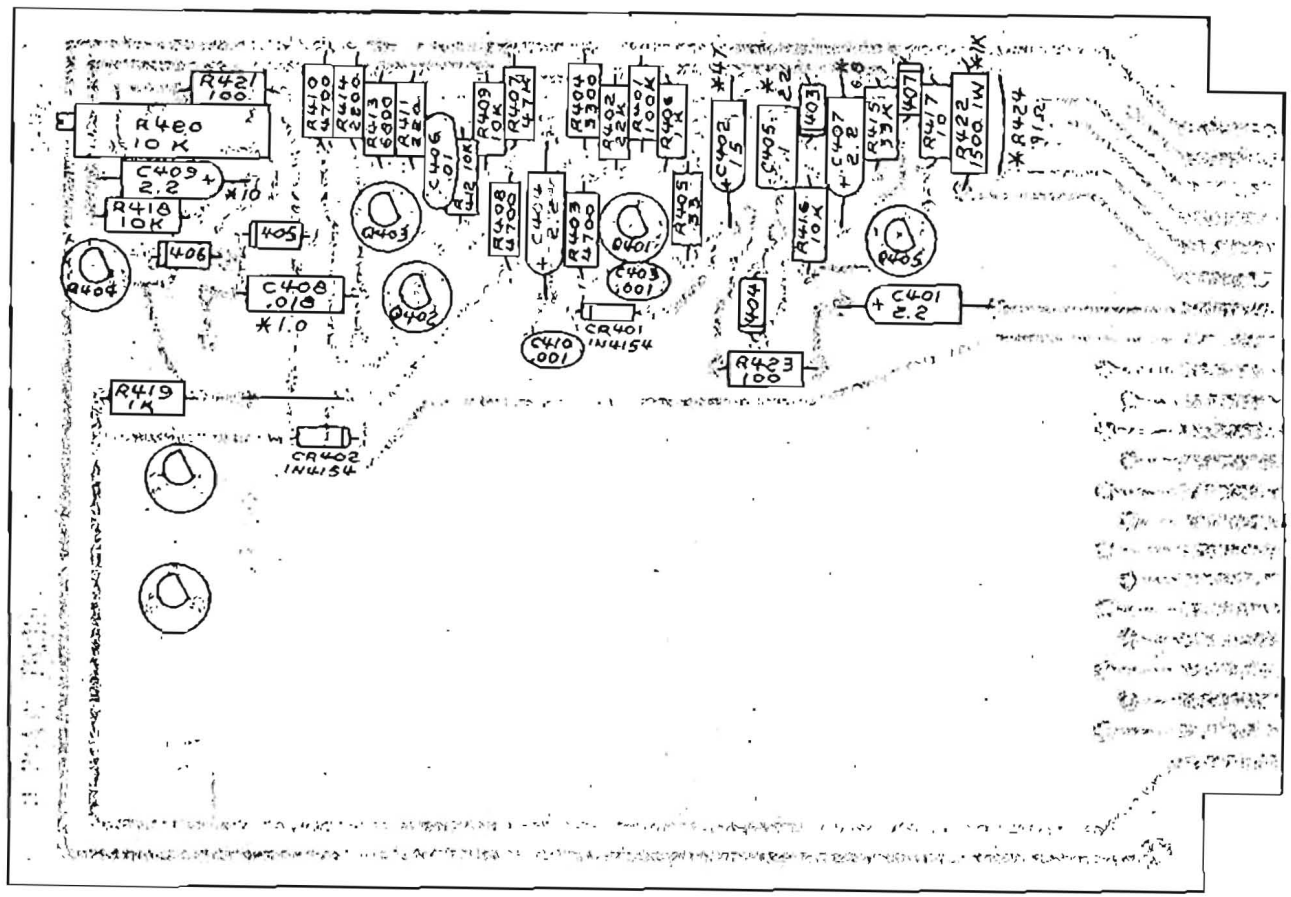
| REVISIONS | | DATE |
|---|---|---|
| A | ADD E JUMPER WIRES 2/GA | |

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

# COMPONENT LAYOUT
## PC BOARD C PBR-21A SCU

TOL FRACT ± 1/32 XX ± .030 .XXX ± .010

| | | | |
|---|---|---|---|
| DWN | F X Y | 11/67 | SCALE: FULL |
| CHK | R V F | 11/67 | 20A2057 A |
| ENG | J G | 11-67 | |




NOTES:

1. UNLESS OTHERWISE SPECIFIED
   RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%
   CAPACITOR VALUES ARE IN MICROFARADS.
   TRANSISTORS ARE 2N2924
   NUMBERED COMPONENTS ARE 1002 DIODES.
2. SCHEMATIC 9186125
3. SUB-AUDIBLE MODIFICATION 5KA6152
4. THIS DWG. SUPERSEDES DWG. 2A1158.
5. * DENOTES COMPONENT CHANGES FOR SUB-AUDIBLE

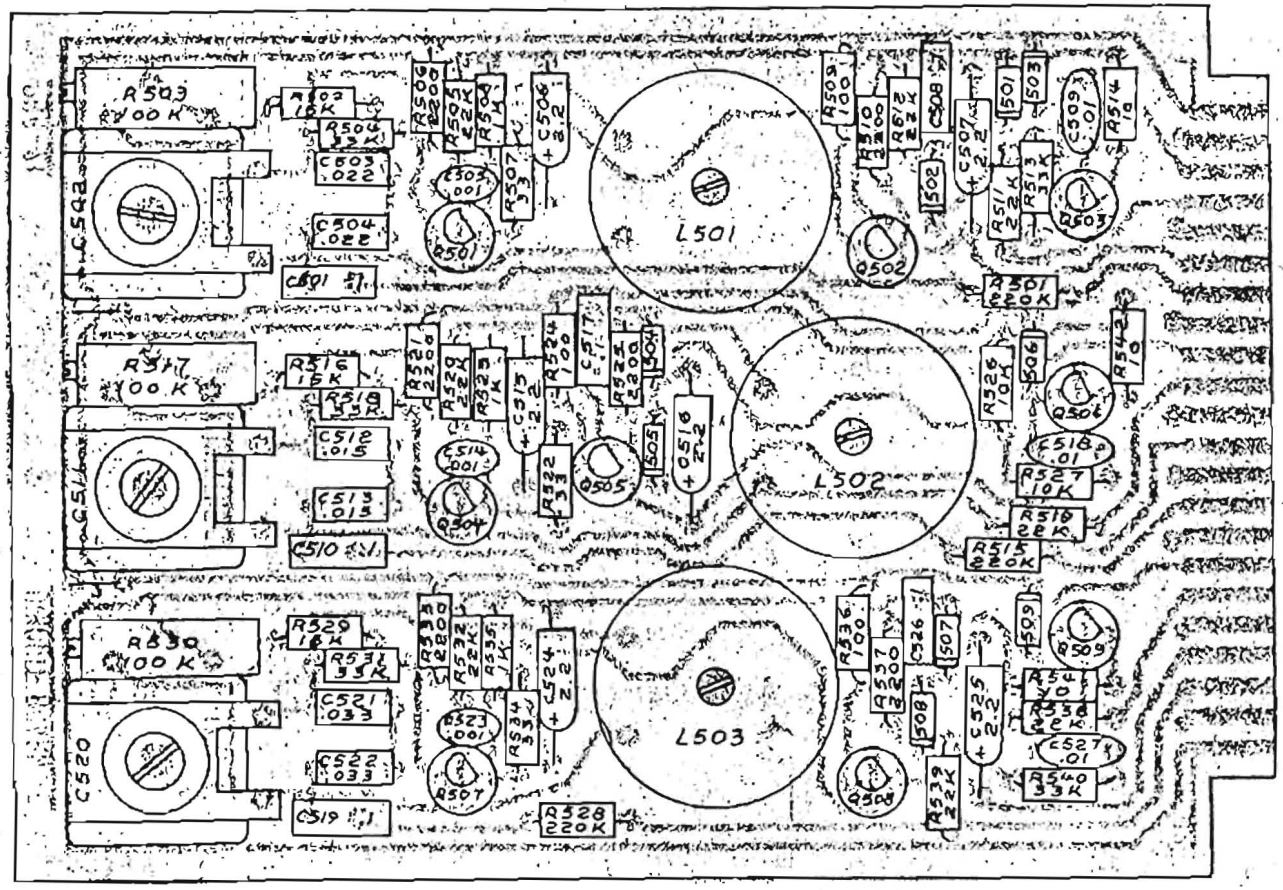
| REVISIONS | DATE | |
|---|---|---|
| B | C402 WAS 10 µf ECO 157 | 5/68 |
| A | DIODES WERE 50-6 | 4/68 |

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

# COMPONENT LAYOUT
## PC BOARD D PBR-21A SCU

TOL FRACT ± 1/32, .XX ± 030, .XXX ± .010

| | | | |
|---|---|---|---|
| DWN | EXY | 11/67 | SCALE: FULL |
| CHK | RVE | 11/67 | 20A2058 B |
| ENG | JCA | 11-67 | |




LEFT BOARD

NOTES:

1. UNLESS OTHERWISE SPECIFIED.
   RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%.
   CAPACITOR VALUES ARE IN MICROFARADS.
   TRANSISTORS ARE 2N2924
   NUMBERED COMPONENTS ARE DIODES.
2. SCHEMATIC 9186128
3. THIS DWG. SUPERSEDES 2A1159

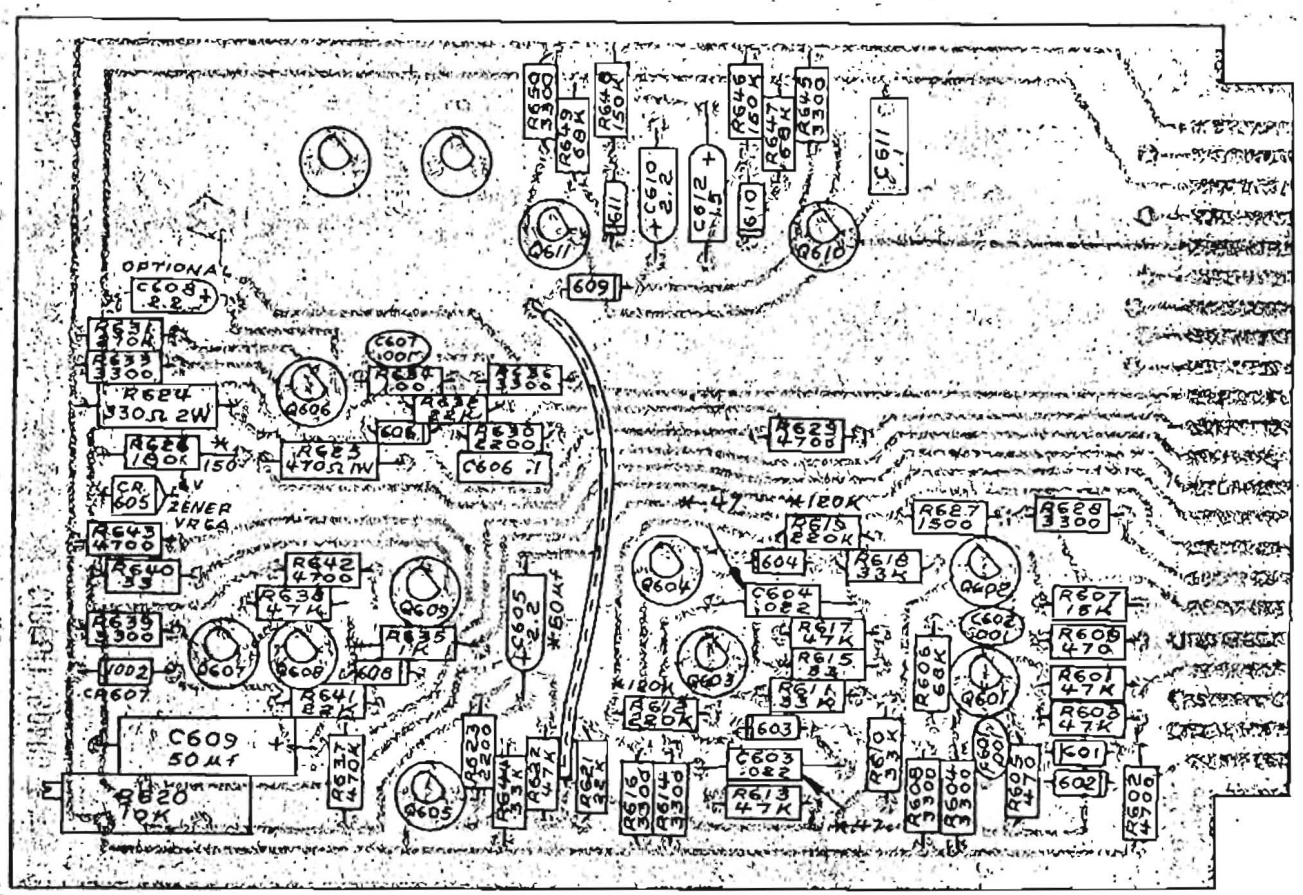
| REVISIONS | DATE | |
|---|---|---|
| B | 4/68 | DIODES WERE SD-6 |
| A | 1/68 | ADD 2 JUMPER WIRES |

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

# COMPONENT LAYOUT
## PC BOARD E PBR-21A TCU

TOL FRACT ± 1/32, .XX ± .030, .XXX ± .010

| | | | |
|---|---|---|---|
| DWN | F X V | 11/67 | SCALE: FULL |
| CHK | R V E | 11/67 | 20A2059 B |
| ENG | J C T | 11-67 | |




RIGHT HAND BOARD -

NOTES:

1 UNLESS OTHERWISE SPECIFIED;
RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%
CAPACITOR VALUES ARE IN MICROFARADS.
TRANSISTORS ARE 2N2924.
NUMBERED COMPONENTS ARE IN4154 DIODES

2 SCHEMATIC B1B6127

3 THIS DWG. SUPERSEDES DWG. 2A1160

4 ✱ DENOTES COMPONENT CHANGES FOR SUB-AUDIBLE

| REVISIONS | DATE | |
|---|---|---|
| D | 11/68 | R614 & R618 WERE 39K ECO. 221 |
| C | 4/68 | CR607 WAS SCE-2 |
| B | 3/68 | ADD SUB-AUDIBLE VALVES TO C603 & C604 |
| A | 1/68 | SWITCH R621 & R622 |

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

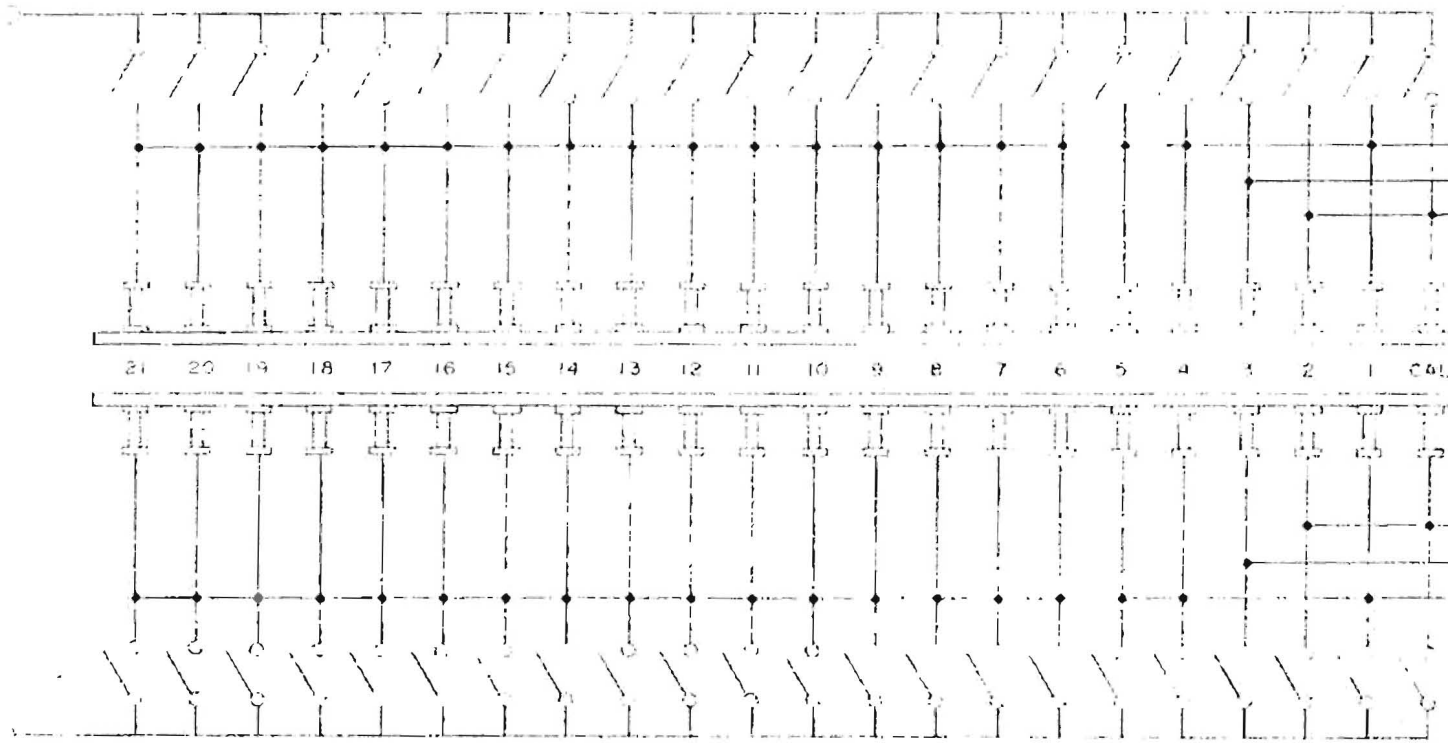
# COMPONENT LAYOUT
## PC BOARD F PBR-21A TCU

TOL. FRACT. ± 1/32 XX ± .030, XXX ± .010

| | | | |
|---|---|---|---|
| DWN | FXY | 11/67 | SCALE: FULL |
| CHK | RVF | 11/67 | 20A2060 D |
| ENG | JCT | 11-67 | |

REAR VIEW

METERING INPUT FROM TELEMETERING CONVERTER




28 VAC LIGHTING INPUT

SWITCHES SHOWN ARE MECHANICALLY GANGED AND ARE TWO OF A TOTAL OF EIGHT CONTACTS THAT CLOSE EACH TIME THEIR RESPECTIVE PUSH BUTTON IS DEPRESSED

TO METER #3 INPUT
" " " #2 "
" " " #1 "

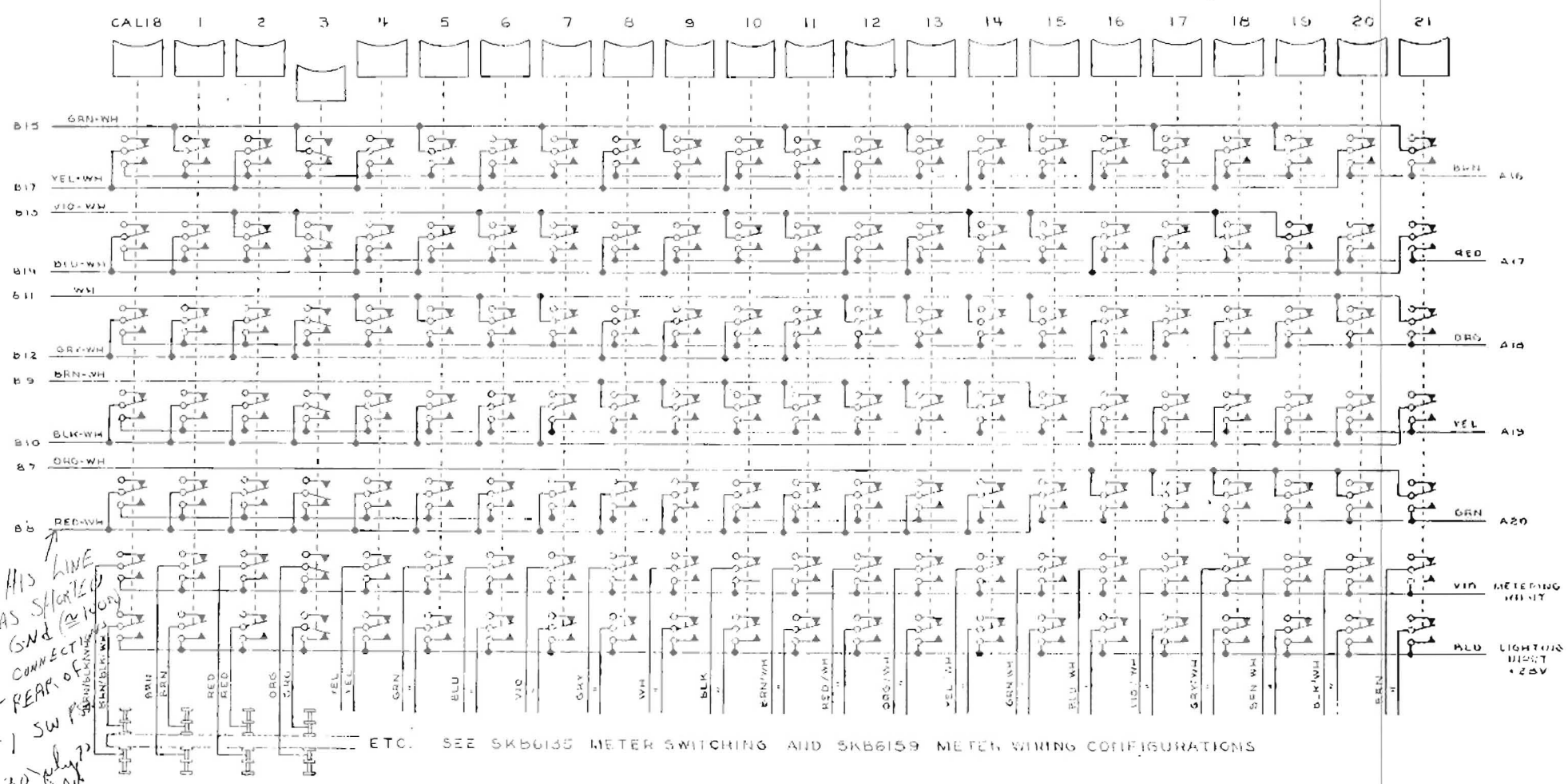
TO METER #1 LIGHTS
" " " #2 "
" " " #3 "

#1 – POWER OUT "3 METER
#2 – PLATE VOLTAGE "1 "
#3 – PLATE CURRENT "2 "
#4 – P.A. SC VOLTAGE "3 "

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

METER SWITCHING
PSR-21

SK 86135 H




THIS LINE WAS SHORTED TO GND (@ 1402) IN CONNECTOR AT REAR OF UNIT

* 1 SW PER CHANNEL

30 July 71

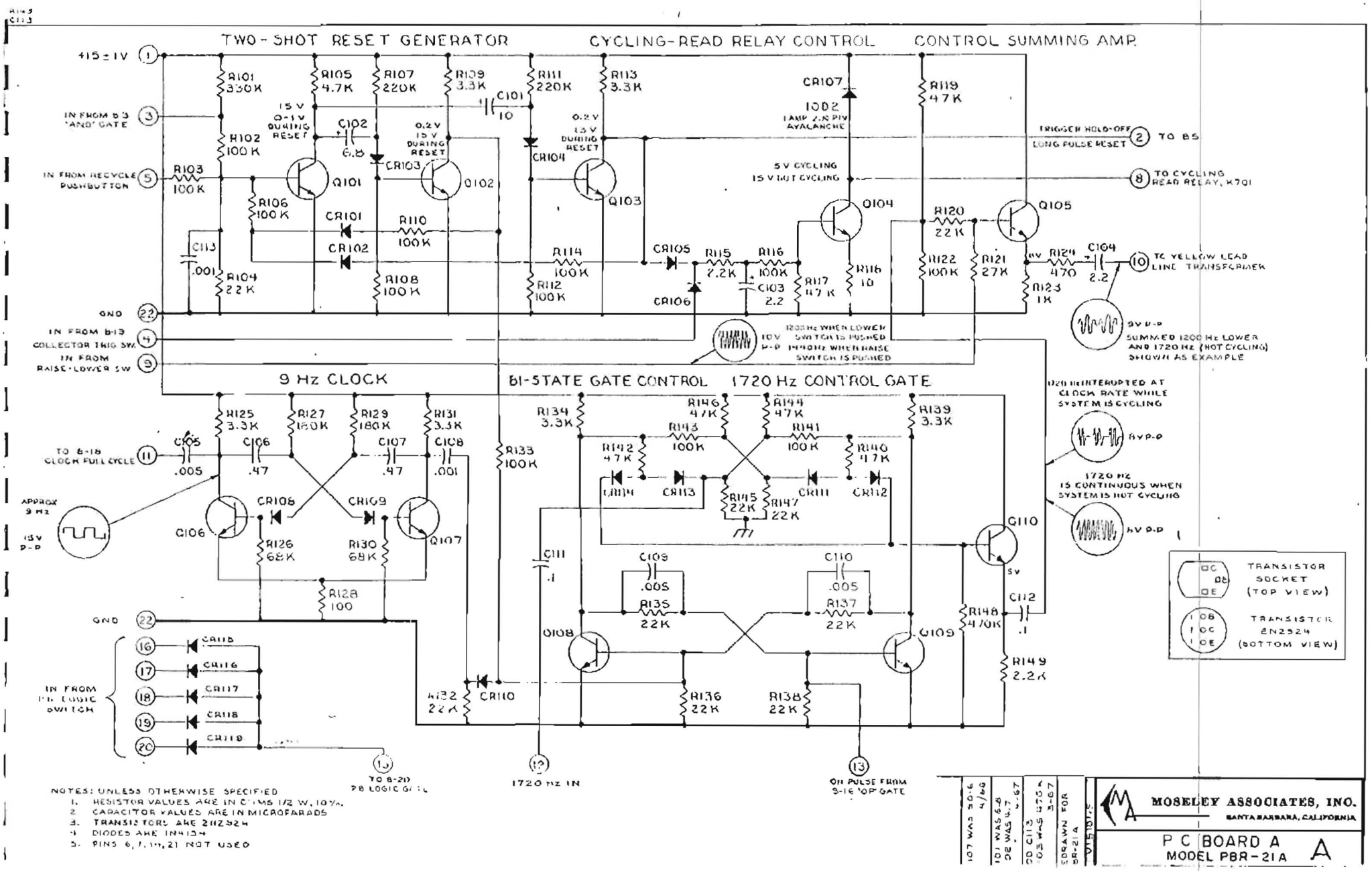
NOTES:

1. ONE SPARE SET CONTACTS PER CHANNEL NOT SHOWN.
2. LETTER-NUMBER DESIGNATIONS INDICATE PC BOARD AND PIN NUMBER

REDRAWN TO SHOW ALL CHAN 9-67

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

PUSH BUTTON CONFIGURATION
MODEL PBR-21A

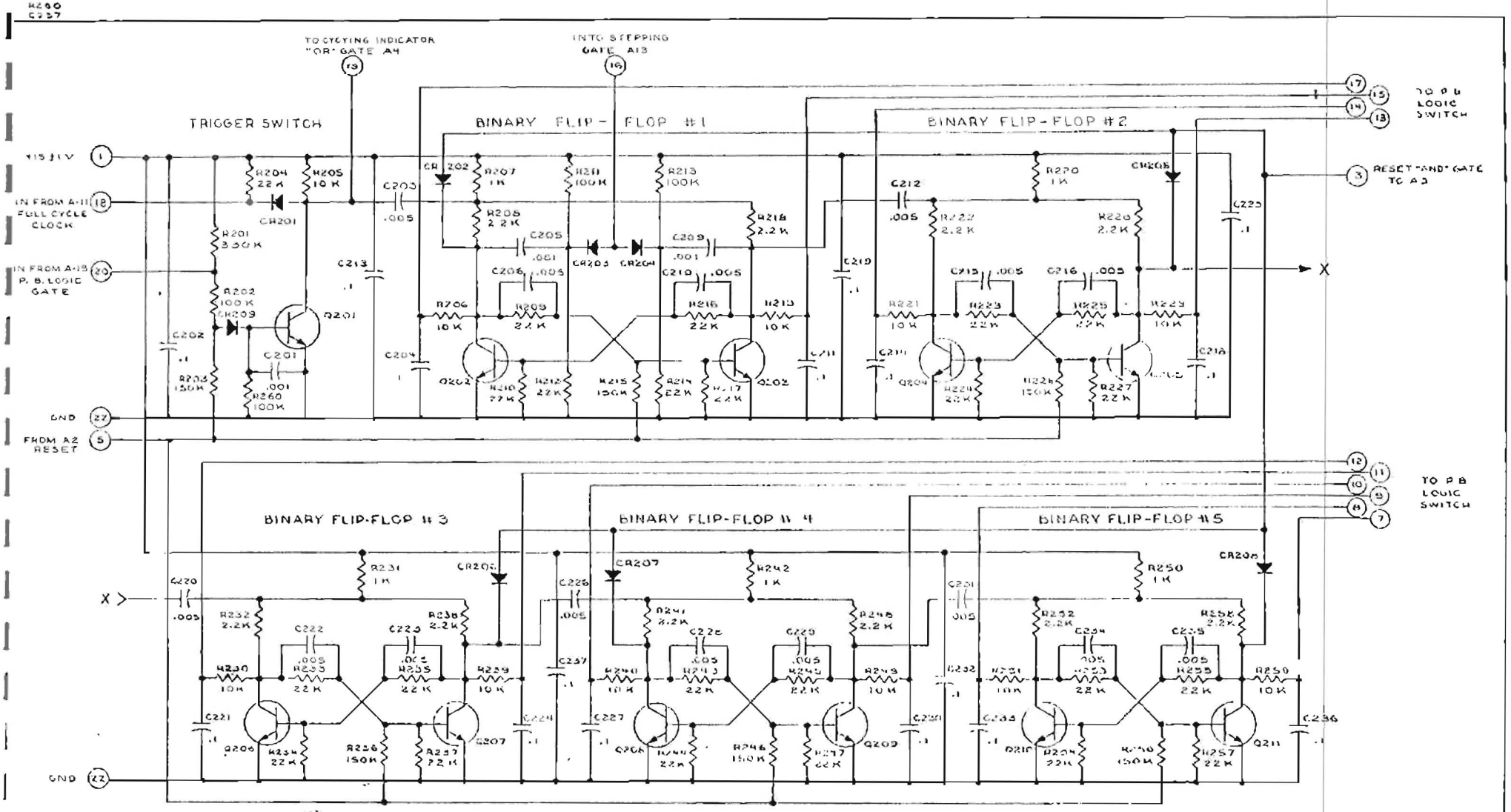



NOTES: UNLESS OTHERWISE SPECIFIED
1. RESISTOR VALUES ARE IN OHMS 1/2 W, 10%.
2. CAPACITOR VALUES ARE IN MICROFARADS
3. TRANSISTORS ARE 2N2924
4. DIODES ARE 1N4154
5. PINS 6, 7, 14, 21 NOT USED

| | |
|---|---|
| 107 WAS 30.6 4/66 | |
| 101 WAS 6.8 02 WAS 4.7 3-67 | |
| 20 C113 103 WAS 4700 3-67 | |
| DRAWN FOR BR-21A | |
| REVISIONS | |

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

P C BOARD A
MODEL PBR-21A A




NOTES: UNLESS OTHERWISE SPECIFIED
1. RESISTOR VALUES ARE IN OHMS 1/2 W, 10%.
2. CAPACITOR VALUES ARE IN MICROFARADS.
3. TRANSISTORS ARE 2N2924.
4. DIODES ARE 1N4154

TRANSISTOR SOCKET (TOP VIEW)

TRANSISTOR 2N2924

9VDC
0VDC

TYPICAL BINARY COLLECTOR WAVEFORM. RATE AND DUTY CYCLE WILL VARY DEPENDING ON BINARY STAGE VIEWED. CONTINUOUS CYCLING POSSIBLE BY REMOVING Q201. EACH BINARY FLIP-FLOP SHOULD RUN AT 1/2 ITS OWN INPUT RATE.

ADD R260 ADD CR 209, R203 WAS 10K TO GND 5-67

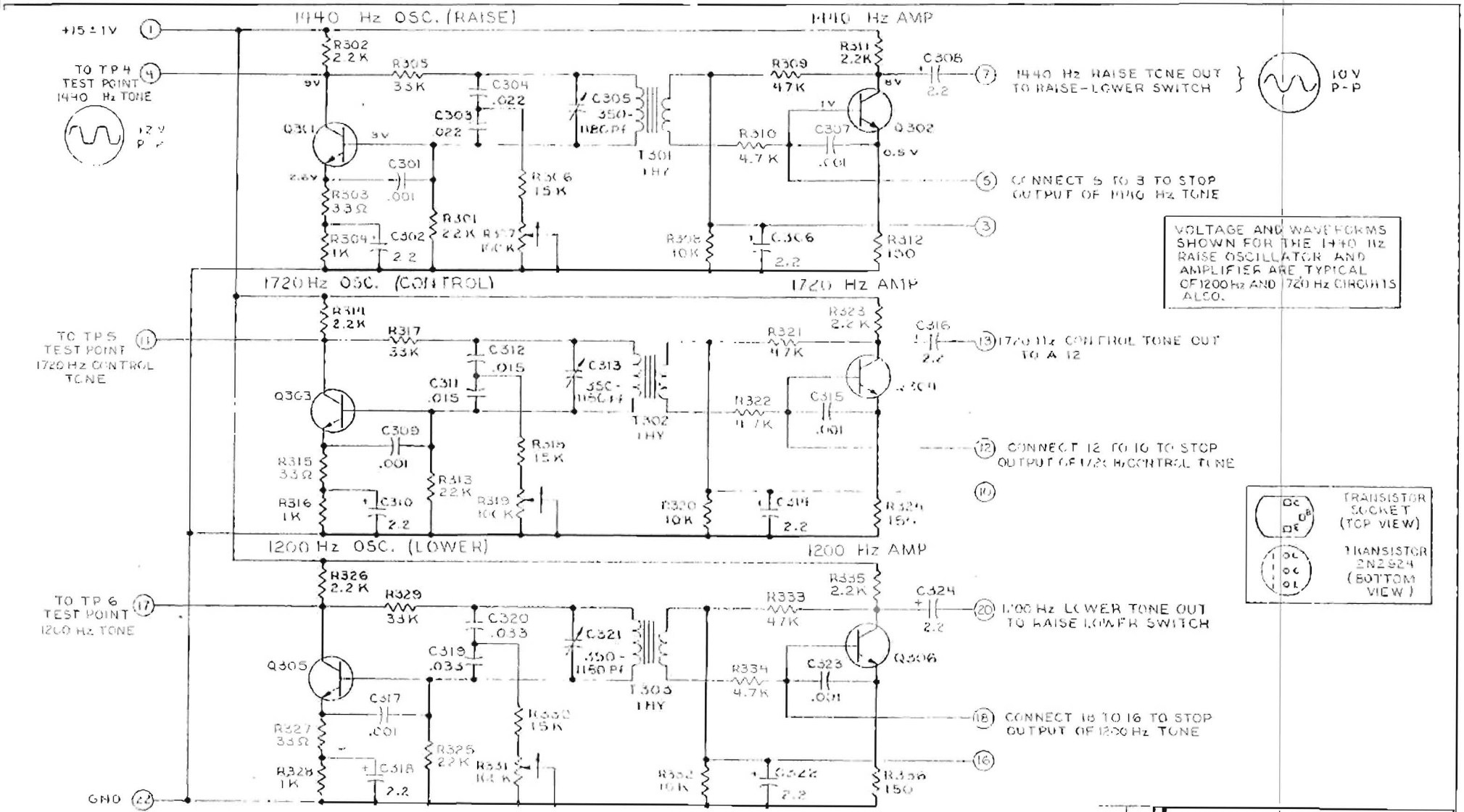
DRAWN FOR 68-214

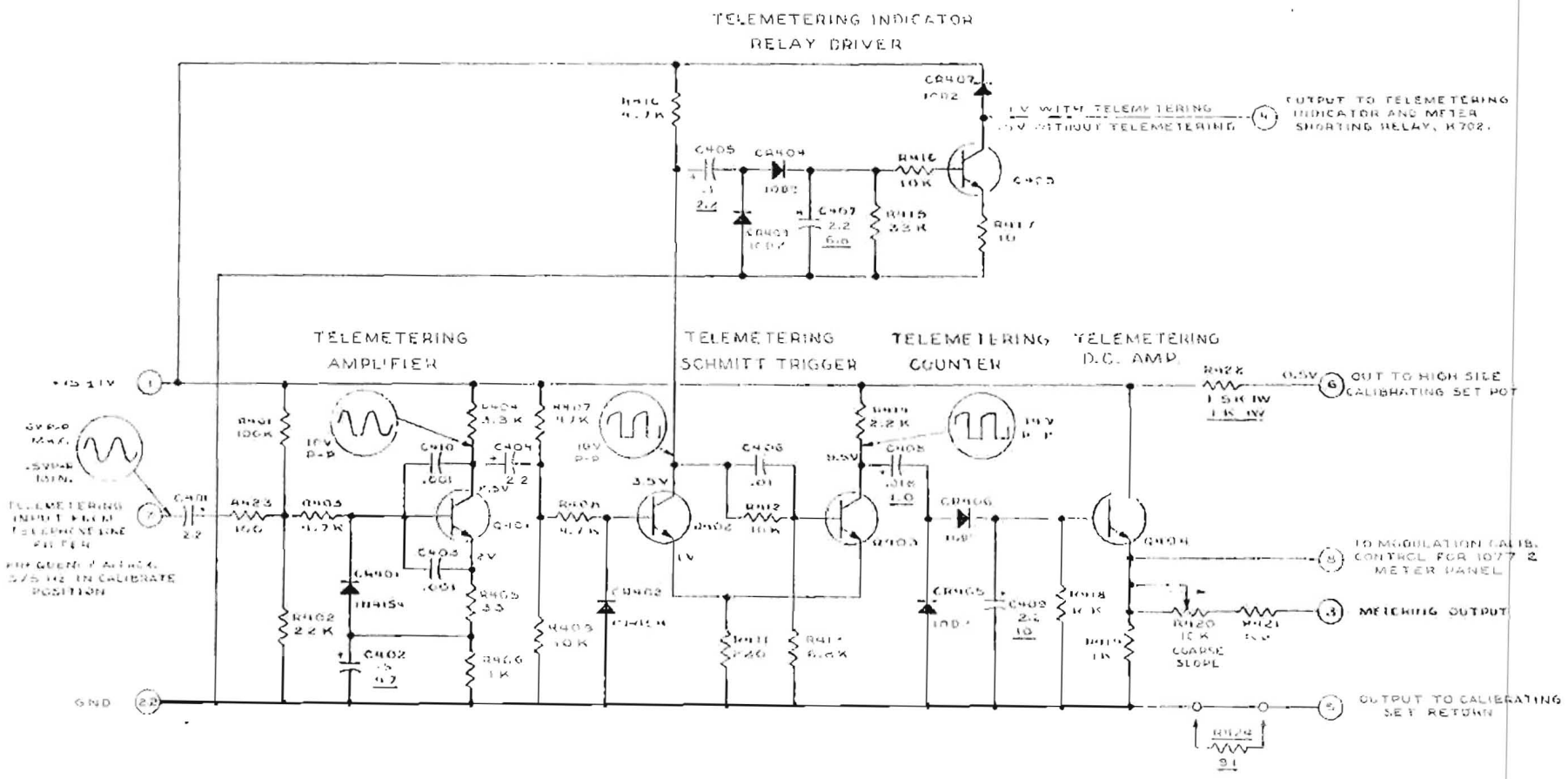
VISINES

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

P C BOARD B
MODEL P8R-21A

B


1440 Hz OSC. (RAISE)
1440 Hz AMP
+15 ± 1V
TO TP 4 TEST POINT 1440 Hz TONE
12 V P-P
R302 2.2K
R305 33K
C304 .022
C303 .022
C305 350-1150 PF
T301 THY
Q301
C301 .001
R303 33Ω
R304 1K
C302 2.2
R301 22K
R307 100K
R306 15K
R309 47K
R311 2.2K
C306 2.2
Q302
R310 4.7K
C307 .001
R308 10K
C306 2.2
R312 150
7 1440 Hz RAISE TONE OUT TO RAISE-LOWER SWITCH
10 V P-P
5 CONNECT 5 TO 3 TO STOP OUTPUT OF 1440 Hz TONE
3
VOLTAGE AND WAVEFORMS SHOWN FOR THE 1440 Hz RAISE OSCILLATOR AND AMPLIFIER ARE TYPICAL OF 1200 Hz AND 1720 Hz CIRCUITS ALSO.
1720 Hz OSC. (CONTROL)
1720 Hz AMP
TO TP 5 TEST POINT 1720 Hz CONTROL TONE
11
R314 2.2K
R317 33K
C312 .015
C311 .015
C313 550-1150 PF
T302 THY
Q303
C309 .001
R315 33Ω
R316 1K
C310 2.2
R313 22K
R318 15K
R319 100K
R323 2.2K
R321 47K
C316 2.2
Q304
R322 4.7K
C315 .001
R320 10K
C314 2.2
R324 150
13 1720 Hz CONTROL TONE OUT TO A 12
12 CONNECT 12 TO 10 TO STOP OUTPUT OF 1720 Hz CONTROL TONE
10
TRANSISTOR SOCKET (TOP VIEW)
TRANSISTOR 2N2924 (BOTTOM VIEW)
1200 Hz OSC. (LOWER)
1200 Hz AMP
TO TP 6 TEST POINT 1200 Hz TONE
17
R326 2.2K
R329 33K
C320 .033
C319 .033
C321 550-1150 PF
T303 THY
Q305
C317 .001
R327 33Ω
R328 1K
C318 2.2
R325 22K
R331 100K
R330 15K
R333 47K
R335 2.2K
C324 2.2
Q306
R334 4.7K
C323 .001
R332 10K
C322 2.2
R336 150
20 1200 Hz LOWER TONE OUT TO RAISE LOWER SWITCH
18 CONNECT 18 TO 16 TO STOP OUTPUT OF 1200 Hz TONE
16
GND 22
NOTES: UNLESS OTHERWISE SPECIFIED
1. RESISTOR VALUES ARE IN OHMS 1/2 W, 10 %
2. CAPACITOR VALUES ARE IN MICROFARADS
3. ALL TRANSISTORS ARE 2N2924
SEE INSTRUCTION MANUAL FOR PROPER ADJUSTMENT OF R307, R319 & R331
MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA
PC BOARD C
MODEL PBR-21A
C



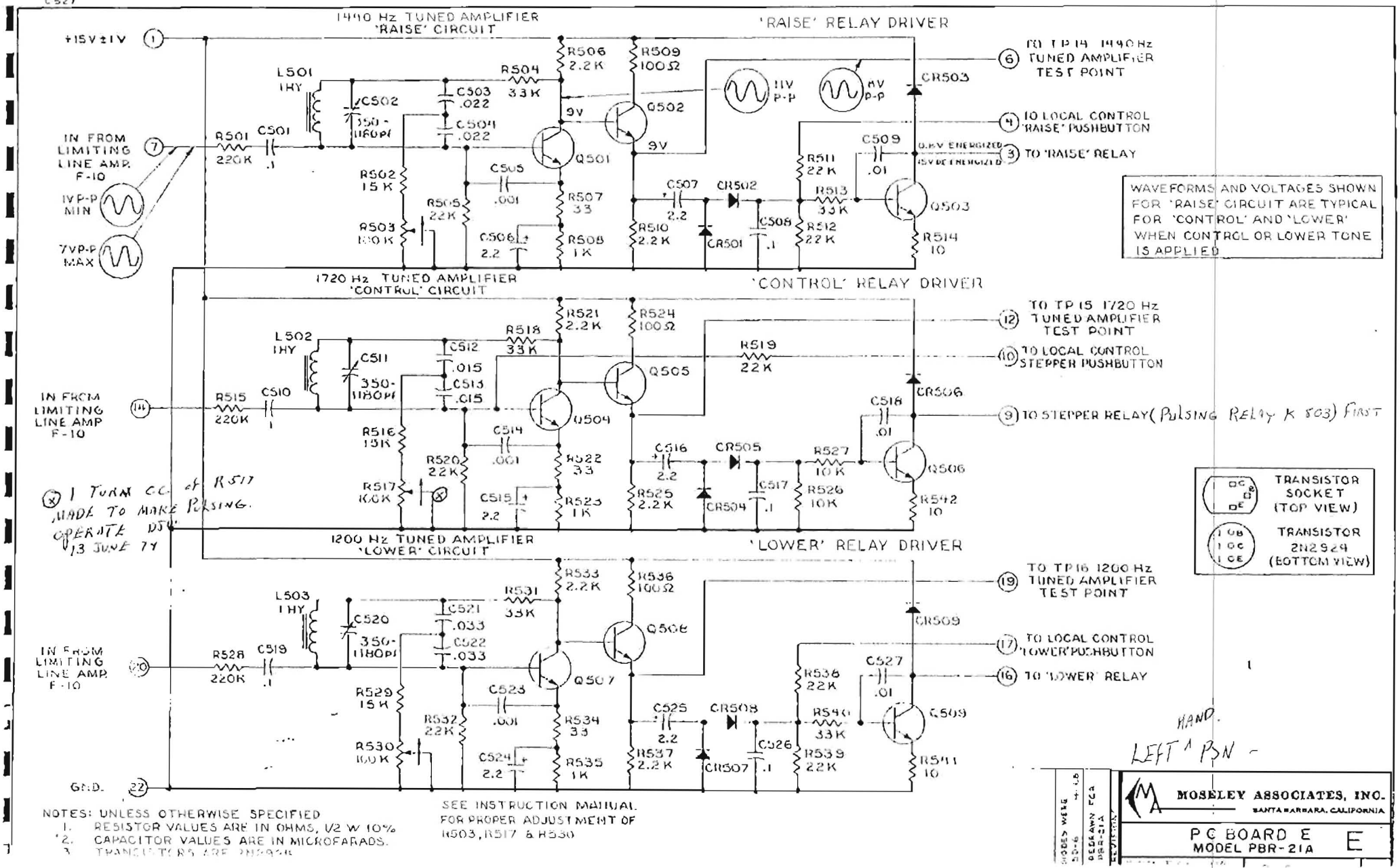

NOTES: UNLESS OTHERWISE SPECIFIED

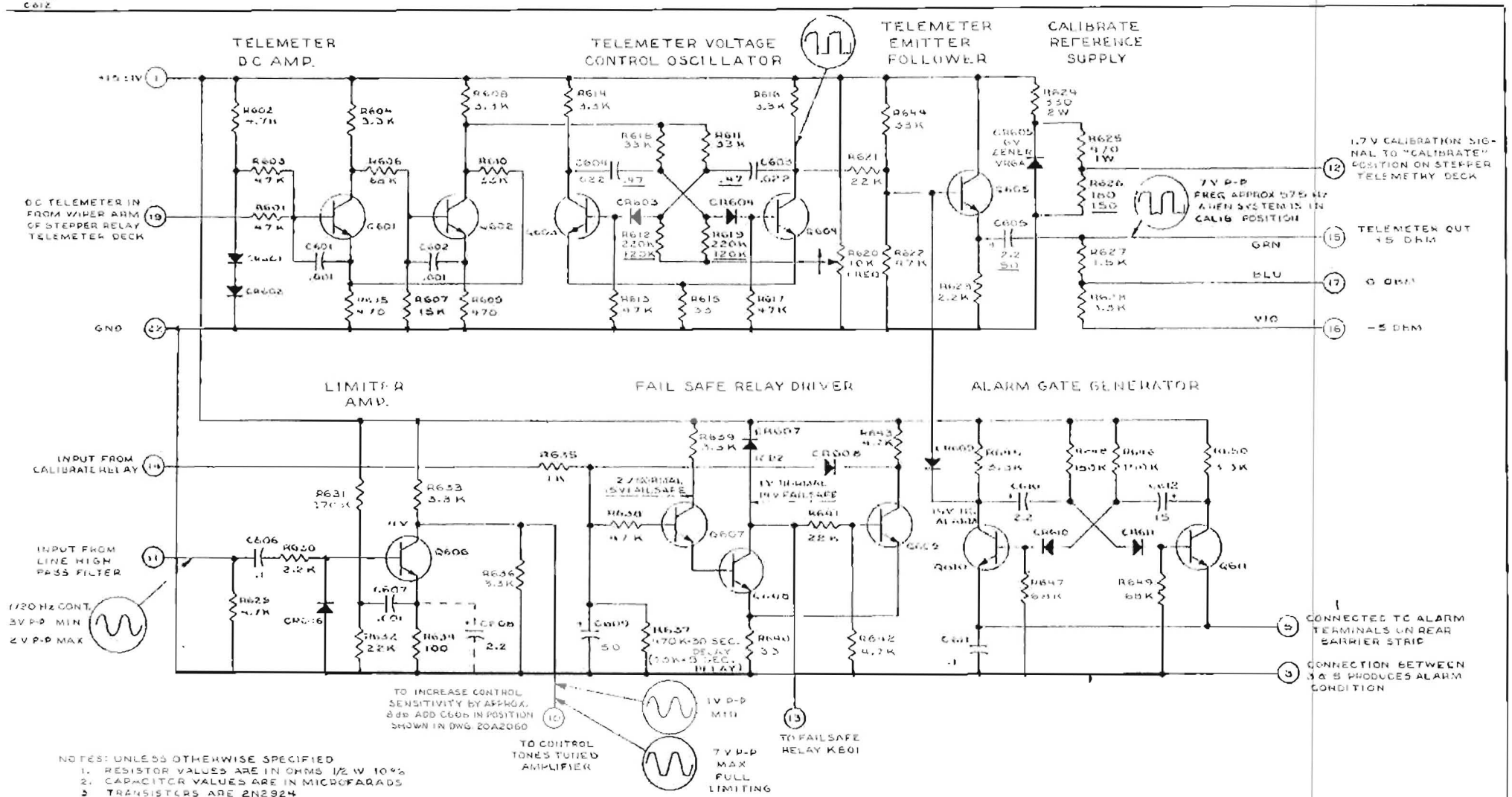
1. RESISTOR VALUES ARE IN OHMS, 1/2 W 10%
2. CAPACITOR VALUES ARE IN MICROMICROFARADS.
3. TRANSISTORS ARE 2N2924
4. 1000 DIODES ARE 1 AMP 200 PIV AVALANCHE.
5. UNDERLINED COMPONENTS AND VALUES ARE FOR 22-25 CYCLE RADIO LINK TELEMETERING

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

P C BOARD D
MODEL PBR-21A

D


1490 Hz TUNED AMPLIFIER
'RAISE' CIRCUIT
'RAISE' RELAY DRIVER
+15V±1V
IN FROM LIMITING LINE AMP. F-10
1VP-P MIN
7VP-P MAX
L501 1HY
C502 350-1180PF
C503 .022
C504 .022
R501 220K
C501 .1
R502 15K
R503 100K
R504 33K
C505 .001
R505 22K
C506 2.2
R506 2.2K
R507 33
R508 1K
R509 100Ω
Q501
Q502
9V
11V P-P
11V P-P
C507 2.2
CR501
CR502
C508 .1
R510 2.2K
R511 22K
R512 22K
R513 33K
C509 .01
Q503
R514 10
CR503
6 TO TP 14 1490 Hz TUNED AMPLIFIER TEST POINT
4 TO LOCAL CONTROL 'RAISE' PUSHBUTTON
3 TO 'RAISE' RELAY
0.6V ENERGIZED
15V DE-ENERGIZED
WAVEFORMS AND VOLTAGES SHOWN FOR 'RAISE' CIRCUIT ARE TYPICAL FOR 'CONTROL' AND 'LOWER' WHEN CONTROL OR LOWER TONE IS APPLIED
1720 Hz TUNED AMPLIFIER
'CONTROL' CIRCUIT
'CONTROL' RELAY DRIVER
IN FROM LIMITING LINE AMP F-10
L502 1HY
C511 350-1180PF
C512 .015
C513 .015
R515 220K
C510 .1
R516 15K
R517 100K
R518 33K
C514 .001
R520 22K
C515 2.2
R521 2.2K
R522 33
R523 1K
R524 100Ω
Q504
Q505
R519 22K
C516 2.2
R525 2.2K
CR504
CR505
C517 .1
R526 10K
R527 10K
C518 .01
Q506
R542 10
CR506
12 TO TP 15 1720 Hz TUNED AMPLIFIER TEST POINT
10 TO LOCAL CONTROL STEPPER PUSHBUTTON
9 TO STEPPER RELAY (PULSING RELAY K 503) FIRST
(X) 1 TURN CC. of R517 MADE TO MAKE PULSING OPERATE DS1 13 JUNE 71
1200 Hz TUNED AMPLIFIER
'LOWER' CIRCUIT
'LOWER' RELAY DRIVER
IN FROM LIMITING LINE AMP F-10
L503 1HY
C520 350-1180PF
C521 .033
C522 .033
R528 220K
C519 .1
R529 15K
R530 100K
R531 33K
C523 .001
R532 22K
C524 2.2
R533 2.2K
R534 33
R535 1K
R536 100Ω
Q507
Q508
R537 2.2K
C525 2.2
CR507
CR508
C526 .1
R538 22K
R539 22K
R540 33K
C527 .01
Q509
R541 10
CR509
19 TO TP16 1200 Hz TUNED AMPLIFIER TEST POINT
17 TO LOCAL CONTROL 'LOWER' PUSHBUTTON
16 TO 'LOWER' RELAY
GND. 22
TRANSISTOR SOCKET (TOP VIEW)
TRANSISTOR 2N2924 (BOTTOM VIEW)
HAND.
LEFT BN -
NOTES: UNLESS OTHERWISE SPECIFIED
1. RESISTOR VALUES ARE IN OHMS, 1/2 W 10%
2. CAPACITOR VALUES ARE IN MICROFARADS.
3. TRANSISTORS ARE 2N2924
SEE INSTRUCTION MANUAL FOR PROPER ADJUSTMENT OF R503, R517 & R530
MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA
PC BOARD E
MODEL PBR-21A
E




NOTES: UNLESS OTHERWISE SPECIFIED
1. RESISTOR VALUES ARE IN OHMS 1/2 W 10%
2. CAPACITOR VALUES ARE IN MICROFARADS
3. TRANSISTERS ARE 2N2924
4. DIODES ARE IN4154
5. UNDERLINED COMPONENT VALUES ARE FOR 32-36 CYCLE RADIO LINK TELEMETERING
6. 50-6 DIODE = 1 AMP. 600 PIV AVALANCHE
7. FREQUENCIES, WAVEFORMS AND DC VOLTAGES TAKEN WHILE SYSTEM IS IN CALIBRATE POSITION.
8. UNITS WITH SERIAL # 1701 AND AFTER HAVE ALARM CIRCUIT.

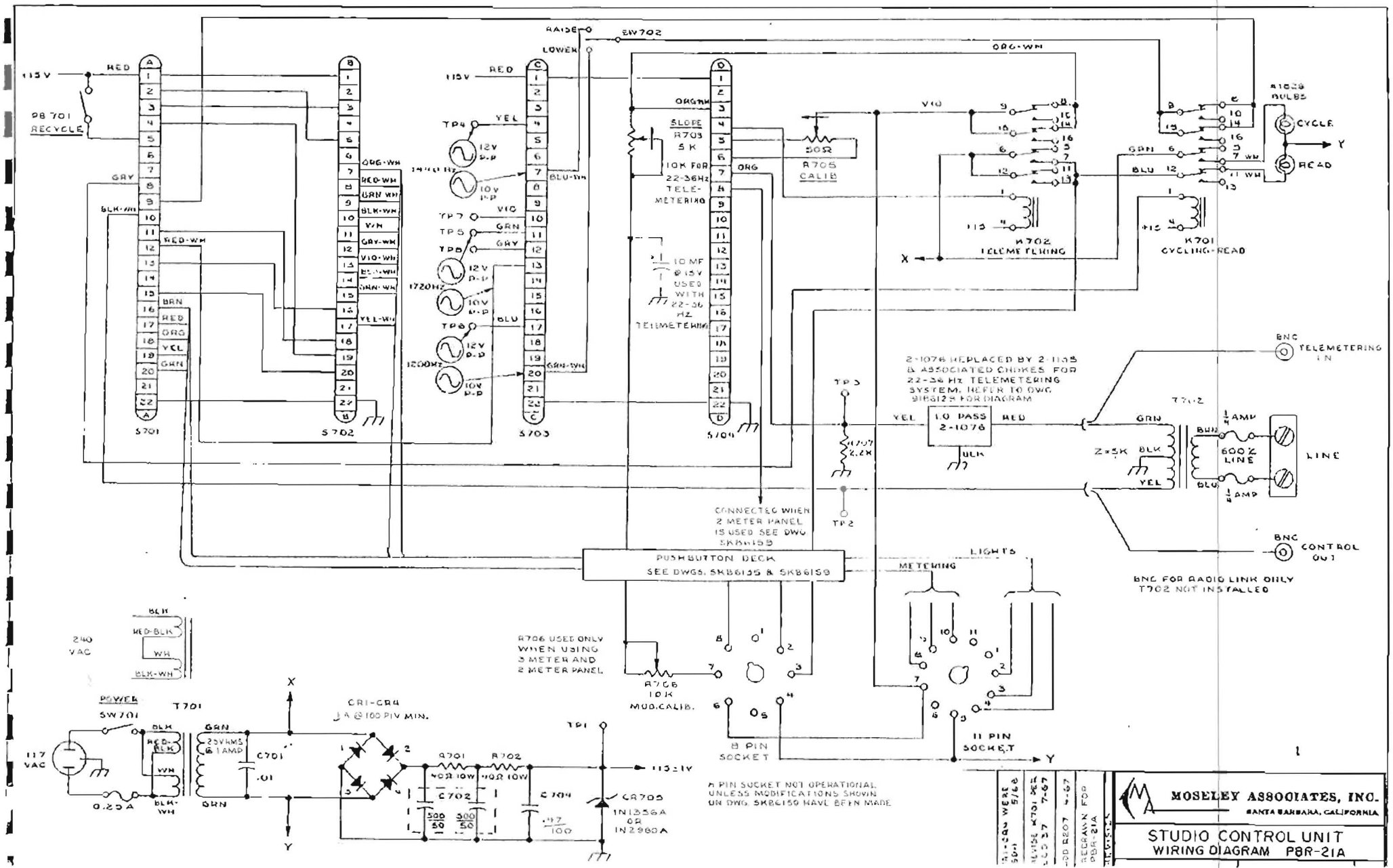
TRANSISTOR SOCKET (TOP VIEW)
TRANSISTOR 2N2924 (BOTTOM VIEW)

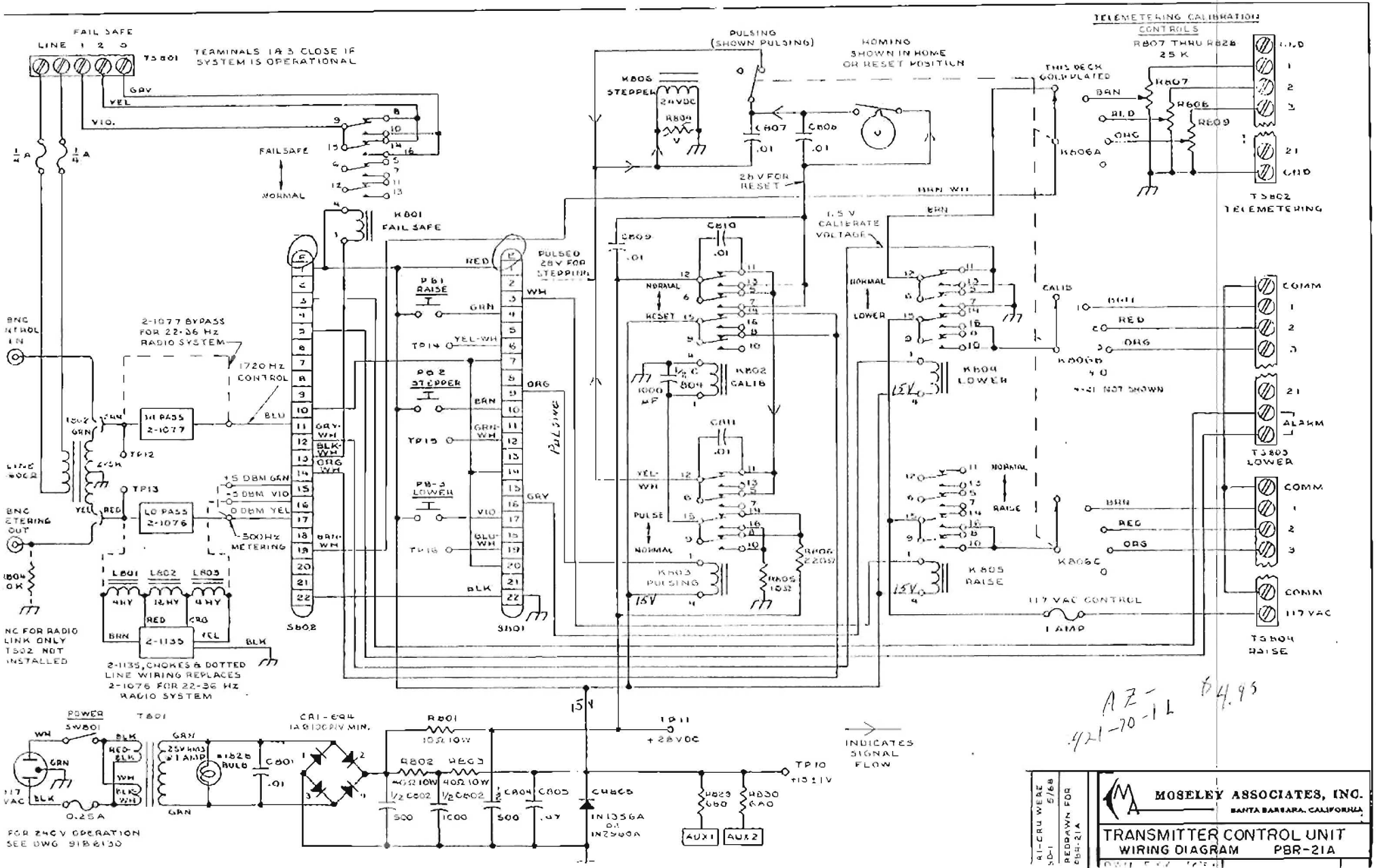
RIGHT HAND P.C.N.

| | | | | |
|---|---|---|---|---|
| SUPERSEDES C0221 11/66 | R607 WAS 50-6 4/66 | -OD UNDERLINED VALUES TO C603 & C604 3/68 | REDRAWN FOR P8R-21A | J. VISIENE |

MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA

P C BOARD F
MODEL P8R-21A F


115V
RED
S8 701
RECYCLE
GRY
BLK-WH
RED-WH
BRN
RED
ORG
YEL
GRN
S701
S702
S703
S704
RAISE
LOWER
EW702
ORG-WH
TP4
YEL
12V P-P
1477 Hz
10V P-P
TP7
VIO
TP5
GRN
TP6
GRY
1720Hz
BLU
1200Hz
SLOPE R703 5K
10K FOR 22-36Hz TELEMETERING
10 MF @ 15V USED WITH 22-36 HZ TELEMETERING
50Ω R705 CALIB
K702 TELEMETERING
K701 CYCLING-READ
A1828 BULBS
CYCLE
READ
2-1078 REPLACED BY 2-1105 & ASSOCIATED CHOKES FOR 22-36 Hz TELEMETERING SYSTEM, REFER TO DWG SK86125 FOR DIAGRAM
TP3
TP2
R707 2.2K
1.0 PASS 2-1078
T702
Z=5K
600Ω LINE
LINE
BNC TELEMETERING IN
BNC CONTROL OUT
BNC FOR RADIO LINK ONLY T702 NOT INSTALLED
CONNECTED WHEN 2 METER PANEL IS USED SEE DWG SK86159
PUSHBUTTON DECK SEE DWGS. SK86135 & SK86159
LIGHTS
METERING
R706 USED ONLY WHEN USING 3 METER AND 2 METER PANEL
R706 10K MOD. CALIB.
8 PIN SOCKET
11 PIN SOCKET
A PIN SOCKET NOT OPERATIONAL UNLESS MODIFICATIONS SHOWN ON DWG. SK86159 HAVE BEEN MADE
240 VAC
POWER SW701
T701
117 VAC
0.25A
25VRMS @ 1 AMP
C701 .01
CR1-CR4 1A @ 100 PIV MIN.
R701 40Ω 10W
R702 40Ω 10W
C702 500 50 300 50
C704 .47/100
CR705 1N1556A OR 1N2980A
TP1
115±1V
MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA
STUDIO CONTROL UNIT
WIRING DIAGRAM P8R-21A


FAIL SAFE
LINE 1 2 3
TS801
TERMINALS 1 & 3 CLOSE IF SYSTEM IS OPERATIONAL
GRY
YEL
VIO
1/4 A
1/4 A
FAILSAFE
NORMAL
K801 FAIL SAFE
PULSING (SHOWN PULSING)
HOMING SHOWN IN HOME OR RESET POSITION
K806 STEPPER 24VDC
R804 V
C807 .01
C806 .01
28 V FOR RESET
PULSED 28V FOR STEPPING
TELEMETERING CALIBRATION CONTROLS
R807 THRU R828 25 K
THIS DECK GOLD PLATED
K806A
BRN
RED
ORG
R807
R808
R809
TS802 TELEMETERING
1,2,3
21
GND
BRN WH
GRN
1.5 V CALIBRATE VOLTAGE
C809 .01
C810 .01
NORMAL
RESET
LOWER
CALIB
K804 LOWER
15V
K802 CALIB
1000 MF
C811 .01
K803 PULSING
PULSE
R805 100Ω
R806 220Ω
K805 RAISE
K806B
K806C
4-21 NOT SHOWN
TS803 LOWER
TS804 RAISE
COMM
117 VAC
ALARM
117 VAC CONTROL
1 AMP
BNC CONTROL IN
2-1077 BYPASS FOR 22-36 Hz RADIO SYSTEM
1720 Hz CONTROL
HI PASS 2-1077
LO PASS 2-1076
TP12
TP13
TP14
TP15
TP16
PB 1 RAISE
PB 2 STEPPER
PB-3 LOWER
PULSING
+5 DBM GRN
-5 DBM VIO
0 DBM YEL
500 Hz METERING
BNC TELEMETERING OUT
680Ω 0K
NC FOR RADIO LINK ONLY T802 NOT INSTALLED
L801 4 MH
L802 12 MH
L803 4 MH
2-1135
2-1135, CHOKES & DOTTED LINE WIRING REPLACES 2-1076 FOR 22-36 Hz RADIO SYSTEM
S802
S801
POWER SW801
T801
117 VAC
0.25 A
FOR 240 V OPERATION SEE DWG 918B130
CR1-CR4 1A @ 130 PIV MIN.
R801 10Ω 10W
R802 40Ω 10W
R803 40Ω 10W
1/2 C802 500
1/2 C802 1000
C804 500
C805 .47
C806 IN1356A OR IN2960A
R829 680
R830 680
AUX1
AUX2
TP10 +15 ± 1V
TP11 +28 VDC
INDICATES SIGNAL FLOW
AZ-421-70-1L
$4.95
MOSELEY ASSOCIATES, INC.
SANTA BARBARA, CALIFORNIA
TRANSMITTER CONTROL UNIT
WIRING DIAGRAM PBR-21A
81-CRU WE&E 5-68
SD-1
REDRAWN FOR PBR-21A