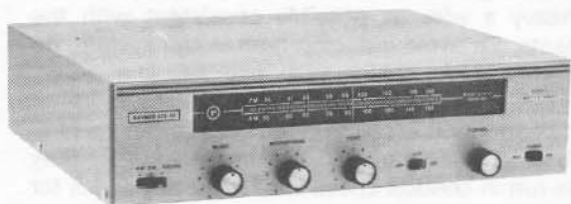


**RAYMER**

OPERATING INSTRUCTIONS



MODEL 870-20 AM-FM RECEIVER

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS RECEIVER TO RAIN OR MOISTURE.

DESCRIPTION

The Raymer Model 870-20 is an all solid state monaural AM-FM background music receiver with provisions for paging. The receiver consists of a tuner for the 88-108 MHz FM band, the 550-1650 KHz AM band and a 20 Watt RMS audio amplifier with a microphone preamplifier.

The receiver has a music output and a preamp output jack for connection to an external amplifier as well as a high level phono input jack and a microphone jack which may be switched for either high or low impedance input. The speaker outputs of the receiver are for 4 or 8 ohm; or 25 volt or 70 volt balanced lines.

The Model 870-20 also features an electronic music mute (precedence) circuit in place of a relay to quickly fade out the music while paging; after paging the music is smoothly restored. The receiver also has a variable tone control.

UNPACKING

The unit is to be removed carefully from the carton and inspected for any possible damage in transit. If there is any evidence of any damage which might have occurred in shipment, immediately notify your supplier, or the transportation company which delivered it. Claims for damage sustained in transit must be made upon the carrier. Save all packing material for inspection by the claim agent who will furnish you with the proper forms and will also give you the necessary instructions for filing a claim.

INSTALLATION

The Raymer Model 870-20 has ample vents for normal ventilation; however, it should be placed so as to permit free air flow around the unit. **DO NOT PLACE ANY OBJECT ON TOP OF THE COVER OR IN ANY WAY BLOCK THE AIR FLOW OF THE VENTS. DO NOT STORE OR OPERATE THE RECEIVER** in areas where the ambient temperature exceeds 140°F.

The receiver may be mounted in a 5 1/4" vertical panel space in a rack, using a Raymer RPK-2 rack mounting kit.

This unit has an AC line cord with a 3 prong plug. The line cord should be plugged into a 3 wire grounded 105 to 120 volt 60Hz AC outlet. This will also ground the receiver.

The AC receptacle on the rear panel is a 3 wire grounded outlet which can supply power to accessory or auxiliary equipment. Any auxiliary equipment connected to this AC receptacle is controlled by the POWER on-off switch so that turning off the power on the unit turns off all equipment.

CONNECTIONS

All connections are made on the rear panel of the unit.

INPUT CONNECTIONS

All patch cords and input leads other than Music Mute must be shielded cables. The Music Mute leads do not have to be shielded. When output leads are run near an unshielded microphone input plug, or when run together with the microphone precedence leads, a supersonic oscillation may occur. When this does occur, it will appear as a distortion in the amplifier output, and oftentimes will cause the circuit breaker to "trip."

The Microphone input jack is for an unbalanced line only. If it is necessary to use a balanced input, an out-board matching transformer such as Raymer Model LMT-150 must be used. If the signal source is a telephone line or a 500 ohm input, the connection can be made to the amplifier by means of a Raymer Telephone Matching Adaptor TM-2. The switch above the microphone input selects the proper input impedance. The Hi-Z position will match either crystal or high impedance dynamic microphones; the Lo-Z position will match microphones in the 150 to 500 ohm range.

CAUTION

To avoid possible supersonic oscillation which might result in damage to the unit, it is mandatory that a shielded (metal cover) microphone plug be used.

If it is desirable to fade out the music while paging, a "dispatcher" type of microphone with an auxiliary switch having a pair of normally open contacts should be used. The microphone is to be connected as shown in Figure 1.

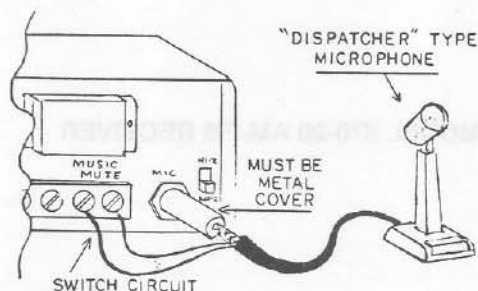


FIGURE 1.

TYPICAL CONNECTION FOR A SINGLE MICROPHONE. FOR MORE THAN ONE MICROPHONE, CONNECT THE SWITCH CIRCUITS IN PARALLEL.

The PHONO input jack enables the unit to amplify program material from a source other than the self-contained radio tuner. This input is high impedance with a maximum sensitivity of one-half volt and will accommodate the output of a ceramic phono cartridge or the output from any preamplifier such as tape, phono, etc. If the source into the PHONO input is from leased telephone lines, a Raymer TM-2 telephone adaptor is required to match the telephone lines to the input.

PREAMP INPUT

If it is desirable to add a signaling annunciator or alarm to the Music and Page system, a RAYMER MODEL TGSP-4 Tone Generator may be connected to the receiver. The output of the TGSP-4 should be connected to the PREAMP IN/OUT jack. By connecting in this fashion the tone or alarm is unaffected by any of the front panel controls.

ANTENNA INPUTS

Separate antenna inputs are made available for the AM and FM portion of the tuner by means of a terminal board. For normal FM reception, the short antenna lead supplied with the unit is sufficient for most locations. In the event that the tuner is located in a remote area, an external Dipole antenna will increase the number of distant stations that can be received. This external antenna is to be connected across the terminals marked FM ANT.

For AM reception, the receiver has a built-in Hi-Q Ferrite loopstick antenna which is all that is normally required for local AM reception. To increase the reception of weak AM stations in the fringe area, it may be advisable to rotate the loopstick to obtain the loudest signal. In instances where the tuner is used inside of an all-metal building or in a weak reception area, an outside antenna is required. Connect an external antenna lead to the terminal marked AM ANT.

OUTPUT CONNECTIONS

The speaker(s) or line matching transformers are connected to the screw terminal board located on the rear panel. For short distances any ordinary insulated wire, such as parallel lamp cord, may be used.

Long lines have an appreciable resistance with resultant power loss. The use of parallel matching transformers on either 25 volt or 70 volt lines is recommended for long distances. In all cases, it is advisable to run as heavy a wire as possible consistent with the requirements. To avoid inducing hum in the system, do not parallel speaker cables with any AC line power cables.

70 volt distribution systems often require the speaker lines to be run in conduit. To determine whether they should be run in conduit check with local city codes for 70 volt system requirements.

The 4 OHM or 8 OHM output is used when connecting directly to the speaker voice coils. When a speaker with an impedance of 8 ohms is connected to the amplifier, use the terminals on the amplifier marked GND and 8. For a 4 ohm speaker or two 8 ohm speakers in parallel, use GND and 4.

The 25 VOLT or 70 VOLT output is used when connecting to speakers which have line matching transformers. Connecting to the 25 volt or 70 volt tap on the unit permits the use of a number of speakers each with its own corresponding line matching transformer, thereby eliminating the necessity of calculating impedances. The tap on the line matching transformer is selected to give the power desired for each speaker. The total of all the power settings should be no greater than the amplifier output rating. If the speaker uses a 25 or 70 volt line transformer, connect the speaker transformer to the terminals marked COM and 25V (or 70V) according to the line desired. For an unbalanced line connect a jumper between COM and GND; if a balanced output line is used, no jumper is required.

Optimum performance of any transistor amplifier depends on the proper current delivered at the output terminals. Connecting a total load impedance at any tap less than the impedance indicated on the back panel of the amplifier will cause the transistors to deliver more current than they were designed for and will deteriorate the performance of the unit and cause damage to the transistors. To prevent this from occurring and to protect the components, the unit is equipped with a circuit breaker that will trip if the output impedance is below the specified rated value; for example, if two 8 ohm speakers are connected in parallel (resulting in a 4 ohm impedance), and in turn connected to the 8 ohm output terminal, the circuit breaker will trip as soon as the volume control is turned up to the unit's maximum output.

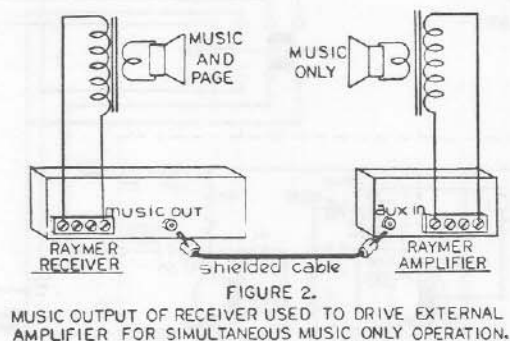
The circuit breaker located on the rear panel protects the unit from drawing excessive AC line current which could cause damage to the internal components.

IN THE EVENT THAT THE CIRCUIT BREAKER CONTINUES TO TRIP, DO NOT ATTEMPT TO DEFEAT THE FUNCTION OF THE CIRCUIT BREAKER. HAVE THE TROUBLE INVESTIGATED BY A QUALIFIED SERVICE TECHNICIAN OR RETURN THE UNIT TO THE FACTORY.

MUSIC OUTPUT

The Music Output jack may be used to connect to an external amplifier in order to operate a "MUSIC ONLY" system (such as MUSIC-ON-HOLD) simultaneously with the regular Music and Page function of the receiver as shown in Figure 2. This output may be phono or tuner as selected by the music switch on the front panel and is not affected by the MUSIC MUTE.

It may also be used to feed the signal from either phono or tuner to a tape recorder which has a Line input.



PREAMP OUTPUT

The output from the PREAMP IN/OUT Jack may be connected to the input of an additional external amplifier if desired. The output from this jack includes both music and page so that both the receiver and the external amplifier operate simultaneously.

OPERATION

The front panel has four knobs and three slide switches. The functions of the knobs are as indicated. The Mic. Volume control knob adjusts the level of sound for paging or public address, and is independent of the Music Volume control knob. The Music Volume control knob is used to adjust the level of the sound of the AM and FM portion or phonograph. The Tone control knob can be turned to the position that is most pleasing to the listener as it affects both the high and low frequency response. The Function switch is used to select the AM band, the FM band or an external PHONO. The Tuning knob is to select the desired AM or FM station. The slide switch at the left of the Tuning knob is used for AFC defeat. A slide switch at the lower right is to turn the unit on or off.

The center marking on the dial glass is a LOG scale for easy recording of the position of the pointer for any specific station.

AFC refers to Automatic Frequency Control and is an electronic means of keeping the receiver properly tuned to an FM broadcast station even when the tuning dial is not precisely set. However when tuning to a weak station which is adjacent to a stronger one the AFC function may tend to lock the receiver on the stronger station. In such a case the AFC switch should be placed in the OFF position. For very precise tuning or selection of a weak station the AFC switch should be placed in the OFF position while tuning. When the station is properly tuned the switch may then be returned to the AFC position to lock the receiver to the desired frequency.

WARRANTY

THIS UNIT HAS BEEN VERY CAREFULLY INSPECTED AND IS WARRANTED TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND SERVICE FOR A PERIOD OF ONE YEAR FROM DATE OF SALE TO THE ORIGINAL PURCHASER. THIS WARRANTY DOES NOT EXTEND TO ANY UNIT WHICH BEEN SUBJECT TO ABUSE, MISUSE, NEGLECT, ACCIDENT, IMPROPER INSTALLATION, OR ALTERATIONS. THE OBLIGATION OF CETEC RAYMER UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OF ANY DEFECT IN MATERIAL OR WORKMANSHIP AND/OR THE REPLACEMENT OF ANY DEFECTIVE PART, PROVIDED THE UNIT IS RETURNED TO CETEC RAYMER TRANSPORTATION PREPAID.

IT IS RECOMMENDED THAT ANY UNIT ON WHICH SERVICE IS REQUIRED BE PROCESSED THROUGH YOU DISTRIBUTOR OR INSTALLATION COMPANY WHEREVER POSSIBLE.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON OUR PART. WE NEITHER ASSUME NOR AUTHORIZE ANY OTHER PERSON TO ASSUME FOR US ANY OTHER LIABILITY IN CONNECTION WITH THE PRODUCTS MANUFACTURED BY CETEC RAYMER.

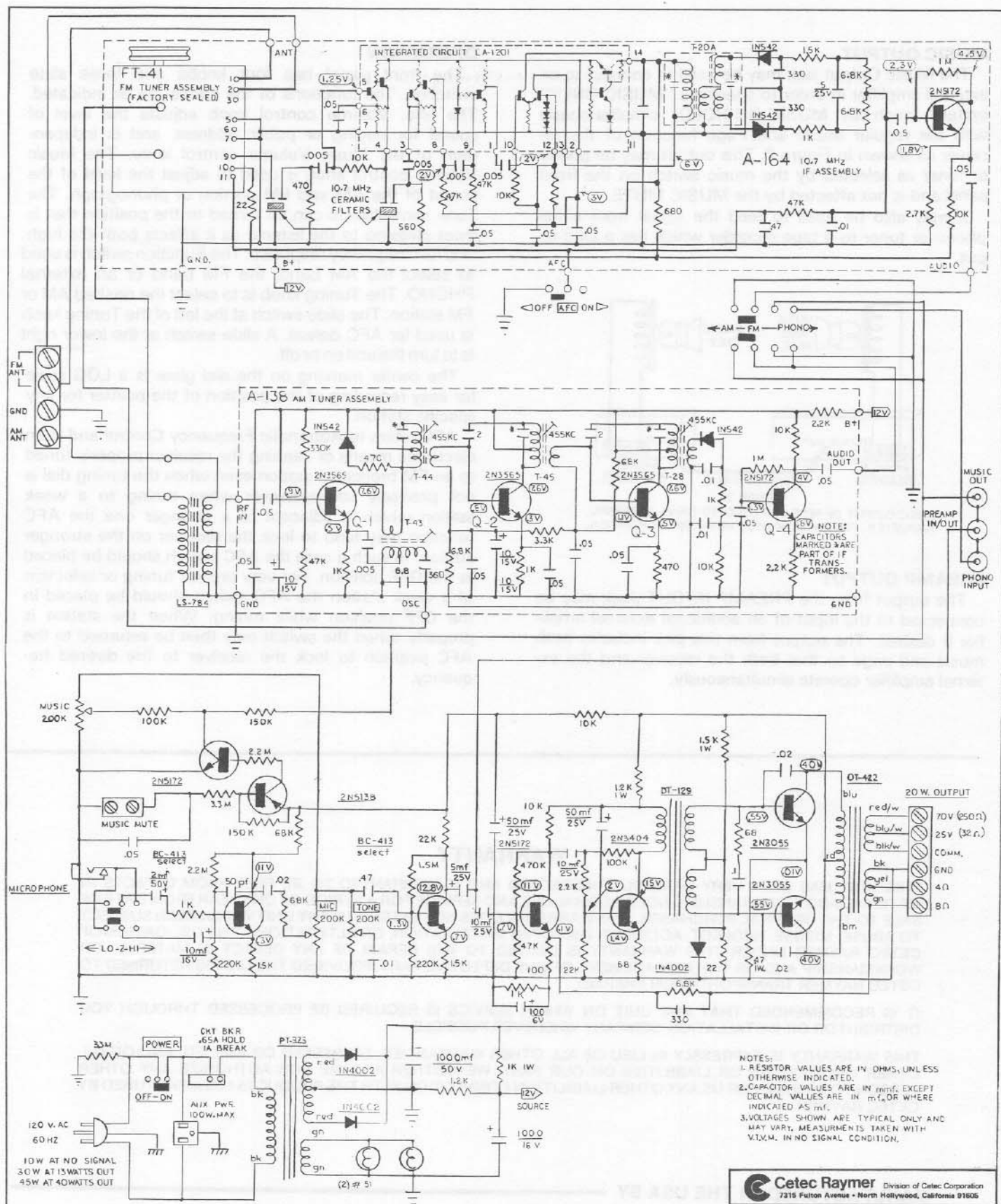
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SCHEMATIC:

RAYMER MODEL 870-20 RECEIVER

ENGINEER: C. KOGGE DATE: 4/16/82