

## INTERPHONE SYSTEM — 2A FARM INSTALLATION AND MAINTENANCE

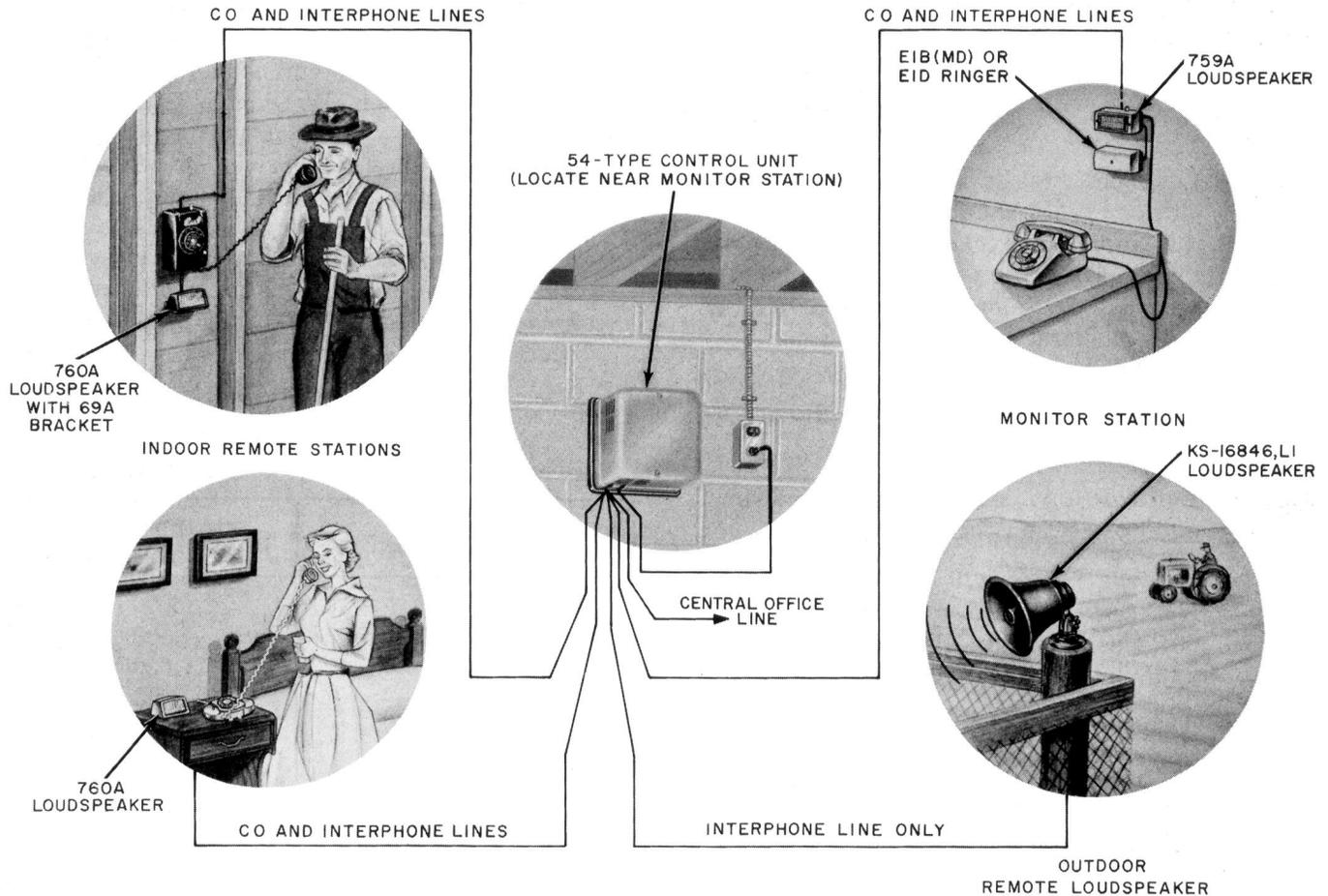


Fig. 1 — Typical 2A Farm Interphone Arrangement

### 1. GENERAL

1.01 This section is reissued to:

- Include schematic diagrams of control unit formerly found in Section 512-515-400.
- Include information on 54B control unit and E1D ringer.
- Show that the 54A control unit and E1B ringer are rated MD.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

### 2. INSTALLATION

#### (a) Planning

- (1) When planning the 2A farm interphone installation, consider the following:
  - Avoid placing apparatus with plastic covers or parts in locations where the ambient temperature may exceed 140 degrees F.
  - Any combination up to a total of six loudspeakers may be used, provided, no more than three are outdoor speakers

and no more than two are monitor speakers.

- A telephone set should be associated with each loudspeaker except the outdoor type.
- Any telephone set providing 2-line pick-up and signaling capabilities and having sufficient mounting cord conductors may be used with the farm interphone system.
- Loudspeakers at all stations (except outdoor type) should be located as near the associated telephone set as practicable for customer to obtain maximum benefit from telephone usage as well as loudspeakers.
- 759-type loudspeakers should be located so that volume control is readily accessible.
- Control unit should be located near monitor station for ease of wiring.
- Control unit should be located within 6 feet (length of power cord) of a 110V, 60Hz ac power receptacle which is not under control of a switch.
- The monitor station is the major location in the system and should be located in an area usually occupied during the time of day that the customer has the greatest need for the monitor feature.



*The vicinity of monitor station lacks secrecy. If any station is picked up and handset push-to-talk button is not operated, it is possible to listen to activities in the monitor station area. This condition has advantages and disadvantages which should be explained to the customer. A cutoff key may be necessary.*

- The KS-16846, List 1 loudspeaker (outdoor type) effectively covers an area that extends 60 degrees on each side of the center line of the speaker and so should be oriented toward the area where coverage is desired.



*Outdoor loudspeakers commonly are placed in areas where exposure to light-*

*ning will be greatest and protection should be installed. Review sections covering station protection. Use station protectors (0.003-inch air gap) on all circuits which are exposed to lightning.*

- (2) Use mounting cords, station wire, or inside wiring cables to interconnect components of the system normally protected from the weather. For components exposed to weather, use exterior wiring similar to drop wire. On longer runs of wiring, the loop resistance must be considered. Table A shows the maximum length of various wires used to interconnect stations of the system. These distances plus the central office loop **must not exceed** the working limits of the central office.

**TABLE A  
SEPARATIONS OF STATIONS**

TYPE CONDUCTOR	MAXIMUM LENGTH IN FEET*
Drop Wire	6,000
Multiple Drop Wire	4,000
B Rural Wire	16,000
D Station Wire	19,000
Inside Wire Cable	5,000
109 Line Wire	16,000

\* This length plus central office loop must not exceed working limits of central office.

**(b) Unpacking**

- Use care in unpacking system components to prevent damage to plastic covers and controls.

**(c) Installing**

**(1) 54-type Control Units**

- Loosen two captive screws and remove cover. Remove P-15E917 plastic caps from cable entrance openings of cover.
- Mount in upright position (as marked on chassis) to a flat surface. Avoid locations which may be subject to dust, temperature or humidity extremes, or abuse.

- Make connections as shown in appropriate connections and maintenance sections. Use screw type terminals to make all terminations.



***Make no adjustments on the 54-type control unit.***

- Replace cover, then close off unused portion of cable entrance openings by breaking plastic caps on indented marks with long-nose pliers and snapping into position.
  - Plug power cord into suitable ac receptacle.
- (2) 759B Loudspeaker
- Loosen two captive screws and remove cover.
  - Mount vertically or horizontally with volume control oriented as to be readily accessible. Install as near as practicable to associated telephone set.
  - Can be secured by four screws through base. Base is also drilled to permit mounting on a 63A bracket or to a standard electrical outlet box by using a 146B adapter.
  - Make connections as shown in appropriate connections and maintenance section. Cord and cable entrance is through holes provided in base or knockouts at end of base.
  - The 12-terminal connecting block serves as a bridging point between control unit, loudspeaker, and telephone set. Use screw-type terminals for all terminations.
  - Replace cover.
- (3) 760A Loudspeaker
- Either place on flat surface such as table, shelf, or counter top or install on wall using 69A bracket.
  - To use 69A bracket, secure bracket to wall, insert loudspeaker cord through

cord opening in bracket, and secure speaker to bracket using screws provided.

- Make loudspeaker connections to same connecting block as the associated telephone set cord. If telephone set is a wall-type set, connect loudspeaker cord inside set.

(4) KS-16846, List 1 Loudspeaker

- Install by securing swivel base to flat surface with suitable fasteners or by removing circular base of swivel mounting and attaching speaker to 1/2-inch pipe.
- Orient horn to area where coverage is required.
- Make connections to suitable connecting block in weatherproof housing.



***Review station protection procedures. Use station protectors on all circuits exposed to lightning.***

(5) E1B (MD) or E1D Ringer

- Install at monitor station only.
- Remove housing and secure base to flat surface with suitable fasteners. Four grommets mounting holes are provided in the base. Orient volume control slide to provide ready access to user.
- Make connections as shown in Fig. 2 or appropriate telephone set connection and maintenance section. Replace cover.
- As connected, ringer provides ringing at monitor station and tone ringing signal at all other loudspeaker stations through relay in control unit. If tone ringing is desired at monitor station, strap terminal J1 to terminal J2 at control unit terminal board.
- The volume control of the E1B (MD) or E1D ringer controls both ringer and tone ringing to remote stations. When placed in the high volume position, the tone ringing feature is disabled and only

the monitor station receives an audible signal on an incoming call from the central office line.

**Note:** When E1B (MD) or E1D ringer is connected, ringers of telephone sets used in the interphone system should be disconnected. Monitor station ringer should present the only ringing bridge to the central office line. Ring signal to other stations will be provided by tone ringing relay in control unit.

(6) Service Options

**Auxiliary monitor station**

- If an auxiliary monitor station is desired it can be wired in parallel to the main monitor station and bridged at the control unit or the 759A loudspeaker.
- The SA lead of the control unit can be extended to one monitor location only. This lead is used to shunt the volume control of the monitor loudspeaker and permits any remote station to transmit using their handset and be received at full volume at the shunted loudspeaker.

**Cutoff key**

- If privacy is desired at monitor station install a cutoff key (6017-type key or equivalent) near the monitor station telephone set. Wire the key between terminal 7 of the 759A loudspeaker and terminal C of the control unit.
- When the cutoff key is opened, remote stations can not go off-hook and listen to sounds or activities in the area of the monitor station.

**Transmitter amplifier**

- In long loop conditions which require amplification of the G-type handset transmitter, two amplifiers (276A and 277A) are available for installation in the handset.

- The 276A is electrically similar to the 238A amplifier except a larger inductor is used because of the higher currents of the 54-type control unit. The 277A is the same as a 276A except a polarity guard is included to protect against line reversal.
- The amplifier is installed inside the G5KR handset transmitter cavity with the handset cord transmitter leads connected to terminals L and V so that the V terminal is positive with respect to L. The transmitter unit is then installed and the cap replaced.



**Insulate the handset cord stay band with electrician's tape to prevent possible shorting of amplifier components.**

- See Section 501-226-100 for complete descriptive information and schematics of transmitter amplifiers.

**Auxiliary DC voltage**

- -35 volts dc voltage is available at the control unit terminal marked DC for uses external to the control unit.
- Connections to this terminal should be made by leads external to the system wiring and the following caution strictly followed.

**CAUTION:** *Wherever possible, leads connected to the DC terminal should not be exposed. If, however, they are exposed, the control unit must be protected from lightning or power surges applied to the connecting cables. A KS-19150L1 (72-ohm, 1/2 watt) resistor, in addition to normal protection, must be connected between the protector blocks and the DC terminal.*

- There are normally no requirements for power from the DC terminal within the 2A farm interphone system.

3. MAINTENANCE



**Remove power from 54-type control unit before attempting any maintenance of interphone components.**

**(a) Cleaning**

- Clean plastic covers, housings, and handset with water dampened KS-2423 cloth or equivalent.
- Do not use scouring powders or cleansers on colored apparatus.
- Do not allow excess water to enter grills of loudspeaker units.
- If cleaning does not produce the desired effect, replace the component.

**(b) Inspecting**

- Housings or covers should not be warped or discolored.
- Turnbuttons and volume controls should work freely without binding or sticking.
- Wiring and mounting cords should be checked for damage to the insulating covering and should not be placed to present a hazard to customer or equipment.
- Screen behind louvers of control unit cover should be intact and free of obstructions.

**(c) Troubleshooting**

- Table B provides a list of the more common troubles encountered with 2A farm interphone and their probable causes with recommended corrective action.

**(d) Connection Index**

Fig. 2 — Line and Ringer Connections

Fig. 3 — 54A (MD) Control Unit, Schematic Showing Modification Using D-180117 Kit of Parts

Fig. 4 — 54B Control Unit, Schematic

**(e) Replaceable Apparatus****(1) 54-Type Control Unit**

- KS-16935, List 11 Cord (power)
- P-15E918 Cover Assembly
- RM-784064 Fuse (3/4-amp.)

**(f) Tests and Adjustments**

- (1) When system is installed, or maintenance is accomplished on any component, test each station in the system for proper operation of central office line pickup and hold as well as the interphone features.



**Make no adjustments on the 54-type control unit.**

- (2) Test monitor station output with one or more remote stations being received at full volume. Using volume control, lower the output of the monitor loudspeaker. If factory furnished volume control (100 ohm potentiometer) does not lower audio output sufficiently, a 1000-ohm P-25E020 potentiometer may be substituted. Assure that volume cannot be cut off completely.

**Note:** Customer should be forewarned that hands-free operation at the monitor station will be affected by the increase in volume control resistance and that it will be necessary to increase volume when transmitting for satisfactory results.

- (3) In cases of radio frequency interference, proceed as follows:

**a.** If a series one amplifier is used (marked P-12E487 SER 1 or P-20F193 SER 1), place a KS-13814, List 1 capacitor (0.05  $\mu$ f) between terminals 3 and 4 of the 2563C transformer in the control unit.

**b.** If interference is still encountered, proceed as follows:

- If interference is heard in the handset when it is used for monitoring, with neither push-to-talk bar depressed nor the quieting relay actuated, connect an additional KS-13814, List 1 (0.05  $\mu$ f) capacitor between terminals C and S1 of the control unit terminal strip.

- If the radio frequency interference is heard on the loudspeakers or on a handset when the handset is off hook and the push-to-talk relay is actuated, connect a KS-13814, List 1 (0.05  $\mu$ f) capacitor between terminals 2R and 2T of the control unit terminal strip.
- If radio frequency interference is heard on the handset after the quieting relay has been actuated, connect a KS-13814, List 4 or 542L (0.1  $\mu$ f) capacitor be-

tween terminals J1 and 2T of the control unit. Two KS-13814, List 1 (0.05  $\mu$ f) capacitors in series may be used.

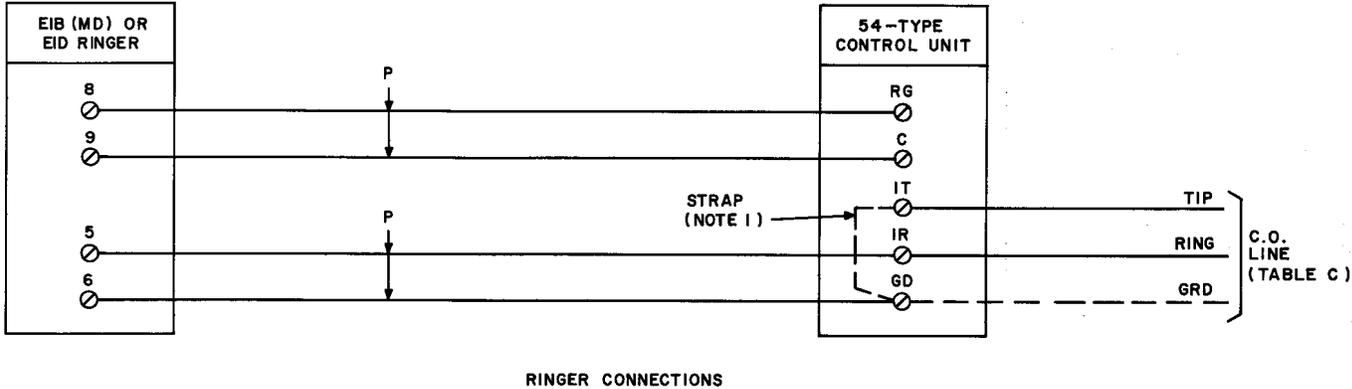
(g) *Associated Telephone Sets*

- Refer to appropriate sections in the Division 502 for maintenance of the various telephone sets associated with the farm interphone system.
- Replace G5KR handset if push-to-talk switch does not function properly.

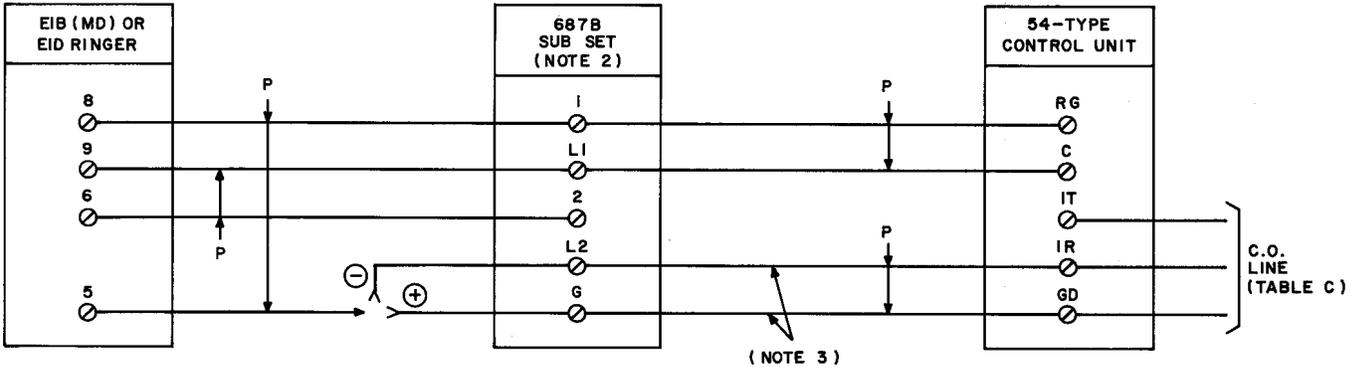
TABLE B

2A FARM INTERPHONE  
COMMON TROUBLES AND PROBABLE CAUSE

TROUBLE	PROBABLE CAUSE	CORRECTION
Individual speaker not operating properly	Incorrect or defective wiring	Rearrange, repair, or replace wiring
	Defective speaker	Replace speaker
Weak or noisy output on all speakers	Incorrect or defective wiring to one or more speaker locations	Rearrange, repair or replace wiring
	Defective control unit	Replace control unit
Crosstalk between CO line and intercom line	Split cable pairs	Rearrange wiring
	Output of control unit too high	Replace control unit
System completely dead	AC power supply off or plug pulled out	Check AC power or place plug back in outlet
	Blown fuse	Replace fuse (3/4 amp)
	Defective control unit	Replace control unit



RINGER CONNECTIONS



CONNECTIONS FOR POLARIZED RINGING USING 687B SUBSCRIBER SET

TABLE C  
C.O. LINE CONNECTIONS

CLASS OF SERVICE	RING	TIP	GRD
INDIVIDUAL; BRIDGED	IR	IT	*
RING PARTY	IR	IT	GD
TIP PARTY	IT	IR	GD
ALL POS AND NEG RING PARTIES	IR	IT	GD
ALL POS AND NEG TIP PARTIES	IT	IR	GD

\* NOT REQUIRED, SEE NOTE 1

NOTES:

- FOR INDIVIDUAL OR BRIDGED SERVICE PLACE STRAP AS SHOWN. DO NOT CONNECT PROTECTOR GROUND AT CONTROL UNIT.
- MODIFY 687B SUBSCRIBER SET AS FOLLOWS:  
FOR ALL POSITIVE PARTIES MOVE (BR-BL) LEAD FROM TERMINAL I TO TERMINAL L2.  
FOR ALL NEGATIVE PARTIES MOVE (BR-BL) LEAD FROM TERMINAL I TO TERMINAL G.
- CONNECTIONS SHOWN FOR NEGATIVE PARTIES. FOR POSITIVE PARTIES CONNECT IR TO G AND GD TO L2.

⊖ INDICATES CONNECTION FOR NEGATIVE PARTIES.

⊕ INDICATES CONNECTION FOR POSITIVE PARTIES.

Fig. 2 — Line and Ringer Connections

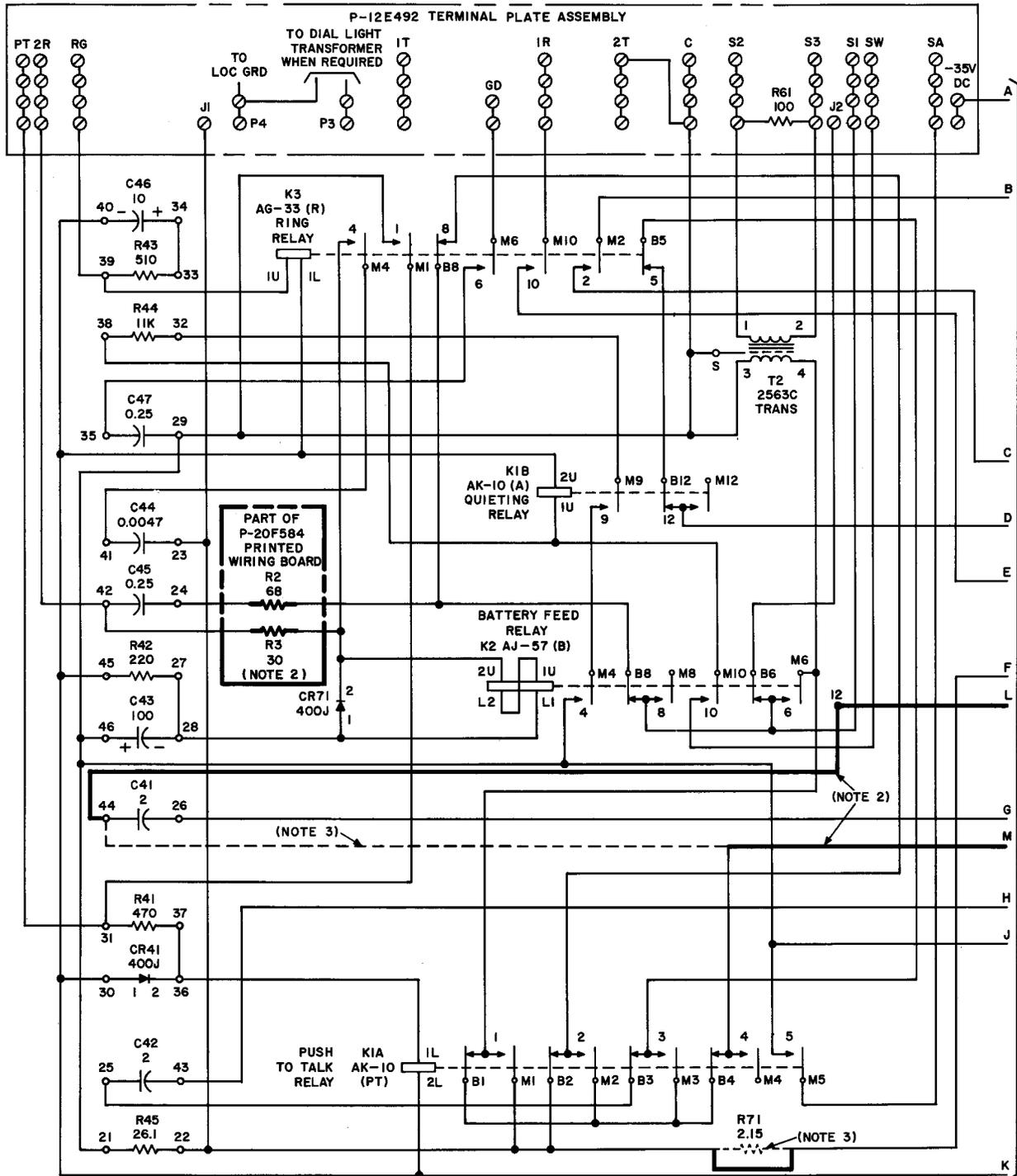


Fig. 3 — 54A (MD) Control Unit, Schematic Showing Modification Using D-180117 Kit of Parts (Sheet 1 of 2)

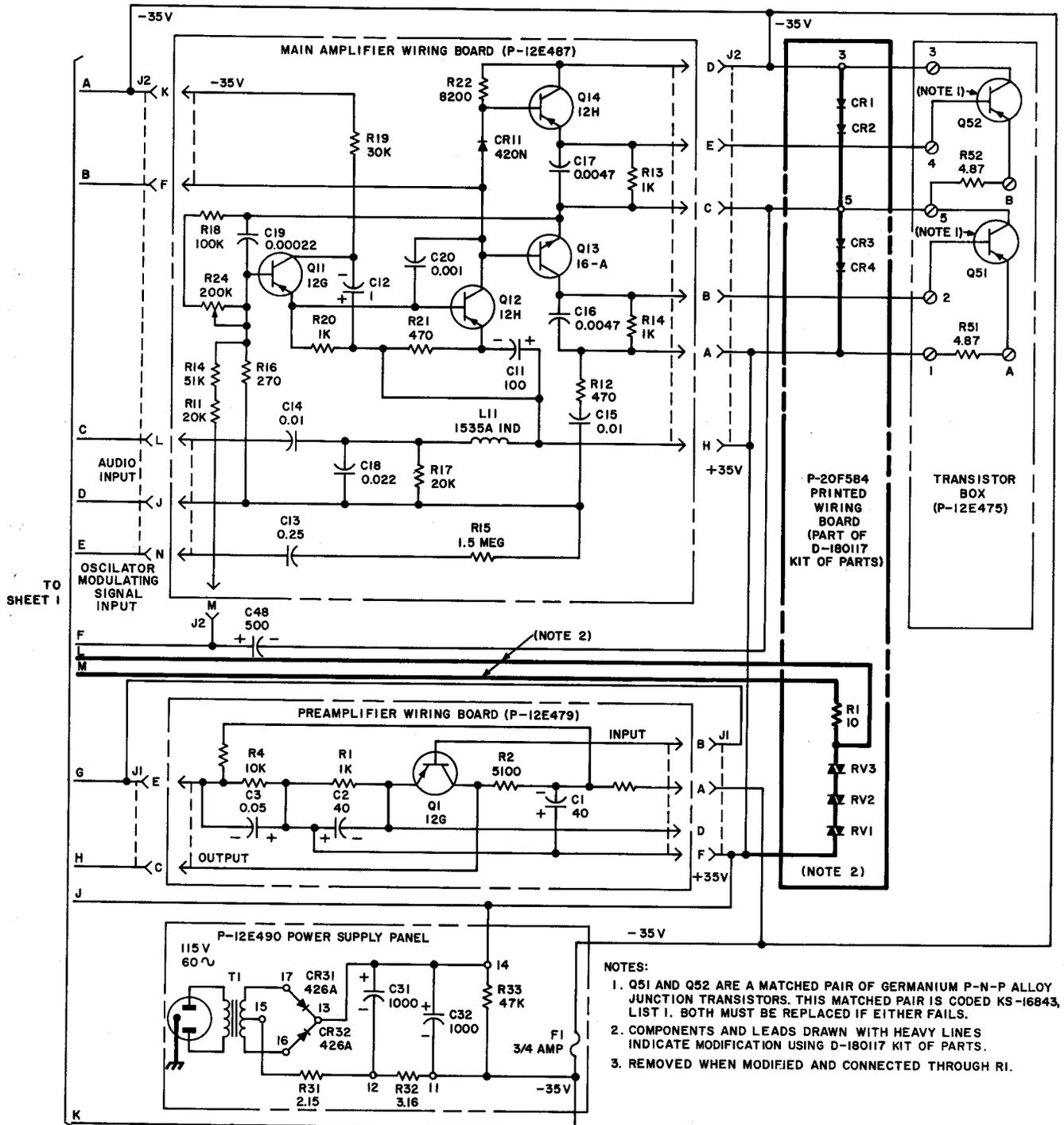
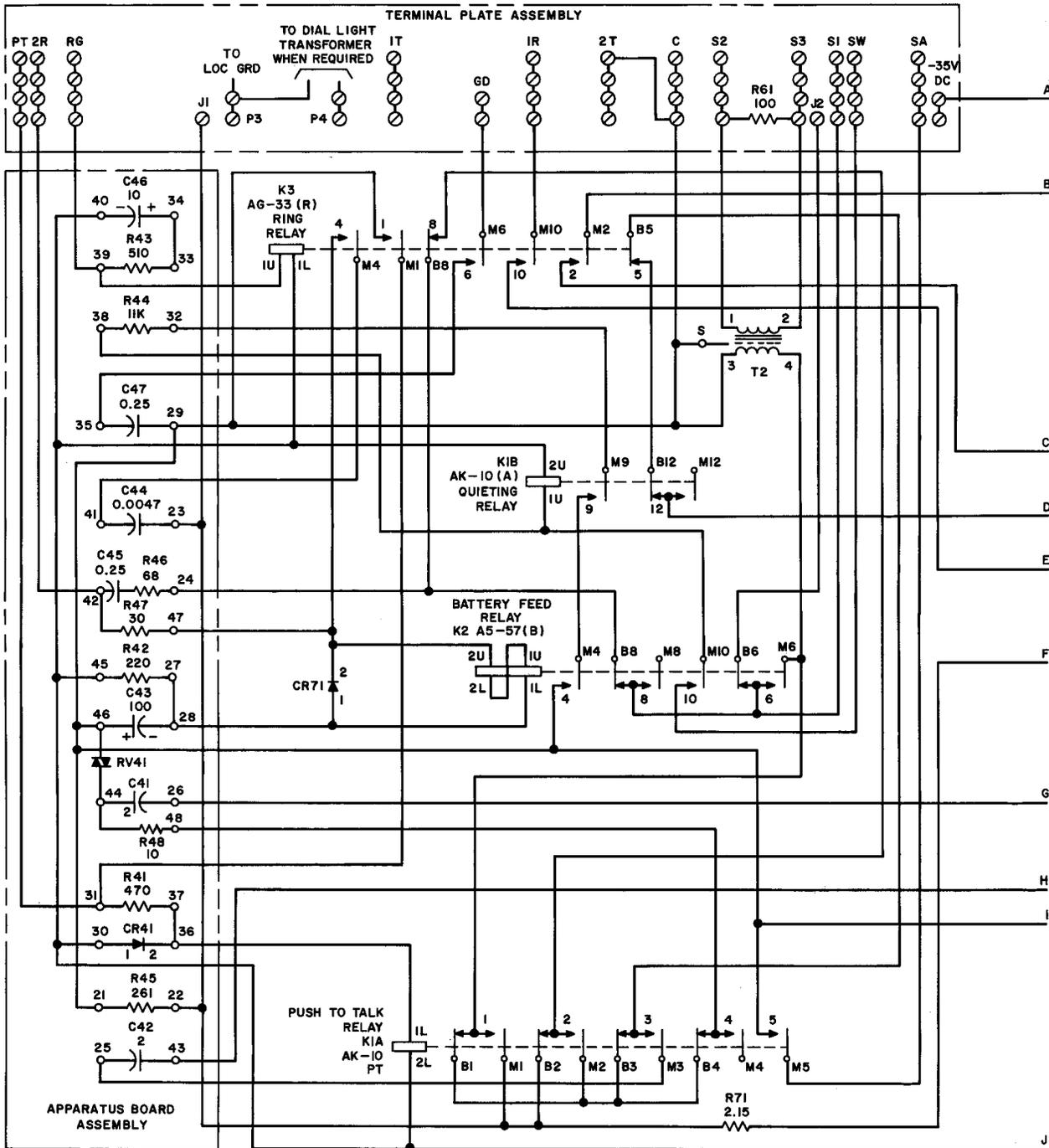


Fig. 3 — 54A (MD) Control Unit, Schematic Showing Modification Using D-180117 Kit of Parts (Sheet 2 of 2)



TO SHEET 2

Fig. 4 — 54B Control Unit, Schematic (Sheet 1 of 2)

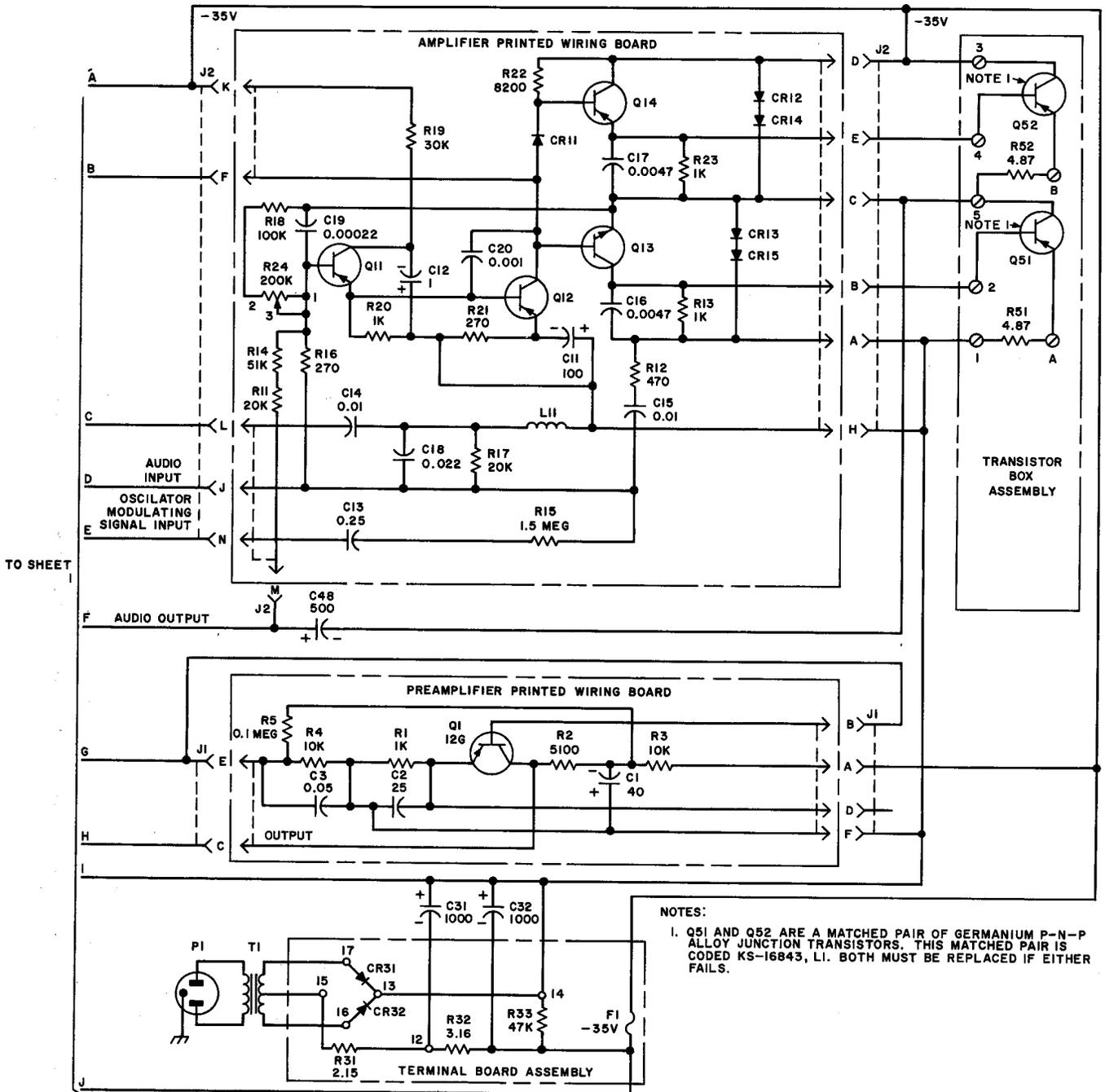


Fig. 4 — 54B Control Unit, Schematic (Sheet 2 of 2)