807E (J86839A)
TONE POWER PLANT
DESCRIPTION

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1. GENERAL

INTRODUCTION

1.01 This section describes the 807E tone power plant. Included in this section are the following:

- Physical Description of the 807E Tone Power Plant
- Functional Description of the 807E Tone Power Plant
- Description of Operating Requirements
- Description of Maintenance Requirements.

1.02 Whenever this section is reissued, the reason for reissue will be given in this paragraph. The Equipment Test List is not affected.

1.03 This issue of the section is based on the following schematic drawings (SDs):

SD-81654-01, Issue 7—Oscillator Circuit

SD-81655-01, Issue 12—Amplifier Circuit

SD-81817-01, Issue 6—Signaling Circuit

SD-81818-01, Issue 9—Interrupter Circuit

If this section is to be used with equipment or apparatus reflecting an earlier or later issue(s) of the SD(s), reference should be made to SDs and circuit descriptions (CDs) to determine the extent of the changes and the manner in which the section may be affected.

PURPOSE OF THE 807E TONE POWER PLANT

1.04 ***Abbreviations and Acronyms:*** Refer to Table A for a list of abbreviations and acronyms with applicable terms in this section.

1.05 The purpose of the 807E tone power plant (J86839A) is to provide continuous audible ringing tone, high tone, and signaling interruptions for the No. 1 Traffic Service Position System (No. 1 TSPS).

EQUIPMENT CHARACTERISTICS

1.06 The major generating functions in the 807E tone power plant are duplicated and divided into side "0" and side "1". Both side "0" and side "1" are normally powered with either side connected to the office loads.

TABLE A
ABBREVIATIONS AND ACRONYMS

ABBREVIATION	TERM
AR	Audible Ring Tone
HT	High Tone
LT	Low Tone
IPM	Interruptions Per Minute
HZ	Hertz
RMS	Root-Mean-Square (Alternating Current)
TSPS	Traffic Service Position System

1.07 The dc input power to tone generators is supplied by the 24-volt central office battery. The −48 volt central office battery supplies the dc power for the tone generators, the semiconductor-type interrupters, and the alarm and transfer relays.

2. PHYSICAL DESCRIPTION

A. Introduction

2.01 The 807E tone power plant (J86839A) is designed to mount on a No. 1 ESS standard framework. The size of the single bay is 7 feet high, 1 foot deep, and 2 feet 2 inches wide.

2.02 The equipment of the 807E tone power plant is as follows (Fig. 1 and 2):

- Manual ringing and tone panel
- Control, test, interrupter, and transfer relays
- Tone oscillators
- Tone amplifiers
- Tone distribution splitting resistors

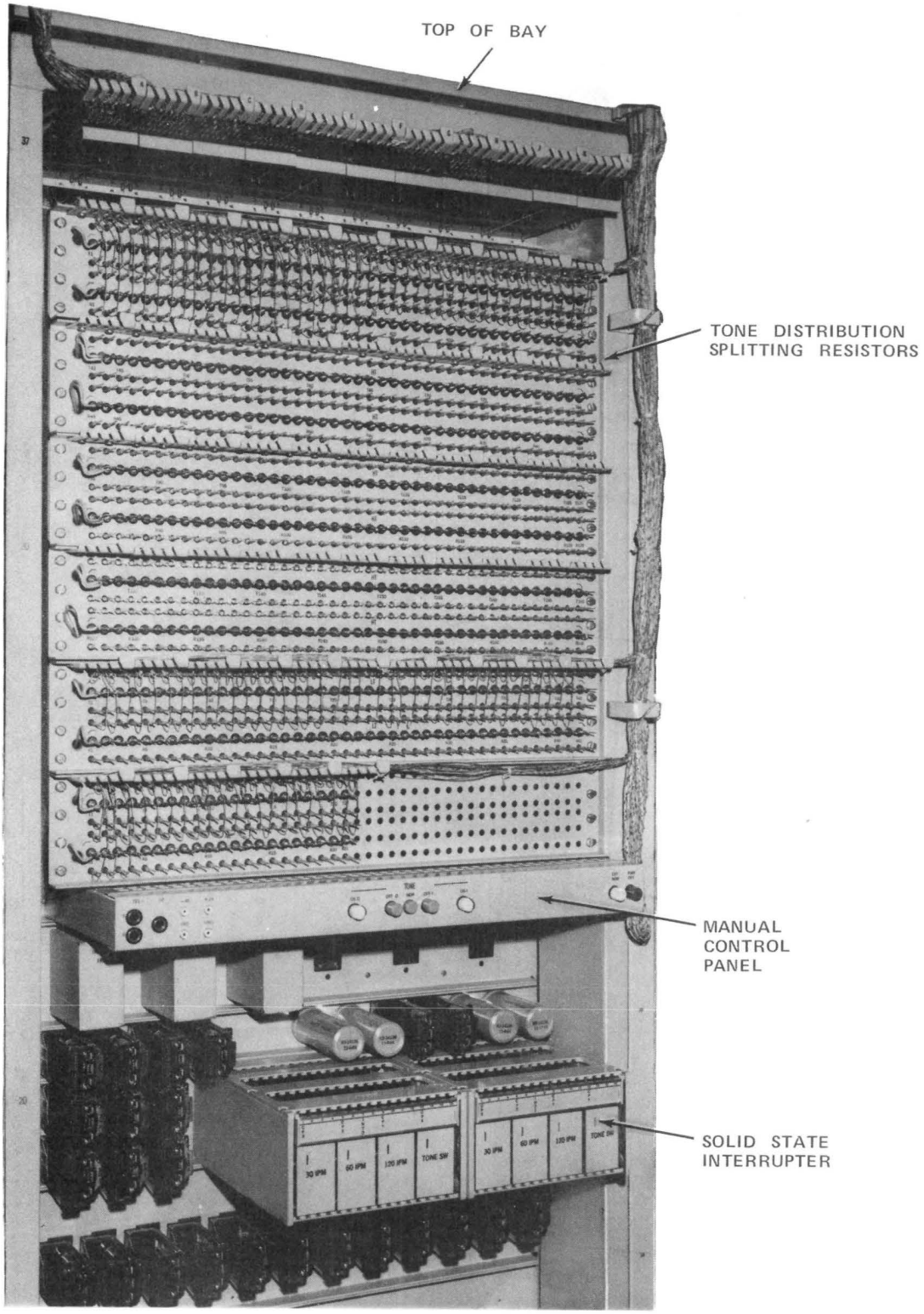

Fig. 1—Upper Portion of a Fully Equipped 807E Tone Power Plant

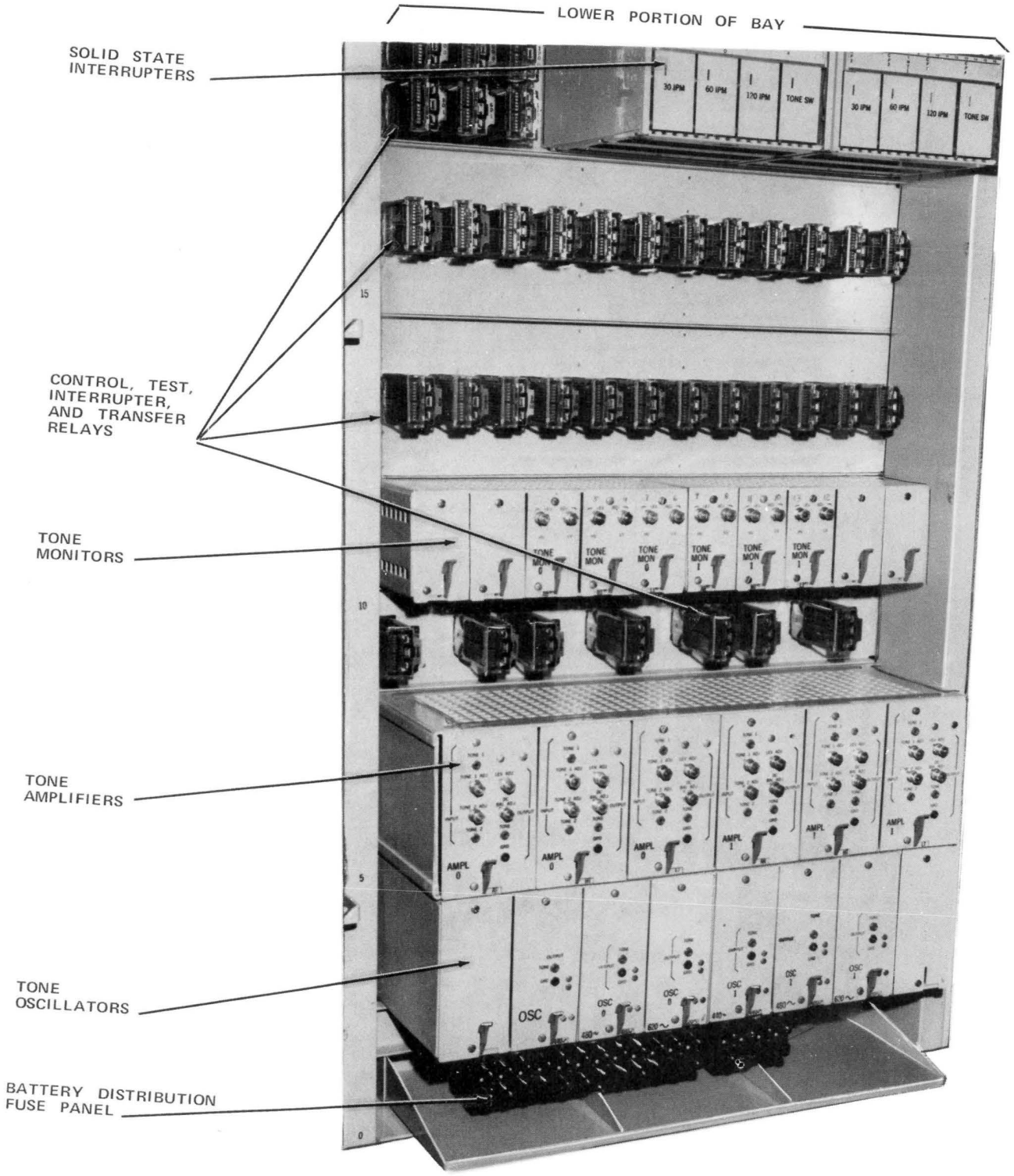

Fig. 2—Lower Portion of a 807E Tone Power Plant

- Solid-state interrupter.

B. Manual Control Panel

2.03 The manual tone panel provides ON-OFF switching and status indicators for the 807E tone power plant. Refer to Fig. 3 for arrangement of switches and lamps. Refer to Table B for function of switches and lamps.

C. Control, Test, Interrupter, and Transfer Relays

2.04 The power ON-OFF relays control the dc power to the plant circuits. The test relays are used to perform marginal checks on the monitors and ground-cross detection circuits within the plant. The interrupter output relays, fed from the solid-state interrupters, provide the actual interrupted tones. The transfer relays determine which side of the plant ("0" or "1") is connected to the office load.

D. Tone Oscillators

2.05 Duplicate tone oscillators are located at the bottom of the bay. Three precise tone oscillators (one 440 Hz, one 480 Hz, and one 620 Hz), are provided for side "0" and "1".

E. Tone Amplifiers

2.06 The tone amplifiers are located directly above the tone oscillators on the bay. The amplifiers mix and amplify the signals from the tone oscillators to produce the three call-progress tones. The tone amplifiers are duplicated to provide regular and reserve service.

F. Tone Distribution Splitting Resistors

2.07 The tone distribution splitting resistors are located in the upper portion of the bay. The 450Ω resistors provide balanced output of the various tones generated within the 807E tone power plant.

G. Solid-State Interrupters

2.08 The solid state interrupters (Fig. 1) are located on the upper right part of the bay above the two rows of control, test, and transfer relays on the bay. The interrupters provide the tones and signaling interruptions.

H. Battery Distribution Fuse Panel

2.09 The battery distribution fuse panel is located at the bottom of the bay. The 70-type fuses supply −48 Vdc power to the control relays. Positive 24 Vdc power is also supplied to the solid-state interrupter, tone amplifier, and tone oscillator circuits through similar type fuses.

3. FUNCTIONAL DESCRIPTION

A. Introduction

3.01 The function of the 807E tone power plant is to provide continuous audible ring tone, high

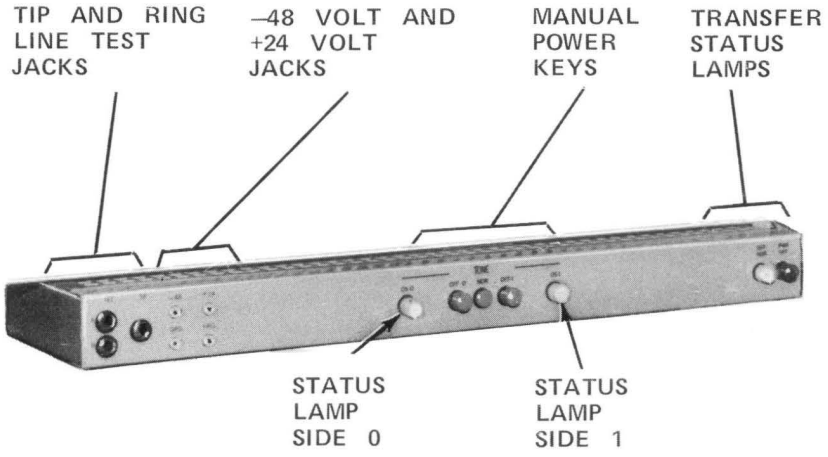

Fig. 3—Manual Control Panel, 807E Tone Power Plant

TABLE B

CONTROLS AND INDICATORS

NAME	EQUIP LOCATION	CONTROL INDICATOR	TYPE	FUNCTION
Manual Tone Panel (J86839G)	Misc PWR FRM			Manual keys, automatic and manual lamps.
		PWR OFF	Lamp (red)	Lights when OFF-0, or OFF-1 key is depressed, or when the 48-volt fuse alarm occurs.
		OFF NOR	Lamp (white)	Lights when OFF-0 or OFF-1 key is depressed.
		OS-1	Lamp (white)	Lights when power is removed from side 1.
		OFF-1*	Pushbutton key	Power is removed from side 1, and load is transferred to side 0, when NOR key is depressed.
		NOR*	Pushbutton key	When depressed, both sides 0 and 1 are powered and the system control determines which side will feed the load.
		OFF-0*	Pushbutton key	Power is removed from side 0, and load is transferred to side 1, when NOR key is restored to normal position.
		OS-0	Lamp (white)	Lights when power is removed from side 0.

*These switches are mechanically interlocked such that only one switch may be operated at a time.

tone and low tone interrupted at 120-IPM rate, and signaling interruptions for the No. 1A/1B TSPS offices. The functional units of the 807E plant are as follows:

- Tone Amplifiers
- Tone Generators
- Solid-State Interrupters
- Tone Voltage Monitors
- Tone Oscillators
- Tone Interruption, Control, and Distribution Circuit
- Output Transfer Circuit.

Power and signal flow control within the 807E power plant is given in Fig. 4.

B. Tone Amplifiers

3.02 The tone amplifier functions are as follows:

(1) Provide regular and reserve transistor amplifiers

(2) Mix and amplify signals from oscillators

(3) Produce tones for audible ring tone, high tone, and low tone.

C. Tone Generators

3.03 The tone generators operate from +24 Vdc to supply three call-progress tones developed from three oscillators feeding summing amplifiers. One or two oscillator outputs are applied to the tone amplifiers. The tone amplifier outputs are connected to tone transformers. The call-progress tones are as follows:

(1) AR—Audible Ringing Tone, 440 Hz and 480 Hz combined

(2) HT—High Tone, 480 Hz

(3) LT—Low Tone, 480 Hz and 620 Hz combined.

D. Solid-State Interrupters

3.04 These circuits are solid state interrupters which are designed to perform the functions of previous mechanical interrupters. The transistor binary divider (flip-flop) circuits drive the relays, which provide the actual interruptions. Each interrupter circuit provides 30, 60, and 120 IPM.

E. Tone Voltage Monitors

3.05 The function of the monitors is to check each tone signal from the amplifier circuit for low voltage or high voltage failure. The monitors detect a loss of a tone output or ground. The following monitors are located within the tone power plant:

- Tone Monitors
- Interrupter Monitors
- Ground Cross-Detection.

3.06 The tone monitors (TONE MON 0 and TONE MON 1) check each of the tone signals from the amplifier circuit for high voltage and low voltage failure. These monitors are provided in duplicate with one set for the regular amplifiers and the other for the reserve amplifiers.

3.07 The interrupter monitors, regular and reserve, are provided through the IF0 and IF1 relays. If any of the three interrupters fail, the IF0 or IF1 relay will release causing an alarm indication that is transmitted to the system. The reserve interrupter is automatically substituted by the system.

3.08 A ground cross detection (GCD) circuit is provided by the system. This circuit is composed of a GCD relay with associated resistors. They are connected to the center taps of the secondary windings of the tone output transformers (AR1, HT1, and LT1). A false ground on one of the output leads, beyond the splitting resistors, operates the GCD relay and actuates an alarm. The system can check for false ground on these leads by operating checking relays H10, L10, or L11.

F. Tone Oscillators

3.09 The general function of the tone oscillators is to provide precise tones at 440-, 480-, and 620-Hz for the regular and reserve side of No. 1A/1B TSPS tone power plants. The tone oscillator circuit includes output filters for the oscillators to limit harmonic content to 50 db below the fundamental.

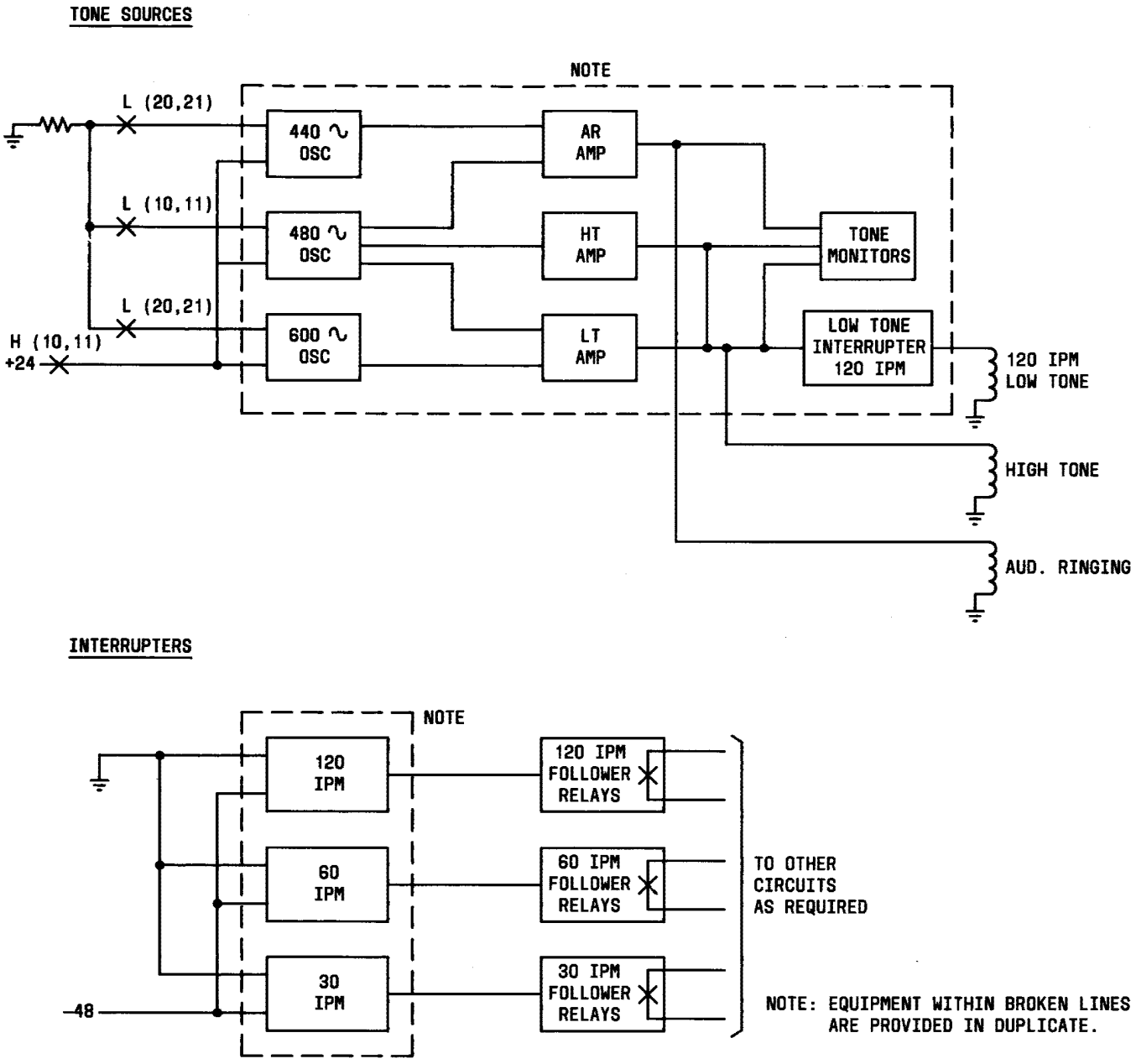

Fig. 4—Power and Control Signal Flow Within the 807E Tone Power Plant—Block Diagram

G. Tone Interruption, Control, and Distribution Circuit

3.10 The tone interruption, control, and distribution circuit connects the output from the tone generator to the office load circuit through an output transformer and associated splitting resistor pairs. The following functions are provided by the tone distribution, interruption, and control:

- Balanced distribution of continuous audible ringing tone
- Balanced distribution of continuous high tone
- Balanced distribution of 120-IPM interrupted low tone
- Monitoring amplifier outputs for low and high voltage to provide the system with signals for automatic transfer and control
- Manual control and transfer that supersedes system control
- Power disconnecting relays which are under system control
- Interrupters which provide interruptions for tones and signaling
- Load transfer relays which are under system control
- Ground cross detection on all tone output transformers
- 30-, 60-, and 120-IPM interrupted loop signaling
- Monitoring of the interrupter outputs
- 120-IPM interrupted low tone
- Simulated interrupter failure under system control.

H. Output Transfer Circuit

3.11 The output transfer circuit connects the office load to ringing outputs and tone outputs from either side "0" or "1". The transfer relays are normally under system control. An override to system control is provided by the manual power off keys (OFF-0 and OFF-1) located on the plant control tone panel.

4. DESCRIPTION OF OPERATION

4.01 The 807E tone power plant operates to provide continuous audible ringing tone (AR), high tone (HT), 120-IPM interrupted low tone (LT), and 30-, 60-, and 120-IPM interrupted loop signaling for the No. 1A/1B TSPS. Each audible ringing tone and low tone consists of two different signals generated by separate tone oscillators and then mixed together and amplified by an individual tone amplifier. The frequencies for each tone are of equal amplitude. The high tone is generated by a single oscillator and amplified by an individual amplifier. The output of each amplifier is monitored to detect a high- or low-voltage condition.

4.02 The 807E tone power plant furnishes solid-state interrupters to provide the 30-, 60-, and 120-IPM interrupted loop signaling for the J86839B interrupter unit. A transistorized interrupter tone switch provides the 120-IPM required for the low tone interruptions (this is independent of the interrupter required for the 120-IPM interrupted loop signaling).

4.03 For reserve tone power, the plant includes duplicate oscillators and amplifiers (tone generators), interrupters, and monitors, as well as distribution, transfer, and fuse alarm circuits.

4.04 The 807E tone power plant also provides for automatic transfer in case of failure of either side "0" or "1" by the electronic switching system. The tone monitor outputs are fed to the electronic switching system which controls which side "0" or "1" of the tone generators and interrupter units will feed the load. All generators and interrupters are transferred as a unit. Manual control is also provided in the plant which supersedes system control.

5. MAINTENANCE

5.01 Scheduled maintenance must be performed on the plant for reliable service. The following routine checks should be performed periodically to prevent faulty or inadequate plant operation:

(1) Clean ventilation passages

(2) Check relays and associated equipment

(3) Check tone amplifiers and tone monitors:

(a) Amplifier dc balance checks

(b) Amplifier voltage checks

(c) Low-voltage tone monitor checks

(d) High-voltage tone monitor checks

(4) Tone distribution voltage checks

(5) Output filter voltage check

(6) High- and low-voltage control relay checks

(7) Transfer and alarm checks

(8) Transfer relay checks

(9) Fuse alarm checks

(10) Fuse alarm relay checks

(11) Interrupter checks

(12) Distribution circuit checks

(13) Ring tone distribution voltage checks

(14) Ground cross-detection circuit checks

5.02 Maintenance and trouble-locating procedures are provided in the ***Task Oriented Practice (TOP)*** for the appropriate system.

6. REFERENCES

6.01 The following listing provides additional information concerning the 807E tone power plant.

SECTION	TITLE
167-725-316	807E Tone Power Plant—Operating Methods
CD-81817-01	Circuit—Interruption, Signaling, Control, and Distribution—No. 1 TSPS Offices—807E Tone Power Plant (J86839)
CD-81654-01	Oscillator Circuit—No. 1 ESS and No. 1 TSPS Offices—Ringing and Tone Power Plant
CD-81818-01	Signaling Circuit—30, 60, and 120-IPM Interrupter (J86839)
CD-81655-01	Amplifier Circuit—No. 1 ESS and No. 1 TSPS Offices—Ringing and Tone Power Plant
CD-81703-01	Interrupter Circuit—Semiconductor Type
CD-1B035-01	Traffic Service Position System No. 1—Miscellaneous Circuit
X-77486	Manufacturing Testing Requirements for 807E Tone Power Plant.