ZITEC

I-2151

TECHNICAL INFORMATION

FOR

ALARM SENDING

AND

CHECKING CIRCUIT 600151

Approved:

Issue 1: 11/9/84
Issue 2: 10/18/85

ALARM SENDING AND CHECKING CIRCUIT

600151

INDEX

FIGURES

DRAWINGS

A. DESIGNATIONS

1. Terminal Designations - See Figure 1

Terminal #	Designation	Function
B1	ALLOT. MAJ. ALM (GND IN)	Receive a major alarm signal from the Allotter Circuit(s) (requires a ground input).
A1	TO ALLOT. MAJ. LAMP	Light the Allotter Major Lamp.
B2	POWER MAJ. ALM. (GND IN)	Receive a Power Board Major Alarm signal (requires a ground input).
A2	TO POWER MAJ. LAMP	Light the Power Major Lamp.
B3	CHG. FAIL ALM. (GND IN)	Receive a Charger Fail Alarm signal (requires a ground input).
A3	TO CHG. FAIL LAMP	Light the Charger Fail Lamp.
B4	EQUIP. MAJ. F.A. ALM. (BATT. IN)	Receive an Equipment Major Fuse Alarm signal (requires a battery (-50V) input).
A4	TO EQUIP. MAJ. F.A. LAMP	Light the Equipment Major Fuse Alarm Lamp.
B5	CARR. ALM. (BATT. or GND IN)	Receive a Carrier Alarm signal (will operate with either battery (-50V) for ground input, via strapping).
A5	TO CARR. LAMP	Light the Carrier Lamp.
B6	OPT. MIN. ALM. (GND IN)	Receive Optional equipment Minor Alarm(s) signal (requires a ground input).
A6	WIRE AS NEEDED	Wire as needed.
B7	ALLOT. MIN. ALM. (GND IN)	Receive Allotter Minor Alarm(s) signal (requires a ground input).
A7	TO ALLOT. MIN. LAMP	Light the Allotter Minor Lamp.
B8	POWER MIN. ALM. (GND IN)	Receive a Power Board Minor Alarm signal (requires a ground input).
A8	TO POWER MIN. LAMP	Light the Power Minor Lamp.

B9	EQUIP. MIN. F.A. (BATT. IN)	Receive Equipment Minor Fuse Alarm(s) signal (requires a battery (-50V) input).
A9	TO EQUIP. MIN. F.A. LAMP	Light the Equipment Minor Fuse Alarm Lamp.
B10	DEL. P.S. ALM. (GND IN)	Receive Delayed Permanent Signal Alarm from Allotter(s) (requires a ground input).
A10	TO P.S. LAMP	Light the Permanent Signal Lamp.
B14	ALM. SND	From Alarm Cut-off key, will receive a ground when the office alarm(s) are to be sent to the Toll Center via CLR TRUNKS or CARRIER CHANNEL.
B15	ALM. CO	From Alarm Cut-off key, will receive a ground when the office alarm(s) signal is to be cut-off.
B17- B21	OPT. ALM. OUTPUTS	Optional Alarm Outputs, used as required. B17 = PS B18 = MAJ B19 = MIN B20 = NT B21 = CARR
B22	A CO LP	Light the Alarm Cut-off lamp.
B23		May be used to extend a distinct tone, for a MAJOR Alarm signal, if required.
B24 B27 B33	T3 R3 S3	Tip, Ring & Sleeve terminals to CLR Trunk Number 3. Used to test and seize the trunk for the Alarm Alert signal to the operator.
B25 B28 B34	T2 R2 S2	Tip, Ring & Sleeve terminals to CLR Trunk Number 2. Used to test and seize the trunk for the Alarm Alert signal to the operator.
B26 B29 B35	T1 R1 S1	Tip, Ring & Sleeve terminals to CLR Trunk Number 1. Used to test and seize the trunk for the Alarm Alert signal to the operator.
B30	FROM POWER BOARD	May be used for a distinct tone to operator, if required.
A25	FROM POWER BOARD (DIRECT GEN; 16 2/3,20, 25HZ)	Receive Generator, used as Alert Tone to operator, when Alarm Send in effect.

A26	MST	Machine Start, used to start office Ring & Tone equipment.
A27	BT-R	Busy Tone Return
A28 A29 A30	R T S	Tip, Ring & Sleeve terminals from Connector circuit(s), Directory Number access to Alarm Sending & Checking circuit.
B31	FBT (120 IPM)	Fast Busy Tone (at 120 IPM) input. Used to indicate a Carrier Fail condition.
A24	FBT-R	Fast Busy Tone - Return
A31	RBT-R	Ring Back Tone - Return
B32	SBT (60 IPM)	Slow Busy Tone (at 60 IPM) input. Used to indicate a Minor Alarm condition.
B36	RBT (1 RING CODE)	Ring Back Tone (1 Ring Code) input. Used to indicate a Permanent Signal condition.
B37	NTT (2 RING CODE)	No Trouble Tone (2 Ring Code) input. Used to indicate No Trouble condition.
B38	GND.	Circuit Ground Input.
B39	ALM. CONT. GND.	Alarm Control Ground output. Use to control Office Alarm signals.
A39	M	M (MARK) terminal output to a Carrier unit for seizure, if required (seize an operator).
A40- A43		Contact shorts when CKT in send condition, used as required for special application.
B40	AUD. ALM.	Audible Alarm output. Used to control the the office audible alarm signal for a minor or major condition.
B41	FA	Fuse Alarm output for this circuit & Wire Chief Test Set.
B42	TO WIRE CHIEF TEST	Battery (-50V) circuit input for Wire Chief Test Set.
B43	BATT	Battery (-50V) circuit input.

CONNECTOR PIN IDENTIFICATION

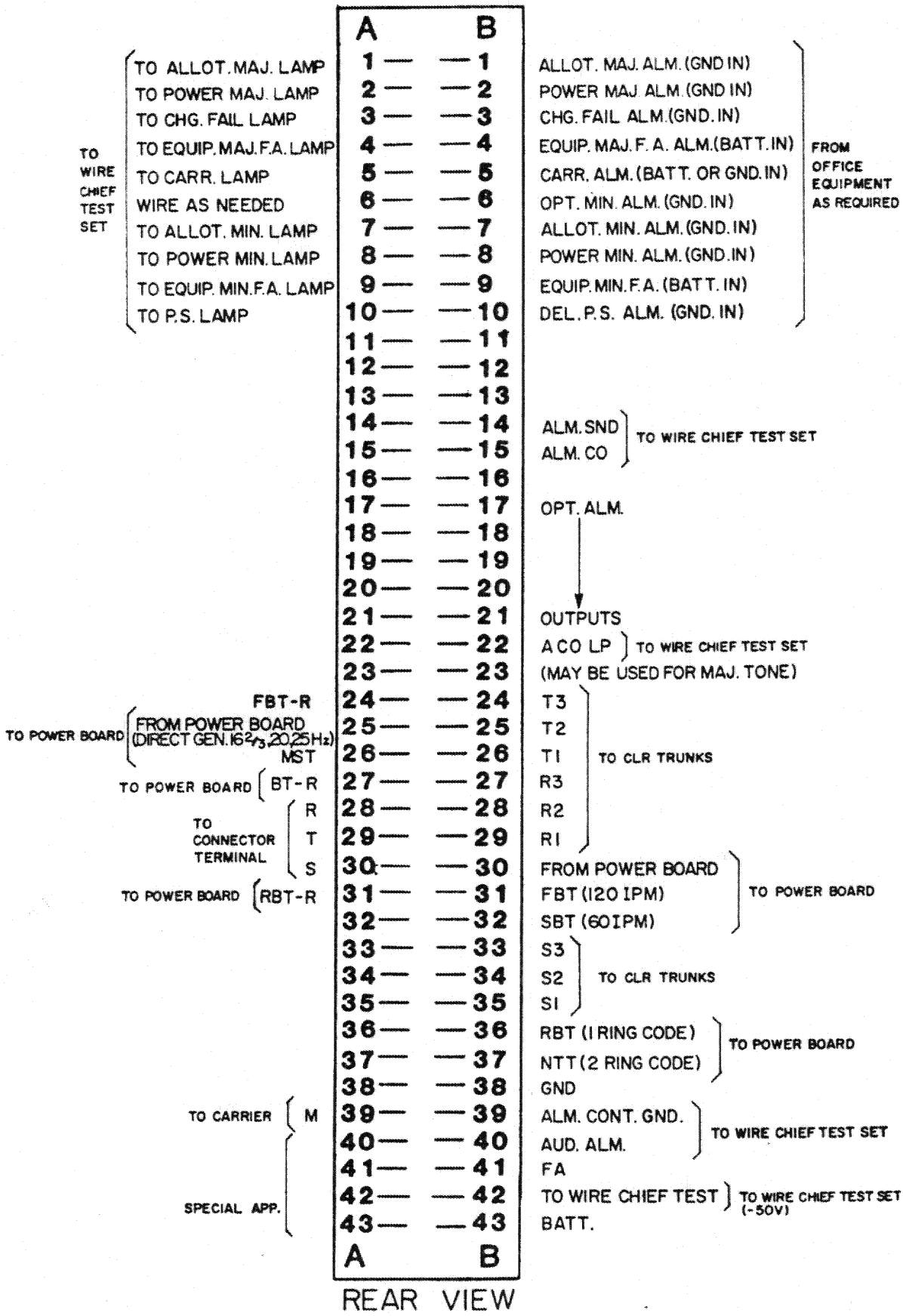


FIGURE 1.

2. LED Designations

Designation	Meaning	Function
ANS	Answer	Indicates the operator has answered the alarm sending.
ALCO	Alarm Cut-off	Indicates the office Audible Alarm has been cut-off.
CARR	Carrier	Indicates a Carrier Alarm.
CT	Cut-through	Indicates the circuit has been accessed from the Connector Number or a CLR TRUNK or CARRIER has been seized.
FA	Fuse Alarm	Indicates a blown fuse in either this circuit or the Wire Chief Test Set.
MAJ	Major	Indicates the circuit has received a Major Alarm signal.
MIN	Minor	Indicates the circuit has received a Minor Alarm signal.
NT	No Trouble	Indicates the circuit has been accessed from the Connector Number and the office has No Trouble Alarm.
PS	Permanent Signal	Indicates the circuit has received a Permanent Signal.
SND	Send	Indicates an office alarm condition has been received and the circuit is set for Alarm Sending.

B. STRAPPING OPTIONS

	STRAP
CARR. ALM. BATT IN	A2 TO A1
CARR. ALM. GND IN	A2 TO A3
CARR. ALM. Required as MAJ.	C5 TO C6
CARR. ALM. Required as CARR.	C5 TO C4
DEL. P.S. ALM. Required as MIN.	C1 TO C2
DEL. P.S. ALM. Required as P.S.	C1 TO C3
DEL. P.S. ALM. To send to CLR	C7 TO C8

STRAP "B" always equipped.

OPT. ALM. OUTPUTS

MAJ - GND.	D1 TO E1
MAJ - BATT.	D2 TO E1
MIN - GND.	D1 TO E2
MIN - BATT.	D2 TO E2
CARR - GND.	D3 TO E3
CARR - BATT.	D2 TO E3
PS - GND.	D3 TO E4
PS - BATT.	D4 TO E4
NT - GND.	D3 TO E5
NT - BATT	D4 TO E5

C. GENERAL (See Figure 2)

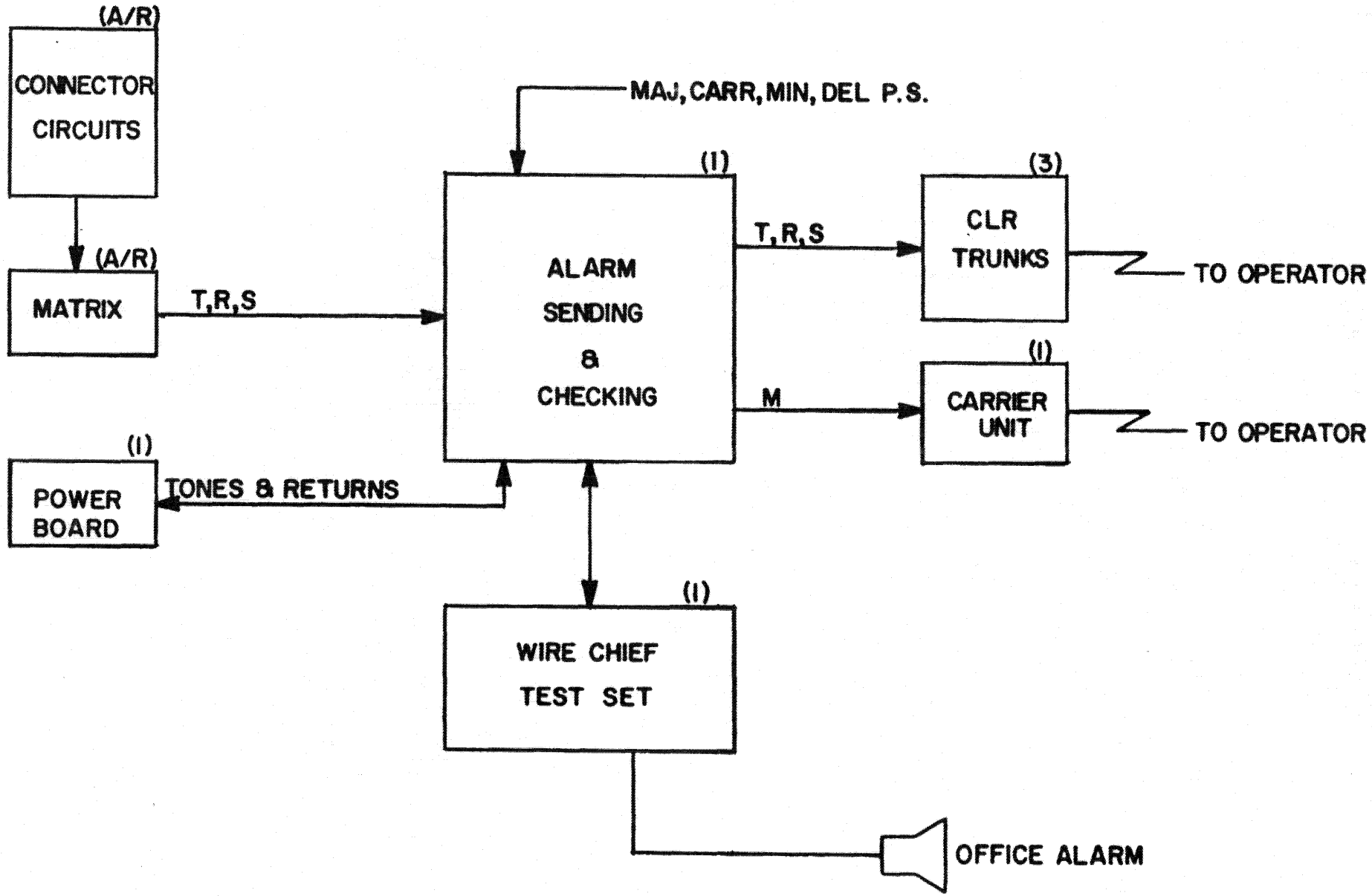
1. The Alarm Sending & Checking circuit is under control of the Wire Chief Test Set for holding the Alarm & P.S. condition local (within the office), or to send an Alarm Alert to the operator, when the office is not attended.

2. The Alarm Sending & Checking circuit is connected to the Alarm & P.S. output of the central office equipment for signal monitoring.

3. It may be connected to access up to three (3) CLR (Combined Line & Recording) trunks or a Carrier unit when it is required to alert an operator of an Alarm or P.S. condition.

4. It is assigned a Connector Terminal Number, which is used as a remote access to determine the office condition. Following are signals which may be used, and what they indicate.

   NTT - 2 Ring Code - indicates NO TROUBLE
   PS - 1 Ring Code - indicates a Permanent Signal
   CARR - Fast Busy Tone - (120 IPM) indicates a Carrier fault.
   MIN - Slow Busy Tone - (60 IPM) indicates a Minor Alarm condition.
   MAJ - No Tones - indicates a Major Alarm condition.



GENERAL SYSTEM BLOCK DIAGRAM

FIGURE 2.

D. GENERAL OPERATION

1. Idle

a. Wire Chief Test Set - Alarm C.O. key set to HOME position. No office alarms or P.S. condition in the office.

b. All Relays normal (released) and no LED's lighted.

c. If the Wire Chief Test Set Alarm C.O. key is operated to the ALM C.O. position, the "ALCO" LED will be lit.

2. Receiving Alarm or P.S. Signals

a. When a Alarm or P.S. signal is received the associated Relay and LED will light.

b. A MAJOR Alarm signal will light the "MAJ" LED and signal the office Audible Alarm uninterrupted.

c. A MINOR Alarm signal will light the "MIN" LED and signal the office Audible Alarm interrupted (1/2 sec. ON, 1/2 sec. OFF).

d. A MAJOR & MIN, is received at the same time, both LED's may be lighted, but the office Audible Alarm will be uninterrupted. Note: A Major Alarm condition will override all other alarms.

e. A CARR Alarm will light the "CARR" LED, but the office Audible Alarm is not directly activated from this circuit. If the Carrier Unit does not provide an audible alarm use the CARR. OPT. ALM. output (terminal B21). Note: A CARR Alarm will override a MINOR and or a P.S. condition.

f. A DEL. P.S. Alarm will light the PS LED, and may provide an Audible office Alarm interrupted signal, if the PS signal sending to CLR option strap is provided (C7 to C8). The PS Alarm may be received as a MINOR condition if strap C1 to C2 provided (the PS LED would not light with this option).

g. The Wire Chief Test Set ALARM C.O. key may be operated to the ALM C.O. position cutting off the Audible office alarm. This operation will also light the "ALCO" LED.

3. Sending Alert Alarm

a. The Wire Chief Test Set ALARM C.O. key must be operated to the ALM SEND position. This operation will disable the Audible office alarm.

b. When an alarm signal is received the ALARM LED and LED "SND" will light.

c. The Alarm Sending Checking circuit then test for an Idle CLR Trunk or Carrier unit. Testing is done on the S1-S3 terminals.

d. When an Idle circuit is found, LED CT lights. Note: If no circuit is idle the test will continue until the idle indication is received.

e. With both the SND & CT operation complete, a seizure signal is extended from this circuit.

f. When the operator answers the requesting circuit, LED ANS will light. At this time the operator will receive a shot burst of Alert Tone. Note: Each time the request is answered the burst of Alert Tone will be sent to the operator.

g. The request will remain until the Alarm is cleared, or the Wire Chief Test Set ALM CO key is removed from the ALM SND position.

h. When the operator releases, the ANS & CT will restore momentarily, and will reseize another circuit to the operator (refer to step C for repeated operation).

4. Checking Office Condition

a. The Alarm Sending & Checking Circuit is assigned a Connector Terminal Number.

b. The operator or other personnel may use the connector number to remotely determine the office condition.

c. The Connector Circuit(s) will test the Alarm Sending & Checking circuit, over its "S" Sleeve terminal for Idle.

d. If the circuit is idle the connector will cut-through extending a ground on the "S" terminal & Ring current on the T & R.

e. The connectors ring is tripped by a ring trip circuit, and the ground received on the "S" terminal will operate the CT relay & light the CT LED.

f. If the circuit is set for Sending the SND function is cut-off and SND LED goes out.

g. The calling station will receive the office condition tone. Following are the signals which may be used, and what they indicate.

NTT - 2 Ring Code - No Trouble
PS - 1 Ring Code - Permanent Signal
CARR - Fast Busy Tone - Carrier fault
MIN - Slow Busy Tone - Minor Alarm
MAJ - No Tones - Major Alarm

E. DETAILED OPERATION

1. Idle

a. All Relays are released and LED's are out. If the Wire Chief Test Set has its Alarm Cut-off key in the ALM CO position "ALCO" LED will light.

b. A19 & A20 inverters, with C20, R54 & R55, is a pulse generator. The output of A19 pin 4 will change at approximately 23 pulses per second. The output pin 4 of A19 is extended to AND gate A7 P12. AND gate A7 pin 13 is Idle at logic (0) and the pulses are not extended through A7 at this time.

c. A6 Inverters, with R38 & C14, is a pulse generator. The output of A6 pin 8 will pulse at 1 pulse per second (1/2 sec. ON, 1/2 sec. OFF). The output A6 pin 8 is extended to AND gate A13 pin 8. AND gate A13 pin 9 is idle at logic (0) and the pulses are not extended through A13 at this time.

2. Receiving Alarm or P.S. Signals

a. Major alarm signals are received on terminals B1-B4.

1) B1-B3 terminals are set to receive a ground input signal. Each ground received on B1-B3 is inverted by an A3 Inverter. The output pins 8, 12, & 10 will change logic (1) to (0).

2) This logic change is extended to NAND gate A8 which operates. The output of NAND gate A8 pin 6, changes logic (0) to (1). This change is extended to pin 8 of OR gate A9, which operates.

3) B4 terminal is set to receive a battery input signal. This will operate transistors Q2, Q3 and A3 Inverter. The output pin 4 changes logic (0) to (1). This change is extended to pin 1 of OR gate A9, which operates.

4) A9 OR gate pin 9 changes logic (0) to (1). This change is extended to pin 3 of Driver A18, pin 5 of Inverter A10, and pin 1 of OR gate A12, which all operate.

5) Driver A18 output pin 16 operates relay MAJ and lights LED MAJ.

6) Inverter A10 output pin 6 changes logic (1) to (0) which is extended to pin 2 of AND gate A11. This holds AND gate A11 off, which is a MAJ ALARM override if a CARR Alarm is received. Note: If CARR Relay operated & CARR LED was on, they would be released.

7) OR gate A12 output pin 3 changes logic (0) to (1). This change is extended to pin 13 of OR gate A12, which operates, and pin 2 of AND gate A13.

8) Relay MAJ operated opens the operate path for relay PS (MAJ override), opens the NTT terminal B37 path, and FBT & SBT terminals B31 & B32 path. This prepares the circuit for a NO Tone condition. (MAJ Alarm indication). Relay MAJ also prepares the path to operate the office AUD. ALM. terminal B40 and marks terminal B18 either with -50V or ground (depends on circuit strapping).

9) With the ALM CO key (Wire Chief Test Set) on the HOME position, terminal B14 AL. SND and terminal B15 ALM. CO is open (NO ground). This causes Inverters A6 output pins 6 and 4 to be at logic (1). These output are extended to pins 1 & 2 of AND gate A2, the output of A2 pin 3 is at logic (1).

10) When output pin 3 of OR gate A12 changes logic (0) to (1) (as stated), it is extended to pin 2 of AND gate A13. With pin 1 of A13 also at logic (1) (from A2 output pin 3), AND gate A13 operates. Its output pin 3 changes logic (0) to (1), extended to pin 8 of OR gate A12, which operates.

11) OR gate A12 output pin 10 changes logic (0) to (1) and through Driver A21 will operate relay BZ.

12) Relay BZ operated completes the signal path to terminal B40 AUD. ALM. The office alarm is sounded at a steady rate.

13) OR gate A12 output pin 11 changes logic (0) to (1) with no effect at this time.

b. CARR Alarm signal is received on terminal B5 and may be either a ground or battery input (A-strapping option).

1) Either Transistors Q4 & Q5 or just Q5 operate, when the CARR ALM signal is received.

2) Transistor Q5 operates Inverter A3. Its output pin 2 changes logic (0) to (1). This change via strapping may be considered a MAJ or a CARR alarm condition. If it is a MAJ ALM see operation of Major Alarm signal starting with step 2.a.4).

3) If the CARR Alarm is controlled as a seperate signal, the output of Inverter A3 pin 2 is extended to pin 1 of AND gate A11.

4) AND gate A11 will operate, if a MAJ Alarm signal has not been received. Its output pin 3 changes logic (0) to (1). This change is extended to pin 1 of Driver A21, pin 9 of Inverter A10, and pin 2 of OR gate A12, which will operate.

5) Driver A21 operates Relay CARR and lights CARR LED.

6) Inverter A10 output pin 8 changes logic (1) to (0), which is extended to pin 6 of AND gate A11. This holds AND gate A11 off, which is the CARR Alarm override, if a MIN Alarm is received. Note: If MIN Relay was operated and MIN LED on, they would be released.

7) OR gate A12 output pin 3 will operate the BZ relay with no effect at this time. Note: The office Audible Alarm is not directly activated from this circuit. If the Carrier unit does not provide an audible alarm use the CARR OPT ALM output terminal B21.

8) The operated CARR Relay opens the path for relay PS (override), and prepares the circuit for extending FBT if access from Connector Terminal.

c. MINOR Alarm signals are received on terminals B6-B9.

1) B6-B8 terminls are set to receive a ground input signal. Each ground received on either B6-B8 is inverted by A4. The output pins 10, 12 & 8 will change logic (1) to (0).

2) This logic change is extended to NAND gate A8, which operates. The output of NAND gate A8 pin 10, changes logic (0) to (1). This change is extended to pin 5 of OR gate A9, which operates.

3) B9 terminal is set to receive a battery input signal. This operates transistors Q6, Q7 and Inverter A4. The output pin 4 of Inverter A4 changes logic (0) to (1). This changes is extended to pin 4 of OR gate A9, which operates.

4) OR gate A9 output pin 6 changes logic (0) to (1). This change is extended to pin 5 of AND gate A11.

5) AND gate A11 will operate, if a CARR Alarm signal has not been received. Its output pin 4 changes logic (0) to (1). This change is extended to pin 2 of Driver A21, pin 3 of Inverter A10, and pin 6 of OR gate A12, which all operate.

6) Driver A21 operates relay MIN and lights MIN LED.

7) Inverter A10 output pin 4 changes logic (1) to (0), which is extended to pin 13 of AND gate A11. This holds AND gate A11 off, which is the MIN Alarm override, if a PS signal is received. Note: If PS relay was operated and PS LED on, they would be released.

8) OR gate A12 output pin 4 changes logic (0) to (1). This change is extended to pin 12 of OR gate A12, which operates, and pin 13 of AND gate A13.

9) Relay MIN operated opens the NTT terminal B37 path and prepares the SBT terminal B32 path. This prepares the circuit for a slow busy tone (MIN Alarm indication). Relay MIN also prepares the path to opeate the office AUD. ALM. terminal B40, and marks terminal B19 either with -50V or ground (depends on circuit strapping).

10) OR gate A12 output pin 11 changes logic (0) to (1), with no effect at this time.

11) With the ALM CO key (Wire Chief Test Set) on the HOME position AND gate A13 pin 12 will have a logic (1).

12) When output pin 4 of OR gate A12 changes logic (0) to (1) (as stated), it is extended to pin 13 of AND gate A13. With pin 12 of A13 also at logic (1) (from A2 output pin 3) AND gate A13 operates. Its output pin 11 changes logic (0) to (1), which is extended to pin 9 of AND gate A13.

13) AND gate A13 is enabled, and permits the pulses on pin 8 of A13 (from the pulse generator A6) [.5 seconds on, .5 seconds off] to operate and restore AND gate A13 at the pulse rate.

14) The output pin 10 of AND gate A13 (pulsing) is extended to pin 9 of OR gate A12 which operates at the pulse rate.

15) OR gate output pin 10 (via Driver A21) operates and releases relay BZ.

16) Relay BZ pulsing (operating & releasing) completes the signal path to terminal B40 AUD. ALM. The office alarm is sounded at the interrupted rate.

d. DEL. P.S. alarm is received on terminal B10 as a ground input.

1) Inverters A4 and A10 operate. Inverter A10 output pin 12 changes logic (0) to (1).

2) This change, via strapping, may be considered a MIN or a PS alarm condition. If it is a MIN ALM see operation for a MINOR Alarm signal starting with step 2.c.5).

3) Is the PS Alarm is controlled as a seperate signal, the output if Inverter A10 pin 12 is extended to pin 12 of AND gate A11.

4) AND gate A11 will operate, if a MIN Alarm signal has not been received. Its output pin 11 changes logic (0) to (1). This change is extended to pin 3 of Driver A21 and to OR gate A12 pin 5 (if the PS signal is to be sent to the distant office, when the circuit is set in the sending Alert Alarm Mode).

5) Driver A21 operates relay PS and lights PS LED. Relay PS prepares the circuit for the RBT (one ring code), and marks terminal B17 Opt. ALM. with either -50V or ground (strapping option). This terminal may be used to provide an Audible Alarm signal.

6) If strap C7 to C8 equipped, OR gate A12 operates. Its output pin 4 changes logic (0) to (1). This change will cause relay BZ to pulse with no effect.

e. Alarm Cut-off

1) If it is desired to stop the Audible office alarm signal, the ALM CO key, on the Wire Chief Test Set is operated to the ALM CO position. This extends a ground to terminal B15 ALM. CO, operating Inverter A6.

2) Inverter A6 output pin 4 will disable the operate path for relay BZ, (which restores) and light ALCO LED via Inverter A19 and Driver A21. The output of Driver A21 pin 12, also grounds terminal B22 ACO LP, which lights the Wire Chief Test Set ALM CO lamp.

3. Sending Alert Alarm

a. The Wire Chief Test Set Alarm CO. key must be operated to the ALM SEND position. A ground is received on terminal B14 ALM. SND, operating Inverter A6.

b. Inverter A6 output pin 6 changes logic (1) to (0). This change is extended to pin 2 of AND gate A2 and pin 13 of Inverter A20, which operate.

c. AND gate A2 output pin 3 changes logic (1) to (0), this disables the BZ relay operate path, for when an Alarm is received.

d. Inverter A20 output pin 12 changes logic (0) to (1). This change is extended to AND gate A7 pin 9, which operates.

e. AND gate A7 output pin 10 changes logic (0) to (1). This change is extended to AND gate A2 pin 13, which operates.

f. AND gate A2 output pin 11 changes logic (0) to (1). This change is extended to AND gate A2 pin 9. This prepares the operate path for relay SND when an Alarm signal is received.

g. When an Alarm signal is received (that requires sending an Alert Alarm), OR gate A12 output pin 11 changes logic (0) to (1). (The Alarm LED & Relay also operates).

h. OR gate output pin 11 (logic change (0) to (1)) is extended to AND gate A2 pin 8, and Inverter A10 pin 1, which operate.

i. AND gate A2 output pin 10 changes logic (0) to (1). This change is extended to Driver A18 pin 4, AND gate A2 pin 5, Inverter A19 pin 11, and AND gate A7 pin 13.

j. Inverter A10 output pin 2 changes logic (1) to (0). This change is extended to OR gate A1 pin 2 and AND gate A7 pin 6.

1) Or gate A1 output pin 3 changes logic (1) to (0). This sets D F/F A15 free to operate, and marks a logic (0) on pin 12 of OR gate A9.

k. Driver A18 output pin 15 operates relay SND and lights SND LED.

l. AND gate A2 is prepared to operate via pin 5.

m. Inverter A19 output pin 10 changes logic (1) to (0), which is extended to pin 13 of OR gate A9.

   1) OR gate A9 operates, and its output pin 10 changes logic (1) to (0). This sets D F/F's A14 & A15 and Octal Counter A17 free to operate.

n. AND gate A7 is enabled, via pin 3 at logic (1), this will extend pulses from the pulse generator A19 and A20 to AND gate output pin 11. These pulses will start Octal Counter A17 to count.

o. With relay SND operated the S1-S3 terminals (B33-B35) of the CLR Trunks are extend into the circuit for Idle testing.

p. If the CLR Trunk is busy a ground will be on its "S" Sleeve terminal (S1-S3 for the 3 CLR Trunks). This ground operates Inverters A5.

   1) The output of A5 Inverter pins 9, 6, & 2 change logic (1) to (0). This change is extended to the D lead of D F/F's A14 & A15 pins 9 & 5.

   2) The pulse on the output pin of AND gate A7 clocks and advances Octal Counter A17.

   3) The outputs Q2, Q3, & Q5 of A17 (pins 3, 7, & 4), change logic with the count of the pulse on the CL lead pin 14. (Logic change (0) to (1)).

   4) The logic change of (0) to (1) on the Q output of A17 will clock the D F/F's A14 & A15. The output Q of the D F/F will not change if the CLR Trunk is not Idle.

   5) The Octal Counter A17 will operate continuously clocking each D F/F A14 & A15 searching for an Idle CLR Trunk.

q. If one of the CLR Trunks are Idle (no ground on its S1-S3 terminal), the D F/F when clock from A17 output Q will operate. (A14 or A15).

   1) A14 D F/F monitoring Lead S1, if operated, will operate. OR gate A16 when its Q lead pin 13 changes logic (0) to (1). A14 D F/F output $\overline{Q}$ pin 12 changes logic (1) to (0), and operates relay K3 (via Inverter A19 and Driver A18).

   2) A14 D F/F monitoring lead S2, if operated, will operate OR gate A16 when its Q lead pin 1 changes logic (0) to (1). A14 D F/F output $\overline{Q}$ pin 2 changes logic (1) to (0), and operates relay K2 (via Inverter A19 and Driver A18).

3) A15 D F/F monitoring lead S3, if operated, will operate OR gate A16 when its Q lead pin 1 changes logic (0) to (1).

r. OR gate A16 operates, and its output pin 9 changes logic (0) to (1). This change is extended to lead CE pin 13 of Octal Counter A17, which stops it counting action, and to AND gate A2 pin 6.

s. AND gate A2 (prepared on pin 5 with a logic (1)) will operate. Its output pin 4 changes logic (0) to (1). This change is extended to AND gate A13 pin 6, which operates, and to AND gate A7 pin 1, which is prepared for operation.

t. AND gate A13 operates and its output pin 4 changes logic (0) to (1). This change is extended to OR gate A1 pin 13, which operates.

u. OR gate A1 operates relay CT and lights CT LED (via Driver A18).

v. With relays SND, K1 or K2 or neither K1 or K2, and CT operated, a loop seizure path is extended to the CLR Trunk T & R terminals (T1, R1 or T2, R2 or T3, R3) via Transformer T1, Diode D50 and Resistor R68.

w. When the operator answers the CLR call, a reverse battery on the CLR Trunk T & R leads are received.

x. This reversal shuts off Diode D50 and operates Optocoupler A22. The output pin 4 of A22 changes logic (0) to (1). This change is extended to AND gate A7 pin 2, which operates.

y. AND gate A7 output pin 3 changes logic (0) to (1). This change is extended to Driver A18 pin 6 and Delayed Inverter A6 pin 13.

z. Driver A18 operates Relay ANS and lights ANS LED.

1) Relay ANS completes the Alert Tone Path to the T & R from the Power Board terminal A25.

2) Relay ANS operates (slow to operate via TH1) relay AT.

aa. Delayed (R37 & C1) Inverter gate A6 operates at the end of approximately 30 ms. Its output pin 12 changes logic (1) to (0) with no effect at this time.

ab. Relay AT operates and removes the Alert Tone from the CLR Trunk T & R terminals. The slow operate action of Relay AT gives a burst of Alert Tone to the operator.

ac. If the operator wants to check for the Tone again, the CLR Trunk must be released. The call will again be returned on a CLR Trunk, and the operator upon answer will receive the burst of Alert Tone.

ad. When an operator release the Alarm Sending & Checking Circuit will release the CLR Trunk & start searching for an Idle Trunk again.

4. Checking Office Condition

a. The Alarm Sending & Checking circuit is assigned a Connector Terminal Number.

b. The operator or other personnel use the connector number to remotely determine the office condition.

c. The connector circuit will test the Alarm Sending & Checking circuit, over it "S" Sleeve terminal for Idle.

d. If the circuit is idle the connector will cut-through extending a ground on the "S" terminal & ring current on the T & R.

e. The connector ring is tripped by Resistor R62 & NEON lamp NL1.

f. The S terminal ground operates Inverter A4. Its output pin 2 changes logic (1) to (0). This change is extended to Delayed (R36, C12) Inverter A3 pin 5 and to pin 12 of AND gate A2.

g. Inverter A3 is delayed by R36 & C12 approximately 100 ms and its output pin 6 changes logic (0) to (1). This change is extended to pin 9 of OR gate A1, pin 11 of D F/F A15 via Diode D56, pin 5 of AND gate A7, and pin 12 of OR gate A1.

h. AND gate A2, pin 5 changes to logic (0).

1) If the Alarm Sending & Checking Circuit was not set in the Alarm Send Alert Tone mode it will, just hold AND gate A2 output pin 11 at logic (0), with no effects.

2) If the Alarm Sending & Checking Circuit was set in the Send Alert Tone mode, AND gate output pin 11 logic would return to normal with a change of (1) to (0). This change is extended to AND gate A2 pin 9, which restores. AND gate A2 will release relay SND and SND LED, if operated.

Relay SND releasing removes the seizure on the CLR Trunk.

i. OR gate A1 operates, its output pin 10 changes logic (0) to (1).

1) If NO ALARM has been received this change will have no effect.

2) If an ALARM has been received, AND gate A11 will operate. Its output pin 10 changes logic (0) to (1), and is extended to OR gate A1 pin 5 and OR gate A1 pin 8. This action latches the output of OR gate A1 pin 4 at logic (1) which prevents the Reset Binary Counter A23 from operating. The circuit will not reset until the Alarm condition has been cleared.

j. D F/F A15 pin 11 changing from logic (0) to (1), via Diode D56.

1) If No Alarm has been received this will have no effect.

2) If an Alarm has been received D F/F A15 will operate. Its output $\overline{Q}$ pin 12 changes logic (1) to (0). This change is extended to OR gate A1 pin 6 (with no effect), and to pin 5 of AND gate A13, with no effect. This operation is in preparation for circuit release.

k. AND gate A7, pin 5 changing to logic (1).

1) If no alarm has been received, A7 AND gate output pin 4 will change logic (0) to (1), operating relay NT and NT LED. No Trouble Tone is prepared for sending to the calling station T & R terminals (connector terminal access).

2) If an Alarm has been received, A7 AND gate will not operate from its pin 5 at logic (1).

l. OR gate A1, pin 12 changes to logic (1) operates. Its output changes logic (0) to (1) and operates relay CT & CT LED, via Driver A18.

m. Relay CT operated completes the path to receive the Alarm Tone office conditions. Following are signals which may be used, and what they indicate.

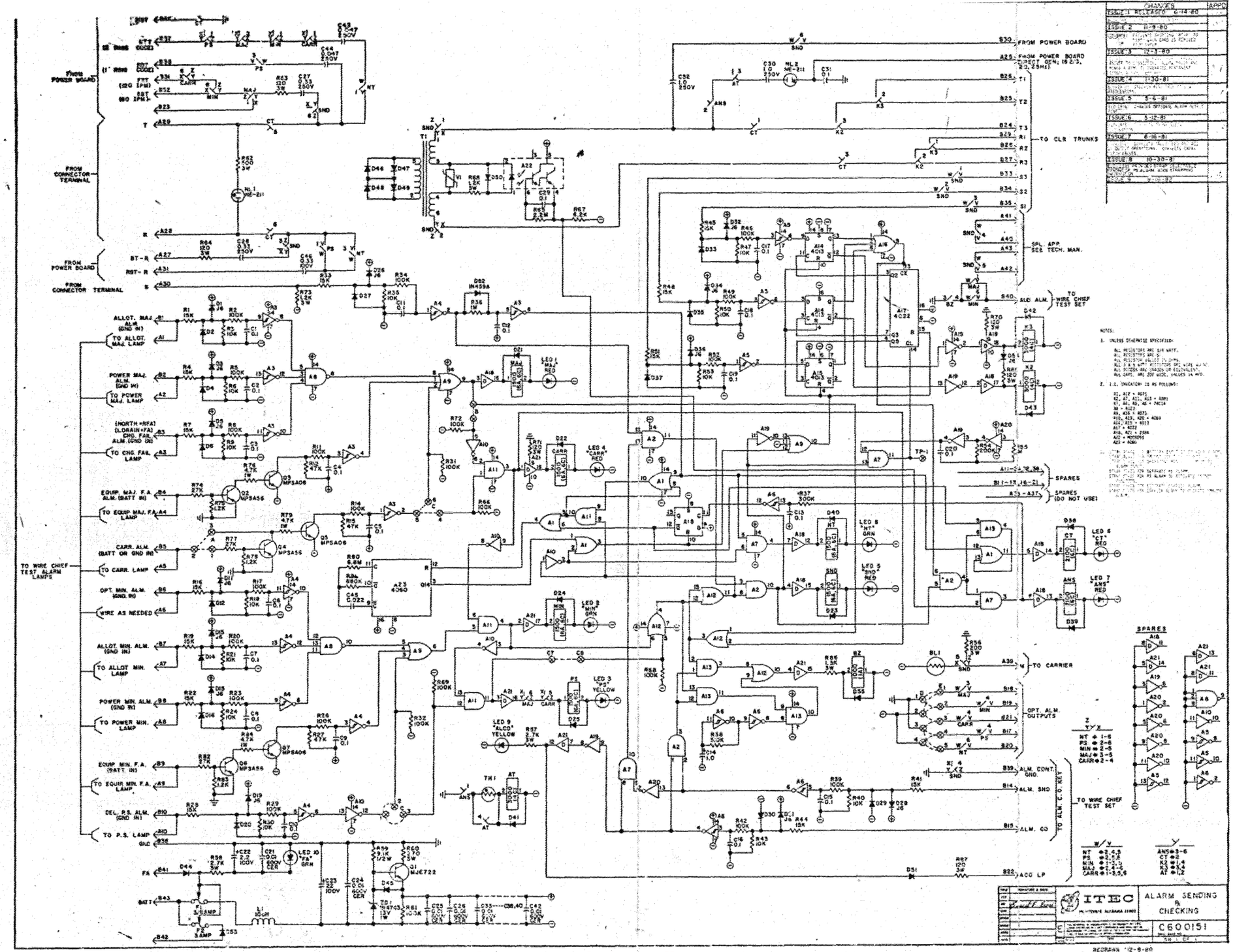
NTT - 2 Ring Code - indicates NO TROUBLE
PS - 1 Ring Code - indicates a Permanent Signal
CARR - Fast Busy Tone - (120 IPM) indicates a Carrier fault.
MIN - Slow Busy Tone - (60 IPM) indicates a Minor Alarm condition.
MAJ - No Tones - indicates a Major Alarm condition.

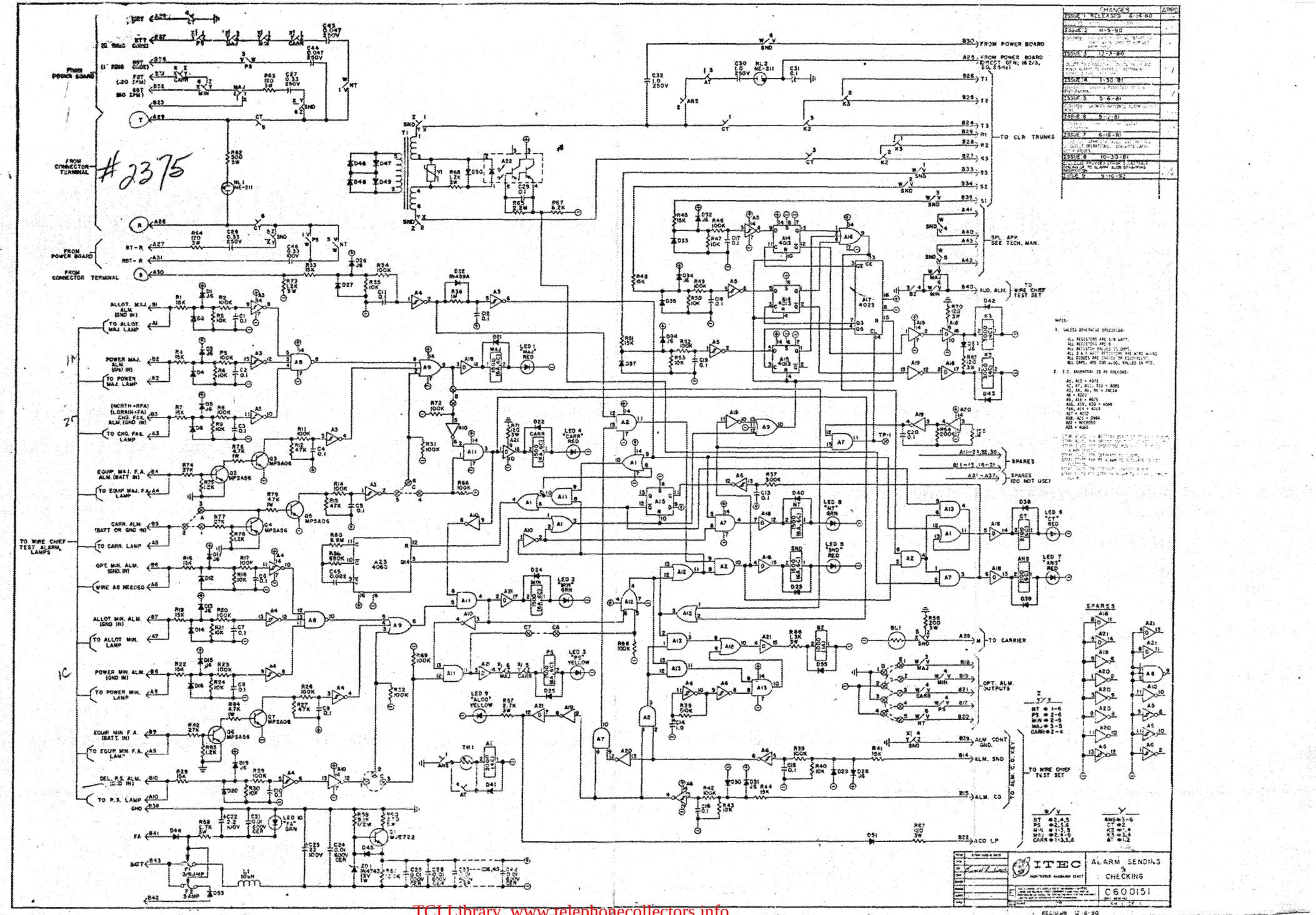
5. Release

a. When the Alarm condition(s) has been cleared the Alarm relay & LED will release.

b. If the circuit had been accessed or set for ALM Sending mode. The A23 Binary Counter is set free to operate. It will be pulsed at approximately 30 pulses per second, via R80, R81 and C45.

c. When A23 Binary Counter output Q14 pin 3 changes logic (0) to (1) the circuit will return to Idle. Release will take approximately 500 ms seconds to complete.




#2375
ITEC
ALARM SENDING & CHECKING
C600151
CHANGES
ISSUE 1 RELEASED 6-14-80
ISSUE 2 11-9-80
ISSUE 3 12-3-80
ISSUE 4 1-30-81
ISSUE 5 5-6-81
ISSUE 6 5-7-81
ISSUE 7 6-18-81
ISSUE 8 10-30-81
ISSUE 9 3-19-82
FROM POWER BOARD
FROM CONNECTOR TERMINAL
TO WIRE CHIEF TEST ALARM LAMPS
TO CLR TRUNKS
SPL. APP. SEE TECH. MAN.
TO WIRE CHIEF TEST SET
TO CARRIER
OPT. ALM. OUTPUTS
SPARES
TO ALM. C.O. TEST
ALLOT. MAJ. ALM. (GND IN)
TO ALLOT. MAJ. LAMP
POWER MAJ. ALM. (GND IN)
TO POWER MAJ. LAMP
CNG. FAIL ALM. (GND IN)
TO CNG. FAIL LAMP
EQUIP. MAJ. F.A. ALM. (BATT IN)
TO EQUIP. MAJ. F.A. LAMP
CARR. ALM. (BATT OR GND IN)
TO CARR. LAMP
OPT. MIN. ALM. (GND IN)
WIRE AS NEEDED
ALLOT. MIN. ALM. (GND IN)
TO ALLOT. MIN. LAMP
POWER MIN. ALM. (GND IN)
TO POWER MIN. LAMP
EQUIP. MIN. F.A. (BATT IN)
TO EQUIP. MIN. F.A. LAMP
DEL. P.S. ALM. (GND IN)
TO P.S. LAMP
LED 1 MAJ RED
LED 2 MIN GRN
LED 3 CARR YELLOW
LED 4 CARR RED
LED 5 ANS RED
LED 6 NT GRN
LED 7 ANS RED
LED 8 NT GRN
LED 9 ALCO YELLOW
LED 10 PS GRN
TP-1
TH1
F1 3/8 AMP
F2 3 AMP
L1 10uH
ACO LP
ALM. CONT GND.
ALM. SND
ALM. CO
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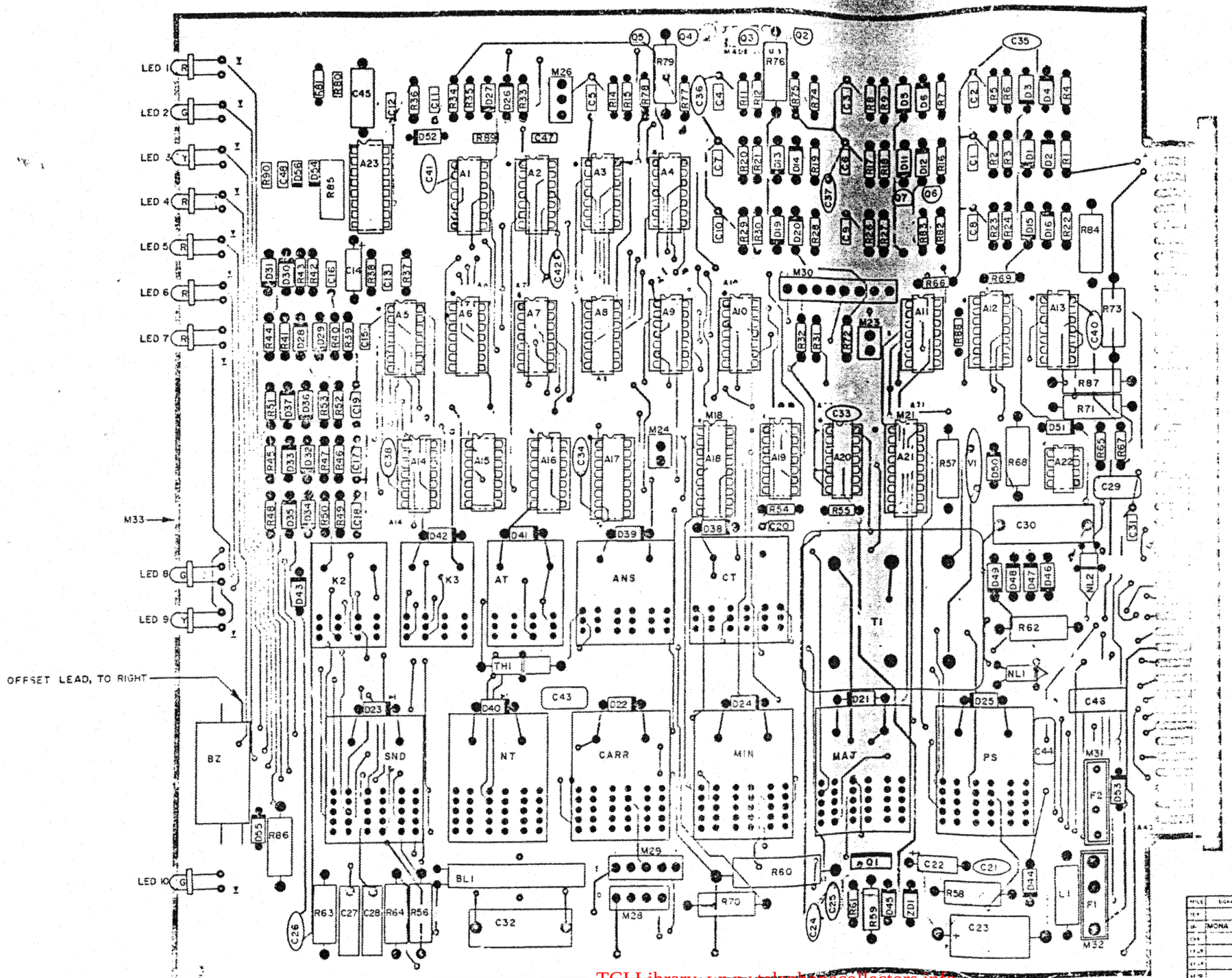
NO.	REVISED	DATE APPROVED
1	RELEASED	6-6-80
2	1743	11-14-80
3	1824	1-29-81
4	1916	5-12-81
5	2395	9-17-82
6	2740	1-27-83
7	2762	2-3-83
8	3163	5-4-841



DRAWN	MONA PERREAULT	
ITEC HUNTSVILLE, ALABAMA 35802	EMS-I ALARM SENDING AND CHECKING CIRCUIT	
	A600151	