STATION SYSTEMS
CIVIL AIR DEFENSE WARNING SYSTEMS
STATION SIGNAL INDICATOR AND
CONTROL STATION DIAL CIRCUIT

CHANGES

B. Changes in Apparatus

B.1 Removed	Replaced By
B1AL Ringer, T option Fig. 1, 2, and 5	C4A Ringer, S option Fig. 1, 2, and 5
531A-3 Subset Modified, T option Fig. 1, 2, and 5	687A-49 Subset Modified, S option Fig. 1, 2, and 5

F. Changes in CD Sections

F.1 Under 5. DESCRIPTION OF OPERATION, change 5.211 to read:

"...tubes (1), (2), (3), or (4) to breakdown..."

F.2 Change 5.411 to read:

Lamp	Ringing Supply to
1 (yellow)	L1
2 (blue)	L1
3 (red)	L2
4 (white)	L2

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 3232-PEC-OFG

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0. CHANGES

0.1 CHANGED AND ADDED FUNCTIONS

None.

0.2 CHANGES IN APPARATUS

Superseded	Superseded By
F-50090 Dial	7F3 Dial

0.3 CHANGES IN CIRCUIT REQUIREMENTS (Not Associated with 0.2 Above)

None.

0.4 DESCRIPTION OF CIRCUIT CHANGES

None.

1. PURPOSE OF CIRCUIT

This circuit provides the station arrangements for originating and receiving alert signals in the Civil Air Defense Warning System (CADW).

2. WORKING LIMITS

The following limits are based on the use of a 13C, or equivalent, resistance lamp in series with the ringing supply. Ranges shown for extension stations or ringers apply to the most distant indicator or ringer.

3. FUNCTIONS

This circuit provides for:

(a) Receiving selective visual and coded audible signals at important warning stations in Civil Air Raid Warning Systems.

TABLE A

Line to Conn Ckt	Min Volts ac	Min Volts dc	Max Earth Potential	Max Cond Loop: No Extension Indicator	Max Cond Loop: One Extension Indicator*	Max Cond Loop: One Extension Ringer	Max Cond Loop: Two Extension Ringers**
15,000 OHM MINIMUM INSULATION RESISTANCE							
2-Wire	65	45	0	600	50	300	200
	70	45	0	1300	400	700	600
	70	45	± 5	800	150	400	200
	70	45	±10	300			
	75	45	0	1800	800	1200	1000
	75	45	± 5	1300	400	800	600
	75	45	±10	900	200	400	300
	80	45	±10	1300	400	900	700
4-Wire	65	45		500		200	100
	70	45		1000	200	500	400
	75	45		1500	600	1000	900
50,000 OHM MINIMUM INSULATION RESISTANCE							
2-Wire	65	45	0	1000	200	600	200
	70	45	0	1800	700	1200	700
	70	45	± 5	1300	300	800	400
	70	45	±10	600		300	
	75	45	0	2600	1000	1700	1200
	75	45	± 5	2000	700	1300	800
	75	45	±10	1600	400	800	500
	80	45	±10	2400	800	1500	900
4-Wire	65	45		800	100	500	300
	70	45		1500	400	800	700
	75	45		2000	700	1500	1100

*** The addition of an extension indicator or two extension ringers will reduce by one the number of lines which may be served by a given central office unit.**

**** The extension ringers are the B1AL type, connected across the line in series with a .5 MF capacitor and a 3600-ohm resistor.**

(b) Receiving coded audible signals only.

(c) Silencing the audible signal under control of a nonlocking ringer cutoff key.

(d) A special dial for originating alert signals and stop signals from control stations.

(e) Receiving visual and audible signals on either a 2-wire or 4-wire line basis.

(f) Connecting an extension station or one or two extension ringers.

4. CONNECTING CIRCUITS

When this circuit is listed on a key sheet, the connecting information thereon is to be followed. The following are typical connecting circuits:

(a) Dial Pulse Receiving and Code Distributing Circuit - SD-95678-01.

(b) One Way Receiving Circuit - SD-95683-01.

(c) Dial Pulse Receiving and Control Circuit - SD-95685-01.

5. DESCRIPTION OF OPERATION

5.1 ORIGINATING ALERT CODES AT CONTROL STATIONS, FIG. 4

The CADW System alerts will be originated from a control station equipped with a special dial shown in Fig. 4. This is arranged so that dialing a single digit, corresponding to the degree of alert as indicated by colored segments on the dial number plate, will control the associated code sending equipment at the central office.

The dial is arranged so that only the dial wheel holes normally used for even numbered digits are usable. This permits dialing four degrees of alert plus a stop signal.

5.2 RECEIVING ALERT CODES AT CONTROL POINTS OR WARNING STATIONS

5.21 Visual and Audible Signal at Warning Stations, Fig. 1

5.211 2-Wire Operation

This figure and "X" wiring are provided if the warning station is to receive both an audible ringing signal and a selective visual signal over a 2-wire line. The audible signal will be on a code basis, with the AS ringer responding to ringing current on the line. The ringing current will be either plus or minus, superimposed, connected to either tip or ring with the opposite side grounded. This will cause one of the cold cathode indicator tubes (Y), (B), (R), or (W) to break down and give a selective visual signal at the same time the ringer operates. Resistors (R1) to (R4) are starter resistance in the control anode circuits of the indicator tubes, resistors (R5) and (R6) are load resistances in the main gap circuits of the tubes and resistor (R7) is a padding resistance to limit the ringer current. Capacitor (RC) is used to prevent direct current from flowing thru the AS ringer.

5.212 4-Wire Operation

This figure and "W" wiring are provided if the warning station is to receive a noncoded audible and selective visual signal over a 4-wire line. Operation of the indicator tubes and ringer are the same as described in 5.211 except that ringing current and ground are connected to the "T," "R," "T1," and "R1" leads of the 4-wire line as covered in Circuit Note 102.

5.22 Audible Only Signal at Warning Stations or Control Stations, Fig. 2

This figure is provided when the visual signal feature is not required. It is arranged for 2-wire operation only. The ringer responds to the coded ringing signal received over the line, thereby giving the coded audible signal.

5.3 RINGER CUTOFF, FIG. 3

The nonlocking ringer cutoff key (RCO) is provided when it is desired to silence temporarily the audible signal. This feature may be applied when either the visual and audible or audible only signals are provided.

5.4 EXTENSION RINGER, FIG. 5

One or two extension ringers per Fig. 5 may be connected across the (L1) and (L2) terminals of the visual and audible signal set. The 3600-ohm resistor is provided to limit the current in each ringer.

5.41 Shop Testing Requirements

5.411 For Visual and Audible Signal, Fig. 1, ED-69231-01

Connect 90 volt 20 cycle ringing current in series with a 13C resistance lamp and a reversible 45-volt dc supply to either the (L1) or (L2) terminal of the indicator and ringing ground through a 300-ohm noninductive resistor to the (G) terminal. Also connect direct ringing ground to either the (L2) or (L1) terminal and strap the (L2) and (BK) terminals.

With the following connections the associated lamp (cold cathode tube) should indicate:

Lamp	Ringing Supply to	45 Volts (-) to	45 Volts (+) to
Yellow	L1	L1	
Blue	L1		L1
Red	L2	L2	
White	L2		L2

In each condition the AS ringer shall operate and the voltages across the 3400-ohm test resistance shall be minimum 11.2 volts as measured with a thermal voltmeter having an internal resistance of approximately 15,000 ohms.

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