294 Community Alerting System Installation

FCC Registration Number BPX826-69545-OT-N

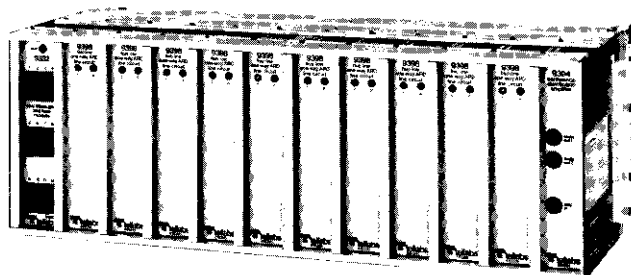**contents**

1. general information

1.01 The Tellabs 294 Community Alerting System (figure 1) is a multistation ringdown telephone circuit used in emergency-reporting and disaster-alerting applications. With the 294 System, large numbers of individuals can be simultaneously alerted via their telephones when emergencies such as train derailments, floods, or dangerous weather conditions occur or threaten. Thus, the 294 System finds application serving small communities, hotels, motels, apartment buildings, condominiums, high-rise structures, hospitals, department stores, shopping malls, schools, factories, chemical and nuclear plants, and numerous other facilities whose personnel require immediate notification of emergency and/or evacuation procedures when disasters occur. Another application of the 294 System is for emergency notification of key individuals via their residential telephones. For example, police, fire department, medical, and civil defense personnel can quickly be notified at home in the event of an emergency at any time of the day or night.

1.02 In the event that this Practice section is reissued, the reason for reissue will be stated in this paragraph.

system configuration

1.03 The 294 System is modular in design and configured in 50-station increments. Each fully autonomous 50-station increment is subdivided into 5-station increments, 5 stations being the number accommodated by each line-circuit module in a 294 Mounting Assembly. A minimum-size 294 System consists of one 294 Mounting Assembly equipped with 2 common-control modules and 1 to 10 line circuit modules, a ringing generator, and a power supply. Optional backup batteries, a message-announcement device, a wall-mounted activation panel, and a cabinet or relay rack that houses all of the above equipment (except the activation panel) can be provided if required. The 294 System is designed to operate in conjunction with a wide range of other standard Tellabs modules for added System flexibility.

figure 1. 294 Community Alerting System

system application

1.04 The 294 System can be used with private (non-party) lines served by any conventional Class 5 central office or PBX switching system. Generally, the 294 System is used in any of three applications. Specifically, the System can be installed in series with station telephones served by a PBX (such as in a hotel or office building), in series with CO lines, (such as in an apartment complex), or in series with lines in a community's central office. The 294 System components are compatible with a wide variety of applications and outside-plant facilities. The System operates with subscriber loops of up to 2000 ohms and can be used with loop-treatment equipment such as loop extenders, dial long line modules, and the like.

294-to-switching-equipment interconnection

1.05 Installation of the 294 System is simplified because the System is compact in size, does not require extensive wiring, and uses connectorized mounting shelves. Generally, the 294 System is located near the switching equipment, and connectorized cables permit quick interconnection between the 294 System and the switching-equipment distributing frame. Station and switching-equipment connections to the 294 System are made via Universal Service Order Code (USOC) RJ21X connectors. This arrangement allows bridging plugs to take the place of the 294 System connectors, allowing normal telephone service both before the System is installed and after the 294 System is taken out of service.

installation and power

1.06 The standard 294-System Mounting Assembly is a prewired Tellabs Type 10 Mounting Shelf with a connectorized backplate. This connectorized configuration allows quick interconnection to the distributing frame and associated peripheral equipment. The Mounting Assembly mounts in a standard 19-inch or 23-inch relay rack or in a

cabinet, all of which are optionally available with the System. The System is powered from nominal −48Vdc filtered, ground-referenced power supply or battery. This voltage source can be provided via a standard telephone-type power supply or by sharing the switching equipment's battery, as desired.

2.   installation
site preparation
2.01   As defined in Part 68 of the FCC rules, registered terminal equipment can be directly connected to the telephone network through standard connectors referred to as Universal Service Order Code (USOC) connectors. It is the customer's responsibility to inform the telephone company of the quantities and types of USOC connectors that are required. In addition, the sequence of PBX extension numbers for each USOC connector must be identified by cable pair and pin numbers. The 294 System is connectorized and wired in accordance with USOC RJ21X.

2.02   Two blank "294 USOC Assignment Worksheets" (table 1) are provided to help the customer obtain the necessary information to determine equipment requirements, establish zoning groups, and provide the necessary information for the telephone company. Before ordering a 294 System, one or more 294 USOC Assignment Worksheets must be filled out (50 stations per worksheet). Additional worksheets are available at no charge. Please call Tellabs' Applications Engineering Group at one of the telephone numbers listed in paragraph 4.03 of this Practice for additional copies. To complete this worksheet, the following must be done:

A. The total number of stations must be determined.

B. The PBX extension numbers of all stations must be determined.

C. The desired zone arrangements (the telephone numbers within each zone) must be defined.

These worksheets should be retained for System troubleshooting if and when it is needed.

2.03   Please be aware that in any zone where the total number of stations is not a multiple of 5, one to four circuits on one line-circuit module are reserved for future stations within that zone. This is because each module (five circuits) has only one group (control) lead to activate all five circuits on that module. These groups are connected together on the cross-connect field to form zones. This information can also be obtained from the worksheet under the zone sections.

Note: *When one 8108 Ringing Generator is used, it provides ringing for 50 ringers. This must be taken into account when determining ringing requirements where two or more telephones share the same extension number.*

2.04   After all customer data is determined, the 294 USOC Assignment Worksheet can be completed. After completing the worksheet, equipment requirements and the information necessary for the

telephone company can be obtained, as shown in table 2. Table 2 also contains callout numbers that are correlated with numbers on the USOC Assignment Worksheet (table 1) for easy identification.

Note: *Under FCC rules, this information must be supplied to the serving telephone company. Please refer to section 8 of the 294 System Description Practice, section 81294-1 for additional information.*

inspection
2.05   The 294 Community Alerting System and its component modules should be inspected upon arrival to find possible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier. If stored, the equipment should be inspected again prior to installation.

2.06   Depending upon its application, the 294 System can vary greatly in size and configuration. Therefore, the System shown in this section is a hypothetical "typical" System. This 100-line System is configured for four zones with different numbers of stations in each zone. This installation is also equipped with a wall-mounted 930 System Control Enclosure (activation panel). All equipment is relay-rack mounted except the Control Enclosure, which is wall mounted. The list below will assist in verifying that all necessary equipment for this particular installation has been provided, and will familiarize you with the various mounting assemblies, modules, and hardware.

equipment list
A. Rack-mounted equipment:
   □ Relay rack, 5.5 feet high by 19 inches wide by 17 inches deep.
   □ Two 294A Mounting Assemblies.
   □ One 8007 48Vdc Power Supply.
   □ Two 8108 20Hz Ringing Generators.
   □ One pair 14-9002 (19-inch) mounting bars for ringing generators.

B. System modules and cables:
   □ Two 9332 Ringing Interrupter and Fuse Modules.
   □ Twenty 9398 Five-Line One-Way ARD Line Circuit Modules.
   □ Two 9394 Conference Distribution Amplifier modules.
   □ One 79-0098 Type 66 Quick-Connect Terminal Block.
   □ Eight 50-5721 25-foot System Interface Cables.
   □ Miscellaneous 22, 18, and 14AWG wire, as needed.

C. Activation equipment:
   □ One 930 System Control Enclosure (wall-mounted activation panel).
   □ Mounting hardware.
   □ 9301 Telephone Handset Panel.
   □ 9302 Zone Select Panel.
   □ 9304 Trouble Indicator Panel.
   □ 9300 Blank Panel.
   □ Required amount of 25-pair 24AWG cable (Belden Type 9585 or equivalent).

294 USOC ASSIGNMENT WORKSHEET   PG____ OF____

SHELF____ OF____

MODULE	MODULE CIRCUIT NUMBER	SHELF LINE NUMBER	ZONE (G NUMBER)	EXTENSION NUMBER	REN (TOTAL)	STATION CONNECTORS TIP OUT PIN	COLOR	RING OUT PIN	COLOR	USOC RJ21X JACK	NETWORK CONNECTORS TIP IN PIN	COLOR	RING IN PIN	COLOR	USOC RJ21X JACK
9398 (1)	1	1	ZONE____ (G1)			26	W/BL	1	BL/W	J3	26	W/BL	1	BL/W	J1
	2	2				27	W/O	2	O/W		27	W/O	2	O/W	
	3	3				28	W/G	3	G/W		28	W/G	3	G/W	
	4	4				29	W/BR	4	BR/W		29	W/BR	4	BR/W	
	5	5				30	W/S	5	S/W		30	W/S	5	S/W	
9398 (2)	1	6	ZONE____ (G2)			31	R/BL	6	BL/R	J3	31	R/BL	6	BL/R	J1
	2	7				32	R/O	7	O/R		32	R/O	7	O/R	
	3	8				33	R/G	8	G/R		33	R/G	8	G/R	
	4	9				34	R/BR	9	BR/R		34	R/BR	9	BR/R	
	5	10				35	R/S	10	S/R		35	R/S	10	S/R	
9398 (3)	1	11	ZONE____ (G3)			36	BK/BL	11	BL/BK	J3	36	BK/BL	11	BL/BK	J1
	2	12				37	BK/O	12	O/BK		37	BK/O	12	O/BK	
	3	13				38	BK/G	13	G/BK		38	BK/G	13	G/BK	
	4	14				39	BK/BR	14	BR/BK		39	BK/BR	14	BR/BK	
	5	15				40	BK/S	15	S/BK		40	BK/S	15	S/BK	
9398 (4)	1	16	ZONE____ (G4)			41	Y/BL	16	BL/Y	J3	41	Y/BL	16	BL/Y	J1
	2	17				42	Y/O	17	O/Y		42	Y/O	17	O/Y	
	3	18				43	Y/G	18	G/Y		43	Y/G	18	G/Y	
	4	19				44	Y/BR	19	BR/Y		44	Y/BR	19	BR/Y	
	5	20				45	Y/S	20	S/Y		45	Y/S	20	S/Y	
9398 (5)	1	21	ZONE____ (G5)			46	V/BL	21	BL/V	J3	46	V/BL	21	BL/V	J1
	2	22				47	V/O	22	O/V		47	V/O	22	O/V	
	3	23				48	V/G	23	G/V		48	V/G	23	G/V	
	4	24				49	V/BR	24	BR/V		49	V/BR	24	BR/V	
	5	25				50	V/S	25	S/V		50	V/S	25	S/V	
9398 (6)	1	26	ZONE____ (G6)			26	W/BL	1	BL/W	J4	26	W/BL	1	BL/W	J2
	2	27				27	W/O	2	O/W		27	W/O	2	W/O	
	3	28				28	W/G	3	G/W		28	W/G	3	G/W	
	4	29				29	W/BR	4	BR/W		29	W/BR	4	BR/W	
	5	30				30	W/S	5	S/W		30	W/S	5	S/W	
9398 (7)	1	31	ZONE____ (G7)			31	R/BL	6	BL/R	J4	31	R/BL	6	BL/R	J2
	2	32				32	R/O	7	O/R		32	R/O	7	O/R	
	3	33				33	R/G	8	G/R		33	R/G	8	G/R	
	4	34				34	R/BR	9	BR/R		34	R/BR	9	BR/R	
	5	35				35	R/S	10	S/R		35	R/S	10	S/R	
9398 (8)	1	36	ZONE____ (G8)			36	BK/BL	11	BL/BK	J4	36	BK/BL	11	BL/BK	J2
	2	37				37	BK/O	12	O/BK		37	BK/O	12	O/BK	
	3	38				38	BK/G	13	G/BK		38	BK/G	13	G/BK	
	4	39				39	BK/BR	14	BR/BK		39	BK/BR	14	BR/BK	
	5	40				40	BK/S	15	S/BK		40	BK/S	15	S/BK	
9398 (9)	1	41	ZONE____ (G9)			41	Y/BL	16	BL/Y	J4	41	Y/BL	16	BL/Y	J2
	2	42				42	Y/O	17	O/Y		42	Y/O	17	O/Y	
	3	43				43	Y/G	18	G/Y		43	Y/G	18	G/Y	
	4	44				44	Y/BR	19	BR/Y		44	Y/BR	19	BR/Y	
	5	45				45	Y/S	20	S/Y		45	Y/S	20	S/Y	
9398 (10)	1	46	ZONE____ (G10)			46	V/BL	21	BL/V	J4	46	V/BL	21	BL/V	J2
	2	47				47	V/O	22	O/V		47	V/O	22	O/V	
	3	48				48	V/G	23	G/V		48	V/G	23	G/V	
	4	49				49	V/BR	24	BR/V		49	V/BR	24	BR/V	
	5	50				50	V/S	25	S/V		50	V/S	25	S/V	

EQUIPMENT REFERENCE NUMBERS | CUSTOMER SUPPLIED INFORMATION | STATION CONNECTORS | NETWORK CONNECTORS

table 1. 294 USOC Assignment Worksheet (page 1 of 2)

SHELF___ OF___

MODULE	MODULE CIRCUIT NUMBER	SHELF LINE NUMBER	ZONE (G NUMBER)	EXTENSION NUMBER	REN (TOTAL)	TIP OUT PIN	TIP OUT COLOR	RING OUT PIN	RING OUT COLOR	USOC RJ21X JACK	TIP IN PIN	TIP IN COLOR	RING IN PIN	RING IN COLOR	USOC RJ21X JACK
	1	1				26	W/BL	1	BL/W		26	W/BL	1	BL/W	
	2	2				27	W/O	2	O/W		27	W/O	2	O/W	
9398 (1)	3	3	ZONE___ (G1)			28	W/G	3	G/W	J3	28	W/G	3	G/W	J1
	4	4				29	W/BR	4	BR/W		29	W/BR	4	BR/W	
	5	5				30	W/S	5	S/W		30	W/S	5	S/W	
	1	6				31	R/BL	6	BL/R		31	R/BL	6	BL/R	
	2	7				32	R/O	7	O/R		32	R/O	7	O/R	
9398 (2)	3	8	ZONE___ (G2)			33	R/G	8	G/R	J3	33	R/G	8	G/R	J1
	4	9				34	R/BR	9	BR/R		34	R/BR	9	BR/R	
	5	10				35	R/S	10	S/R		35	R/S	10	S/R	
	1	11				36	BK/BL	11	BL/BK		36	BK/BL	11	BL/BK	
	2	12				37	BK/O	12	O/BK		37	BK/O	12	O/BK	
9398 (3)	3	13	ZONE___ (G3)			38	BK/G	13	G/BK	J3	38	BK/G	13	G/BK	J1
	4	14				39	BK/BR	14	BR/BK		39	BK/BR	14	BR/BK	
	5	15				40	BK/S	15	S/BK		40	BK/S	15	S/BK	
	1	16				41	Y/BL	16	BL/Y		41	Y/BL	16	BL/Y	
	2	17				42	Y/O	17	O/Y		42	Y/O	17	O/Y	
9398 (4)	3	18	ZONE___ (G4)			43	Y/G	18	G/Y	J3	43	Y/G	18	G/Y	J1
	4	19				44	Y/BR	19	BR/Y		44	Y/BR	19	BR/Y	
	5	20				45	Y/S	20	S/Y		45	Y/S	20	S/Y	
	1	21				46	V/BL	21	BL/V		46	V/BL	21	BL/V	
	2	22				47	V/O	22	O/V		47	V/O	22	O/V	
9398 (5)	3	23	ZONE___ (G5)			48	V/G	23	G/V	J3	48	V/G	23	G/V	J1
	4	24				49	V/BR	24	BR/V		49	V/BR	24	BR/V	
	5	25				50	V/S	25	S/V		50	V/S	25	S/V	
	1	26				26	W/BL	1	BL/W		26	W/BL	1	BL/W	
	2	27				27	W/O	2	O/W		27	W/O	2	W/O	
9398 (6)	3	28	ZONE___ (G6)			28	W/G	3	G/W	J4	28	W/G	3	G/W	J2
	4	29				29	W/BR	4	BR/W		29	W/BR	4	BR/W	
	5	30				30	W/S	5	S/W		30	W/S	5	S/W	
	1	31				31	R/BL	6	BL/R		31	R/BL	6	BL/R	
	2	32				32	R/O	7	O/R		32	R/O	7	O/R	
9398 (7)	3	33	ZONE___ (G7)			33	R/G	8	G/R	J4	33	R/G	8	G/R	J2
	4	34				34	R/BR	9	BR/R		34	R/BR	9	BR/R	
	5	35				35	R/S	10	S/R		35	R/S	10	S/R	
	1	36				36	BK/BL	11	BL/BK		36	BK/BL	11	BL/BK	
	2	37				37	BK/O	12	O/BK		37	BK/O	12	O/BK	
9398 (8)	3	38	ZONE___ (G8)			38	BK/G	13	G/BK	J4	38	BK/G	13	G/BK	J2
	4	39				39	BK/BR	14	BR/BK		39	BK/BR	14	BR/BK	
	5	40				40	BK/S	15	S/BK		40	BK/S	15	S/BK	
	1	41				41	Y/BL	16	BL/Y		41	Y/BL	16	BL/Y	
	2	42				42	Y/O	17	O/Y		42	Y/O	17	O/Y	
9398 (9)	3	43	ZONE___ (G9)			43	Y/G	18	G/Y	J4	43	Y/G	18	G/Y	J2
	4	44				44	Y/BR	19	BR/Y		44	Y/BR	19	BR/Y	
	5	45				45	Y/S	20	S/Y		45	Y/S	20	S/Y	
	1	46				46	V/BL	21	BL/V		46	V/BL	21	BL/V	
	2	47				47	V/O	22	O/V		47	V/O	22	O/V	
9398 (10)	3	48	ZONE___ (G10)			48	V/G	23	G/V	J4	48	V/G	23	G/V	J2
	4	49				49	V/BR	24	BR/V		49	V/BR	24	BR/V	
	5	50				50	V/S	25	S/V		50	V/S	25	S/V	

table 1. 294 USOC Assignment Worksheet (page 2 of 2)

equipment requirements
① shelf requirements
② 9398 Line Circuit Modules
telephone company information
③ total number of RJ21X USOC connectors
④ USOC connector number and cable appearance for each extension number
zoning information
⑤ total number and pins of zone or zones

table 2. Summary of information obtainable from completed worksheet

☐ Required amount of two-conductor 18AWG cable (Belden Type 8461 or equivalent).

mounting
2.07   The 294 System is designed for installation in a central office or in a PBX equipment room. All equipment except the wall-mounted 930 System Control Enclosure is mounted in a standard 19-inch equipment rack. The Control Enclosure should be mounted so that it is out of the way of equipment used for everyday operations yet easily accessible in the event of an emergency.

2.08   The required mounting arrangement for this typical 294 System's equipment is shown in figure 2. The two 294 Mounting Assemblies mount at the top of the equipment rack. The ringing generators and power supply mount below the last (lowermost) equipment shelf.

installer connections
Note: *The installer connections section is written with reference to a PBX application. Most procedures are adaptable to central office applications as well. If additional information is required, please call the Tellabs Applications Engineering Group at one of the telephone numbers listed in paragraph 4.03.*

power
2.09   Before beginning the power wiring procedure, ensure that input power is **not** applied to the power supply and/or ringing generators. Power must be applied only after all wiring is completed and all modules are properly optioned. Reference to figure 3 will aid in completing this wiring procedure. Wire the System's power connections according to the following list:

A.   System power connections (ground return):
   ☐ Use 14AWG wire for all ground-return power connections.
   ☐ Connect the two terminals labeled *POS. BATT.* on the 8108 20Hz Ringing Generators to the *positive (+)* output of the 8007 Power Supply.
   ☐ Connect the *positive (+)* power terminals on each of the two 294 Mounting Assemblies to the *positive (+)* output of the 8007 Power Supply.

B.   System power connections (−48Vdc):
   ☐ Use 18AWG wire for all −48Vdc power connections.
   ☐ Connect the *negative (−)* output of the 8007 Power Supply to the *RG COM.* and *NEG. BATT.* terminals on the two 8108 20Hz Ringing Generators.
   ☐ Connect the *negative (−)* output of the 8007 Power Supply to the *negative (−)* power terminals on the two 294 Mounting Assemblies.

ringing
2.10   Make the following connections between the 8108 20Hz Ringing Generators and the 294 Mounting Assemblies (reference to figure 3 will aid in completing this wiring procedure):
   ☐ Use 18AWG wire for all ringing connections.
   ☐ Connect the *RG* output terminal of the first 8108 to the *RING GEN (RG)* terminal on the first 294 Mounting Assembly.
   ☐ Connect the *RG* output terminal of the second 8108 to the *RING GEN (RG)* terminal on the second 294 Mounting Assembly.

cabling
2.11   Make the following connections via male connectorized cables to the corresponding female connectors (reference to figure 4 will aid in completing this procedure):
   ☐ Mount the Type 66 Quick-Connect Terminal Block on the existing cross-connect field or distributing frame.
   ☐ Connect a cable between each common-control connector *(J6)* of each 294 Mounting Assembly to the connector on the Type 66 Terminal Block.
   ☐ Connect the eight station interface cables from the USOC demarcation point (supplied by the local telephone company) to the correct female connectors on the 294 Mounting Assemblies.

930 System Control Enclosure (activation panel)
2.12   Mount the 930 System Control Enclosure (see figure 5) and wire it to the 294 equipment shelves as follows:
   ☐ Mount the Control Enclosure on the wall as directed in the instructions and using the hardware supplied with the unit. It should be located in a restricted area to ensure access by authorized personnel only.
   ☐ Make connections to the Control Enclosure with 24AWG 25-pair cable.
   ☐ Route the cable (in accordance with local codes) to the Type 66 Terminal Blocks mounted on the cross-connect field.
   ☐ Connect the 24AWG 25-pair cable to the Type 66 Terminal Block to provide the Control Enclosure with the zone-assignment, trouble, and audio connections. Please refer to table 3 for wiring instructions and to the paragraphs below for additional information.
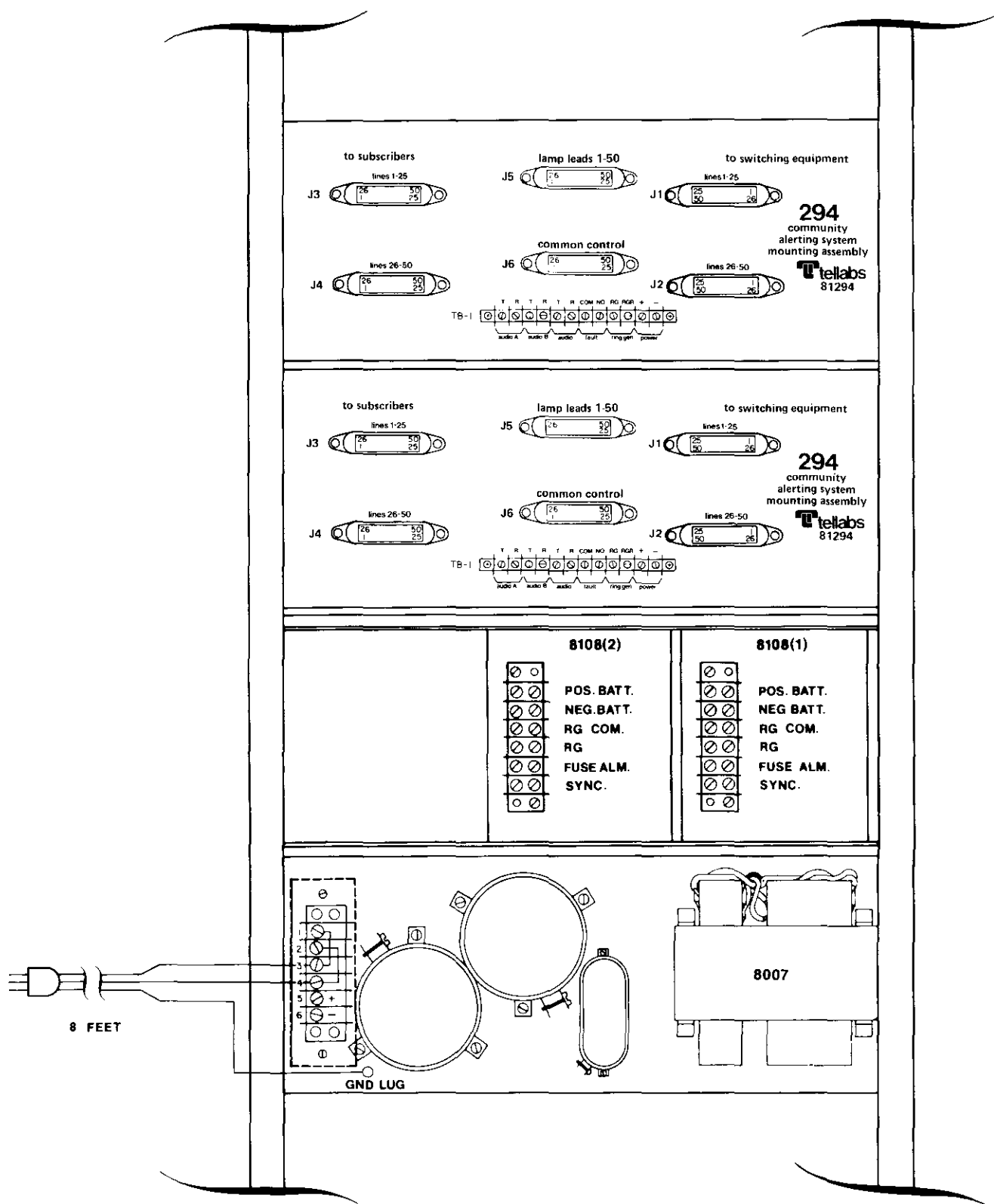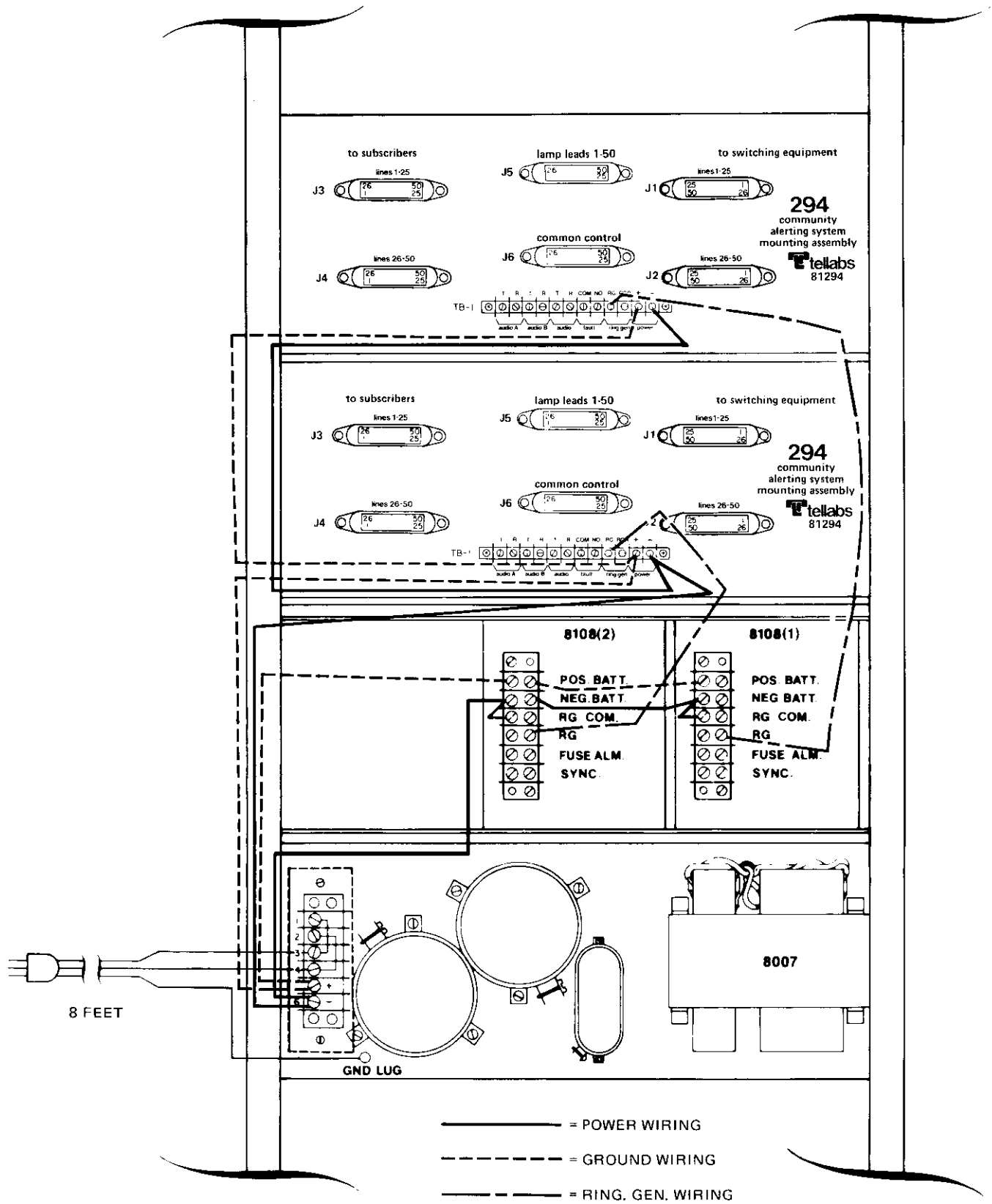
figure 2. Typical 100-line 294 System

figure 3. Power, ground, and ringing-generator wiring
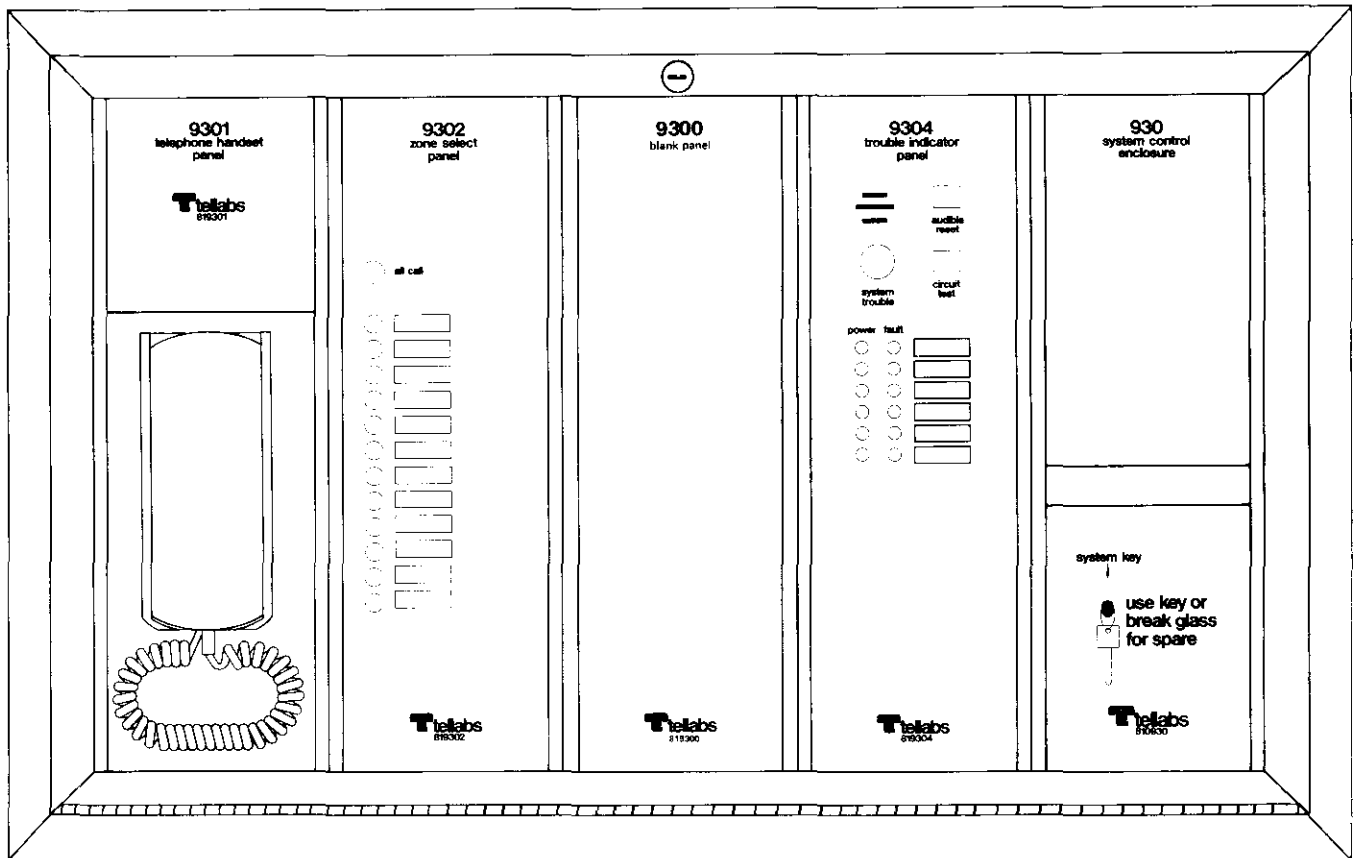
figure 4. Cabling connections

figure 5. 930 System Control Enclosure

Note: *To power the LED's on the Control Enclosure, a —24Vdc power source must be provided. This optional power source must be a Tellabs 9395 Supervisory Interface Module. Please call the Tellabs Applications Engineering Group at one of the telephone numbers listed in paragraph 4.03 for specific information on mounting and wiring the 9395 module(s).*

zone assignments
2.13 Zone assignments are made by following the 294 USOC Assignment Worksheets that were filled out in the site-preparation section. The worksheet shows the strapping that must be installed for each zone. (The zone pushbuttons on the Control Enclosure associated with the 9395's output leads must be strapped to the appropriate group leads.)

trouble connections
2.14 For the 294 System to indicate a fuse, power-supply, or ringing-generator failure, make the required connections as follows: bridge the trouble contacts on shelf 1 with the trouble contacts on shelf 2 and wire them to the Control Enclosure.

audio connections
2.15 Each prewired 294 Mounting Assembly is factory-wired to accept a common audio bus for all 50 stations. In our **hypothetical installation**, one common audio message is used for all zones. To accomplish this, connect the T (tip) and R (ring) audio terminals from the System Control Enclosure to

both 294 Mounting Assemblies by making appropriate connections to the Type 66 Terminal Block.

option switch selection
2.16 The only optioning required for the 294 System is the setting of three slide switches on the 9394 module's printed circuit board and the setting of one slide switch on the 9398 module's printed circuit board. Locations of these option switches on their modules are shown in figure 6. The 9332 module, 8108 Ringing Generators, and 8007 Power Supply have no options.

9394 options
2.17 For our hypothetical 294 System application, set the 9394 option switches in accordance with the following checklist (the 9394 modules are located in position 12 of the two mounting shelves):

☐ Set switch *S1* (*MASTER/SLAVE* switch) on the first 9394 module to the *MASTER* position.

☐ Set switch *S1* (*MASTER/SLAVE* switch) on the second 9394 module to the *SLAVE* position.
Note: *For applications that require additional 9394 modules (Systems larger than 100 lines), set S1 to the MASTER position on only one 9394 module. For all other 9394 modules, set S1 to the SLAVE position.*

☐ Set switch *S3* (*OFF-HOOK ALL-CALL* switch) on both modules to the *OFF* position.
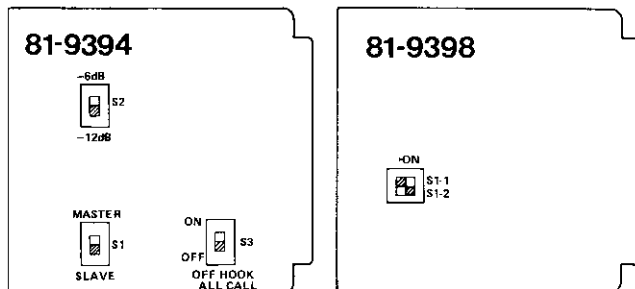
figure 6. Option switch locations

Note: *Switch S3 is used in conjunction with S1. For other applications, set S3 to the ON position when live hot-line announcements are made (S1 must be in the MASTER position); set S3 to the OFF position when manual or zone activation is being used.*

☐ Set switch *S2 (−6dB/−12dB* switch) on both modules to the *−12dB* position.

Note: *Switch S2 controls the loudness of the broadcasted message. Set switch S2 to the −12dB position for most local applications; set S2 to the −6dB position for applications that require additional loudness.*

9398 options

2.18 The 9398 module provides **two** optional modes of operation for **each** position of its two-position DIP switch. Therefore, no given settings for these switches are required for our hypothetical 294 System. This switch and its functions are described in paragraphs 2.19 and 2.20. Table 4 summarizes the functions of that switch.

alerting tone/auto transfer switch

2.19 Switch *S1-1* is used to select either alerting tone or automatic transfer for stations that are off-hook when the 294 System is activated. Set *S1-1* to the *ON* position for applications where it is desired that calls in progress receive alerting tone. Set *S1-1* to the *OFF* position for applications where it is desired that calls in progress be automatically transferred to the low impedance message bus. When no calls are in progress, *S1-1* has no effect (the station is transferred to negative-battery-biased ringing generator).

service restoration/lockout switch

2.20 Switch *S1-2* is used to select either normal service restoration or lockout for stations associated with the 9398. Set *S1-2* to the *ON* position for applications requiring normal service restoration after one alerting message length (approximately 3 seconds) for the 9398's five associated stations. Set *S1-2* to the *OFF* position for applications requiring the five answered stations to be held on the low-impedance message bus (locked out from normal service) until the ground signal is removed from the *group* (activation) *lead*. Normal telephone service restoration is desirable for key personnel in emergency-alerting situations.

symbol designation	function	description
T and R (tip and ring)	input	In some system applications, a standard telephone connected to these terminals can be used to activate the system by going off-hook. Please refer to the Tellabs 9394 module Practice for additional information.
G1, GND to G10, GND	inputs	These are group activation inputs. A ground applied to G1 activates the 9398 module in shelf position 2, a ground applied to G2 activates the 9398 module in shelf position 3, etc. All connections labeled GND are connected internally (via the 294 pre-wired Mounting Assembly) to the positive (+) side of the −48Vdc power supply.
ALC GND	input	A ground connected to the ALC (all call) input activates all 9398 modules in the 294 Mounting Assembly.
T-A and R-A	input	These are the tip and ring inputs for audio bus A. Audio connected to this input is connected to the first five 9398 modules.
T-B and R-B	input	These are the tip and ring inputs for audio bus B. Audio connected to this input is connected to the second five 9398 modules.
IE	output	This is the interrupter enable output. This output transfers to an active ground state whenever any of the group inputs are active. This output is normally not used and is provided for special-purpose applications only.
N.O. COM. N.C.	output	These are normally open, common, and normally closed form-C relay contacts. This relay output is normally used to indicate system trouble (fault) to a remote location. A blown fuse, loss of ringing generator, or loss of the −48Vdc power supply on the corresponding 294 System Mounting Assembly causes this relay to change states.

table 3. J6 connections and descriptions

switch	option	function
S1-1 alerting tone/ auto transfer	ON	alerting tone sent to stations that are off-hook
	OFF	stations off-hook are automatically transferred to alerting message
S1-2 service restoration/ lockout	ON	restores normal telephone service after receiving alerting message
	OFF	locks out stations from normal service while *group lead* input is active
Note: *Each position of switch S1 controls all five of the circuits contained on the module.*		

table 4. 9398 switch options

module mounting

2.21 After the 9394 and 9398 modules are properly optioned, install all modules in their proper positions in the two Mounting Assemblies, as shown

in figure 7. The 9394 module is factory-aligned; no further alignment of the 294 System is required.

9 3 3 2	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 4
9 3 3 2	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 8	9 3 9 4

figure 7. Module positions in mounting assemblies

system test

2.22   When all wiring is completed and all cables and modules are installed, apply power to the System by plugging the line cord of the Power Supply into a conventional 117Vac, earth-grounded power receptacle. To verify proper operation of the 294 System, complete the checklist below. If any difficulties are encountered, please refer to the Troubleshooting Checklist in section 4 of this Practice.

Note: *Some of these tests require two people, one to control the 930 System Control Enclosure (activation panel) and one to verify the System's operation.*

☐ With the System idle, verify that all telephones connected to the 294 System are functioning normally.

☐ Use a VOM to verify proper operation of the 8007 Power Supply (nominal −48Vdc).

☐ From the remote 930 System Control Enclosure, verify that the green *power* lamps are on; also verify that no *fault* lamps are lighted.

☐ Remove each ringing generator's fuse (located on the front panel of the 8108 Ringing Generator) one at a time, and verify that the trouble indicator on the Control Enclosure and the audible alarm go on.(Replace each fuse after the test is completed.)

☐ Activate each zone and broadcast a test message. Verify that the message is received at each telephone connected to that zone. Return the System to the idle state when testing is completed.

☐ If the System functions normally, and no fault signals are generated, no further testing is required. If faults are encountered, refer to the Troubleshooting Checklist in section 4 of this Practice.

3.   system specifications

system capacity
5 stations per 9398 module; 50 stations per 294 Mounting Assembly; A system of any size can be configured by using multiple shelves

transmission
idle System has no effect on normal telephone service (because of direct metallic connection through module and lack of bridging elements in System)

ringing
ring trip loop limit: 2000-ohm loop between module and telephone set
interruption rate: 0.5 second on, 2.0 seconds off, ±10% (others optionally available)
voltage output: 90Vac ±15%, negatively biased at −48Vdc
frequency: 20Hz ±0.2Hz
harmonic distortion: less than 5%
ringing capacity: each 9398 module can ring a total 10.0A REN as defined in FCC Part 68

audio
compression range: −25 to −5dBm
output level: −6dBm or −12dBm, switch selectable
frequency response: ±1.0dB, re 1000Hz, 300 to 3000Hz

answered-call loop current
approximately 5mA

lamp-lead drive current
50mA maximum to a negative-dc voltage return

power requirements
dc input voltage: −44 to −56Vdc, filtered, positive-ground-referenced
dc input current (per 50-station Mounting Assembly and ringing generator): system idle, 0.25 ampere maximum; system active, 3 amperes maximum

operating environment
32° to 122°F (0° to 50°C), humidity to 95% (no condensation)

dimensions
294 Mounting Assembly:
   5.92 inches (15.04cm) high
   17.5 inches (44.45cm) wide (excluding mounting ears)
   9.5 inches (24.1cm) deep
8108 Ringing Generator:
   4.75 inches (12.07cm) high
   7.0 inches (17.78cm) wide
   7.25 inches (18.42cm) deep

weight
approximately 19 pounds (8.7kg) for a 50-line System with no ringing or power

mounting
prewired 294 Mounting Assembly: 19-inch or 23-inch relay rack (6 inches of vertical rack space is used)
8108 Ringing Generator: apparatus case, or relay rack via mounting bars

4.   testing and troubleshooting

4.01   The test procedures and Troubleshooting Checklist in this section may be used to assist in the installation, testing, or troubleshooting of the 294 Community Alerting System. The tests and Checklist are intended as an aid in the localization of trouble to a specific Mounting Assembly and/or module. If a 294-System Assembly or module is suspected of being defective, a new one should be substituted and the test conducted again. If the substitute item operates correctly, the original should be considered defective and returned to Tellabs for repair or replacement. In compliance with FCC Registration, no internal (component-level) testing or repairs must be attempted on the modules or Assemblies in the 294 System. Return

malfunctioning items to Tellabs for repair or replacement. Unauthorized testing or repairs may void the item's warranty.

4.02   Tellabs warrants the 294 System Assemblies and modules to be free of defective components, workmanship, and design for a period of two years from the date of manufacture, when applied as outlined in our Practices, subject to handling and installation commensurate with industry standards for solid-state electronic equipment. If a 294-System Assembly or module does not prove to be free of defective components, workmanship, and design under these criteria, Tellabs will replace or repair it free of charge.

Note: *Warranty service does not include removal of permanent customer markings on the front panels of Tellabs modules, although an attempt will be made to do so. If a module must be marked* **defective**, *we recommend that it be done on a piece of tape or on a removable stick-on label.*

4.03   If a situation arises that is not covered in the tests and Checklist, contact Tellabs Customer Service at your Tellabs Regional Office or at our Lisle, Illinois, or Mississauga, Ontario, Headquarters. Telephone numbers are as follows:
US central region: (312) 969-8800
US northeast region: (412) 787-7860
US southeast region: (305) 645-5888
US western region: (702) 827-3400
Lisle Headquarters: (312) 969-8800
Mississauga Headquarters: (416) 624-0052

4.04   If a 294-System Assembly or module is diagnosed as defective, the situation may be remedied by either *replacement* or *repair and return*. Because it is more expedient, the *replacement* procedure should be followed whenever time is a critical factor (e.g., service outages, etc.).

replacement
4.05   To obtain a replacement 294 System Assembly or module, notify Tellabs via letter (see addresses below), telephone (see numbers above), or twx (910-695-3530 in the USA, 610-492-4387 in Canada). Be sure to provide all relevant information, including the 8XXXX(X) part number that indicates the issue of the item in question. Upon notification, we shall ship a replacement item to you. If the item in question is in warranty, the replacement will be shipped at no charge. Pack the defective 294 System Assembly or module in the replacement item's carton, sign the packing slip included with the replacement, and enclose it with the defective item (this is your return authorization). Affix the preaddressed label provided with the replacement item to the carton being returned, and ship the item prepaid to Tellabs.

repair and return
4.06   Return the defective 294-System Assembly or module, shipment prepaid, to Tellabs (attn: repair and return).
in the USA: Tellabs Incorporated
4951 Indiana Avenue
Lisle, Illinois 60532

in Canada: Tellabs Communications Canada, Ltd.
1200 Aerowood Drive, Unit 39
Mississauga, Ontario, Canada L4W 2S7
Enclose an explanation of the item's malfunction. Follow your company's standard procedure with regard to administrative paperwork. Tellabs will repair the item and ship it back to you. If the item is in warranty, no invoice will be issued.

294 System testing
4.07   After the 294 System is installed and optioned, it must be tested to verify proper System operation. Two sets of tests are required. The first set of tests is performed with the System in the idle condition (power applied but not in the alerting state). The second set of tests requires the 294 System to be activated (in the alerting state). The second set of tests should include the broadcasting of a live or recorded test message to all stations.

4.08   As a courtesy, be sure to give prior notice to System station users that testing will be conducted at a prescribed time. The station users should be informed that they will be involved in the test of the emergency alerting system and that it is **only** a test. They should also be told that when the test begins, they will hear distinctive ringing on their telephones and that calls in progress either will be cut off or will receive a warning tone, depending on optioning; when the calls are answered, a test alerting message will be received.

idle System test procedure
Note: *This first set of tests is made with the System in the idle state. Some of these tests may require two people to complete. If the System fails any of the following tests, proceed to the Troubleshooting Checklist for specific procedures.*

4.09   To test the System in the idle state, proceed as follows:

A. Verify that all telephones connected to the 294 System function normally □.

B. Use a VOM to verify that the proper outputs of all power supplies and ringing generators are present □.

C. Verify that all of the *fault* indicators on the front panels of the 9332 modules are *off* □.

D. Verify that all of the *fault* indicators on the System's Control Enclosure are *off* □.

E. Disable the 8108 Ringing Generators one at a time by removing their front-panel fuses. Verify that the *fault* indicators on the associated 9332 modules and the *fault* indicators on the Control Enclosure are *on* □.

F. Go off-hook with the telephone in the 9301 Telephone Handset Panel. Connect a test telephone equipped with a standard 310-type test plug first to the *audio out 1* jack and then to the *audio out 2* jack on a 9394 module. Verify that there is an audio path to the *audio out 1* and *audio out 2* jacks (audio A and audio B) □.

G. Repeat step F for all other 9394 modules in the System □.

active System test procedure

Note: *This second set of tests requires activation of the 294 System. Some of these tests may require two people to complete. Before starting this test, notify station users that their telephone service will be interrupted and that a test alerting message will be broadcast. If the System fails any of the following tests, proceed to the* troubleshooting checklist *for specific procedures.*

4.10   To test the System in the active state, proceed as follows:

A. 1.   If the 294 is equipped with a recorder, record the following message: "This is a test of the emergency alerting system. In the event of an actual emergency, you would be given specific instructions. Thank you."

2.   If the 294 System is not equipped with a recorder, the message in step A must be verbally repeated while steps B through D are conducted.

B.   Activate each zone (floor, room, etc.) one at a time and verify that only the stations within that zone are ringing at a distinctive rate ☐.
Note: *Any stations that are engaged in normal telephone calls at this time either are disconnected and immediately transferred to the audio message or receive a warning tone.*

C.   As the stations within an activated zone are answered, verify that they receive the one-way alerting test message ☐.

D.   Deactivate the zone and verify that normal telephone service is restored ☐.

troubleshooting checklist

Note: *If a fault is isolated to a particular module in the 294 System but cannot be corrected with the information provided in this checklist, please refer to the separate Tellabs Practice on that module for detailed testing information.*

problem	steps toward solution
normal telephone service is disrupted when System is idle	☐ Remove the 9398 module that controls the defective telephone circuits. **Note:** *Because special spring-loaded card-edge connectors are used, the System is effectively bypassed when the 9398 module is removed.* ☐ If normal telephone service is restored, replace with a new 9398 module and retest. If normal telephone service remains disrupted, proceed as follows: ☐ Verify cable assignments. ☐ Verify cabling on the RJ21X USOC connectors. ☐ Use a VOM (set to ohmmeter function) to verify continuity through the 294 System (T in to T out, R in to R out, etc.).
power supply's output voltage is low or not present	☐ Use a VOM (set to ac voltmeter function) to verify 115Vac input (105 to 120Vac). ☐ Verify wiring from power supply to equipment shelves. Disconnect the output wiring from the power supply and proceed as follows: ☐ If voltage is still out of range, replace power supply. ☐ If voltage is present, remove all modules from System and recheck voltage. ☐ If voltage is out of range, verify wiring.
trouble condition present on one of the 9332 modules or on the System's Control Enclosure	☐ Replace blown fuse in the 9332 module. If ringing generator input to shelf is not present, proceed as follows: ☐ Use a VOM (set to ac voltmeter function) to verify ringing voltage on rear terminal strip. ☐ If correct voltage not present, verify wiring. ☐ If wiring is correct, replace ringing generator and retest. ☐ The −48Vdc input is out of range; refer to previous step ("power supply's output voltage is low or not present"). ☐ Verify wiring to System's Control Enclosure (activation panel).
loss of ringing generator does not generate a fault condition	(When the fuse on a ringing generator is blown or removed, a fault indication is present on the associated 9332 module [*fault* LED lighted] and also on the System's Control Enclosure.) ☐ If the 9332 module does not indicate a fault, replace and retest the 9332 module. If the Control Enclosure does not indicate a fault, proceed as follows: ☐ Verify wiring to the Control Enclosure. ☐ Replace and retest the 9304 Trouble Indicator Panel of the Control Enclosure.
one of the audio distribution busses is inoperative	☐ Verify wiring to the 294 prewired Mounting Assembly. ☐ Replace the 9394 module and retest.
station telephones outside of the selected zone are ringing	☐ Verify zone wiring. ☐ Replace 9394 module associated with the affected lines and retest.
station telephones within a selected zone fail to ring	☐ Verify zone wiring. ☐ Replace associated 9398 module and retest. ☐ Replace associated 9332 module and retest.

alerted stations within a selected zone do not hear the alerting message	☐ Replace the associated 9398 module and retest.
depending on System optioning, alerted stations either do not automatically transfer, or do not receive warning tone	☐ Verify that associated 9398 module is properly optioned for intended operation. ☐ Replace associated 9398 module and retest.
depending on System optioning, alerted stations either are not locked out or do not receive normal service restoration while an alert is in progress	☐ Verify that associated 9398 module is properly optioned for intended operation. ☐ Replace associated 9398 module and retest.
normal telephone service is not restored when the 294 System is deactivated	☐ Replace the associated 9398 module and retest.

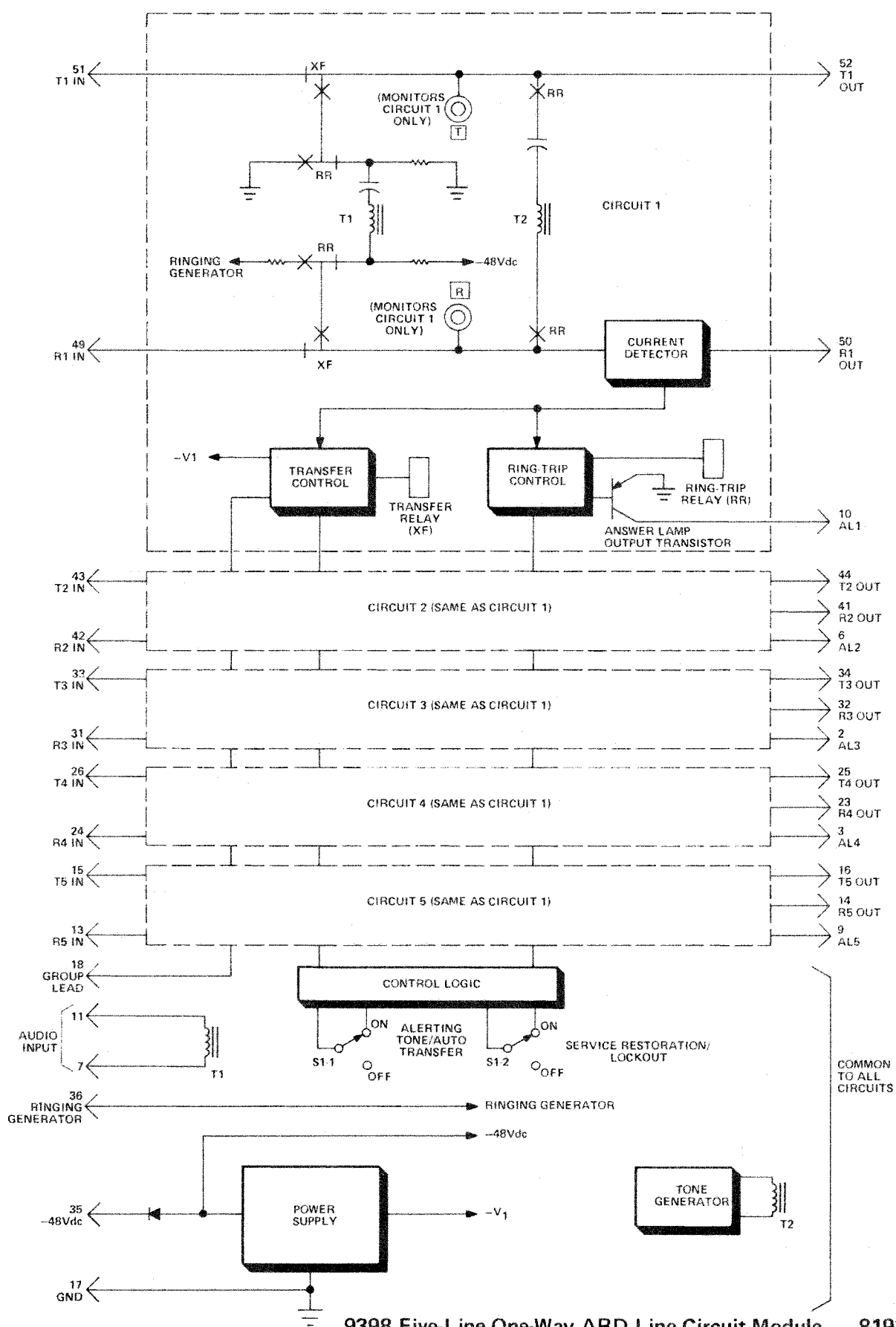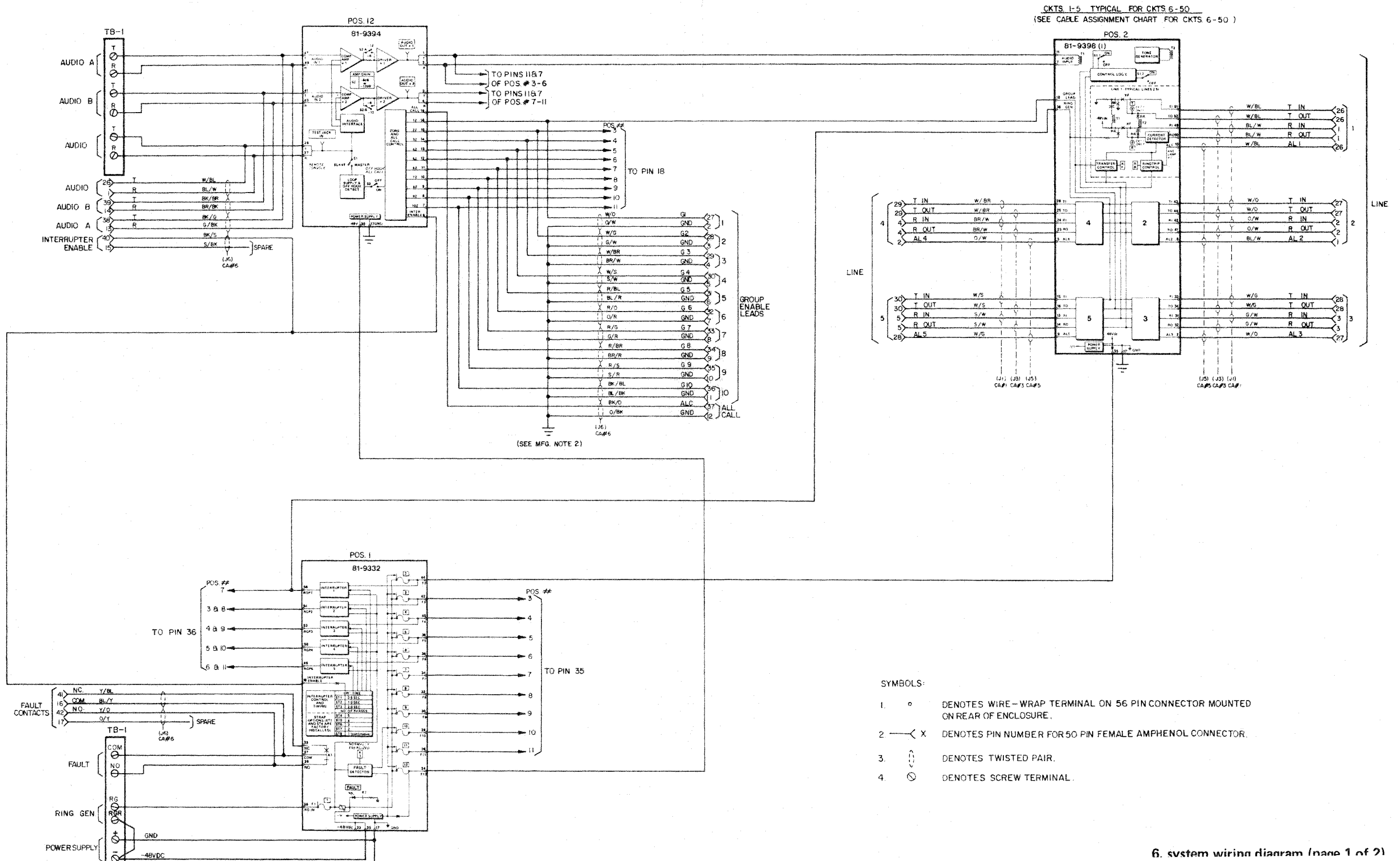9394 Conference Distribution Amplifier module   819394
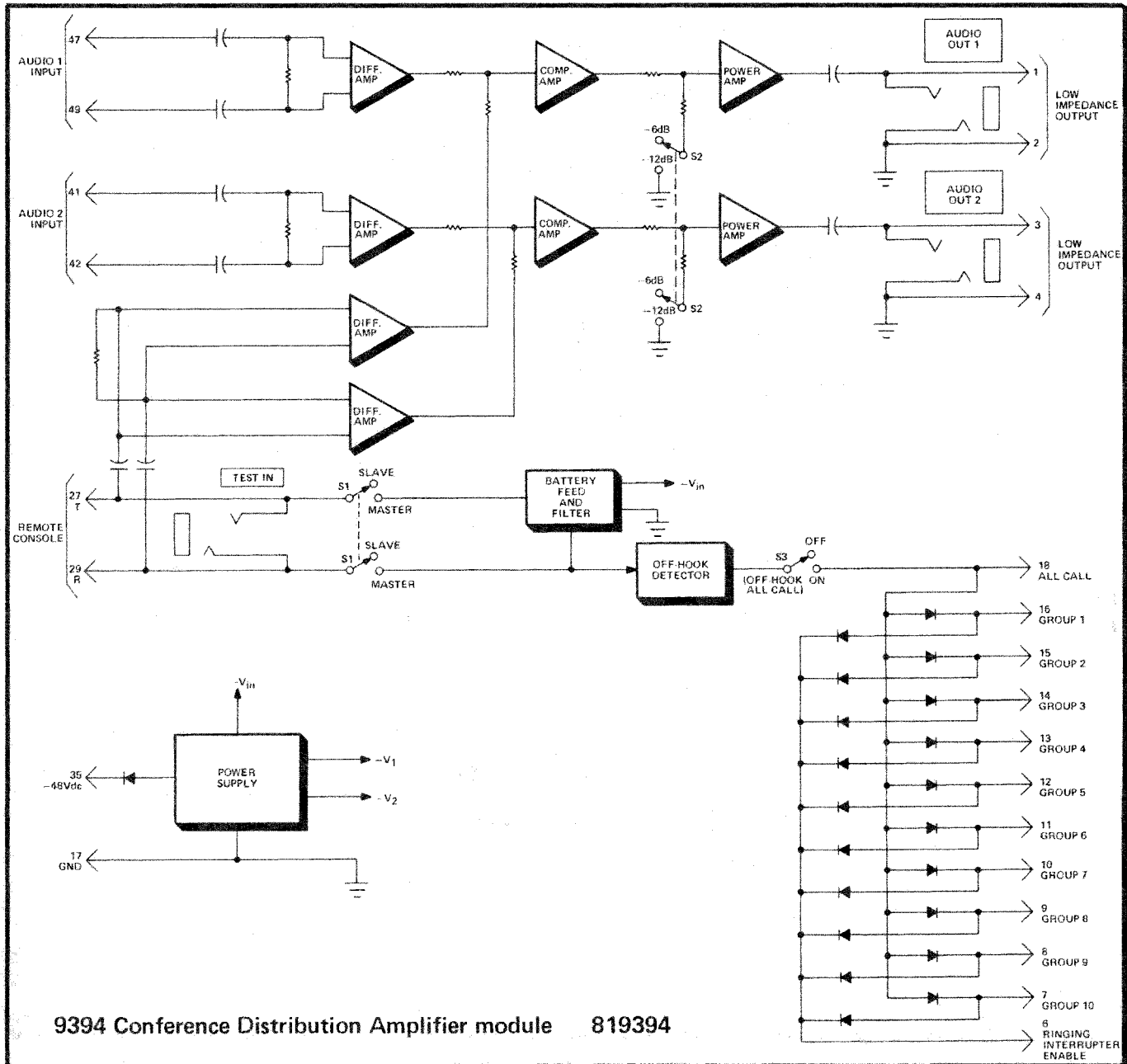
5. module block diagrams
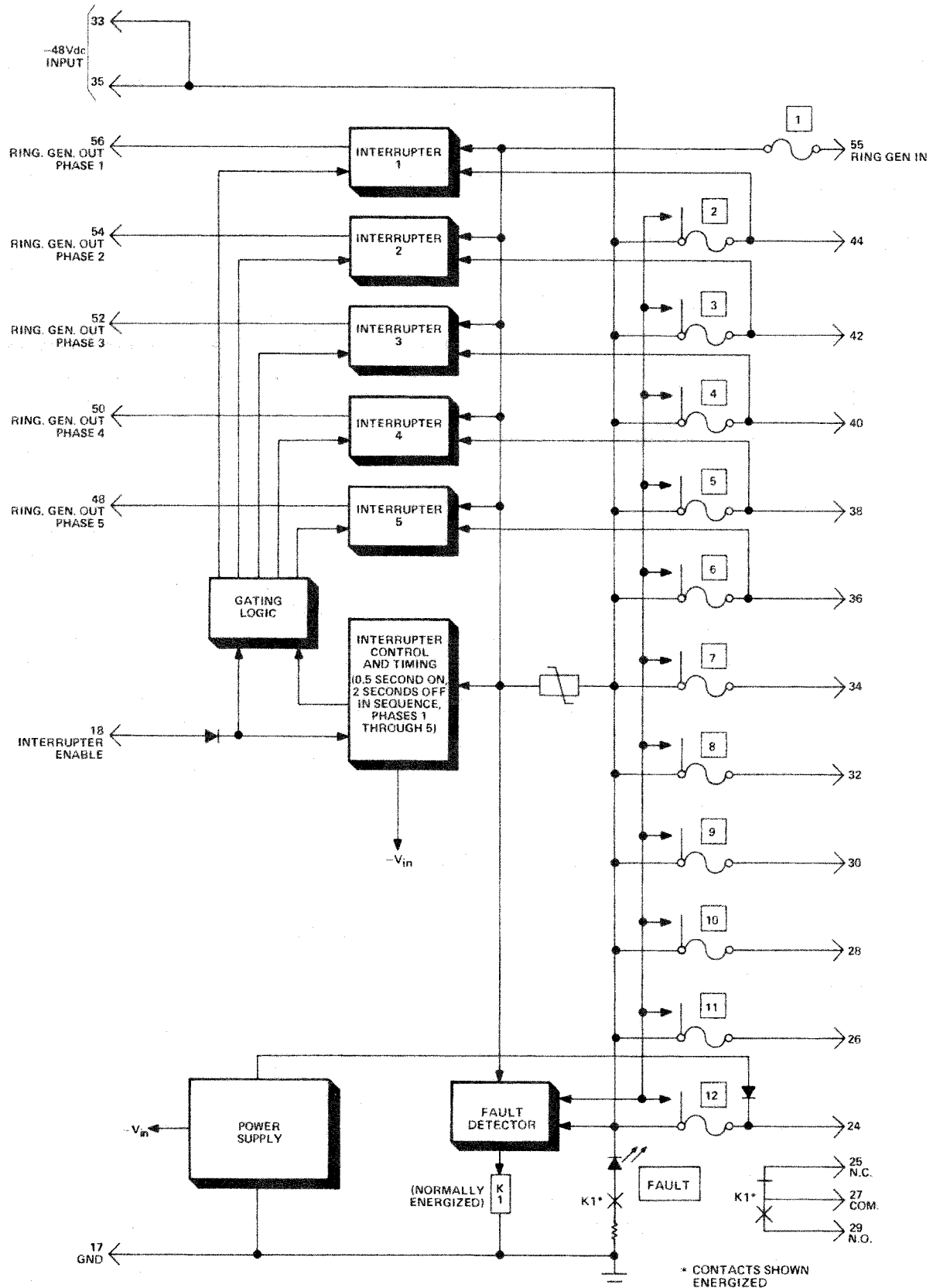
9332 Ringing Interrupter and Fuse Module   819332

5. module block diagrams
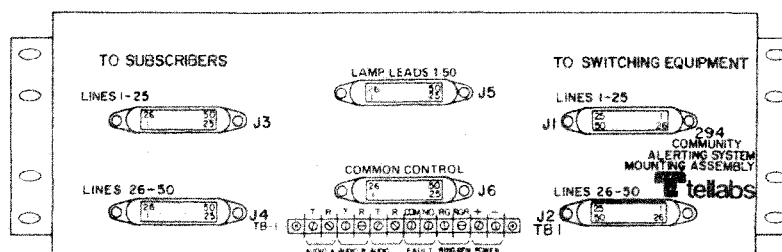
9398 Five-Line One-Way ARD Line Circuit Module   819398

5. module block diagrams

6. system wiring diagram (page 1 of 2)

PIN NO.	COLOR	CABLE #1 (J1) SW LINES		CABLE #2 (J2) SW LINES		CABLE #3 (J3) SUB LINES		CABLE #4 (J4) SUB LINES		CABLE #5 (J5) ANS. LP. LEADS		CABLE #6 (J6) COM. CONTROL	
26	W/BL	T IN	1	T IN	26	T OUT	1	T OUT	26	AL 1	1	T	AUDIO
1	BL/W	R IN		R IN		R OUT		R OUT		AL 2	2	R	
27	W/O		2		27		2		27	AL 3	3	G1	GROUP 1
2	O/W									AL 4	4	GND	
28	W/G		3		28		3		28	AL 5	5	G2	GROUP 2
3	G/W									AL 1	6	GND	
29	W/BR		4		29		4		29	AL 2	7	G3	GROUP 3
4	BR/W									AL 3	8	GND	
30	W/S		5		30		5		30	AL 4	9	G4	GROUP 4
5	S/W									AL 5	10	GND	
31	R/BL		6		31		6		31	AL 1	11	G5	GROUP 5
6	BL/R									AL 2	12	GND	
32	R/O		7		32		7		32	AL 3	13	G6	GROUP 6
7	O/R									AL 4	14	GND	
33	R/G		8		33		8		33	AL 5	15	G7	GROUP 7
8	G/R									AL 1	16	GND	
34	R/BR		9		34		9		34	AL 2	17	G8	GROUP 8
9	BR/R									AL 3	18	GND	
35	R/S		10		35		10		35	AL 4	19	G9	GROUP 9
10	S/R									AL 5	20	GND	
36	BK/BL		11		36		11		36	AL 1	21	G10	GROUP 10
11	BL/BK									AL 2	22	GND	
37	BK/O		12		37		12		37	AL 3	23	ALC	ALL CALL
12	O/BK									AL 4	24	GND	
38	BK/G		13		38		13		38	AL 5	25	T	AUDIO A
13	G/BK									AL 1	26	R	
39	BK/BR		14		39		14		39	AL 2	27	T	AUDIO B
14	BR/BK									AL 3	28	R	
40	BK/S		15		40		15		40	AL 4	29	I.E.	INTERRUPTER ENABLE
15	S/BK									AL 5	30	SPARE	
41	Y/BL		16		41		16		41	AL 1	31	NC	FAULT CONTACT
16	BL/Y									AL 2	32	COM	
42	Y/O		17		42		17		42	AL 3	33	NO	
17	O/Y									AL 4	34	SPARE	SPARE
43	Y/G		18		43		18		43	AL 5	35		
18	G/Y									AL 1	36		
44	Y/BR		19		44		19		44	AL 2	37		
19	BR/Y									AL 3	38		
45	Y/S		20		45		20		45	AL 4	39		
20	S/Y									AL 5	40		
46	V/BL		21		46		21		46	AL 1	41		
21	BL/V									AL 2	42		
47	V/O		22		47		22		47	AL 3	43		
22	O/V									AL 4	44		
48	V/G		23		48		23		48	AL 5	45		
23	G/V									AL 1	46		
49	V/BR		24		49		24		49	AL 2	47		
24	BR/V									AL 3	48		
50	V/S	T IN	25	T IN	50	T OUT	25	T OUT	50	AL 4	49		
25	S/V	R IN		R IN		R OUT		R OUT		AL 5	50		

294 EQUIPMENT LAYOUT

POS# 1 2 3 4 5 6 7 8 9 10 11 12

Position 1: 9332 (1 2 3 4 / 5 6 7 8 / 9 10 11 12)
Positions 2–11: 9398 (T R) — (1) (2) (3) (4) (5) (6) (7) (8) (9) (10)
Position 12: 9394 — ○1 ○2 ○ test in

FRONT VIEW

EQUIPMENT ENCLOSURE – REAR VIEW

TO SUBSCRIBERS
LINES 1-25 — J3
LINES 26-50 — J4 TB-1

LAMP LEADS 1-50 — J5
COMMON CONTROL — J6
T R Y R T R COM NO RG RG + −
AUDIO A AUDIC B AUDIO   FAULT RING GEN POWER

TO SWITCHING EQUIPMENT
LINES 1-25 — J1
LINES 26-50 — J2 TB1

294 COMMUNITY ALERTING SYSTEM MOUNTING ASSEMBLY
tellabs

6. system wiring diagram (page 2 of 2)