

TELLABS 9192 2W ARD
CONFERENCE ACCESS TRUNK CIRCUIT

1. GENERAL

1.01 This Section describes the 9192 2Wire Automatic Ring Down (ARD) Conference Access Trunk Circuit manufactured by TELLABS Inc. which is approved for installation by Southwestern Bell Telephone Co.

1.02 This Section is issued to provide guidelines for the installation and maintenance of TELLABS 9192 2W ARD Conference Access Trunk Circuit.

2. DESCRIPTION AND APPLICATION

2.01 The TELLABS 9192 2Wire ARD Conference Access Trunk Circuit is designed specifically for use in the TELLABS 291 Conference/Alerting System to initiate a conference call automatically via a central office line circuit. (The 291 System is a self-contained multistation ringdown telephone conference circuit designed primarily for use in emergency reporting and alerting, or business conference applications.) In the 291 System, the 9192 module provides the interface between the System and any switching system equipped for sleeve lead or C-lead control.

2.02 An automatic conference call is initiated when the 9192 generates a start pulse to signal all conference stations in response to a grounded sleeve or C lead in an electromechanical office. The start pulse generated by the 9192 directs the 291 System to apply ringing to all idle conference lines and, depending on System optioning, to either apply

alerting tone to all busy conference lines or to cut off all calls in progress and automatically transfer these lines into the conference.

2.03 The 9192 module extends ringback tone to the originating station until the first conference station answers. Unanswered conference lines continue to ring until timeout (an adjustable ringing interval is provided by the 9132 Ringing Timer module). The 9192 also provides holding ground to maintain the conference connection until the last conference station goes on-hook.

2.04 When the 291 System is used in emergency reporting applications, it is advisable to use two 9192 Trunk Circuits as a hunt group. It is also strongly recommended that one conference telephone location be supplied with a two-position switch. This switch, depending on position, deactivates one 9192 (or the other) and busies out the associated connector circuit at the central office.

2.05 This arrangement ensures that one 9192 will always be available to initiate a conference because, if a conference is held up by a caller failing to go on-hook (e.g., forgetting to hang up), the emergency crewman need only set the switch to the other position to release the active 9192 (which drops the conference in progress) and to activate the other 9192 (which readies the System for future emergency calls). If the means of transferring to the second 9192 were

not available, a conference held up as described would be activated indefinitely and subsequent emergency calls would not be able to be completed. Also with only one 9192 module active at a time, two simultaneous emergency calls will result in one being cut through and the other receiving busy tone, both of which are necessary System functions. If both 9192's were active at the same time, two simultaneous emergency calls would result in both being connected to the conference, possibly creating confusion among both the callers and emergency personnel.

2.06 The 9192 module may also be combined with a 9193 2Wire ARD Conference Originate Line Circuit module to permit the 291 System to operate in a combined manual/automatic arrangement. This arrangement is used when the conference master station used in manual conferencing arrangements can only be manned on a part-time basis. While the master station is manned, the manual conferencing mode is enabled, and while the master station is unmanned, the automatic conferencing mode is enabled. The conferencing modes are selected by a two-position switch (not supplied) that busies out either the 9192 or 9193 module when the other module is enabled.

2.07 The 9192 module, when installed in the 291 System, is located in positions 1 and 2 (position 2 optional) of the common equipment shelf.

3. INSTALLATION

A INSPECTION

3.01 The 9192 2Wire ARD Conference Access Trunk Circuit module should be visually inspected upon arrival in order to find possible damage incurred during shipment. If damage is noted, a claim

should immediately be filed with the carrier. If stored, the module should be visually inspected again prior to installation.

B MOUNTING

3.02 The 9192 module mounts in positions 1 and 2 (position 2 optional) of the 12-position common equipment shelf of the 291 Conference/Alerting System. The module plugs physically and electrically into a 56-pin connector at the rear of the shelf.

C INSTALLER CONNECTIONS

3.03 Before making any connections to the mounting shelf, make sure that power is off and modules are removed. Modules should be put into place only after they are properly optioned and after wiring is completed.

3.04 When the 9192 module is supplied as part of the 291 System, all inter-module wiring is factory wired and external wiring is simplified through the use of connectorized cables. Refer to Section 310-530-900SW for more detailed information regarding wiring procedures and distributing frame terminations. Figure 1 lists the external connections to the 9192 module for reference purposes only.

CONNECT:	TO PIN:
R (Ring).....	49
T (Tip).....	47
K2C (Transfer key, normally closed) (M-DMS-10).....	1
K1C (Transfer key, normally closed).....	3
CN (C lead input).....	11
C (C lead bias when required).....	9
K30 (Transfer key, normally open).....	5
K40 (Transfer key, normally open) (MB-DMS-10).....	7
STR (start lead).....	25
TS (Tone start lead).....	27
ANS (Answer lead).....	23
G1 (Gain control lead).....	21
G2 (Gain control common).....	19
RBT (Ring back tone, tip).....	41
L1 (Common audio bus No. 1).....	37
L2 (Common audio bus No. 2).....	39
RBR (Ring back tone, ring).....	43
C1 (control lead, not used in 291).....	13
LG (Locking ground).....	15
L (Lamp).....	45
E (Type II E&M E lead).....	55
SG (Type II E&M E lead return).....	53
-BATT (-42.75 to -56Vdc).....	35
GND (Ground).....	17

FIGURE 1

D OPTION SELECTION

3.05 Before plugging the 9192 module into place, eight options must be selected via slide switches located on the component side of the printed circuit board. Switch locations are shown in Figure 2.

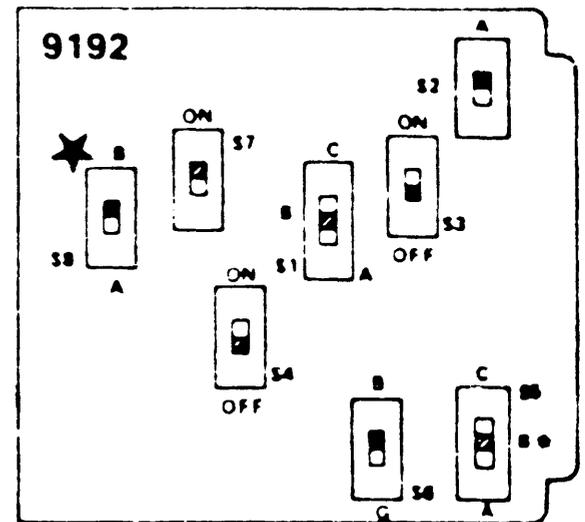


FIGURE 2

3.06 All option switches (S1 through S7) must be set in various combinations, depending upon the type of switching system with which the 9192 and the 291 System as a whole must operate. Exhibit 1 lists the required combinations of switch settings for all major types of CO switching systems.

NOTE: Position B of S5 not labeled on board.

4. CIRCUIT DESCRIPTION

4.01 This circuit description is designed to familiarize you with the 9192 module for engineering and application purposes only. Attempts to test or troubleshoot the 9192 internally are not recommended. Procedures for recommended testing and troubleshooting in the field are limited to those prescribed in Part 6 of this Section.

4.02 The 9192 module interfaces the 291 System with a CO or PBX line circuit to originate a conference call in response to a subscriber dialing a specific directory or PBX extension number (e.g., a fire-reporting number). Option switches are provided on the 9192 to condition the module to interface the following switching equipment: SXS, X-bar, or other switching machines that can supply C-lead (or sleeve lead) control. Because the basic operation of the 9192 module is the same regardless of the type of switching equipment it interfaces, this circuit description will, for convenience, be presented in terms of the 291 System's operation with a SXS system.

4.03 When the 9192 module is used to interface a SxS office, the connector terminal (with line relay equipment removed) is cross-connected to the 9192 module. (The tip lead is connected to pin 47, the ring lead to pin 49, and the sleeve or C lead to the CN terminal, pin 11.) Either a jumper or a contact from a trunk transfer switch, when provided, supplies a path between relay contacts K1C and K2C (pins 3 and 1). Upon origination of a call to that particular connector terminal, ringing voltage is applied to the tip and ring leads and a ground is applied to the sleeve lead. The sleeve-lead ground, through the unoperated RT relay contact, activates the C relay. Operation of the C relay does the following: provides a partially operated path for the RT relay (operation of the AN relay completes this path); operates the ST relay; applies ground to one side of the SR relay winding, permitting the sleeve-lead ground to activate the SR relay via its driver circuitry; and provides a ground pulse through the unoperated AN relay to

the STR lead (pin 25). The operated C relay also connects ground to one side of the R relay, causing it to operate.

4.04 Operation of the R relay applies ground to the LG lead (system locking ground), enabling the 9132 Ringing Timer module and providing the locking path for all 9191 Station Termination modules. Operation of the ST relay does the following: provides a resistive locking path for the R relay; provides an operate path from the ANS lead (pin 23) to the AN relay winding via an unoperated contact of the AN relay; and connects ground to the L (lamp) lead (pin 45). This contact also completes the circuit, causing the front-panel LED to indicate a busy condition.

4.05 Operation of the SR relay also applies a resistive termination to the transformer, thereby excluding any ringing or ring trip transients from the conference. The SR relay connects the tip and ring leads to resistance ground to aid ring trip and also to prevent answer supervision (i.e., to prevent the calling party from being charged for the call). The SR relay also connects ring-back tone to the calling party until the first party answers.

4.06 When the first conference station answers, ground is applied to the ANS lead (pin 23) through the operated ST relay contact to operate the AN relay. The AN relay locks operated through its own EMB contacts, through the operated ST relay contact, and through to ground. One contact of the AN relay, in series with the operated C relay contact, completes the operate path of the RT relay, which operates and locks to the grounded CN lead. Another normally closed contact of the AN relay operates and breaks the ground path from the C and ST relay's contacts to the STR lead.

4.07 Operation of the RT relay opens the ground path to the C relay winding, causing the C relay to release. One contact of the RT relay bridges a C relay contact to maintain operation of the ST relay when the C relay releases. Another normally open contact of the C relay removes the operate path for the R relay. However, the resistive ground supplied by the operated ST relay prevents the R relay from releasing. Release of the C relay causes the SR relay to release, removing the resistive transformer termination, disconnecting ringback tone and dropping the final ground on the STR lead. Operation of the RT relay connects the transformer secondary to the amplifier bus and applies a short between G1 and G2, increasing the amplifier gain (9194 module) to offset the bridging loss.

4.08 Ring trip is also facilitated by two zener diodes connected in a back-to-back arrangement in the ring-trip circuit. These diodes break down at any voltage over 60 volts (ringing voltage rather than loop supply). This causes the ring-trip relay in the CO connector circuit to operate.

4.09 When the 9192 module is used in a CO with a 1000 ohm loop limit, switch S1 is set to the A position to reflect 1200 ohms from tip lead to ground and from ring lead to ground. A CO with a 1200 ohm limit requires that switch S1 be set to B for 1400 ohms.

5. SPECIFICATIONS

- CN-LEAD RANGE
1000 ohms with switch S4 set to the OFF position;
400 ohms with S4 set to ON position

- C-LEAD RESISTANCE
0, 830 or 1200 ohms, switchable, battery or ground connected
- TIP-TO-GROUND AND RING-TO-GROUND RESISTANCE (SEIZED)
1200, 1400 or 2020 ohms, switchable
- TRANSFORMER IMPEDANCE RATIO
1:1
- INSERTION LOSS
0.5dB at 1000Hz
- FREQUENCY RESPONSE
+0.5dB, 300 to 3500Hz, re 1000Hz
- LONGITUDINAL BALANCE
60dB minimum, 200 to 4000Hz
- POWER REQUIREMENTS
input voltage: -42.75 to -56Vdc with positive ground
input current: 80mA maximum
- OPERATING ENVIRONMENT
-40° to +140°F (-40° to +60°C), humidity to 95%, no condensation
- DIMENSIONS
5.58 inches (14.17cm) high
1.42 inches (3.61cm) wide
5.96 inches (15.14cm) deep
- WEIGHT
16 ounces (454 grams)
- MOUNTING
one position of TELLABS Type 10 (or Wescom Type 400) Mounting Shelf

6. TESTING AND TROUBLESHOOTING

6.01 The Testing Guide Checklist (Exhibit 2) may be used to assist in the installation, testing or troubleshooting of the 9192 2W ARD Conference Access Trunk Circuit. The Testing Guide Checklist is intended as an aid in the localization of trouble to a specific module. If a module is suspected of being defective, a new module should be substituted and the test conducted again. If the substitute module operates correctly, the original module should be considered defective and returned to TELLABS for repair or replacement. It is strongly recommended that no internal (component level) testing or repairs be attempted on the 9192 module. Unauthorized testing or repairs may void the module's warranty.

6.02 If a 9192 is diagnosed as defective, the situation may be remedied by either replacement or repair and return. Because it is the more expedient method, the replacement procedure should be followed whenever time is a critical factor (e.g., service outages, etc.).

A. REPLACEMENT

6.03 If a defective module is encountered on central office installed equipment, Network Maintenance will arrange for a replacement by notifying TELLABS via telephone on 312-969-8800, letter (See Below), or TWX on 910-695-3530. Notification should include all relevant information, including the 8X9192 part number (from which TELLABS can determine the issue of the module in question). Upon notification, TELLABS will ship a replacement module to the installation site or other designated address. If the warranty period of the defective module has not elapsed, the replacement module will be shipped at no charge. Package the

defective module in the replacement module's carton; sign the packing list included with the replacement module and enclose it with the defective module (this is your return authorization); affix the preaddressed label provided with the replacement module to the carton being returned; and ship the equipment prepaid to TELLABS.

6.04 For defective customer premise installed units, Business I/M will return the defective module to their Supplies Attendant or Material Management coordinate for Repair and Return handling as covered in paragraph 6.05.

B. REPAIR AND RETURN

6.05 Return the defective 9192 module, shipment prepaid, to:

TELLABS Incorporated
4951 Indiana Avenue
Lisle, Illinois 60532
Attn: Repair and Return Dept.

6.06 Enclose an explanation of the module's malfunction. TELLABS will repair the module and ship it back to you. If the module is in warranty, no invoice will be issued.

EXHIBIT 1

9192 SWITCH SETTINGS

SWITCH POSITIONS							
type of switch- ing equipment	S1	S2	S3	S4	S5	S6	S7
SxS	A or B (note 1)	A	OFF	ON	B or A (note 2)	B	ON
No. 1 EAX	X (note 3)	B	ON	OFF	C	G	OFF
No. 2 EAX	X	B	ON	ON	C	G	OFF
X-BAR	C	A	OFF	OFF	C	G	ON
<p>Notes:</p> <ol style="list-style-type: none"> Set S1 to the A position for 1000 offices and to the B position for 1200 offices. Set S5 to the B position for normal use and to the A position in AECO offices with 600 + 230 ohms in line equipment tip lead. "X" denotes that the switch is not utilized in that application (its setting, therefore, is immaterial). 							

9192 TESTING GUIDE CHECKLIST

PROBLEM	POSSIBLE CAUSE
Incoming call ring trips, but conference phones do not ring.	<ul style="list-style-type: none"> (1) Subscriber's line block miswired. Relay K1C not connected to relay K2C either by means of a trunk transfer key or a wire strap. (2) 9192 not correctly optioned. (3) Fuse associated with 9192 blown. (4) Defective 9192. Replace and retest.
Originating line does not release when distant end goes on hook.	<ul style="list-style-type: none"> (1) 9192 not correctly optioned. (2) Line relay equipment not removed from connector terminal. (3) Connector sleeve lead from switch remains at ground. (4) Defective 9192. Replace and retest.
Originating line does not ring-trip; conference call is not activated.	<ul style="list-style-type: none"> (1) 9192 not correctly optioned. (2) Relay K1C not connected to relay K2C either by a trunk-transfer key or wire jumper. (3) 8 X 20 switching equipment terminal block miswired. (4) 9192 in wrong shelf position. (5) Defective 9192. Replace and retest.