

Addendum: 9003A Ringing Interrupter Control Module

1.01 This addendum to Tellabs practice section 819003A, revision B (dated 2 September 1985), is issued to update the *alarm threshold voltage* specification in section 5 of the practice. Please note that this specification update applies only to Issue 1 9003A modules (Tellabs part number **819003A**) of production revision level K2 and later. These modules can be identified by a "rev. K2" (or later) label at the bottom of the handle portion of their front panels.

1.02 In the event that this addendum section is revised or reissued, the reason for revision or reissue will be stated in this paragraph.

1.03 For 9003A modules of production revision level K2 and later as described above, change the *alarm threshold voltage* specification in section 5 of the 9003A practice from **50 ±6mV rms** to **50 ±10mV rms**.



9003A Ringing Interrupter Control Module

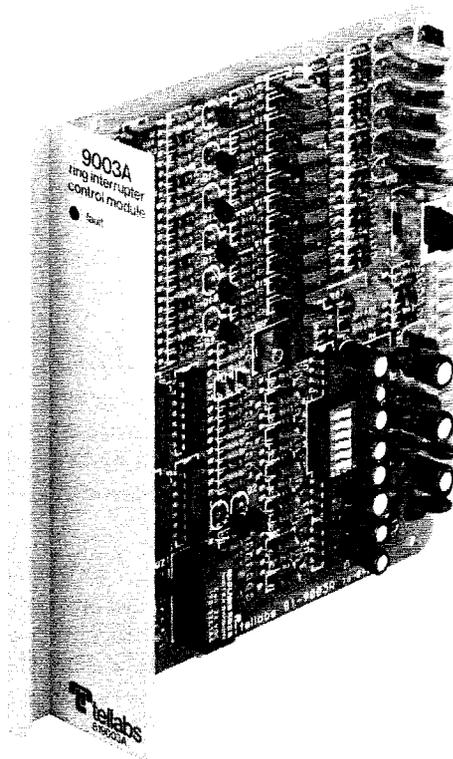


Figure 1. 9003A Ringing Interrupter Control Module

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1. Description and Application

- 1.01 The Tellabs 9003A Ringing Interrupter Control Module (figure 1), which must be used in conjunction with an associated Tellabs 9132 Ringing Timer module, provides either continuous or divided harmonic ringing to two groups of stations. The 9003A alternately connects a ringing source to each group for 1 second, thus producing a distinctive 1-second-on, 1-second-off ringing signal.
- 1.02 This practice is revised to cover changes to the 9003A module. These changes are as follows: fuses are substituted for thermistors, maximum ringing voltage to the module is increased to 150Vrms, and a maximum ringing current of 300mA is supplied at each of the 9003A's six outputs.

- 1.03 The 9003A module, with its associated 9132 Ringing Timer module, is primarily used to activate station ringing in the Tellabs 291, 291R, and 292R Conference/Alerting Systems. These Systems are self-contained multistation ringdown conference systems designed for emergency-reporting and business-conference applications. In the 29X Systems, the 9003A module activates ringing at each conference station by repeating the start pulse supplied by the line circuit or trunk circuit that originates the conference. The 9003A module also divides the ringing load of conference stations into two groups as described above, alternately connecting each group to a ringing source for 1 second to produce the 1-second-on, 1-second-off ringing signal that distinguishes conference calls from normal traffic.
- 1.04 In applications outside the 29X Systems, the 9003A module can be used wherever distinctive station ringing with adjustable ringing timeout is required (e.g., in conjunction with automatic ringdown operation). In these applications, as in 29X-System applications, the 9003A module must be used with an associated 9132.
- 1.05 Three separate ringing-generator inputs allow the 9003A to be used with harmonic ringing arrangements. The module's integral fault-detection circuitry lights a front-panel fault LED if ringing voltage is not present at any of the three inputs. Ringing voltage must not exceed 150Vrms.
- 1.06 Each of the 9003A's three inputs terminates in two outputs. In response to 1-second control pulses generated by its associated 9132 module, the 9003A alternately connects the ringing source to one half of the outputs while connecting battery or ground to the other group of outputs to provide the bias required to trip ringing during the silent period. This configuration is reversed once every second. The ringing capacity of the 9003A depends upon the capacity of the ringing source and the maximum ringing current that the 9003A can provide without generating a fault condition (300mA per output).
- 1.07 Each of the 9003A's six outputs is monitored for excessive load conditions. When a fuse blows as a result of a shorted output, the module's front-panel fault LED lights, and a relay-contact closure is provided to activate an external audible or visible alarm. When any of the outputs is not used, the corresponding fault-detection circuitry must be disabled by setting the appropriate positions of six-position DIP switch S1 to the ON position.
- 1.08 An option switch on the 9003A module allows use with either ground-referenced or external battery-biased ringing generators. In addition, the module can be optioned to provide either continuous ringing or 1-second-on/1-second-off interrupted ringing on all outputs.
- 1.09 The 9003A operates on -42 to -56 Vdc filtered, positive-ground-referenced input. Current requirements range from 20mA at idle to a maximum of 80mA when busy.
- 1.10 The 9003A is a Type 10 module. When used in a 291, 291R, or 292R System, it mounts in position 9 of the System's 12-position common equipment shelf. In applications other than the 29X Systems, the 9003A mounts in one position of a Tellabs Type 10 Mounting Shelf, versions of which are available for relay-rack and apparatus-case installation. For specific information on use of the 9003A in the 291, 291R, or 292R Conference/Alerting Systems, refer to the appropriate 29X System Practices.

2. Installation

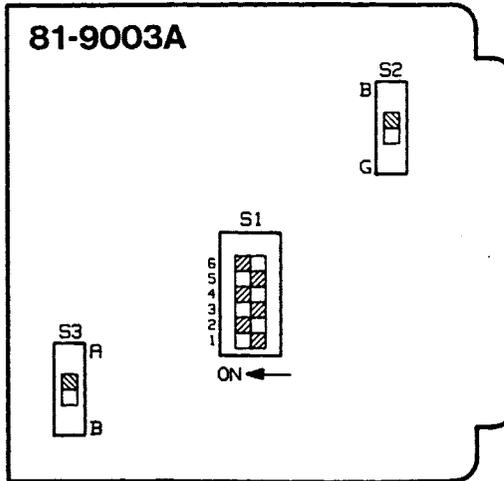
Inspection	2.01	The 9003A Ringing Interrupter Control Module should be visually inspected upon arrival to find possible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier. If stored, the module should be visually inspected again prior to installation.
Mounting	2.02	The 9003A module mounts in position 9 of the 29X System's common equipment shelf or in one position of a Tellabs Type 10 Shelf. The module plugs physically and electrically into a 56-pin connector at the rear of the shelf.
Installer Connections	2.03	Before making any connections to the mounting shelf, make sure that power is off and modules are removed . The 9003A module should be put into place only after it is properly optioned and after wiring is completed.
	2.04	When the 9003A module is supplied as part of the 29X System, all intermodule connections are factory-wired and external wiring is simplified through the use of connectorized cables. Refer to the 29X System Practices for detailed information regarding wiring procedures and distributing frame terminations. Table 1 lists external connections to the 9003A.

Table 1. External connections to 9003A module

connect:	to pin:
GA (generator input A)	1
GB (generator input B)	3
GC (generator input C)	5
RO (ringing over lead to associated 9132)	11
RC (ringing continuing lead to associated 9132)	13
LGI (locking ground lead to associated 9132)	15
R.M.ST. (ringing machine start)	28
G1A (generator A output, phase 1)	38
G2A (generator A output, phase 2)	40
G1B (generator B output, phase 1)	42
G2B (generator B output, phase 2)	44
G1C (generator C output, phase 1)	46
G2C (generator C output, phase 2)	48
STR (start relay)	25
ST1 (ringing start lead 1 to station line circuits)	41
ST2 (ringing start lead 2 to station line circuits)	43
ST3 (ringing start lead 3 to station line circuits)	45
ST4 (ringing start lead 4 to station line circuits)	47
ST5 (ringing start lead 5 to station line circuits)	49
ST6 (ringing start lead 6 to station line circuits)	51
FAULT COM. (fault relay common)	4
FAULT N.C. (fault relay normally closed)	6
FAULT N.O. (fault relay normally open)	2
-BATT (-42 to -56Vdc filtered, positive-ground-referenced input)	35
GND (ground)	17

Option Selection	2.05	The 9003A module requires no alignment. Optioning consists of enabling the ringing generator bias, and selecting either continuous or interrupted ringing. Locations of the option switches on the module's printed circuit board are shown in figure 2.
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Figure 2 9003A option switch locations



- 2.06 Option switch S1, a six-position DIP switch, enables or disables the six ringing-voltage detectors. Switches S1-1 and S1-2 correspond to output phases 1 and 2 of ringing generator input A, switches S1-3 and S1-4 correspond to output phases 1 and 2 of ringing generator input B, and switches S1-5 and S1-6 correspond to output phases 1 and 2 of ringing generator input C. If all inputs and outputs are used, set switches S1-1 through S1-6 to the OFF (enable) position. If any of the ringing generator outputs are not used, set the corresponding S1 switch positions to the ON (disable) position to disable them.
- 2.07 Slide switch S2 options the module for use with either ground-referenced or external battery-biased ringing generators. Set S2 to the B position if the associated ringing generators are battery biased or to the G position if the ringing generators are ground biased.
- 2.08 Slide switch S3 selects either continuous ringing or interrupted ringing for all outputs. Set S3 to position A for interrupted 1-second-on/1-second-off ringing, or to position B for continuous ringing.

3. Circuit Description

- 3.01 This *circuit description* is intended to familiarize you with the 9003A Ringing Interrupter Control Module for application and engineering purposes only. Attempts to troubleshoot the 9003A internally are not recommended and may void your warranty. Procedures for recommended testing and troubleshooting in the field are limited to those prescribed in section 6 of this Practice. Refer to the 9003A block diagram, section 4 of this Practice, as an aid in following this circuit description.

- 3.02 The 9003A module splits the ringing load and provides either continuous or interrupted ringing when used with the 9132 Ringing Timer module. The 9003A accepts up to three separate ringing generator inputs and provides two alternating outputs for each input, as listed in table 2.
- 3.03 The LGI lead (pin 15), upon receipt of signals from the associated 9132 module, enables or disables the 9003A. A ground applied to the LGI lead activates the 9003A's switching circuitry, which applies either ringing voltage or a bias signal to the 9003A's outputs, as determined by the state of the RC lead (pin 13). The RC-lead state, which is controlled by the associated 9132 module, alternates between ground and open every second. This controls the cycle of 1 second of ringing voltage plus bias signal (during RC-lead ground) and 1 second of bias signal only (during RC-lead open) applied to the 9003A's outputs. Switch S2 on the 9003A allows either ground or battery potential to be selected as the bias signal.

Table 2. Ring generator inputs and associated outputs

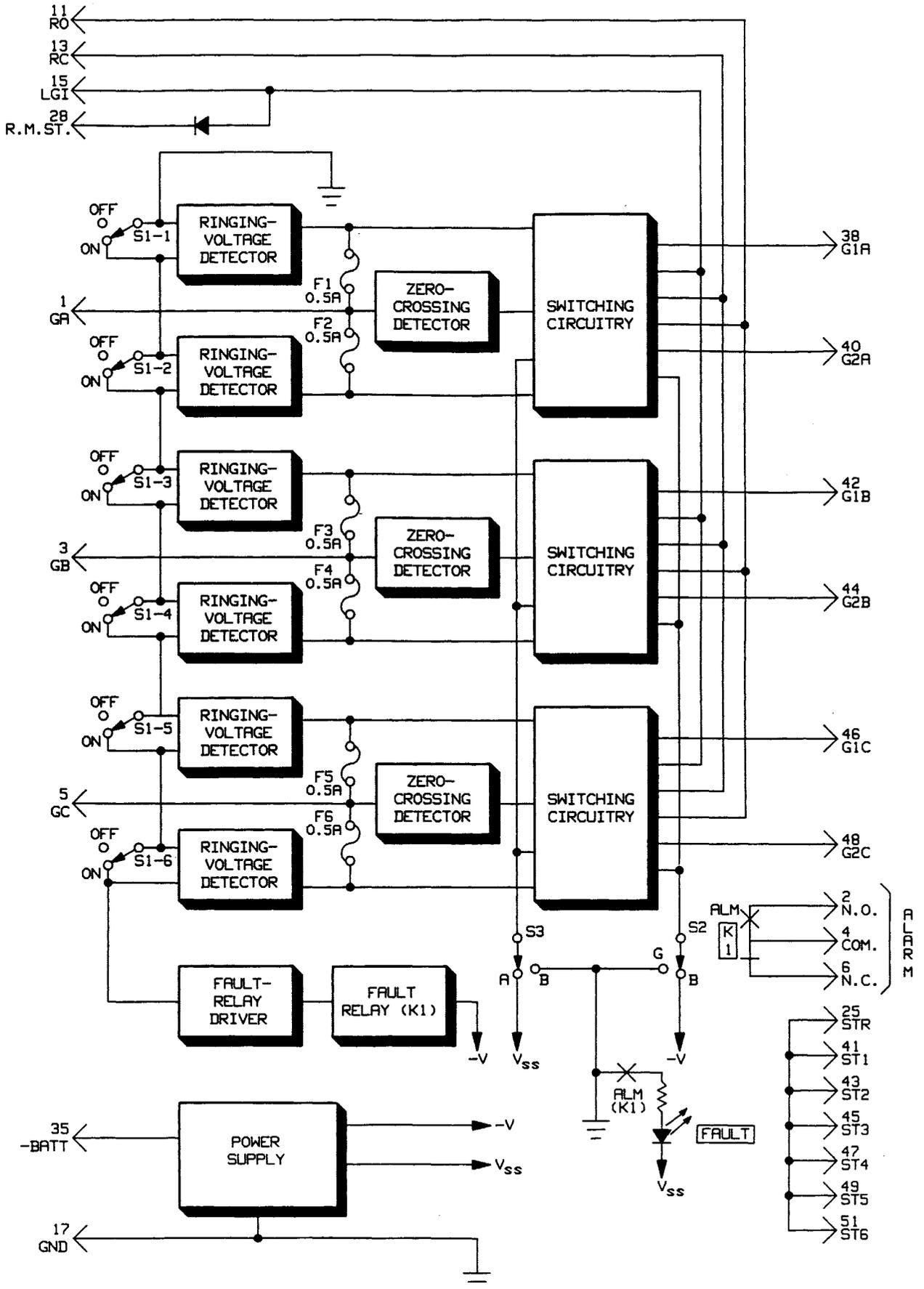
ring gen. input	pin no.	associated alternating outputs	pin no.
GA	1	G1A	38
		G2A	40
GB	3	G1B	42
		G2B	44
GC	5	G1C	46
		G2C	48

- 3.04 When all stations have answered or when the associated 9132 module times out, ground is removed from the LGI lead, which disables ringing to the 9003A's outputs. Also, ground is provided to the 9003A's RO lead (pin 11) by the associated 9132 module. With the RO lead grounded and the LGI lead open, the 9003A switches the bias signal (ground or battery potential, as selected via S2) on at all outputs. This allows any station that is answered after ringing times out to access the conference by activating its associated ring-trip circuitry.
- 3.05 Whenever the LGI lead is grounded, the 9003A extends a ground to the R. M. ST. (ringing machine start) lead (pin 28), which is used in applications that require a start lead to the associated ringing generator.
- 3.06 The 9003A's six outputs are individually protected from short circuits and excessive load-current demands by fuses F1 through F6, each of which is rated at 0.5A. Bias-voltage current is limited by the switching circuitry and by the fused -48Vdc supply external to the 9003A.
- 3.07 If the input-ringing-source voltage drops below its alarm threshold voltage, or if the current demand from the ringing generator is excessive and blows any fuse during an active output phase, the ringing-voltage detectors turn the front-panel *fault* LED on and also operate the alarm relay, K1, which provides one form-C contact for an external alarm indication.

4. Block Diagram

9003A Ringing Interrupter Control Module

819003A



5. Specifications

<i>interruption frequency</i>	1 second on, 1 second off, when pulsed by associated 9132 Ringing Timer Module
<i>capacity (ringing frequencies)</i>	3 frequencies to accommodate harmonic ringing
<i>alarm relay contact rating</i>	0.5A (115Vac, 60Hz)
<i>functional arrangement</i>	total number of ringing outputs: six number of frequencies and ringing groups: three number of ringing subgroups per frequency: two ringing pattern: alternate ringing between subgroups
<i>maximum ringing current supplied</i>	300mA at each of six outputs; each output individually fused with a 0.5A fuse
<i>maximum ringing input voltage</i>	150Vac
<i>fuse rating</i>	0.5 ampere
<i>alarm threshold voltage</i>	50Vrms \pm 6Vrms
<i>power requirements</i>	input voltage: -42 to -56Vdc, filtered, positive-ground-referenced input current: 20mA, idle; 80mA, busy (maximum)
<i>operating environment</i>	32° to 122°F (0° to 50°C), humidity to 95% (no condensation)
<i>dimensions</i>	5.58 inches (14.17cm) high 1.42 inches (3.61cm) wide 5.96 inches (15.14cm) deep
<i>weight</i>	7 ounces (199 grams)
<i>mounting</i>	position 9 in the rack-mounted common equipment shelf of a Tellabs 291, 291R, or 292R System; can also be mounted in one position of a Tellabs Type 10 Mounting Shelf (relay-rack or apparatus-case mounted)

6. Testing and Troubleshooting

- 6.01 The *testing guide checklist* in this section may be used to assist in the installation, testing, or troubleshooting of the 9003A Ringing Interrupter Control Module. The 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 one 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 as directed below. We strongly recommend that no internal (component-level) testing or repairs be attempted on the 9003A module. Unauthorized testing or repairs may void the module's warranty; in addition, if the module is part of a registered system, unauthorized repairs will void the FCC registration.

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.*

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- Telephone Assistance** 6.02 If a situation arises that is not covered in the troubleshooting guide, contact Tellabs Customer Service as follows (telephone numbers are given below):
- USA customers: Contact Tellabs Customer Service at your Tellabs Regional Office.

Canadian customers: Contact Tellabs Customer Service at our Canadian headquarters in Mississauga, Ontario.

International customers: Contact your Tellabs distributor.

US atlantic region: (203) 798-0506

US capital region: (703) 478-0468

US central region: (312) 357-7400

US southeast region: (305) 834-311

US southwest region: (214) 869-4114

US western region: (714) 850-1300

Canada: (416) 624-0052

Determining Need	6.03	If a 9003A module is diagnosed as defective, follow the replacement procedure in paragraph 6.04 when a critical service outage exists (e.g., when a system or a critical circuit is down and no spares are available). If the situation is not critical, follow the repair and return procedure in paragraph 6.05.
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Replacement	6.04	To obtain a replacement module, notify Tellabs via letter or telephone (see addresses and numbers below) or via TWX (910-695-3530 in the USA, 610-492-4387 in Canada). Be sure to provide all relevant information, including the 8X9003A part number that indicates the issue of the module in question. Upon notification, we shall ship a replacement module to you. If the module in question is in warranty, the replacement will be shipped at no charge. Pack the defective 9003A module in the replacement module's carton, sign the packing slip included with the replacement, 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 module prepaid to Tellabs.
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Repair and Return	6.05	<p>Return the defective module, shipment prepaid, to Tellabs (attn: repair and return).</p> <p>in the USA: Tellabs, Inc. 4951 Indiana Avenue Lisle, Illinois 60532 telephone (312) 969-8800</p> <p>in Canada: Tellabs Communications Canada, Ltd. 1200 Aerowood Drive, Unit 39 Mississauga, Ontario, Canada L4W 2S7 telephone (416) 624-0052</p> <p>Enclose an explanation of the module's malfunction. Follow your company's standard procedure with regard to administrative paperwork. Tellabs will repair the module and ship it back to you. If the module is in warranty, no invoice will be issued.</p>
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Testing Guide Checklist

Note 1: The testing guide checklist is written with reference to the 9003A's most common application: its use in a 291, 291R, or 292R System. Testing in other applications can easily be derived from this checklist.

Note 2: When the 9003A is used in a 29X System, to prevent unnecessary ringing of subscriber telephones during testing, remove the 9021 Fuse Modules from the System's line equipment shelves but leave the common-equipment-shelf Fuse Module in place.

Note 3: Because the connectorized backplate of each 29X System equipment shelf prevents access to the connector pins at the rear of most module positions, the use of a Tellabs 9801 or 9802 Card Extender or equivalent is necessary for testing this module when used in a 29X System.

test	test procedure	normal result	if normal conditions are not met, verify:
idle state	Use VOM (set to appropriate ac voltage scale) to measure voltage at each output (pins 38, 40, 42, 44, 46, and 48) with reference to ground (pin 17).	No ac ringing voltage on any output pins <input type="checkbox"/> .	Pins 11, 13 and 15 are either open or at negative battery voltage (check with VOM set to appropriate dc voltage scale, with reference to ground, pin 17) <input type="checkbox"/> . Replace 9003A module and retest <input type="checkbox"/> .
LGI function check	Apply ground to LGI lead (pin 15). 1.) Use VOM (set to appropriate dc voltage scale) to check phase 1 outputs (pins 38, 42, and 46) with reference to ground (pin 17). 2.) Use VOM (set to appropriate ac voltage scale) to check phase 2 outputs (pins 40, 44, and 48) with reference to ground (pin 17).	1.) All three outputs are at negative battery potential (nominal -48Vdc) <input type="checkbox"/> . 2.) All three outputs are at ringing-voltage-potential (nominal 100Vac rms) <input type="checkbox"/> .	Ringing sources are properly connected to the three inputs (pins 1, 3, and 5) <input type="checkbox"/> . Replace 9003A module and retest <input type="checkbox"/> .
RC function check	Retain ground on LGI lead (pin 15). 1.) Apply ground to RC lead (pin 13). Use VOM (set to appropriate ac voltage scale) to check phase 1 outputs (pins 38, 42, and 46) with reference to ground (pin 17). 2.) Use VOM (set to appropriate dc voltage scale) to check phase 2 outputs (pins 40, 44, and 48) with reference to ground (pin 17).	1.) All three outputs are at ringing voltage potential (nominal 100Vac rms) <input type="checkbox"/> . 2.) All three outputs are at negative battery potential (nominal -48Vdc) <input type="checkbox"/> .	Replace 9003A module and retest <input type="checkbox"/> .
RO function check	Remove ground from LGI and RC leads (pins 13 and 15). Apply ground to RO lead (pin 11). Use VOM (set to appropriate dc voltage scale) to check all outputs (pins 38, 40, 42, 44, 46, and 48) with reference to ground (pin 17).	All outputs are at negative battery potential (nominal -48Vdc) <input type="checkbox"/> .	Replace 9003A module and retest <input type="checkbox"/> .



Tellabs, Inc., 4951 Indiana Avenue, Lisle, Illinois 60532 Tel. (708) 969-8800 FAX (708) 852-7346