

# 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 always be used in conjunction with an associated Tellabs 9132 Ringing Timer module, divides a ringing load into two groups of stations and 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 In the event that this Practice section is reissued, the reason for reissue will be stated in this paragraph.

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 For applications outside of 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 causes a front-panel *fault* LED to light if any of the three inputs drops below 50Vac.

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 connects the ringing source to one half of the outputs. Battery or ground is connected to the other group of outputs to provide the bias required to trip ringing during the silent period.

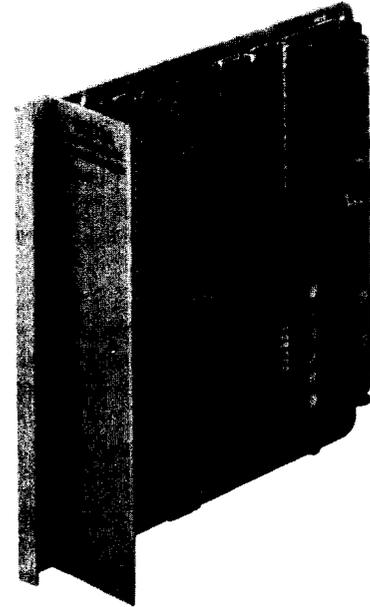


figure 1. 9003A Ringing Interrupter Control Module

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 (200mA per output).

1.07 Each of the 9003A's six outputs is monitored. If any output draws more than 200mA of current, the front-panel *fault* LED lights and a relay contact closure is provided to activate an external audible or visible alarm. When the *fault* LED lights as a result of a shorted output, the 9003A limits the output power until the short is removed. When any of the outputs is not used, the corresponding fault-detection circuitry must be disabled. This is accomplished 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 selection of either ground-referenced ringing generator or external battery-biased ringing generator. In addition, the module can be optioned to provide either continuous ringing on all outputs or interrupted 1-second-on, 1-second-off ringing on all outputs.

1.09 The 9003A operates on -42 to -56Vdc 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 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 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.

### 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 wiring is 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.

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

table 1. External connections to 9003A module

### 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.

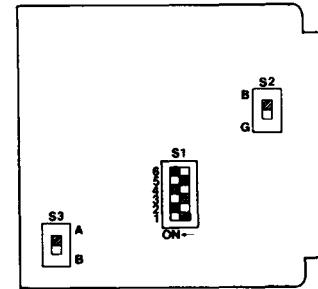


figure 2. 9003A option switch locations

2.06 Option switch *S1*, a six-position DIP switch, is used to enable or disable 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* selects either ground-referenced or external battery-biased ringing generator. 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 provides ringing-load splitting and ringing interruption 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) controls the enabling or disabling of the module. A ground on the LGI lead enables the *switching circuitry*, which applies either ringing or bias voltage to the outputs. Whether ringing or bias voltage appears on the outputs is determined by the state of the RC lead (pin 13).

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

table 2. Ring generator inputs and associated outputs

3.04 The RC-lead signal alternates between ground and open every second, and this controls the cycle of 1 second of ringing and 1 second of bias voltage applied to the outputs. The 9132 module supplies the RC, LGI, and RO signals to the 9003A module.

3.05 When the 9132 module times out, ground is removed from the LGI lead, which disables ringing to the outputs, and ground is provided to the RO lead (pin 11). With the RO lead grounded and the LGI lead open, the 9003A switches bias voltage 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.

3.06 Whenever the LGI lead is grounded, the 9003A extends a ground to the R. M. ST. (ringing machine start) lead (pin 28). (This lead is used only in offices that require a ringing machine start lead.)

3.07 The 9003A's six outputs are protected from shorts and excessive load-current demands by thermistors *TH1* through *TH6*, which limit ringing current. Bias-voltage current is limited by the switching circuitry.

3.08 If the input-ringing-source voltage drops below a nominal 50Vac rms level or if the current demand from the ringing generator is excessive, the ringing-voltage detectors switch the front-panel fault LED on and also operate the fault relay, which provides a contact closure for an external fault indication.

## 5. specifications

### interruption frequency

1 second on, 1 second off, when pulsed by associated 9132 Ringing Timer module

### capacity (ringing frequencies)

3 frequencies to accommodate harmonic ringing

### functional ringing arrangement

two ringing subgroups per frequency (six outputs total), arranged as three ringing groups of two subgroups each (alternate ringing is provided within the three ringing groups)

fault threshold voltage	maximum current per output
50Vac rms	200mA rms

### power requirements

input voltage: -42 to -56Vdc, filtered, positive-ground-referenced

input current: 20mA at idle, 80mA maximum when busy

### operating environment

32° to 122°F (0° to 50°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

7 ounces (198.5 grams)

### mounting

position 9 of the common equipment shelf of Tellabs' 291, 291R, and 292R Systems; can also be relay-rack or apparatus-case mounted via one position of a Tellabs Type 10 Mounting Shelf

## 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. 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.

6.02 Tellabs warrants this product 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 this product 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.

6.03 If a situation arises that is not covered in the 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

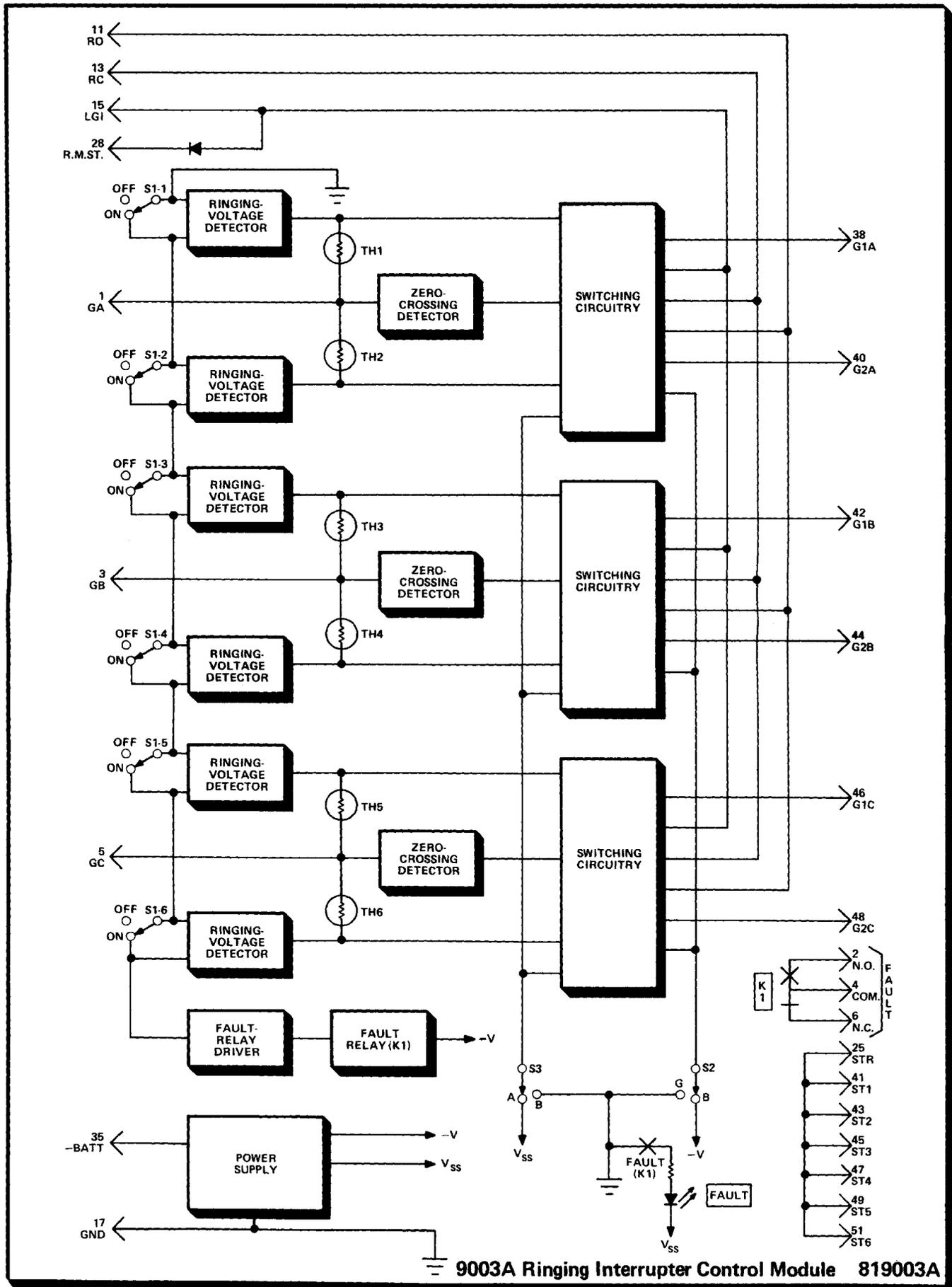
US southeast region: (305) 645-5888

US western region: (702) 827-3400

Lisle Headquarters: (312) 969-8800

Mississauga Headquarters: (416) 624-0052

6.04 If a 9003A 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.).



4. block diagram  
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**replacement**

6.05 To obtain a replacement 9003A 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 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 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.  
**repair and return**

6.06 Return the defective 9003A 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 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.

**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 of 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). Use VOM (set to appropriate dc voltage scale) to check phase 1 outputs (pins 38, 42, and 46) with reference to ground (pin 17). Use VOM (set to appropriate ac voltage scale) to check phase 2 outputs (pins 40, 44, and 48) with reference to ground (pin 17).	All three outputs are at negative battery potential (nominal -48 Vdc) <input type="checkbox"/> .  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). 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). Use VOM (set to appropriate dc voltage scale) to check phase 2 outputs (pins 40, 44, and 48) with reference to ground (pin 17).	All three outputs are at ringing voltage potential (nominal 100Vac rms) <input type="checkbox"/> .  All three outputs are at negative battery potential (nominal -48 Vdc) <input type="checkbox"/> .	Replace 9003A module and retest <input type="checkbox"/> .
RO function check	Remove grounds 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 -48 Vdc) <input type="checkbox"/> .	Replace 9003A module and retest <input type="checkbox"/> .



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