tellabs
technical manual
76-828102
rev C

practice section 828102

8102 Ringing Generator

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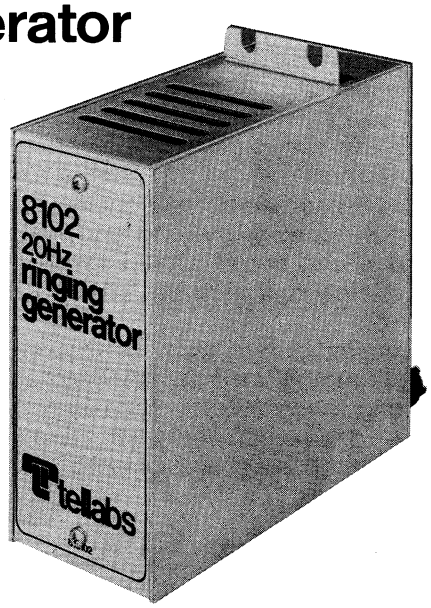


figure 1. 8102 Ringing Generator

1. description and application

1.01 The 8102 Ringing Generator (figure 1) provides 100Vac (nominal) sine-wave ringing voltage, at 20Hz, from a nominal −24Vdc or −48Vdc power source. The 8102's 5-watt ringing output is capable of driving up to five high-impedance telephone ringers simultaneously.

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

1.03 The 8102 offers the following features:

- Low-noise continuous sine-wave output.
- Option switch that conditions the unit for either −24Vdc or −48Vdc input power.
- Internal receptacle for optional use of a Tellabs 9903 Ringing Interrupter plug-on subassembly, which provides nominal 2-second-on, 4-second-off ringing interruption.
- Floating output that allows the unit to be connected in series with a dc voltage source for biased (superimposed) ringing.
- KTU-type apparatus-case mounting or, via mounting bars, relay-rack mounting.
- An input polarity protection diode and an input protection fuse.

1.04 The 8102 is normally used in customer-premises and other applications where 20Hz ringing is required and larger ringing generators are impractical. Typically, ringing must be supplied in applications involving foreign-exchange station-end (FXS) signaling modules and in off-premises-station (OPS) applications where loop signaling repeaters (LSR's) are used. The 8102's −24/−48Vdc *input power* switch option allows the unit to be used at standby-battery (battery-backup) installation sites where ac input power is not readily available. Because its output is floating, i.e., not referenced to the dc input voltage, the 8102 can be used in circuits requiring biased ringing. In such applications, either a positive or negative dc source, as required, is connected in series with the 8102's 20Hz ac ringing output.

1.05 Integral mounting ears at the top and bottom of the 8102's steel case allow direct mounting in KTU-type apparatus cases. The unit can also be mounted in conventional relay racks if mounting bars are provided. In relay-rack applications, up to six 8102's can be mounted across a 19-inch rack, and up to seven 8102's can be mounted across a 23-inch rack. In either case, four standard rack-mounting spaces (7 vertical inches) are required.

2. installation

inspection

2.01 The 8102 Ringing Generator 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 unit should be visually inspected again prior to installation.

mounting

2.02 The 8102 is designed for mounting in standard KTU-type apparatus cases. Use the four screws supplied with the unit to secure its top and bottom mounting ears to the apparatus case mounting framework. To install the 8102 in a standard relay rack, top and bottom mounting bars must be provided. Use the four screws provided with the unit to secure its mounting ears to the mounting bars.

installing optional 9903 Ringing Interrupter subassembly

Warning: *If the 8102 is already in service at the time the 9903 is to be added, be absolutely certain to disconnect all external power from the unit before removing the unit's backplate. Otherwise, both damage to the unit and potentially fatal exposure of personnel to hazardous voltages could occur.*

2.03 To install an optional Tellabs 9903 Ringing Interrupter plug-on subassembly in the 8102, proceed as follows:

A. Remove the two screws that secure the 8102's backplate to its chassis.
B. Being careful not to break any internal connections to terminal blocks *TB1* and *TB2,* remove the backplate from the unit to expose its printed circuit board.
C. Locate the two 4-pin connectors — one male and one female — on the printed circuit board. The 9903 has two corresponding four-pin connectors — one female and one male — on its printed circuit board. Orient these connectors appropriately and plug the 9903 securely onto the 8102.
D. After ensuring that both connector pairs are securely mated, replace the 8102's backplate. No wiring to the 9903 is necessary because all required connections between the subassembly and the 8102's terminal blocks are internally prewired.

installer connections

Warning: *Before making any connections to the 8102, set the input power selector switch on the rear of the unit to* off. *This will prevent exposure to hazardous voltages at the unit's output terminals.*

Caution: *Do not attempt to connect two or more 8102's in parallel to achieve higher power output, or damage to the unit will result.*

2.04 All input and output connections to the 8102 are made to barrier-type screw-terminal blocks *TB1* and *TB2,* respectively, on the rear of the unit. Using 20AWG or heavier wire, make all connections to the 8102 as indicated in table 1 and figure 2.

connect:	to terminal:
−24 or −48Vdc input power	−V (TB1-1)
input power return	+V (TB1-4)
ringing interrupter −24 or −48Vdc input power*	−Vc (TB1-2)
ringing interrupter input power return*	+Vc (TB1-3)
ringing output, common	com (TB2-1)
ringing output, continuous	±105 (TB2-2)
ringing output, interrupted*	int ±105 (TB2-3)

* Use only when 8102 is equipped with 9903 Ringing Interrupter subassembly.

table 1. External connections to 8102

input-voltage switch option

2.05 After all wiring is completed, set the *input power* selector switch on the rear of the 8102 to the *24V* position if nominal −24Vdc input voltage is being supplied to the unit, or to the *48V* position if nominal −48Vdc input voltage is being supplied to the unit.

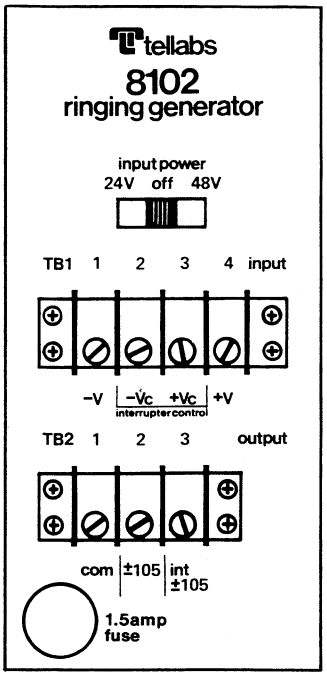


figure 2. Rear view of 8102

fuse replacement

2.06 If the 8102's 1.5-ampere input protection fuse must be replaced, use only an equivalent 1.5-ampere AGC-type fuse. The fuse is located in a cartridge-type fuse holder on the rear of the unit.

3. circuit description

3.01 This circuit description is intended to familiarize you with the 8102 Ringing Generator for engineering and application purposes only. Attempts to troubleshoot the 8102 internally are not recommended and may void its warranty. Troubleshooting procedures should be limited to those prescribed in section 6 of this practice. Please refer to the 8102 block diagram, section 4 of this practice, as an aid in following the circuit description.

3.02 The 8102 uses dual integrated-circuit operational amplifiers (op amps) wired in a gyrator configuration to produce a 20Hz sine-wave signal. This signal is routed through another op amp used as a *buffer* to isolate the high-power class-B "push-push" output stage from the *20Hz oscillator.* The *buffer* also drives a third op amp that provides the 180° phase shift to drive one-half of the complementary output stage.

3.03 The primary winding of the output transformer is tapped to provide the correct turns ratio for operation from either −24Vdc or −48Vdc input power, as selected via an option switch on the rear of the unit.

3.04 Appropriate internal four-pin connectors and wiring allow optional use of the Tellabs *9903 Ringing Interrupter plug-on subassembly* with the 8102. Because the 9903 operates on −24Vdc input power only, an integral *voltage regulator* in the 8102 supplies the necessary voltage to the subassembly

regardless of the input voltage used for the 8102. A control relay on the 9903 connects the 8102's interrupted-ringing output terminal (*TB2-3, int ±105*) to the continuous-ringing output terminal (*TB2-2, ±105*) during the 2-second-on period and to the common output terminal (*TB2-1, com*) during the 4-second-off period. Thus, in biased-ringing applications, dc continuity is maintained for the dc bias voltage that must be present to allow ring trip during silent (non-ringing) periods.

5. specifications

input voltage
−22 to −26Vdc or −44 to −56Vdc, switch-selectable

input current
at −24Vdc: 100mA at idle, 450mA at full load
at −48Vdc: 75mA at idle, 250mA at full load

ringing output
85 to 135Vac sine-wave output at 20Hz; 5 watts maximum

ringing capacity
can drive up to five high-impedance telephone ringers simultaneously

optional ringing interruption
nominal 2-second-on, 4-second-off interruption when equipped with a Tellabs 9903 Ringing Interrupter plug-on subassembly

input fusing
1.5-ampere Bussman AGC-type (or equivalent) fuse in cartridge-type fuse holder on rear of unit

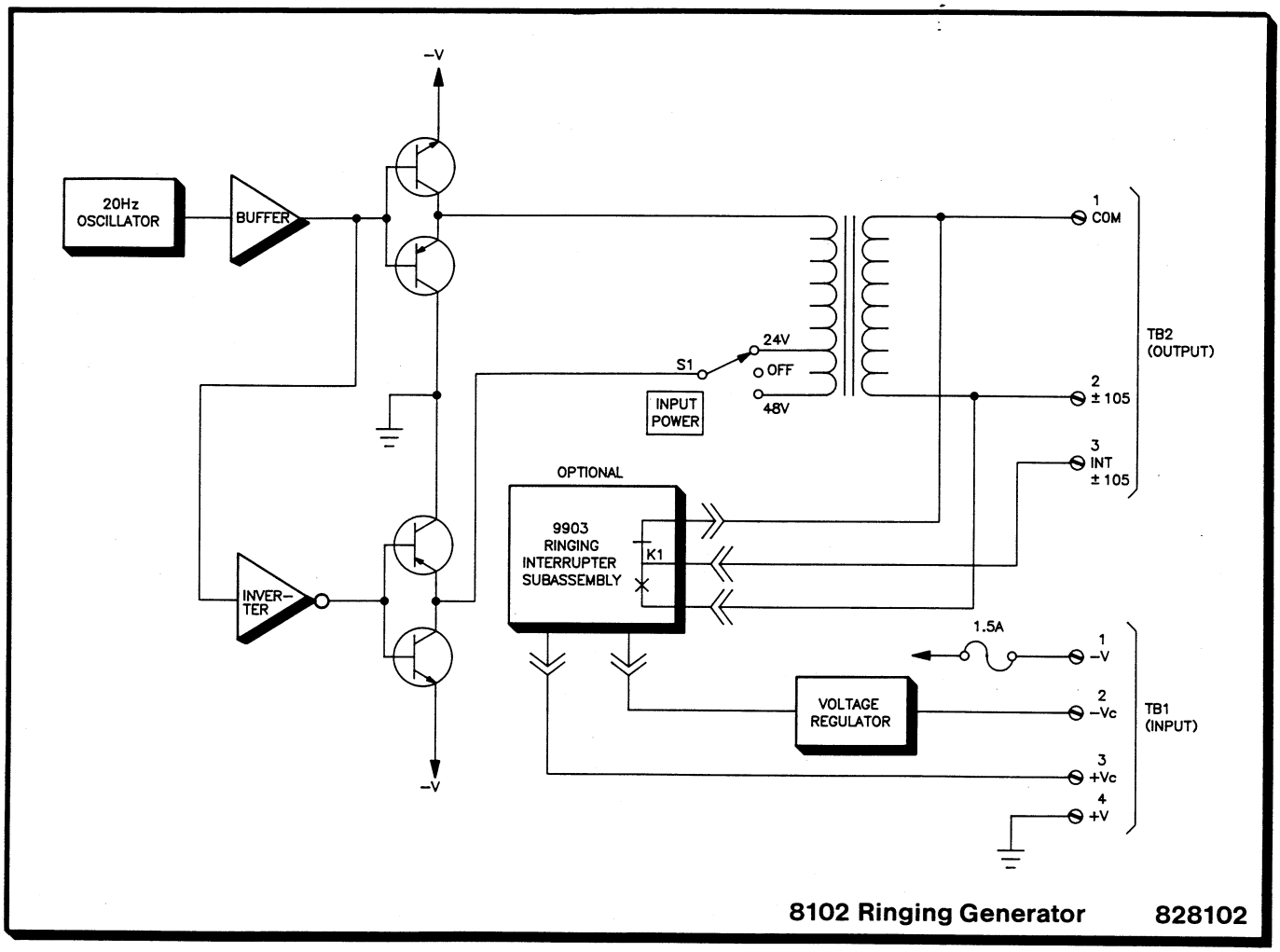
output polarity
floating output, which can be connected in series with an external positive or negative dc source for biased (superimposed) ringing, if required

operating environment
20° to 130°F (−7° to +54°C), humidity to 95% (no condensation)

dimensions
6.90 inches (17.6cm) high, including mounting ears
2.88 inches (7.3cm) wide
7.00 inches (17.8cm) deep

weight
5 pounds 10 ounces (2.55kg)

mounting
KTU-type apparatus case or, via mounting bars, 19 or 23-inch relay rack



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4. block diagram

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 8102 Ringing Generator. The checklist is intended as an aid in the localization of trouble to the 8102. If an 8102 is suspected of being defective, a new one should be substituted and the test conducted again. If the substitute operates correctly, the original should be considered defective and returned to Tellabs for repair or replacement as directed below. We strongly recomment that no internal (component-level) testing or repairs be attempted on the 8102. Unauthorized testing or repairs may void its warranty. Also, if the unit is part of a registered system, unauthorized repairs will result in noncompliance with Part 68 of the FCC Rules and Regulations.

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

6.02 If a situation arises that is not covered in the checklist, 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) 834-8311
US Southwest Region: (214) 869-4114
US Western Region: (714) 850-1300
Canada: (416) 624-0052

6.03 If an 8102 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.

replacement

6.04 To obtain a replacement 8102, 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 8X8102 part number that indicateds the issue of the unit in question. Upon notification, we shall ship a replacement to you. If the 8102 in question is in warranty, the replacement will be shipped at no charge. Pack the defective 8102 in the replacement's carton, sign the packing slip included with the replacement, and enclose it with the defective unit (this is your return authorization). Affix the preaddressed label provided with the replacement to the carton being returned, and ship the unit prepaid to Tellabs.

repair and return

6.05 Return the defective 8102, shipment prepaid, to Tellabs (attn: repair and return).

in the USA:
Tellabs, Inc.
4951 Indiana Avenue
Lisle, Illinois 60532
telephone (312) 969-8800

in Canada:
Tellabs Communications Canada, Ltd.
1200 Aerowood Drive, Unit 39
Mississauga, Ontario, Canada L4W 2S7
telephone (416) 624-0052

Enclose an explanation of the unit's malfunction. Follow your company's standard procedure with regard to administrative paperwork. Tellabs will repair the unit and ship it back to you. If the unit is in warranty, no invoice will be issued.

testing guide checklist on page 5

testing guide checklist

test	procedure	normal result	if normal conditions are not met, verify:
output voltage (no load)	Set *input power* switch to *off*. Connect negative input battery to *−V* terminal (*TB1-1*) and ground to *+V* terminal (*TB1-4*). Arrange VOM to measure up to 250Vac and connect it to *com* and *±105* terminals (*TB2-1* and *TB2-2*). Set *input power* switch to proper voltage setting.	VOM indicates 85 to 135Vac ☐.	Input voltage correct ☐. Fuse not blown ☐. Output not shorted ☐. *Input power* switch correctly set ☐.
output voltage (full load)	Set *input power* switch to *off*. Connect 2-kilohm, 5-watt resistor across VOM leads. Reset *input power* switch to proper voltage setting.	VOM indicates 82 to 135Vac ☐.	Same as above ☐.
interrupted output voltage (when 8102 is equipped with 9903 Ringing Interrupter subassembly)	Set *input power* switch to *off*. Connect 20AWG or heavier jumpers across terminals *−V* and *−Vc* (*TB1-1* to *TB1-2*) and across terminals *+V* and *+Vc* (*TB1-4* to *TB1-3*). Reset *input power* switch to proper voltage setting.	VOM indicates 85 to 135Vac interrupted at nominal 2-second-on, 4-second-off rate ☐.	9903 subassembly securely installed inside 8102 ☐. Replace 9903 and retest ☐.

tellabs Tellabs, Inc., 4951 Indiana Avenue, Lisle, Illinois 60532 telephone (312) 969-8800 twx 910-695-3530