



# TECHNICAL Practice

TELECOM SOLUTIONS FOR THE 21ST CENTURY

**SQRG-12**  
**Sequential Ring**  
**Generator**

July 28, 2006

## **Allow Multiple Attendants to Answer Sequenced Calls While Eliminating Call Crashing**



The **SQRG-12** Sequential Ring Generator is designed for applications where more than one person answers incoming calls and those persons may be in locations where the **TMS-6X** or **TMS-12A** is not visible.

The **SQRG-12** eliminates confusion about which line to answer next by displaying the oldest call as a ringing line on all phones in the phone system.

### **Features**

- Compatible with ground or loop start lines
- Re-rings calls held by Viking's **TMS-6X** or **TMS-12A** Call Sequencers
- Selectable ring cadence
- 10 REN load total

Phone... 715.386.8861

info@vikingelectronics.com

<http://www.vikingelectronics.com>

### **Applications**

- Generate automatic oldest call notification for the **TMS-6X**
- Generate automatic oldest call notification for the **TMS-12A**
- Eliminates call crashing on outbound calls when used with Viking's **TMS-6X** or **TMS-12A** Call Sequencers

### **Specifications**

**Power:** 120V AC/13.8V AC 1.25A UL listed adapter provided

**Dimensions:** 210mm x 160mm x 44mm (8.25" x 6.25" x 1.75")

**Shipping Weight:** 1.36 Kg (3 lbs)

**Environmental:** 0°C to 32°C (32°F to 90°F) with 5% to 95% non-condensing humidity

**REN:** 10.0

**Connections:** (2) RJ21X jacks, (1) RJ14 jack

**Maximum Run:** 305m (1000 ft) between **SQRG-12** and sequencer

Sold by:



## IF YOU HAVE A PROBLEM WITH A VIKING PRODUCT, PLEASE CONTACT: VIKING TECHNICAL SUPPORT AT (715) 386-8666

Our Technical Support Department is available for assistance Monday 8am - 4pm and Tuesday through Friday 8am - 5pm central time. So that we can give you better service, before you call please:

1. Know the model number, the serial number and what software version you have (see serial label).
2. Have your Technical Practice in front of you.
3. It is best if you are on site.

### RETURNING PRODUCT FOR REPAIR

The following procedure is for equipment that needs repair:

1. Customer must contact Viking's Technical Support Department at 715-386-8666 to obtain a Return Authorization (RA) number. The customer MUST have a complete description of the problem, with all pertinent information regarding the defect, such as options set, conditions, symptoms, methods to duplicate problem, frequency of failure, etc.
2. Packing: Return equipment in original box or in proper packing so that damage will not occur while in transit. Static sensitive equipment such as a circuit board should be in an anti-static bag, sandwiched between foam and individually boxed. All equipment should be wrapped to avoid packing material lodging in or sticking to the equipment. Include ALL parts of the equipment. C.O.D. or freight collect shipments cannot be accepted. Ship cartons prepaid to: **Viking Electronics, 1531 Industrial Street, Hudson, WI 54016**
3. Return shipping address: Be sure to include your return shipping address inside the box. We cannot ship to a PO Box.
4. RA number on carton: In large printing, write the R.A. number on the outside of each carton being returned.

### RETURNING PRODUCT FOR EXCHANGE

The following procedure is for equipment that has failed out-of-box (within 10 days of purchase):

1. Customer must contact Viking's Technical Support at 715-386-8666 to determine possible causes for the problem. The customer MUST be able to step through recommended tests for diagnosis.
2. If the Technical Support Product Specialist determines that the equipment is defective based on the customer's input and troubleshooting, a Return Authorization (R.A.) number will be issued. This number is valid for fourteen (14) calendar days from the date of issue.
3. After obtaining the R.A. number, return the approved equipment to your distributor, referencing the R.A. number. Your distributor will then replace the product over the counter at no charge. The distributor will then return the product to Viking using the same R.A. number.
4. The distributor will NOT exchange this product without first obtaining the R.A. number from you. If you haven't followed the steps listed in 1, 2 and 3, be aware that you will have to pay a restocking charge.

### LIMITED WARRANTY

Viking warrants its products to be free from defects in the workmanship or materials, under normal use and service, for a period of one year from the date of purchase from any authorized Viking distributor or 18 months from the date manufactured, whichever ever is greater. If at any time during the warranty period, the product is deemed defective or malfunctions, return the product to Viking Electronics, Inc., 1531 Industrial Street, Hudson, WI., 54016. Customer must contact Viking's Technical Support Department at 715-386-8666 to obtain a Return Authorization (R.A.) number.

This warranty does not cover any damage to the product due to lightning, over voltage, under voltage, accident, misuse, abuse, negligence or any damage caused by use of the product by the purchaser or others.

**NO OTHER WARRANTIES.** VIKING MAKES NO WARRANTIES RELATING TO ITS PRODUCTS OTHER THAN AS DESCRIBED ABOVE AND DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

**EXCLUSION OF CONSEQUENTIAL DAMAGES.** VIKING SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE TO PURCHASER, OR ANY OTHER PARTY, FOR CONSEQUENTIAL, INCIDENTAL, SPECIAL OR EXEMPLARY DAMAGES ARISING OUT OF OR RELATED TO THE SALE OR USE OF THE PRODUCT SOLD HEREUNDER.

**EXCLUSIVE REMEDY AND LIMITATION OF LIABILITY.** WHETHER IN AN ACTION BASED ON CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR ANY OTHER LEGAL THEORY, ANY LIABILITY OF VIKING SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT, OR AT VIKING'S OPTION, REFUND OF THE PURCHASE PRICE AS THE EXCLUSIVE REMEDY AND ANY LIABILITY OF VIKING SHALL BE SO LIMITED.

IT IS EXPRESSLY UNDERSTOOD AND AGREED THAT EACH AND EVERY PROVISION OF THIS AGREEMENT WHICH PROVIDES FOR DISCLAIMER OF WARRANTIES, EXCLUSION OF CONSEQUENTIAL DAMAGES, AND EXCLUSIVE REMEDY AND LIMITATION OF LIABILITY, ARE SEVERABLE FROM ANY OTHER PROVISION AND EACH PROVISION IS A SEPARABLE AND INDEPENDENT ELEMENT OF RISK ALLOCATION AND IS INTENDED TO BE ENFORCED AS SUCH.

### FCC REQUIREMENTS

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the side of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ#TXXXX. If requested, this number must be provided to the telephone company.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive REN's on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of the REN's should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total REN's, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ#TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

The plug used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this SQRG-12 does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

If the SQRG-12 causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make

the necessary modifications to maintain uninterrupted service.

If trouble is experienced with the SQRG-12, for repair or warranty information, please contact:

**Viking Electronics, Inc., 1531 Industrial Street, Hudson, WI 54016 (715) 386-8666**

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to Party Line Service is subject to State Tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

#### WHEN PROGRAMMING EMERGENCY NUMBERS AND (OR) MAKING TEST CALLS TO EMERGENCY NUMBERS:

Remain on the line and briefly explain to the dispatcher the reason for the call. Perform such activities in the off-peak hours, such as early morning or late evenings.

It is recommended that the customer install an AC surge arrester in the AC outlet to which this device is connected. This is to avoid damaging the equipment caused by local lightning strikes and other electrical surges.

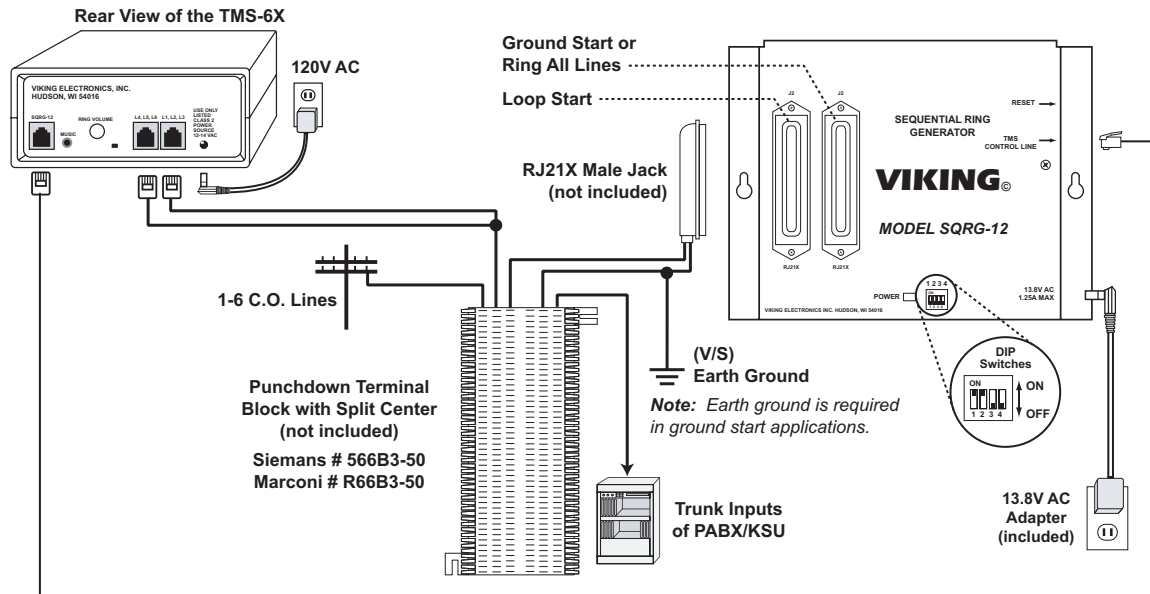
### PART 15 LIMITATIONS

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

# Installation / Applications

## A. Installing the SQRG-12 with the TMS-6X

### 1. Wiring



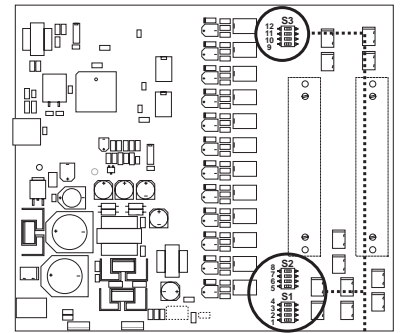
## 2. Wiring Table for the TMS-6X

ROW 1 Loop/Ground Start C.O. Lines	ROW 2 TMS-6X	ROW 3 SQRG-12 Pin, Color	ROW 4 Open	ROW 5 SQRG-12 Pin, Color	ROW 6 Loop/Ground Start C.O. Lines
1T 1R	L1, G L1, R	26, W/BL 1, BL/W		38, BK/G 13, G/BK	1T 1R
2T 2R	L2, BK L2, Y	27, W/O 2, O/W		39, BK/BN 14, BN/BK	2T 2R
3T 3R	L3, W L3, BL	28, W/G 3, G/W		40, BK/S 15, S/BK	3T 3R
4T 4R	L4, G L4, R	29, W/BN 4, BN/W		41, Y/BL 16, BL/Y	4T 4R
5T 5R	L5, BK L5, Y	30, W/S 5, S/W		42, Y/O 17, O/Y	5T 5R
6T 6R	L6, W L6, BL	31, R/BL 6, BL/R		43, Y/G 18, G/Y	6T 6R
* Earth Ground		50, V/S			

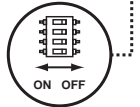
\* Note: Earth Ground is only required in ground start applications.

Notes: If the PABX does not recognize lines on the TMS-6X as busy and call crashing is observed, set up those lines as "incoming only trunks" on the PABX. If those lines must be used for inbound and outbound calls, you must use the special software TMX-PRAL. Contact Viking product support at (715) 386-8666 for more information. Do not install bridging clips on any connections which connect the two halves of the punch down terminal block. Bridge clips should only be installed as a method of bypassing equipment. In order for the SQRG-12 to work properly, the four-wire modular jack must be installed between the TMS CONTROL LINE on the SQRG-12 and the SQRG jack on the TMS-6X or TMS-12A.

Rear View of the SQRG-12

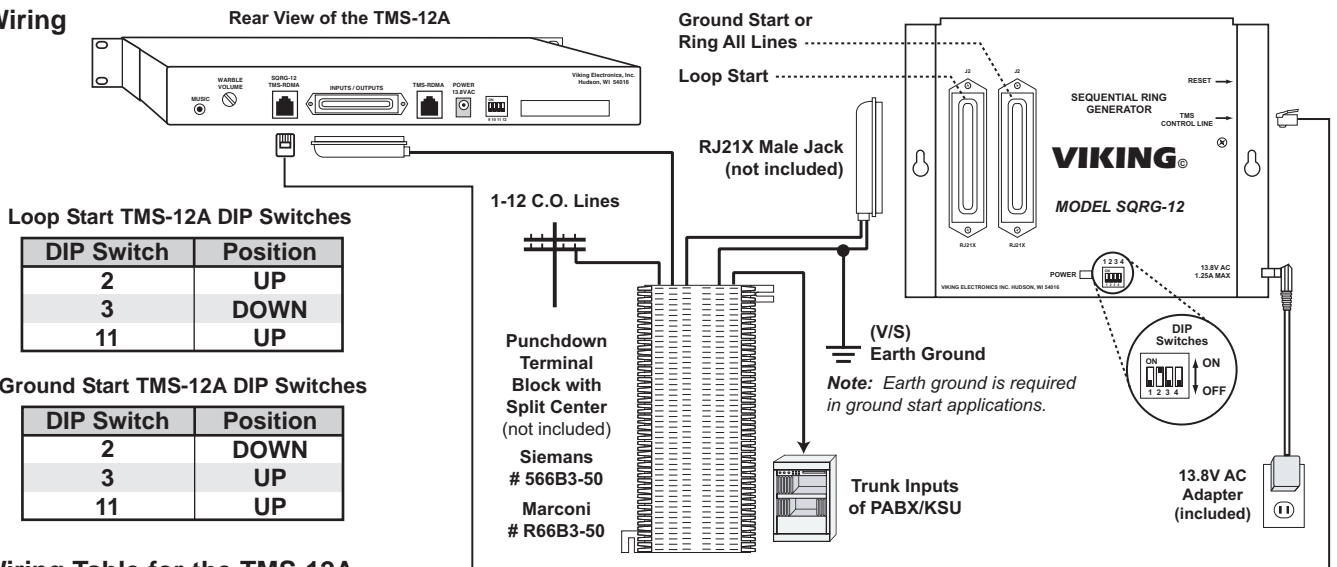


Note: For proper ground start operation, DIP switches 1-12 must be set to OFF as shown above.



## B. Installing the SQRG-12 with the TMS-12A

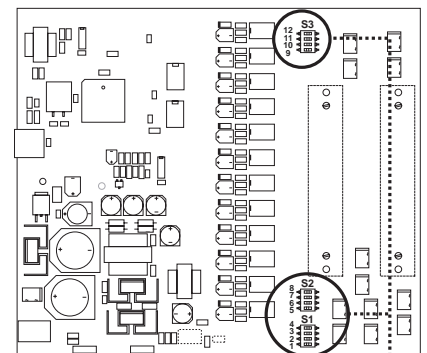
### 1. Wiring



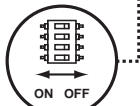
### 2. Wiring Table for the TMS-12A

ROW 1 Loop/Ground Start C.O. Lines	ROW 2 TMS-12A Pin, Color	ROW 3 SQRG-12 Pin, Color	ROW 4 Open	ROW 5 SQRG-12 Pin, Color	ROW 6 Loop/Ground Start C.O. Lines
1T 1R	26, W/BL 1, BL/W	26, W/BL 1, BL/W		38, BK/G 13, G/BK	1T 1R
2T 2R	27, W/O 2, O/W	27, W/O 2, O/W		39, BK/BN 14, BN/BK	2T 2R
3T 3R	28, W/G 3, G/W	28, W/G 3, G/W		40, BK/S 15, S/BK	3T 3R
4T 4R	29, W/BN 4, BN/W	29, W/BN 4, BN/W		41, Y/BL 16, BL/Y	4T 4R
5T 5R	30, W/S 5, S/W	30, W/S 5, S/W		42, Y/O 17, O/Y	5T 5R
6T 6R	31, R/BL 6, BL/R	31, R/BL 6, BL/R		43, Y/G 18, G/Y	6T 6R
7T 7R	32, R/O 7, O/R	32, R/O 7, O/R		44, Y/BN 19, BN/Y	7T 7R
8T 8R	33, R/G 8, G/R	33, R/G 8, G/R		45, Y/S 20, S/Y	8T 8R
9T 9R	34, R/BN 9, BN/R	34, R/BN 9, BN/R		46, V/BL 21, BL/V	9T 9R
10T 10R	35, R/S 10, S/R	35, R/S 10, S/R		47, V/O 22, O/V	10T 10R
11T 11R	36, BK/BL 11, BL/BK	36, BK/BL 11, BL/BK		48, V/G 23, G/V	11T 11R
12T 12R	37, BK/O 12, O/BK	37, BK/O 12, O/BK		49, V/BN 24, BN/V	12T 12R
* Earth Ground	44, Y/BN	50, V/S			

Rear View of the SQRG-12



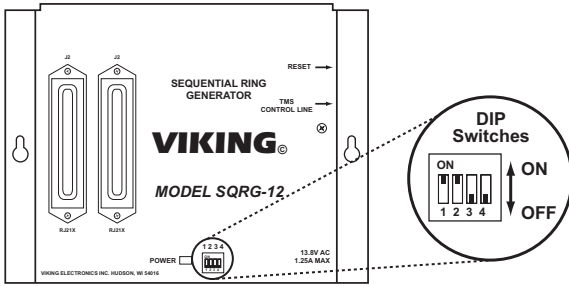
Note: For proper ground start operation, DIP switches 1-12 must be set to OFF as shown above.



\* Note: Earth Ground is only required in ground start or master / slave applications.

*Notes: If the PABX does not recognize lines on the TMS-12A as busy and call crashing is observed, set up those lines as "incoming only trunks" on the PABX. If those lines must be used for inbound and outbound calls, set DIP switch 3 to on and switch 2 to off, on the TMS-12A. Do not install bridging clips on any connections which connect the two halves of the punch down terminal block. Bridge clips should only be installed as a method of bypassing equipment. In order for the SQRG-12 to work properly, the four-wire modular jack must be installed between the TMS CONTROL LINE on the SQRG-12 and the SQRG jack on the TMS-12A.*

## Programming



Switch	Position	Description
1	ON	Receive line status data from the TMS-6X
1	OFF	Receive line status data from the TMS-12A
2	ON	Ring cadence: 1 sec on, 3 sec off
2	OFF	Ring cadence: 2 sec on, 4 sec off
3	OFF	Unused (Leave in OFF position)
4	OFF	Unused (Leave in OFF position)

## Operation

The **SQRG-12** is a sequential ring generator option for use with the **TMS-6X** and **TMS-12A**. The **SQRG-12** will re-ring lines for the KSU/PABX based on line status information from the **TMS-6X** or **TMS-12A**.

The **SQRG-12** is designed for applications where more than one person answers incoming calls, or in locations where the **TMS-6X** or **TMS-12A** front panel display is not visible. The **SQRG-12** eliminates confusion about which line to answer next by only ringing the oldest call to the key system or PABX.

In some applications, it is desirable to have the **SQRG-12** re-ring all calls that are ringing or holding within the call sequencer. This is required in many PABX applications and some key system applications to prevent call crashing (glare) problems when the C.O. lines connected to the **TMS-6X** or **TMS-12A** are also used for outgoing calls by the PABX or KSU. The **SQRG-12** is capable of this mode of operation when DIP switch 3 on the **TMS-12A** is in the on position, or the **TMS-6X** has special software "TMX-PRAL" installed.

### A. SQRG-12 Operation when Ringing Calls in Sequence

When the **SQRG-12** is used with loop start C.O. lines, and you want the calls to ring through to the telephones in sequence (one at a time), use J2 to block C.O. ringing from passing to the PABX or KSU. As a call rings in, the **TMS-6X** or **TMS-12A** detects the ringing, and tells the **SQRG-12** to ring that line through to the PABX or KSU (only if this line is the oldest call). If a live operator does not answer, the **TMS-6X** or **TMS-12A** will answer the call, play the message and put the caller on hold, while continuously commanding the **SQRG-12** to re-ring that line into your system. As new calls ring in on other lines, the **SQRG-12** blocks these calls from ringing through to the PABX or KSU until they have become the oldest call. Once an operator answers the oldest ringing call, the **TMS-6X** or **TMS-12A** will begin ringing the next oldest call through to the PABX or KSU. This process of ringing calls through one at a time will continue until the operators have answered all holding or ringing calls.

### B. SQRG-12 Operation when Ringing All Calls

When the **SQRG-12** is used with either loop or ground start C.O. lines, and you want all holding or ringing calls re-rung through to the telephones, use J1 to pass tip ground (for ground start trunks), and ringing through to the PABX or KSU. Note internal DIP switches 1 through 12 must be set to OFF anytime you use the J1 jack. The J1 jack is a straight through jack, so in the idle state, the C.O. tip and ring are passed straight through to the PABX or KSU. When the **TMS-6X** or **TMS-12A** recognize that there is an incoming call on a line, the call sequencer commands the **SQRG-12** to re-ring that line along with any other lines that are ringing or holding. While the **SQRG-12** is ringing a given line position of the PABX or KSU, the **SQRG-12** constantly maintains a grounded tip condition (for ground start lines), supplies -48V DC battery on the ring side of the phone line and superimposes its high voltage ringing on this -48V DC. This is purposely part of the **SQRG-12** design to give the ground trunk card in the PABX or KSU the impression that the line is a ringing line that has never been answered, even though the **TMS-6X** or **TMS-12A** may be holding a call on that line. All calls will continue to ring through to the PABX or KSU until the call is answered by a live operator, or the caller hangs up (abandons).

Although the J1 jack was designed for ground start C.O. lines, it also works properly for loop start C.O. lines when using the "ring all lines" mode.



**Product Support Line...715.386.8666**

**Fax Back Line...715.386.4345**

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