

## Technical Practice

Issue 4, October, 1990

# MODEL 610 BRIDGED RINGING INTERFACE

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### 1. General Description

**1.1 PRACTICE** Issue 4 is released due to several changes in the unit. The internal circuitry has been simplified. An external source of  $-48\text{Vdc}$  is no longer required. The connection procedure has changed slightly. This practice applies to Model 610s with serial number 610-0040 or greater. Although earlier versions performed the same function, they are not pin-for-pin compatible. Refer to Section 2.2 of this technical practice for details.

**1.2 PRODUCT OVERVIEW** The Model 610 Bridged Ringing Interface is designed to allow bridged ringing operation of station telephone sets or other terminal devices associated with the Gordon Kapes, Inc. System 605 DID Power Failure Transfer System.

**1.3 POWER REQUIREMENTS** The Model 610 requires an external source of 20/30Hz ringing voltage for operation. This ringing source must be active whenever the associated System 605 is operating in the Power Failure Transfer (PFT) mode.

**1.4 NUMBER OF CIRCUITS** Each Model 610 provides bridged ringing interfacing for up to 16 circuits of DID PFT.

**1.5 PHYSICAL DESCRIPTION** The Model 610 consists of a precision fabricated printed circuit board and an injection molded base and cover. The thermoplastic material used for the housing conforms to industry recognized flame retardant standards. The 610 measures 8.75 inches (22.0cm) square, 3.25 inches (8.2cm) deep, and weighs 1.5 pounds (0.68kg). The unit wall mounts with four #8 screws.

### 2. Applications and Limitations

**2.1 PRIMARY APPLICATION** The only intended application for the Model 610 is to provide bridged ringing of station telephone sets or other terminal devices associated with the System 605 DID Power Failure Transfer System. The System 605, when configured with 602 Full PFT Cards, connects DID trunks to dedicated station telephones in the event of a power failure or PBX system malfunction. In the standard System 605 installation configuration, two pairs of wires are connected to the

station telephone. The first pair is the talk path (along with  $-48\text{Vdc}$  talk battery). The second pair carries a low voltage (nominally 12Vdc) buzzer signal. Buzzers, mounted inside the station telephones, alert users of incoming calls.

In certain applications, bridged ringing of the station telephones or terminal devices is required. Bridged ringing consists of a nominal 90Vac, 20/30Hz signal superimposed upon the pair of wires carrying the talk battery and voice signals. A bridged ringing application could be where System 605 station ports are terminated in an electronic key or PBX telephone system. This type of system requires bridged ringing to recognize that a call is coming in. The Model 610 allows the System 605 buzzer signal to control a source of ringing signal, allowing the correct signaling of equipment that requires bridged ringing.

**2.2 COMPATIBILITY** This practice applies to Model 610s with serial number 610-0040 or greater. Although earlier versions performed the same function, they are not pin-for-pin compatible with this "new" version. A new Model 610 cannot be directly installed in place of an older unit. The difference is strictly related to the connection of power. The other connections remain the same. In the older version,  $-48\text{Vdc}$  and ground were connected to the last pair of plug P1; and ringing voltage was connected to the last pair of plug P2. In the new version  $-48\text{Vdc}$  and ground are no longer required. So as not to require both plugs be terminated in cases where only the first eight circuits are utilized, the ringing voltage is now connected to the last pair of plug P1. In this way, a site requiring only the first eight Model 610 circuits will only require one 25-pair connector. Contact Gordon Kapes, Inc. for detailed technical information.

**2.3 LIMITATIONS** As an external device, the Model 610 is not able to provide "perfect" bridged ringing. A high sensitivity relay, powered by the System 605 buzzer leads, is used to switch the station telephone or other terminal device away from the System 605's STA connection and to a ringing voltage source. When an incoming call occurs, the buzzer lead cycles through an on and off sequence until an off-hook condition is

detected. Off-hook is detected by loop current flowing through the System 605's STA leads. With the System 610 installed, the System 605's STA leads are disconnected during the on portion of a ring cycle. (Remember: the ringing generator is connected in place of the STA connection.) This makes off-hook detection impossible during the on portion of the ringing cycle. Once the on portion is over and the System 605's STA connection is again connected to the station telephone, off-hook detection again is possible. A potential problem can occur when the station telephone goes off-hook during the on portion of the ringing cycle. The on portion of the ringing cycle must complete before the System 605 can detect off-hook and prevent further ringing. A user picking up a station telephone just after the start of the on portion of the ringing cycle would hear a short burst of low frequency ringing voltage before being connected to the calling party. In most cases this would not pose a problem.

### 3. Installation

**3.1 WORDS OF CAUTION** As with any product, installing the Model 610 requires a safety first approach.

**Warning:** Never install telephone wiring during a lightning storm. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines.

**3.2 CHECKING FOR DAMAGE** The Model 610 should be inspected for damage immediately upon receipt. A claim should be filed with the shipper if damage is found. A replacement should be ordered if necessary.

**3.3 INSTALLATION KIT** Included in each Model 610 shipping carton is an installation kit. Each kit contains four #8 pan head screws and two nylon cable ties.

**3.4 THE COVER** The cover is secured via two clamp screws located on the top and bottom of the cover. Remove the cover at this time.

**3.5 MOUNTING** The Model 610 wall mounts using four #8 screws appropriate for the wall material. Four #8 pan head screws are contained in the installation kit; use these if suitable.

**3.6 610 CONNECTIONS** All connections to the Model 610 are made via 25-pair plugs P1 and P2. The installer must provide two 25-pair cable mounted connectors (female) to mate with P1 and P2. Figure 1, located at the end of this practice, gives detailed connection information. Refer to this figure when reading the installation procedures.

**3.7 INSTALLING AND TERMINATING THE 25-PAIR CONNECTORS** Install the 25-pair cable mounted connectors into plugs P1 and P2. Secure them using the fastener straps that are attached to the plugs. Terminate the cables (e.g., in a "66" type block). Use the cable ties, provided in the installation kit, to secure the 25-pair cables to the mounting points molded into the 610's base. Note: if you are not going to interface with more than the first eight circuits of the Model 610, only mating with P1 is required.

**3.8 RINGING VOLTAGE SOURCE** The Model 610 requires a continuous (non-interrupted) source of 20/30Hz ringing voltage. This source must be active when the System 605 is in the PFT mode, as would happen during a power failure or PBX system malfunction. The output power and frequency of

the ringing voltage source are determined by examining the type and number of station telephones or selected terminal devices (e.g., electronic key telephone CO line position) that will be connected to the Model 610. The power requirement is determined by summing the ringer equivalence numbers of all the station devices. An example would be connecting all 16 circuits of the Model 610 to CO line positions on an electronic key telephone system with a ringer equivalence of 0.3. Using the assumption that a ringer equivalence of 1.0 requires one watt of ringing power, our example would require 4.8 watts of ringing power. In most cases, 10 watts of ringing voltage are more than sufficient.

**3.9 CONNECTING THE RINGING VOLTAGE SOURCE** The ringing voltage source is connected to the Violet-Slate pair of plug P1. Ensure that ringing voltage will be present whenever the System 605 is in the power failure transfer mode.

**3.10 CONNECTING THE CIRCUITS** The following procedure should be followed for each Model 610 circuit. Each 610 circuit has three connections associated with it. Two connections are made to the associated System 605 Full PFT circuit; the third connects to the station telephone or other terminal device. The circuit numbers on the Model 610 are for reference only and are not intended to match the circuit numbers on the System 605. Up to sixteen full PFT circuits can be converted to bridged ringing; use only as many circuits as required. The Model 610's 605 STA Connection is cross-connected to the System 605's STA connection. The Model 610's 605 Buzzer Connection cross-connects to the System 605's + and - buzzer connections. Be careful to maintain correct polarity or the circuit will not function. The station telephone is connected to the Model 610's Station Telephone connection.

**3.11 TESTING** After the Model 610 is installed, the station telephones or selected terminal devices must be tested to ensure correct operation. Use the System 605 buzzer test mode to simultaneously check all Model 610 circuits that are installed. Refer to the System 605 Technical Practice for further information on testing.

### 4. Circuit Description

**4.1 GENERAL** The Model 610 contains 16 identical circuits, one of which is described as follows.

**4.2 RELAY** A two, form-C (DPDT) relay is used to select if the station telephone or other terminal device is connected to the System 605 STA connection or to ringing voltage.

**4.3 IDLE STATE** In the idle state, the relay is non-energized and the System 605 STA connection is connected to the station telephone.

**4.4 INCOMING CALL STATE** When the System 605 is in the PFT mode and a 602 Full PFT circuit is seized by the Central Office (CO), the buzzer leads associated with that PFT circuit begin the ringing cycle. The buzzer drive signal is nominally 12Vdc, and is current limited to approximately 20mA. This signal is used to directly drive the 610's ringing relay. During the active portion of the ringing cycle the System 605 STA connection is disconnected and the ringing voltage is directly connected to the station telephone.

**4.5 RINGING VOLTAGE** The incoming ringing voltage is connected in parallel to all 16 pairs of normally open relay contacts. No current limiting is provided in the circuitry. A shorted station telephone cable pair will short the ringing voltage source whenever its associated relay is energized.

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## 5. Specifications

### COMPATIBILITY

Intended for use only with 602 Full PFT Cards installed in a Gordon Kapes, Inc. System 605 DID Power Failure Transfer System

### NUMBER OF CIRCUITS

16

### POWER REQUIREMENT

90Vac (nominal), 20/30Hz ringing voltage, continuous (non-interrupted), wattage required is determined by load

### ENVIRONMENT

0 to 50 degrees C, humidity to 95% (no condensation)

### FCC REGISTRATION

The Model 610 is not intended for connection with the public switched telephone network. As such, FCC registration is not required.

### RADIATED NOISE COMPLIANCE

Contains no circuitry subject to EMI regulations

### RELIABILITY

MTBF 28 years, per Method I of Bellcore TS-TSY-000332, Issue 2, July 1988

### INTERCONNECTIONS

The 610 contains two 25-pair plugs. Installer must supply two 25-pair cable mounted connectors (female)

### DIMENSIONS

8.75 inches high (22.0cm)

8.75 inches wide (22.0cm)

3.25 inches deep (8.2cm)

### WEIGHT

Less than 1.5 pounds (0.68kg)

### MOUNTING

Four #8 pan head screws of the type appropriate for the wall material

## 6. Incorrect Operation

**6.1 REVIEW PRACTICE** Should problems arise in the operation of the Model 610, please review Section 3 - Installation of this practice. Ensure that all connections have been made properly.

**6.2 BUZZER SIGNALS FROM THE SYSTEM 605** Ensure that the buzzer signal from the correct Full PFT circuit is connected to the correct Model 610 Buzzer connection. 10 to 20mA of current should flow through the buzzer leads during the "on" portion of a ringing cycle. The Model 610's "605 Buzzer Connection" is polarity sensitive—"+" must be connected to "+"!

## 7. Repair and Replacement

**7.1 NOT SO FAST** Statistically, most equipment returned to Gordon Kapes, Inc. for repair actually has nothing wrong with it. A telephone call to Gordon Kapes, Inc. technical support can often help to get the equipment operating correctly. We don't mind spending time with our customers getting a site up and running.

**7.2 SEND IT BACK** If you do determine that the Model 610 is defective, return it for repair or replacement according to the Gordon Kapes, Inc. Warranty/Repair and Return policy.

**7.3 ONLY WE FIX IT** In the event repairs are ever needed on your Model 610, they should be performed by Gordon Kapes, Inc. or our authorized representative. For further information, contact Gordon Kapes, Inc.

Specifications and information contained in this technical practice subject to change without notice.

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www.gkinc.com  
support@gkinc.com

**Figure 1. Plugs P1 and P2 Connection Diagram**

Plug Pin	Wire Color	Description	Plug P1	Plug P2
26	WHT-BLU	T 605 STA Connection	Circuit 1	Circuit 9
1	BLU-WHT	R		
27	WHT-ORN	T Station Telephone		
2	ORN-WHT	R	Circuit 2	Circuit 10
28	WHT-GRN	+ 605 Buzzer Connection		
3	GRN-WHT	-		
29	WHT-BRN	T 605 STA Connection	Circuit 3	Circuit 11
4	BRN-WHT	R		
30	WHT-SLT	T Station Telephone		
5	SLT-WHT	R	Circuit 4	Circuit 12
31	RED-BLU	+ 605 Buzzer Connection		
6	BLU-RED	-		
32	RED-ORN	T 605 STA Connection	Circuit 5	Circuit 13
7	ORN-RED	R		
33	RED-GRN	T Station Telephone		
8	GRN-RED	R	Circuit 6	Circuit 14
34	RED-BRN	+ 605 Buzzer Connection		
9	BRN-RED	-		
35	RED-SLT	T 605 STA Connection	Circuit 7	Circuit 15
10	SLT-RED	R		
36	BLK-BLU	T Station Telephone		
11	BLU-BLK	R	Circuit 8	Circuit 16
37	BLK-ORN	+ 605 Buzzer Connection		
12	ORN-BLK	-		
38	BLK-GRN	T 605 STA Connection	Circuit 9	Circuit 17
13	GRN-BLK	R		
39	BLK-BRN	T Station Telephone		
14	BRN-BLK	R	Circuit 10	Circuit 18
40	BLK-SLT	+ 605 Buzzer Connection		
15	SLT-BLK	-		
41	YEL-BLU	T 605 STA Connection	Circuit 11	Circuit 19
16	BLU-YEL	R		
42	YEL-ORN	T Station Telephone		
17	ORN-YEL	R	Circuit 12	Circuit 20
43	YEL-GRN	+ 605 Buzzer Connection		
18	GRN-YEL	-		
44	YEL-BRN	T 605 STA Connection	Circuit 13	Circuit 21
19	BRN-YEL	R		
45	YEL-SLT	T Station Telephone		
20	SLT-YEL	R	Circuit 14	Circuit 22
46	VIO-BLU	+ 605 Buzzer Connection		
21	BLU-VIO	-		
47	VIO-ORN	T 605 STA Connection	Circuit 15	Circuit 23
22	ORN-VIO	R		
48	VIO-GRN	T Station Telephone		
23	GRN-VIO	R	Circuit 16	Circuit 24
49	VIO-BRN	+ 605 Buzzer Connection		
24	BRN-VIO	-		
50	VIO-SLT	Ring Generator Voltage Source	90Vac	Spare
25	SLT-VIO		AC Common	

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 support@gkinc.com