

406 Ringdown Signaling Circuit Module

CONTENTS	PAGE
1. GENERAL	1
2. SPECIFICATIONS	2
3. INSPECTION	2
4. MOUNTING	2
5. INSTALLER CONNECTIONS	3
6. CIRCUIT DESCRIPTION	3
7. TESTING	4

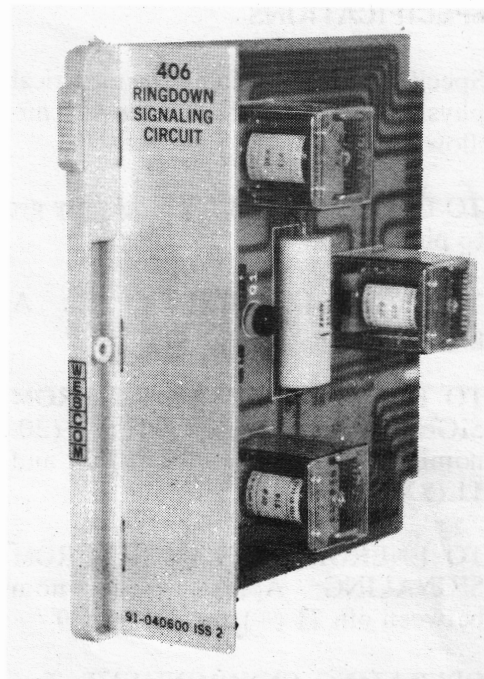


Figure 1. 406 Ringdown Signaling Circuit Module

1. GENERAL

1.01 This Section provides circuit description, installation, and basic testing information for the Wescom 406 Ringdown Signaling Circuit Module.

1.02 The 406 Module (Figure 1) is a plug-in, printed-circuit module which responds to AC or polarized 48Vdc ringing signals, received via the simplex leads of the Wescom 401 Line Amplifier or other line terminating device, by producing audible or visual signals to indicate an incoming call. The 406 module, used with the Wescom 850 or 851 Ringing Generators, also provides outgoing signaling over the line.

1.03 Features provided by the 406 module are:

(a) Transistorized circuitry and other state-of-the-art components, used wherever possible to reduce space requirements, power consumption, and maintenance, while increasing reliability.

(b) The plug-in module concept, to allow use of the substitution approach to assure rapid service of the equipment with minimum down-time.

(c) The total capability concept, to provide for mounting the 406 Ringdown Signaling Circuit Module in the same shelf with any of the 400 type equipment.

1.04 The 406 module is constructed as a plug-in module designed to mount in one position of the Wescom Type 400 Mounting Assembly. Type 400 Mounting Assemblies are available in capacities of from 1 to 13 modules and allow for either KTU apparatus-case or relay-rack mounting.

1.05 The 406 module makes electrical connection to the system through one of the 56-pin, wire-wrap connectors provided as part of

the mounting assembly. Each connector is mechanically keyed to prevent the 406 from being inserted into any position other than the proper mounting assembly position.

2. SPECIFICATIONS

2.01 Specifications describing the electrical and physical characteristics of the 406 module are as follows:

- (a) TO ENERGIZE RELAY R: Apply ground to pin 5.
- (b) TO ENERGIZE RELAY RL: Apply ground to pin 53.
- (c) TO ENERGIZE RELAY RU FROM AC SIGNALING: Apply 90Vac (20-Hz), nominal, between pin 13 (SXT) and pin 11 (SXR)
- (d) TO ENERGIZE RELAY RU FROM DC SIGNALING: Apply 48Vdc, nominal, between pin 21 (-) and pin 13 (+)
- (e) OPERATING ENVIRONMENT: Temperature, 35 to 120°F; Humidity, 10 to 100% (no condensation).
- (f) POWER REQUIREMENTS: -24 Vdc, nominal (-21 to -28 volt limits) at 70 mA, maximum.
- (g) WEIGHT: 0.56 lbs.
- (h) DIMENSIONS: Height, 7 inches; Width, 1-13/16 inches; Depth, 7-3/8 inches (including one-module mounting assembly).

3. INSPECTION

3.01 Inspect the equipment thoroughly and as soon as possible after delivery. If any part of the equipment has been damaged in transit, report the extent of damage to the transportation company immediately. If the equipment is to be stored for some time before installation, an operational check should be made at once. The

purpose of this check is to make sure that the equipment is in proper working order as received from the factory. Should this check indicate satisfactory performance, the equipment may be stored for future installation. If the System is to be installed at once, an operational check is made after the installation is completed.

3.02 Wescom equipment is specifically identified by the model number and final-assembly number silk screened on the front panel of the plug-in module. At the start of production, the final-assembly number is assigned an issue number of 1 which becomes an integral part of the final-assembly number. After the start of production, this issue number is advanced each time a major engineering change occurs. Therefore, be sure to use the model number and final-assembly number when making inquiries about the equipment. The issue number of the instruction manual and schematic diagram attached should be the same as the issue number assigned to the equipment. If a one-to-one correspondence does not exist between these items request from Wescom the instruction manual required for your equipment.

4. MOUNTING

4.01 The 406 module is designed to mount in a Type 400-1 (one-module) Mounting Assembly. Type 400 Mounting Assemblies are available in capacities of from 1 to 13 modules and may be factory-wired and equipped with any combination of modules from the Wescom product line.

4.02 Type 400-1 (one-module) through 400-9 (nine-module) Mounting Assemblies may be mounted either in a 15A (equivalent to W.E.Co. 31B) or 16C, KTU apparatus case or, when installed with mounting bars, on a 19- or 23-inch relay rack. Type 400-10 (ten-module) and 400-11 (eleven-module) and 400-13 (thirteen-module) Mounting Assemblies are also provided with mounting brackets for 23-inch relay rack mounting.

4.03 Because Type 400-1 through 400-9 Mounting Assemblies must be installed with mounting bars, 7 inches of vertical space

(four-mounting spaces) are required for relay-rack mounting. Type 400-10 through 400-13 Mounting Assemblies, however, are provided with mounting brackets located on the sides of the mounting assemblies and require only 6 inches of vertical rack space. Install the mounting assembly in a KTU apparatus case or on a relay rack as described above with the mounting hardware provided.

5. INSTALLER CONNECTIONS

5.01 The 406 module makes electrical connection to the associated equipment through a 56-pin, wire-wrap card connector provided as part of the mounting assembly; all installer connections are made to this connector. Make the connections in accordance with Table 1.

Table 1. 406 Module Installer Connections

SCHEMATIC DESIGNATION	56-PIN CONNECTOR ASSIGNMENT	APPLICATION INSTRUCTION
SXT	13	Connect to simplex tip lead or 2 wire tip.
SXR	11	Connect to simplex ring lead or 2 wire ring.
F,F,	17,21	To condition module to receive dc simplex ringing signals, add a jumper between pins 17 and 21.
L	47	Connect to signal lamp on station set.
LB	49	Connect to battery supply for signal lamp.
LF	41	Connect to lamp flashing voltage from Time Out and Flash module.
HA	37	Connect to Time Out and Flash module to start time out, flasher and ring interrupt circuitry.
B	31	Connect to ground to provide latching circuit for relay RU.
SG2	25	Connect to ring generator output.
±105V, -48V	9	For dc signaling to distant station connect to -48V battery supply. For AC signaling connect this lead to the ring generator.
SG1	27	For continuous ringing, connect this lead to the bell on the station set. For interrupted ringing, connect this lead through the Time Out and Flash module to the bell on the station set.

LK	55	For automatic release after time out, connect this lead to the Time Out and Flash module. When the time out feature is not provided, connect this lead to the -24V battery supply.
S	5	To provide for signaling the distant station, connect this lead through a normally open contact set on the associated pickup relay and through the signal key on the station set to ground.
RL	53	To provide ring release when the station set goes off-hook, connect this lead through a normally open contact set on the associated pickup relay to ground.
CO	51	Lead provided to permit the use of the 406 module with the W.E. Co. 30A KTU or equivalent time out circuit.
GRD	33	Connect to system ground.
-24V	1	Connect to -24V supply battery.

CAUTION: Do not make any connections with power applied to the equipment or modules installed in the mounting assembly.

6. CIRCUIT DESCRIPTION

6.01 The 406 Module is used to receive simplex ringing signals and convert them to a relay contact closure to operate audible or visual signals indicating an incoming call. The 406 module also provides relay switching to transmit AC signaling over the same simplex circuit.

Refer to the attached 406 schematic diagram and to the 406 Module Typical Application drawing (Figure 2) during the following discussion.

idle circuit condition

6.02 During the idle condition, all relays are de-energized and transistor Q1 is turned off.

circuit operation

6.03 Simplex signaling leads, derived from the 4-wire line enter the 406 module on connector pins 13 (tip) and 11 (ring). The simplex tip-lead connects to ground through

transfer contact set 2 (relay R) and resistor R3. The simplex ring-lead connects to the base of transistor Q1 through transfer contact set 5 (relay R), dc blocking capacitor C1, resistor R2, diode CR1 and resistor R4.

6.04 A circuit comprised of C1, R2, CR1, CR2, C2 and R4 provides dc isolation, limiting, rectification filtering to incoming 20 Hz ringing signals received over the simplex leads from the 4-wire line. R2 and C2 provide a delay of approximately 80-ms, to prevent transients from operating relay RU. Ringing signals result in a negative voltage across C2, which turns on transistor Q1 to energize relay RU. When energized, relay RU provides a contact closure to operate the audible or visual indicator of an incoming call. Relay RU latches (remains energized) if a ground is provided on pin 31 (B), and remains latched until this ground is removed or the LK lead (pin 55) is opened.

6.05 The 406 module is arranged for dc signaling by connecting pin 9 to the -48V battery in place of the ring generator and by placing a jumper from pin 17 to pin 21 to conduct the dc ringing signal around the dc

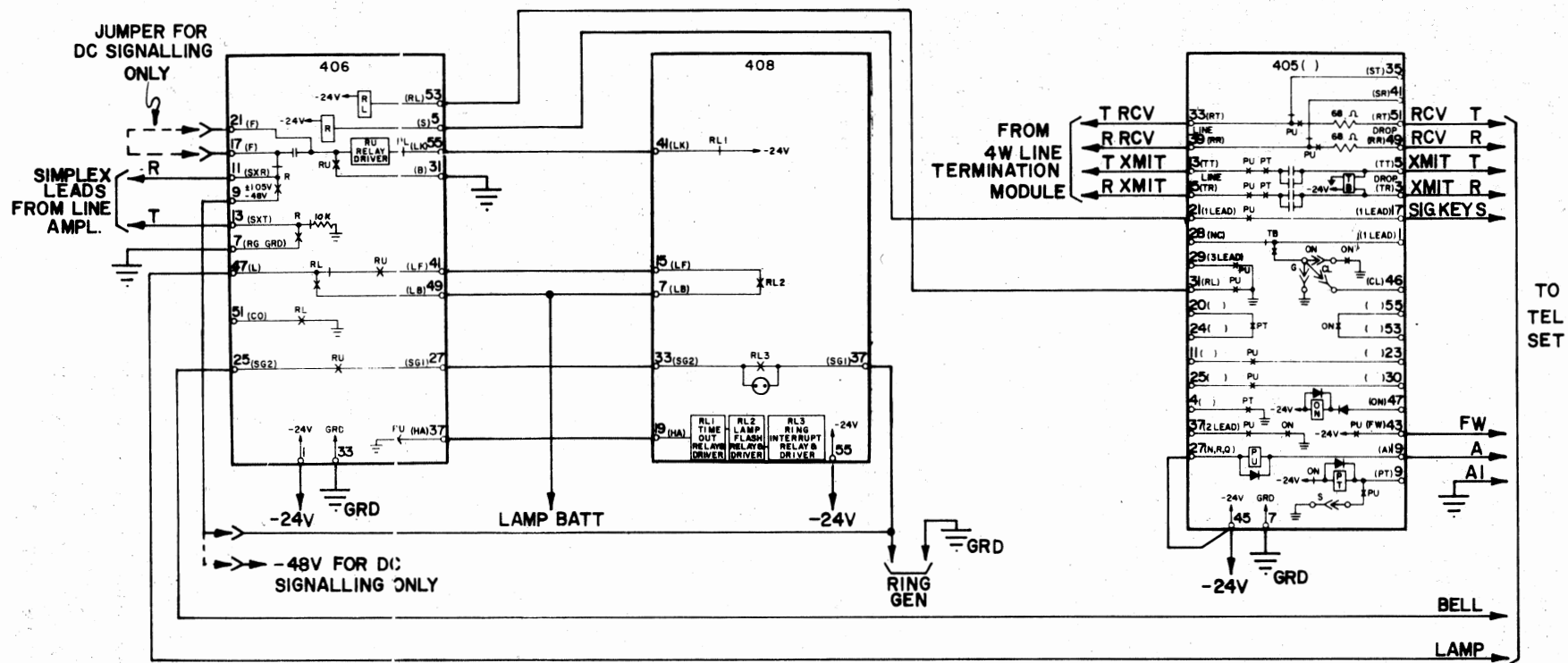


Figure 2. 406 Module Typical Application

blocking capacitor C1. Ringing signals, received on the simplex ring lead (pin 11) are conducted through contact set 5 (NC) on relay R to pin 17. Pin 17 is jumpered to pin 21 to route the dc ringing signal through R2, CR1 and R4 to the base of Q1. Transistor Q1 turns on, energizing relay RU, which operates the audible or visual indicator.

6.06 Locally generated ringing voltage is applied to connector pin 7 (ground) and pin 9 (battery or ringing generator). When ringing is transmitted by the local station, a ground, provided by depressing the signal key, enters pin 5 and energizes relay R. Relay R, energized, provides contact closures which connect the locally generated ringing voltage to the simplex leads for transmission to the distant terminal.

7. TESTING

7.01 If trouble is encountered with the operation of the 406 module verify that all installer connections (Table 1 and Figure 2) have been properly made. Make certain that the 406 module is making good connection with the mounting-assembly card connector; snap the module out and in several times. If the trouble persists, perform the following test procedure to determine whether the fault exists within the 406 module or in the external circuitry.

equipment required

- (1) Multimeter: Simpson 260 or equivalent.
- (2) Miscellaneous test leads.

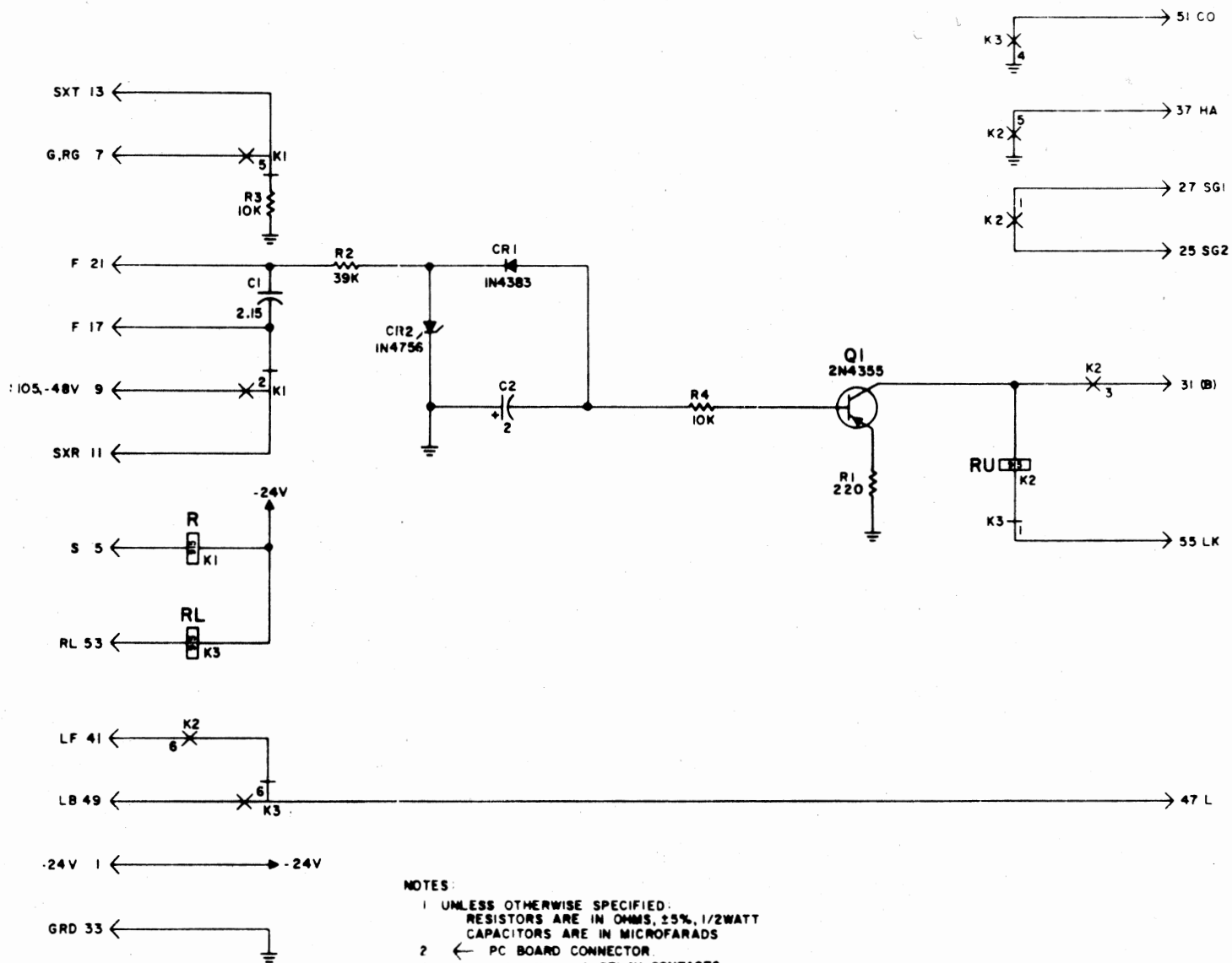
test procedure

- (1) Set the multimeter to the 50 Vdc range and connect the positive lead to connector pin 33 and the negative lead to pin 1. Apply power: the Multimeter should indicate 24 ± 3 Vdc.
- (2) Determine that the local station set is on-hook. Remove the negative Multimeter lead from pin 1 and reconnect it to pin 51. Remove any other leads which may be connected to pin 51. Set the Multimeter to the RX1 ohms scale: the meter should indicate infinity (open circuit). Temporarily ground pin 53: the meter should indicate 0-ohms (closed circuit).

- (3) Remove the temporary ground placed on pin 53 in step 2. Remove the simplex tip lead from pin 13. Reconnect the Multimeter leads to pins 7 and 13: the Multimeter should read 10K ohms or greater. Temporarily ground pin 5: the Multimeter should indicate 0-ohms (closed circuit).
- (4) Remove the temporary ground placed on pin 5 in step 3. Set the Multimeter to the 250 Vac scale and connect one lead to pin 33 and the other lead to pin 25. The meter should indicate the local ring generator voltage, approximately 105 volts.
- (5) Remove the meter lead from pin 25 and connect it to pin 27: meter should indicate 0-volts. Remove any connections made to pin 31. Temporarily connect pin 55 to the -24V battery supply. If the 406 module is conditioned to receive dc signaling, momentarily connect pin 17 to the -48 V battery supply. If the unit is conditioned to receive 20 Hz signaling, momentarily connect pin 17 to the output of the ring generator (pin 25). The Multimeter should indicate the ring generator voltage (approximately 105V) and return to an indication of 0-volts when the test lead to pin 17 is removed.

If, after completing the above test procedure, the conditions required in steps 1 and 4 have been met and one or more of the conditions required in steps 2,3 and 5 have not been met, the module can be assumed to be defective and should be returned to Wescom for repair. Disconnect the Multimeter, remove all test leads and restore all installer connections.

7.02 Field repairs involving replacement of components within a module are not recommended. All Wescom systems and component boards are warranted for 1 year from the date of purchase. Return to Wescom, Inc., 501 Rogers Street, Downers Grove, Illinois 60515. For technical assistance, call 312-971-2010 or TWX 910-695-4735.



NOTES:

- 1 UNLESS OTHERWISE SPECIFIED, RESISTORS ARE IN OHMS, 15%, 1/2WATT CAPACITORS ARE IN MICROFARADS
- 2 ← PC BOARD CONNECTOR
- 3 ✕, + NO, NC RELAY CONTACTS.
- 4 WHEN USING DC SIGNALING INCOMING, STRAP PINS 17 AND 21
- 5 WHEN NO TIMEOUT CIRCUIT IS ASSOCIATED, STRAP PINS 1 AND 55.
- 6 WHEN TIMEOUT CIRCUIT IS ASSOCIATED, STRAP PINS 31 AND 33

**SCHEMATIC DIAGRAM
4W 20HZ SIGNAL CIRCUIT**

REV NO. DATE DATE
 1 1971 1971
 2 1971 1971
 3 1971 1971
 4 1971 1971
 5 1971 1971
 6 1971 1971
 7 1971 1971
 8 1971 1971
 9 1971 1971
 10 1971 1971

C	1971	1661-REDRAWN	JSP
B	1967-69	1099	ERK
A	7-7-69	ISS CHG	ERK
REV NO.	DATE	ECO NO.	BY
JSP			
406	ISS 2		
1-13-71			C

WESCOM INC.

SO. ROBERTS
 BOWERS GROVE
 8000

191-040600