WESCOM 414 4-WIRE/4-WAY CONFERENCE BRIDGE CIRCUIT DESCRIPTION, INSTALLATION, AND TESTS

1. GENERAL

1.01 This section is a cover sheet for the Wescom 414 4-Wire/4-Way Conference Bridge instruction, Section 414-101/3. GAEL 1365 authorizes the use of this equipment in Pacific Company.

1.02 It is reissued to:

- Revise the section title.
- Transmit the latest issue of the Wescom instruction.
- Include procedures for ordering Wescom equipment.
- Provide maintenance and repair/return information.

Note: Marginal arrows used to designate changes are omitted.

1.03 The Wescom 414 module provides passive coupling of voice and data circuits via 4-wire/4-way resistive bridge.

1.04 If corrections are required in the manufacturer's instruction, use form E 3973-1PT as described in Section 000-010-901PT to process the correct information.

1.05 If equipment design and/or manufacturing problems should occur, refer to Section 010-700-010PT for procedures on how to file an Engineering Complaint.

1.06 When revised instructions reflect changes due to modification of equipment, retain the superseded information until equipment is modified.

Note: Equipment shall *not* be modified without the approval of the Equipment Maintenance Engineer.

2. MAINTENANCE

2.01 Field repairs that involve replacement of components within this unit are not recommended.

3. ORDERING PROCEDURES

3.01 Order Wescom equipment direct from the manufacturer:

Wescom, Inc.
P.O. Box 1458
Downers Grove, IL 60515

3.02 When ordering Wescom equipment, use the Purchase Order, Form GTP 2, as specified in SI 70, Section 2. Enter Contract No. *ATT 109C* on all orders. Send the blue copy of the Purchase Order as follows:

- For Northern California and Nevada —

  ROPSAC
  221 W. Winton Avenue, Room 140
  Hayward, CA 94544

- For Southern California —

  ROPSAC
  2420 Yates Avenue, Room 210
  Commerce, CA 90040

Note: Additional ordering information is contained in the GTP Catalog.

4. REPAIR/RETURN

4.01 Return defective units to the Plug-In Maintenance Pool for "like-for-like" exchange as specified in SI 60, Section 6, and Section 005-202-919PT. The Supplies Superintendent shall forward defective units to the manufacturer for repair and return.

4.02 This Wescom equipment has a warranty period of 18 months from date of shipment.

Attachment:

Wescom, Inc, Circuit Description/Installation Series, Section 414-101/3, Issue 1, April 1976.

414 4-Wire/4-Way Conference Bridge

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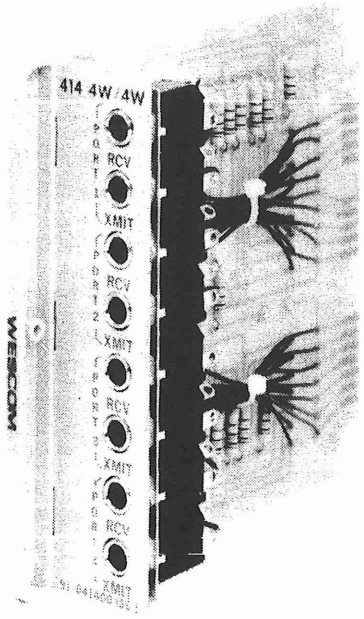

Figure 1. 414 4-Wire/4-Way Conference Bridge

1. GENERAL

1.01 This Practice provides circuit description, installation procedures, and basic testing information for the Wescom® 414 4-Wire/4-Way Conference Bridge (Figure 1).

1.02 This Practice has been reprinted to incorporate technical and editorial changes. Significant technical or editorial changes are indicated by a change bar (▮) in the margin adjacent to the affected copy.

1.03 The 414 module provides passive coupling (resistance bridge) of up to four voice or data circuits on a 2-wire facility. It features front panel jacks for easy access to the receive and transmit ports and a modular printed circuit board which plugs into one mounting position of the Wescom Type 400 Mounting Assembly. This assembly accommodates from 1 to 13 modules and allows for either KTU apparatus-case or relay-rack mounting.

1.04 Electrical connections are made by a 56-pin, wire-wrapped card connector which is provided as part of the mounting assembly.

2. CIRCUIT DESCRIPTION

2.01 The 414 4-Wire/4-Way Conference Bridge provides passive coupling of voice and data circuits by means of a 4-wire/4-way resistive bridge. Refer to the functional diagram in Figure

2 and the schematic diagram in Figure 4 while reading the following circuit description.

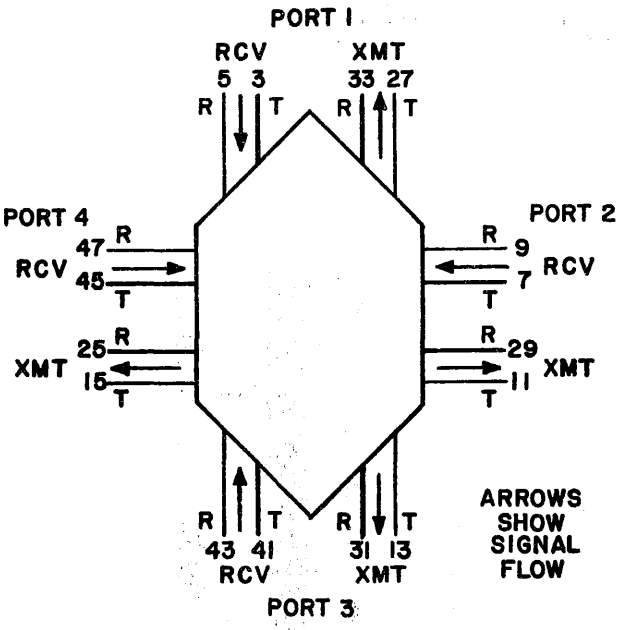

Figure 2. 414 Functional Diagram

2.02 When a signal enters the module through the receive path of port 1, it is bridged to ports 2, 3 and 4 where it is transmitted to external voice or data acquisition equipment. As an additional example, consider an application where the four receive and transmit ports are required for conference purposes. In such an application, external equipment which receives and transmits voice frequencies or data communications is tied to each receive and transmit port of the 4-way bridge. This arrangement permits the 414 bridge to process signal information through the receive and transmit paths of all the ports. For instance, signals received by port 1 are coupled to ports 2 through 4; signals entering on receive port 2 are coupled to transmit ports 1, 3 and 4. This action continues for the remaining receive ports, i.e., receive signals of port 3 are coupled to transmit ports 1, 2 and 4; receive signals on port 4 are coupled to transmit ports 1, 2 and 3.

3. INSPECTION

3.01 Inspect the equipment thoroughly as soon as possible after delivery. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company.

3.02 Wescom equipment is identified by a model and issue number imprinted on the front panel. Each time a major engineering design change is made on the equipment, the issue number is advanced by one number on any following models that are manufactured. Therefore, be sure to include the issue number along with the model number when making inquiries about the equipment.

4. MOUNTING

4.01 The 414 4-Wire/4-Way Conference Bridge is designed to mount in one module position of a Type 400 Mounting Assembly. This assembly can accommodate from 1 to 13 modules and may be equipped and prewired for a variety of modules in the Wescom product line. In addition, Type 400 Mounting Assemblies allow for either Key Telephone Unit (KTU) apparatus-case or relay-rack mounting. For more information on these mounting assemblies, refer to Sections 400-103 and 400-U-101/3.

5. INSTALLER CONNECTIONS

5.01 When the 414 4-wire/4-way module is installed in a Type 400 Mounting Assembly, it makes electrical connection to associated equipment through a 56-pin, wire-wrapped card connector which is provided as part of the mounting assembly. Make all installer connections to this connector in accordance with Table 1.

Table 1. 414 Installer Connections

CONNECT:	TO:
Transmit port 1 T&R	27, 33
Receive port 1 T&R	3, 5
Transmit port 2 T&R	11, 29
Receive port 2 T&R	7, 9
Transmit port 3 T&R	13, 31
Receive port 3 T&R	41, 43
Transmit port 4 T&R	15, 25
Receive port 4 T&R	45, 47

6. OPTIONS

6.01 The 414 module is capable of providing 4-wire/4-way operation. However, the receive and transmit paths of port 4 are equipped with strapping options which permit the module to also function as a 3-way bridge. When optioning the 414 module, refer to Figure 3 (Option Locations) and strap all options in accordance with the following paragraph.

6.02 If a 4-wire/3-way bridge is required, strap the option posts which are located on the foil side of the board. This terminates the receive and transmit paths of port 4 with a 600-ohm load, thereby reflecting a 600-ohm impedance to the other circuits in the bridge.

NOTE

When utilizing the 414 in a 4 port application, verify that the option straps are removed.

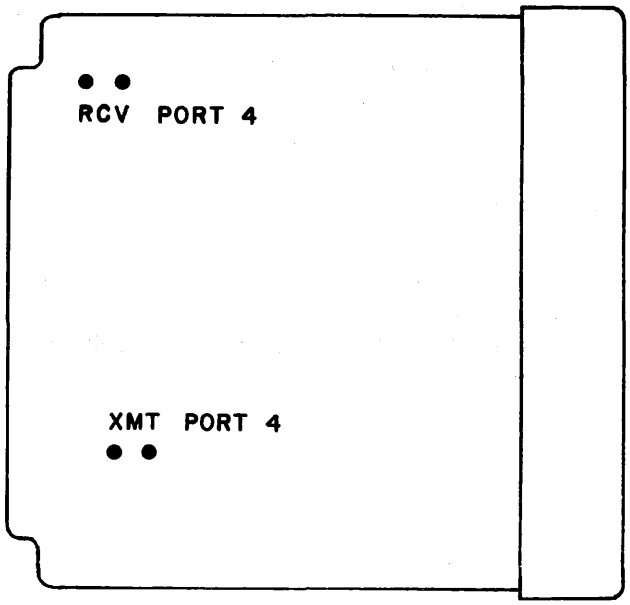

Figure 3. 414 Option Locations

7. TESTING

7.01 If trouble is encountered with the operation of the 414 module, verify that all installer connections have been made in accordance with Table 1 and that the option is added if required. In addition, make certain that the module mates well with the connector. This can be accomplished by removing and reinserting the module several times. If trouble persists, attempt to determine whether the cause of the malfunction exists within the 414 module or elsewhere in the system. If technical assistance is required, contact the Wescom Technical Services Department by calling:

(312) 971-2010,
TWX 910-695-4735, or
DATAPHONE (312) 971-1698

Canadian Customers:
(416) 453-2222 or
TWX 610-492-2697

8. WARRANTY

8.01 STANDARD WARRANTY: Wescom products are warranted to be free from defects in material, workmanship, and design given proper installation and regular maintenance. Wescom's obligations under this warranty are limited to correction and replacement at Wescom's production facility of any defective items received by Wescom, transportation prepaid, for a period of five years from the date of original shipment. Warranty and remedies on products not manufactured by Wescom are in accordance with the warranty of the respective manufacturer. WESCOM MAKES NO OTHER WARRANTY OF ANY KIND WHATEVER, EXPRESSED OR IMPLIED; AND ALL IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE AFORESAID OBLIGATIONS IS HEREBY DISCLAIMED BY WESCOM.

8.02 Field repairs involving the replacement of components within a unit are not recommended. If an item is found to be defective, contact Wescom, Inc., by telephone or TWX, for instructions regarding replacement or repair.

8.03 If a replacement unit is required, it will be shipped in the fastest manner consistent with the urgency of the situation. Upon receipt of a replacement unit, return the defective unit in the carton in which the replacement was shipped, using the shipping label provided, to:

Wescom, Inc.
8245 Lemont Road
Downers Grove, Illinois 60515

Canadian Customers:
Wescom Canada, Ltd.
287 Glidden Road
Brampton, Ontario L6W1H9
Canada

Repair or Exchange Services

8.04 In addition to the standard Wescom Warranty Service, Wescom offers a repair or exchange service for those items out of warranty. Under this arrangement, faulty units may be shipped to Wescom for either complete repair and quality testing or exchanged for a replacement unit. To obtain details of this service and a schedule of prices, contact your local Wescom Sales Representative.

9. SPECIFICATIONS

9.01 Electrical and physical characteristics of the 414 are as follows:

(a) FACILITY: 4-wire.

(b) INPUT/OUTPUT PORTS: Four.

(c) INPUT/OUTPUT IMPEDANCE: 600 ohms.

(d) INSERTION LOSS: 15.0dB nominal.

(e) FOUR-WIRE RETURN LOSS: 25dB.

(f) CROSS COUPLING: -60dB maximum.

(g) MAXIMUM INPUT LEVEL: +20dBm.

(h) ENVELOPE DELAY: 2us at 200Hz with 4kHz reference.

(i) FREQUENCY RESPONSE: 100Hz to 20kHz, ±0.25dB.

(j) OPERATING ENVIRONMENT: Temperature, 35° to 120°F (1.5° to 48°C); humidity 10 to 100% (no condensation).

(k) WEIGHT: 0.6 lbs (270g).

(l) DIMENSIONS: Height, 5.6 inches (14.2cm); width, 1.5 inches (3.8cm); depth, 6 inches (15.2cm).

(m) MOUNTING: Module occupies one position in a Type 400 Mounting Assembly which accommodates from 1 to 13 modules and allows for either Key Telephone Unit (KTU) apparatus-case or relay-rack mounting.

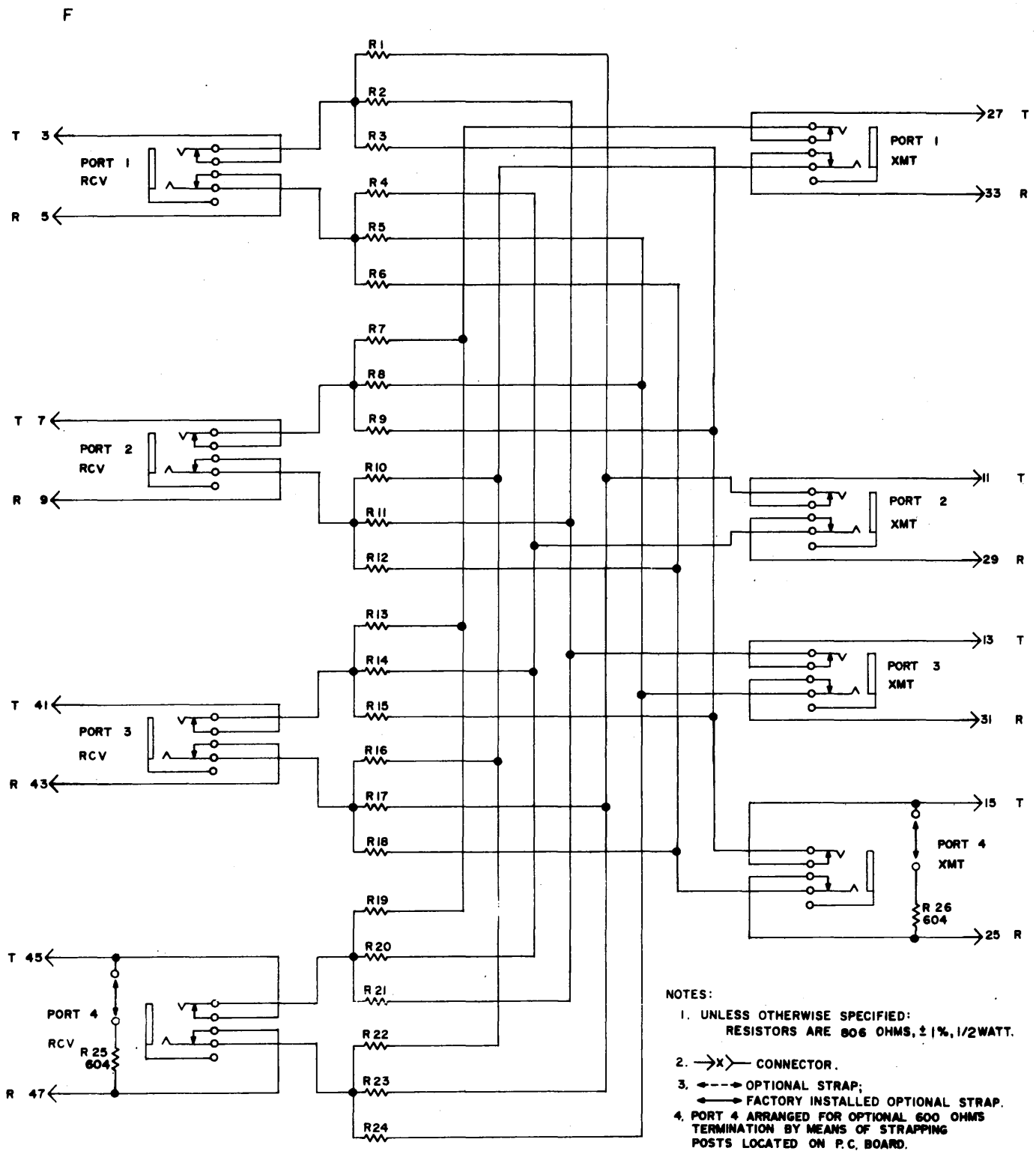

Figure 4. 414 4-Wire/4-Way Conference Bridge Schematic Diagram (Issue 1)