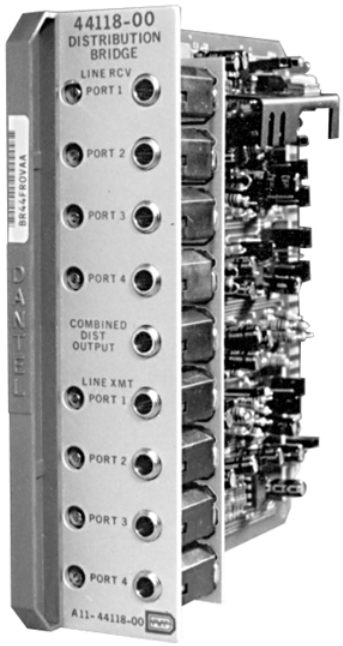
44118 ACTIVE DISTRIBUTION BRIDGE



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About this Practice:

This practice has been reissued to:

- Update Table E.

Reissued Practices: Updated and new content can be identified by a banner in the right margin.

UPDATED

Issue date: July 1998

CAUTION

- Install or remove modules from the shelf only when the power is off. If you install a module in the shelf with the power on, the internal circuitry may suffer damage and the product warranty will be void.
- Remove and install circuit boards only in a static-safe environment (use antistatic wrist straps, smocks, footwear, etc.).
- Keep circuit boards in their antistatic bags when they are not in use.
- Do not ship or store circuit boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.
- For more complete information on electrostatic discharge safety precautions, refer to Bellcore™ Technical Reference # TR-NWT-000870.

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ORDERING INFORMATION

NOTE: This section lists the different options available for this product. To order any of the available options, contact Dantel Inside Sales through our toll-free number, **1-800-432-6835.**

OPTION NUMBER	FEATURES
A11-44118-00	Active Distribution Bridge

GENERAL DESCRIPTION

The 44118 Active Distribution Bridge (44118 ADB) is a plug-in printed circuit module that fits into any 400-type or similar equipment housing.

The 44118 ADB can be used as:

- A four-way/four-wire bridge
- An eight-way/four wire bridge using two modules
- A general purpose summing and distribution amplifier

The front panel includes test jacks and level controls for each port, allowing complete alignment of the bridge.

A combined distribution output port provides alignment and operation of a common DTMF decoder or monitor speaker.

The 44118 ADB operates on -21 to -56 VDC input power.

CIRCUIT DESCRIPTION

Fig. 1 shows the functional schematic for the 44118 Active Distribution Bridge. The circuit consists of:

- Four line receive circuits
- Four transmit distribution networks
- Four line transmit circuits
- Four receive distribution networks
- A summing bus
- A combined distribution circuit
- A power regulator

Here is a brief description of each of the functional parts of the circuit:

Line Receive Circuits

Each of the four line receive circuits contains:

- A test jack

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- An input transformer
- An integrated circuit operational amplifier

The input signal at the PC connector pins routes to the normal-through contacts of the LINE RCV jack, then to the primary side of the transformer. The secondary side of the transformer has transient-protection diodes and a 600-ohm terminating resistor. The transformer drives the amplifier.

The amplifier has variable gain and a gain-range strap. The gain-range strap matches the input to the desired amplifier output level. The HI position is for input levels of 0 to -16 dBm. The LO position is for input levels of +7 to 0 dBm.

Each line receive circuit output couples to the combined distribution circuit through a resistive network. Each line receive circuit output can be strapped to drive the summing bus and/or the respective transmit distribution network.

Transmit Distribution Networks

Each of the four transmit distribution networks provides one direct bus (low impedance) output and three resistively isolated (100K ohm) outputs. The outputs distribute signals to external summing points; that is, eight-way bridges and general signal distribution.

A strapping network can disconnect the transmit distribution network if you use four-way bridges.

Line Transmit Circuits

Each of the four line transmit circuits contains:

- An amplifier
- An output transformer
- A test jack

The summing bus (in four-way and eight-way bridge applications) and/or the receive distribution network (in eight-way bridge and general summing applications) provides the input signal to the amplifier. Strapping networks allow individual selection of these input sources.

Use the gain strap LO position for output levels between -16 dBm and 0 dBm. Use the HI position for input levels below 0 dBm or output levels up to +7 dBm.

The amplifier output couples to the transformer primary through a 600-ohm resistor. The primary provides transient-protection diodes. The secondary side of the transformer routes the signal to the normal-through contacts of the LINE XMT jack and the output PC connector pins.

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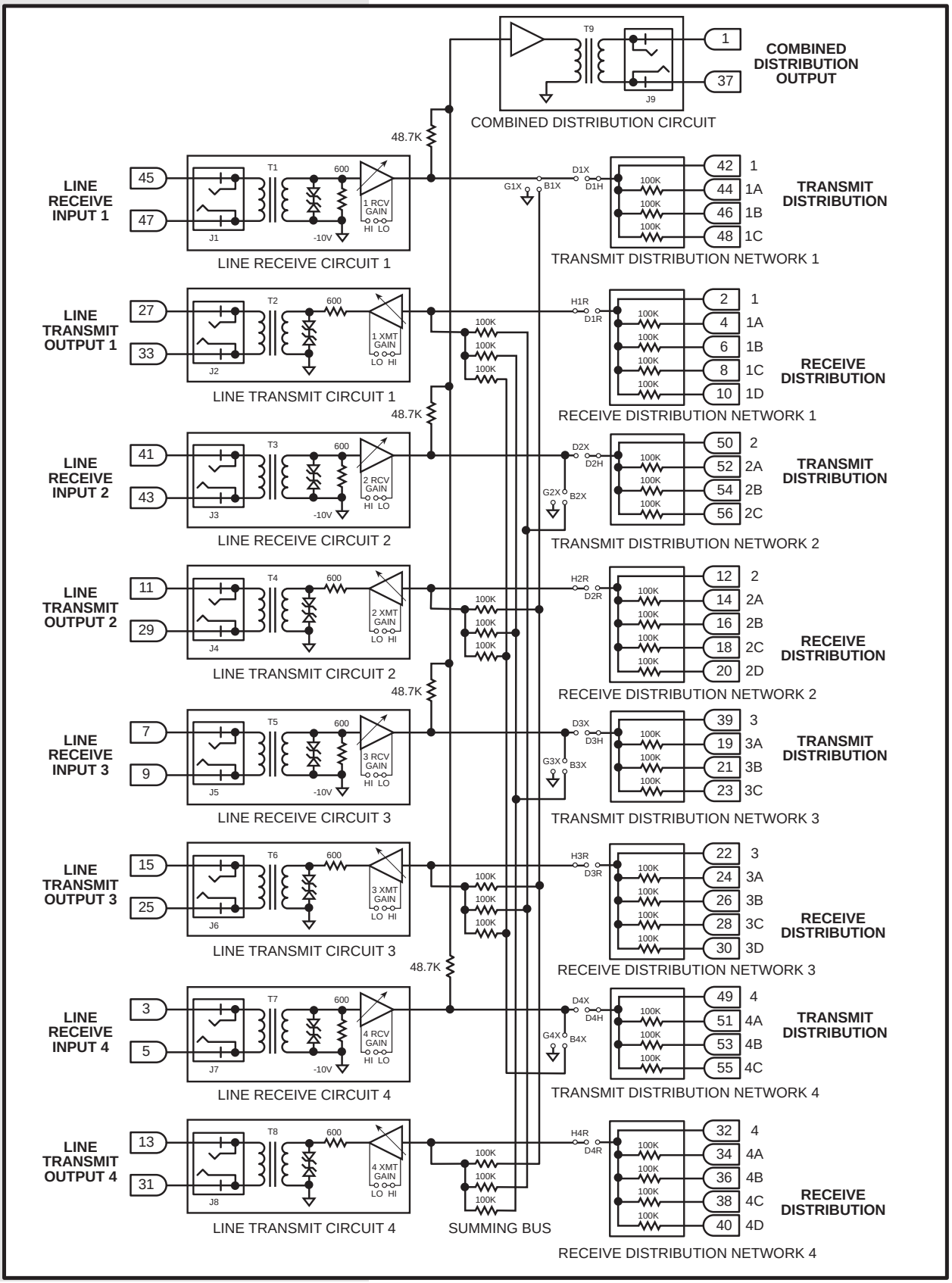
FIG. 1 - FUNCTIONAL SCHEMATIC, 44118



Receive Distribution Networks

Each of the four receive distribution networks provides one direct bus input and four resistively isolated (100K ohm) inputs. These inputs sum signals from external distribution points; that is, eight-way bridges and general signal distribution applications.

Several signals can be summed at the direct bus input. Only one signal source should connect to each resistively isolated input. A strapping network can disconnect the receive distribution network if you use four-way bridges.

CAUTION: *Rx bus radio levels should not exceed **0** dBm. Levels above **0** dBm can result in distorted signals. Check the RX bus signal level at the combined distribution output.*

Summing Bus

The summing bus is a resistive network that distributes signals from each line receive circuit to each line transmit circuit. The line transmit circuit excludes its mating transmit port input. This forms an on-board, four-way bridge.

You can strap each input circuit to the summing bus in general signal distribution applications. Inputs not strapped to the summing bus has its respective summing line strapped to ground. This prevents noise and cross talk from injection at the line transmit circuits. You can also use the summing bus in eight-way bridge applications.

Combined Distribution Circuit

The combined distribution circuit contains:

- Summing resistors
- A fixed-gain amplifier
- An output transformer
- A test jack

Each line receive circuit signal sums at the amplifier input. The unity-gain amplifier buffers the signal and feeds it to the transformer primary through a 600-ohm resistor.

The transformer secondary passes the signal to the normal-through contacts of the test jack. The signal feeds to the output PC connector at pins 1 and 37. The test jack sets the line receive circuit gains. You can wire the output pins to a DTMF decoder for common decoding of all four input legs.

Power Regulator

The power regulator provides -10 and -20 VDC output power for the 44118 ADB.

INSTALLATION

Installation consists of wiring the connector and installing the proper strap settings based on the application use. Applications include:

- Four-Way/Four-Wire Bridge
- Eight-Way/Four-Wire Bridge
- Summing and Distribution Amplifier

This section also includes calibration procedures for each of the applications.

1. Wire the connector

Normally, the shelf is pre-wired for the module. If you wire the connector, refer to Fig. 2 for the edge connector pin designations.

2. Install the Proper Strap Options

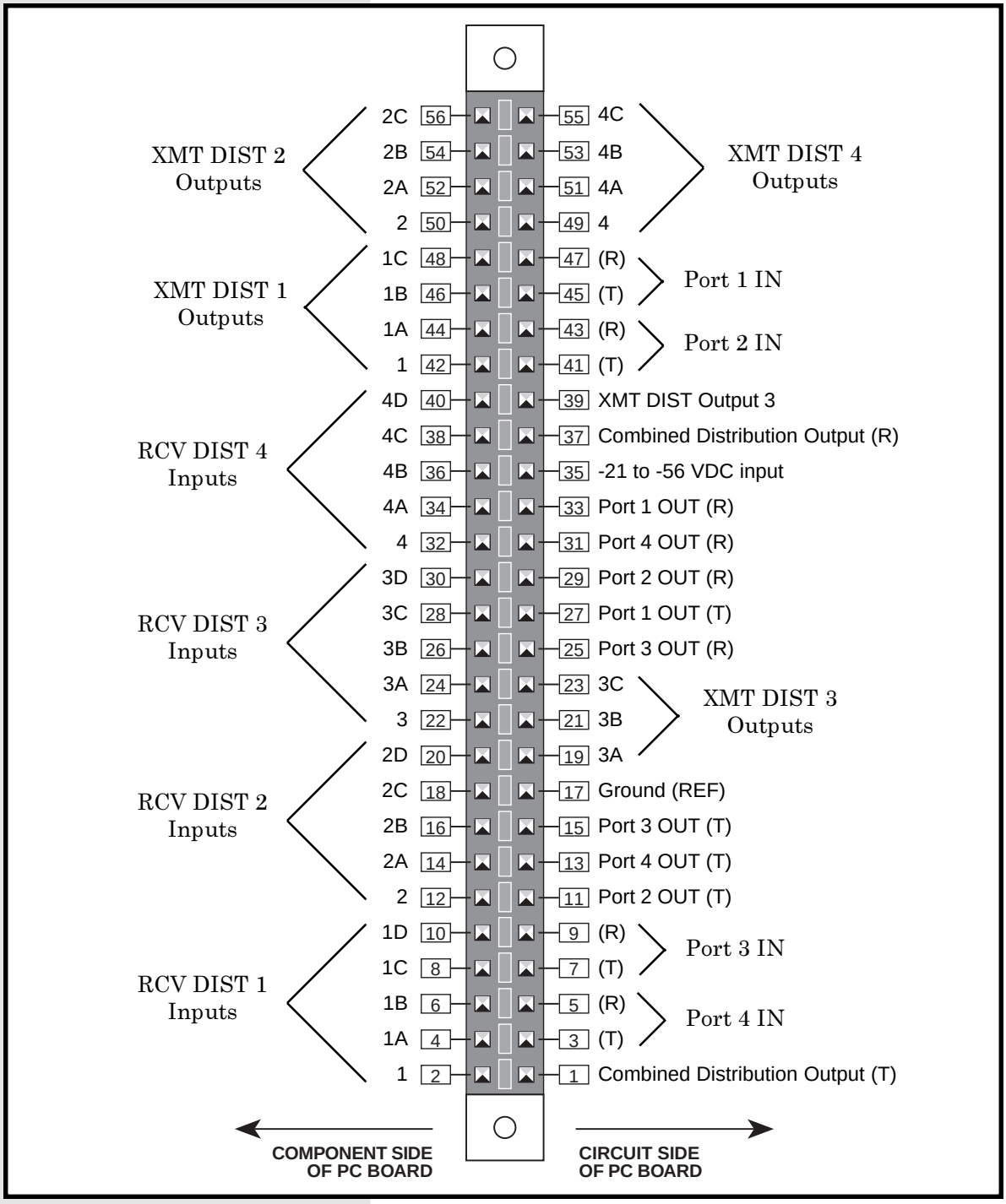
Determine the desired strapping application:

- Four-Way/Four-Wire Bridge
- Eight-Way/Four-Wire Bridge
- Summing and Distribution Amplifier

The following sections describe each application.

NOTE: *If the 44118 is shipped in a shelf, it is strapped according to the shelf application. If the 44118 is not shipped in a shelf, it is strapped for Four-Way/Four-Wire.*

FIG. 2 - PIN DESIGNATIONS, 44118 BRIDGE



FOUR-WAY/FOUR-WIRE BRIDGE APPLICATION

FIG. 3 - STRAP LOCATIONS

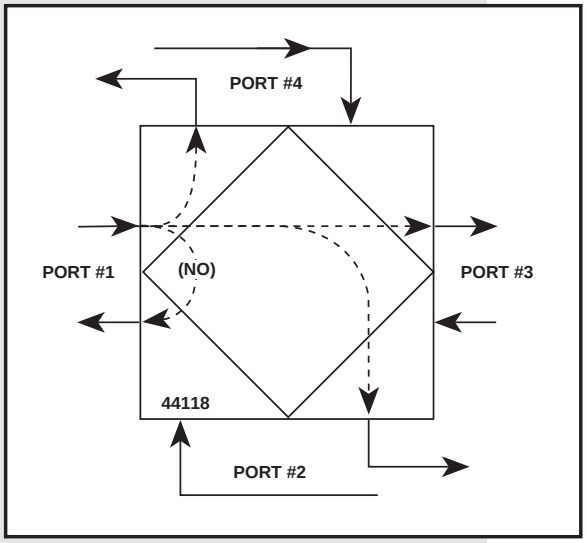


Fig. 3 shows a 44118 Active Distribution Bridge four-way/four-wire bridge application. A signal received at port 1 appears at output ports 2, 3 and 4, but not at output port 1. Dividing the input signal three ways and providing the necessary isolation between the ports reduces the input signal amplitude. Set the proper signal level by adjusting the gain on the input and output of each port. The illustration is typical for all four ports.

You can connect a 44020 DTMF decoder to the combined distribution output (pins 1 and 37). The 44020 DTMF decodes DTMF dialing tones from any of the four input legs. You can use this output for connecting monitoring equipment, because all signals coming into the bridge appear at this output.

Refer to Fig. 4 and Table A for proper strap option installation.

FIG. 4 - FOUR-WAY/FOUR-WIRE BRIDGE APPLICATION

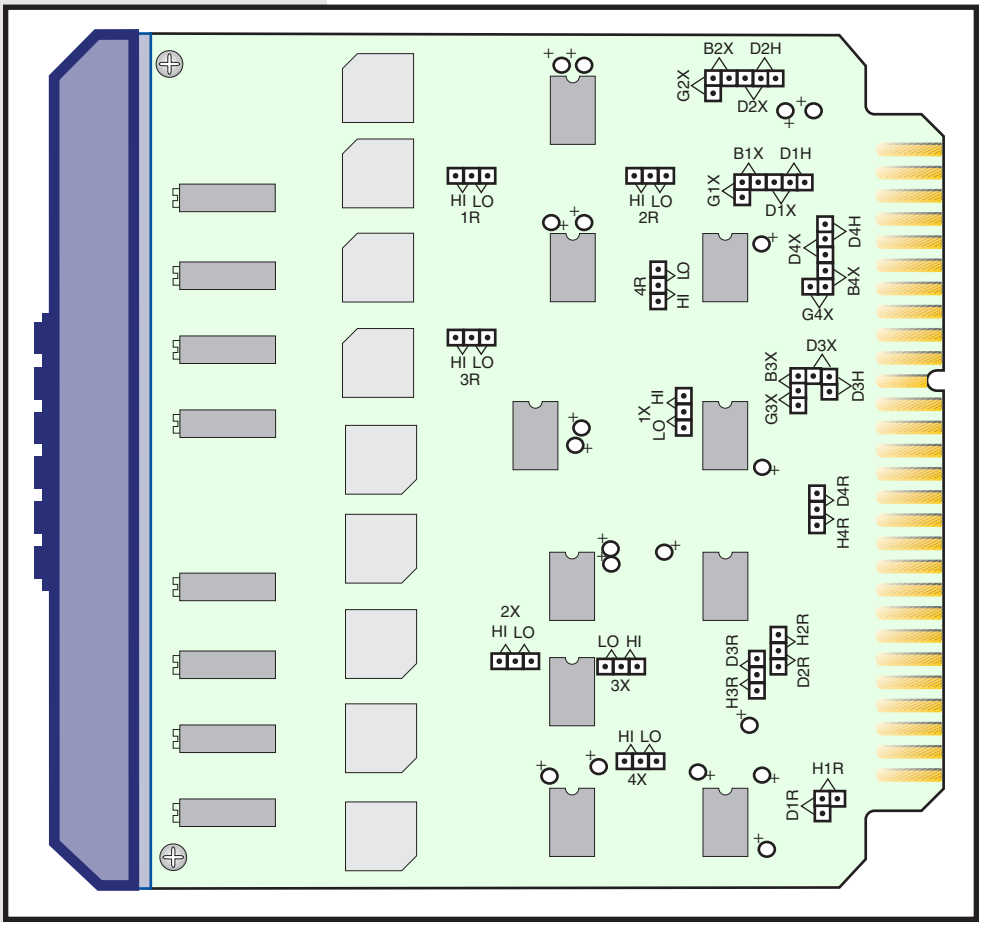
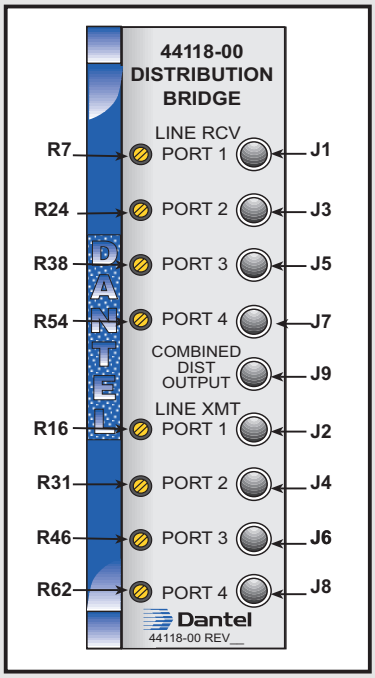


TABLE A - FOUR-WAY/FOUR-WIRE BRIDGE APPLICATION STRAP OPTIONS

OPTION	STRAP IN
GAIN STRAPS	
Receive Port 1	
0 to -16 dB	1R HI
0 to +7 dB	1R LO
Receive Port 2	
0 to -16 dB	2R HI
0 to +7 dB	2R LO
Receive Port 3	
0 to -16 dB	3R HI
0 to +7 dB	3R LO
Receive Port 4	
0 to -16 dB	4R HI
0 to +7 dB	4R LO
Transmit Port 1	
0 to +7 dB	1X HI
0 to -16 dB	1X LO
Transmit Port 2	
0 to +7 dB	2X HI
0 to -16 dB	2X LO
Transmit Port 3	
0 to +7 dB	3X HI
0 to -16 dB	3X LO
Transmit Port 4	
0 to +7 dB	4X HI
0 to -16 dB	4X LO
FOUR-WAY BRIDGE	
Summing Bus IN	B1X, B2X, B3X, B4X
Transmit Distribution Networks OUT	D1H, D2H, D3H, D4H
Receive Distribution Networks OUT	H1R, H2R, H3R, H4R

FIG. 5 - FRONT PANEL, 44118



Checkout

Table B provides the checkout and calibration procedures for a four-way/four-wire bridge. Use the following test equipment for checkout (refer to Fig. 5 for a front panel view):

- Signal generator
- Two bantam jack test cables (a bantam plug on one end, and a plug to fit the meter and generator on the other)
- dB level meter with 600-ohm termination

TABLE B - FOUR-WAY/FOUR-WIRE BRIDGE APPLICATION CALIBRATION PROCEDURE

STEP	ACTION	RESULTS
1	A) Remove power from the module receptacle. B) Plug in 44118 module. C) Apply power	
2	Connect a 600 ohm terminated dB meter across the 600 ohm output from the signal generator. Set generator frequency to 1 KHz.	Adjust generator level for reading equal to system line receive test tone level (0 dBmO) for port 1. This level will be between -16 and +7 dBm, according to your company's requirements.
3	Connect the 600 ohm terminated dB level meter to the COMBINED DIST OUTPUT jack (J9) on the 44118 front panel.	Leave the dB meter connected to J9 for steps 4 through 7.
4	Connect the signal generator to the LINE RCV PORT 1 jack (J1) on the 44118 front panel.	Read distribution level on meter. Adjust the LINE RCV PORT 1 level control (R7) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 1R gain strap to the HI or LO position, as required.
5	Move signal generator to the LINE RCV PORT 2 jack (J3). Reset for port 2 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 2 level control (R24) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 2R gain strap to the HI or LO position, as required.

CONTINUED . . .

TABLE B (CONTINUED) - FOUR-WAY/FOUR-WIRE BRIDGE APPLICATION CALIBRATION PROCEDURE

STEP	ACTION	RESULTS
6	Move signal generator to the LINE RCV PORT 3 jack (J5). Reset for port 3 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 3 level control (R38) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 3R gain strap to the HI or LO position, as required.
7	Move signal generator to the LINE RCV PORT 4 jack (J7). Reset for port 4 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 4 level control (R54) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 4R gain strap to the HI or LO position, as required.
8	Leave the signal generator connected to J7 for steps 9 through 11. Do not change generator level. Do not readjust any receive level controls.	
9	Move the 600 ohm terminated dB meter to the LINE XMT PORT 1 jack (J2).	Read system line transmit test tone level (0 dBmO) for port 1. Adjust the LINE XMT PORT 1 level control (R16) for proper reading. If the desired reading cannot be reached, move the 1X gain strap to the HI or LO position as required.
10	Move the 600 ohm terminated dB meter to the LINE XMT PORT 2 jack (J4).	Read system line transmit test tone level (0 dBmO) for port 2. Adjust the LINE XMT PORT 2 level control (R31) for proper reading. If the desired reading cannot be reached, move the 2X gain strap to the HI or LO position as required.
11	Move the 600 ohm terminated dB meter to the LINE XMT PORT 3 jack (J6).	Read system line transmit test tone level (0 dBmO) for port 3. Adjust the LINE XMT PORT 3 level control (R46) for proper reading. If the desired reading cannot be reached, move the 3X gain strap to the HI or LO position as required.
12	Move signal generator to the LINE RCV PORT 1 jack (J1). Reset for port 1 receive level, if necessary. Do not readjust any receive level controls. Move the 600 ohm terminated dB meter to the COMBINED DISTRIBUTION OUTPUT jack (J9).	Read -10 dBm, or the appropriate system level distribution level, if different. This is the same level as obtained in step 4.
13	Move the 600 ohm terminated dB meter to the LINE XMT PORT 4 jack (J8).	Read system line transmit test tone level (0 dBmO) for port 4. Adjust the LINE XMT PORT 4 level control (R62) for proper reading. If the desired reading cannot be reached, move the 4X gain strap to the HI or LO position as required.
14	Calibration is complete. Remove the signal generator and dB meter.	

EIGHT-WAY/FOUR-WIRE BRIDGE APPLICATION

The 44118 Active Distribution Bridge eight-way/four-wire bridge application features two interwired 44118 ADBs. You can connect two independent 44020 DTMF decoders to the combined distribution outputs (pins 1 and 37) of each module. This allows split signaling routing. Receive ports on legs 1 to 4 route to DTMF Decoder #1 and receive ports on legs 5 to 8 route to DTMF Decoder #2. All locations maintain voice communication while routing.

You can use two independent monitor systems for combined distribution outputs. One system listens to traffic on legs 1 to 4, and the other system listens to traffic on legs 5 to 8. If you use only one decoder or monitor, you can combine the two distribution outputs by using a hybrid transformer or a resistive combiner. A combined distribution output load mismatch does not affect the rest of the bridge.

Refer to Fig. 3 and Table C for proper strap option installation.

Checkout

Table D provides the checkout and calibration procedures for a eight-way/four-wire bridge. Use the following test equipment for checkout (refer to Fig. 5 for a front panel view):

- Signal generator
- Two bantam jack test cables (a bantam plug on one end, and a plug to fit the meter and generator on the other)
- dB level meter with 600-ohm termination

TABLE C - EIGHT-WAY/FOUR-WIRE BRIDGE APPLICATION STRAP OPTIONS

OPTION	STRAP IN
GAIN STRAPS	
Receive Port 1	
0 to -16 dB	1R HI
0 to +7 dB	1R LO
Receive Port 2	
0 to -16 dB	2R HI
0 to +7 dB	2R LO
Receive Port 3	
0 to -16 dB	3R HI
0 to +7 dB	3R LO
Receive Port 4	
0 to -16 dB	4R HI
0 to +7 dB	4R LO
Transmit Port 1	
0 to +7 dB	1X HI
0 to -16 dB	1X LO
Transmit Port 2	
0 to +7 dB	2X HI
0 to -16 dB	2X LO
Transmit Port 3	
0 to +7 dB	3X HI
0 to -16 dB	3X LO
Transmit Port 4	
0 to +7 dB	4X HI
0 to -16 dB	4X LO
FOUR-WAY BRIDGE	
Summing Bus IN	B1X, B2X, B3X, B4X
Transmit Distribution Networks IN	D1X, D2X, D3X, D4X
Receive Distribution Networks IN	D1R, D2R, D3R, D4R

TABLE D - EIGHT-WAY/ FOUR-WIRE BRIDGE APPLICATION CALIBRATION PROCEDURE

STEP	ACTION	RESULTS
1	A) Remove power from the module receptacle. B) Plug in 44118 module. C) Apply power	
2	Calibrate module #1 first. (It doesn't matter which one is called #1.) Connect a 600 ohm terminated dB meter across the 600 ohm output from the signal generator. Set generator frequency to 1 KHz.	Adjust generator level for reading equal to system line receive test tone level (0 dBmO) for port 1. This level will be between -16 and +7 dBm, according to your company's requirements.
3	Connect the 600 ohm terminated dB level meter to the COMBINED DIST OUTPUT jack (J9) on the 44118 front panel.	Leave the dB meter connected to J9 for steps 4 through 7.
4	Connect the signal generator to the LINE RCV PORT 1 jack (J1) on the 44118 front panel.	Read distribution level on meter. Adjust the LINE RCV PORT 1 level control (R7) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 1R gain strap to the HI or LO position, as required.
5	Move signal generator to the LINE RCV PORT 2 jack (J3). Reset for port 2 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 2 level control (R24) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 2R gain strap to the HI or LO position, as required.
6	Move signal generator to the LINE RCV PORT 3 jack (J5). Reset for port 3 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 3 level control (R38) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 3R gain strap to the HI or LO position, as required.
7	Move signal generator to the LINE RCV PORT 4 jack (J7). Reset for port 2 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 4 level control (R54) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 4R gain strap to the HI or LO position, as required.
8	Leave the signal generator connected to J7 for steps 9 through 11. Do not change generator level. Do not readjust any receive level controls.	

CONTINUED . . .

TABLE D (CONTINUED) - EIGHT-WAY/ FOUR-WIRE BRIDGE APPLICATION CALIBRATION PROCEDURE

STEP	ACTION	RESULTS
9	Move the 600 ohm terminated dB meter to the LINE XMT PORT 1 jack (J2).	Read system line transmit test tone level (0 dBmO) for port 1. Adjust the LINE XMT PORT 1 level control (R16) for proper reading. If the desired reading cannot be reached, move the 1X gain strap to the HI or LO position as required.
10	Move the 600 ohm terminated dB meter to the LINE XMT PORT 2 jack (J4).	Read system line transmit test tone level (0 dBmO) for port 2. Adjust the LINE XMT PORT 2 level control (R31) for proper reading. If the desired reading cannot be reached, move the 2X gain strap to the HI or LO position as required.
11	Move the 600 ohm terminated dB meter to the LINE XMT PORT 3 jack (J6).	Read system line transmit test tone level (0 dBmO) for port 3. Adjust the LINE XMT PORT 3 level control (R46) for proper reading. If the desired reading cannot be reached, move the 3X gain strap to the HI or LO position as required.
12	Move signal generator to the LINE RCV PORT 1 jack (J1). Reset for port 1 receive level, if necessary. Do not readjust any receive level controls. Move the 600 ohm terminated dB meter to the COMBINED DISTRIBUTION OUTPUT jack (J9).	Read -10 dBm, or the appropriate system level distribution level, if different. This is the same level as obtained in step 4.
13	Move the 600 ohm terminated dB meter to the LINE XMT PORT 4 jack (J8).	Read system line transmit test tone level (0 dBmO) for port 4. Adjust the LINE XMT PORT 4 level control (R62) for proper reading. If the desired reading cannot be reached, move the 4X gain strap to the HI or LO position as required.
14	Repeat steps 2 through 13 for module #2.	
15	Check for cross-coupling of signals between the two modules. For the following steps, do not adjust the transmit or receive levels on either module.	
16	Move the signal generator to the LINE RCV PORT 1 jack (J1) of module #1. Reset generator for port 1 receive level, if necessary.	
17	Move the dB meter to LINE XMT ports 1, 2, 3, and 4 of module #2.	Read the system line transmit test tone level (0 dBmO) for each port of module #2.
18	Repeat steps 16 and 17, moving the signal generator to LINE RCV ports 2, 3, and 4 of module #1.	With each new LINE RCV port, read the system line transmit test tone level (0 dBmO) at LINE XMT ports 1, 2, 3, and 4 of module #2.

CONTINUED . . .

TABLE D (CONTINUED) - EIGHT-WAY/ FOUR-WIRE BRIDGE APPLICATION CALIBRATION PROCEDURE

STEP	ACTION	RESULTS
19	Move the signal generator to the LINE RCV PORT 1 jack (J1) of module #2. Reset for port 1 receive level, if necessary.	
20	Move the dB meter to LINE XMT ports 1, 2, 3, and 4 of module #1.	Read the system line transmit test tone level (0 dBmO) for each port of module #1.
21	Repeat steps 19 and 20, moving the signal generator to LINE RCV ports 2, 3, and 4 of module #2.	With each new LINE RCV port, read the system line transmit test tone level (0 dBmO) at LINE XMT ports 1, 2, 3, and 4 of module #1.
22	Calibration is complete. Remove signal generator and dB meter.	

SUMMING AND DISTRIBUTION AMPLIFIER APPLICATION

Fig. 6 shows a summing and distribution amplifier application. A signal received on the summing (common) port goes out the other three ports, but the signal does not transmit through the summing port.

A signal received at any of the distribution ports transmits through the summing port, but does not transmit through the distribution ports.

Fig. 7 shows a summing and distribution application using multiple 44118 ADBs. Three interwired 44118 ADBs provide one summing port and 11 distribution ports.

Refer to Fig. 3 and Table E for proper strap option installation.

Checkout

Table F provides the checkout and calibration procedures for a summing and distribution amplifier. Use the following test equipment for checkout (refer to Fig. 5 for a front panel view):

- Signal generator
- Two bantam jack test cables (a bantam plug on one end, and a plug to fit the meter and generator on the other)
- dB level meter with 600-ohm termination

FIG. 6 - SUMMING AND DISTRIBUTION AMPLIFIER EXAMPLE APPLICATION

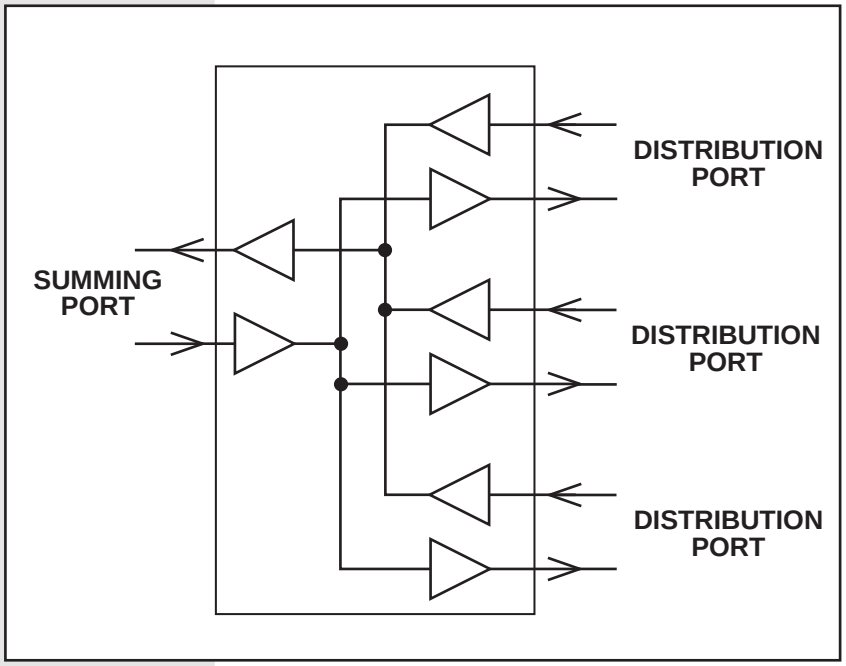


FIG. 7 - SUMMING AND DISTRIBUTION W/ MULTIPLE BRIDGES

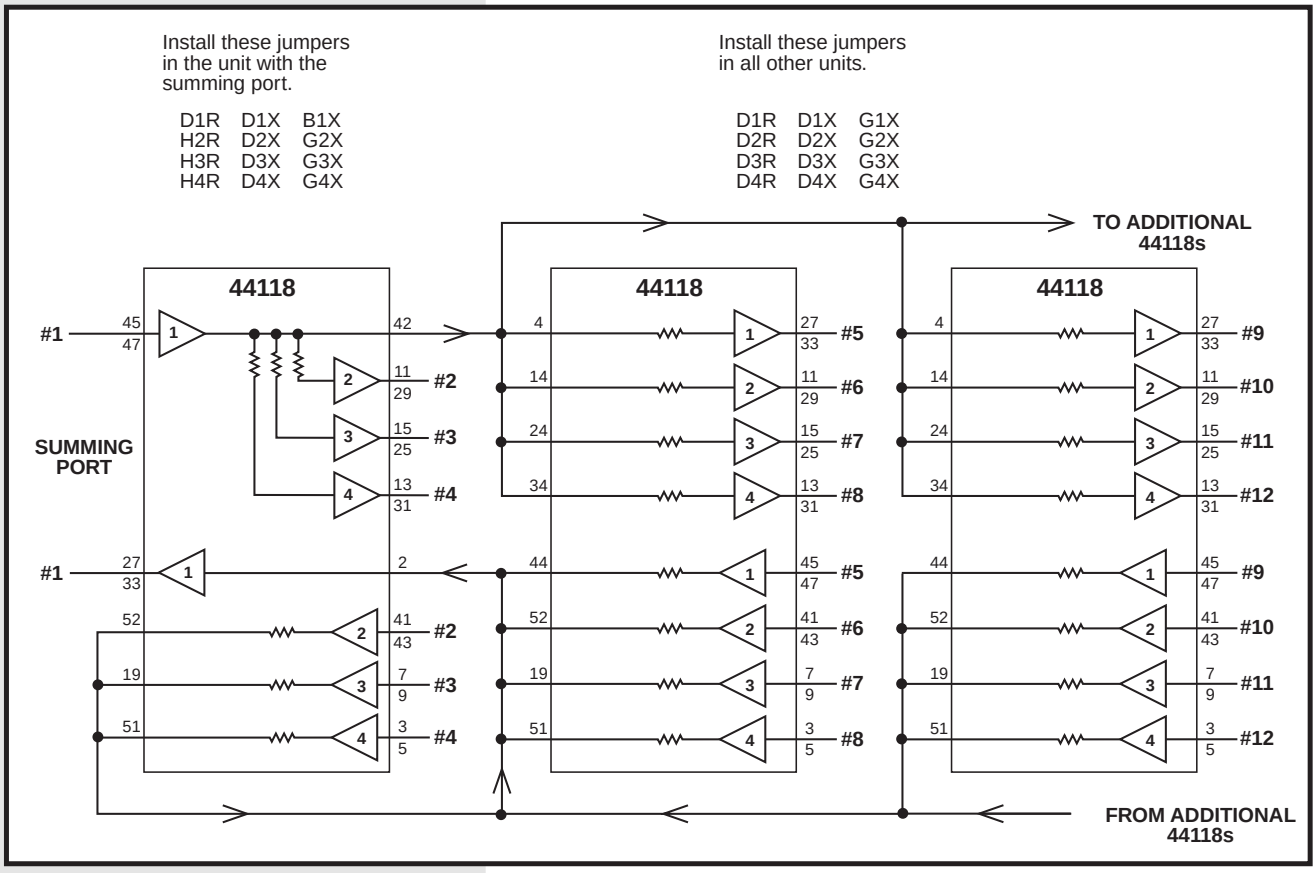


TABLE E - SUMMING AND DISTRIBUTION APPLICATION STRAP OPTIONS

OPTION	STRAP IN
GAIN STRAPS	
Receive Port 1	
0 to -16 dB	1R HI
0 to +7 dB	1R LO
Receive Port 2	
0 to -16 dB	2R HI
0 to +7 dB	2R LO
Receive Port 3	
0 to -16 dB	3R HI
0 to +7 dB	3R LO
Receive Port 4	
0 to -16 dB	4R HI
0 to +7 dB	4R LO
Transmit Port 1	
0 to +7 dB	1X HI
0 to -16 dB	1X LO
Transmit Port 2	
0 to +7 dB	2X HI
0 to -16 dB	2X LO
Transmit Port 3	
0 to +7 dB	3X HI
0 to -16 dB	3X LO
Transmit Port 4	
0 to +7 dB	4X HI
0 to -16 dB	4X LO

***NOTE**: Check the drawings for your application to determine which of the four ports is the summing port, then strap the module accordingly.*

PORT 1 SUMMING	PORT 2 SUMMING	PORT 3 SUMMING	PORT 4 SUMMING
(Ports 2, 3, & 4 Distribution)	(Ports 1, 3, & 4 Distribution)	(Ports 1, 2, & 4 Distribution)	(Ports 1, 2, & 3 Distribution)
D1R, D1H, B1X	H1R, D1X, G1X	H1R, D1X, G1X	H1R, D1X, G1X
H2R, D2X, G2X	D2R, D2H, B2X	H2R, D2X, G2X	H2R, D2X, G2X
H3R, D3X, G3X	H3R, D3X, G3X	D3R, D3H, B3X	H3R, D3X, G3X
H4R, D4X, G4X	H4R, D4X, G4X	H4R, D4X, G4X	D4R, D4H, B4X

***NOTE**: In Fig 7, Port 1 of the first module is the summing port and ports 2, 3, and 4 are distribution ports and are strapped as described above. All the ports on the other modules are distribution ports and each module is strapped as follows:*

D1R, D1X, G1X
D2R, D2X, G2X
D3R, D3X, G3X
D4R, D4X, G4X

UPDATED

TABLE F - SUMMING AND DISTRIBUTION APPLICATION CALIBRATION PROCEDURE

STEP	ACTION	RESULTS
1	A) Remove power from the module receptacle. B) Plug in 44118 module. C) Apply power	
2	Connect a 600 ohm terminated dB meter across the 600 ohm output from the signal generator. Set generator frequency to 1 KHz.	Adjust generator level for reading equal to system line receive test tone level (0 dBmO) for port 1. This level will be between -16 and +7 dBm, according to your company's requirements.
3	Connect the 600 ohm terminated dB level meter to the COMBINED DIST OUTPUT jack (J9) on the 44118 front panel.	Leave the dB meter connected to J9 for steps 4 through 7.
4	Connect the signal generator to the LINE RCV PORT 1 jack (J1) on the 44118 front panel.	Read distribution level on meter. Adjust the LINE RCV PORT 1 level control (R7) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 1R gain strap to the HI or LO position, as required.
5	Move signal generator to the LINE RCV PORT 2 jack (J3). Reset for port 2 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 2 level control (R24) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 2R gain strap to the HI or LO position, as required.
6	Move signal generator to the LINE RCV PORT 3 jack (J5). Reset for port 3 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 3 level control (R38) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 3R gain strap to the HI or LO position, as required.
7	Move signal generator to the LINE RCV PORT 4 jack (J7). Reset for port 4 receive level, if necessary.	Read distribution level on meter. Adjust the LINE RCV PORT 4 level control (R54) for reading of -10 dBm, or appropriate distribution level for the system, if different. If desired level cannot be reached, move the 4R gain strap to the HI or LO position, as required.
8	Move the signal generator to the LINE RCV port that is being used as the summing port. Reset the generator for the port receive level, if necessary. Connect the 600 ohm level meter to the LINE XMT distribution ports, one at a time. For example, if port 1 is the summing port, connect the generator to LINE RCV port 1 and the dB meter to LINE XMT ports 2, 3, and 4.	As the dB meter is moved to each LINE XMT port, read the system line transmit test tone level (0 dBmO) for that port. Adjust the LINE XMT port level control for that port.

CONTINUED . . .

TABLE F (CONTINUED) - SUMMING AND DISTRIBUTION APPLICATION CALIBRATION PROCEDURE

STEP	ACTION	RESULTS
9	Move the dB meter to the LINE XMT port that is being used as the summing port. Connect the generator to the LINE RCV distribution ports, one at a time. For example, if port 1 is being used as the summing port, connect the dB meter to LINE XMT port 1 and the generator to LINE RCV ports 2, 3, and 4. At each of the LINE RCV ports, reset the generator for the receive level of that port, if necessary.	At the LINE XMT summing port, read the system line transmit test tone level (o dBmO) for that port. Adjust the LINE XMT port level control for that port. ***NOTE**: Make the LINE XMT port level adjustment only once. When the generator is moved to other distribution ports, it is only to verify signal path continuity. The LINE XMT level will remain the same.*
10	If there is only one module being calibrated, this completes the procedure. Remove the generator and the dB meter. If there is more than one module (refer to Fig. 7), continue to step 11.	
11	Connect the dB meter to the COMBINED DIST OUTPUT jack (J9) on the front panel of the next 44118 to be calibrated. Adjust the signal generator for the proper receive test tone level (0 dBmO) for port 1. Connect the generator to the LINE RCV PORT 1 jack (J1) on the 44118 front panel.	Read distribution level on meter. Adjust the LINE RCV PORT 1 level control (R7) for reading of -10 dBm, or appropriate distribution level for the system, if different. If the desired reading cannot be reached, move the 1R gain strap to the HI or LO position as required.
12	Repeat step 11 for each of the other LINE RCV ports on the 44118 module.	Adjust the receive level for each port, if necessary.
13	Move the dB meter to the LINE XMT summing port on the 44118 module with the summing port. Connect the signal generator to the four LINE RCV ports, one at a time, on the module being calibrated. Reset the generator level for each port, as necessary.	Read the proper line transmit test tone level. The LINE XMT level at the summing port will be the same from all the LINE RCV distribution input ports.
14	Move the generator to the LINE RCV summing port on the module with the summing port. Reset the generator level, if necessary. Connect the dB meter to the four LINE XMT ports, one at a time, in the module being calibrated.	Read system line transmit test tone level (o dBmO) for each port. Adjust the LINE XMT level for each port for the proper reading.
15	Repeat steps 11-14 for additional 44118 modules.	
16	Calibration complete. Remove the generator and dB meter.	

TECHNICAL SPECIFICATIONS

DESCRIPTION	VALUE
Frequency Response	300 Hz to 4 KHz, ±0.5 dB
Return Loss	Greater than 20 dB
Cross Talk	Greater than 60 dB @ 1 KHz
Impedances	
Line Receive Ports	600 ohm, transformer coupled
Line Transmit Ports	600 ohm, transformer coupled
Combined Distribution Output	600 ohm, transformer coupled
Distribution Outputs	
Direct Bus	Less than 2 ohms
Bridging	100K ohm
Summing Inputs	
Direct Bus	High impedance (requires 100K ohm source)
Bridging	100K ohm + high impedance
Levels	
Line Receive Ports	-16 dBm to +7 dBm
Line Transmit Ports	-16 dBm to +7 dBm
Combined Distribution Output	-10 to 0 dBm
Distribution Outputs	-10 to 0 dBm
Summing Inputs	-10 to 0 dBm
Input Voltage Range	-21 to -56 VDC
Input Power Requirement	50 mA
Heat Dissipation	9.55 Btu/Hr
Physical Dimensions	1.4" x 6.0" x 5.6"
Weight	9.5 ounces
Operating Temperature Range	0° to 60° C.

WARRANTY

LIMITED WARRANTY

The Seller warrants that the standard hardware products sold will be free from defects in material and workmanship and perform to the Seller's applicable published specifications for a period of 18 months for hardware, and 3 months for software, from the date of the original invoice. The liability of the Seller hereunder shall be limited to replacing or repairing, at its option, any defective products which are returned F.O.B. to the Seller's plant, (or, at the Seller's option, refunding the purchase price of such products). In no case are products to be returned without first obtaining permission and a customer return authorization number from the Seller. In no event shall the Seller be liable for any consequential or incidental damages.

Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. The Seller shall make the final determination as to the existence and cause of any alleged defect. No warranty is made with respect to custom equipment or products produced to the Buyer's specifications except as specifically stated in writing by the Seller in the contract for such custom equipment.

This warranty is the only warranty made by the Seller with respect to the goods delivered hereunder, and may be modified or amended only by a written instrument signed by a duly authorized officer of the Seller and accepted by the Buyer.

Warranty and remedies on products not manufactured by the Seller are in accordance with warranty of the respective manufacturer. THE SELLER MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED; AND ALL IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE AFORESAID OBLIGATIONS IS HEREBY DISCLAIMED BY THE SELLER.

IN CASE OF DIFFICULTY

If you experience difficulty with this equipment, check the following, as appropriate:

1. **Switch settings**
2. **Signal levels**
3. **Software configuration**
4. **Connections between Dantel's equipment and your equipment.**

If there is still a problem, substitute equipment that is known to be good. For additional assistance, call Dantel's Technical Field Service Department weekdays, 6 A.M. to 5 P.M. pacific time:

1-800-4DANTEL (1-800-432-6835).

If a thorough checkout shows a piece of equipment has malfunctioned, you may return it to the factory. For repairs and emergency replacements, obtain a Return Material Authorization (RMA) number from the Customer Service Representative at **1-800-4DANTEL** (1-800-432-6835).

To ensure expedient processing of your order, provide a purchase order number and shipping and billing information when requesting an RMA number. Also, when the units are returned to Dantel, include a description of the failure symptoms for each unit returned. Send defective equipment to:

Dantel, Inc. • 2991 North Argyle Avenue • Fresno, California 93727-1388