

4424 and 4425 Wideband Repeat Coils

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1. general description

1.01 The 4424 and 4425 Wideband Repeat Coil modules (figure 1) each provide transformer isolation, impedance matching, and simplex-lead derivation for use on wideband voice-frequency transmission facilities (normally transmitting am or fm radio programming or tv audio) with a bandwidth requirement of 50 to 15,000Hz.

1.02 This practice section is revised to correct the frequency-response specification in section 6 and to update the text portion of section 7.

1.03 Frequency response of the 4424 and 4425 is nominally flat (± 0.7 dB re 1000Hz) from 50Hz to 15kHz.

1.04 The 4424 is a single-circuit module, while the 4425 contains two identical, independent circuits. Both are Type 10 modules.

1.05 Option switches on the 4424 and 4425 select either nominal 600 or nominal 150-ohm terminating impedance independently at each port (i.e., on both the terminal and facility sides) of each repeat coil circuit.

1.06 A simplex lead is derived toward each port of the 4424 and 4425 only when that port is optioned for 600-ohm terminating impedance.

1.07 The 4424 and 4425 each mount in one position of a Tellabs Type 10 Mounting Shelf, versions of which are available for relay-rack and apparatus-case installation. In relay-rack applications, up to 12 modules can be mounted across a 19-inch rack, while up to 14 modules can be mounted across a 23-inch rack. In either case, 6 inches of vertical rack space is used.

1.08 Because of common connector-pin assignments, the 4424 (single) Wideband Repeat Coil may be used in lieu of a 4008 Program Amplifier in certain 248 Program Amplifier Assemblies. See paragraph 2.05 for details.

2. application

2.01 The 4424 and 4425 Wideband Repeat Coil modules are used almost exclusively in program circuits transmitting either am, fm, fm stereo, or tele-

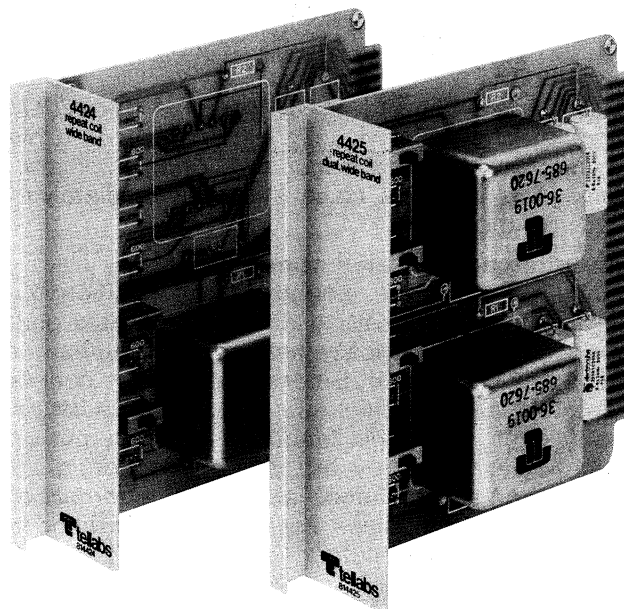


figure 1. 4424 and 4425 Wideband Repeat Coils

vision audio broadcasts. Terminating the circuit with impedance matching and transformer isolation, the specially designed transformers of the 4424 and 4425 accommodate the 50Hz to 15kHz frequency range of radio programming. (In most applications involving the 4424 and 4425, amplification and amplitude equalization are provided at the opposite end of the circuit from the repeat coil.)

2.02 The single-circuit 4424 module is typically used in monaural broadcast applications, while the dual-circuit 4425 module can be conveniently used on facilities transmitting stereo programming. In applications serving multiple program channels, the 4425 provides greater mounting density.

2.03 The 600-ohm terminating impedances on both the terminal and facility sides of the 4424 and 4425 are compatible with the impedance characteristics of most terminal equipment and of non-loaded cable. Either module can, in addition, be switch-optioned to provide 150-ohm terminating impedance (see paragraph 3.03). The 150-ohm option is used, for example, to interface a passive program equalizer local to the repeat coil.

2.04 When each port of a repeat coil circuit is optioned for 600-ohm terminating impedance, a simplex lead is derived toward that port. These simplex leads can be used to provide a path for sealing current or to provide dc powering to a remote location.

2.05 Pinouts on the single circuit of the 4424 or on circuit 1 of the 4425 are identical to those of the Tellabs 4008 Program Amplifier. A wideband repeat coil may, therefore, be substituted for a 4008 (without rewiring) in prewired assemblies or shelves when only termination, and not amplification or equalization, is required in the circuit.

3. installation
inspection

3.01 The 4424 and 4425 Wideband Repeat Coil modules should be visually inspected upon arrival to find possible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier.

mounting and installer connections

3.02 Each module mounts in one position of a Tellabs Type 10 Mounting Shelf. The module plugs physically and electrically into a 56-pin connector at the rear of the shelf. Before making any connections to the shelf, make sure that power is **off** and modules are **removed**. Modules should be put into place only **after** they are properly optioned and **after** wiring is completed. Table 1 lists external connections to the modules. Pin numbers are found on the body of the connector.

connect:	to pin:
(circuit 1—4424 and 4425)	
side 1 tip	5
side 1 ring	15
side 1 simplex	1
side 2 tip	7
side 2 ring	13
side 2 simplex	9
(circuit 2—4425 only)	
side 1 tip	55
side 1 ring	49
side 1 simplex	51
side 2 tip	41
side 2 ring	47
side 2 simplex	43

table 1. External connections to 4424 and 4425

options and alignment

3.03 No alignment of the 4424 and 4425 is required. To option any port of the 4424 and 4425 for 600 or 150 ohm terminating impedance, set the option switch associated with that port to the 600 or 150 position, respectively. On the 4424, the terminating impedance on side 1 of the circuit (see **functional schematic**) is selected via switch S1 and on side 2 via switch S2. On the 4425, the terminating impedance on side 1 of circuit 1 is selected via switch S1 and on side 2 of circuit 1 via switch S2. The terminating impedance on side 1 of circuit 2 is selected via switch S3 and on side 2 of circuit 2 via switch S4. Switch locations are shown in figure 2.

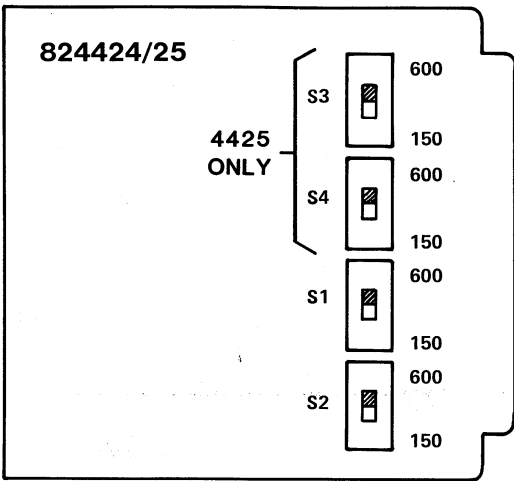


figure 2. 4424 and 4425 option switch locations

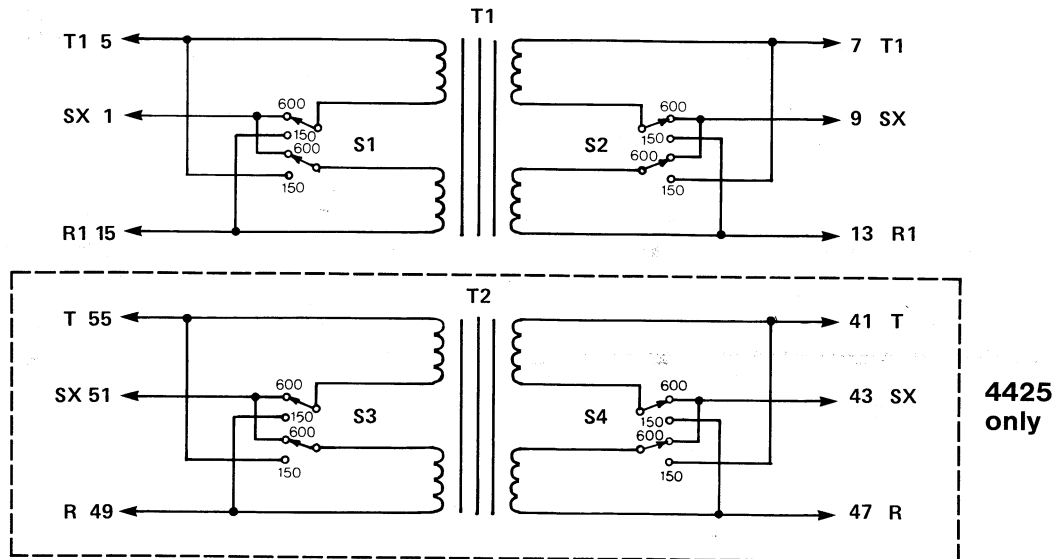
4. circuit description

4.01 This circuit description is intended to familiarize you with the 4424 and 4425 Wideband Repeat Coil modules for engineering and application purposes only. Attempts to troubleshoot either module internally are not recommended and may void its Tellabs warranty. Troubleshooting procedures should be limited to those prescribed in section 7 of this practice. Please refer to the **functional schematic**, section 5 of this practice, as an aid in following the circuit description.

4.02 Each wideband repeat coil circuit (one on the 4424, two on the 4425) consists of a dual-winding, bifilar-wound, special wideband transformer that is tapped to derive a simplex lead toward each port when that port is optioned for 600-ohm terminating impedance. When a port is optioned for 150-ohm terminating impedance, the two bifilar windings on that side of the transformer are placed in parallel via the impedance option switch.

6. specifications

- frequency response
 - ± 0.7 dB re 1000Hz level, 50Hz to 15kHz
- insertion loss
 - 0.5 ± 0.2 dB at 1000Hz
- impedance
 - 600 ohms (CT) to 600 ohms (CT) (1:1) or, via switch option, 600 ohms to 150 ohms (not CT)
- reflected impedance
 - 600 ohms $\pm 10\%$, 50Hz to 15kHz, with a secondary terminated in 600 ohms $\pm 1\%$
- echo return loss (ERL)
 - 20dB minimum
- maximum input level
 - +20dBm
- unbalanced dc winding current
 - no more than 5mA unbalanced current in either winding
- maximum isolation between windings
 - 50V rms at 60Hz



4424 and 4425 Wideband Repeat Coils 824424/824425

5. functional schematic

longitudinal balance

60dB minimum, 100Hz to 15kHz (with CT grounded)

operating environment

−40° to +140°F (−40° to +60°C), humidity to 95% (no condensation)

dimensions

5.58 inches (14.17cm) high

1.42 inches (3.61cm) wide

5.96 inches (15.14cm) deep

weight

4424: 13 ounces (369 grams)

4425: 1 pound 7 ounces (625 grams)

mounting

relay rack or apparatus case via one position of a Tellabs Type 10 Mounting Shelf; can also be mounted in one position of a Tellabs 248-series Mounting Assembly

7. testing and troubleshooting

7.01 The **testing guide checklist** in this section may be used to assist in the installation, testing, or troubleshooting of the 4424 or 4425 Wideband Repeat Coil module. The checklist is intended as an aid in the localization of trouble to this specific equipment. If the equipment is suspected of being defective, substitute new equipment (if possible) and conduct the test again. If the substitute operates correctly, the original should be considered defective and returned to Tellabs for repair or replacement as directed below. We strongly recommend that no internal (component-level) testing or repairs be attempted on the equipment. Unauthorized testing or repairs may void its warranty. Also, if the equipment is part of a registered system, unauthorized repairs will result in

noncompliance with Parts 15 and/or 68 of the FCC Rules and Regulations.

Note: Although repair service always includes an attempt to remove any permanent markings made by customers on Tellabs equipment, the success of such attempts cannot be guaranteed. Therefore, if equipment must be marked **defective** or **bad**, we recommend that it be done on a piece of tape or on a removable stick-on label.

technical assistance via telephone

7.02 If a situation arises that is not covered in the **testing guide checklist**, contact Tellabs Customer Service as follows:

USA customers: Contact your Tellabs Regional Office listed below.

region	telephone	office location
US Atlantic	(203)798-0506	Danbury, CT
US Capital	(703)359-9166	Washington, DC
US Central	(312)357-7400	Chicago, IL
US Southeast	(305)834-8311	Orlando, FL
US Southwest	(214)869-4114	Dallas, TX
US Western	(714)850-1300	Orange County, CA

Canadian customers: Contact our Canadian headquarters in Mississauga, Ontario. Telephone (416)624-0052.

International customers: Contact your Tellabs distributor.

selecting correct product service procedure

7.03 If equipment is diagnosed as defective or if in-service equipment needs repair, follow the **product return procedure** in paragraph 7.04 in all cases except those where a critical service outage exists (e.g., where a system or a critical circuit is

down and no spares are available). In critical situations, or if you wish to return equipment for reasons other than repair, follow the **product replacement procedure** in paragraph 7.05.

product return procedure (for repair)

7.04 To return equipment for repair, first contact Tellabs Product Services (see addresses and numbers below) to obtain a Material Return Authorization (MRA). A service representative will request key data (your company's name and address, the equipment's model and issue numbers and warranty date code, and the purchase order number for the repair transaction). The service representative will then give you an MRA number that identifies your particular transaction. After you obtain the MRA number, send the equipment prepaid to Tellabs (attn: Product Services).

in the USA:

Tellabs, Inc.
4951 Indiana Avenue
Lisle, Illinois 60532
telephone (312) 969-8800

in Canada:

Tellabs Communications Canada, Ltd.
1200 Aerowood Drive, Unit 39
Mississauga, Ontario, Canada L4W 2S7
telephone (416) 624-0052

Enclose an explanation of the malfunction, your company's name and address, the name of a person to contact for further information, and the purchase order number for the transaction. Be sure to write the MRA number clearly on the outside of the carton being returned. Tellabs will inspect, repair, and retest the equipment so that it meets its original performance specifications and then ship the equipment back to you. If the equipment is in

warranty, no invoice will be issued. Should you need to contact Tellabs regarding the status of a repair, call or write the Product Services department at our Lisle or Mississauga headquarters as directed above.

product replacement procedure

7.05 For critical service outages, Tellabs offers a choice of two replacement services (if the product is in replacement stock) in lieu of the 15-day repair and return service described above. These are **overnight express service** (at extra cost) anywhere in the USA and **five-day expedited delivery** (at no extra cost) anywhere in the USA and Canada. To obtain replacement equipment via either of these services, contact your Tellabs Regional Office in the USA or our Canadian headquarters in Mississauga, Ontario, for details, costs (if applicable), and instructions. Telephone numbers are given in paragraph 7.02. A service representative will request key data (your company's name and address, the equipment's model and issue numbers and warranty date code, and the purchase order number for the replacement transaction). Tellabs will then ship the replacement to you in accordance with the replacement service you request. An invoice in the amount of the replacement's current price plus any applicable service charges will be issued after the replacement is shipped. When you receive the replacement, pack the equipment to be returned in the replacement's carton, sign and enclose the packing list, affix to the carton the preaddressed label provided, and ship the carton prepaid to Tellabs at our USA or Canadian headquarters. When we receive the defective equipment (within 30 days of our issuing the replacement), the invoice will be adjusted to reflect only service charges (if applicable). Please note that OEM, modified, and manufacture-discontinued equipment is not available via overnight express service.

testing guide checklist

test	test procedure	normal result	if normal conditions are not met, verify:
transmission continuity, 4424 and circuit 1 of 4425	Arrange xmt portion of transmission measuring set (TMS) for 1004Hz tone output at +1dBm. Connect this signal to module's input side (pins 5 and 15 or pins 1 and 7, as appropriate). (If TMS has separate xmt impedance setting, set it for impedance selected on module's input side.) Connect rcv portion of TMS, arranged for terminated measurement at impedance selected on module's output side, to pins 1 and 7 or pins 5 and 15, as appropriate.	Output level not more than 0.5 $\pm$ 0.2dB below input level ☐ .	Wiring ☐ . Switch S1 and S2 impedance settings ☐ . No double terminations ☐ . Replace module and retest ☐ .
transmission continuity, circuit 2 of 4425	Set xmt portion of TMS as directed above, and connect it to module's input side (pins 55 and 49 or pins 41 and 47, as appropriate). Set rcv portion of TMS as directed above, and connect it to module's output side (pins 41 and 47 or pins 55 and 49, as appropriate).	Same as above ☐ .	Wiring ☐ . Switch S3 and S4 impedance settings ☐ . No double terminations ☐ . Replace module and retest ☐ .