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## Addendum: 7206 2W Switched Gain Compression Amplifier

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### 1. General

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- 1.01 This addendum to Practice Section 817206, revision C (dated April 1982), is being issued to update the *crosstalk loss between units in adjacent shelf slots* on page 6, replace the existing text with the following updated text:

*crosstalk loss between units in adjacent shelf slots*  
80dB nominal at 2000Hz



# 7206 2W Switched Gain Compression Amplifier

## contents

section 1	general description	page 1
section 2	application	page 2
section 3	installation	page 2
section 4	circuit description	page 4
section 5	block diagram	page 5
section 6	specifications	page 4
section 7	testing and troubleshooting	page 6

## 1. general description

1.01 The Tellabs 7206 2Wire Switched Gain Compression Amplifier module (figure 1) provides a 2wire cable facility with continuously adjustable bidirectional gain and automatic gain control. As such, the 7206 is intended for applications where transmission levels vary greatly from call to call, as is typically experienced in extended WATS calling arrangements, key-phone conferencing applications, and private-line tie-trunk networks.

1.02 This practice section is revised to provide a corrected noise specification in section 6 and to update the text portion of section 7.

1.03 The switched-gain circuitry of the 7206 combines signal gain in one direction with simultaneous signal attenuation in the other direction. The stronger signal is amplified while the weaker signal is attenuated by an equal amount. This arrangement results in unconditional stability, independent of gain and terminating impedances, because the sum of signal gain and loss equals zero.

1.04 The direction-detection circuitry of the 7206 is designed to provide a 27dB (minimum) advantage for remote dual-tone multifrequency (DTMF) pulsing in the presence of precise dial tone, thus ensuring off-network, on-network DTMF access under adverse conditions. All transitions of gain and loss occur smoothly and rapidly and are undetectable by the subscribers at either end of the facility. An option switch reduces the sensitivity of the direction-detection circuitry in the A-to-B direction of transmission to prevent excessive ambient noise from triggering the direction detector.

1.05 The 7206 combines from 0 to 14dB of continuously adjustable voice-frequency gain with a compression threshold that is continuously adjustable across a 0 to -20dBm range. This module is basically an automatic gain control amplifier that provides the adjusted amount of linear gain for input signals that result in output levels below the adjusted compression threshold. If the combination of input signal level and adjusted gain results in an output level greater than the adjusted compression threshold, gain is automatically reduced to maintain the adjusted compression threshold. No further

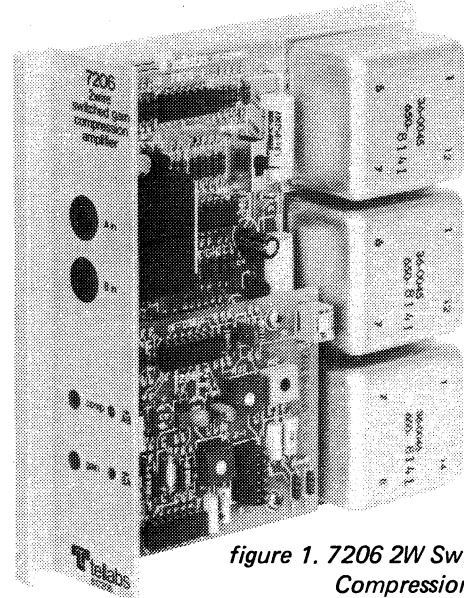


figure 1. 7206 2W Switched Gain Compression Amplifier

compression (or gain) is provided for input signals greater than the adjusted compression threshold. Maximum output level capability of the 7206 (when input signal levels exceed the adjusted compression threshold and compression is disabled) is +10dBm.

1.06 The 7206 is repeat-coil isolated at both ports and derives A and B leads at both ports for signaling. A switchable inductor on the B-side A and B leads may be removed from the circuit to avoid any possible interference when the 7206 is used with an external signaling unit.

1.07 The A-side and B-side amplifiers of the 7206 are current sources that can reflect the 2wire circuit impedances to the opposite port, thus maintaining a natural 1:1 impedance ratio. Impedance matching, therefore, need not be considered in conventional applications.

1.08 For ease of alignment and maintenance, 310-type opening jacks are provided on the line and drop sides of the 7206. In addition to the *gain* and *comp* (compression) controls, the front panel of the 7206 contains two light-emitting diodes (LED's) that provide visible indications of the direction of gain insertion (A-to-B or B-to-A).

1.09 Internal voltage regulation permits the 7206 to operate on any filtered input voltage between -22 and -56Vdc. Reverse-battery protection and transient-limiting circuitry are also provided.

1.10 A Type 10 module, the 7206 mounts in one position of a Tellabs Type 10 Mounting Shelf, versions of which are available for relay rack or apparatus case installation. In relay rack applications,

up to 12 modules may be mounted across a 19-inch rack, while up to 14 modules may be accommodated across a 23-inch rack. In either case, 6 inches of vertical rack space is used.

## **2. application**

**2.01** The 7206 2W Switched Gain Compression Amplifier module provides a 2wire cable facility with continuously adjustable bidirectional gain and automatic gain control. If the gain of this module is set for +14dB and the compression threshold adjusted for -10dBm, for example, the 7206 will maintain a -10dBm output level for all input signals between -24 and -10dBm. No further compression (or gain) will be provided for input signals above -10dBm. Compression dynamics are smooth and undetectable; the fast-attack, slow-delay compression dynamic inhibits gain before it is inserted. The 7206 is intended for applications in which transmission levels vary greatly from call to call.

**2.02** When speech is detected from station A to station B, the 7206 inserts gain from A to B and an equal amount of loss from B to A. Verification of gain insertion is provided by the A→B and B→A LED's on the module's front panel. When no speech is present, gain is disabled and both LED's extinguish.

**2.03** Transmission attenuation of the weaker party will occur during doubletalk if both signals are below the compression threshold and will be equal (in dB) to the difference between the level of the stronger signal and the compression threshold. In no case will levels be attenuated by an amount greater than the adjusted gain.

### **extended WATS**

**2.04** The major application of the 7206 is in extended WATS or combination on-network, off-network calling arrangements. Transmission quality typically ranges from fair to poor in these applications since the call must, in effect, go through the toll network twice. In these applications, it is recommended that the 7206 be aligned for +14dB of gain and -10dBm compression. Private-line tie-trunk networks should be treated with 7206's at their access points to improve transmission for on-net, off-net calls without causing crosstalk or excessive loudness for intra-network calls. The direction detector is designed to distinguish remote DTMF signaling in the presence of precise dial tone. The 7206 can recognize DTMF signaling at levels up to 27dB (minimum) below that of dial tone, thus ensuring off-network, on-network DTMF access under adverse conditions.

### **key phone conferencing**

**2.05** Transmission quality can become poor in 2wire key-phone conferencing systems; in such cases, it is recommended that one 7206 per line be installed. The module will regulate transmission levels for both conference and regular calls automatically. Since station-to-switch transmission levels will normally be greater than transmission levels in the opposite direction, it is recommended that the

A-side of the 7206 be oriented toward the station and the direction detector circuitry of the 7206 desensitized (via option switch *S1* on the module's baby board) to prevent ambient noise from falsely triggering the direction detector. Recommended gain setting for key-phone conferencing applications is +10dB; recommended compression threshold is -10dBm.

### **common mode**

**2.06** Line treatment is often provided within the switch, between the line finder and the first selector, and on each connector to alleviate the cost of line-by-line treatment. Since switched connections are unpredictable, gain will only be required in certain instances. In these types of applications, the 7206 should be arranged for full gain (14dB) and -10dBm compression to provide satisfactory transmission for weak talkers and poor connections without instability, crosstalk or excessive loudness.

### **special terminal applications**

**2.07** Conventional terminal repeaters are restricted to +6dB of gain; in applications where more gain is required, it is customary to use additional intermediate repeaters. In instances where the use of an intermediate repeater would be impractical, the 7206 can be installed at the terminal repeater's location and adjusted to provide the required additional gain. In these applications, compression settings are not required, since the 7206 will provide no gain for input signals above 0dBm.

### **wiring options and amplifier orientation**

**2.08** Figures 2 through 4 show A-and-B lead wiring options and amplifier orientation for various signaling modes. In figure 2, A-and-B-lead routing and amplifier orientation for applications using extended-range E&M-lead (DX) signaling is shown. In DX signaling applications, orient the 7206 so that inductor *L1* (i.e., the B side of the module) faces the dc-signaling side and route the 7206's A and B leads as shown in figure 2. Figure 3 shows A and B-lead routing in applications where the 7206 is used with an associated dial long line (DLL) unit; in these applications, the B-side of the 7206 should face the station equipment. In figure 4, the through-signaling configuration is shown; in these applications, orientation of the 7206 is immaterial. In all station applications, however, orient the A side of the 7206 toward the station end to permit use of the module's direction-detector sensitivity option (see paragraph 3.08).

## **3. installation**

### **inspection**

**3.01** The 7206 2W Switched Gain Compression Amplifier module should be visually inspected upon arrival in order to find possible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier. If stored, the module should be visually inspected again prior to installation.

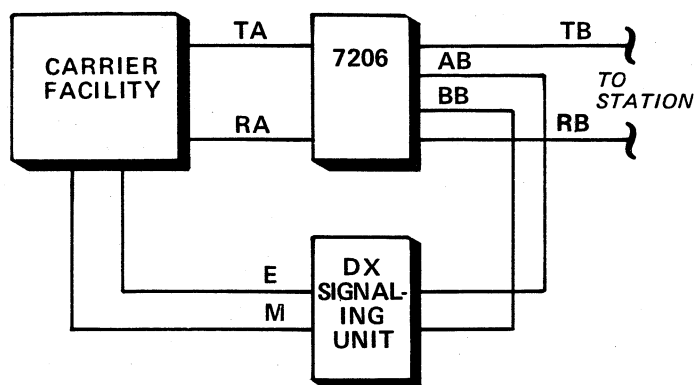


figure 2. A and B-lead routing and amplifier orientation for DX-signaling applications

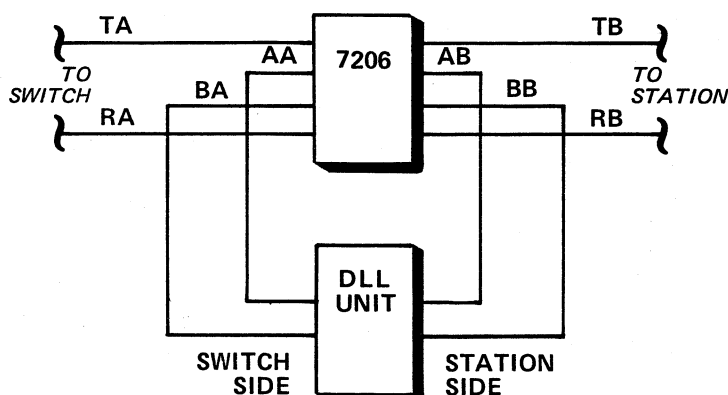


figure 3. A and B-lead routing and amplifier orientation when 7206 is used with associated DLL

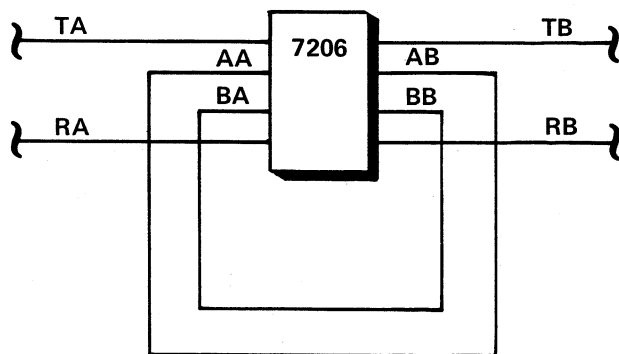


figure 4. Through signaling configuration

### mounting

3.02 The 7206 module mounts in one position of the Tellabs Type 10 Mounting Shelf, which is available in configurations for both relay rack and apparatus case installation. The module plugs physically and electrically into a 56-pin connector at the rear of the Type 10 Shelf.

### installer connections

3.03 Before making any connections to the mounting 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.

3.04 Table 1 lists external connections to the 7206 module. All connections are made via wire wrap at the 56-pin connector at the rear of each module's mounting shelf position. Pin numbers are found on the body of the connector.

connect:	to pin:
TA (tip, A side) . . . . .	51
RA (ring, A side) . . . . .	33
AA (A-lead, A side) . . . . .	53
BA (B-lead, A side) . . . . .	31
TB (tip, B side) . . . . .	41
RB (ring, B side) . . . . .	49
AB (A-lead, B side) . . . . .	45
BB (B-lead, B side) . . . . .	43
BATT (–24 to –56Vdc input) . . . . .	35
GND (ground) . . . . .	17

table 1. Installer connections to 7206

### amplifier orientation and wiring

3.05 A-and-B-lead derivation for various signaling modes is shown in figures 2 through 4 and described in paragraph 2.08. To summarize, in DX signaling applications, orient the Amplifier and route the 7206's A and B leads as shown in figure 2. Figure 3 shows signaling-lead arrangements and amplifier orientation for applications where the 7206 is used with a DLL. Figure 4 shows the through-signaling configuration. In all station applications, the A side of the 7206 faces the station and the B side faces the switching equipment.

### option selection

3.06 Two option switches must be set before the 7206 can be placed into service and aligned. The locations of these switches on the module's printed circuit board and baby board are shown in figure 5. Switch designations are indicated on the module adjacent to each switch.

3.07 Switch *S1* on the module's printed circuit board, which provides the means to include or exclude inductor *L1* from the B-side A and B leads, should be set to *NORMAL* to include *L1* and thus, to provide the best transmission. In the event that *L1* interferes with signaling, *S1* can be set to *SHORTED* to remove the inductor.

3.08 Switch *S1* on the module's baby board is used to reduce the sensitivity of the 7206's direction-detection circuitry to ambient noise in the A-to-B direction of transmission. In station applications, the A side of the 7206 should face the station and *S1* on the module's baby board set to *ON*. In all other applications, set *S1* to *OFF*.

### alignment

3.09 Alignment of the 7206 consists of adjusting the linear gain and the compression threshold. After the module is properly optioned, turn the *gain* and *comp* controls fully counterclockwise and insert the module into its mounting position. Procedures for adjusting the gain and compression of the module are contained in paragraphs 3.10 and 3.11, respectively. Suggested gain and compression adjustments for typical 7206 applications are contained in table 2.

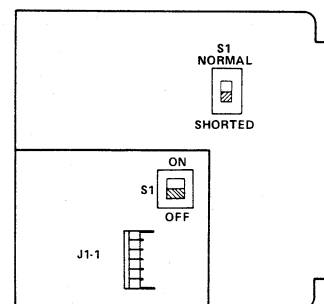


figure 5. Option switch location

**gain adjustment**

3.10 Connect the receive portion of a transmission measuring set (TMS), terminated in 900 ohms, to the *B in* jack. Arrange the transmit portion of the TMS to output 1004Hz test tone at a level equal to 0dBm minus the suggested amount of gain for your application (see table 2) minus an additional 2dB and insert this signal into the *A in* jack. *Since the 7206 automatically compresses at a 0dBm level, it is necessary to insert tone at a level approximately 2dB below the suggested level.* Turn the *gain* control clockwise until the TMS indicates -2dBm. For example, if the 7206 is used in key-phone conferencing applications, suggested gain from table 2 is +10dB. In this instance, arrange the TMS to output 1004Hz tone at -12dBm (0dBm - [10dB + 2dB] = -12dBm). Turn the *gain* control clockwise until the TMS indicates a -2dBm level at the *B in* port.

**compression adjustment**

3.11 With the receive portion of the TMS connected as above, arrange the transmit portion of the TMS to output 1004Hz test tone at a level 2dB below the suggested compression threshold for your application (see table 2) and insert this signal into the *A in* jack. Turn the *comp* control clockwise until the receive portion of the TMS indicates the suggested compression threshold.

application	suggested gain setting	suggested compression threshold
extended WATS, on-net, off-net calls	maximum ( <i>gain</i> control fully clockwise)	-10dBm
key-phone conferencing	+10dB	-10dBm
common mode (line treatment)	maximum* ( <i>gain</i> control fully clockwise)	-10dBm
special terminal applications	as required	0dBm ( <i>comp</i> control fully counterclockwise)

\* Less gain can be used if required.

table 2. Suggested gain and compression adjustments for typical 7206 applications

**4. circuit description**

4.01 This circuit description is intended to familiarize you with the 7206 2W Switched Gain Compression Amplifier for engineering and application purposes only. Attempts to troubleshoot the 7206 internally are not recommended and may void your warranty. Troubleshooting procedures should be limited to those prescribed in section 7 of this Practice. Please refer to the 7206 block diagram, section 5 of this Practice, as an aid in following the circuit description.

4.02 The *power supply* in the 7206 Amplifier is a series-regulated bipolar supply that uses a zener diode as a reference source. A series diode in the negative input lead protects the circuit against reversed input power connections.

4.03 The 7206 is transformer-isolated at both ports. In addition to providing the facility inter-

face, these transformers provide excellent immunity from 60Hz longitudinal voltages. For signaling purposes, A and B leads are derived at each transformer via coupling capacitors. On the B side of the 7206, these leads pass through inductor *L1*, which isolates the A and B leads from any possible interference when the module is used with an external signaling unit. An option switch provides the means to remove *L1* from the circuit, if necessary. Opening 310-type jacks at each port provide the means to align the module. Lightning protection is provided by means of varistors located across the secondaries of each transformer.

4.04 The *A-side* and *B-side amplifiers* are current sources that can reflect any impedance termination based on a signal from the *control circuit*. This *control signal* is designed so that the *A-side amp* reflects the impedance at the B-side port and the *B-side amp* reflects the impedance at the A-side port, thus maintaining a 1:1 impedance ratio regardless of gain or loss inserted in either direction. The *direction detector* also causes the amplifier to appear transparent below the direction detector's threshold or to insert gain in the A-to-B direction or the B-to-A direction, depending upon the direction of the dominant signal.

4.05 The gain of the 7206 is controlled by adjustment of the *gain* potentiometer, which places increasing dc bias on a pair of linear multipliers, thus increasing the gain request signal to the *control circuit*. When the *direction detector* is *ON*, as indicated by the *A→B* or *B→A* LED lighting, the *control circuit* will provide the appropriate amount of gain.

4.06 The *comp* control sets the threshold at which the compression control signal will recognize the combined signals at both ports. When this threshold is reached, the control signal quickly reduces the gain signal to the multipliers. The *compression* circuit has a fast attack time with slow release, so that compression is not discernible to subscribers at either end of the circuit.

4.07 An option switch on the module's baby board provides the means to reduce the *direction detector's* sensitivity to ambient noise, thus preventing room noise from falsely triggering directional changes of the *direction detector* in applications where the 7206 is located at the station. Two LED's (*A→B* and *B→A*) associated with the *direction detector* indicate the direction of gain insertion.

**6. specifications***gain range*

0 to +14dB ±1dB, continuously adjustable

*maximum output capability*

+10dBm

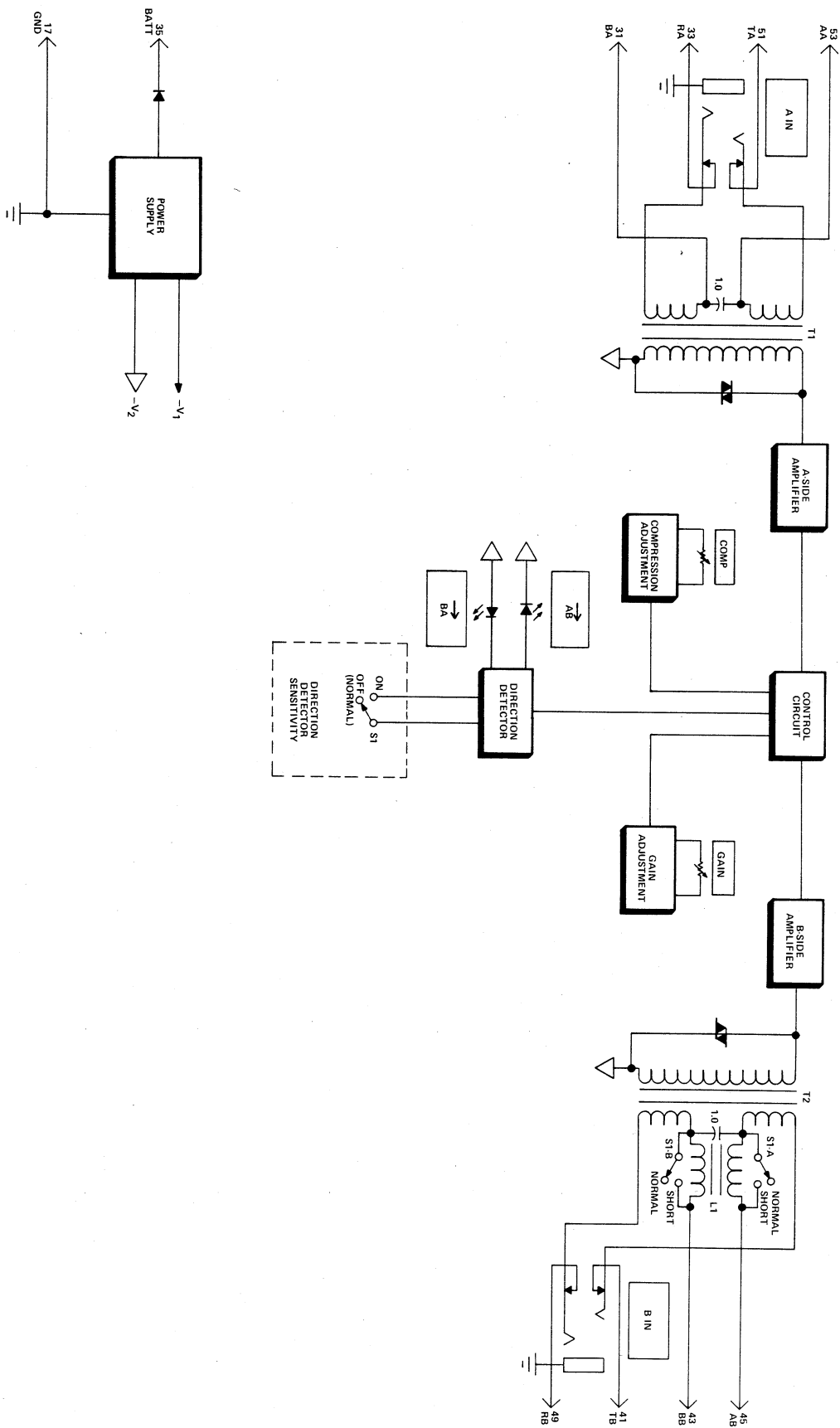
*compression threshold range*

0 to -20dBm, continuously adjustable

*harmonic distortion*

less than 1% (for any gain/compression setting)

specifications continued on page 6



5. block diagram

noise (at full gain)  
20dB<sub>BrnC</sub> maximum

longitudinal balance  
60dB average, 150 to 3000Hz

crosstalk loss between units in adjacent shelf slots  
80dB minimum at 2000Hz

echo return loss  
20dB minimum for any gain/compression setting with  
opposite port terminated in 900 ohms

dc resistance  
inductor in: 130 ohms, typical  
inductor shorted: 72 ohms, typical

frequency response (inductor in, full gain)  
-6 ± 1dB at 300Hz, re 1000Hz  
-1 ± 0.5dB at 3000Hz, re 1000Hz

direction detector sensitivity  
-50 ± 3dB at 1000Hz, approximately 25dB less at 300Hz,  
factory set

dial tone take away (DTMF capability)  
will operate through connection loss of 27dB, minimum,  
all cable gauges (assumes -10dBm precise dial tone level  
and 0dBm DTMF signal level)

delay distortion  
less than 175µs between 500 and 3000Hz, re 1000Hz

power requirements  
input voltage: filtered -22 to -56Vdc  
input current: 45mA maximum at -52.1Vdc and 0dBm  
signal level

operating environment  
20° to 130° F (-7° to 54° 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  
28 ounces (784 grams)

mounting  
relay rack or apparatus case via one position of Tellabs  
Type 10 Mounting Shelf

## 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 7206 2Wire Switched Gain Compression Amplifier 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 Northeast	(203) 798-0506	Danbury, CT
US Capital	(703) 359-9166	Washington, DC
US Central	(708) 505-7800	Chicago, IL
US Southeast	(407) 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) 858-2058.

**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 60532-1698  
telephone (708) 969-8800

#### in Canada:

Tellabs Communications Canada, Ltd.  
2433 Meadowvale Boulevard  
Mississauga, Ontario, Canada L5N 5S2  
telephone (416) 858-2058

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 pre-addressed label provided, and ship the carton prepaid to Tellabs at our USA or Canadian headquarters. The defective equipment must be received within 30 days of the replacement's ship date. When we receive the defective equipment, a credit will be issued, leaving a balance due on the replacement's invoice that reflects only the express service and/or out-of-warranty charges, if any. Returns received more than 30 days after the replacement's ship date **will not be accepted for credit** but instead will be returned to you, thereby rendering the replacement's invoice due and payable. Please note that OEM, modified, and manufacture-discontinued equipment is not available via overnight express service.

**testing guide checklist on page 8**

## testing guide checklist

test	test procedure	normal conditions	if normal conditions are not met, verify:
gain, A to B	Turn <i>comp</i> control fully counterclockwise (CCW) and <i>gain</i> control fully clockwise (CW). Connect receive portion of TMS, terminated in 900 ohms, to <i>B in</i> jack. Connect transmit portion of TMS, arranged to output 1004Hz test tone at -16dBm level, to <i>A in</i> jack.	<i>A</i> → <i>B</i> LED lights <input type="checkbox"/> . TMS indicates approximately -2dBm (output level equals input level plus gain) <input type="checkbox"/> .	<i>Comp</i> and <i>gain</i> control adjustments <input type="checkbox"/> . Power <input type="checkbox"/> . Wiring <input type="checkbox"/> . Replace 7206 and retest <input type="checkbox"/> .
gain, B to A	Repeat above procedure except insert tone in <i>B in</i> jack and terminate <i>A in</i> jack.	Same as above except <i>B</i> → <i>A</i> LED lights <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
compression	With TMS connected as above, adjust <i>comp</i> control for -10dBm threshold. Insert 1004Hz test tone at -24dBm level.	<i>B</i> → <i>A</i> LED lights <input type="checkbox"/> . TMS indicates approximately -10dBm (output level equals input level plus gain) <input type="checkbox"/> .	<i>Gain</i> and <i>comp</i> adjustments <input type="checkbox"/> . Power <input type="checkbox"/> . Wiring <input type="checkbox"/> . Replace 7206 and retest <input type="checkbox"/> .
	With test connections as above, insert 1004Hz test tone at -15dBm level.	<i>B</i> → <i>A</i> LED lights <input type="checkbox"/> . TMS indicates approximately -10dBm (output level equals compression threshold) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
	With test connections as above, insert 1004Hz test tone at -2dBm level.	<i>B</i> → <i>A</i> LED lights <input type="checkbox"/> . TMS indicates approximately -2dBm (output level equals input level) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
direction detector sensitivity	Set <i>S1</i> on the module's <b>babyboard</b> to <i>OFF</i> . Connect receive portion of TMS, terminated in 900 ohms, to <i>A in</i> jack. Connect transmit portion of TMS, arranged to output 1004Hz test tone at -45dBm level, to <i>B in</i> jack.	<i>B</i> → <i>A</i> LED lights <input type="checkbox"/> . TMS indicates approximately -31dBm (output level equals input level plus gain) <input type="checkbox"/> .	Option switches <input type="checkbox"/> . Power <input type="checkbox"/> . Wiring <input type="checkbox"/> . Replace 7206 and retest <input type="checkbox"/> .
	With test connections as above, insert 300Hz tone at -20dBm level.	<i>B</i> → <i>A</i> LED lights <input type="checkbox"/> . TMS indicates at least -12dBm (output level equals input level plus gain, less roll off) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
	Repeat above procedure except insert tone in <i>A in</i> jack and terminate <i>B in</i> jack.	Same as above except <i>A</i> → <i>B</i> LED lights <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
	Set <i>S1</i> on module's <b>babyboard</b> to <i>ON</i> . Arrange TMS to output 1004Hz test tone at -35dBm level.	<i>A</i> → <i>B</i> LED does not light <input type="checkbox"/> . TMS indicates approximately -35dBm (output level equals input level) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .
	With test connections as above, insert 1004Hz test tone at -25dBm level.	<i>A</i> → <i>B</i> LED lights <input type="checkbox"/> . TMS indicates approximately -11dBm (output level equals input level plus gain) <input type="checkbox"/> .	Same as above <input type="checkbox"/> .