SSP-1405

PASSIVE PROGRAM EQUALIZER

CONTENTS PAGE

1. GENERAL

1.01 The SSP-1405 is a plug-in module designed to mount in Transcom SSP mountings, or industry equivalent 400 type mountings.

1.02 The SSP-1405 is designed to equalize nonloaded cable used for 5, 8, or 15 KHz program circuits.

1.03 The module contains a line transformer whose input and output can be individually set for either 600 or 150 ohm impedance.

1.04 The equalizing network can be connected on either the input or output side of the line transformer. Six settings are available: one each for 5 and 8 KHz and four for 15 KHz circuits.

1.05 Terminals are provided to accommodate additional components when the basic network does not provide adequate equalization.

1.06 Test jacks and monitor points are provided on both sides of the line transformer.

2. APPLICATION NOTES:

2.01 Test jacks are provided on the input and output of the SSP-1405 to set up the module.

2.02 Monitor points are also provided to monitor the operation of the SSP-1405.

2.03 After the correct switch is selected, the module can be inserted in the circuit and the front panel thumbwheel switches can be fine-tuned to give the correct equalization.

2.04 In some circuits made up of long lengths of mixed gauges or containing several equalizers in tandem, external components may have to be added. Shorting clips and component mounting posts are provided for these applications. See Section 9 for more information.

3. SPECIFICATIONS

Temperature, Operating: 0 to + 60°C
Storage: -40 to + 85°C

Humidity: 95%, no condensation

Transformer:
Input Impedance: 600 or 150 ohms, ±5%
Ratio: 150/600: 150/600 Ω

Insertion loss, 600:600 ohms:
1.0 ± 0.3 dB from 100 Hz to 20 KHz
Derived simplex leads when switched to 600 ohms.

Equalizer:
Parallel L-C circuit in series with 0-990 Ω, Thumb wheel switches with 10 Ω resolution.
Can be connected to input or output.
Switch-selectable for 5, 8, or 15 KHz program circuits.
Terminals for adding external components.

4. MOUNTING INFORMATION

4.01 The SSP-1405 mounts in Transcom SSP or industry equivalent 400 type mounting assemblies, including apparatus cases and various mounting shelves.

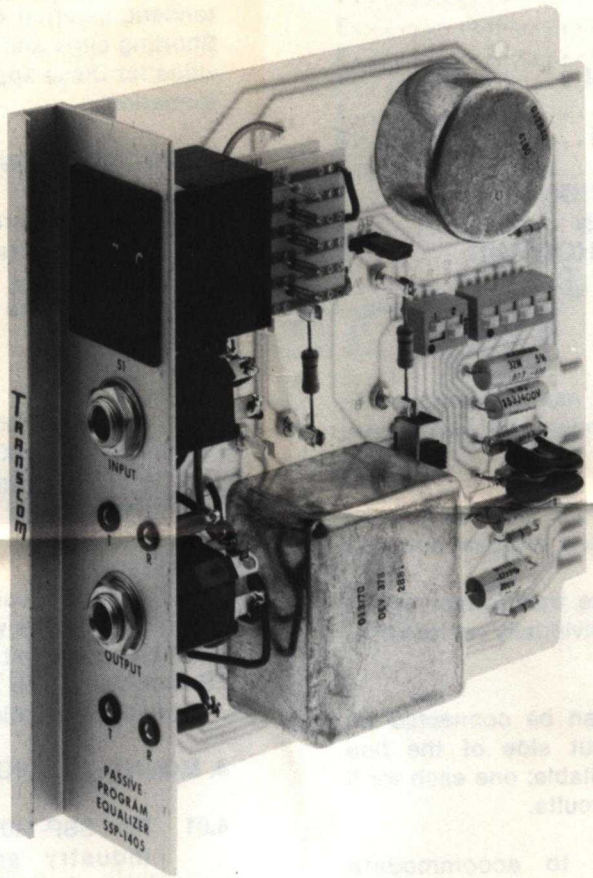
4.02 See Product Bulletin 107219 for more information.

5. PHYSICAL DESCRIPTION:

5.01 Plug in card:
depth - 5.5" (140mm)
height- 5.6" (142mm)
width - 1.5" (38mm)

5.02 The contacts on the card edge connector are gold plated.

5.03 Mounted on the combination panel- extractor are the test jacks and monitor points, and the network resistance thumbwheel switches.



6. ORDERING INFORMATION

6.01 When ordering, specify the number of SSP-1405 units required.

6.02 Specify the number of SSP mounting shelves or other mounting arrangements required.

7. CIRCUIT DESCRIPTION

7.01 Figure 1 is a schematic drawing of the SSP-1405 Passive Program Equalizer.

7.02 T1 is a standard 150/600: 150/600 line transformer. The input and output impedances can be separately switched to either 150 or 600 ohms. In the 600 ohm position, a simplex lead is available.

7.03 The equalization network consists of various capacitors and a tapped inductor in parallel, with a 2-position thumbwheel switched resistance in series. Switches select the correct combination of capacitor and inductor for the particular program circuit. The resistance switches can be adjusted from the front panel.

7.04 The parallel capacitor and inductor have a resonant frequency higher than the maximum frequency of the program circuit. Therefore, at the frequencies of interest, the circuit is inductive. This means that the network introduces more loss at the lower frequencies than at the higher frequencies. Also, as more resistance is introduced by the thumbwheel switches, less equalization is produced by the resonant network.

7.05 Removable shorting clips and component mounting posts are available to add external components, if needed.

7.06 The jack sleeves and electrostatic shields are brought out on separate connector pins to be tied in where needed.

8. INSTALLATION INFORMATION

8.0l Figure 2 shows the pin assignments for the SSP-1405.

8.02 Battery is not needed for the SSP-1405. If pins 17 and 35 are wired to ground and battery, no current will be drawn from the battery by the module.

9. ALIGNMENT INFORMATION

9.01 Figure 3 shows the location of the various switch and clip options, the thumbwheel switches, and the terminals for mounting external components.

9.02 The AB and CD clips should normally be in the position shown. Move AB or CD to the alternate position to open the circuit between A and B, or C and D, respectively.

9.03 The NETWORK switch is normally set to INPUT for 5.0 or 8.0 KHz program circuits, and to OUTPUT for 15 KHz program circuits.

9.04 The INPUT and OUTPUT switches are set to 150 or 600, depending upon the impedance of the input and output.

9.05 The KHz switches are set depending upon the frequency range of the particular program circuit. Only one of the KHz switches should be IN at any time.

9.06 The following procedures assume 100 Hz as the lower frequency limit of the program band. If local tariffs require a different limit (e.g. 50 Hz), use that limit instead of 100 Hz when adjusting the thumbwheel switches.

9.07 Procedure for 5.0 and 8.0 KHz program circuits:

a. Set clips and switches as outlined in 9.02 through 9.05.

b. Set the thumbwheel switches to 10 (equivalent to 100 Ω).

c. Send 5.0 (or 8.0) KHz at 0 dBm level at one end of the circuit and read the loss at the other end of the circuit.

d. Send 100 Hz and adjust the thumbwheels to give the same loss reading as in step c.

e. Repeat steps c and d until the readings at 5.0 (or 8.0) KHz and 100 Hz match. If no match is possible, see Section 9.14.

f. Check the loss at other frequencies between 100 Hz and 5.0 (or 8.0) KHz. If all readings equal the 100 Hz loss ± 1dB, the setup is complete.

g. If there is a hump or dip which does not exceed 2 dB, reset the 100 Hz loss to equal the 5.0 (or 8.0) KHz loss plus (for dip) or minus (for hump) one-half the magnitude of the dip or hump in the loss curve. This adjustment will yield a response curve with a hump or dip that does not exceed 1 dB.

h. If the hump or dip is more than 2 dB, see section 9.09.

9.08 Procedure for 15 KHz program circuits:

a. Set clips and switches as outlined in 9.02 through 9.05. Set the 15-1 KHz switch IN.

b. Set thumbwheel switches to 10 (equivalent to 100 Ω).

c. Send 15 KHz at 0 dBm level at one end of the circuit and read the loss at the other end of the circuit.

d. Send 100 Hz and adjust the thumbwheels to give the same loss reading as in step c.

e. Repeat steps c and d until the readings at 15 KHz and 100 Hz match. If no match is possible, see section 9.14.

f. Check the loss at other frequencies between 100 Hz and 15 KHz. If all readings equal the 100 Hz loss ± 1dB, the setup is complete.

g. If there is a hump in the loss curve which exceeds 1 dB, note the peak magnitude of the hump. Switch to the next higher 15 KHz switch and repeat from step c. **Note:** Only one KHz switch may be IN at any one time.

h. If there is a dip in the loss curve which exceeds 1 dB, note the peak magnitude of the dip. If the dip is greater than the hump in the preceding KHz switch position, return to the preceding position and proceed to step i. If the dip is less than the hump in the preceding KHz switch position, leave the KHz switch in the present position and proceed to step i.

i. If the hump or dip does not exceed 2 dB, reset the 100 Hz loss to equal the 15 KHz loss plus (for dip) or minus (for hump) one-half the magnitude of the dip or hump in the loss curve. This adjustment will yield a response with a hump or dip which does not exceed 1 dB.

j. If the hump or dip is more than 2 dB, see section 9.09.

9.09 For a hump or dip that exceeds 2 dB, it may be necessary to add resistors and/or capacitors. The components necessary to equalize a particular line can only be determined experimentally. Sections 9.10 through 9.13 define this procedure.

9.10 To flatten response between 5 and 15 KHz:

a. Place the KHz switch in the position which produced the dip.

b. Note the magnitude of the dip with the potentiometer set to give equal losses at 100 Hz and the upper frequency limit.

c. Increase the loss at 100 Hz by the amount of the dip in step b by resetting the thumbwheels. Note the setting of the thumbwheels.

d. Move the AB clip to the alternate position. Remove the 5 ohm resistor between post A and B, and connect a resistor equal to ten times the thumbwheel setting in step c between posts A and B, Set the thumbwheels to 00.

e. This should improve the response by about 1 dB and will also increase the equalized loss by approximately the same amount.

9.11 To add shunt resistance to the output:

a. Proceed as in 9.10 steps a through c.

b. Connect a resistance of between 1500 and 5000 ohms across posts E and F. The potentiometer may have to be readjusted slightly to match the high and low frequency losses.

c. If a hump occurs, the added resistance on posts E and F should be larger. If the dip is still present, the resistance should be smaller.

9.12 To equalize a hump which cannot be removed, even in position 15-4:

Add a capacitor of about 0.015uF across posts B and C. Adding this capacitance lowers the resonant frequency of the circuit and the equalized loss. An excessive capacitance may produce either a hump or an "S" shape in the response which will give a relatively sharp roll-off very near 15 KHz. It should not be necessary to lower the resonant frequency by more than 5 KHz.

9.13 To add series capacitance:

a. Adding series capacitance increases the resonant frequency of the circuit and the equalized loss. Minimal additional flattening may be expected by this technique. The resonant frequency should not be raised by more than 5 KHz.

b. Move the CD clip to the alternate position. Remove the 5 ohm resistor between posts C and D and connect a capacitor across posts C and D. The value will be between 0.009 and 0.25 uF, depending upon the switch position and the amount of flattening needed.

9.14 For longer lines where the thumbwheel switch setting is less than 10, in some instances it may not be possible to achieve the match in readings between 100 Hz and the upper frequency. The following procedure may produce a better match:

a. Move the AB and CD clips to their alternate positions. This is equivalent to inserting 5 ohms in series with the thumbwheel.

b. Go back to step e. of section 9.07 or 9.08.

10. TESTING AND TROUBLESHOOTING

10.01 If trouble is encountered, verify the following:

a. Installer wiring is correct.

b. Clips are in the correct positions.

c. If external components are used, they are soldered to the correct posts, and the solder joints are good.

d. Card is in the correct slot and firmly seated.

10.02 If trouble persists, replace the SSP-1405.

11. MAINTENANCE

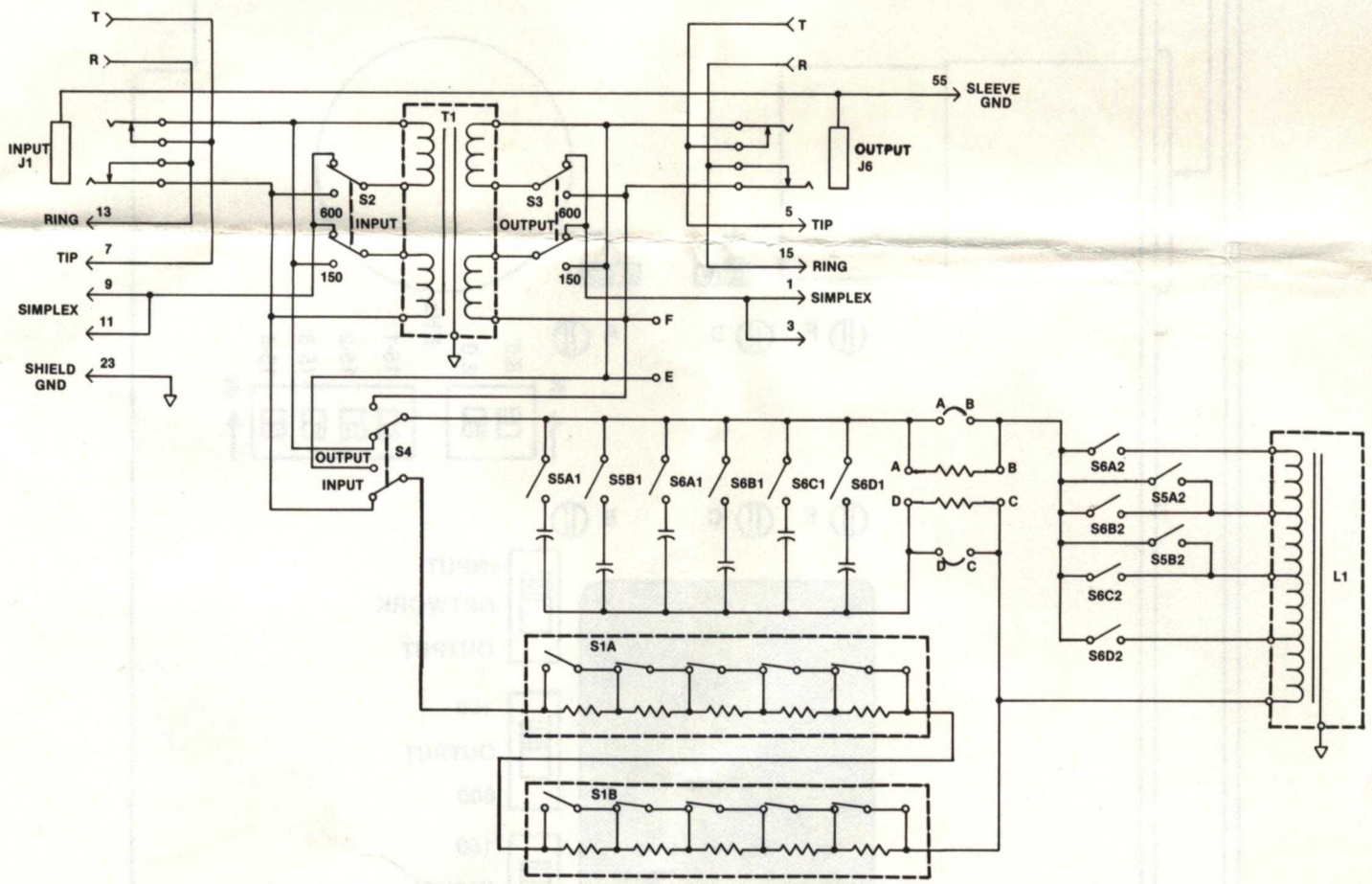
11.01 In most cases, it is impractical to troubleshoot and repair a unit in the field; therefore, a faulty unit should be sent to the factory.

11.02 A unit can be repaired in thirty days or less. To have a unit repaired, follow this procedure:

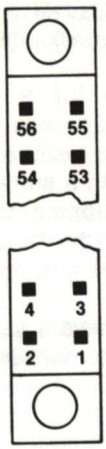
a) Call or write for a Return Authorization Number.

b) Pack the unit in a suitable carton (preferably the original shipping carton) and return it to the factory with the Return Authorization Number.

c) If you do not have a suitable carton, ask the Transcom Customer Service Manager to send one.



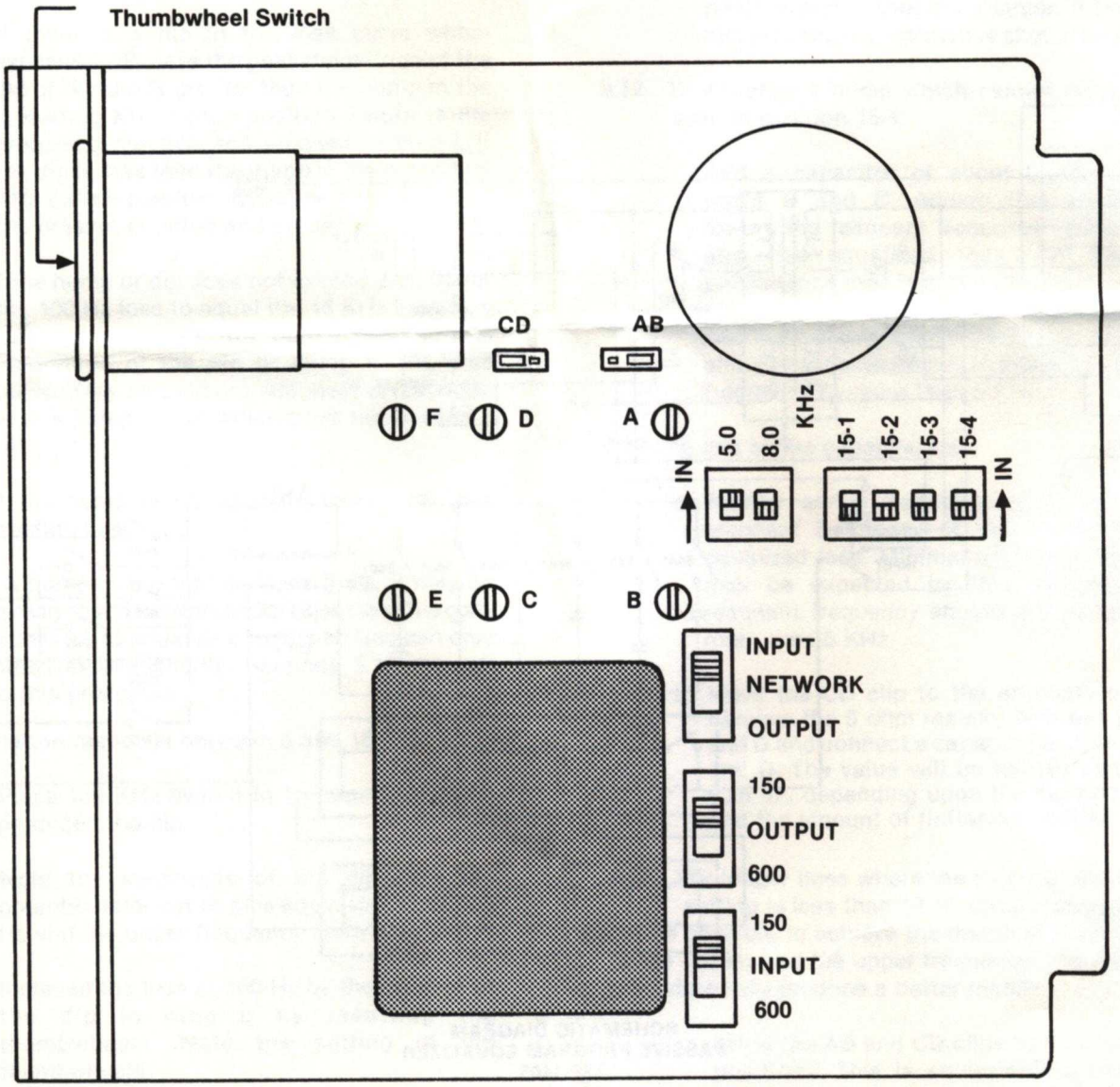
SCHEMATIC DIAGRAM
PASSIVE PROGRAM EQUALIZER
SSP-1405
Figure 1



CONNECTOR PIN#	TO
1	Simplex Output
3	Simplex Output
5	T Output
7	T Input
9	Simplex Input
11	Simplex Input
13	R Input
15	R Output
23	Shield Gnd
55	Sleeve Gnd

SSP-1405 CONNECTOR PIN ASSIGNMENTS

Figure 2



OPTION LOCATIONS FOR SSP-1405

Figure 3

TRANSCOM®
ELECTRONICS
Division of Lynch Communication Systems, Inc.
1170 East Main Road • Portsmouth, R. I. 02871
401 – 683-3000

Printed in U.S.A.