Texscan

Forward Trunk Modules

T3AM,T8AM, T4AM,T9AM With T4AC AGC-ASC Module

Application, Alignment, & Maintenance

Manual

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

REFERENCES

CATV SYSTEMS APPLICATION HANDBOOK
T300/T400 POWER SUPPLY MANUAL
T300/T400 BRIDGING MODULE MANUAL

SPECIFICATIONS—T300/400 FORWARD AND AGC/ASC MODULE

		T300 47-300 MHz 35 CHANNELS	T330 47-330 MHz 40 CHANNELS	47-330 MHz 40 CHANNELS	T400 47-400 MHz 53 CHANNELS	T440 47-440 MHz 60 CHANNELS
RECOMMENDED OPERATING GAIN Trunk in to Trunk out	dB	22	22	22	21	21
RATED OUTPUT (-57 dB or better cross-mod)[1]	dBmV	+45/47/49	+44/46/48	44/50	42/49	41/48
TRIPLE BEAT (-57 dB or better)[1]	dBmV	44/46/48	42/44/46	44/50	43/50	42/49
TYPICAL OPERATING LEVEL Trunk Input/Output	dBmV	10/28-30-32	10/28-30-32	10/26-32	10/25-32	10/25-32
DISTORTION (Worst Case for Typical Operating Levels)-Cross Mod	dB	91	90	93	92	91
2ND ORDER BEATS	dB	85	85	86	86	85
COMPOSITE TRIPLE BEAT[2] at Recommended Operating Levels	dB	89	88	94	93	92
MINIMUM FULL GAIN [3]	dB	26	26	26	25	25
NOISE FIGURE	dB	8	8	8	9	9
RESPONSE FLATNESS	dB	±0.25				
CABLE EQUALIZATION RANGE [3]	dB	10-26				
MANUAL GAIN CONTROL RANGE (MGC)	dB	8				
MANUAL SLOPE CONTROL RANGE (MSC)	dB	5				
AUTOMATIC GAIN AND SLOPE CONTROL (AGC/ASC) (AGC/ASC) for changes of ± 4 dB of cable—Output holds at	dB	±0.25				
INPUT TO BRIDGER TAP (min.)	dB	11				
POWER REQUIREMENTS: Trunk Module AGC Module	dcmA dcmA	290 70				

NOTES:
1. With PAD-0, PAD and Equalizer plug-ins.
2. NCTA test method.
3. With appropriate plug-in pad and equalizer.
4. Bridger module tap is a flat 17dB below trunk out.
5. Theta-Com proposed spectrum analyzer test method.
6. Specifications are for a typical module operating in an XR2AH-7 housing with 14IM and 140M input/output modules.

INTRODUCTION

This manual provides specification, application, installation, set-up and maintenance information for T3AM and T4AM Trunk Forward Modules. Troubleshooting procedures and aides are presented to assist the experienced CATV Technician in performance of general maintenance and bench alignment. Specifications and schematics are given for reference.

The module plugs into the station input and output modules, providing trunk amplification and control of trunk gain and slope functions.

By use of plug-in pads and equalizers, a wide range of operating options are available. A plug-in control module (T4AC) changes the trunk forward module to AGC control (See Figure 1). A directional coupler in the trunk output provides input for the AGC module and bridging modules. The T3AM module has similar characteristics to the TFM module and can be used as an interchangeable spare.

APPLICATION

The T3AM/T4AM Block Diagram is shown in Figure 2, and pad and equalizer combinations are shown in Figure 3. The T3AM amplifier has an equalized gain of 12 dB at 300 MHz (12 dB of cable) and a minimum of 10 dB flat gain, for a total operational gain of 22 dB. With appropriate plug-in pad and equalizer, it can be spaced from 10 to 25 dB. The T4AM amplifier has an equalized gain of 12 dB (12 dB of cable at 400 MHz) and a minimum 9 dB flat gain, for a total operational gain of 21 dB. With appropriate plug-in pad and equalizer, it can be spaced from 10 to 23 dB. A plug-in variable equalizer circuit allows response optimization, which might be desirable on long cascades.

The T8AM and T9AM Forward Modules are identical to the T3AM and T4AM. The difference is in their extended bandwidth (330 and 440 MHz respectively), which is obtained by component selection. Consult factory for replacement hybrids for these amplifiers.

FIELD SETUP

GENERAL

The following procedure is to establish proper operational setup after initial station installation or module maintenance repair service. It assumes the forward module has been properly bench aligned, or factory aligned as initially received. Figure 4 provides the necessary correction factor to compensate for system cable variances due to temperature during the setup processes. This allows the MGC amplifier to be set at the proper level within the operational range of the amplifier. This procedure assumes the following:

1. Alternate trunk stations are AGC.
2. Amplifiers are spaced at 20/22 dB.
3. Trunk cable with an approximate temperature coefficient of .00125°F.
4. The system design temperature is 70°F.
5. Reference carrier levels are 28/32 dBmV for 300-330 MHz. (Recommended levels for 400-440 MHz are 25/32).

If the system uses an AGC amplifier in every third trunk station, the first amplifier would be set as shown in Figure 4, and the correction differential doubled for the second amplifier.

The uncorrected MGC trunk station output level will only be at the design reference levels near the design reference temperature. As the environment temperature varies above or below this point, the amplifier input levels vary according to the temperature characteristic of the preceeding coaxial cable. Since the amplifier gain is fixed, the same variation occurs at the station output. When setting station output levels, it is therefore necessary to apply proper temperature compensation allowance, to assure proper system operation throughout the complete operational environment. The compensation chart shown in Figure 4 provides precise settings that will allow the system to remain

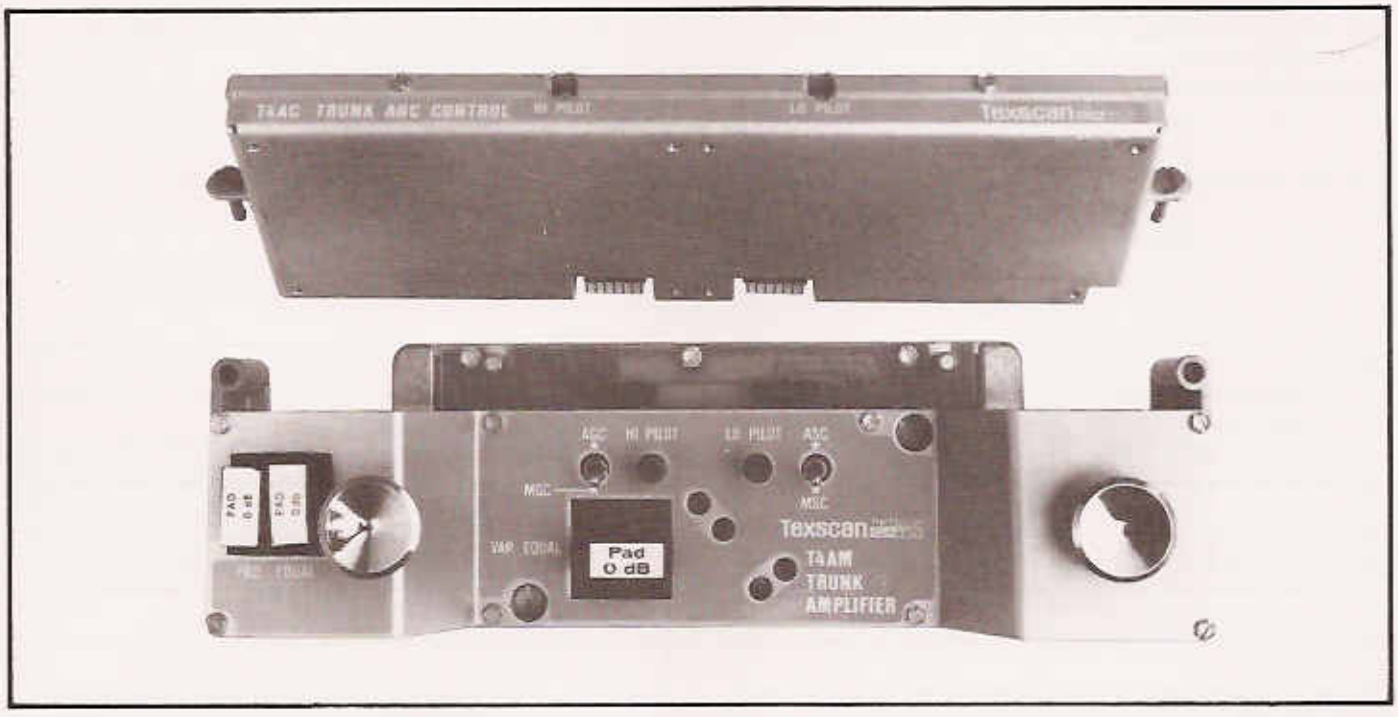


FIGURE 1. T4AM MODULE WITH PLUG IN T4AC AGC MODULE

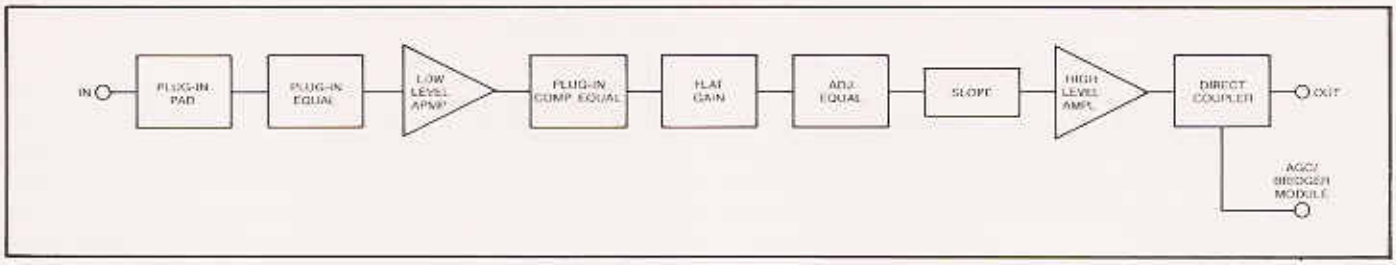


FIG. 2. T3AM/T4AM FORWARD MGC TRUNK AMPLIFIER FUNCTIONAL BLOCK DIAGRAM

unattended for seasonal temperature changes, for example, assume the outside temperature is 10°F during the setup procedure. From the chart the proper carrier levels are +29 dBmV for the low reference and +33.65 dBmV for the high reference (22 dB spacing). Setting the station outputs at these values will give station levels of +28 32 dBmV when the temperature returns to +70°F.

EQUIPMENT REQUIRED (or equivalent)

Signal Level Meter	Texscan Model 7272, Digitech or VSM-1, 2, or 5
Volt Ohm Meter	Triplett Model 310 Simpson Model 260
Test Probe	Texscan XR2TP (-20 dB Test Probe Power Blocked)
NOTE: Assure that all equipment is properly calibrated.	

T3/T4AM SETUP PROCEDURE

1. Assure that proper pad and equalizers are installed.
2. Assure that proper interconnection modules are installed (T4CM or T4DF), and necessary input/output plug-ins are installed.
3. Assure that forward amplifier switches are set to "MGC" and "MSC".
4. Connect Signal Level Meter (thru RF Test Probe) to Output Test Point.
5. Locate and note low and high carrier correction values for the test conditions (See Figure 4).
6. Set carrier levels as shown in Figure 4.
7. A. If this setup is a part of sweep setup procedure, refer to Section V of T300 - T400 System Manual.
   B. If the station is an AGC station, proceed to T4AC Setup Procedure.
   C. If the station has a bridger module, refer to continuing procedure shown in bridger station manual.
   D. If only general setup of an MGC station is required, the procedure is complete. CLOSE STATION COVER.

T4AC SETUP PROCEDURE

1. Assure the T4AC Module is firmly inserted and secured with its two mounting screws.
2. If not previously completed, perform Steps 1 thru 6.
3. Note values of the high and low pilot carriers.
4. Set the T4AM AGC function switches to "AGC".
5. Set T4AC "HI PILOT" to the high pilot value noted in Step 3.
6. Set T4AM ASC function switch to "ASC".
7. Set T4AC "LOW PILOT" to the low pilot value noted in Step 3.

EQUALIZER	
CABLE LOSS ONLY @ UPPER FREQUENCY	EQUALIZER PLUG-IN
8 to 16 dB	PAD-0
12 to 20 dB	EQ-4/XX0
16 to 24 dB	EQ-8/XX0

PAD	
CABLE + FLAT LOSS @ UPPER FREQUENCY	PAD PLUG-IN
21 to 22 dB	PAD-0
19 to 21 dB	PAD-2
17 to 19 dB	PAD-4
15 to 17 dB	PAD-6

FIG. 3. FORWARD TRUNK AMPLIFIER MODULE PLUG-IN SELECTION

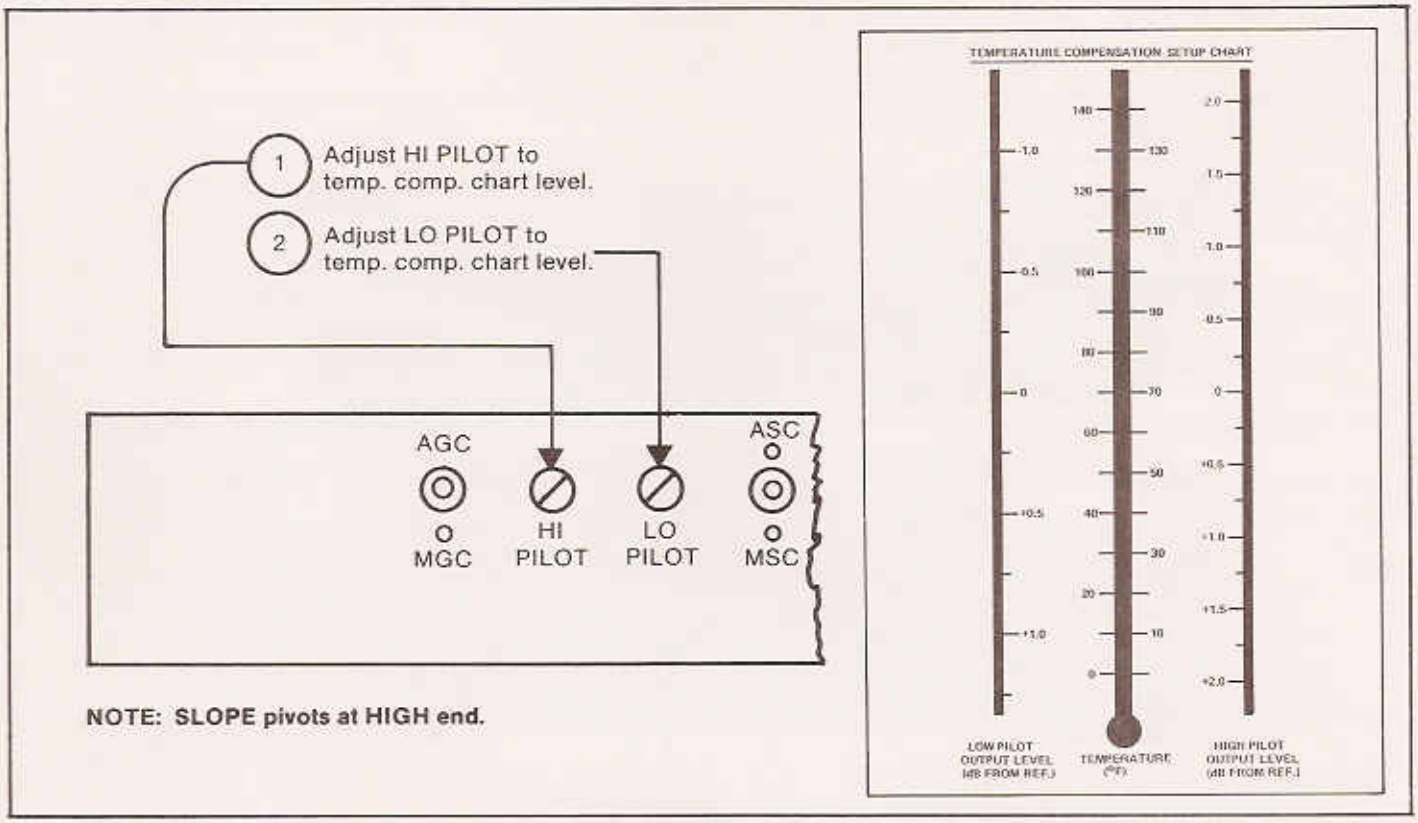


FIGURE 4. TEMPERATURE COMPENSATION CHART

8. If the station has a bridger module, refer to continuing procedure in bridger station manual.
9. Close station cover.

FIELD MAINTENANCE

GENERAL

The T300/T400 Modules have been carefully designed to provide the most efficient and reliable performance. The modules are easily replaced, making modular interchange the most economical means of field service. A supply of replacement modules should be carried for field maintenance stock. Maintenance procedures shown below are for the forward amplifier and AGC modules; refer to "CATV System Application Handbook" for complete station procedures. Modular construction and advanced features provide many opportunities to make quick "on the spot" field repairs. Good maintenance policies will minimize system down time and enhance the inherent reliability of Texscan/Theta-Com equipment.

EQUIPMENT REQUIRED

Equipment requirements are the same as shown in SETUP section above.

FIELD MAINTENANCE PROCEDURE, FORWARD MODULE

Assure proper pad, equalizer and variable equalizer are installed. (Refer to station log posted inside station cover). RF levels for test points are shown in Table 1.

1. Measure station output.

IF LEVEL IS INCORRECT
Proceed to Step 2.

IF LEVEL IS CORRECT
Close cover and proceed to next station.

2. Measure station input and note value.

IF LEVEL IS INCORRECT
Proceed to previous station.

IF LEVEL IS CORRECT
Proceed to Step 3.

3. Assure power supply operation is satisfactory. Refer to T300/T400 Power Supply Manual for Procedures.

IF POWER SUPPLY IS DEFECTIVE
Replace or repair as necessary. Repeat Step 1.

IF OPERATION IS SATISFACTORY
Proceed to Step 4.

4. Remove Trunk Amplifier Module Cover (Refer to Figure 6).
5. Measure voltage on T.P.'s (test points) G and H. Voltage should be 24 ± 1 VDC.

IF EITHER LEVEL IS INCORRECT
Proceed to Step 6.

IF LEVEL IS CORRECT
Proceed to Step 7.

6. Replace module and setup station as shown in FIELD SETUP PROCEDURE above. Tag defective module with notation "Break in DC continuity".
7. Using the test probe, check R.F. level at Test Point "C". Level should be within 1.0 dB of value noted in Step 2.

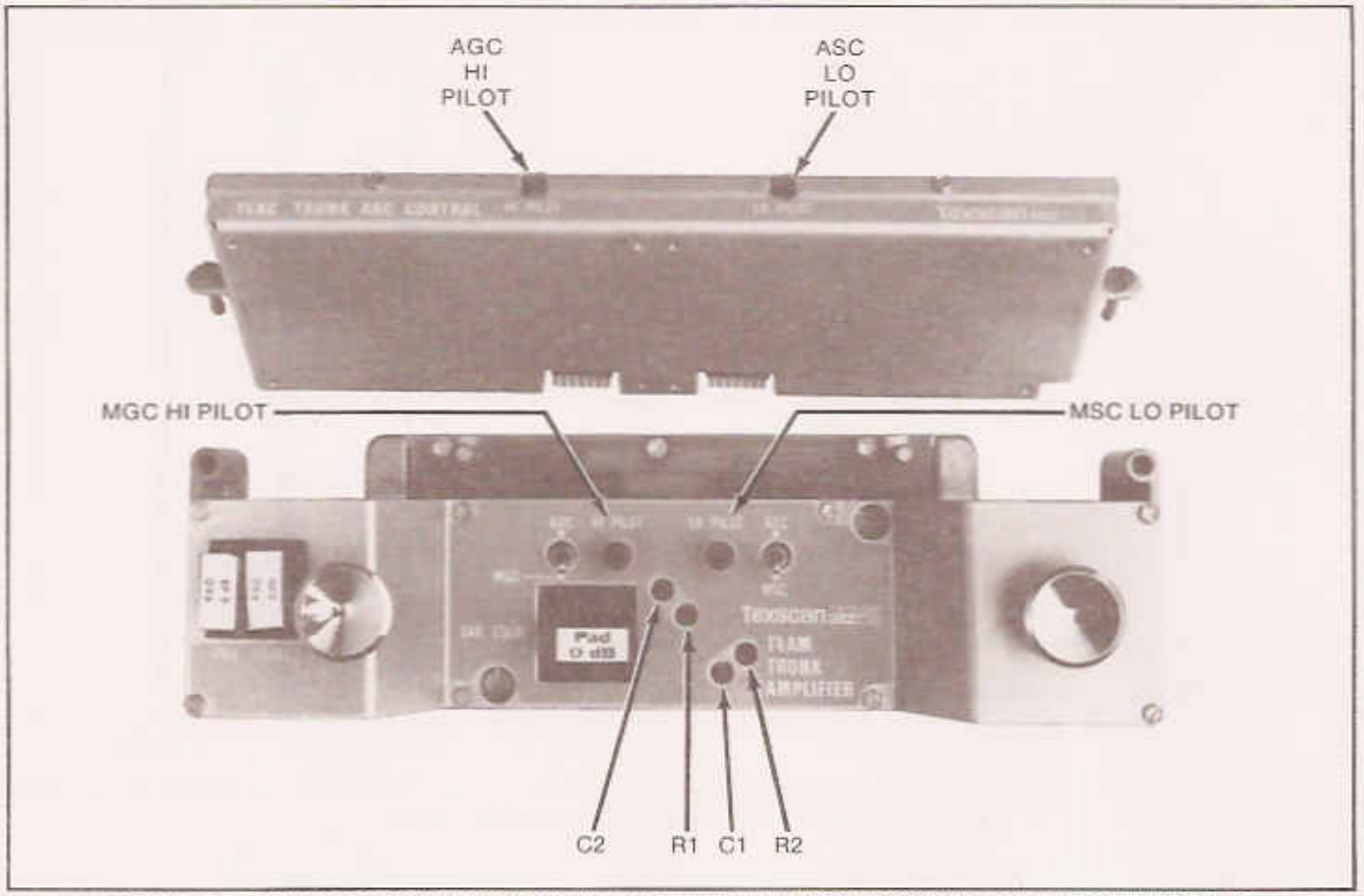


FIGURE 5. CONTROL IDENTIFICATIONS FORWARD TRUNK MODULE WITH AGC PLUG-IN MODULE

IF VALUE IS CORRECT
Proceed to Step 8.

IF VALUE IS INCORRECT
Check R.F. continuity through input module and associated RF connectors. Repair as necessary.

8. Check R.F. level at Test Point "D". Level should be 17 ± 2 dB above level noted in Step 2.

IF VALUE IS CORRECT
Proceed to Step 9

IF VALUE IS INCORRECT
Replace input hybrid module and setup station as shown in FIELD SETUP PROCEDURE above.

9. Check RF level at Test Point "E". Level should be 8 ± 2 dB above level noted in Step 2.

TABLE 1
RF TEST POINT VALUES

HYBRID GAIN	TEST POINT VALUES IN dBmV				
	C	D	E	F	Station Output
17	-1 ± 1	17 ± 2	10 ± 2	27 ± 2	26 ± 2
17	—	—	10 ± 2	31 ± 2	30 ± 2

NOTE: 1. Values are the levels above input level noted in Step 2.
2. Values measured with XR2TP Test Probe.

IF VALUE IS CORRECT
Replace output hybrid module and setup station as shown in FIELD SETUP PROCEDURE above.

IF VALUE IS INCORRECT
Replace module and tag defective module "Defective interstage circuit". Setup station as shown in FIELD SETUP PROCEDURE above.

MAINTENANCE PROCEDURE, AGC MODULE

1. Set Gain Switch (AGC—MGC) to MGC.
   A. While monitoring station or forward module output, rotate gain control (Forward Module HI PILOT). The sweep level (or Lo pilot level) should be adjustable over a minimum range of 8 dB.

IF OPERATION IS SATISFACTORY
Proceed to next step.

IF OPERATION IS UNSATISFACTORY
Remove Forward Module for repair. Tag with notation "Defective MGC Control Circuit". Replace module and setup as shown in Field Setup.

2. Set slope switch (ASC—MSC) to MSC.
   A. While monitoring station or forward module output, rotate slope control (Forward Module LO PILOT). The sweep level (or Hi pilot level) should be adjustable over a minimum range of 5 dB.

IF OPERATION IS SATISFACTORY
Proceed to next step.

IF OPERATION IS UNSATISFACTORY

Remove forward module for repair. Tag with notation "Defective MSC control circuit". Replace module and setup as shown in Field Setup.

3. Set gain and slope switches to "AGC" and "ASC".
   A. While monitoring station or forward module output, remove input pad and replace with a value 3 dB larger. The output should remain unchanged.

IF OPERATION IS SATISFACTORY

AGC operation is satisfactory.

IF OPERATION IS UNSATISFACTORY

Remove T4AC Module for repair. Replace module and setup as shown in Field Setup.

BENCH SERVICE AND ALIGNMENT

GENERAL

All modules are precision aligned at the factory prior to shipment. The alignment procedures presented in this section should be used to assure conformance to factory standards after each bench repair or maintenance. Troubleshooting, repair, set-up and maintenance procedures are given as an aid to allow fast and efficient service of the equipment. These procedures should be conducted by technicians skilled in CATV electronic repair and adjustment techniques.

TEST EQUIPMENT

The following table shows test equipment needed for bench service and alignment. All test equipment should be laboratory grade and accurately calibrated.

The Module may be tested in Test Fixture, Part Number XR2AMTF-1 (See Figure 7), or the Trunk Station Housing, Part Number XR2AH, with Input and Output Modules installed.

To mount a module in the test fixture:

1. Install module on test fixture. (See Figure 7).
2. Apply +24 Vdc to the B+ terminal. The test fixture base and module chassis are Ground B–.

TABLE 2
TEST EQUIPMENT (or equivalent)

Volt-Ohm Meter	Triplett Model 310, Simpson Model 260
Oscilloscope	Texscan DU720
Sweep Frequency Generator	Texscan Model VS-60 or 9900D
Attenuator	Texscan RA-70F and RA-73F
D.C. Supply	Power Design Model 5015T
75 Ohm Terminator	Texscan Model 15493-1
Test Probe	Texscan XRTP (-20 dB Test Probe, Power Blocked)
Signal Level Meter	Texscan Model 7272, Digitech or VSM-1, 2, 5
Dual Pilot Carrier Generator	Theta-Com Model XRPG
NOTE: Assure that all equipment is properly calibrated.	

3. Terminate the bridger output connector with 75 Ohms. There is no dc voltage on the test fixture RF input or output connectors.

To mount a module in a trunk station housing for testing,

1. Install the Input and Output Modules in the trunk station housing.
2. Install coaxial connectors in all housing ports, making certain that the center conductor passes through the seizure post; then tighten the seizure screw on all ports. Terminate any unused outputs during test.
3. Apply 24 Vdc to the module through the six pin power connector on the Output Module (See Figure 8). Pin 5 of the power connector and the trunk station housing are Ground B–, while Pin 6 is the +24 Vdc input.

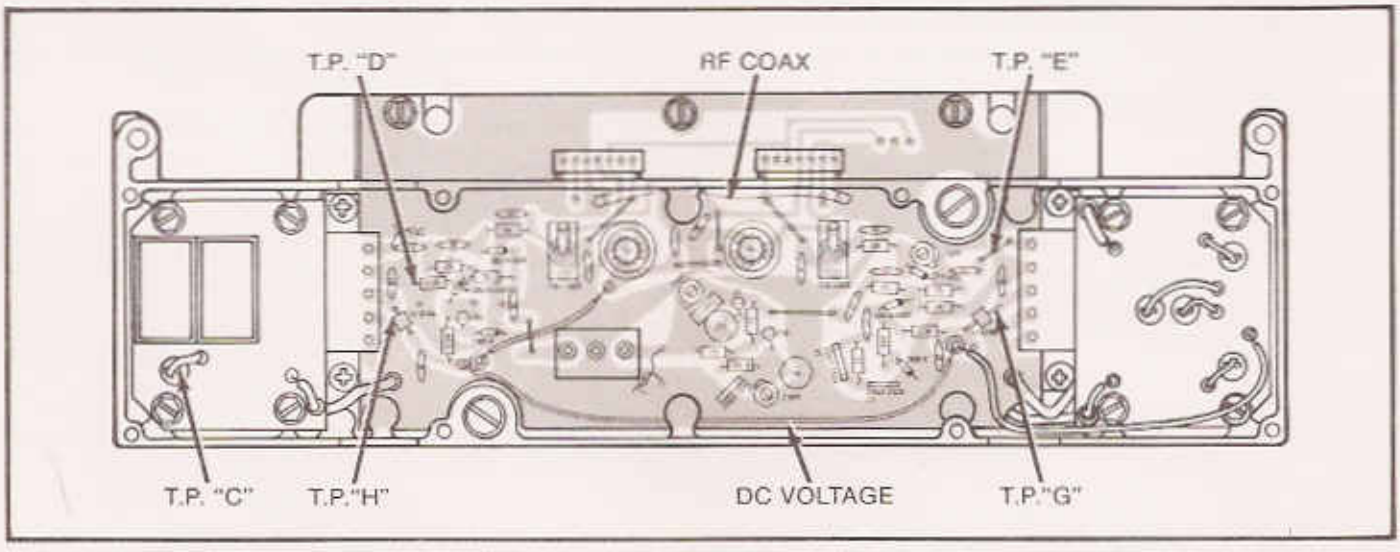


FIGURE 6. D.C. VOLTAGE CIRCUITRY

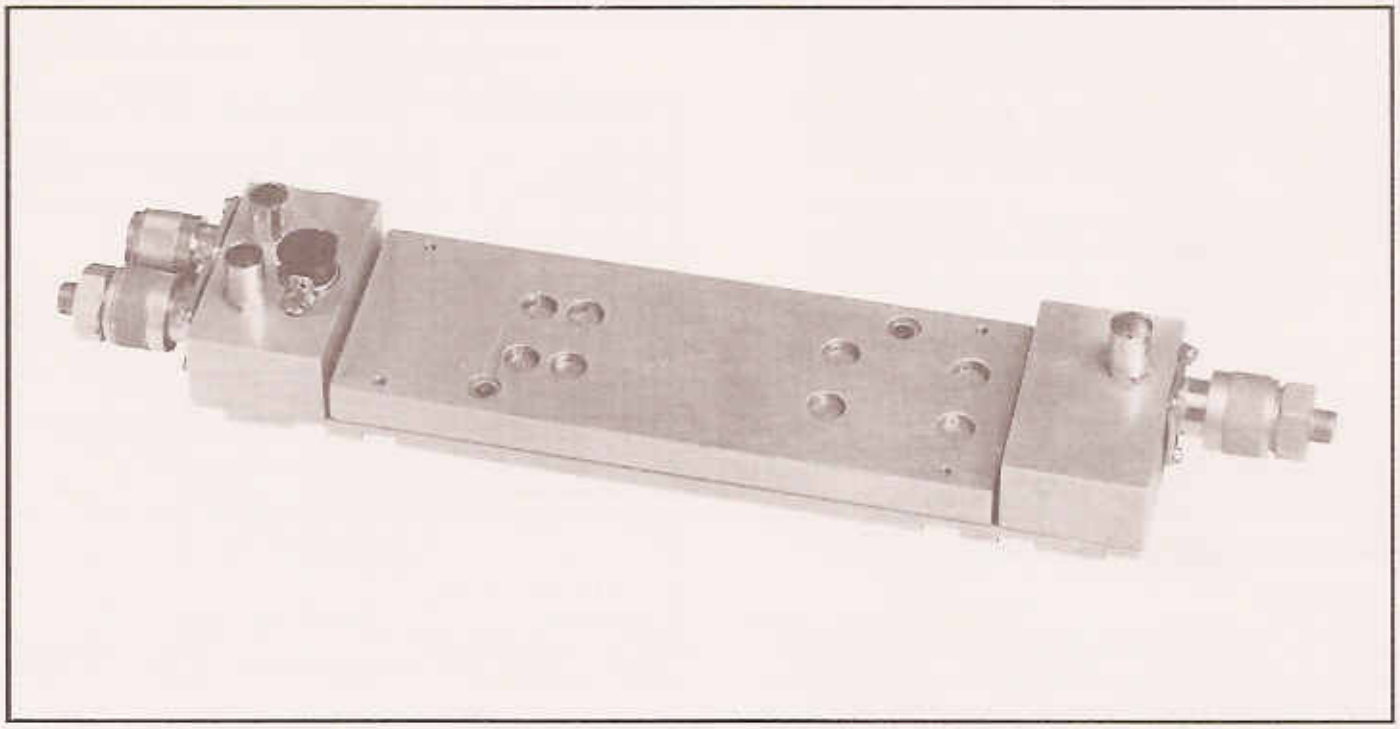


FIG. 7. MODULE TEST FIXTURE XR2AMTF-1

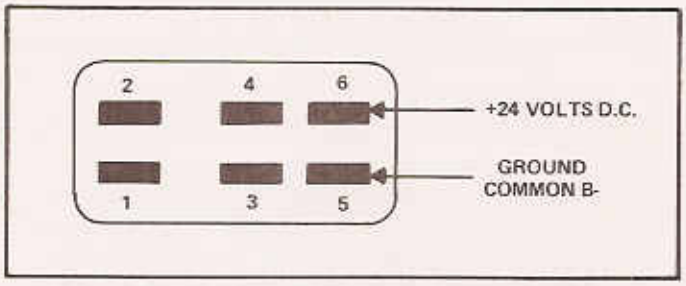


FIG. 8. POWER CONNECTOR ON OUTPUT MODULE

TROUBLESHOOTING PROCEDURE, FORWARD

1. Connect equipment as shown in Figure 9. Use Jumper to establish setup reference (use 50 MHz for reference and test measurements). Terminate bridger output with 75 Ohms.
2. Set GAIN full clockwise and SLOPE full counter-clockwise.
3. Insert 0-dB Pad, 0-dB Equalizer, and 0-dB Pad in Variable Equalizer Socket.
4. Set cable at 0 dB.
5. Refer to Table 1 for RF levels.
6. Check RF level at trunk output. Level should be above reference by amount shown in Table 1.

IF LEVEL IS UNSATISFACTORY
Proceed to Step 7.

IF LEVEL IS SATISFACTORY
Proceed to ALIGNMENT PROCEDURE below.

7. With the XR2TP Test Probe, measure RF level at Test Point "E".

IF LEVEL IS UNSATISFACTORY
Proceed to Step 9.

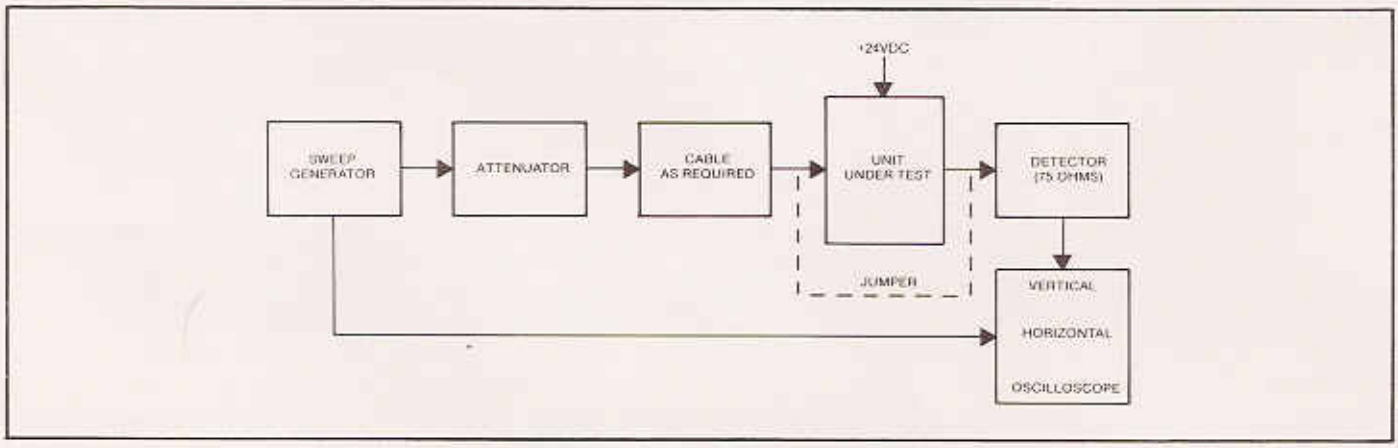


FIGURE 9. TEST SETUP

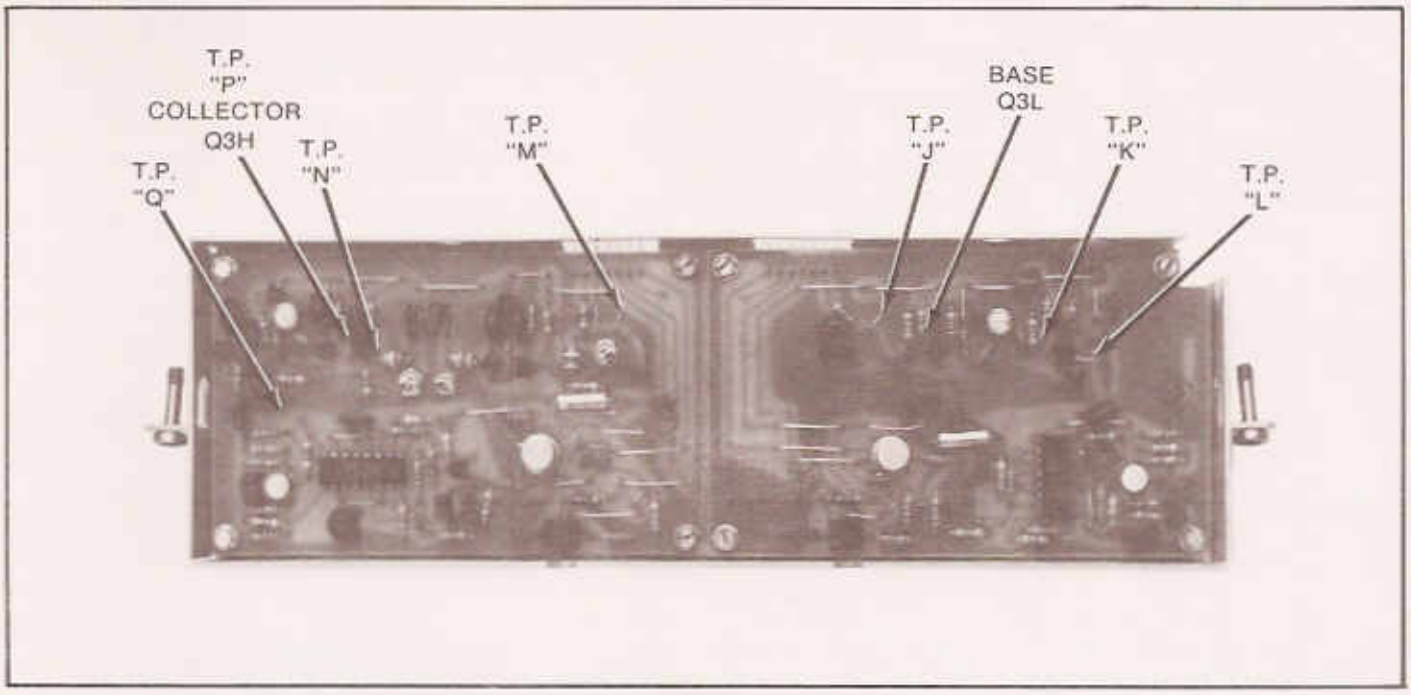


FIGURE 10. TEST POINT LOCATIONS T4AC MODULE

IF LEVEL IS SATISFACTORY
Proceed to Step 8.

8. Check DC level at Test Point "G". Level should be 24 ± 1 VDC.

IF LEVEL IS UNSATISFACTORY
Troubleshoot circuitry between T.P. "G" and the DC Power Connector (See Figure 6). Repair as necessary and repeat Step 6.

IF LEVEL IS SATISFACTORY
Replace output hybrid module and repeat Step 6.

9. Measure RF level at Test Point "D".

IF LEVEL IS UNSATISFACTORY
Troubleshoot interstage coupling circuitry. Repair as necessary and repeat Step 6.

IF LEVEL IS SATISFACTORY
Proceed to Step 10.

10. Check voltage level at T.P. "H". Level should be ± 1 VDC.

IF LEVEL IS SATISFACTORY
Replace input hybrid and repeat Step 6.

IF LEVEL IS UNSATISFACTORY
Troubleshoot circuitry between T.P. "H" and the DC Power Connector (See Figure 6). Repair as necessary and repeat Step 6.

TROUBLESHOOTING PROCEDURE, AGC CONTROL MODULE

1. Determine which AGC channel is defective.
   A. Check voltage levels as shown on schematic. If no positive fault indication is found, proceed to next step.

   B. Connect DVM between Pin #6 of IC 3 and ground (on Lo Pilot circuit board See Figure 10).

   C. Touch grounded lead to base of Q3. Voltage should rise from 11.5 VDC.

   D. Repeat A and B for Hi Pilot Board IC 1.

   E. After determining the defective channel: (1) Proceed to Step 2 for defective Lo Pilot indication. (2) Proceed to Step 6 for Hi Pilot indication. (3) Proceed to Step 5 for no fault indication.

Assure forward module is operating correctly. Perform Steps 1 through 6 of Forward Module Procedure. Set and note reference values for LO and HI PILOT carriers (Levels should be 10-12 dBmV at Forward Module Input).

NOTE

The following test requires use of test fixture or adequate bench setup to allow access to AGC controls/test points.

2. Measure Lo Pilot RF signal value at T.P. "J". Value should be 11 ± 2 dB above value noted in Step 1.

IF LEVEL IS INCORRECT
Check AGC Module Connector pins. Troubleshoot Output Module/Connections. Repair as necessary and repeat Step 2.

IF LEVEL IS CORRECT
Proceed to Step 3.

3. Measure Lo Pilot RF signal at T.P. "L". Value should be 3 ± 2 dB above value noted in Step 2.

IF LEVEL IS INCORRECT
Proceed to Step 4.

TABLE 3
D.C. VOLTAGES

PIN NUMBER	IC1	IC2	IC3	IC4
1	1.3	1.3	N/C	N/C
2	4.0	4.0	3.0	3.0
3	1.3	1.3	8.7	8.7
4	2.1	2.1	GND	GND
5	GRD	GRD	N/C	N/C
6	12.0	12.0	10.8	10.8
7	2.1	2.1	12.0	12.0
8	2.8	2.8	GND	GND
9	2.8	2.8		
10	2.1	2.1		
11	12.0	12.0		
12	4.0	4.0		
13	1.3	1.3		
14	2.1	2.1		
15	1.6	1.6		
16	0.8	0.8		

IF LEVEL IS CORRECT
Proceed to Step 5.

4. Measure Lo Pilot RF signal at T.P. "K". Value should be 1 ± 1 dB above value noted in Step 2.

IF LEVEL IS INCORRECT

A. Check position of Potentiometer R2.

B. Check voltages on Q3L.

C. Check printed circuit board for bad/open connections between T.P. "J" and T.P. "K".

D. Repair as necessary and repeat Step 3.

IF LEVEL IS CORRECT

A. Check voltages on Q2L.

B. Check printed circuit board for bad/open connection between T.P. "K" and T.P. "L".

C. Repair as necessary and repeat Step 3.

5. The Detector—Amplifier is entirely DC coupled. Therefore, any failure of semi-conductor devices will be apparent from voltage measurements.

A. Measure voltages as shown in Table 3.

B. If step-by-step check of each stage is desired, refer to Table 4, which gives relative voltage changes with input change. An example of how Table 4 would be used is as follows:
   1. Connect VOM between IC Pin #12 and ground.
   2. Touch a grounded lead to the end of the 4.7 K resistor leading to IC Pin #8. If the IC is normal (and the VOM was indicating about 4.0 volts), the VOM indication should go to a lower value. Touching the grounded lead to the 4.7 K resistor leading to IC Pin #9 should cause the voltage to rise. This procedure should be followed for each stage until defective stage is obvious.

C. If operation is satisfactory on IC1 Pin #6 proceed to Step 6.

6. Measure Hi Pilot RF signal value at T.P. "M". Value should be 11 ± 2 dB above value noted in Step 1.

IF LEVEL IS CORRECT
Proceed to Step 7.

7. Measure Hi Pilot RF signal at T.P. "Q". Value should be 3 ± 2 dB above value noted in Step 2.

IF LEVEL IS INCORRECT

A. Check position of Potentiometer R2.

B. Proceed to Step 8.

IF LEVEL IS CORRECT
Proceed to Step 10.

8. Measure Hi Pilot RF signal at T.P. "P". Value should be 2 ± 2 dB above value noted in Step 2.

IF LEVEL IS INCORRECT
Proceed to Step 9

IF LEVEL IS CORRECT
Check circuit between T.P. "P" and "Q" for bad or open connections. If none are found, replace Q2H and repeat Step 7.

9. Measure Hi Pilot RF signal at T.P. "N". Value should be 1 ± 2 dB above value noted in Step 2.

IF LEVEL IS INCORRECT
Troubleshoot circuit between T.P. "M" and "N" for bad or open connections. If none are found, replace Q4H and repeat Step 7.

IF LEVEL IS CORRECT
Troubleshoot circuit around Q3H for bad or open connections. If none are found, replace Q3H and repeat Step. 7.

10. The Detector-Amplifier portion of the Hi-Pilot and Lo-Pilot channels are identical. Perform Step 5 to check performance for Hi-Pilot Channel (IC2).

TABLE 4
TROUBLESHOOTING VOLTAGES

Change Input Touch Ground Lead to Opposite End of 4.7K Resistor Leading To:	The Output Then Changes			
	IC1 #12	Q1 Emitter	IC3 #2	IC3 #6
IC1 #8	3.6V (or lower)	3.0V (or lower)	2.5V (or lower)	11.4 (or higher)
IC1 #9	4.5V (or higher)	3.9V (or higher)	3.4V (or higher)	9.8 (or lower)
NOTE: Connect the ground lead to the resistor lead going to the desired IC Pin number. DO NOT CONNECT GROUND LEAD TO IC TERMINALS. (Accidental grounding of Pin #7 or Pin #10 will destroy the IC.)				

BENCH ALIGNMENT

Trunk Amplifier Response

1. Connect equipment as shown in Figure 9. Use Jumper to establish setup reference.
2. Set HI PILOT and LO PILOT controls to maximum clockwise position (controls on trunk amplifier). Set Gain Switch (AGC—MGC) to MGC. Set slope switch (ASC—MSC) to MSC. Rotate LO PILOT control approximately 20° CCW.
3. Install PD-0 Pad and EQ-8 Equalizer Plug-ins.

> *NOTE*
>
> *This Pad—Equalizer combination covers a typical trunk application. If it is desired to align for a specific location, refer to Figure 3, for other Pad—Equalizer combinations.*

4. Set test cable for 18 dB, and attenuator to bring sweep near reference. Touchup gain and slope controls to attain best reference.
5. Set R1 and C2 to obtain optimum response below 250 MHz.
6. Set R2, C1 and L1 to obtain optimum response above 250 MHz.
7. Repeat Steps 5 and 6, if necessary, to obtain specified response.
8. Set test cable to 24 dB.
9. Adjust L2 and L3 to obtain best response.
10. Set test cable at 16 dB. Set attenuator and slope control to obtain best response.
11. Adjust C3 to obtain desired slope pivot point.
12. Repeat Steps 8-11 to assure satisfactory slope pivot.
13. Set cable at 14 dB and attenuator at 10 dB. Adjust HI PILOT and LO PILOT controls to obtain best response.
14. Response should meet requirements shown in specification section.
15. Remove 10 dB attenuation and reset HI PILOT control only. Response should still meet specification. If necessary, touchup R1, C2 or C1, L1, R2 to obtain optimum response over gain range.

AGC RF CIRCUITS

1. Connect equipment as shown in Figure 9.
2. Set pilot frequency generator to desired Lo Pilot value. Terminate bridger tap.
3. Insert PD-0 plug-ins for PAD and EQUALIZER. Set HI PILOT and LO PILOT to MGC and MSC.
4. Set test cable for 12 dB.
5. Set sweep generator output for a +11 dBmV input on the trunk amplifier INPUT. Adjust trunk amplifier controls to obtain flat response at a +32 dBmV level.
6. Remove sweep input.
7. Connect DVM between Pin 7 and Pin 10 of IC1 (Low Pilot Board).
8. Set R4L for 0 VDC indication.
9. Repeat Steps 7 and 8 for IC2 (Hi Pilot Board).

LOW PILOT RF ALIGNMENT

10. Reconnect sweep input.
11. Connect DC oscilloscope to base of Q1L (Base end of R1L).
12. Set Sweep generator center frequency to desired low pilot value.
13. Set sweep width for 10 MHz per division on scope.
14. Adjust length of L2, and set C1 and C2 to obtain maximum signal peak at low pilot frequency.
15. Set C4L to obtain maximum signal.

HIGH PILOT RF ALIGNMENT

16. Connect scope to base Q1H (Base end of R1H).
17. Set sweep generator center frequency to desired high pilot value.
18. Set sweep width for 10 MHz per division on scope.
19. Set C2, C3 and C4 to obtain maximum signal at high pilot frequency. Assure the response envelope is balanced and smooth. (NOTE: Position of Capacitor C1 will have a slight effect on frequency response).

AGC PERFORMANCE CHECK

1. Setup equipment as shown in Figure 11. Use PAD-0 and EQ-8 plug-ins.
2. Set HI PILOT and LO PILOT switches to MGC and MSC.
3. Set test cable at 12 dB.
4. Set pilot frequency to obtain a Hi Pilot value of +11 dBmV at the forward module input.
5. Set HI PILOT (on forward module) to obtain +32 dBmV on pilot frequency.
6. Set HI PILOT switch to AGC.
7. Set HI PILOT (AGC Module) to obtain +32 dBmV output.
8. Change test cable to 16 dB. Output level must remain within ± 0.25 dB.
9. Change test cable to 8 dB. Output level must remain within ± 0.25 dB.
10. Set pilot frequency source to obtain a Low Pilot level of +18 dBmV at the forward module input.
11. Set LO PILOT switch to MSC.
12. Repeat Step 3 through 9 for Low Pilot frequency (substituting LO PILOT for HI PILOT).

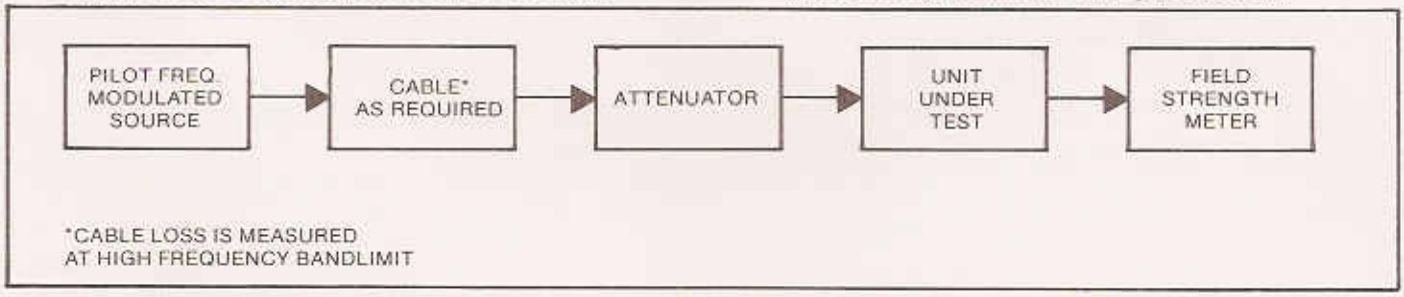
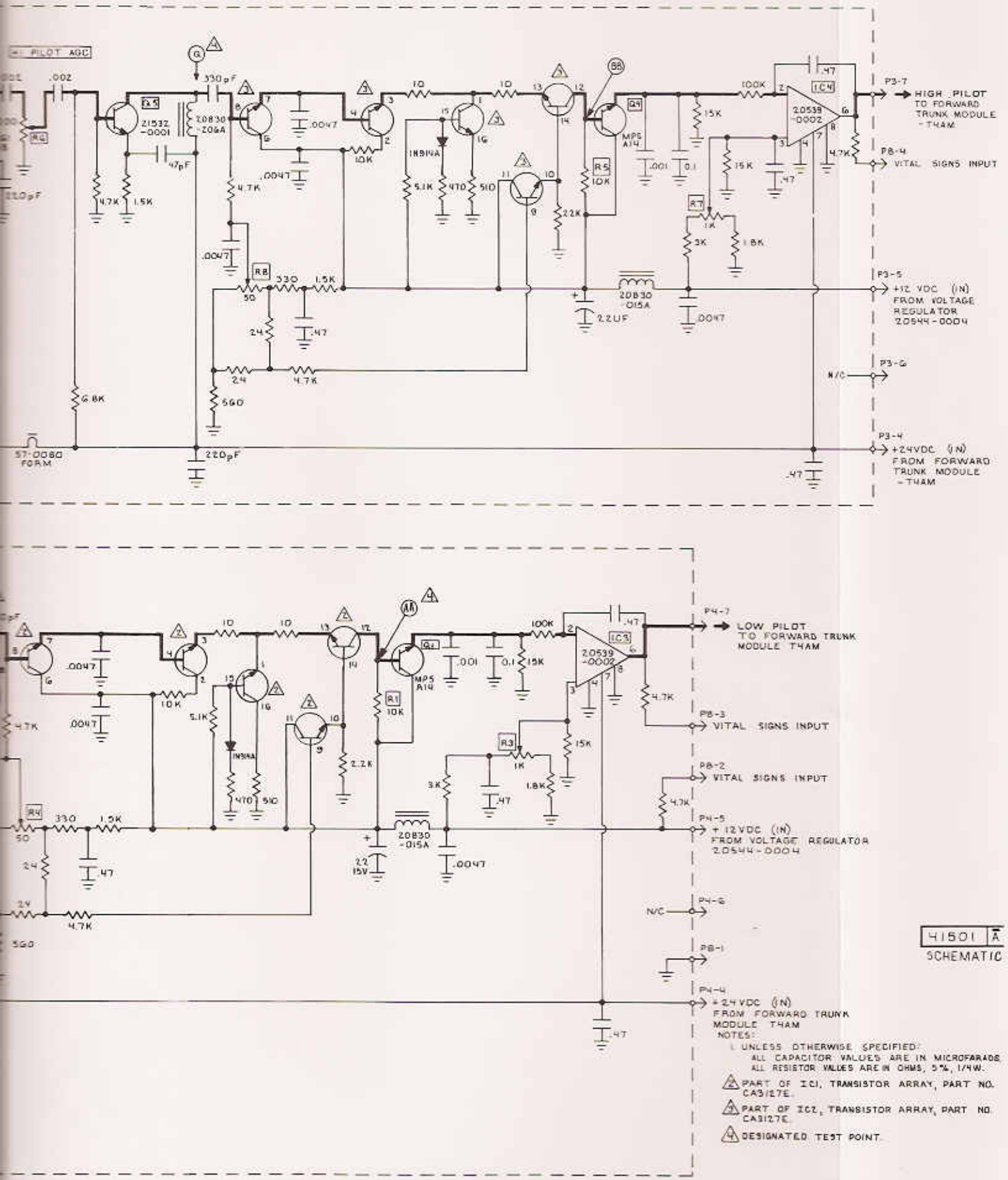


FIGURE 11. AGC TEST SETUP



41501 A
SCHEMATIC

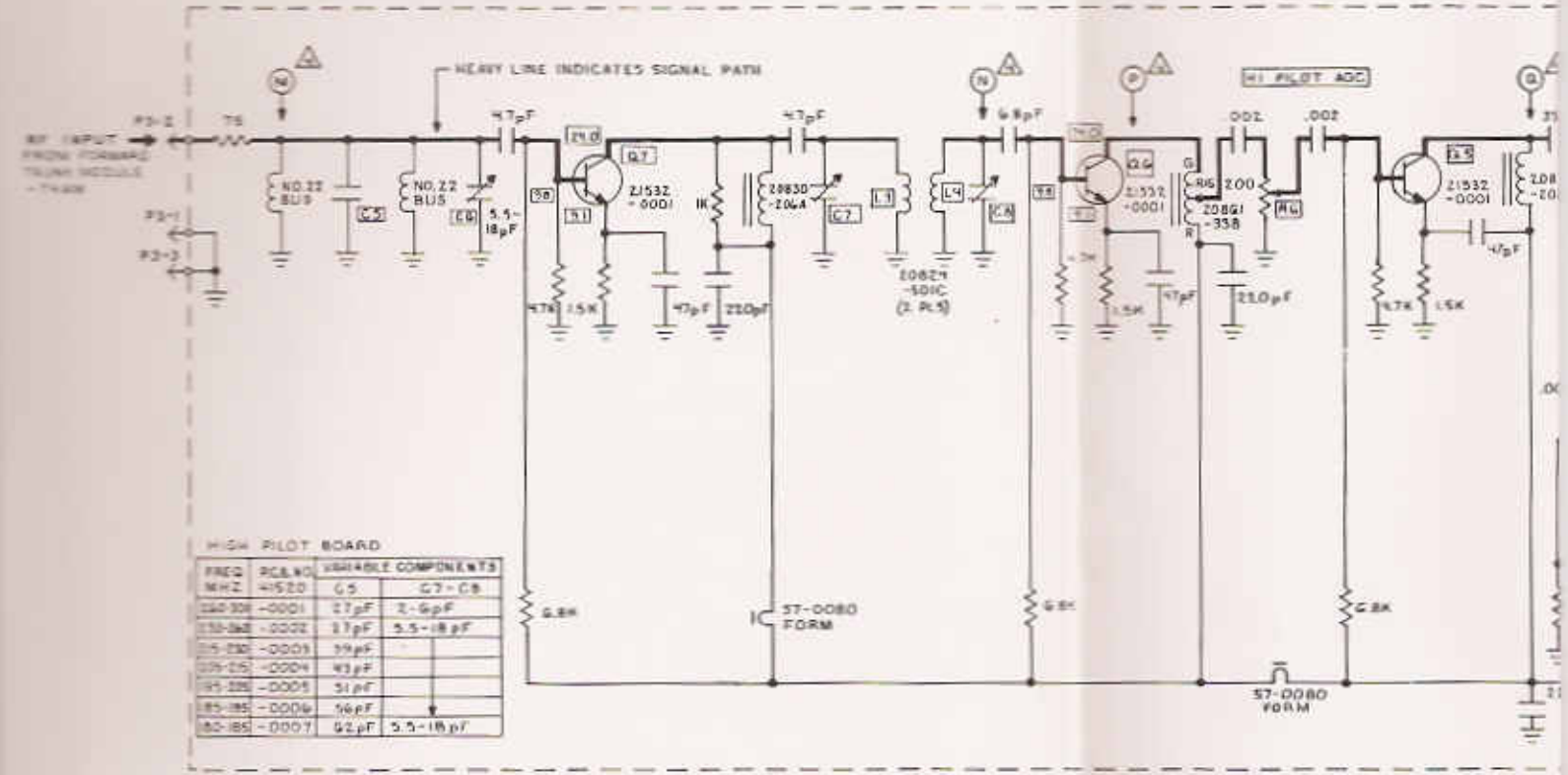
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   ALL CAPACITOR VALUES ARE IN MICROFARADS
   ALL RESISTOR VALUES ARE IN OHMS, 5%, 1/4W.

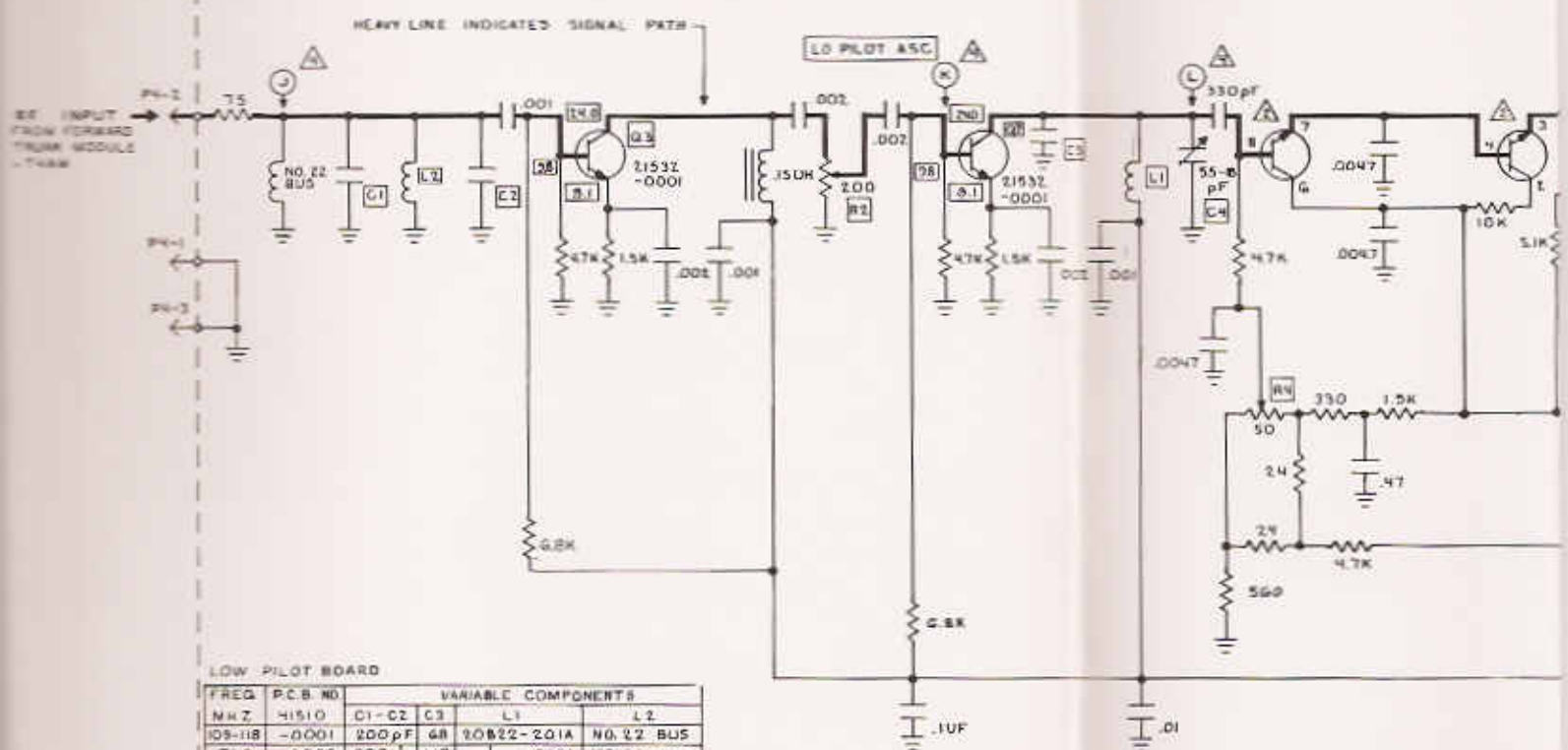
(2) PART OF IC1, TRANSISTOR ARRAY, PART NO. CA3127E.

(3) PART OF IC2, TRANSISTOR ARRAY, PART NO. CA3127E.

(4) DESIGNATED TEST POINT.



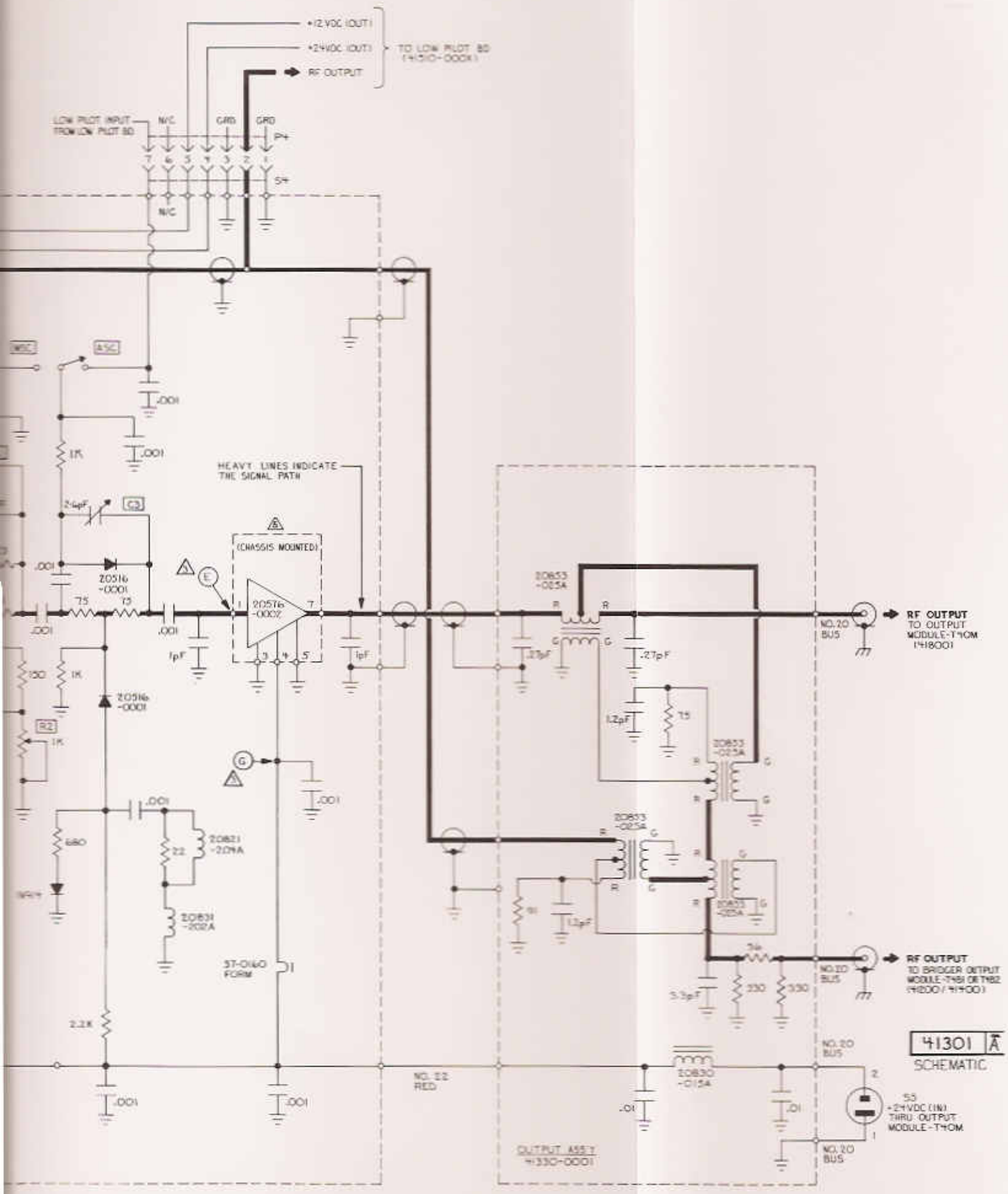
FREQ MHZ	PCB NO 41520	VARIABLE COMPONENTS C5	C7-C8
240-300	-0001	2.7pF	2-6pF
210-260	-0002	2.7pF	5.5-18 pF
175-230	-0003	3.9pF	
205-215	-0004	4.3pF	
191-205	-0005	5.1pF	
185-195	-0006	5.6pF	
180-185	-0007	6.2pF	5.5-18 pF

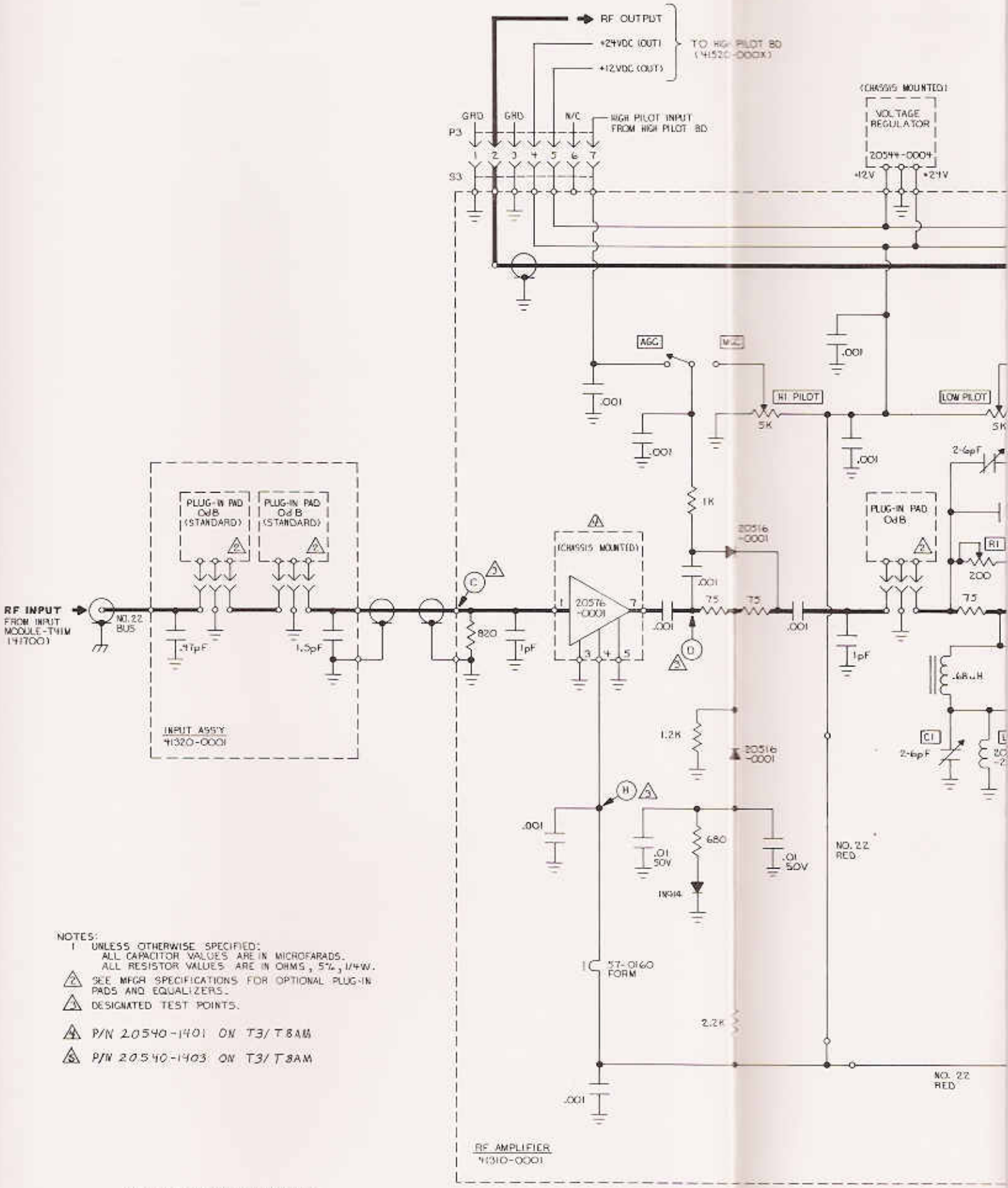


LOW PILOT BOARD

FREQ. MHZ.	P.C.B. NO. 41510	VARIABLE COMPONENTS C1-C2	C3	L1	L2
109-118	-0001	200 pF	68	20822-201A	NO. 22 BUS
73.0	-0002	360	110	-203A	NO. 22 BUS
55.25	-0003	330	180	-204A	——
61.25	-0004		160	-203A	——
67.25	-0005		150		NO. 22 BUS
71.25	-0006		110		
77.25	-0007		110		
80.6	-0008		110	-203A	
83.25	-0009	330	100	-202A	
133.25	-0010	130 pF	51	20822-201A	NO. 22 BUS

SCHEMATIC DIAGRAM, T4AC


+12 VDC (OUT)
+24VDC (OUT)
RF OUTPUT
TO LOW PILOT BD (41310-0001)
LOW PILOT INPUT FROM LOW PILOT BD
N/C
GRD
GRD
P4
S4
HEAVY LINES INDICATE THE SIGNAL PATH
(CHASSIS MOUNTED)
20516 -0001
20576 -0002
20853 -025A
RF OUTPUT TO OUTPUT MODULE-T40M (41800)
NO. 20 BUS
RF OUTPUT TO BRIDGER OUTPUT MODULE-T48I OR T48Z (41200 / 41900)
20821 -209A
20831 -202A
20830 -015A
NO. 22 RED
OUTPUT ASS'Y 41330-0001
S5 +24VDC (IN) THRU OUTPUT MODULE-T40M
41301 A
SCHEMATIC



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   ALL CAPACITOR VALUES ARE IN MICROFARADS.
   ALL RESISTOR VALUES ARE IN OHMS, 5%, 1/4W.
2. SEE MFGR SPECIFICATIONS FOR OPTIONAL PLUG-IN PADS AND EQUALIZERS.
3. DESIGNATED TEST POINTS.
4. P/N 20540-1401 ON T3/T8AM
5. P/N 20540-1403 ON T3/T8AM

SCHEMATIC DIAGRAM, TRUNK FORWARD MODULE

REPLACEMENT PARTS LIST T4AC

ITEM	QTY	DESCRIPTION	PART NO.
ASSEMBLY	1	PRINTED CIRCUIT BOARD	41510-0011
ASSEMBLY	1	PRINTED CIRCUIT BOARD	
INT. CIRCUIT	2	MODULE	CA3127E
INT. CIRCUIT	2	MODULE	20539-0002
TRANSISTOR	2	MPSA14	MPSA14
TRANSISTOR	4		21532-0001
DIODE	2	1N914A	20502-0001
CAPACITOR	2	TANTALUM 22 μF, 15V	20522-220E
CAPACITOR	2	VARIABLE 2-6 pF	20519-006E
CAPACITOR	2	VARIABLE 5.5-18 pF	20519-018E
POTENTIOMETER	2	50Ω	20553-500A
POTENTIOMETER	2	200Ω	20553-201A
RESISTOR	2	VARIABLE, 1K	3329-1-102
CONNECTOR	2	RT. ANGLE, MALE	23887-0004

REPLACEMENT PARTS LIST TXAM

ITEM	QTY	DESCRIPTION	PART NO.
ASSEMBLY	1	PRINTED CIRCUIT BOARD (TRUNK AMP)	41310-0001
ASSEMBLY	1	PRINTED CIRCUIT INPUT ASSEMBLY	41320-0001
ASSEMBLY	1	PCB, INPUT ASSEMBLY	41320-0001
RESISTOR	2	VARIABLE 1KΩ	20553-102A
RESISTOR	4	VARIABLE, 200Ω	20553-201A
RESISTOR	1	VARIABLE, 5KΩ	23076-8502
CAPACITOR	3	VARIABLE, 2-6 pF	20519-006E
KNOB	2		161350001
REGULATOR	1	+12 VDC	20544-0004
HYBRID	2	SEE FIGURE 13	
INT. CIRCUIT	1	MODULE	20540-0001
PAD, PLUG-IN	3	0-dB, STANDARD (PAD-0)	21892-0000
PAD, PLUG-IN	AR	1-20dB, OPTIONAL (PAD-XX)	21892-00XX
EQUALIZER	AR	OPTIONAL VARIABLE T4CEQ-X	4116X
SWITCH	2	SWITCH, AGC OR ASC	7101SDCQ
COVER	1	COVER ASSEMBLY	41303-0011
ASSEMBLY	1	PCB, OUTPUT ASSEMBLY	41330-0001

Texscan

Texscan Theta-Com CATV • 2960 Grand Avenue • P.O. Box 27548 • Phoenix, AZ 85061