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DESIGNS DEPARTMENT SPECIFICATION

No. 5.185(70)

Wide Band Amplifier Type AM14/13

10 watt version of AM14/12

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C O N T E N T S

D R A W I N G S

Circuit	D28005 A2
Parts list	D28006 A4
Assembly and wiring	D28007 A2
Details	D28008 A1
PB Wiring Board 1	D28009 A2
PB Wiring (Comp. side) Board	D28010 A2
PB Component location Board 1	D28011 A4
PB Drilling Board 1	D28012 A4
Transformer	D28013 A3
PB Wiring Board 2	D27923 A4
PB Drilling Board 2	D27924 A4
PB Wiring Board 3	D27925 A4
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BBC

SPA4

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GENERAL

This unit is a wide band amplifier covering 4-27MHz. It has a constant output of 10 watts for any input level between 1mW and 100mW.

The output level may be monitored by connecting a meter type ME15/4 or /4P to SKB.

MECHANICAL

The amplifier is housed in an Eddystone diecast box. In order to dissipate the large amount of heat produced in the output transistor, two large heat sinks are fixed to the box. The fins of the heat sinks must be vertical when the amplifier is in normal use, and there must be free air circulation above and below the heat sinks.

The overall dimensions of the amplifier are: 8" x 5¾" x 5¼".

Input impedance	75Ω Unbalanced
Output impedance	100Ω Balanced
Input power	1mW - 100mW
Output power	10W
DC supply voltage	26V Floating (N.B. The supply MUST be floating AND the current must be limited to 3A).
Current consumption	2.6 ± 0.2 Amps.
Frequency response with AGC in operation	< ± 0.5dB from 4-27MHz.
Harmonic distrotion	All harmonics better than -25dB relative to the fundamental
AGC range	⩾ 20dB (for an output change <1W)
Maximum ambient temperature	45°C (with free air circulation)
Input Socket	75Ω BNC
Output Socket	100Ω Cannon type S0264 twin
Monitor socket	5 pin McMurdo type TSR4

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PRODUCTION TEST SCHEDULE

Apparatus required

1)	Power supply	International Electronics type DS50/50/2 or equivalent (N.B. Set current limiting to 3 Amps).
2)	Signal generator (a)	Marconi 40KHz - 50KHz oscillator type TF1246 or equivalent.
3)	Signal generator (b)	Marconi AM signal generator type TF801D/1 or equivalent.
4)	Oscilloscope	Tektronix type 581 (Plug in unit type 82).
5)	Oscilloscope probe	Tektronix X10 probe.
6)	Power meter (2 off)	Marconi RF Power Meter type TF1152A or equivalent.
7)	Milliammeter	BBC code ME15/4 or 4P.
8)	AVO model 8	
9)	Polyskop	
10)	Attenuator (variable)	Rohde & Schwarz type DPU or equivalent.
11)	Attenuator (fixed)	Rohde & Schwarz (20dB, 20W) type RBD
12)	Specturm Analyser	Polarad Electronic Instruments Wide Dispersion Spectrum Analyser Model 2892A or equivalent

13) Lead to convert 100Ω balanced output to two 50Ω unbalanced outputs.

Make the lead in accordance with the following instructions:

a) Connect a plug type PL 284 to about 12" of RF cable type DR68.

b) Fix two BNC sockets type GE3507H (Greenpar) side by side on a metal plate, about 2 inches square.

c) Connect the metal braid of the cable to the metal plate, and the inner conductors to the two BNC sockets.

Procedure

Check that the amplifier has been satisfactorily manufactured in accordance with the relevant drawings. Check the following points in particular:-

1) That the base and collector of TR8 are connected to the correct parts of the printed board.

2) That the nuts securing TR8 are tight, and that only one is in electrical constact with the printed board.

3) That the brackets of T5 are connected securely to the correct parts of the printed board.

4) That the blue (AGC) wire from the bridge rectifier to PB1 is in place.

5) That R1 is in circuit.

Connect the variable voltage power supply to the appropriate feed through capacitors, and connect the power meters to the output socket. (A special lead will have to be made to convert the 100Ω balanced output to two 50Ω Unbalanced outputs, see item 13 of test apparatus.) Gradually increase the supply voltage to 26 volts; the current should rise to about 2.4 Amps at 18 volts and then remain almost constant up to 26 volts. Check that the power meters are reading zero.

Connect signal generator 'b' (as specified) to the input of the amplifier via the variable attenuator (set to maximum attenuation). Adjust the signal generator to produce an output at 15MHz and gradually decrease the attenuation until the output power either ceases to rise or reaches 10 watts. If the AGC circuit does not limit the output power to 10W replace R1 with a 47KΩ variable resistor, and adjust it until the output power is limited to 10 watts. Measure the value of the resistance and replace it with a fixed resistor of the nearest preferred value. Check that the output power is limited to 10 watts.

In place of one of the power meters connect the 20dB 20W attenuator. Using the Polyskop, measure the frequency response of the amplifier from the amplifier input to the attenuator output. It is important that the above measurement is made with an input level which is sufficiently low, that the AGC circuit does not operate. A suitable level may be obtained by setting the Polyskop attenuator to -40dB. (If the input level is too high the peak of the Polyskop trace will be flattened). The total gain of the amplifier (without the attenuator) should be between 45dB and 55dB. If the amplification between 4 and 27MHz varies by more than 4dB, then adjust R29 and C15 until it is with the above limit. Now increase the input level and check that the AGC circuit effectively flattens the response.

Connect signal generator 'a' (as specified) to the input of the amplifier via the variable attenuator and reconnect the other power meter. Check that the output power stays constant (0.5W) for input voltage with the oscilloscope. (1mW into 75Ω is approximately 0.77 v PK-PK).

Now connect the spectrum analyser (via the 20dB attenuator) in place of one of the power meters, and drive the amplifier with signal generator 'b' (as specified), set to produce an output power between 1mW and 100mW. Check that for all frequencies between 4 and 27MHz each harmonic of the output signal is at least 25dB below the fundamental.

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Connect an ammeter type ME15/4 or 4P to socket SKB. An output of 10 watts should deflect the meter to almost full scale. Disconnect the power meters and check that the ammeter reading does not change. Now short the output socket for a few seconds, then reconnect the power meters and check that the amplifier is producing 10 watts.

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