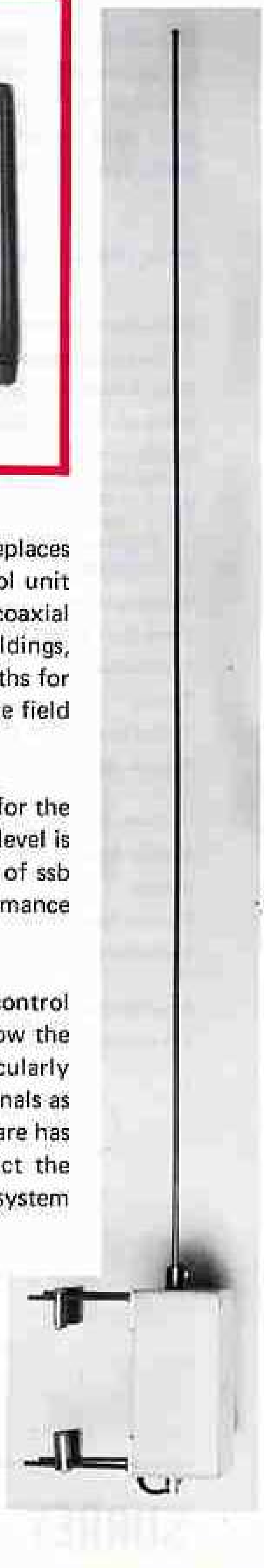
ADVANCED ACTIVE AERIAL

- EXCEPTIONAL LINEARITY AND NOISE LEVEL
- DEFINED GAIN FROM FIELD STRENGTH TO 50Ω
- BROADCAST, COMMUNICATIONS, MARINE AND AERONAUTICAL USES : 40kHz–30MHz



The Advanced Active Aerial provides a high standard of reception at lower frequencies and replaces frequency dependent antenna systems. The system comprises two parts, a power and control unit and a remote head unit with a short stainless steel whip which receives its power along a coaxial cable. The head unit will normally be mounted outdoors as far away as practicable from buildings, metal structures and sources of interference. Higher mounting points will yield greater strengths for ground wave and long distance, low angle signals. The aerial presents an accurate replica of the field strength where the head unit is mounted into the 50 Ohm coaxial line.

This aerial has unrivalled linearity which is reflected in the intercept point specifications and for the first time allows full use of an active system around the lf and mf broadcast bands. The noise level is such as to allow daytime atmospheric noise in a rural area to be heard on a quiet channel of ssb bandwidth in the difficult 1–3MHz region and the high intercept points mean that this performance is not marred by the presence of intermodulation products arising from broadcast stations.

The linearity is so far in excess of present day receivers using bandpass front ends that the control unit incorporates a tuned preselector as well as switchable attenuators. These provisions allow the dynamic range of this aerial to be realised even with modest receivers and make it particularly suitable for reception and measurement of low frequency time, telegraphy and navigation signals as well as maritime and aeronautical non-directional beacons adjacent to the broadcast bands. Care has been taken to ensure that when the preselector is in use the tuned circuits cannot restrict the bandwidth of am signals in the broadcast bands in a way that would impair use of the system for quality monitoring.

In settling on the gain of the aerial the need to have enough output to overcome distribution losses and the noise level of practical receivers has been balanced against the desire to keep gain low to reduce receiver overloading. The choice of −10dB gain also means that a spectrum analyser or calibrated receiver can be used to measure field strength directly as 1 Volt per metre of electric field in the same plane as the whip will produce 316mV into a 50 Ohm load. The gain stability and flat frequency response make the aerial attractive for long term monitoring of broadcast and beacon stations.

Vertical polarisation provides optimum reception of ground wave and medium angle signals with a null at vertical incidence which in practice is between 5 and 20dB, above non-perfect ground. Single whip construction is adopted since mounting a dipole vertically at these frequencies leads to a poor polar diagram through distortion of the local free field by the support structure and coaxial feeder. The control box can select a passive mode where the receiver is connected to the inner of the coaxial feeder from the head unit while the outer is floated. The feeder then acts as a long wire with pick up from the outer of the cable as the inner to outer capacity provides coupling going away from the base unit. If the feeder runs along or just under the ground then in this mode it will provide preferential reception of high angle signals.

Theoretical limits to the noise level of an aperiodic receiving aerial of 1 metre length mean that above the 15–20MHz region and under quiet band conditions better signal to noise ratio can be provided by passive aerials. No active aerial would generally be recommended but this system does still offer convenience for general purpose monitoring. The closely specified gain permits field strength measurements up to 30MHz and the system may be used in a vehicle if a low power ac supply is available. The input of the head unit is protected against nearby static and lightning discharges but the noise contribution of this circuitry is less than 1dB.

SPECIFICATION Output loaded 50Ω. Input dummy aerial comprising terminated coax coupled through 10pF, equivalent to whip supplied.

Frequency response	± 3dB 4kHz–40MHz; ± 1dB 8kHz–30MHz.			
Output impedance	50Ω.			
Gain, Effective length	−10dB ± 1dB, 0.3 metre.			
Noise at output 300kHz–30MHz	−150dBm in 1Hz, −130dBm in 100Hz, −110dBm in 10kHz.			
Intermodulation Refered to either of two equal signals	Second order intercept point		Third order intercept point	
0.9 + 1MHz	+ 90dBm	10dB higher in dummy aerial	+ 55dBm	10dB higher in dummy aerial
2.7 + 3MHz	+ 75dBm		+ 45dBm	
9 + 10MHz	+ 45dBm		+ 20dBm	
27 + 30MHz	+ 25dBm		+ 15dBm	
Clipping point	16V/m:+27dBm output.			
Head Unit power consumption	50mA at ± 28–35V.			
Attenuators 0–30MHz	5, 10, 15, 20,dB ± 0.5dB; 25, 30, 35dB ± 1dB.			
Tuning	Broadband. 0.1–0.5, 0.5–1.8, 1.8–8, 8–30MHz: loss 1–7dB.			
Tuned bandwidth at lf and mf	>9kHz at 154kHz; >11kHz at 531kHz for −3 dB.			
Passive selector	Selects inner of coaxial feed from head unit, outer floated. Attenuators and tuning still operative.			
Outputs to receiver	BNC, 2 sockets in parallel.			
Supply input	IEC connector, 90–120V or 200–250V 50–60Hz 5VA.			
Safety	Complies with IEC 65–2, BS415.			
Coaxial feed to Head Unit	BNC connectors. Use 50Ω RG58C/U(5mm) or RG213/U (10.3mm).			
Dimensions and weight	Control Unit 190 x 120 x 60mm; 1Kg. Head Unit 1050 x 130 x 80mm; 500g.			
Mounting pole maximum diameter	45mm, 1¾ inches.			

2.5 metres supply lead to BS6500 with IEC connector supplied along with servicing details.