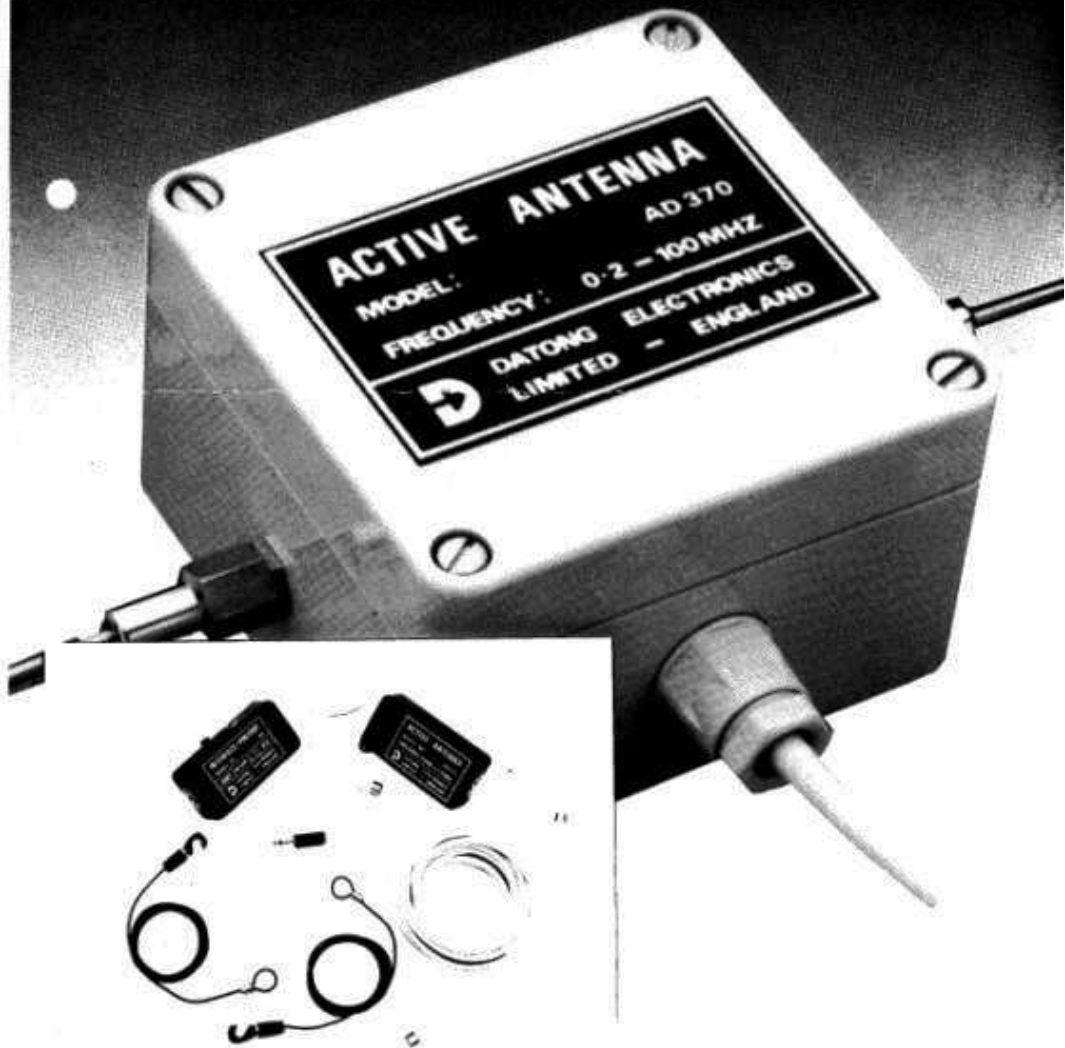


D **DATONG** ELECTRONICS LIMITED

MODELS AD270, AD370
Active Receiving Antennas.



ULTRA-COMPACT RECEIVING ANTENNA SYSTEMS GIVING WIDEBAND COVERAGE FROM 200kHz to 30MHz AT HIGH SENSITIVITY.

Models AD270 and AD370 give similar receive performance to large conventional antenna systems yet are only 3 metres in overall length. The balanced dipole configuration also gives good rejection of local interference.

FEATURES

- Available in two versions: one for indoor use only (Model 270), the other for outdoor mounting (Model 370).
- Overall length only 3 metres yet gives signal-to-noise ratios comparable to full size conventional antennas in the 200kHz to 30MHz range.
- The response is broadband and no tuning or adjustment is required when changing frequency, therefore ideal for mounting in remote positions, e.g. loft, attic, roof, or chimney.
- Designed to professional standards of low noise level and strong signal performance.
- Dipole configuration gives choice of polarisation plus useful directivity and eliminates need for ground plane or earth connection.
- Excellent balance and constant output impedance minimise interference pick-up by the feeder.
- No need for expensive accessories such as antenna tuner units or matching units.

COMPACT AND UNOBTRUSIVE

Modern HF receivers have been brought to a high level of development and are both compact and convenient to use. On the other hand antennas are conventionally large and cumbersome and environmental pressures are making them more and more difficult to erect.

Datong Active Antennas provide an ideal solution to this growing problem. They give results comparable to full size conventional antennas yet with an overall length of only three metres. This means that the indoor version (Model 270) can easily be mounted in a loft or attic, while the outdoor version (Model 370) is quite unobtrusive, less so in fact than most TV antennas. Both models contain identical electronics and differ only in their mechanical design.

ACTIVE VERSUS PASSIVE

Modern receivers are highly sensitive and require only a short antenna to give enough input signal for incoming noise to mask receiver noise. Once this point is reached any further increase in antenna output is counterproductive because overload effects in the receiver cause spurious signals to increase very rapidly. Unfortunately short passive antennas are very frequency conscious and difficult to match to a feeder.

This problem is solved in Datong Active Antennas by using a high grade solid state amplifier to match a short dipole (3 metres overall) to 50ohm coaxial feeder. The result is an antenna with constant sensitivity from 200kHz to over 30MHz yet which gives reception entirely comparable with very much bigger conventional antennas. The output level is similar to that of a passive dipole resonant at about 14MHz.

As well as small size and good feeder match other advantages of the Active Antennas are the complete absence of tuning adjustments, minimised pick up of interference (due to excellent dipole balance), and the ability to easily change the plane of polarisation.

NEW AMPLIFIER DESIGN

Amplifiers used in active antennas have a very difficult task to perform and require very careful design. A new feedback technique is used in Models AD270 and AD370 which with the use of low noise FETs and r.f. power transistors gives excellent results. The amplifier combines extremely good large signal handling ability with a very low noise level. In addition it has differential high impedance inputs and good rejection of common mode signals.

As a result spurious signals (which plague simpler active antenna designs) are negligible in normal use and the antennas are ideally suited to serious DX listening.

INSTALLATION

The complete Active Antenna systems supplied by Datong comprise a head unit (either AD270 or AD370), an interface unit, coaxial feeder cable to link head unit to interface unit, antenna elements, and a coaxial lead to connect the interface unit to the receiver.

The interface unit (Model IB5) contains a broadband amplifier with a gain of 12db which can be switched in or out as desired. It also accepts a DC power source and sends current up the main feeder to power the head unit.

Model AD270 is supplied with two 1.5 metre antenna elements made of flexible wire. The head unit should be suspended in the desired orientation between these wires.

Model AD370 is supplied with two stainless steel taper ground whips and is intended to be screwed to a flat surface outdoors.

A DC supply of 12 volts at 140mA is required. A suitable mains adaptor is available as an optional extra (Model MPU).

TECHNICAL INFORMATION

(Data measured using 12 volt power supply)

Frequency range:	sensitivity is constant from 200kHz to 30MHz. Useful performance is also obtained from 100kHz to over 70MHz.		
Output impedance:	50 ohms nominal		
Differential voltage gain of head unit:	6 db (into 50 ohm load)		
Gain of interface unit (IB5):	0 db (pre-amplifier out of circuit) or 12 db, switchable.		
Output intercept point:		Pre-amplifier out of circuit	Pre-amplifier in-circuit
	2nd order	66dbm	46dbm
	3rd order	36dbm	27dbm
Supply voltage:	11 to 14 volts		
Supply current:	140mA.		
Dimensions:	AD270 and IB5 cases, 99 x 49 x 25mm (3.9 x 1.9 x 1.0 inches); AD370 case, 80 x 82 x 55mm (3.1 x 3.2 x 2.2 inches).		

ORDERING INFORMATION

Models AD270 and AD370 are normally supplied as complete systems. A mains power unit (220-240 volts only) is also available.

In addition both head units are available separately. This allows an indoor installation to be upgraded to an outdoor system or more than one head unit can be installed to give choice of polarisation or directivity.

Model AD270 complete system comprises the following items (Datong part numbers are shown in brackets):

- 1 off AD 270 Head Unit.
- 1 off IB5 Interface Unit.
- 2 off 1.5 metre dipole wires (782-0050).
- 1 off coaxial cable, length 4 metres, terminated to link AD270 and IB5 (782-0010).
- 1 off coaxial cable, length 1 metre, one end to suit IB5, other end unterminated (782-0021).
- 1 off 3.5mm power supply jack for IB5 (512-0030).

Model AD370 complete system comprises:

- 1 off AD370 gasket sealed Head Unit fitted with 8 metres of coaxial cable terminated to suit IB5.
- 1 off IB5 Interface Unit.
- 2 off Stainless steel whip antennas (755-0150).
- 1 off coaxial cable, length 1 metre, one end to suit IB5, other end unterminated (782-0021).
- 1 off 3.5mm power supply jack for IB5 (512-0030)
- 1 off Allen Key (755-0140).

OPTIONAL ACCESSORIES

Model MPU: mains power unit
Lead IB 5/A: coaxial jumper lead, length 1 metre, one end to suit IB5, the other fitted with PL259 coaxial plug.



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Power Source

A DC power supply is required capable of providing between 11 and 14 volts at 140 mA. Good stability is not essential. A mains power supply such as the Datong Model MPU is suitable.

Battery operation is not recommended due to the high current drain (high current drain is necessary if good strong signal performance is to be achieved).

NOTE When the power jack is inserted or withdrawn it will be momentarily short circuited. Therefore unless the power supply is short circuit proof (eg. Model MPU) switch off the supply before inserting or withdrawing the jack.

CAUTION Power to the head unit is fed up the coaxial cable from the Interface Unit. Any short circuit in the cable will therefore short out the supply. If a power source with a high current capability is used (such as a car battery) such a short circuit could burn out the cable or some of the components in the Interface Unit. A fuse (0.5 Amp) should therefore be used in series with such power supplies.

Positioning

For best results the dipole elements should be mounted as far as possible from surrounding objects, especially metal ones, and away from possible sources of interference such as fluorescent lights, TV receivers, or thermostats.

Remember that the antenna will only detect the signals which exist actually at the dipole elements. If the elements are screened by large metal objects, signals will be reduced.

The antennas have the same directional properties as conventional dipoles. This means that if the dipoles are mounted horizontally maximum pick up will be from directions perpendicular to the axis of the dipole. On the other hand signals arriving along the axis of the dipole will be rejected and this can be very useful if there is one dominant source of interference nearby. Careful positioning of the antenna can often give a big improvement as the interference source is nulled out.

When the dipole is mounted vertically it will respond equally in all horizontal directions, with minimum pick up above and below.

Normally it will be found that some signals are received best with the dipole vertical and others are better with it horizontal. The best orientation for the dipole depends on many factors such as distance from transmitter, mode of propagation, transmitter polarisation, time of day, and operating frequency, and some initial experimentation is strongly advised.

In general for long distance and general purpose reception, especially at frequencies above about 10 MHz, vertical or near-vertical mounting is recommended. Vertical mounting will give omnidirectional reception of ground waves (e.g. from LF stations) and of low angle sky waves (e.g. from far distant or 'DX' stations). Reception of high angle sky waves from medium distant stations will however be relatively poor.

Horizontal mounting gives almost omnidirectional reception of high angle sky



waves and directional reception of low angle sky waves. For the latter maximum response will be obtained when the line of the dipole wires is perpendicular to the line between antenna and transmitter.

Mounting Model AD 270

Model AD 270 is intended to be suspended between its dipole wires using lengths of string or plastic twine (not supplied) tied to the loops on the ends of the antenna wires. Both wires should be stretched out in a straight line and the coaxial feeder should run perpendicular to the line of the wires for a distance of at least one metre. Symmetry helps to maintain the excellent balance of the dipole. The weight of heavy lengths of feeder should be separately supported.

Mounting Model AD 370

The case of the head unit has four mounting holes outside the rubber gasket seal. It is intended that these holes be used to screw or bolt the head unit to a flat surface. Access to the mounting holes is obtained by removing the lid of the head unit after unscrewing the four lid retaining screws.

The two stainless steel dipole elements must be fitted to the mounting posts on the head unit. Each whip should be securely clamped using both set screws. A suitable Allen Key is supplied with the antenna.

The mounting post into which the whips fit is itself screwed onto a stud mounted on the plastic case. Check that these two parts are tightly screwed together when installing the antenna.

The whips should be as far as possible from other metal objects. If the head unit is mounted directly onto a wall, for example, the whips can be bent near the base so that they angle out slightly from the wall. When mounting the unit to a wall it is better to first fasten a piece of wood to the wall. The head unit can then easily be fastened to the wood using suitable wood screws. The same mounting method can be used for chimney mounting.

To avoid possible ingress of water, position the unit so that water cannot collect in the cable gland-entry, and arrange for the coaxial cable to point downwards as it leaves the gland.

Length of feeder

The length of feeder used between head unit and interface unit is not critical. Losses in the feeder can if necessary be made up using the extra amplification in the Interface Unit. With normal coaxial cable up to 100 metres should be satisfactory.

If a long cable run is to be used good quality 50 ohm cable is preferable. For short runs ordinary TV type 75 ohm coaxial cable will be quite suitable.

Connecting to the receiver

The antennas come supplied with a singly terminated 1 metre jumper lead which connects between the output of the Interface Unit and the input to the receiver. A plug must be fitted to the cable to suit the receiver. If the receiver does not have a coaxial input connector connect the outer shield of the jumper lead to the "EARTH" connection and the centre conductor to the "ANTENNA" connection. An alternative output lead already fitted with a PL 259 coaxial plug is available at extra cost.

Alternative Dipole Elements

Only two factors determine the length of the dipole elements. First, if they are too short the internal noise level of the head unit amplifier may be noticeable; second, if they are made too long the stronger signals will eventually overload the amplifiers and generate spurious signals.

The elements supplied (3 metres overall) represent a good choice for most applications. However if the antenna has to be installed in a shielded position results may be improved if longer elements are used. The sensitivity is proportional to element length. Thus doubling the elements to 6 metres overall will give an increase in sensitivity of 6 db.

Although Model AD 370 is supplied with steel whips the whip holders can also accept wire elements if desired. Such wire elements could be held in position by plastic twine as described for Model AD 270.

If alternative dipole elements are used be sure to make them of equal length otherwise the antenna will be unbalanced and subject to interference pick-up by the feeder cable.

Choice of gain setting

Under normal conditions best results will be obtained with the preamplifier inside the Interface Unit (IB 5) switched out of circuit.

The extra gain with the preamplifier switched into circuit may be useful occasionally when band conditions are extremely quiet and/or when extra long cable runs are used.

Beware of using the preamplifier when signals are strong (after dark for example) as overload and spurious signal generation are likely.

WARNING

If the Active Antennas are connected to transceivers beware of accidentally transmitting. Damage to the antenna will almost certainly result.