AT-1743 TACTICAL DIPOLE ANTENNA USER MANUAL

200W 2-30MHZ

INTRODUCTION

The AT1743 are manpackable, half wave, dipole antennas, constructed using lightweight strong materials, for field use.

The antennas are marked with frequency markings along its length to enable easy setting of desired operation frequency.

PARTS IDENTIFICATION

Part Number	Quantity	Description
1.1	2	Antenna elements, PVC covered copper braid, Kevlar core, 36m long, calibrated in: • 0.1MHz intervals 2.0-3.0MHz • 0.2MHz intervals 3.0-4.0MHz • 0.5MHz intervals 4.0-10.0MHz • 2.0MHz intervals 10.0-18.0MHz • 4.0MHz intervals 18.0-30.0MHz
1.2	1	Coaxial cable assembly, 10m long, fitted strain relief, 2 x BNC male connectors
1.3	1	Centre junction unit, black polypropelene, BNC female socket
1.4	2	Throwing rope, 1.5mm polyester flexible plaited rope, 20m long, fitted with 2oz lead weight
1.5	1	Nylon/PVC belt mounted kit bag
1.6	1	Operator's manual

FAMILIARISATION

Care should be taken to familiarise yourself with each component, so that identification, assembly and use become automatic.

ASSEMBLY & USE

1. Remove all components from the kit bag and check for damage/wear, ensure all components are present.

2. Choose a spot on the ground near to a tree or elevated anchor point to represent the centre of the dipole and fit cable assembly to the centre junction, unwind the cable and lay the assembly on the ground.

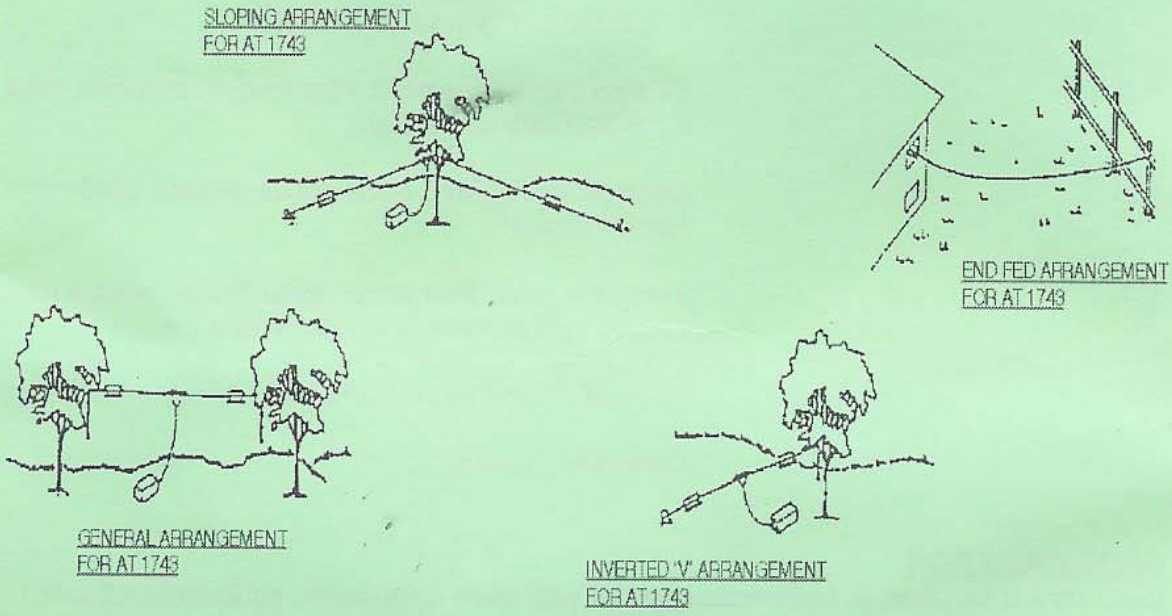
3. Take the two elements, with storage boards and throwing line, and begin to unwind the frequency marked element, after fixing the terminal and strain relief to the centre junction lugs.

   When the desired frequency marker is reached, slip off the element into the slots provided on the storage board. The straining line/weight should then be unwound and played out, being careful to avoid tangles. (Two people are preferable for this operation but not completely necessary).

4. Repeat 3 for the second element.

5. The dipole is now ready to be elevated into a working position, either on a tree or some elevated natural object. If you have a mast available, the antenna may be slung from this.

Possible configuration for the AT-1743 dipole antenna:



WHAT IS THE BEST CONFIGURATION?

Considering that the ideal components for the best possible antenna location is unlikely to occur during field use, the above four methods should resolve most situations.

The centre fed dipole works best when its longitudinal axis is straight and when it is *parallel* to the ground at a particular height (refer to Elevation Patterns). This gives good *sky-wave* performance, with some ground wave and an almost omni-directional field of radiation, so the centre fed horizontal configuration is best for medium range communications, with some short range ground waves.

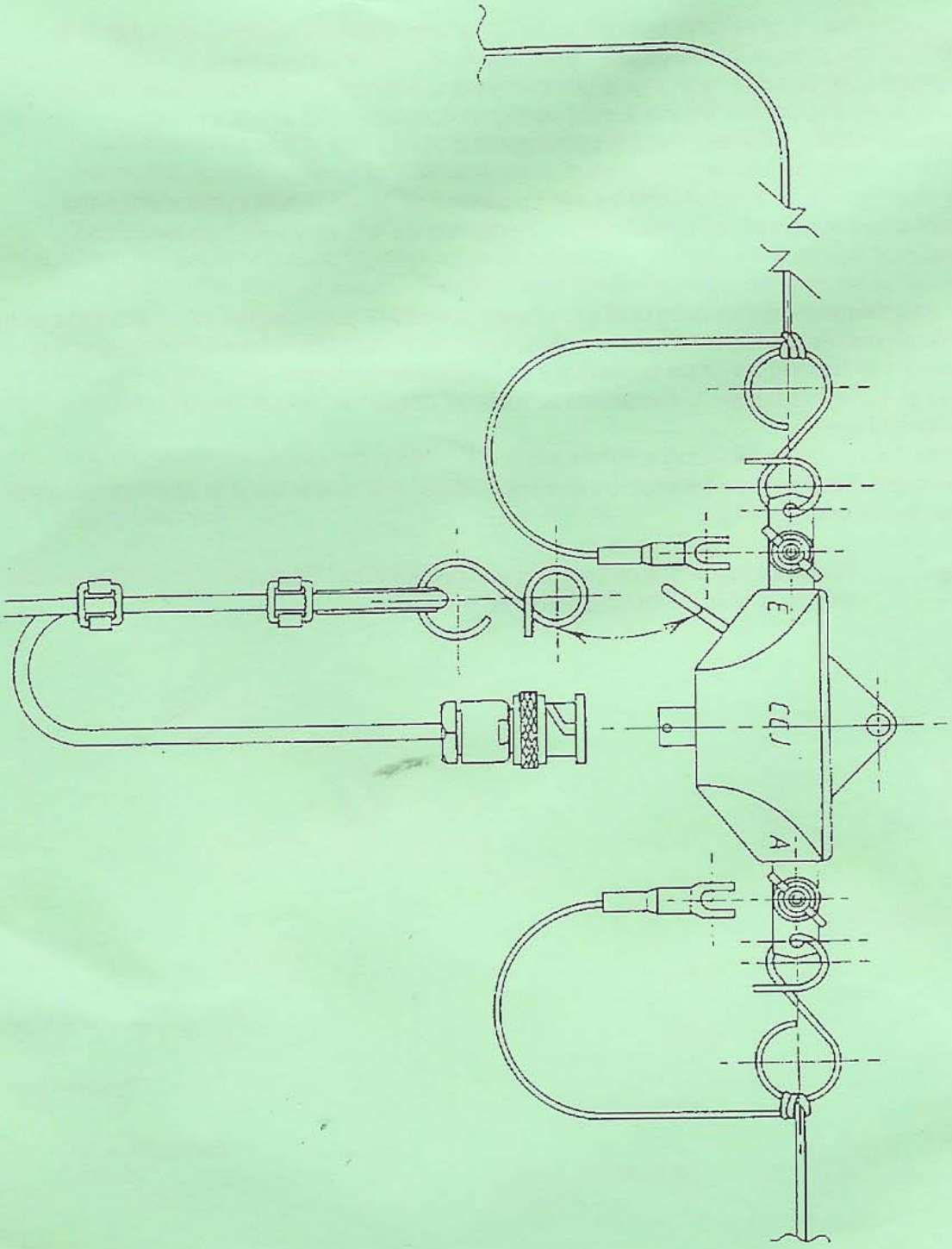
The sloping wire end fed should be set up using half of the dipole connected to the antenna tuning unit of your transmitter. Performance will vary with frequency and location.

The inverted vee configuration will give some directivity to the signal when the ends of the dipole elements are drawn together to a minimum angle of 50°, however, keeping the elements in line will given an essentially omni-directional signal but, due to the ground being at a varying height to the antenna, take off angle will not comply with those published here.

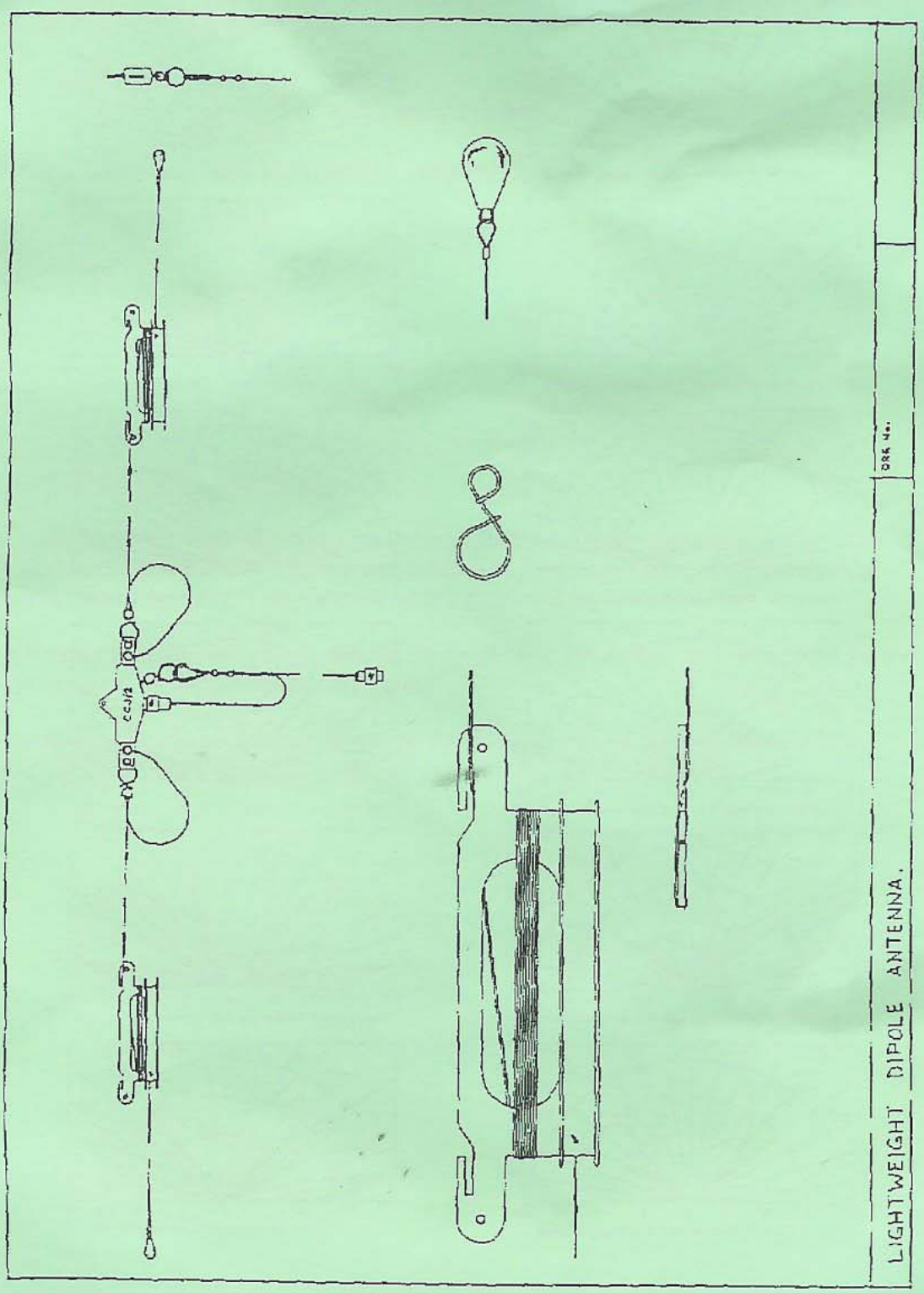
The centre fed sloping wire method is a variation of the inverted vee and will given good omni-directional signals.

Note: Ground stakes are not provided in the antenna kits and natural objects such as rocks or tree branches should be used.

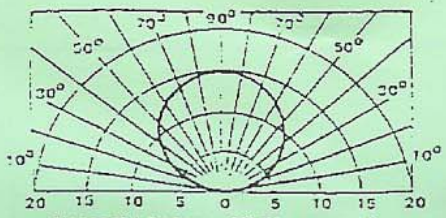
CENTRE JUNCTION ARRANGEMENT



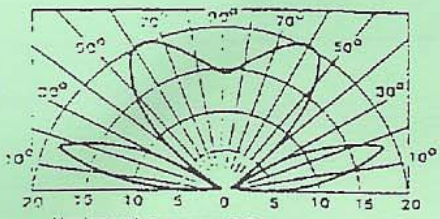
LIGHTWEIGHT DIPOLE ANTENNA



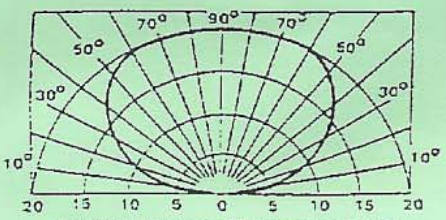
SIGNAL ELEVATION DIAGRAMS



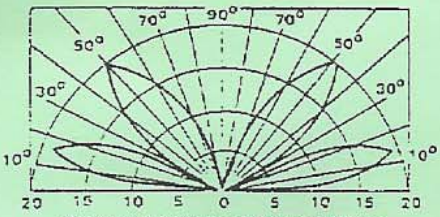
Horizontal Antennas 1/8 Wavelength High



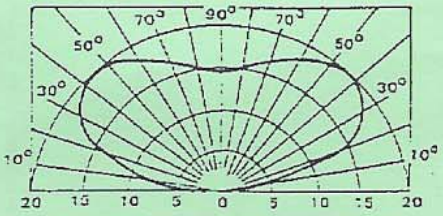
Horizontal Antennas 7/8 Wavelength High



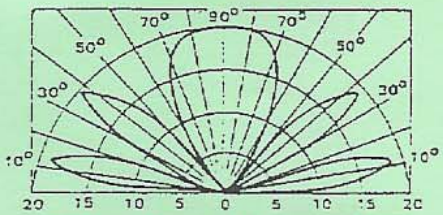
Horizontal Antennas 1/4 Wavelength High



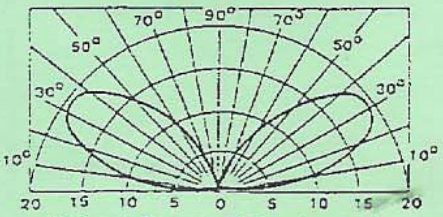
Horizontal Antennas 1 Wavelength High



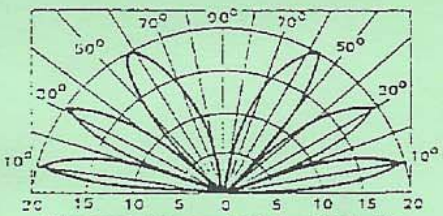
Horizontal Antennas 3/8 Wavelength High



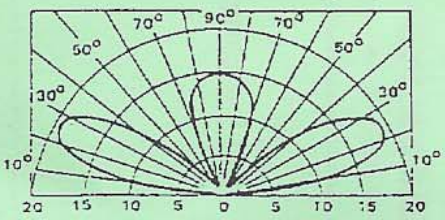
Horizontal Antennas 1-1/4 Wavelengths High



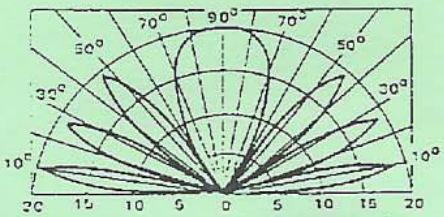
Horizontal Antennas 1/2 Wavelength High



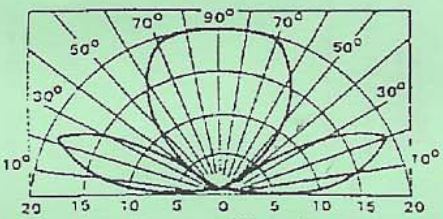
Horizontal Antennas 1-1/2 Wavelength High



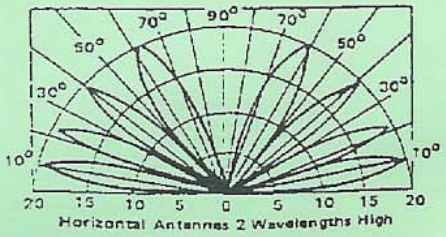
Horizontal Antennas 5/8 Wavelength High



Horizontal Antennas 1-3/4 Wavelengths High



Horizontal Antennas 3/4 Wavelength High



Horizontal Antennas 2 Wavelengths High

WAVE LENGTH CHART

This chart can be used to determine height above ground in wave lengths; interpolations between these given figures is difficult, since the relationship is non-linear, however, one wavelength can be calculated thus.

One wavelength in metres = $\frac{285.30}{\text{Frequency in MHz}}$

Frequency	Total Wavelength (Metres)
3MHz	95.10m
6MHz	47.56m
10MHz	28.54m
15MHz	19.02m
20MHz	14.26m
25MHz	11.42m
30MHz	9.52m

DE-COMMISSIONING STOWING

Each time the antenna is de-rigged and stored, care should be taken to ensure that all knots and twists are removed as far as possible to avoid damage, all connectors are clean and free of grit and mud etc and, as far as possible, moisture free.

The elements and throwing braid should be as clean as possible and re-stowed on the storage board in the appropriate segments.

The coaxial cable can be wound up on the forearm and all components should be replaced in the kit bag, where they should remain until required again.

HINTS ON USE

Below is a chart giving the incidence of frequency markers, from the centre of the dipole, out to the ends. The markers are raised on the element material and can be counted out should the unit be used in poor light or if the printed markings become erased for any reason.

Counting from the inner end of each element:

NUMBER	FREQUENCY
1	30MHz
2	26MHz
3	22MHz
4	18MHz
5	16MHz
6	14MHz
7	12MHz
8	10MHz
9	9.5MHz
10	9.0MHz
11	8.5MHz
12	8.0MHz
13	7.5MHz
14	7.0MHz
15	6.5MHz
16	6.0MHz
17	5.5MHz
18	5.0MHz

NUMBER	FREQUENCY
19	4.5MHz
20	4.0MHz
21	3.8MHz
22	3.6MHz
23	3.4MHz
24	3.2MHz
25	3.0MHz
26	2.9MHz
27	2.8MHz
28	2.7MHz
29	2.6MHz
30	2.5MHz
31	2.4MHz
32	2.3MHz
33	2.2MHz
34	2.1MHz
35	2.0MHz

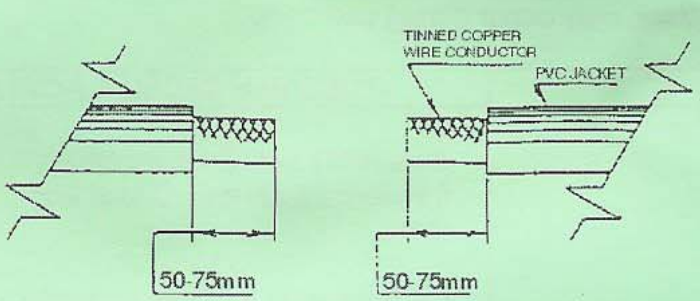
REPAIRING DAMAGE IN THE FIELD

Emergency field repair may be carried out on the antenna but these should, in most cases, be restricted to repairing elements, throwing strings, etc. Coaxial cables and coaxial connectors should be replaced when damaged.

ELEMENT BREAKAGES

Should the antenna elements (1.1) be broken, they can be temporarily repaired as follows:

1. Strip back PVC covering, exposing wire braid on both ends.



2. Tie the stripped part of the element in a reef knot, to ensure maximum conductivity and, if available, cover in self-amalgamating tape (demo tape) or PVC insulating tape.

THROWING CORD BREAKAGES

These can be field repaired using a reef knot, obviously no stripping back is required.

LOSS OF LEAD WEIGHT

This can be replaced temporarily by a stone or large metal nut.

LOSS OF CONNECTING TERMINAL

The antenna can still be used by stripping back the element at the point where the terminal was and clamping the exposed braid under the equipment connecting terminal.

Note: All broken or damaged assemblies should be replaced with the correct spares as soon as possible.

COAXIAL CABLE & CONNECTOR DAMAGE

Replace with new assembly.

CENTRE JUNCTION DAMAGE

Replace with new assembly.

TROUBLE SHOOTING

These are a few situations which may occur during use:

SYMPTOMS	POSSIBLE CAUSE & ACTION
High VSWR	- Incorrectly set elements on frequency markers. Check and reset - Close proximity of tree or similar large object. Move to another location
No transmission reception	- Connections loose. Check and tighten - Coaxial cable not connected correctly. Check and correct - Coaxial cable open or short circuit - Check continuity with DVM or similar. If damaged replace - Lost continuity in centre junction. Check continuity, if damaged replace **Remember:** Transmitter damage can result if antennas are not set and functioning correctly