



TECHNICAL MANUAL

VTM-01-003

**OPERATION AND INSTALLATION
INSTRUCTIONS**

AS-1735/SRC ANTENNA

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Errors in this publication can be reported to the Manufacturer.
Refer to Section 6 for contact information and address
attention to the Engineering Department.

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1.0 GENERAL INFORMATION

1.1 Scope

This manual is intended for the purpose of installing, operating and maintaining the AS-1735/SRC antenna.

1.2 Description

The AS-1735/SRC antenna is a UHF (ultra high frequency) antenna which provides vertically polarized transmissions and receptions in an omnidirectional radiation pattern across the 225 to 400 MHz frequency range. Optimal operation is achieved when the antenna is mounted on masts of 12 inches in diameter down to 4 inches in diameter. As an option, the antenna can also be mounted on masts of 12 inch to 15 inch diameters through the use of Extended Feed Line Sections in the Lower Feed Assembly. The part number for these Extended Feed Line Sections is VD-00-00225-2 and they are available on request from the manufacturer (See Section 6 for contact information).

The AS-1735/SRC antenna is comprised of a four-element array with each element equally spaced around a central mountable mast. The broadband elements are fed in-phase with each other and work together to obtain an omnidirectional radiation pattern in the Azimuth plane. The elements are fed by an integral coaxial line matching transformer and transmission line network all coupled from a single coaxial input to the antenna. Installation of the antenna is simplified through the use of flange mounts and standard hardware.

Table 1.1 - Electrical Properties of the AS-1735/SRC Antenna

| | |
|---|--|
| Operating Frequency Range | 225 MHz to 400 MHz |
| Input Impedance | 50 Nominal |
| Voltage Standing Wave Ratio (VSWR) | 1.8:1 maximum |
| Gain | +2 dB above an isotropic source |
| Power Rating | 2 kW PEP (Peak Envelope Power) |
| Input Connector | UG-352/U |
| Polarization | Vertical |
| Radiation Pattern | Omnidirectional within ± 2 dB in the azimuth plane when mounted on 11" diameters or less |

Table 1.2 - Mechanical Properties of the AS-1735/SRC Antenna

| | |
|---------------------------|--|
| Weight | 31 lbs (14 kg) |
| Finish | Epoxy polyamide paint, colour Haze Grey |
| Mounting Position | Vertical mast of 4 to 12 inch (10.2 to 30.5 cm) dia. *Optional 12 to 15 inch (30.5 to 38.1 cm) dia. |
| Overall Dimensions | 29-3/4 in (wide) x 29-3/4 in (deep) x 28-1/4 in (high) (75.6 cm (wide) x 75.6 cm (deep) x 71.8 cm (high)) |
| Temperature | Storage -140°F to +158°F (-95°C to +70°C) Operating -76°F to +140°F (-50°C to +65°C) |
| Wind Loading | Operating 75 mph (120 km/h) Survival 120 mph (192 km/h) |
| Shock | per MIL-S-910C, Grade A, Class I, Type A |
| Vibration | per MIL-STD-167, Type I |

* See Section 6 for contact information

2.0 INSTALLATION

2.1 Unpacking

The AS-1735/SRC antenna is shipped along with two Technical Manuals within the same shipping container. Carefully pry off the lid of the shipping container to find the antenna and the two manuals in amongst the packing material. See Figure 2.1. Lift out the top layer of packing material and carefully remove the antenna. Remove any additional packing material and note that the antenna has not suffered any damage from shipping.

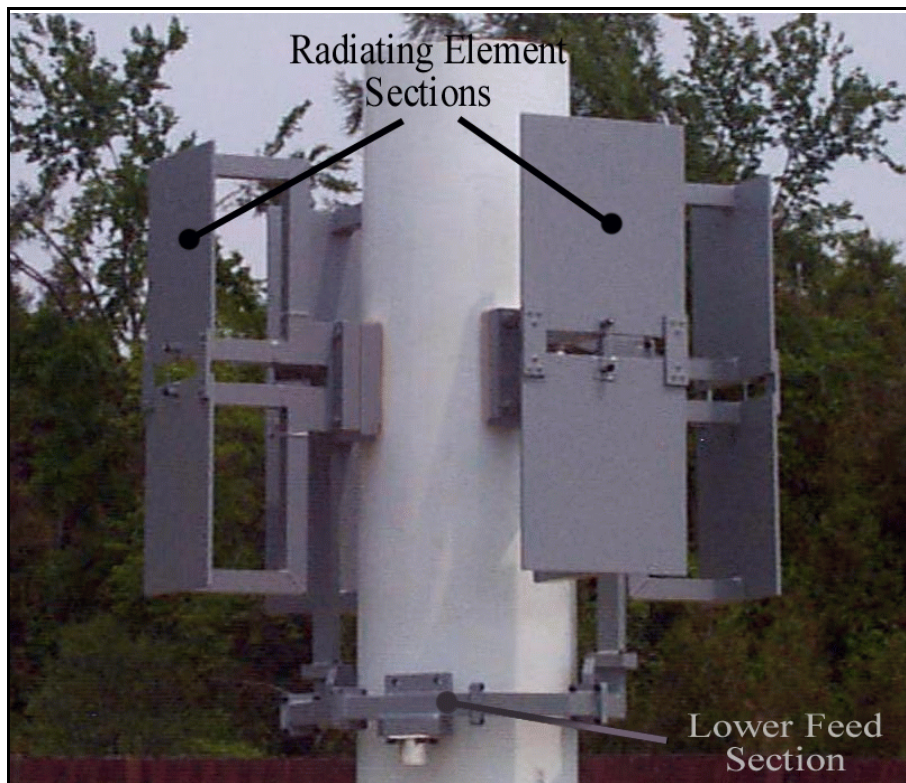


Figure 2.1 - Identifying the main sections of the AS-1735/SRC

Note :

The shipping container is reusable.
Save it for repackaging the antenna for further shipments.

2.2 Handling

Care must be taken with the antenna so as not to damage any of the flanges or contacts nor to chip or scratch the painted surfaces of the antenna. No special handling procedures are necessary.

2.3 Power Requirements

The AS-1735/SRC antenna has an RF power handling capability of 2 kW Peak Envelope Power in the 225 MHz to 400 MHz range. This is inputted through an LC type, UG-352/U RF connector which is located at the centre of the Lower Feed Section. No other power sources are required.

2.4 Cabling

The AS-1735/SRC antenna is designed to mate with the UG-154A/U connector of the transmission line via a UG-352/U connector. The transmission line should be tied down to the mast to prevent excessive stress on the connector assemblies of both the transmission line itself and the antenna.

2.5 Site Preparations

The AS-1735/SRC antenna has been designed for shipboard use and is intended to be installed around a self-supporting mast of diameters between 4 and 12 inches (up to 15 inch masts can be supported by special order). The Antenna can also be used in shore applications so long as the installation requirements laid out in this manual are maintained.

2.6 Installation Requirements

Note :

The optimum installation layout for the AS-1735/SRC antenna is determined on a ship-by-ship basis. The particular installation plans for the ship should be consulted.

The AS-1735/SRC antenna is designed to be installed around a 12 inch vertical mast. Four radiating elements encompass the mast, each 90 degrees from each other and joined by a common feed point. Refer to Figure 2.2 for a visual illustration.

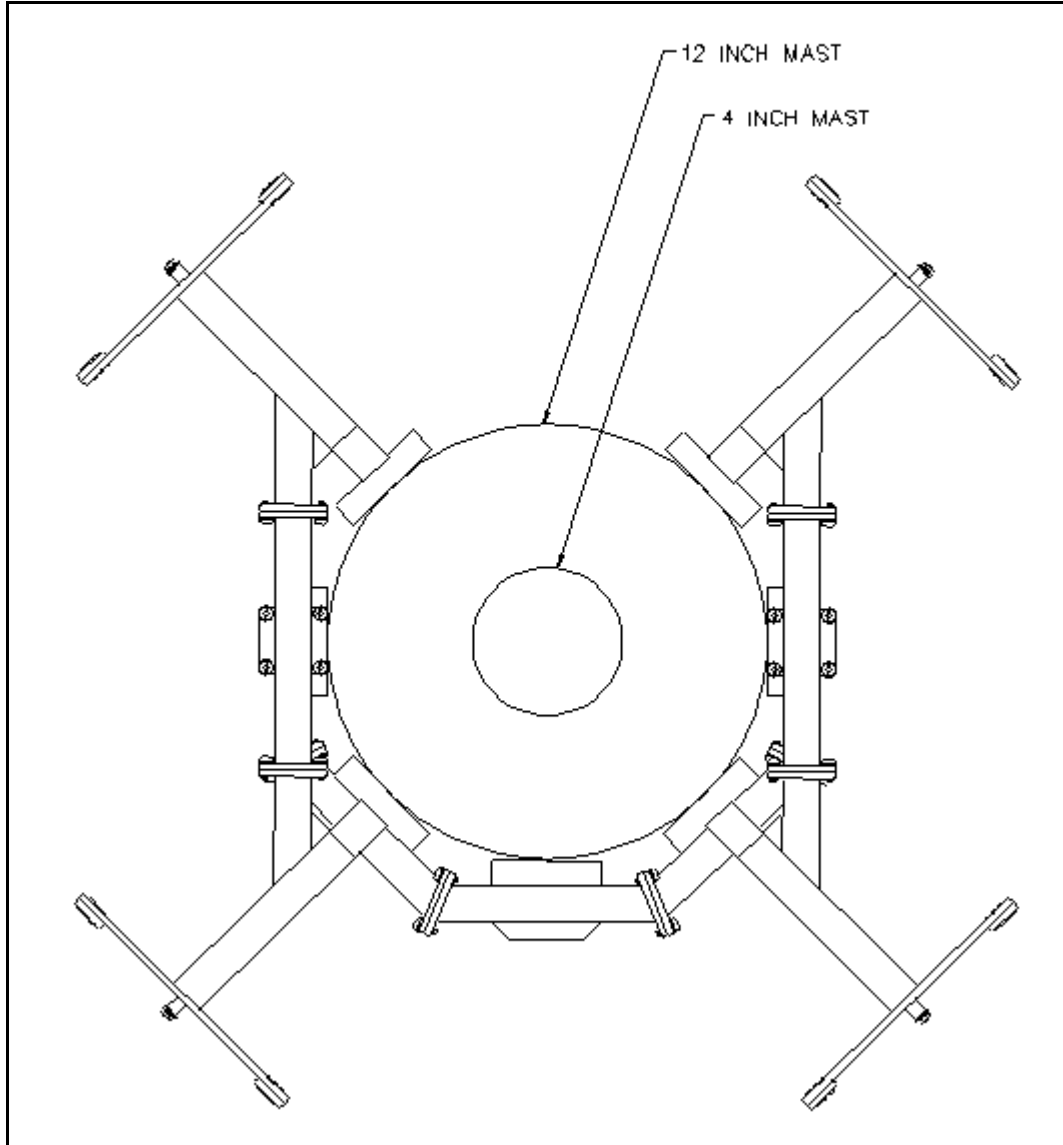


Figure 2.2 - Mounting the AS-1735/SRC around masts of 4 inches and 12 inches

The antenna is shipped fully assembled and can be thought of having three main sections to it; the Lower Feed Section and the Left-hand and Right-hand Radiating Element Sections (see Figure 2.1). The Lower Section is equipped with three mounting flanges. Each flange has 2 bolt holes to accommodate 3/8" hardware. The Radiating Elements are equipped with two mounting flanges each spaced 90° apart. These mounting flanges have 4 bolt holes which also accommodate 3/8" hardware. For dimensions of bolt holes, see Figures 2.3.a and 2.3.b.

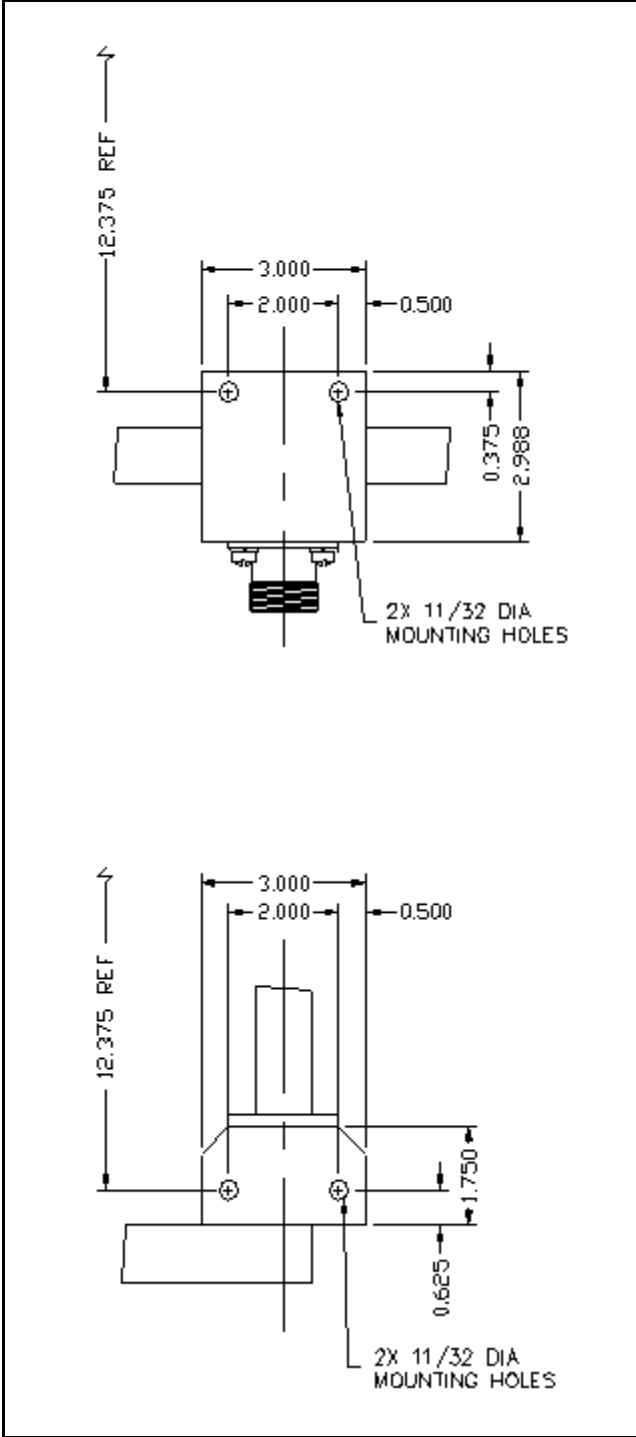


Figure 2.3.a - Lower mounting hole dimensions of the AS-1735/SRC antenna

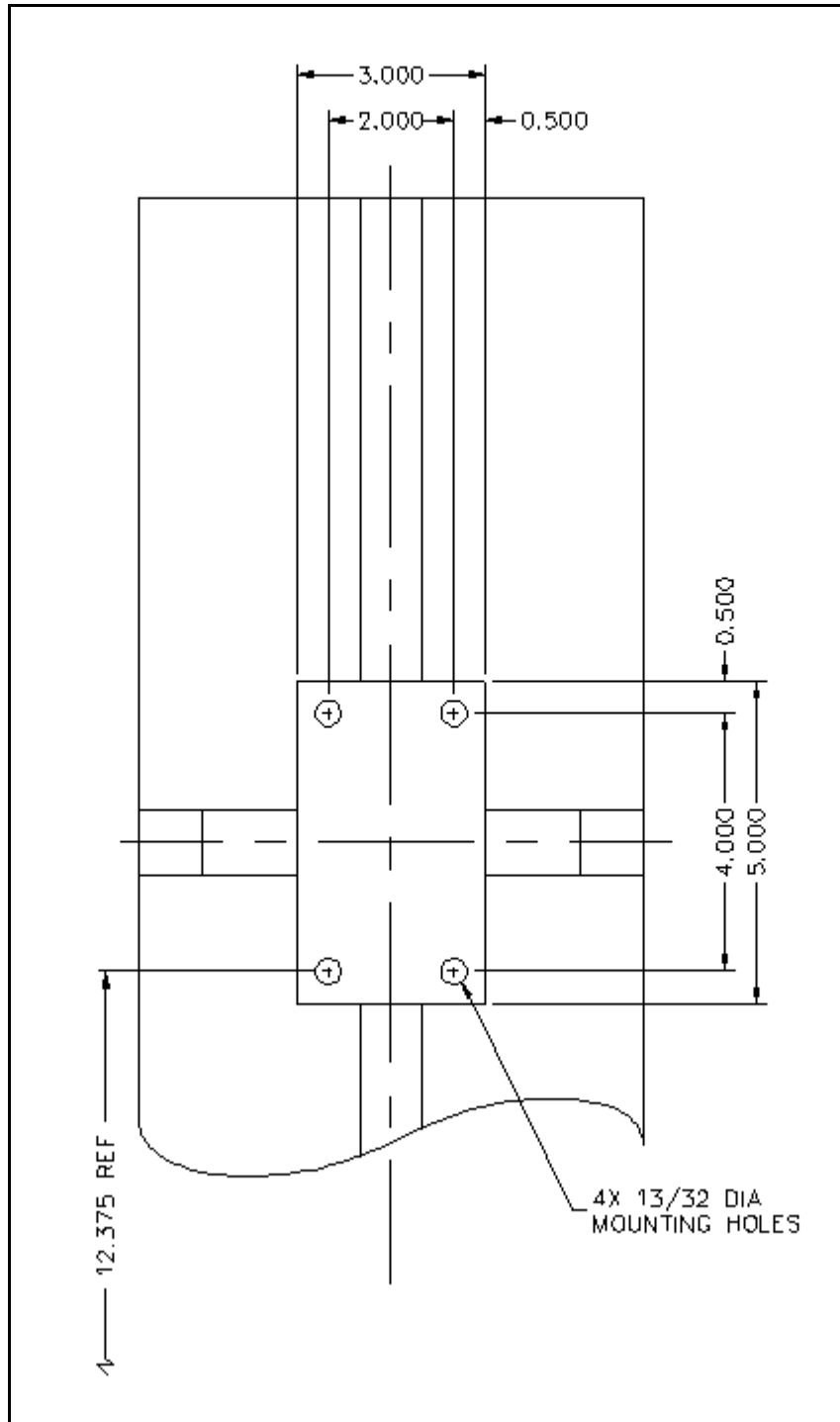


Figure 2.3.b - Upper mounting hole dimensions of the AS-1735/SRC antenna

Support assemblies must be provided between the mast and the antenna's Radiating Element Sections and Lower Feed Section for proper installation of the antenna. The support assemblies are not supplied by the manufacturer.

Various types of support assemblies may be utilized in the installation of the AS-1735/SRC antenna. The type of assembly used depends upon the mast size. However, it is imperative that proper alignment, positioning and location of the mounting holes of the support assembly be maintained. If misalignment exists, the AS-1735/SRC will suffer excessive stress levels which will greatly reduce the reliable lifespan of the antenna.

The antenna must be mounted on the mast so that it is high enough to clear any obstructions which may hinder the antenna's "line of sight" mode of operation. A minimum vertical spacing of 4 feet must be maintained between the AS-1735/SRC and any other projections from the mast. This is to ensure full efficiency of the antenna and also to protect against damage to other equipment by the high power levels radiating from the antenna.

Orientation of the elements of the AS-1735/SRC is not critical as the antenna is designed to provide omnidirectional radiation in the azimuth plane.

The easiest recommended installation is to raise the antenna to the top of the mast then sliding it down over the mast and bolting it to the appropriate mounting location. If possible, the mast may even be lowered to a near horizontal state and the antenna slipped over the top of the mast. Line up the bolt holes of the seven flanges to the support assembly attached to the mast. Use stainless steel hardware, such as 3/8" bolts and lock washers (not supplied), to fasten the antenna to the support assembly.

Note :

The use of an anti-seize thread compound per MIL-A-907 is highly recommended on the threads of all hardware.

Use some touch-up paint to seal around the joint where the seven antenna mounting flanges meet the support assembly. Also touch up any chips which may have occurred on the hardware during disassembly.

2.7 Alternate Installation Method

In some instances, it may not be possible to raise the antenna over top of the mast, nor to lower the mast to a comfortable working height. If this is the case, it may be necessary to separate the AS-1735/SRC into the three main sections, as identified in Figure 2.1, by removing both sets of the four screws at the top of the two elbow joint flanges. Keep the hardware and the two rubber O-rings in a safe place for re-assembling.

Note :

When disassembling, be cautious not to bend or break the inner conductors and do not let any moisture to enter the inside of the antenna.

The AS-1735/SRC can now be installed by bolting one of the Radiating Element Sections to the support assembly attached to the mast by stainless steel hardware, such as 3/8" bolts and lock washers (not supplied), but do not tighten the bolts all the way yet. Bolt the second Radiating Element Section to the mast in a similar fashion, again, do not tighten the bolts yet. Place the previously removed O-rings in each of the grooves of the Lower Feed Section and, lining up the inner conductor bullet connections, attach the Lower Feed Section to the two Radiating Element Sections. Use the stainless steel hardware previously removed to secure the three sections together. Tighten the screws to 8.5 ft lbs (± 0.5 ft lbs). Bolt the Lower Feed Section to the support assembly attached to the mast by stainless steel hardware; such as 3/8" bolts and lock washers (not supplied). All mounting bolts can now be fully tightened as specified on the support assembly's documentation.

Note :

The use of an anti-seize thread compound per ML-A-907 is highly recommended on the threads of all hardware.

Use some touch-up paint to seal around the joint where the elbow flanges have just been joined, as well as where the seven antenna mounting flanges meet the support assembly. Also touch up any chips which may have occurred on the hardware during disassembly.

3.0 OPERATION

3.1 Functional Description

The AS-1735/SRC antenna consists of four dipole radiators fed in phase and positioned equally spaced around a circular mast. This configuration provides an omnidirectional radiation pattern in the azimuth plane over the frequency range of 225 MHz to 400 MHz which is capable of power inputs up to 2 kW peak.

The dipole elements are supported by an aluminum frame which also forms the outer conductors of the coaxial feed lines and transformers. Each dipole is fed through a balun and utilizes isolation traps to limit the flow of current in the mast.

The impedance of the radiating elements is essentially high. Impedance matching is achieved by pairing two elements in parallel and then paralleling those with the other two elements, which are also in parallel to each other.

The radiation pattern of the antenna is essentially that of a vertically polarized dipole. When the antenna is mounted on masts of 11 inches in diameter or smaller, the radiation pattern is omnidirectional to within ± 1.5 dB. When the antenna is mounted on larger diameter masts, the pattern tends to show slight nulls but is still relatively omnidirectional.

The design of the antenna has been driven to provide a lightweight, rugged, reliable and weatherproof antenna. This has been achieved through minimal assembly parts and in such a way that installation can be done in a variety of ways without noticeable differences in operation performance.

3.2 Operating Procedures

The AS-1735/SRC exhibits complete broadband operation over the frequency range of 225 MHz to 400 MHz in which the antenna requires no special procedures to operate. The antenna is ready to use upon completion of installation.

4.0 TROUBLE SHOOTING AND MAINTENANCE

4.1 General

Problems in transmission and reception applications can be the result of faulty equipment, transmission lines or the antenna. If problems occur in the operation of the system, check first and ensure the problem is not being caused by another piece of equipment or the transmission line. The AS-1735/SRC can be checked as described in this section.

4.2 Equipment Required

Due to the design of the AS-1735/SRC, trouble shooting tactics are limited to visual inspections of the various components. The antenna's internal electrical system contains a DC short to ground so any continuity tests will always indicate a short circuit. This is normal. Other than a screwdriver, no special tools are required.

4.3 Typical Troubles

The main area of concern would be the UG-352 connector; check for solid contact on the threads and that the centre contact is not broken or loose. Symptoms of a poor connector would be random fluctuations of reflected power during operation or abnormally high VSWR readings.

The AS-1735/SRC is an integrally constructed piece of equipment. The only replacement part is the UG-352 connector which must be procured from the manufacturer. If the antenna requires more extensive repair, it must be returned to the manufacturer for complete replacement or repair (see contact information in Section 6).

4.4 Preventative Maintenance

On a regular basis, i.e. once a month, the AS-1735/SRC antenna should be visually inspected for rigidity, cleanliness and general condition. At this time, it is also recommended to remove the UG-352/U connector to check as to whether or not any moisture has formed inside due to condensation. If so, the connector should be wiped dry and reconnected.

5.0 PARTS LIST

5.1 General

A list of parts shipped with the AS-1735/SRC antenna appears in Table 5.1.

A list of optional parts available from the manufacturer appears in Table 5.2.

Table 5.1- Parts supplied with AS-1735/SRC antenna Shipment

| Item # | Part Number | Description | Quantity |
|--------|---------------|---------------------|----------|
| 1 | VD-00-00171-1 | AS-1735/SRC Antenna | 1 |
| 2 | VTM-01-003 | Technical Manual | 1 |

Table 5.2 - Optional Parts available for the AS-1735/SRC antenna

| Item # | Part Number | Description | Quantity |
|--------|---------------|--|----------|
| 1 | VD-00-00225-2 | Extended Feed Line Sections, 12 to 15 inch masts | 2 |

6.0 QUICK REFERENCE DATA

6.1 General

Manufacturer's contact information can be found in Section 6.2.

6.2 Manufacturer's Address

| | |
|--|---|
| Postal address: | Shipping address: |
| Valcom Limited P.O. Box 603 Guelph, Ontario Canada N1H 6L3 | Valcom Limited 175 Southgate Drive Hanlon Industrial Park Guelph, Ontario Canada N1G 3M5 |
| Or directly at: | |
| Phone : (519) 824 - 3220 Fax : (519) 824 - 3411 e-mail : enquiries@valcom-guelph.com Internet : www.valcom-guelph.com | |
| For contractual questions, please contact Mr. Bill Burtenshaw. For technical questions, please contact Mr. Don Brandi. | |