Antenna VHF TV 170-230MHz

Quad Dipole Panel, H90 Horizontal Polarisation

Application

The AlanDick Band 3 Quad Dipole Panel operates across the band from 170 to 230 MHz. It has been developed as a versatile, robust and reliable horizontally polarised module forming the basis of a range of standard antenna arrays and custom designs whose radiation patterns may be tailored to specific requirements. The Quad Dipole Panel may be conveniently mounted on either new or existing structures.

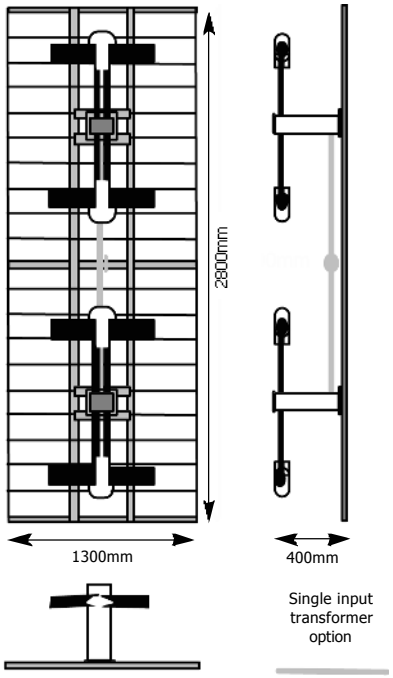
The horizontal plane pattern of the H-90 panel has been optimised for the normal requirements of panels to be mounted around triangular structures. AlanDick offers the H-120 panel for triangular structures.

Design

The radiating elements made of 76mm (3") diameter hot dipped galvanized steel tube, are mounted a quarter wavelength in front of a galvanized steel screening frame. The screening frame has been designed using tubular main members and screening bars in a welded construction providing a very robust and efficient screen combined with a low effective wind area. The main members provide a versatile means of fixing the panel to a variety of structures using standard clamps without the need for complex and expensive steelwork.

Weather protection of the dipole feed points is provided by GRP covers.

In its normal configuration there are two inputs per panel thereby providing a high input power rating and a greater control over the vertical plane radiation pattern of complete arrays. At the same time installation is made easier by retaining smaller, easily handled, distribution feeders together with the advantage of a one piece screening frame. A single input alternative is available.

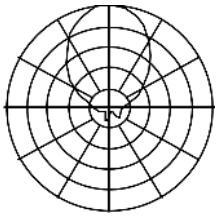


Approximate weight and Aerodynamic area		
Weight	76kg	170lbs
Area (BS CP3)		
Front Elevation	1.0m2	10.8ft2
Side Elevation	0.8m2	8.6ft2

Product Specification	
Impedance 50 ohms 170-230MHz	
VSWR	<1.10:1
Reflection coefficient	<5%
Return loss	>26dB
Peak Gain	
10.8dB at 200MHz. (Relative to halfwave dipole)	

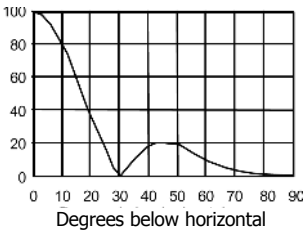
Single Panel Radiation Patterns and Performance			
Peak Synch Power Rating (According to Input Connector)			
Single input panel rating			
7.16 DIN	3.4kW	7/8 IEC (EIA)	5kW
Total combined rating of two inputs per panel			
7.16 DIN	6.8kW	7/8 IEC (EIA)	10kW

Horizontal Plane Pattern (200MHz.)



Max/Mean gain 6.7dB

Vertical Plane Pattern (200MHz.)



In pursuance of continual product improvement, AlanDick reserve the right to change specifications without prior notice

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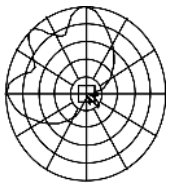
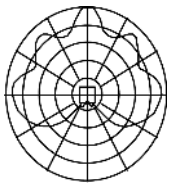
Horizontal Plane Radiation Patterns

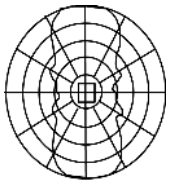
Plotted for panels mounted on a 1300mm face triangular structure



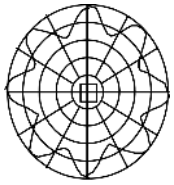
a) Max/Mean Gain 4.5dB



b) Max/Mean Gain 2.8dB



c) Max/Mean Gain 3.6dB



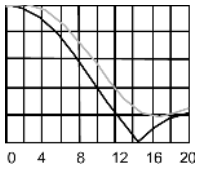
d) Max/Mean Gain 1.4dB

Vertical Plane Radiation Patterns

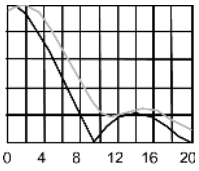
(200MHz.)

Patterns without Null Fill or Beam Tilt ——

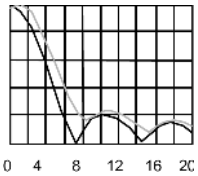
Patterns with typical Null Fill and Beam Tilt ——



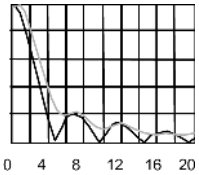
a) 2 Tiers (3.9λ)



b) 3 Tiers (5.9λ)



c) 4 Tiers (7.9λ)



d) 6 Tiers (11.9λ)

	(a)	(b)	(c)	(d)
Beam Tilt degrees	2.0	1.5	1.0	0.6
Null Fill Loss, dB	0.4	0.4	0.3	0.4

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Array Data

Radiation Patterns

AlanDick design and manufacture a complete range of distribution feeder components to enable an almost unlimited variety of radiation patterns and array gains to be achieved.

Gain

Array gain is determined by the max/mean value of the horizontal radiation pattern and the number of tiers of panels employed. Figures are given below for 2 to 6 tiers of Quad Dipole Panels. Higher gains may be achieved by even larger apertures but at the expense of very narrow beam widths which make the antenna sensitive to movement of the supporting structure in high winds. For smaller apertures the Double Dipole Panel is available. The gains of typical directional arrays may be determined by simply adding the HRP max/mean gains for the patterns opposite to the gains of omnidirectional arrays given in the following table. The table makes no allowance for null fill loss but includes typical distribution feeder loss.

No. of tiers	2	3	4	6
Mean Gain, dB	6.9	8.5	9.8	11.5
Aperture, m	5.8	8.8	11.8	17.8

Horizontal Radiation Patterns

A selection of radiation patterns is shown above left, for simple arrangements of panels. An almost unlimited variety of alternative patterns may be developed on a custom basis to provide optimum coverage in any particular case. In addition to the control offered by varying the power division between faces of the array and the relative phase of the current to each face, the geometry of the panel positions relative to one another, may also be varied. The Quad Dipole Panel thus provides a flexible design capability giving economical customised options.

Vertical Radiation Patterns

A selection of vertical plane radiation patterns are shown on the left. Typical values of beam tilt and null fill are indicated but alternative values may readily be provided. The branch feeder system offers excellent broad band pattern stability.

Multi Channel Operation

The capability of multi channel operation is provided by the bandwidth stability of the panel coupled with appropriate branch feeder components and design. These components are all manufactured by AlanDick which thereby retains overall control of the system performance.

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