STACKING YAGIS

Stacking identical antennas is an excellent way to increase gain, improve directivity and increase capture area.

Where gain is an important factor, stacking antennas can provide enough boost in signal to establish a much better signal to noise ratio in the first amplifier.

Good directivity in an antenna can eliminate many reception problems such as co-channel interference, reflected signals (ghosting) and noise pick-up from ground level sources.

Stacking antennas can narrow the directivity up to 45% in either the vertical or horizontal plane.

Increasing the capture area of an antenna will often eliminate fading problems of very weak signals. Either vertical or horizontal stacking may be used to correct fading while extreme cases may require quad stacks.

The following illustrations show how vertical, horizontal and quad stacking of yagis increases gain and improves directivity.

To obtain this performance the following installation rules should be observed.

1. Space antenna booms one wavelength apart to prevent interaction and obtain maximum gain.

2. Locate coupler equal distance from downlead terminals of antennas so connecting leads will form 45° angle with vertical masting.

3. Cut phasing lines equal length.

4. Connect antenna terminals to coupler as shown in schematic diagrams. (Phasing is critical.)

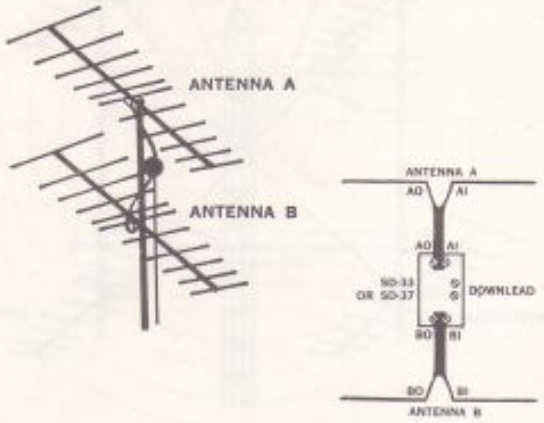
5. Horizontal supports on quad stacks and horizontal stacks must be constructed of non-metallic materials. Redwood or cypress are recommended.

6. Use Winegard's Model SD-33 or SD-37 for vertical and horizontal stacks and Model CC-482 for quad stacks.

Wavelengths of VHF TV Channels

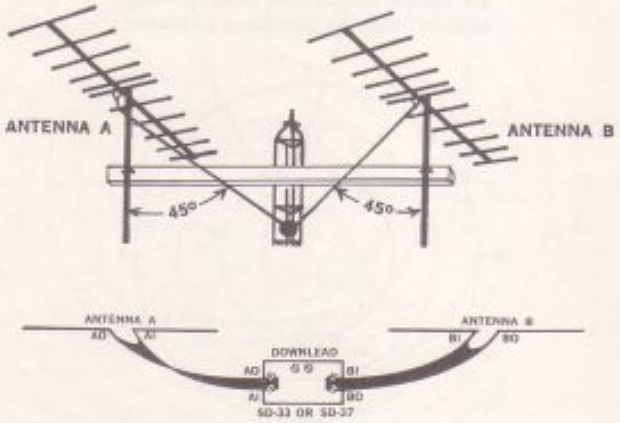
Ch. #	Wavelength
2	205"
3	186"
4	170"
5	148"
6	138"
7	66.5"
8	64.5"
9	62.2"
10	60.5"
11	58.5"
12	57.0"
13	55.2"

VERTICAL STACK



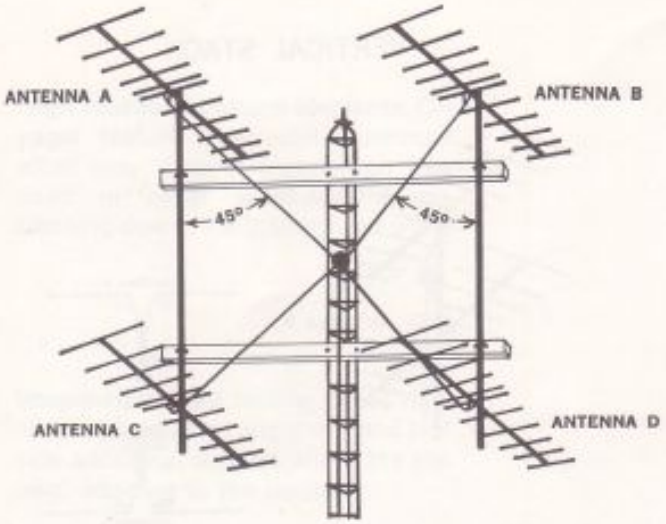
PERFORMANCE DATA VERTICAL STACKED	
GAIN OVER STANDARD REFERENCE DIPOLE	14.7db
GAIN OVER THEORETICAL ISOTROPIC RADIATOR	16.9db
BEAM WIDTH VERTICAL	28°
BEAM WIDTH HORIZONTAL	34°
FRONT-TO-BACK RATIO	35db

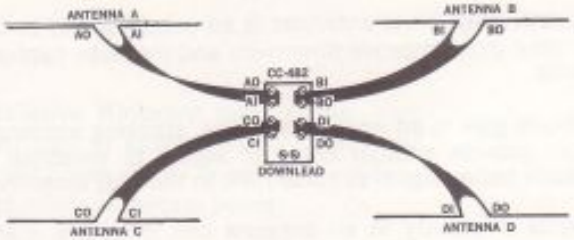
HORIZONTAL STACK



PERFORMANCE DATA HORIZONTAL STACKED	
GAIN OVER STANDARD REFERENCE DIPOLE	14.7db
GAIN OVER THEORETICAL ISOTROPIC RADIATOR	16.9db
BEAM WIDTH VERTICAL	43°
BEAM WIDTH HORIZONTAL	23°
FRONT-TO-BACK RATIO	35db

QUAD STACK



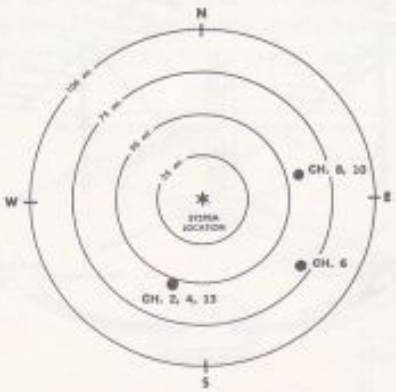


PERFORMANCE DATA QUAD STACKED	
GAIN OVER STANDARD REFERENCE DIPOLE	17.2db
GAIN OVER THEORETICAL ISOTROPIC RADIATOR	19.4db
BEAM WIDTH VERTICAL	28°
BEAM WIDTH HORIZONTAL	23°
FRONT-TO-BACK RATIO	40db

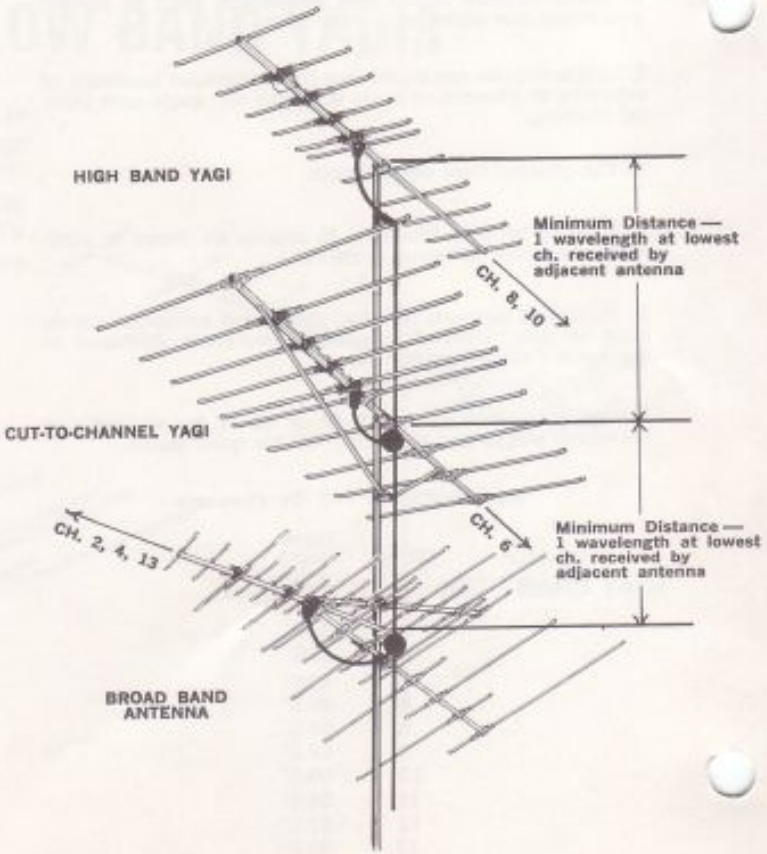
STACKING YAGIS & BROAD BAND ANTENNAS

Combining cut-to-channel and broad band antennas provide a convenient method of receiving stations located in different directions. A common reception problem and the solution is illustrated here.

PROBLEM: Six stations to be received in three different directions as shown.



SOLUTION: Three antennas were selected. A broad band was chosen for Channels 2, 4, and 13; a Model CH-2073 high band yagi was chosen for Channels 8 and 10 and a cut-to-channel Model CH-2006 for Channel 6.



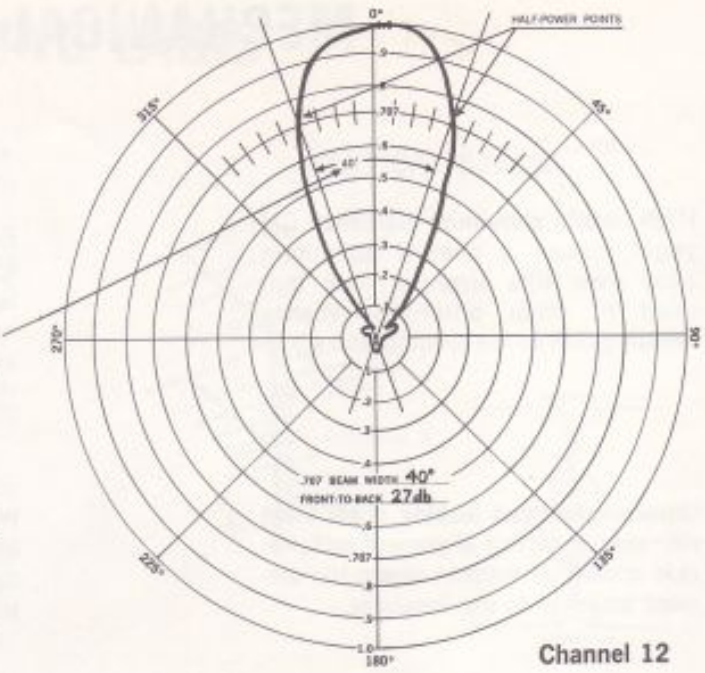
DIRECTIVITY

CH yagis have a narrow well-defined reception pattern which has all the power concentrated into a single lobe, free from spurious side lobes. These excellent reception patterns, in both the vertical and horizontal plane, reject reflected signals which cause ghosting and greatly reduce noise and interference caused by citizen band transmissions, auto ignition and aircraft.

Beam width measurement is angle between lines drawn through center of chart and half-power points on polar outline.

The polar chart is a graphic picture of how the gain of an antenna is related to the direction it is pointed. To make a comparison of antennas easier, directivity is shown here in tabular form as the beam width (in degrees) at the half-power points.

Typical polar chart shows horizontal reception plane of antenna.



Channel 12

Beam Width at Half Power Points (.707) in Degrees

Channel Number	2	3	4	5	6	7	8	9	10	11	12	13
Horizontal Plane	61°	55°	50°	52°	44°	38°	40°	38°	39°	40°	40°	36°

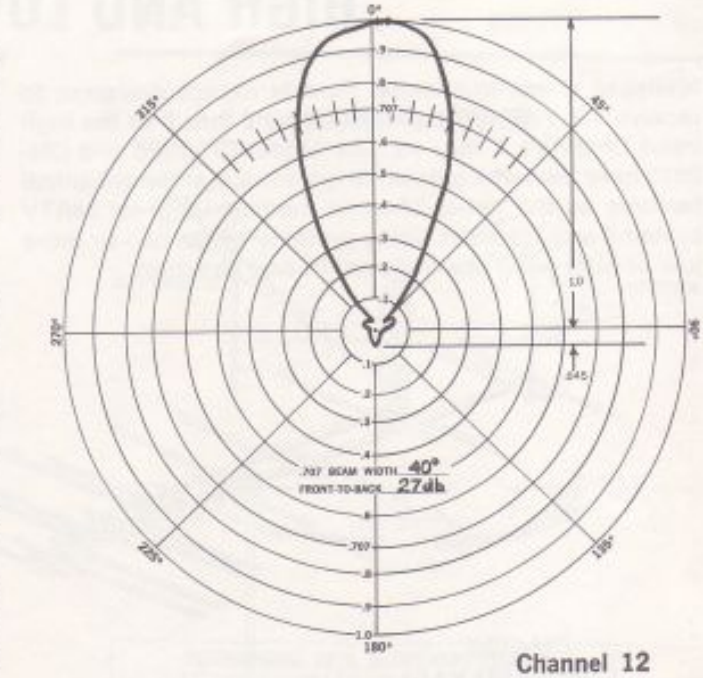
FRONT-TO-BACK RATIO

The ability of an antenna to reject unwanted signals from the rear determines to a large degree how well it will operate in areas where co-channel interference is a problem. The multiple driven elements of the CH yagis virtually eliminate signals from the rear - cleans up co-channel interference problems.

Polar chart shows front and rear reception lobes of typical CH antenna. Difference in maximum values expressed in dB is front-to-back ratio.

The polar chart is also a graphic representation of the front-to-back ratio of an antenna. By measuring the reception lobes at 0° and 180° we can assign a number of db to represent the ratio between signal received at the front and rear of the antenna.

EXAMPLE: A front-to-back ratio of 40db would indicate that a given antenna producing 1000 microvolts of signal when pointed at the station would produce only 10 microvolts when rotated 180°.



Channel 12

Front-to-Back Ratio (db)

Channel Number	2	3	4	5	6	7	8	9	10	11	12	13
Horizontal Plane	27db	27db	30db	29db	30db	33db	34db	35db	35db	36db	27db	25db

MECHANICAL FEATURES

High tensile aluminum elements: CH yagis feature a special aluminum alloy over 40% stronger than that used in other antennas - resists bending due to ice loading and wind.

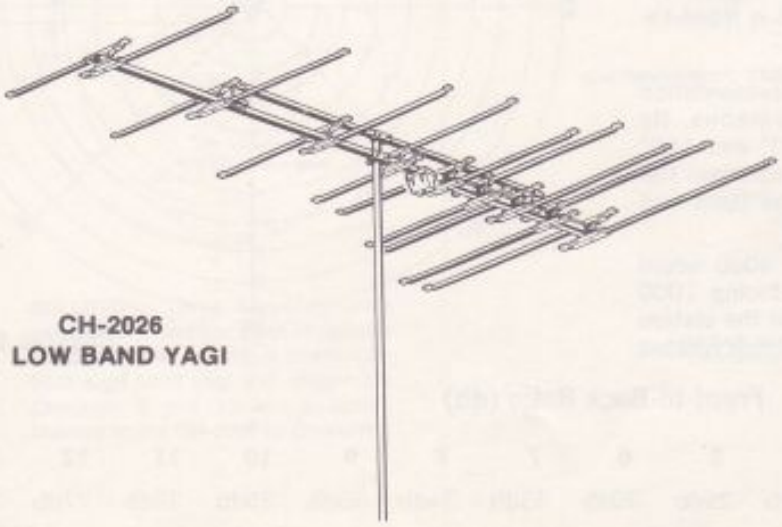
Exclusive Winegard mast clamp: Has four pair of locking jaws — holds antenna boom rigidly in position, yet cannot crush or deform boom.

Unique reinforced locking clips: Hold elements in perfect alignment and provide additional support where the element attaches to the insulator.

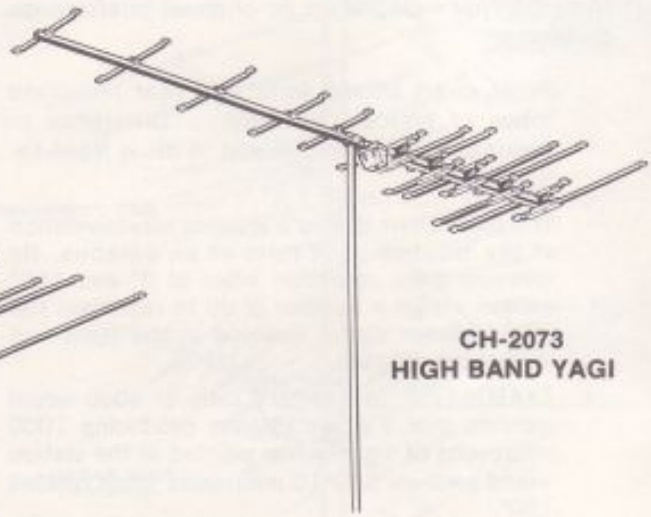
Wrap-around insulators: Constructed of low loss dialectric, weatherproof elements and correlators at point of electrical contact.

HIGH AND LOW BAND YAGIS

Identical to cut-to-channel models except designed to receive the VHF low band Channels 2 thru 6 or the high band Channels 7 thru 13. The Model CH-2026 and CH-2073 have the same outstanding electrical and mechanical features as the cut-to-channel models. Ideal for MATV systems and rotorless home systems where two or more low or high band channels are in one direction.



CH-2026
LOW BAND YAGI



CH-2073
HIGH BAND YAGI