

# ANDREW Decibel Products DB-222-JJ 220-225 MHz Dual Folded Dipole Antenna

## Broad Band Gain Antenna DB222-JJ

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(Measurements made: April 2020)

Description: The Andrew, formerly Decibel Products DB222-JJ exposed dipole quasi-omni directional antenna operates in the frequency range 220-225 Mhz. This VHF field adjustable dipole antenna has a maximum power input of 500 watts. A harness with N male connection is included along with the DB365-OS pipe mount kit for 1.25 - 3.5 inch OD round members. It is suitable for mounting to the top or on the side of a tower.

The antenna is a two stack collinear array designed to provide high gain, broad bandwidth and minimum pattern distortion. The omni pattern has a gain of 3 dBd and the offset is 6.0 dBd gain. The DB222-JJ antenna is now discontinued. This entire document package provides original, measured antenna engineering and construction information, allowing repair of an original used DB222JJ, or even a close fabrication of a new equivalent system.

It should be noted the DB222-JJ is a two stack (dipole) collinear array and the DB224 is a four stack collinear array. Some original Andrew and Decibel engineering documents contain information for single or multiple antenna models by frequency range or band segment. The documents in this package are focused on providing only information for the DB222-JJ two stack (dipole) collinear array antenna.

The DB-222-JJ antenna main-mast aluminum tube, total length is 10 feet. The mast is 1-3/4 inch OD, AL, thick-wall aluminum tube. There is a 24 inch inside mount reinforcement liner at the lower base end of the tube.

The distance from the mast, lower end, to the center of the lower dipole support is 50-3/8 inches. The distance from the mast, lower end, to the center of the upper dipole support is 97-3/8 inches.



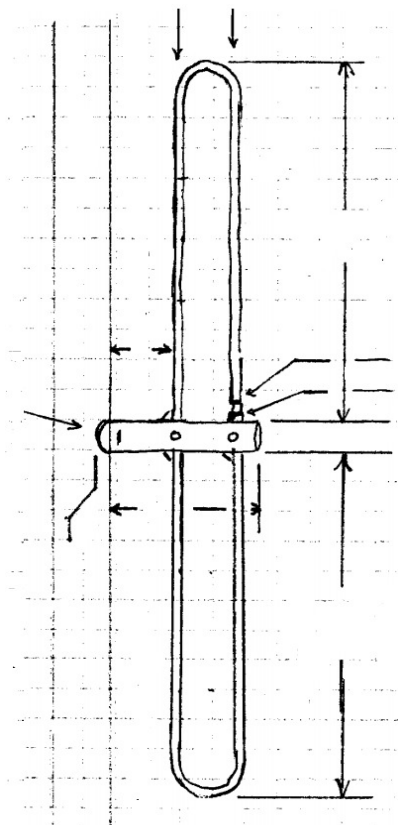
## ANDREW Decibel Products DB-222-JJ 220-225 MHz Dual Folded Dipole Antenna

The two dipoles support center-to-center spacing is 47 inches (3 feet, 11 inches). The distance from the center of the upper dipole to the top of the antenna tube (no cap) is 22-1/2 inches

Dipole support aluminum tube is 1-5/8 inch Diameter, 5-1/4 inch total length. The dipole support tube is secured to antenna mast by a hose clamp, through a rectangular hole cut in the support tube, 5/8 inches long, spaced 1 inch from end fixed to the main mast. Approximately 5/8 inches of support mounting tube is cut concave to snugly fit the end around and flush against the main mast. Andrew Dipole Assembly DB224 Drawing No. 018670-001/002, sheets 1 and 2 of 3 provide detailed construction information.

Top folded dipole element is 1/2 inch AL tube length, measured from center of the dipole support to furthest OD end of curve is 11-15/16 inches. The top side of the dipole loop, insulated gap at the coax feed-point is 1/2 inch. There is no insulated gap on the lower portion of the dipole loop. The lower folded dipole Element is also 1/2 inch AL tube length, measured from center of the dipole support to furthest OD end of curve is 11-15/16 inches.

The top and bottom dipole elements are 1/2 inch OD, AL tube, bent in a U-shape, vertical sides lengths are spaced approximately 2-1/4 inches, dipole tube center to center. The distance from the main mast to the closest dipole side is 1-1/2 inches.



The coax harness details for fourteen (14) different DB222 antenna models, are shown on the Andrew Harness Assembly DB222 Document. The Dash No 013 220-225 MHz coax harness DIM A length (two 30-1/4 inch sections of VB-11, 75 ohm) and DIM B length (one 67 inch section VB-83, 35 ohm) as shown.

## Broadband Antennas DB222 Series



### GENERAL INFORMATION

DB222 broadband antennas are lightweight and equipped with two dipoles for transmit and receive applications.

### ELECTRICAL DESIGN

Either an offset or circular (omni) pattern can be achieved, depending on the direction in which the two dipoles are arranged. For a circular (omni) pattern, the two dipoles are staggered on opposite sides of the mast to provide a gain of 3 dB over a vertical half-wave dipole. For a collinear pattern (offset), the two dipoles are positioned in line to provide a forward gain of 6 dB, with 3 dB on the sides and -1.5 dB on the back. The dipoles can be easily changed in the field. See Figure 1.

### LIGHTNING PROTECTION

The radiators operate at dc ground, and the aluminum mast, with its pointed cap, provides a low resistance discharge path to the tower or ground system.

### BANDWIDTH

The bandwidth permits the antenna to perform efficiently on both transmit and receive frequencies. Through the use of a suitable duplexer, a single DB222 and transmission line can be used for simultaneous transmission and reception when used in DUPLEX or MOBILE REPEATER operations. This arrangement avoids the differing coverage patterns that occur when one antenna is mounted on top of another on the side of a tower, and it gives maximum gain for transmit and receive.

### MOUNTING

The DB222 is mounted using DB365-OS mounting clamps, which are included. The DB365-OS mounting clamps are designed for top mounting to the tower. For side mounting, the DB5001 mounting hardware must be ordered separately.

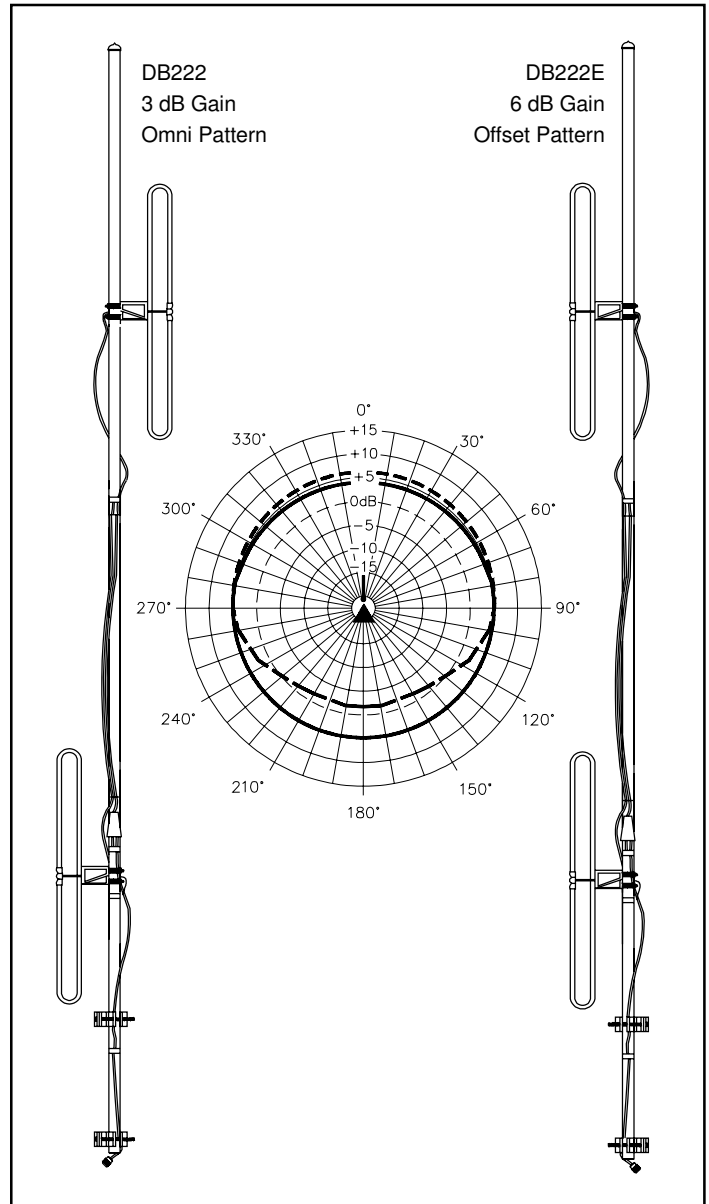


Figure 1. Dipole Arrangement for Achieving Pattern Shaping.  
(continued on page 2)

### NOTICE

The installation, maintenance, or removal of an antenna requires qualified, experienced personnel. Andrew installation instructions are written for such installation personnel. Antenna systems should be inspected once a year by qualified personnel to verify proper installation, maintenance, and condition of equipment.

Andrew disclaims any liability or responsibility for the results of improper or unsafe installation practices.



Do not install near power lines. Power lines, telephone lines, and guy wires look the same. Assume any wire or line can electrocute you.



Do not install on a wet or windy day or when lightning or thunder is in the area. Do not use metal ladder.



Wear shoes with rubber soles and heels. Wear protective clothing including a long-sleeved shirt and rubber gloves.

(Continued from page 1)

**INSTALLATION INSTRUCTIONS**

1. After removing the antenna from the shipping box, inspect it to be sure all parts are included and there is no physical damage.
2. Inspect the antenna feed assembly output connector to determine that it mates with the end of your station transmission line. Do not remove any connector or cable from the antenna feed assembly as they are all part of your antenna.
3. Verify that the frequency to which the antenna has been tuned is the frequency on which your radio system is to operate.
4. Attach the furnished DB365-OS mounting clamps to the bottom of the antenna mast at the designated locations.
5. Mount the antenna on the tower with the bottom dipole above and facing away from the tower.
6. A check of the VSWR as measured at the antenna is recommended at this point. Note this measurement for future reference.
7. After checking the VSWR at the antenna, connect the station transmission line to the antenna. Make connections snug but do not apply heavy force with pliers. Carefully wrap the connection with VAPOR-WRAP® (part number 11317 or 11316.) Work the compound into all cracks and smooth over outer jackets to avoid moisture problems. Failure to waterproof the cable connection may result in improper operation of your antenna.
8. To avoid physical damage to the cable, secure the feeder cable and the antenna transmission line to the tower in the best possible position
9. After the antenna and transmission line installation has been completed, a careful visual check should be made to ensure that:
  - All mechanical connections are secure.
  - The antenna is mounted on the proper leg of the tower with sufficient physical clearance.
  - All connections have been carefully wrapped with VAPOR-WRAP to prevent moisture problems.

**MECHANICAL DATA**

Maximum Exposed Area..... 1.6 ft<sup>2</sup>  
 Wind Load (at 100 m.p.h.).....64 lbf  
 Bending Moment (at top clamp) .....290 ft. lbs.  
 Net Weight (with mounting clamps)..... 12 lbs.  
 Shipping Weight ..... 16 lbs.  
 VSWR (at 50 ohms)..... <1.5:1  
 Rated Power Input..... 500 W  
 Duraluminum Mast: 6061-T6 Aluminum 1-3/4" OD with bottom wall thickness of 0.12 inches and top wall thickness of 0.062 inches. Total length is 10 feet, 8 inches.

Mounting: Complete with clamps that will fit round or angle members up to 3-1/2 inches.

Standard Termination: Captive Type-N male attached to end of flexible lead.

**SIDE MOUNTING**

When antennas are side-mounted, their normal horizontal patterns are distorted. Often this distortion can be used to an advantage, but only if the pattern shape is known. Table 1 lists the approximate gains of the DB222 and DB222E antennas when they are side-mounted on triangular towers that measure 18 to 24 inches between legs.

The DB5001 side mount kit is required for side mounting. Note that the side mount arm should extend from the tower at zero degrees azimuth.

Antenna	Azimuth			
	0°	90°	180°	270°
DB222	4.0 dB	5.5 dB	-3.0 dB	5.5 dB
DB222E Elements facing away from tower	6.3 dB	4.5 dB	-7.0 dB	4.5 dB
DB222E Elements facing toward tower	3.0 dB	5.0 dB	-1.0 dB	5.0 dB

Table 1. Approximate Side Mounting Gains.



Andrew Corporation  
 Base Station Antennas  
 260 Telecom Parkway  
 Richardson, TX U.S.A. 75082

Telephone: 800-676-5342  
 FAX (U.S.A.): 214-688-0089  
 Internet: www.andrew.com

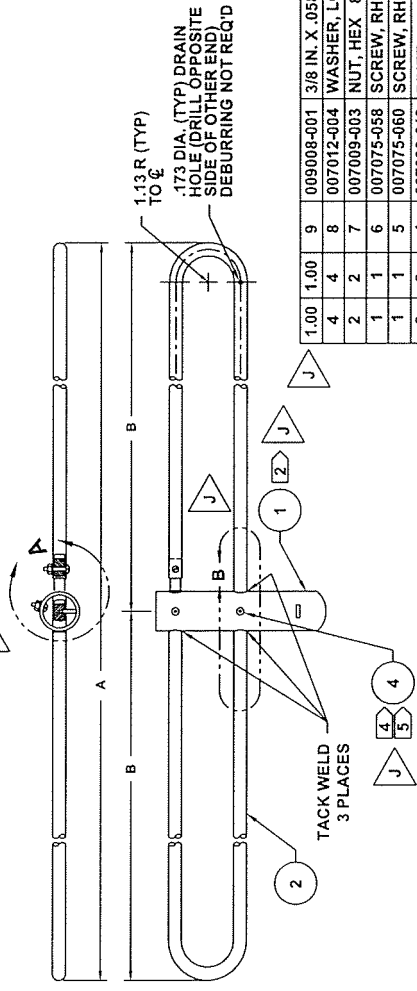
Customer Service, 24 Hour: U.S.A. • Canada • Mexico: 800-255-1719  
 U.K.: 0800 250055  
 Other Europe: +44 1592 782612

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REV.	DESCRIPTION	02/09/2004 15:43:12
	SEE SEPARATE SHEET FOR REVISIONS	DATE
		APP.

NOTES:

1. USING DIMENSION 23 7/8 FOR -001 AND 19" FOR -002 BEND ONE END OF TUBING (ITEM 2) TO INDICATED RADIUS.
2. INSERT TUBING INTO DIPOLE SUPPORT (ITEM 1) AS SHOWN AND BEND AT DIMENSION 11-15/16 FOR -001 AND 9-1/2 FOR -002 WITH INDICATED RADIUS.
3. INSERT NYLON INSULATOR (ITEM 3) INTO TUBING UNTIL BLACK MARK IS FLUSH WITH END OF TUBING AS SHOWN IN DETAIL A.
4. USING TWO HOLES IN DIPOLE SUPPORT AS GUIDES, DRILL TWO .191 DIA. (#11) HOLES THRU ONE SIDE OF TUBING. DRILL INTO NYLON INSULATOR IN TOP HOLE DEEP ENOUGH TO ALLOW FOR HEAD OF RIVET (ITEM 4).
5. FASTEN TUBING TO DIPOLE SUPPORT WITH RIVETS.
6. DRILL .177 DIA(#16) HOLE THRU TUBING AT DIMENSION INDICATED IN DETAIL A. INSERT ROUND HEAD SCREW (ITEM 5) THROUGH HOLE AND FASTEN WITH WASHERS AND HEX NUT (ITEMS 7 & 8).
7. INSERT ROUND HEAD SCREW (ITEM 6) THROUGH HOLE IN DIPOLE SUPPORT AND FASTEN WITH WASHERS AND HEX NUT AS SHOWN IN DETAIL A.
8. ALL FRACTIONAL DIMENSIONS WILL HAVE A TOLERANCE OF ±1/32 INCH.



NO SCALE

DIM	A	B
-001	23-7/8	11-15/16
-002	19	9-1/2

-002	39-3/32	7-11/16
-001	48-11/16	10-7/16
DASH No.	CUT LENGTH	FIRST BEND

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1.00	1.00	9	009008-001	3/8 IN. X .058 IN. AL. TUBE, (2 EA 6 IN. LONG)	FT
4	4	8	007012-004	WASHER, LOCK	EA
2	2	7	007009-003	NUT, HEX 8-32	EA
1	1	6	007075-058	SCREW, RH 8-32x3/4	EA
1	1	5	007075-060	SCREW, RH 8-32x1	EA
2	2	4	007030-079	RIVET	EA
1	1	3	018113-001	INSULATOR	EA
3.26	4.06	2	009008-002	TUBING, ALUM 1/2 OD	FT
1	1	1	018671-001	SUPPORT, DIPOLE	EA
-002	-001	ITEM	PART NO.	DESCRIPTION	U/M

FINISH: N/A  
 MATERIAL: N/A  
 DATE: 09-27-77  
 DRAWN BY: KM  
 CHKD.: N/A  
 MECH. ENG.: RHB  
 ELEC. ENG.: JRM  
 MFR. ENG.: N/A  
 RELEASED: N/A  
 DATE: 12-01-77  
 DATE: 12-01-77  
 DATE: 12-01-77  
 DATE: 12-01-77  
 DATE: 12-01-77  
 DATE: 12-01-77

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. INTERPRET DIM & TOL PER ASME Y14.5M-1994

DECIMAL: XXX = ±010  
 XX = ±02  
 X = ±1

ANGLE: ±5°

SEE WHERE USED

NEXT ASSEMBLY

ANDREW CORPORATION  
 10500 W. 153rd Street  
 Orland Park, IL U.S.A. 60462

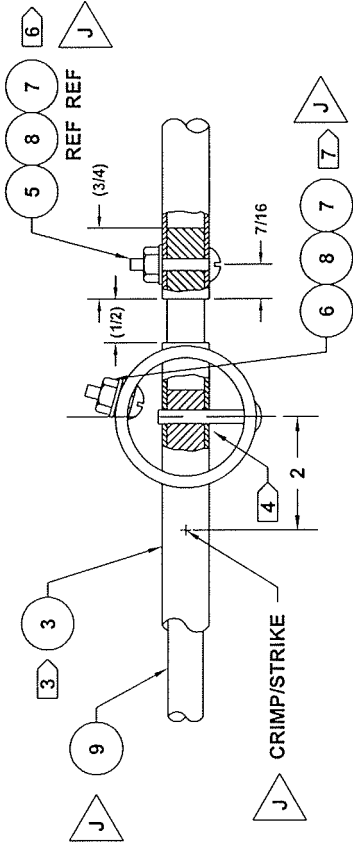
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SIZE: B  
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REV. J  
 SHEET 1 OF 3

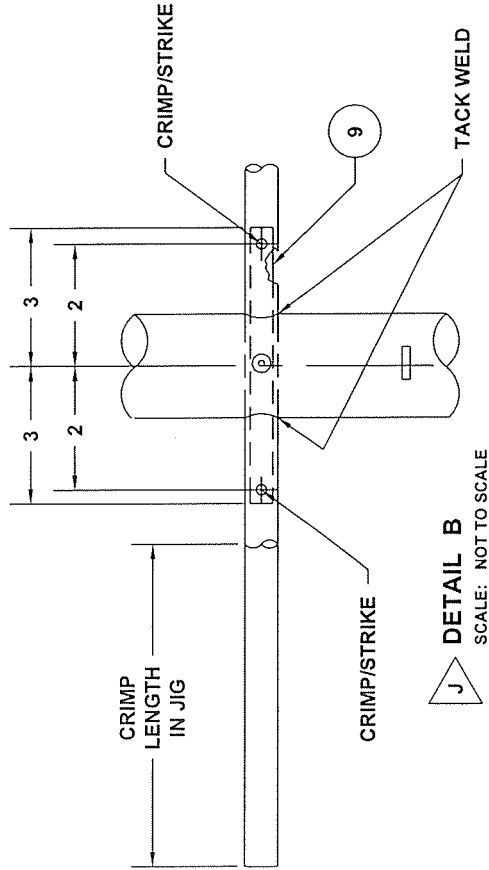
-001 PB224-JJ 220-222  
 -002 DB224-J 276-285

FOR NOTES SEE SHEET 1.



**DETAIL A**

SCALE: NOT TO SCALE



**DETAIL B**

SCALE: NOT TO SCALE

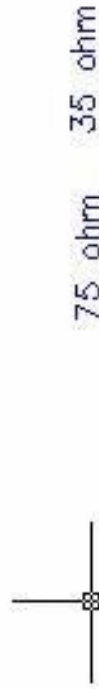
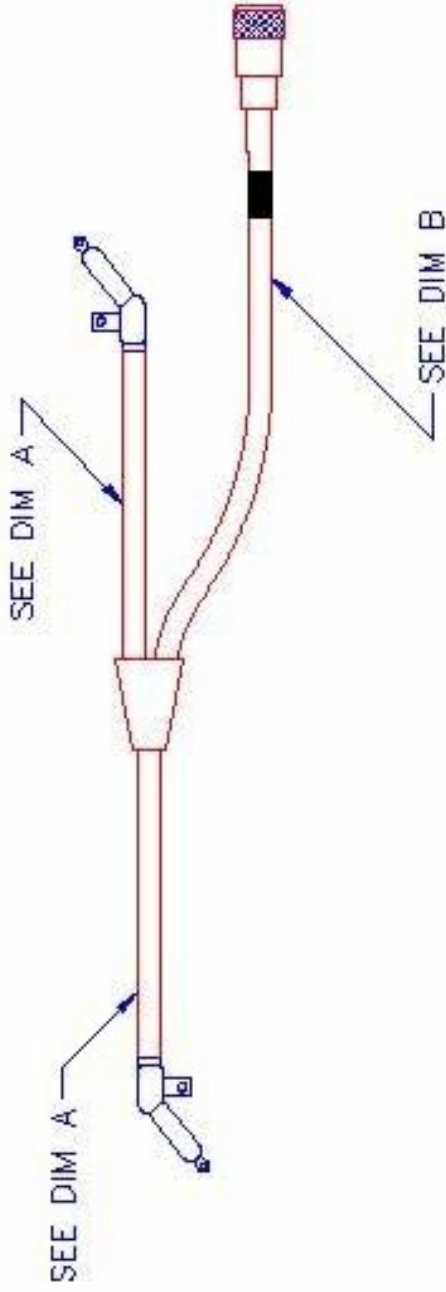


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TITLE: **DIPOLE ASSEMBLY**  
**DB244**

SIZE	DRAWING No.	REV.
<b>B</b>	<b>018670-001/002</b>	<b>J</b>
DO NOT SCALE DRAWING		SHEET 2 OF 3

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DASH NO	FREQ. (MHz)	DIM 'A'	DIM 'B'	IDENT TAPE
-001	150-158	37	65	YELLOW
-002	158-166	35 7/8	61 1/2	YELLOW AND WHITE
-003	166-174	35 3/4	57 1/4	YELLOW AND BLUE
-004	144-153	39	66	-----
-007	150-158	37	65	YELLOW
-008	158-166	35 7/8	61 1/2	YELLOW AND WHITE
-009	166-174	35 3/4	57 1/4	YELLOW AND BLUE
-010	137-143	41 1/2	69	-----
-011	136-143	41 1/2	69	-----
-012	276-285	22	49-1/2	-----
-013	220-225	30-1/4	38-3/4	-----
-014	143-150	39-1/4	67	BLUE
CABLE TYPE				
PROGRAM (-001\013)				
		VB-11	VB-83	
		084	093	043
				172

SEE SPECIFIED  
DIMENSIONS  
IN INCHES.  
M & TOL  
5M-1994

ANGLE:  
±.5°

MATERIAL:  
N/A

DRAWN BY: DP

CHKD.: PD

ELEC. ENG.: MU

MECH. ENG.: N/A

MFR. ENG.: N/A

FINISH:  
N/A

DATE: 01-12-70

DATE: 04-02-70

DATE: 10-31-94

DATE: N/A

DATE: N/A

**ANDREW**®

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TITLE:

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