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Interface Control Drawing for JTIDS Shipboard Antenna

K. G. Kaufmann

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NAVAL OCEAN SYSTEMS CENTER

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INTERFACE CONTROL DRAWING
FOR
JTIDS SHIPBOARD ANTENNA

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JTIDS Shipboard Antenna ICD

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1. SCOPE

This Interface Control Drawing (ICD) establishes the mechanical and electrical interface requirements to integrate the Full Scale Development (FSD), Joint Tactical Information Distribution System (JTIDS) Shipboard Antenna on a shipboard platform. This ICD will be periodically updated as the interfaces are refined, to provide a common data reference.

2. APPLICABLE DOCUMENTS2.1. Government Documents.

The following documents of the exact issue shown, form a part of this specification to the extent specified herein.

2.2. SPECIFICATIONS:

MIL-E-16400	Rev. G, 24 December 1974; Amendment 1, 1 December 1976 - Electronic, Interior Communications and Navigation Equipment, Naval Ship and Shore: General Specification for
NOSC TD 1284	8 March 1988 - Prime Item Development Specification for JTIDS Shipboard Antenna
MIL-C-39012	Rev. C, 11 August 1982; Supplement 1, 30 September 1982; Amendment 2, 26 February 1986 - Connectors, Coaxial, Radio Frequency, General Specification for

2.3. STANDARDS:

MIL-STD-1310 (Class C)	Rev. D, 8 February 1979 - Shipboard Bonding, Grounding, and other Techniques for Electromagnetic Compatability and Safety.
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2.4. TECHNICAL MANUALS:

SPAWAR 0967-LP-627-3000 Series	Change 3, 4 September 1985 - Technical Manual, Operation and Maintenance Instructions, Antenna Group OE-273(V)/URN and OE-273A(V)/URN
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2.5. DRAWINGS:

55910-0121953	JTIDS Shipboard Antenna - Antenna Assy. Drawing
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3. INTERFACE REQUIREMENTS

3.1. Mechanical Interface.

3.1.1. Item definition.

The JTIDS FSD Shipboard Antenna is a Circular Aperture Bicone array with an attached Power Combiner/Divider providing 12 RF ports. The array is comprised of two cones, placed apex-to-apex to form the RF wavefront, using 12 antenna probes. This provides for the transmission and reception of JTIDS RF signals over 360° of azimuth coverage with tapered hemispheric elevation coverage. The Power Divider/Combiner consists of stripline printed wire board, high power isolation resistors, and integral heat sinks. The antenna operates over the entire JTIDS frequency band (960 MHz to 1215 MHz) without electrical or mechanical tuning. *JTIDS*

The JTIDS Shipboard Antenna is a mast mounted structure located beneath the OE-273(V)/URN TACAN Antenna Group, and it provides both the mechanical support and the electrical connections required for the AS-3240/URN TACAN Antenna. Figure 1 shows the installed antenna and the obstruction-free field-of-view requirements.

3.1.2. Dimensions.

The Shipboard Antenna envelope and mounting configuration is illustrated in figure 2 and is detailed in 55910-0121953, JTIDS Shipboard Antenna - Antenna Assy. Drawing.

3.1.3. Weight.

The total weight of the JTIDS FSD Shipboard Antenna shall not exceed 100 pounds.

3.1.4. Mounting.

The JTIDS FSD Shipboard Antenna shall have flat horizontal mounting flanges for through-bolt mounting to the mast and to the AS-3240/URN TACAN Antenna (Antenna for OE-273(V)/URN TACAN Antenna Group). The JTIDS Shipboard Antenna shall provide mechanical support and cabling for the AS-3240/URN TACAN Antenna as specified in SPAWAR 0967-LP-627-3000 Series. The horizontal mounting flanges shall be 16 inches (406.4mm) in overall diameter with eight (8) equally spaced mounting holes (11/16 inch or 17.5mm diameter) on a 14.00 inch (355.6mm) bolt circle. The eight (8) hole pattern shall have two (2) opposite holes aligned with the North-South (Bow-Stern) plane of antenna, +/- 0.50 degrees, in accordance with SPAWAR 0967-LP-627-3000 Series.

Corrosion at mounting interfaces due to contact between dissimilar metals shall be controlled by using corrosion resistant materials and coatings using MIL-E-116400 as a guide. Corrosion resistant bolts and protection practices shall be used by the installing activity to minimize this problem.

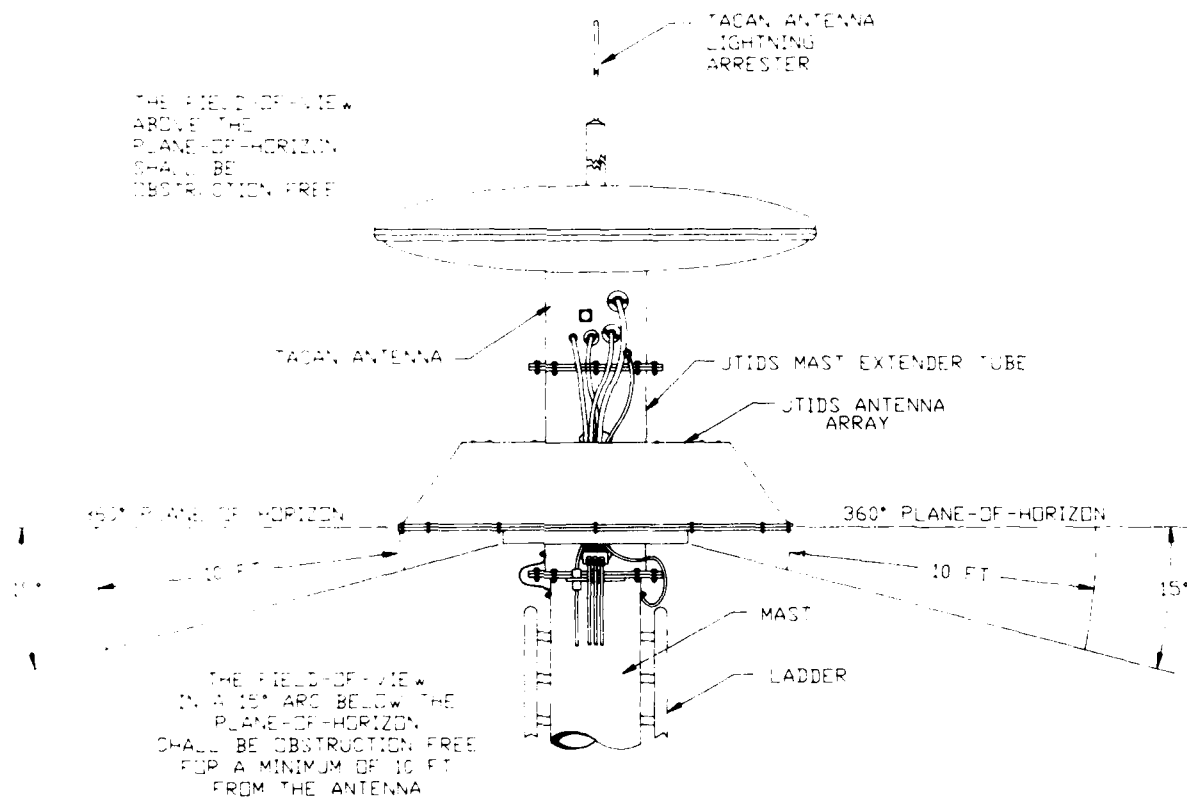


Figure 1. JTIDS Shipboard Antenna Installed

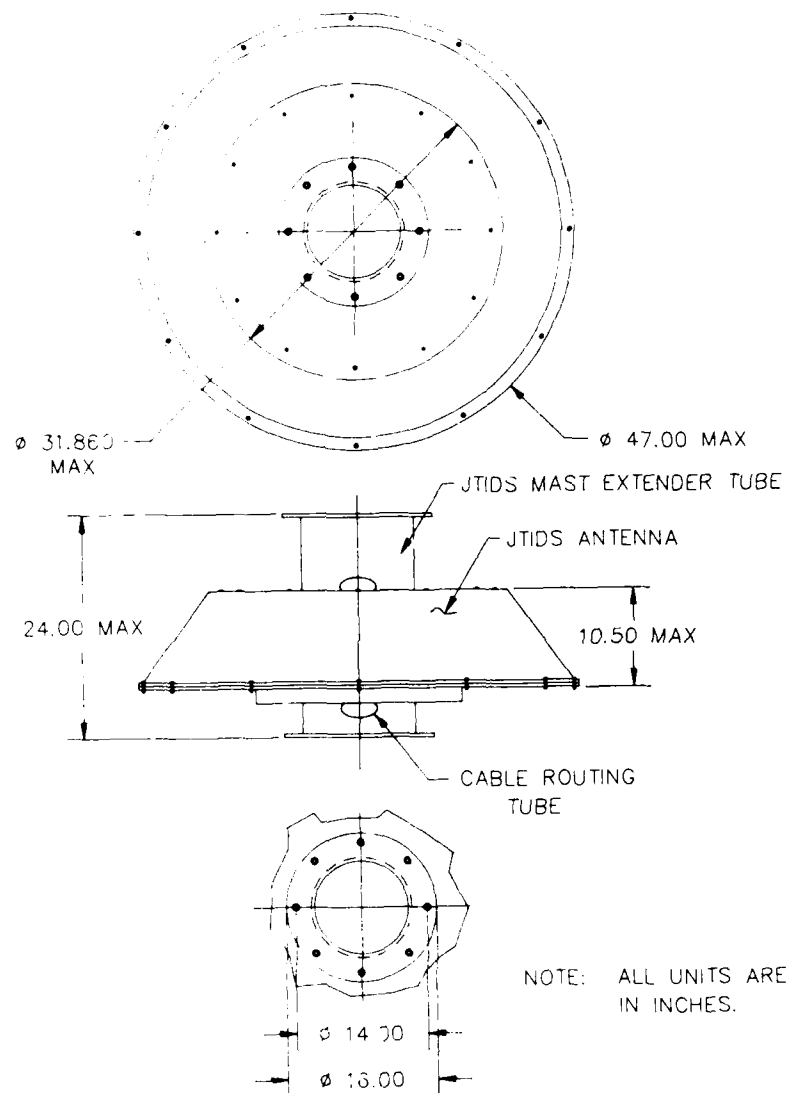


Figure 2. JTIDS Shipboard Antenna Envelope and Mounting (1 of 2)

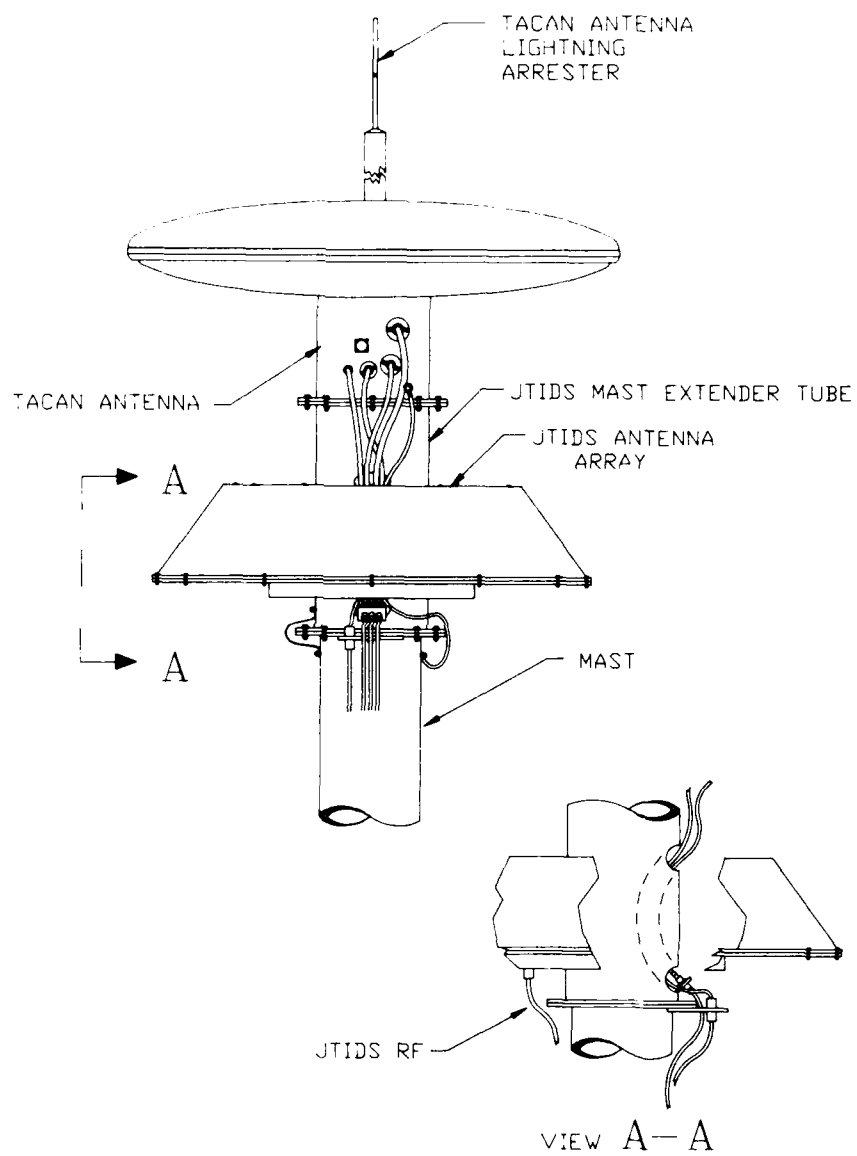


Figure 2. JTIDS Shipboard Antenna Envelope and Mounting (2 of 2)

JTIDS Shipboard Antenna ICD

3.2. Electrical Interfaces.

The electrical interfaces between the JTIDS FSD Shipboard Antenna, the JTIDS terminal and the OE-273(V)/URN TACAN Antenna Group are shown in figure 3 and are defined in the following paragraphs. The connectors and cabling shall be located on the Stern(South) face of the AS-3240/URN TACAN Antenna, as shown in Figure 8-1 of SPAWAR 0967-LP-627-3000 Series. Cable Running Sheets for JTIDS and TACAN are shown in figures 4 and 5 respectively.

3.2.1. JTIDS Electrical Interfaces.

The JTIDS electrical interface, a single coaxial transmission line and antenna ground, connects the JTIDS Shipboard Antenna to the JTIDS Shipboard Class 2 Terminal and the Ships Ground (Mast). The coaxial line shall be mounted to the ship's mast and connected to the antenna by the installing activity using standard shipboard exterior cabling practices. The antenna is fitted with a bulkhead connector appropriate for mating with the JTIDS RF Power Cable Connector, Type N and designated J1 for this Electrical Interface. The Antenna Ground shall be connected to the JTIDS Shipboard Antenna and Ships Mast using standard shipboard bonding techniques (MIL-STD-1310), by the installing activity.

3.2.2. TACAN Electrical Interfaces.

The TACAN electrical interfaces are defined in Figures 6 and 7. The following are the cable names, uses, types, and connectors:

Name	Use	Designation	Type
J1	Phone Cable	R-RN(2)	(TTSU-1 1/2)
J2	Power Cable	R-RN(6)	(2SWU-7)
J3	Control Cable	R-RN(5)	(2SWAU-19)
J4	RF Cable	R-RN(9A)	(RG-225/U)
J5	Sound Powered Phone Jack		(Maintenance Headset)
Ant Gnd	Ships Ground - Lightning		MIL-STD-1310, Class C

Mast Connectors		Antenna Connectors	
J1	MS3102R16-11P	C2139188G003	(10-214617-11S)
J2	MS3102R28-12P	C2139188G007	(10-214628-12S)
J3	MS3102R36-10P	C2139188G005	(10-214636-10S)
J4	M39012/02-003	M39012/01-0005	
J5	N/A	N/A	

The JTIDS Shipboard Antenna shall provide two types of cable extension for the indicated TACAN installation (Figure 3). All types shall pass through the cable feed-through provided within the JTIDS Mast Extender Tube (Figure 1). Type 1 will provide bulkhead connectors as indicated above for J1 through J3, and appropriate cables passing from the bulkhead connectors through the cable feed-through. Type 2 will provide replacement cables for the existing R-RN(9A) TACAN RF Power cable using the existing R-RN(9) connector and the antenna ground cable, indicated in SPAWAR 0967-LP-627-3000 Series, that shall be routed through the cable feed-through.

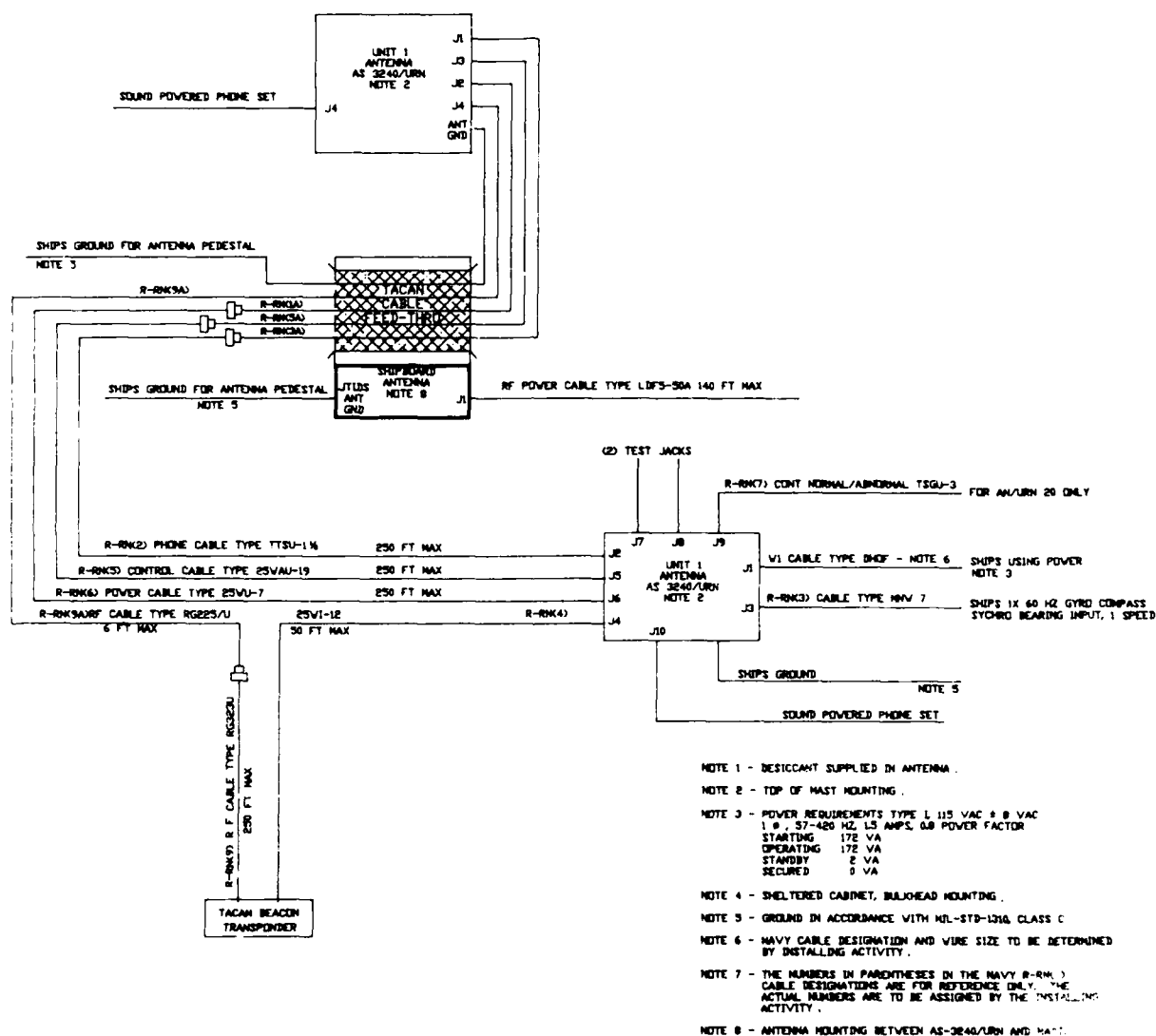


Figure 3. Electrical Interfaces of the JTIDS FSD Antenna

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Figure 5. TACAN Cable Running Sheets (2 of 10)

CABLE TYPE & SIZE 2SWAU-19		ACTIVE WIRES 27		CABLE DESIGNATION R-RN (5)	
UNIT A		UNIT B			
UNIT NUMBER		UNIT 2		UNIT 1	
UNIT NAME		ANTENNA CONTROL		2SWAU-19 MAST	
CABLE CONNECTOR		2139188G005 (10-214636-10S)		2139188G005 (10-214636-10S)	
UNIT A TERM. NO.	PAIR NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION	
J5 PIN Z	1	BLACK	J3 PIN Z	SIG LOW, DIODE SW PATTERN	
J5 PIN a	1	WHITE	J3 PIN a	SIG HIGH, DIODE SW PATTERN	
J5 RFI RING	1	SHIELD	J3 RFI RING		
J5 PIN R	2	BLACK	J3 PIN R	SIG LOW, FRAME SYNC PULSE	
J5 PIN K	2	WHITE	J3 PIN K	SIG HIGH, FRAME SYNC PULSE	
J5 RFI RING	2	SHIELD	J3 RFI RING		
J5 PIN S	3	BLACK	J3 PIN S	SIG LOW, LIMITED VIDEO	
J5 PIN T	3	WHITE	J3 PIN T	SIG HIGH, LIMITED VIDEO	
J5 RFI RING	3	SHIELD	J3 RFI RING		
J5 PIN L	4	BLACK	J3 PIN L	SIG HIGH, DGTL TP FROM ANT.	
J5 PIN M	4	WHITE	J3 PIN M	SIG LOW, DGTL TP	
J5 RFI RING	4	SHIELD	J3 RFI RING		
J5 PIN g	5	BLACK	J3 PIN g	3KW POWER LEVEL	
J5 PIN h	5	WHITE	J3 PIN h	700 W POWER LEVEL	
J5 RFI RING	5	SHIELD	J3 RFI RING		
J5 PIN I	6	BLACK	J3 PIN I	DET R.F. PWR LEVEL	
J5 PIN J	6	WHITE	J3 PIN J	RET. DET R.F. PWR LEVEL	
J5 RFI RING	6	SHIELD	J3 RFI RING		
J5 PIN t	7	BLACK	J3 PIN t	MULTIPLEXED ANLG SIG FROM ANT	
J5 PIN p	7	WHITE	J3 PIN p	RET MULTIPLEXED ANLG SIG	
J5 RFI RING	7	SHIELD	J3 RFI RING		
J5 PIN m	8	BLACK	J3 PIN m	SPARE	
J5 PIN e	8	WHITE	J3 PIN e	SPARE	
J5 RFI RING	8	SHIELD	J3 RFI RING		
J5 PIN X	9	BLACK	J3 PIN X	SIG HIGH, 500 KHZ CLOCK	
J5 PIN O	9	WHITE	J3 PIN O	SIG LOW, 500 KHZ CLOCK	
J5 RFI RING	9	SHIELD	J3 RFI RING		
J5 PIN W	10	BLACK	J3 PIN W	SIG HIGH, DIODE SW ADDR.	
J5 PIN P	10	WHITE	J3 PIN P	SIG LOW, DIODE SW ADDR.	
J5 RFI RING	10	SHIELD	J3 RFI RING		
J5 PIN u	11	BLACK	J3 PIN u	SPARE	
J5 PIN v	11	WHITE	J3 PIN v	SPARE	
J5 RFI RING	11	SHIELD	J3 RFI RING		
J5 PIN w	12	BLACK	J3 PIN w	SIG HIGH, MOISTURE SENSOR	
J5 PIN x	12	WHITE	J3 PIN x	SIG LOW, MOISTURE SENSOR	

Figure 5. TACAN Cable Running Sheets (3 of 10)

[illegible]

Figure 5. TACAN Cable Running Sheets (4 of 10)

CABLE TYPE & SIZE 2SWAU-19		ACTIVE WIRES 27		CABLE DESIGNATION R-RN (5A)	
		UNIT A		UNIT B	
UNIT NUMBER		UNIT 2		UNIT 1	
UNIT NAME		2SWAU-19 MAST			
CABLE CONNECTOR		10-214636-10P		2139188G005 (10-214636-10S)	
UNIT A TERM. NO.	PAIR NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION	
J5 PIN Z	1	BLACK	J3 PIN Z	SIG LOW, DIOD SW PATTERN	
J5 PIN a	1	WHITE	J3 PIN a	SIG HIGH, DIOD SW PATTERN	
J5 RFI RING	1	SHIELD	J3 RFI RING		
J5 PIN R	2	BLACK	J3 PIN R	SIG LOW, FRAME SYNC PULSE	
J5 PIN K	2	WHITE	J3 PIN K	SIG HIGH, FRAME SYNC PULSE	
J5 RFI RING	2	SHIELD	J3 RFI RING		
J5 PIN S	3	BLACK	J3 PIN S	SIG LOW, LIMITED VIDEO	
J5 PIN T	3	WHITE	J3 PIN T	SIG HIGH, LIMITED VIDEO	
J5 RFI RING	3	SHIELD	J3 RFI RING		
J5 PIN L	4	BLACK	J3 PIN L	SIG HIGH, DGTL TP FROM ANT.	
J5 PIN M	4	WHITE	J3 PIN M	SIG LOW, DGTL TP	
J5 RFI RING	4	SHIELD	J3 RFI RING		
J5 PIN g	5	BLACK	J3 PIN g	3KW POWER LEVEL	
J5 PIN h	5	WHITE	J3 PIN h	700 W POWER LEVEL	
J5 RFI RING	5	SHIELD	J3 RFI RING		
J5 PIN -	6	BLACK	J3 PIN -	DET R.F. PWR LEVEL	
J5 PIN q	6	WHITE	J3 PIN q	RET. DET R.F. PWR LEVEL	
J5 RFI RING	6	SHIELD	J3 RFI RING		
J5 PIN t	7	BLACK	J3 PIN t	MULTIPLEXED ANLG SIG FROM ANT	
J5 PIN p	7	WHITE	J3 PIN p	RET MULTIPLEXED ANLG SIG	
J5 RFI RING	7	SHIELD	J3 RFI RING		
J5 PIN m	8	BLACK	J3 PIN m	SPARE	
J5 PIN e	8	WHITE	J3 PIN e	SPARE	
J5 RFI RING	8	SHIELD	J3 RFI RING		
J5 PIN X	9	BLACK	J3 PIN X	SIG HIGH, 500 KHZ CLOCK	
J5 PIN O	9	WHITE	J3 PIN O	SIG LOW, 500 KHZ CLOCK	
J5 RFI RING	9	SHIELD	J3 RFI RING		
J5 PIN W	10	BLACK	J3 PIN W	SIG HIGH, DIODE SW ADDR.	
J5 PIN P	10	WHITE	J3 PIN P	SIG LOW, DIODE SW ADDR.	
J5 RFI RING	10	SHIELD	J3 RFI RING		
J5 PIN u	11	BLACK	J3 PIN u	SPARE	
J5 PIN v	11	WHITE	J3 PIN v	SPARE	
J5 RFI RING	11	SHIELD	J3 RFI RING		
J5 PIN w	12	BLACK	J3 PIN w	SIG HIGH, MOISTURE SENSOR	
J5 PIN x	12	WHITE	J3 PIN x	SIG LOW, MOISTURE SENSOR	

Figure 5. TACAN Cable Running Sheets (5 of 10)

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Figure 5. TACAN Cable Running Sheets (6 of 10)

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Figure 5. TACAN Cable Running Sheets (8 of 10)

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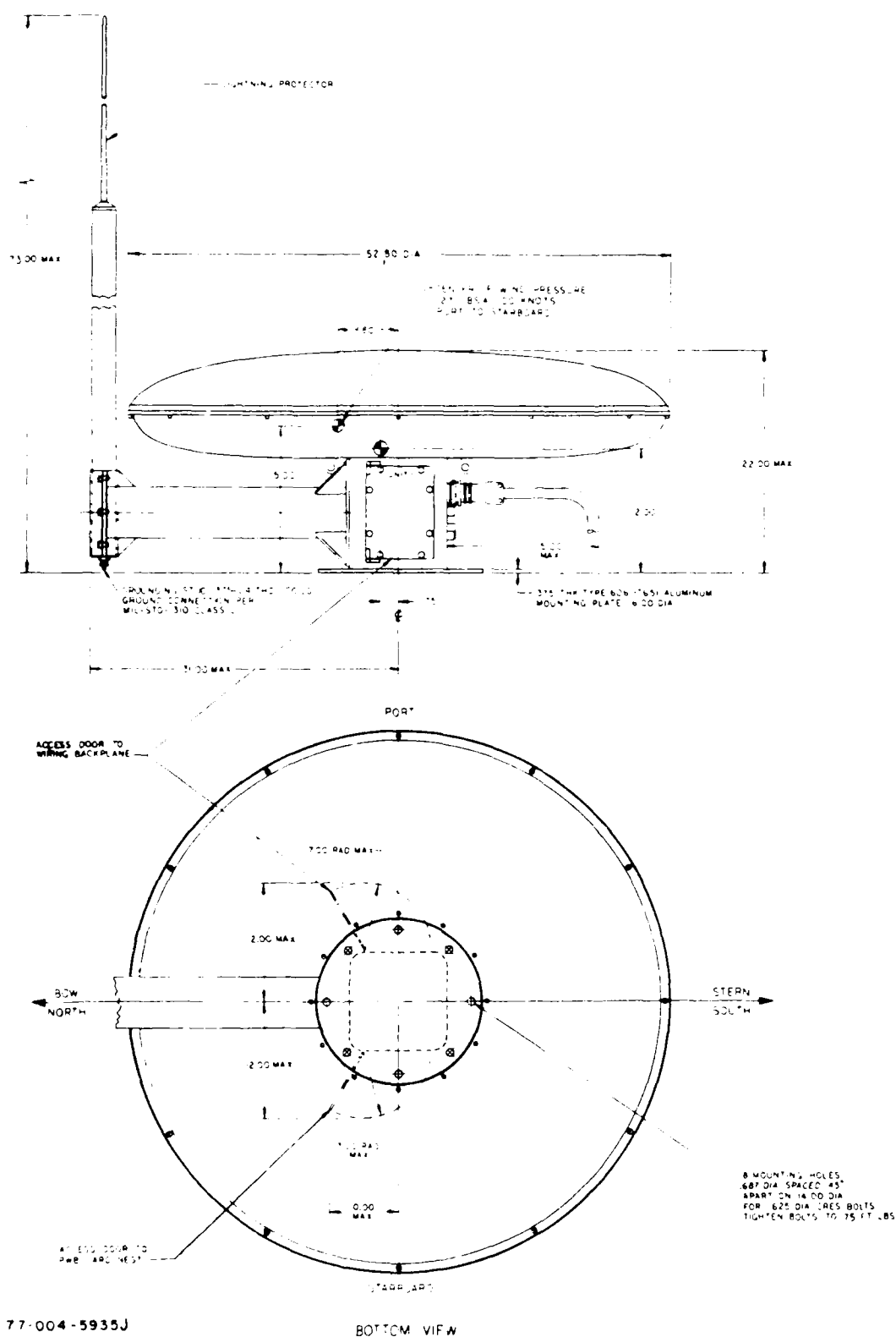


Figure 6. TACAN Antenna (AS-3240/URN) Connector Location (1 of 2)

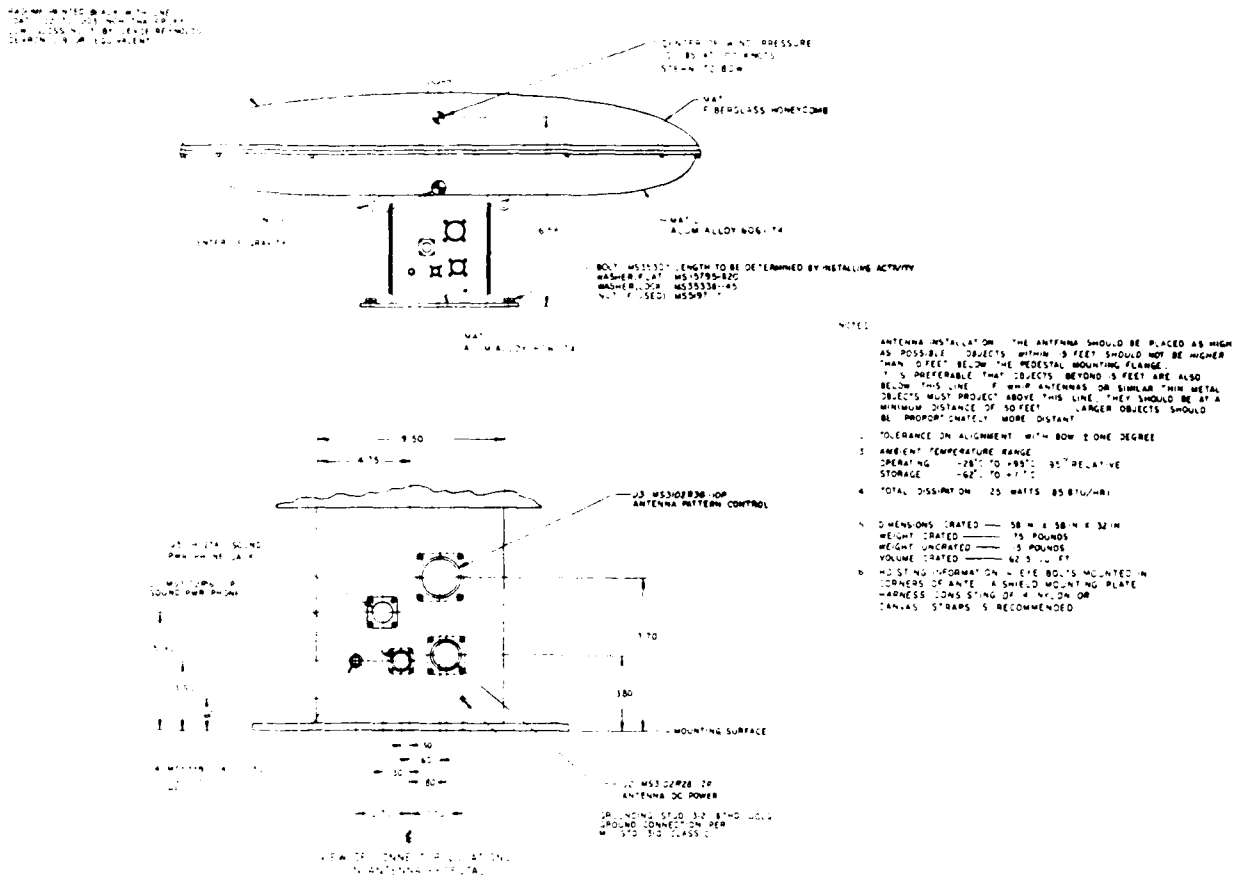
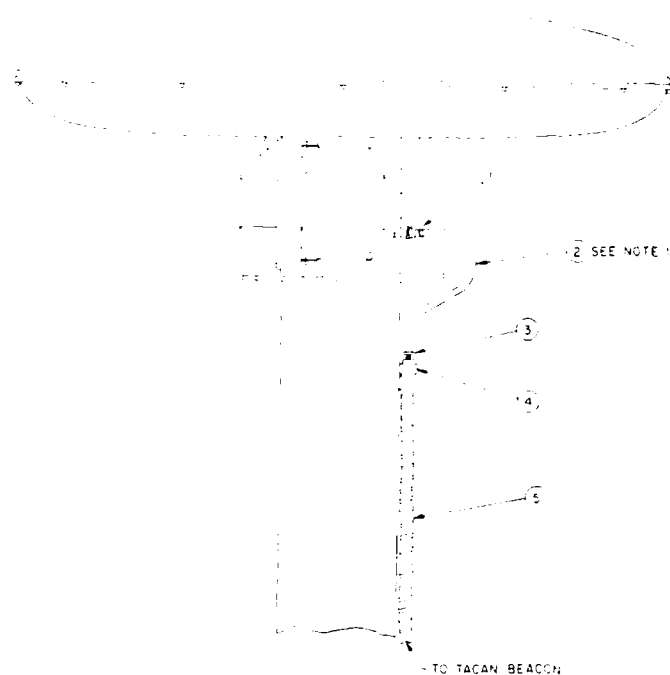


Figure 6. TACAN Antenna (AS-3240/URN) Connector Location (2 of 2)

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ITEM	QTY	DESCRIPTION
1	1	CONNECTOR, PLUG, ELECT TYPE 'N' M39012/01-0005
2	6-0	CABLE, COAXIAL, RF RG 225/U
3	1	CONNECTOR, PLUG, ELECT TYPE 'N' M39012/02-0003
4	1	CONNECTOR, TYPE 45AW (ANDREWS)
5	AP	CABLE, COAXIAL, RG 323U

NOTES

- 1 AT INSTALLATION CABLE TO BE SUPPORTED TO PROVIDE STRAIN RELIEF AT CONNECTOR

Figure 7. Typical TACAN Antenna (AS-3240/URN) Installation

3.2.3. Cables.

All existing TACAN cabling shall remain in place and the installing activity shall be responsible for the antenna mounting, since all cables are provided by the JTIDS Antenna.

3.2.4. Electrical connectors.

The JTIDS Shipboard Antenna does not require electrical connectors. The antenna does provide electrical feed-thru for the OE-273(V)/URN TACAN employing the connectors specified in paragraph 3.2.2.

3.2.5. RF Coaxial connectors.

The JTIDS connector shall conform to LDF5-50A Type N connection.

3.2.6. Signal Definition.

The JTIDS Shipboard Antenna shall provide the Radio Frequency (RF) interface for all transmitted and received JTIDS signals. It shall provide feed-through cabling for the TACAN signals. Figures 4 and 5 are the respective Cable Running Sheets for JTIDS and TACAN.

3.2.6.1. JTIDS Antenna (Transmit or Receive RF) (J1)

- a. Signal Name: JTIDS RF Power (Transmit and Receive)
- b. Signal From/To: JTIDS Notch Filter Assembly to Antenna
- c. Signal Function: Transmission/Reception of JTIDS RF pulses
- d. Signal Characteristics:
 - Type: RF Pulse, Unbalanced Coax
 - XMIT Amplitude :
(peak watts) 160 watts (Low Power Mode)
1200 watts (High Power Mode)
(at 20% Duty Cycle)
 - Frequency Range: 960 to 1215 MHz
- e. Cable Type: Coaxial, RF (Andrews LDF5-50A)
- f. Connector Type: Andrews L45W
- g. Load Impedance: 50 ohms, nominal
- h. Voltage Standing Wave Ratio: 1.5:1, Maximum

3.2.6.2. TACAN Feed-Through Signals.

All TACAN feed-through signals shall be according to Cable Running Sheets, SPAWAR 0967-LP-627-3000 Series, Figure 8-5.

3.2.6.2.1. TACAN Antenna (Transmit and Receive RF) (J4) R-RN(9A).

- a. Signal Name: TACAN RF Power (Transmit and Receive)
- b. Signal From/To: TACAN Beacon To TACAN Antenna through JTIDS Antenna
- c. Signal Function: Transmission/Reception of TACAN RF pulses
- d. Signal Characteristics:
 - Type: RF Pulse, Unbalanced Coax
 - XMIT Amplitude: 3k Watts at 7% Duty Cycle
(peak watts)
 - Frequency Range: 960 to 1215 MHz
- e. Cable Type: Coaxial, RF (RG-225)
- f. Connector Type: Mast Connection for R-RN(9)
Type N (M39012/01-0003)
Antenna Connection (J4)
Type N (M39012/01-005)

3.2.6.2.2. TACAN Power Cable (J2).

- a. Signal Name: DC Power
- b. Signal From/To: TACAN Control Unit to TACAN Antenna through JTIDS Antenna
- c. Signal Function: Power Supply Voltages
- d. Signal Characteristics:
 - Type: DC Power
 - Amplitude: +15VDC, -15VDC, +80VDC, +10VDC, +5VDC
OV Sensor
- e. Cable Type: 2SWU-7
 - Active Wires: 12
- f. Connector Type: Mast Connection for R-RN(6)
MS3102R16-11P
Antenna Connection (J2)
C2139188G003 (10-214617-11S)

3.2.6.2.3. TACAN Control Signals (J3).

- a. Signal Name: TACAN Control Signals
- b. Signal From/To: TACAN Control Unit to TACAN Antenna through JTIDS Antenna
- c. Signal Function: Antenna Controls BIT Monitors
- d. Signal Characteristics:
 - Type: Digital Control Voltages, Analog Sampled Video
- e. Cable Type: 2SWAU-19
 - Active Wires: 27
- f. Connector Type: Mast Connection for R-RN(5)
MS3102R36-10P
Antenna Connection (J3)
C2139188G005-(10-214636-10S)

3.2.6.2.4. Sound Powered Phone (J1).

- a. Signal Name: Sound-Powered Phone R/T
- b. Signal From/To: TACAN Control Unit to TACAN Antenna through JTIDS Antenna
- c. Signal Function: Personnel Communication
- d. Signal Characteristics:
 - Type: Audio
- e. Cable Type: TTSU-1-1/2
 - Active Wires: 2
- f. Connector Type: Mast Connection for R-RN(2)
MS3102R16-11P
Antenna Connection (J1)
2139188G003 (10-214617-11S)