



FISHER WIRELESS **SERVICES, INC.**

The Redwood Empire's Communications Leader

February 14, 2020

Lake County Sheriff's Office
1220 Martin Street
Lakeport, CA 95453

Subject: St. Helena Sealed Bid No. 20-08

Fisher Wireless Services is pleased to have the opportunity to respond to this bid invitation and provide the Lake County Sheriff's Office with quality communications equipment and services.

The attached bid request consists of all specified requested equipment, not including the Harris equipment, as Fisher is not a Harris Dealer. Each item will come with the standard manufacturer warranties, ranging from 30 days to 5 years. Please note, you may find some part numbers may differ from the listed items in your bid invitation, as some items may be listed by vendor sku, or manufacturer part numbers.

This quote will remain in effect for 180 days as requested.
Please do not hesitate to reach out directly should you have any questions or concerns.

We thank you for the opportunity to supply you with the attached bid.

Sincerely,

Fisher Wireless Services

Shannon C. Hendry,
Operations Manager



MOTOROLA
Authorized Two-Way
Radio Dealer

Ukiah
2081 Wellmar Dr., Ukiah, CA 95482
(800) 399-2929 (707) 462-9736
(707) 462-9749 Fax

KENWOOD
COMMUNICATIONS
AUTHORIZED DEALER



LAKE COUNTY SHERIFF'S OFFICE

1220 Martin Street • P.O. Box 489 • Lakeport, California 95453

Administration
(707) 262-4200

Central Dispatch
(707) 263-2690

Coroner
(707) 262-4215

Corrections
(707) 262-4240

Patrol/Investigation
(707) 262-4200

Brian L. Martin
Sheriff / Coroner

February 7th, 2020

The Lake County Sheriff's Office is requesting your company provide a bid on the specified below equipment. In order for your bid to be considered, it is critical that you adhere to the provided specifications in the attached bid form. If your company is not able or unwilling to provide a bid, please notify us before the bid due date. We look forward to considering your sealed competitive bid.

Please prepare and submit a price quote to me, in writing, for the following products, brand new, with full factory warranty and specifications.

QTY	Item:	Item Description:
1	TELEWAVE ANT150Y7-WR	148-174 MHz, 5 dBd YAGI ANTENNA
	ANDREWS LDF4-50A	100' ½" FOAM HELIX 50 OHM COAXIAL CABLE
1	POLIS-B50HN-C2-MA	125-1000MHz BULKHEAD PROTECTOR
2	ANDREWS L4TNF-PSA	Positive Stop N-Female for ½"
3	ANDREWS L4TNM-PSA	Positive Stop N-Male for ½"
1	Telewave T-1530	118-174MHz, 100w Single Isolator
1	TPRC-1508-2	148-174MHz 8" Dual Cavity Bandpass/reject
	430174	150' ½" SUPERFLEX CABLE
4	441175	N MALE CONN. ½"
6	312466	6'N- MALE-N-MALE RG142 JUMPER
6	313411	GROUNDING KIT For ½" LDF4-50 cable
2	F01U306547	IP-224 Gateway Basic
2	F01U165538	IP-224 MOUNTING BRACKETS (DUAL)
1	F01U117426	AHS-1 ALIGNMENT HANDSET

2	F01U165544	DB-37 TO 4-WIRE CABLE
1	15920	138-174MHz DIPOLE ANTENNA
1	485569	DUAL 8" VHF NOTCH PASS CAVITY
2	TELANT150Y7-WR	148-174MHz, 5dBd YAGI ANTENNA
	429150	400' ½" HELIAX CABLE LDF-4
3	377273	½" MALE CONNECTOR
3	307941	½" N FEMALE CONNECTOR
4	441175	N. MALE CONN. ½"
2	40756	POLY PHASER LIGHTNING ARRESTOR
5	418162	CLICK ON HANGERS (10-PK) (5)
2	488136	WEATHERPROOFING KIT
1	204353	STANDOFF ADAPTER
5	506097	CHANNEL NUT HARDWARE
1	484188	STACK HANGERS (10-PK)
4	253900	SPLIT 3/8" WASHER LOCK
1	265322	HEAD CAP SCREWS 3/8-16 (100-PK)
2	207567	3/8-16 S.S NUTS (50-PK)

Items below are for a L3Harris TB9400 VHF 100 Watt Base radio with listed options and Zetron M250 Tone Remote Interface module.

1	T01-01103-DAAA	Reciter, TB9400, 148-174MHz
1	TB9435S-100H	CHASSIS, TB9400, SINGLE, 100w
1	T01-01121-DBBA	TB94 Linear PA 148-174M 100Watts
1	TBAS062	SFE SIMULCAST ENABLE (TB91/94)
1	TBA3071	SFE IP NETWORKING SATELLITE
1	TBA30A0-0200	TB9000 Power Management Unit AC with Aux24volts
1	219-01561-00	CABLE, PMU IEC, 6.5FT
1	901-9588	Model 250 Tone Remote Adapter
1	950-0898	Dual Rack Mount Adapter Kit
1	709-7540	Generic Interface cable with flying leads

Please note: All items listed in this document MUST meet or exceed list manufacturer's specifications. Documentation will be required if bidding on comparable equipment.

Your price quote should include shipping, handling, and any applicable sales tax. Our tax rate is 7.25% and our shipping address is: Lake County Sheriff's Department, 4913 Helbush Drive, Lakeport, CA 95453. If you waive a shipping and/or handling charge, your quote must so state. Delivery must be available within 30 days with billing available immediately upon purchase order issuance. The order may be increased or decreased depending on budget allowance.

We would appreciate your prompt attention to this request as we are in urgent need of this information. If you have any questions, please do not hesitate to call me at (707) 262-4218 or by e-mail at mbs@co.lake.ca.us.

Provide the base price of each item separately

Purchase will be dependent on budget allocation. We reserve the right to increase/decrease accordingly.

Specify warranty information and any related costs

Specify delivery costs and tax information – tax rate is 7.25%

INVITATION FOR BID NO. 20-08

Date: February 13, 2020

Page 1 of 4 pages

Bids are subject to the terms and conditions set forth herein. Hard copy bids on the attached bid form must be delivered in a sealed envelope and signed, dated, and received no later than Tuesday, February 18th, 2020, at 3:00 p.m. Bids may be hand delivered or sent through a mail carrier. Faxed or emailed quotes will NOT be accepted.

Submit Bids to:
County of Lake – Administrative Office
255 N. Forbes Street
Lakeport, CA 95453
BID No.

The bids will be opened on Tuesday, February 18th, 2020 at 3:00 p.m. at the Lake County Courthouse. First Floor – County Administrative Office

For further information contact: Mary Beth Strong at (707) 262-4218

THE BOARD OF SUPERVISORS RESERVES THE RIGHT TO ACCEPT OR REJECT ANY OR ALL OF THE ITEMS BID AND WAIVE ANY MINOR IRREGULARITIES

BID:

The undersigned hereby submits a bid for up to four the above specified items for use by the Lake County Sheriff's Office.

A ten percent (10%) preference shall be granted to Lake County local vendors on all sealed bids. However, in no case shall the amount of the preference exceed ten thousand (\$10,000.00), unless waived by the Lake County Board of Supervisors when it determines that a waiver would serve the best interests of the County and the public due either to the nature of the goods or services provided, the projected long-term costs to the County, or the ability to respond to the County's needs in a timely manner.

SPECIAL INSTRUCTIONS

LITERATURE: Literature which fully describes the item(s) on which you are bidding is to be submitted with your bid.

DELIVERY: Bids are to be F.O.B. destination and shall include shipping to:
County of Lake – Administrative Office
255 N. Forbes Street
Lakeport, CA 95453
Telephone: (707) 263-2580

PRICE PROTECTION: Bid prices shall be firm for a period of one hundred and eighty (180) days following the date of bid closing.

MISCELLANEOUS INSTRUCTIONS

None

BID COMPLIANCE

1. Failure on the part of the BIDDER to comply with all requirements and conditions of the Invitation for Bid and these specifications may subject their bid to rejection. No exceptions to or deviations from these specifications will be considered unless each exception or deviation is specifically stated by the BIDDER as an exception with a detailed statement completely defining the exception and/or exceptions.
2. Any bidder who desires to object to any matter relating to the Bid must submit their objections in writing to the Purchasing Agent within forty-eight (48) hours from the time set herein for opening of bids. Oral objections will not be considered.

BID Form

TOTAL BID FOR ST. HELENA MICROWAVE/VOTING COMMUNICATIONS PROJECT INCLUDING 7.25 % SALES TAX

Subtotal: Base plus options: 16,737.58

Other Discounts: (e.g. Bulk discount/Dlr. Adj.) _____

Delivery: 635.00

Sales Tax: 1213.47

Fees: _____

Total Cost: 18,586.05

Total cost spelled out: Eighteen thousand five hundred Eighty six and five Cents.

Fisher Wireless Services Shannon Hendry 2/13/2020
Company Name Authorized Signature Date

Shannon Hendry 2081 Wellmar Drive, Ukiah CA 95482
Name (Please print) Mailing Address (Please print)

707-462-9736 / 707-489-6866 shendry@fisherwireless.com
Office Phone # / Cell Phone # Email address

AWARD

ACCEPTED:

Date: _____

Chairman, Board of Supervisors

ATTEST: Carol J. Huchingson
Clerk of the Board

By: _____
Deputy

Fisher Wireless Services, Inc
 2081 Wellmar Road
 Ukiah, CA 95482
 (707) 462-9736

QUOTATION

QUOTE NO.: 11024 - 00

DATE: 2/12/20

TERMS: NET 30

DELIVERY:

TO: LAKE COUNTY SHERIFFS OFFICE
 ATTN: MARYBETH STRONG
 4913 HELBUSH DRIVE
 LAKEPORT, CA 95453

WE ARE PLEASED TO QUOTE YOU THE FOLLOWING:

QTY	ITEM	DESCRIPTION	UNIT PRICE	DISC%	TOTAL
3	TELANT150Y7-WR	148-174 MHz, 5 dBd YAGI ANTENNA	775.00		2,325.00
500	429150	1/2" HELIAX CABLE	2.90		1,450.00
2	40756	POLY PHASER LIGHTENING ARRESTOR	63.00		126.00
5	307941	1/2" N FEMALE CONNECTOR	24.59		122.95
6	377273	1/2" MALE CONNECTOR	24.59		147.54
1	TELT-1530	118-174 MHz, 100W Single Isola	700.00		700.00
2	TPRC-1508-2	148-174 MHz 8" Dual Cavity Ban	1,300.00		2,600.00
150	430174	1/2" SUPERFLEX CABLE	3.30		495.00
8	441175	N.MALE CONN. 1/2"	27.60		220.80
6	312466	6' MALE-MALE RG142 JUMPER	65.00		390.00
6	SG12-12B2U	1/2" GROUNDING KIT	19.99		119.94
1	15920	138-174mhz DIPOLE ANTENNA	785.00		785.00
5	418162	CLICK ON HANGARS (10PK)	19.83		99.15
2	488136	WEATHERPROOFING KIT	18.00		36.00
1	204353	STANDOFF ADAPTER	34.00		34.00
5	506097	CHANNEL NUT HARDWARE	7.00		35.00
1	484188	STACK HANGERS (10PACK)	23.00		23.00
Continued on following page					

QTY	DESCRIPTION	UNIT PRICE	DISC%	TOTAL
4	253900 SPLIT 3/8" WASHER LOCK	10.50		42.00
1	265322 HEAD CAP SCREW 3/8-16 (100PK)	56.25		56.25
2	207567 3/8-16 S.S NUTS (50PK)	7.75		15.50
2	F01U306547 IP-224 Gateway Basic	2,459.85		4,919.70
2	F01U165538 IP-224 MOUNTING BRACKETS (DUAL	100.00		200.00
1	F01U117426 AHS-1 ALIGNEMENT HANDSET	75.00		75.00
2	F01U165544 DB-37 TO 4-WIRE CABLE	225.00		450.00
1	901-9588 MODEL 250 TONE REMOTE ADAPTER	1,025.00		1,025.00
1	950-0898 19" RACK MOUNT ADAPTER KIT	88.00		88.00
1	709-7540 INTERFACE CABLE W/LEADS (GENERI	78.00		78.00
1	68433 BULKHEAD ARRESTOR NM/NF	78.75		78.75
		Item summary		16,737.58
		Subtotal		16,737.58
Continued on following page				

QTY	DESCRIPTION	UNIT PRICE	DISC%	TOTAL
		Inbound Frt		635.00
		Sales Tax		1,213.47
		GRAND TOTAL:		18,586.05

ORDERS SUBJECT TO SHIPPING & HANDLING AND SALES TAX IF APPLICABLE

TERMS SUBJECT TO CREDIT REVIEW

BY SHANNON HENDRY (707)462-9736 Ext shendry@fisherwireless.com

THIS QUOTE IS SUBJECT TO REVIEW BY MANAGEMENT FOR COMPLETENESS AND ACCURACY.

Accepted

by

P.O. No. _____

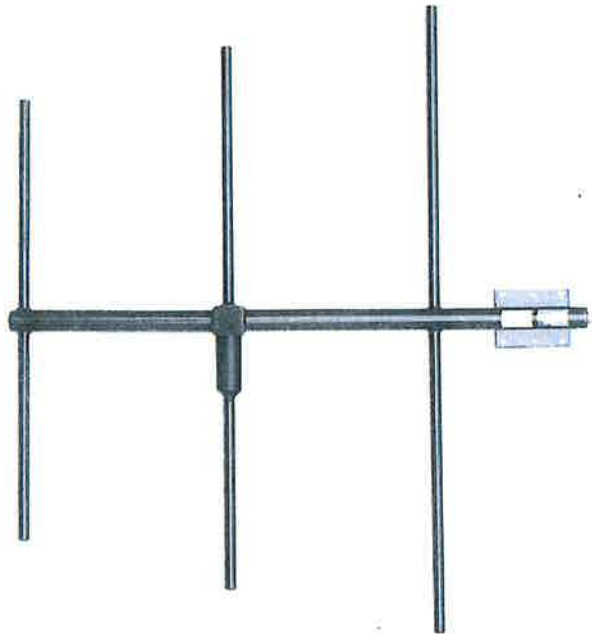
LEGAL NAME OF PURCHASER

Date

AUTHORIZED SIGNATURE

ANT150Y7-WR

YAGI ANTENNA 5 dBd



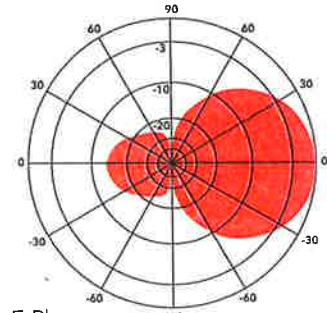
The Telewave ANT150Y7-WR is a high performance directional antenna, designed especially for point to point as well as point to multipoint applications. This antenna produces 5 dBd forward gain with an excellent front-to-back ratio, and solid aluminum elements with 360° welds prevent intermodulation and provide exceptional strength.

Each antenna is completely protected with our high-tech Txylan™ coating, which provides icing resistance and environmental protection from corrosive gases,

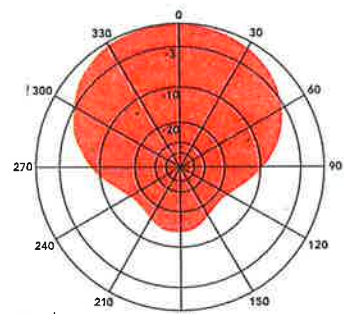
ultraviolet radiation, salt spray, acid rain and wind blown abrasives such as desert sand. The feed line is protected within the boom, and the radiating element connection is completely sealed against ice and other environmental hazards with a tough, RF-transparent radome.

The ANT150Y7-WR includes a welded vertical plate and mast clamp set. A horizontal plate is optional. The clamp set secures the antenna to a vertical mast or tower support from 1.5" - 3.5" O.D.

ANT150Y7-WR at 156 MHz

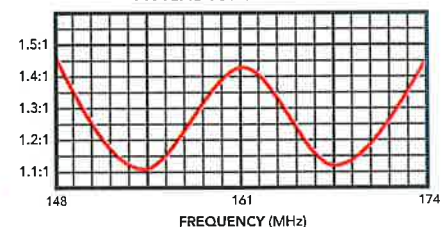


E-Plane
Gain: 5.1 dBd



H-Plane
Gain: 5.1 dBd

TYPICAL VSWR RESPONSE



SPECIFICATIONS

Frequency (continuous)	148-174 MHz	Elements	3
Gain (typ)	5 dBd	Dimensions (L x H)	38 x 40.5 in.
Power rating (typ)	500 watts	Antenna weight	16 lb.
Impedance / VSWR	50 ohms / 1.5:1 (max)	Shipping weight	19 lb.
Front to back ratio (min)	20 dB	Wind rating / with 0.5" ice	150 / 125 MPH
Beamwidth V / H	64° / 114°	Exposed area (flat plate equiv.)	1.0 ft. ²
Pattern / Polarization	Directional / Vertical	Lateral thrust at 100 MPH	41 lb.
Termination	N Female or 7-16 DIN (opt)	(40 psf - flat plate equiv.)	

LDF4-50A



LDF4-50A, HELIAX® Low Density Foam Coaxial Cable, corrugated copper, 1/2 in, black PE jacket

Product Classification

Brand	HELIAX®
Product Series	LDF4-50A
Product Type	Coaxial wireless cable

Standards And Qualifications

EN50575 CPR Cable EuroClass	Fca
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Construction Materials

Jacket Material	PE
Outer Conductor Material	Corrugated copper
Dielectric Material	Foam PE
Flexibility	Standard
Inner Conductor Material	Copper-clad aluminum wire
Jacket Color	Black

Dimensions

Nominal Size	1/2 in
Cable Weight	0.15 lb/ft 0.22 kg/m
Diameter Over Dielectric	12.954 mm 0.510 in
Diameter Over Jacket	15.875 mm 0.625 in
Inner Conductor OD	4.8260 mm 0.1900 in
Outer Conductor OD	13.970 mm 0.550 in

Electrical Specifications

Cable Impedance	50 ohm ±1 ohm
Capacitance	23.1 pF/ft 75.8 pF/m
dc Resistance, Inner Conductor	0.450 ohms/kft 1.480 ohms/km
dc Resistance, Outer Conductor	0.820 ohms/kft 2.690 ohms/km
dc Test Voltage	4000 V
Inductance	0.190 µH/m 0.058 µH/ft
Insulation Resistance	100000 Mohms•km
Jacket Spark Test Voltage (rms)	8000 V
Operating Frequency Band	1 – 8800 MHz
Peak Power	40.0 kW

IS-B50 Series

The IS-B50 Series of DC block surge arrestors are designed to protect against lightning events and are ideal for HF, UHF and VHF radios. The IS-B50 family of RF protectors can be used for general radio use with frequency ranges between 1.5 MHz to 1000 MHz.



FEATURES

- Broad frequency ranges from 1.5 MHz to 1000 MHz
- Connectors: N-Type and UHF
- High power versions capable to 3kW
- Industry leading surge rating of 20kA
- Nuclear EMP versions available with N-Type connectors
- Flexible bulkhead and bracket mounting options

STANDARDS

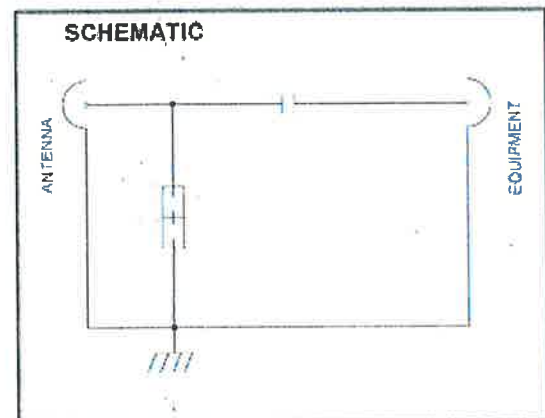
- CE Compliant
- RoHS Compliant

GENERAL SPECIFICATIONS

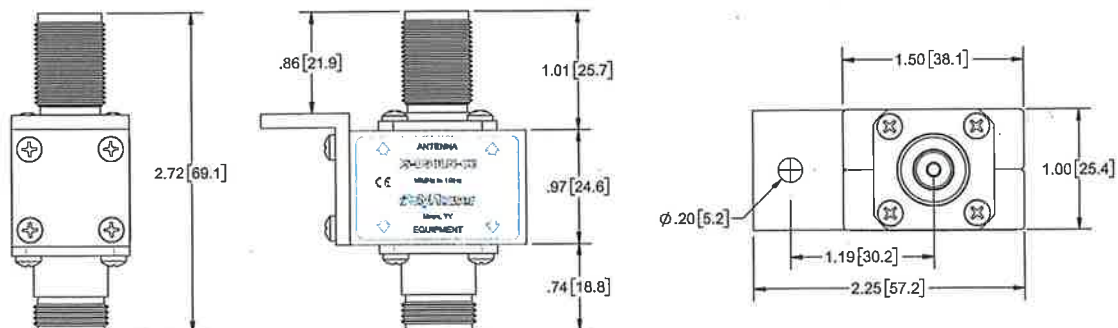
Insertion Loss	≤0.1dB
VSWR	≤1.2:1 or Better Over Frequency Range
Return Loss	<20dB
Max Surge	20 kA 8/20µs Waveform
Weathering Kit Available	Part Number: WK-1

PATENTED LIGHTNING ARRESTOR TECHNOLOGY

The IS-B50 product family is based on PolyPhaser's market establishing surge protection technology. This engineered surge suppressor has been the cornerstone for ham radio operators, land mobile communications and remote industrial monitoring. The IS-B50 is approved by major OEMs for use in critical applications such as emergency response, SCADA and public safety communications.



DIMENSIONS



L4TNF-PSA



Type N Female Positive Stop™ for 1/2 in AL4RPV-50, LDF4-50A, HL4RPV-50 cable

Product Classification

Brand	HELIAX® Positive Stop™
Product Type	Wireless and radiating connector

General Specifications

Interface	N Female
Body Style	Straight
Harmonized System (HS) Code	854420 (Coaxial cable and other coaxial electric conductors)
Mounting Angle	Straight
Ordering Note	CommScope® standard product (Global)

Electrical Specifications

Connector Impedance	50 ohm
Operating Frequency Band	0 – 8800 MHz
Cable Impedance	50 ohm
3rd Order IMD, typical	-116 dBm @ 910 MHz
3rd Order IMD Test Method	Two +43 dBm carriers
RF Operating Voltage, maximum (vrms)	707.00 V
dc Test Voltage	2000 V
Outer Contact Resistance, maximum	0.30 mOhm
Inner Contact Resistance, maximum	2.00 mOhm
Insulation Resistance, minimum	5000 MOhm
Average Power	0.6 kW @ 900 MHz
Peak Power, maximum	10.00 kW
Insertion Loss, typical	0.05 dB
Shielding Effectiveness	-130 dB



Type N Male Positive Stop™ for 1/2 in AL4RPV-50, LDF4-50A, HL4RPV-50 cable

- This product is part of the CommScope Wired for Wireless® Solution

Product Classification

Brand	HELIAX® Positive Stop™
Product Type	Wireless and radiating connector

General Specifications

Interface	N Male
Body Style	Straight
Harmonized System (HS) Code	854420 (Coaxial cable and other coaxial electric conductors)
Mounting Angle	Straight
Ordering Note	CommScope® standard product (Global)

Electrical Specifications

Connector Impedance	50 ohm
Operating Frequency Band	0 – 8800 MHz
Cable Impedance	50 ohm
3rd Order IMD, typical	-116 dBm @ 910 MHz
3rd Order IMD Test Method	Two +43 dBm carriers
RF Operating Voltage, maximum (vrms)	707.00 V
dc Test Voltage	2000 V
Outer Contact Resistance, maximum	0.30 mOhm
Inner Contact Resistance, maximum	2.00 mOhm
Insulation Resistance, minimum	5000 MOhm
Average Power	0.6 kW @ 900 MHz
Peak Power, maximum	10.00 kW
Insertion Loss, typical	0.05 dB
Shielding Effectiveness	-130 dB

T-1530 / T-1560 FERRITE ISOLATORS

Telewave Single and Dual Ferrite Isolators prevent intermodulation, and protect transmitters from high VSWR or mistuned filtering devices by providing a constant 50 ohm impedance. All Telewave isolators are manufactured and tested in our own plant to the highest quality standards. These isolators handle up to 100 watts of power, with several different load options. All Telewave isolators include one or two removeable 35 watt loads in the basic configuration. Typical tuning range is up to ± 4 MHz from the original center frequency, and typical isolation is 35 dB for single, and 70 dB for dual.

NOTE: Isolators have limited bandwidth and tuning range. Each isolator is manufactured for a specific range and tuned to a specific frequency. Please specify the exact desired operating frequency and special load requirements with the order.

BENEFITS

Under adverse conditions, the isolator performs several critical functions:

Broken Antenna, Damaged Cable, High VSWR

All of these conditions will cause large amounts of power to be reflected down the transmission line toward the transmitter. The circulatory property of the isolator will direct this energy to the load port, and protect the transmitter. The load on the isolator must be capable of handling full transmitter power. Age, water invasion, and incorrect cable length will also cause impedance changes. The tuned ports of the isolator provide a constant 50 ohm impedance for the transmitter to avoid overheating and oscillation.



T-1530 SINGLE ISOLATOR



CAVITY-MOUNT ISOLATOR



T-1560 DUAL ISOLATOR

Intermodulation

When RF energy from a strong nearby signal source enters a transmitter via the antenna, mixing with the primary transmitter frequency often occurs, resulting in the radiation of new, undesired signals. The isolator antenna port reflects out-of-band energy back to the antenna. In-band energy enters the isolator, and is circulated to the output load. No energy from nearby transmitters enters the protected transmitter from the antenna, and intermodulation can be eliminated.

SPECIFICATIONS			T-1530	T-1560
Frequency band	118-174 MHz	Isolator type	Single	Dual
Tuning range (typ.)	± 4 MHz	Isolation (typ. / min)	35 dB / 30 dB	70 dB / 60 dB
Input power	100 watts	Insertion loss (typ.)	0.4 dB	0.8 dB
VSWR (typ.)	1.25:1	Load(s) included	(1) 35 W	(2) 35 W
Impedance	50 ohms	Dimensions (incl. loads) in.	4.5 x 4 x 2	6.5 x 4.5 x 2
Connectors	N Female	cm	11.5 x 10 x 5	16.5 x 11.5 x 5
Temperature range	-30°C to +60°C	Weight lb. (kg)	3 (1.4)	6 (2.7)

TPRC-1508-1, 2 PASS-REJECT CAVITIES

The Telewave TPRC-1508-1 and TPRC-1508-2 are 8" diameter, 1/4-wavelength Pass-Reject cavities with an adjustable coupling loop and tuning capacitor. Pass-Reject cavities reject all frequencies outside a narrow pass band, with a tunable notch for additional rejection with close spacing. These cavities are commonly used to reduce transmitter sideband noise, and protect receivers against desensitization.

TPRC-1508 cavities cover 148-174 MHz. All cavities are tuned to specified frequencies prior to shipping, and no further adjustments should be required. The positive locking mechanism allows for quick field re-tuning if frequency changes become necessary.

These cavities feature calibrated adjustable coupling, and insertion loss can be easily set from 0.5 dB to 2 dB or more to improve selectivity. This allows cavity response to be optimized for any operating environment.

At densely populated sites, the TPRC-1508-2 dual cavity filter provides greater selectivity with minimum insertion loss. Multiple cavities can also provide a wider passband when required. Mounting rails are provided for all multiple-cavity filters.

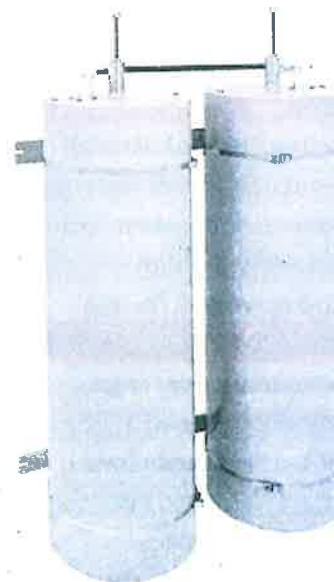
Excellent frequency stability is achieved by the use of a specially machined compensator and Invar rod. The pass and reject frequencies are temperature stable from -30°C to +70°C. Telewave Ground Loop technology places the center conductor of each coupling loop at DC ground potential for lightning protection and noise reduction.

Heavy duty materials are used throughout each cavity to insure high performance and long life. Cavity top plates are machined from 1/4-inch aluminum, and are heliarc welded to the cavity body at the high current point for improved conductivity and strength. This allows Telewave cavities to handle up to 350 watts, depending on insertion loss.

Rigid foam inserts support the tuner assembly allowing vertical or horizontal mounting. Similar metals and alodined aluminum help prevent galvanic corrosion. Silver plated tuners and beryllium copper finger stock provide non-corrosive low loss contact, and ensure reliable, long-term performance.



TPRC-1508-1



TPRC-1508-2

Product Specifications

COMMSCOPE®

POWERED BY

ANDREW



FSJ4-50B

FSJ4-50B, HELIAX® Superflexible Foam Coaxial Cable, corrugated copper, 1/2 in, black PE jacket

Construction Materials

Jacket Material	PE
Outer Conductor Material	Corrugated copper
Dielectric Material	Foam PE
Flexibility	Superflexible
Inner Conductor Material	Copper-clad aluminum wire
Jacket Color	Black

Dimensions

Nominal Size	1/2 in
Cable Weight	0.14 lb/ft 0.21 kg/m
Diameter Over Dielectric	8.890 mm 0.350 in
Diameter Over Jacket	13.462 mm 0.530 in
Inner Conductor OD	3.5560 mm 0.1400 in
Outer Conductor OD	12.192 mm 0.480 in

Electrical Specifications

Cable Impedance	50 ohm \pm 1 ohm
Capacitance	25.2 pF/ft 82.7 pF/m
dc Resistance, Inner Conductor	0.820 ohms/kft 2.690 ohms/km
dc Resistance, Outer Conductor	1.560 ohms/kft 5.120 ohms/km
dc Test Voltage	2500 V
Inductance	0.207 μ H/m 0.063 μ H/ft
Insulation Resistance	100000 Mohms•km
Jacket Spark Test Voltage (rms)	5000 V
Operating Frequency Band	1 – 10200 MHz
Peak Power	15.6 kW
Velocity	81%

Environmental Specifications

Installation Temperature	-40 °C to +60 °C (-40 °F to +140 °F)
Operating Temperature	-55 °C to +85 °C (-67 °F to +185 °F)
Storage Temperature	-70 °C to +85 °C (-94 °F to +185 °F)

General Specifications

Type N Male for 1/2 in FSJ4-50B cable



Product Classification

Brand	HELIAX®
Product Type	Wireless and radiating connector

General Specifications

Interface	N Male
Body Style	Straight
Mounting Angle	Straight
Ordering Note	CommScope® standard product (Global)

Electrical Specifications

Connector Impedance	50 ohm
Operating Frequency Band	0 – 12000 MHz
Cable Impedance	50 ohm
3rd Order IMD, typical	-120 dBm @ 910 MHz
3rd Order IMD Test Method	Two +43 dBm carriers
RF Operating Voltage, maximum (vrms)	707.00 V
dc Test Voltage	2000 V
Outer Contact Resistance, maximum	0.30 mOhm
Inner Contact Resistance, maximum	2.00 mOhm
Insulation Resistance, minimum	5000 MOhm
Average Power	0.6 kW @ 900 MHz
Peak Power, maximum	10.00 kW
Insertion Loss, typical	0.05 dB
Shielding Effectiveness	-110 dB

F4PNMV2-HC

Environmental Specifications

Operating Temperature	-55 °C to +85 °C (-67 °F to +185 °F)
Storage Temperature	-55 °C to +85 °C (-67 °F to +185 °F)
Immersion Depth	1 m
Immersion Test Mating	Mated
Immersion Test Method	IEC 60529:2001, IP68
Water Jetting Test Mating	Mated
Water Jetting Test Method	IEC 60529:2001, IP66
Moisture Resistance Test Method	MIL-STD-202F, Method 106F
Mechanical Shock Test Method	MIL-STD-202F, Method 213B, Test Condition C
Thermal Shock Test Method	MIL-STD-202F, Method 107G, Test Condition A-1, Low Temperature -55 °C
Vibration Test Method	MIL-STD-202F, Method 204D, Test Condition B
Corrosion Test Method	MIL-STD-1344A, Method 1001.1, Test Condition A

Standard Conditions

Attenuation, Ambient Temperature	20 °C 68 °F
Average Power, Ambient Temperature	40 °C 104 °F

Return Loss/VSWR

Frequency Band	VSWR	Return Loss (dB)
0–1000 MHz	1.03	36.00
1010–2000 MHz	1.04	35.00
2010–3000 MHz	1.08	28.00

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system



* Footnotes

Immersion Depth	Immersion at specified depth for 24 hours
Insertion Loss, typical	0.05v·freq (GHz) (not applicable for elliptical waveguide)



SKU: 312466

6' DAS jumper using RG-142 plenum cable N M;N M

For wireless networking professionals demanding value and availability, Ventev's 6' N Male; N Male antenna extension cable uses RG-142P series Low Loss/RG type cable and is terminated w/ high performance 50 Ohm RF connectors and weatherproofed w/ heat shrink. Built by a manufacturer-certified technicians, this jumper is 100% tested prior to shipment. Built by a manufacturer-certified technicians, this antenna extension is tested prior to shipment for 100 percent customer satisfaction and guaranteed performance.

Technical Specs

Cable Length	6 ft
RF Connector Style	N Male Straight, N Male Straight
Qty/ Uom	1 Each
RF Connector Body Style	Straight, Straight
Jumper Length	5 - 7.99 ft
RF Connectors	N Male, N Male
Coaxial Cable Series	RG-142
Cable Type	RG-142P
Manufacturer	Ventev



SKU: 313411

ANDREW SureGround for 1/2" Al or Cu corrugated or smoothwall coaxial cable. Tinned copper clip with 48" #6 copper bond & field attached, 2 hole lug.

Technical Specs

Qty/ Uom	1 Each
Cable Compatibility	1/2 in
Ground Kit Type	Standard
Manufacturer	CommScope

ANT150D, D3, D6-9

DIPOLE AND DIPOLE ARRAY 1 TO 9 dBd

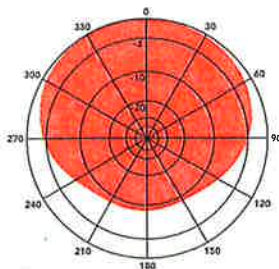
The Telewave ANT150D series consists of single, dual, and 4-element dipole array antennas with a precision phasing harness for optimum performance. The horizontal pattern is field-adjustable for any current or future coverage requirements. The wide bandwidth and high efficiency of these antennas make them ideal for applications including trunking, business, public safety, and amateur radio.

Each dipole element is constructed with 6061-T6 aluminum, and welded at the base for maximum strength. Each element is also completely sealed with our high-tech Txylan™ coating, which resists water and ice

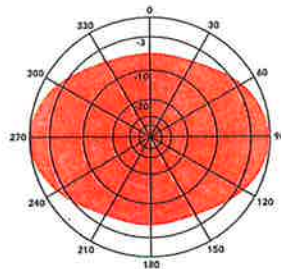
buildup, and provides exceptional protection from corrosive gases, UV radiation, salt spray, acid rain and windblown abrasives. The phasing harness is fully sealed by Telewave's Millenium Seal™ technology.

All components are at DC ground potential for lightning protection. Each dipole element includes a heavy-duty custom clamp set for mounting to a 1.5"-2.5" diameter galvanized steel support pipe or tower leg.

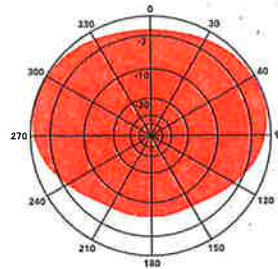
Up to 15 degrees of electrical uptilt or downtilt may be specified for D3 or D6-9 models. Desired tilt angle must be included with the order, and consultation with our antenna engineering staff is requested.



H-Plane: Gain 9.1 dBd
1/4 wl. spacing from tower



H-Plane: Gain 9.1 dBd
1/2 wl. spacing from tower

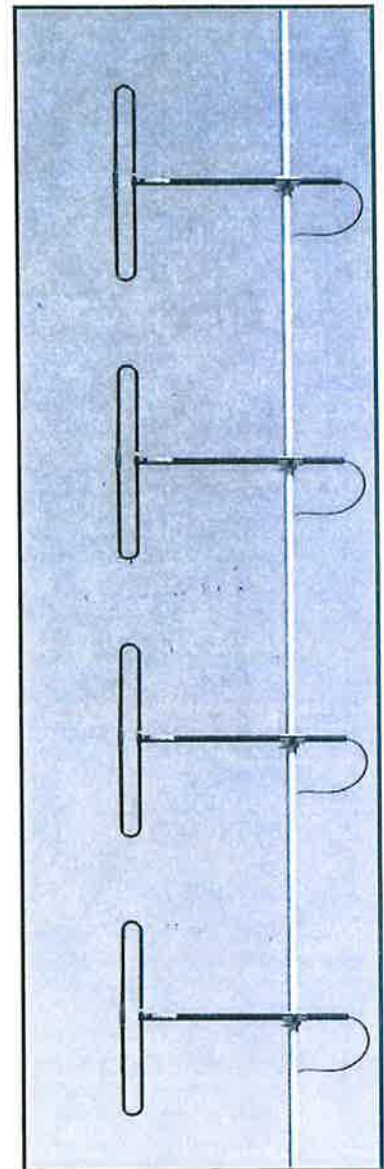


H-Plane: Gain 8.5 dBd
3/8 wl. spacing from tower

COMMON SPECIFICATIONS

Frequency (continuous)	138-174 MHz	Lightning protection	DC Ground
Power rating (typ.)	500 watts	Wind rating	175 MPH
Impedance	50 ohms	(with 0.5" ice)	150 MPH
VSWR	1.5:1 or less		
Pattern	Adjustable: Offset circular, cardioid, or bidirectional		
Termination	N-Male or 7-16 DIN (opt.) on harness feed cable		

MODEL	ANT150D	ANT150D3	ANT150D6-9
Gain (dependent on pattern)	1-2.5 dBd	3-6 dBd	6-9 dBd
Vertical beamwidth (3/8 wl.)	78°	37°	18°
Dimensions (H x D) max.	34 x 36 in.	89 x 36 in.	195 x 36 in.
Weight (antenna + clamps)	5 lb.	13 lb.	28 lb.
Maximum exposed area	0.73 ft. ²	1.6 ft. ²	3.3 ft. ²
Lateral thrust at 100 MPH	29 lbs	64 lbs	134 lbs
Electrical uptilt or downtilt	N/A	1-15°	1-15°



ANT150D6-9
(Harness not shown)
Support mast is
customer-supplied

TPRC-1508-1, 2 PASS-REJECT CAVITIES

The Telewave TPRC-1508-1 and TPRC-1508-2 are 8" diameter, 1/4-wavelength Pass-Reject cavities with an adjustable coupling loop and tuning capacitor. Pass-Reject cavities reject all frequencies outside a narrow pass band, with a tunable notch for additional rejection with close spacing. These cavities are commonly used to reduce transmitter sideband noise, and protect receivers against desensitization.

TPRC-1508 cavities cover 148-174 MHz. All cavities are tuned to specified frequencies prior to shipping, and no further adjustments should be required. The positive locking mechanism allows for quick field re-tuning if frequency changes become necessary.

These cavities feature calibrated adjustable coupling, and insertion loss can be easily set from 0.5 dB to 2 dB or more to improve selectivity. This allows cavity response to be optimized for any operating environment.

At densely populated sites, the TPRC-1508-2 dual cavity filter provides greater selectivity with minimum insertion loss. Multiple cavities can also provide a wider passband when required. Mounting rails are provided for all multiple-cavity filters.

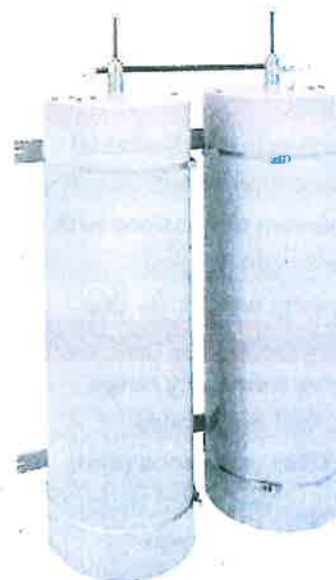
Excellent frequency stability is achieved by the use of a specially machined compensator and Invar rod. The pass and reject frequencies are temperature stable from -30°C to +70°C. Telewave Ground Loop technology places the center conductor of each coupling loop at DC ground potential for lightning protection and noise reduction.

Heavy duty materials are used throughout each cavity to insure high performance and long life. Cavity top plates are machined from 1/4-inch aluminum, and are heliarc welded to the cavity body at the high current point for improved conductivity and strength. This allows Telewave cavities to handle up to 350 watts, depending on insertion loss.

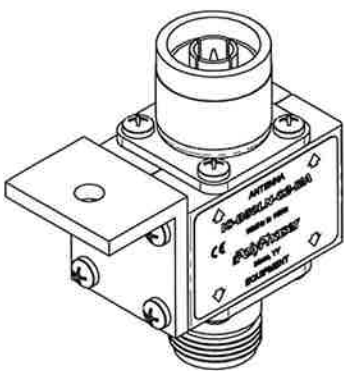
Rigid foam inserts support the tuner assembly allowing vertical or horizontal mounting. Similar metals and alodined aluminum help prevent galvanic corrosion. Silver plated tuners and beryllium copper finger stock provide non-corrosive low loss contact, and ensure reliable, long-term performance.



TPRC-1508-1



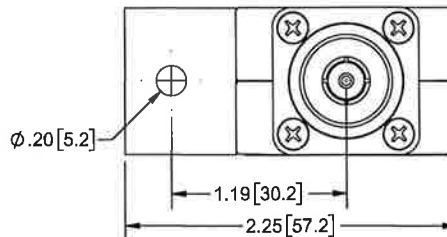
TPRC-1508-2



HARDWARE KIT INCLUDES:

QTY	DESCRIPTION
1	O-RING 114 EPDM
2	WASHER 10 INT 4-10 SS
1	SCREW 10-32x.75 HEX MS 18-8 SS
1	NUT 10-32 HEX 18-8 SS

REVISIONS				
REV.	DESCRIPTION	ECN	DATE	APPROVED
K	REFER TO ECN	13641	4/26/16	EJD



MAXIMUM CHARACTERISTICS

APPLICATION:

FOR TWO WAY RADIO AND SCADA APPLICATIONS
NON-WEATHERIZED, BULKHEAD MOUNT

SURGE:

20kA IEC 61000-4-5 8/20μs WAVEFORM MULTIPLE

TURN-ON:

600Vdc ±20%

TURN-ON TIME:

2.5ns for 2kV/ns

FREQUENCY RANGE:

10MHz to 1GHz

VSWR:

≤ 1.1 to 1 OVER FREQUENCY RANGE

INSERTION LOSS:

≤ 0.1dB OVER FREQUENCY RANGE

MAX POWER:

1.5kW @ 10 to 50MHz

375W @ 50 to 220MHz

125W @ 220 to 700MHz

50W @ 700 to 1000MHz

THROUGHPUT ENERGY:

≤ 3.5mJ @ 3kA 8/20μs WAVEFORM

TEMPERATURE:

STORAGE: -55°C to +85°C

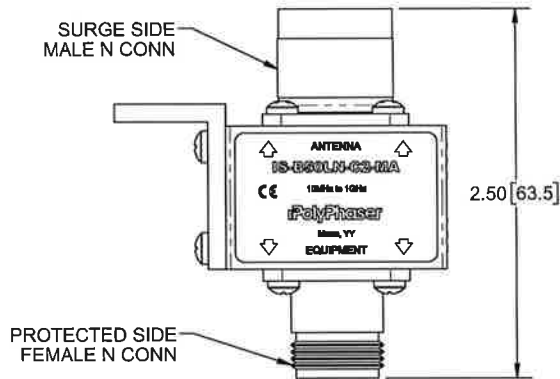
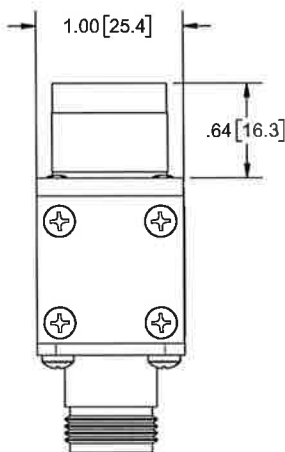
OPERATING: -50°C to +50°C

VIBRATION:

1G up to 100Hz

CE COMPLIANT

RoHS COMPLIANT



CUSTOMER APPROVAL: _____ DATE: _____

ALL DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.

<small>UNLESS OTHERWISE SPECIFIED: LEADING DIMENSIONS ARE IN INCHES DIMENSIONS IN [] ARE MILLIMETERS</small> <small>TOLERANCES: FRACTIONS ± 1/32 .XXX ± .03 ANGLES ± 1° .XXX ± .010</small> <small>NOTICE: THE INFORMATION AND DESIGN IN THIS DOCUMENT IS THE PROPERTY OF POLYPHASER CORPORATION. ALL RIGHTS RESERVED.</small> <small>THIRD-ANGLE PROJECTION</small>	DRAWN	C.G.	DATE	2/20/06		SHEET	1	OF	1
	ENG APPD	PA	DATE	2/20/06		SCALE	1:1		
	PRODUCT MGR	TK	DATE	2/20/06		BROADBAND 10MHz TO 1GHz N FEM BLKH <small>CUSTOMER SPECIFICATION</small>			
	MARKETING APPD	RM	DATE	2/20/06					
PROJECT NO.		DOCUMENT NAME		SIZE	CAGE	PROD CAT	PART NUMBER	REV	
		IS-B50LN-C2-MAC		A	30992	RFP	IS-B50LN-C2-MA	K	

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Double Click-on Hanger for 1/2 in coaxial cable

Product Classification

Product Type Hanger kit

Dimensions

Nominal Size	1/2 in
Compatible Diameter, maximum	16.256 mm 0.640 in
Compatible Diameter, minimum	15.240 mm 0.600 in
Height	51.00 mm 2.01 in
Length	89.00 mm 3.50 in
Width	45.00 mm 1.77 in

Electrical Specifications

DTF Effect	0.1 dB
Return Loss Effect	0.1 dB

Environmental Specifications

Operating Temperature -40 °C to +85 °C (-40 °F to +185 °F)

General Specifications

Hanger Type	Click-on hanger
Cables per Hanger	2
Color	Black
Material Type	Engineered plastic
Maximum Stack Height	3
Ordering Note	CommScope® standard product in the United States and Canada
Package Quantity	10

Mechanical Specifications

Mounting	Mounting hole clearance for 3/8, 16 UNC or M10 threaded rod
UV Resistance, minimum with no degradation	=100 hours exposure in accelerated UV life chamber
Vibration Survival	=4 hours at resonant frequency



SKU: 207567

3/8-16 S.S. Nuts

3/8-16 S.S. Nuts

Technical Specs

Thread Size	3/8-16
Steel Grade	0
Fastener Material	Stainless Steel
Nut Type	Hex
Manufacturer	Uneda Bolt
Qty/ Uom	50 Pack
Inside Diameter	3/8 in
Description	Hex Nuts



SKU: 265322

Hex head cap screw 3/8-16 thread x 3/4" L SS

HARGER CS66S-100 Hex head cap screw 3/8-16 thread x 3/4" L Stainless steel

Technical Specs

Manufacturer	Harger
Item Length	3/4 in
Fastener Material	Stainless Steel
Description	Hex head cap screw 3/8-16 thread x 3/4" L Stainless steel
Thread Size	3/8-16
Color	Silver
Screw Type	Hex Head Cap
Qty/ Uom	100 Pack



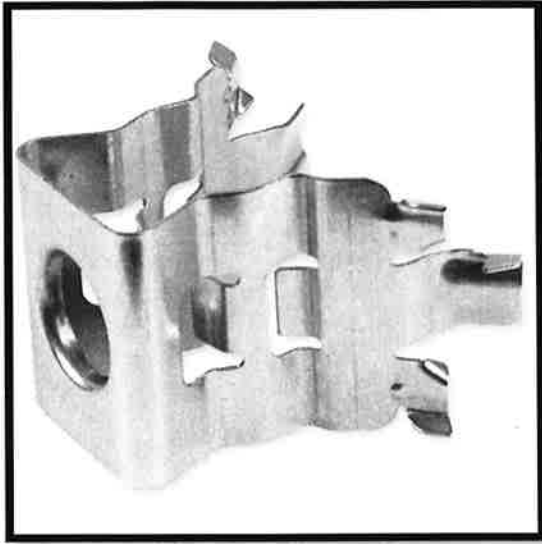
SKU: 508755 (253900)

3/8" 18-8 Stainless Steel Medium Split Lock Washer

UNEEDA BOLT 3/8" 18-8 Stainless Steel Medium Split Lock Washer, 100 Pack

Technical Specs

Fastener Material	stainless Steel
Washer Type	Split Lock
Inside Diameter	3/8 in
Manufacturer	Uneeda Bolt
Qty/ Uom	100 Pack



SKU: 484188

SnapStak Stackable Hangers, (1/2")

ANDREW "SNAPSTAK" Snap-in hangers for 1/2" corrugated cable. The hanger installs in 3/4" holes in support structures. Stainless steel construction

Technical Specs

Cable Compatibility	1/2 in
Hole Size	3/4 in
Hanger Type	Snap-In
Description	For 1/2" cable.
Qty/ Uom	10 Pack
Manufacturer	CommScope



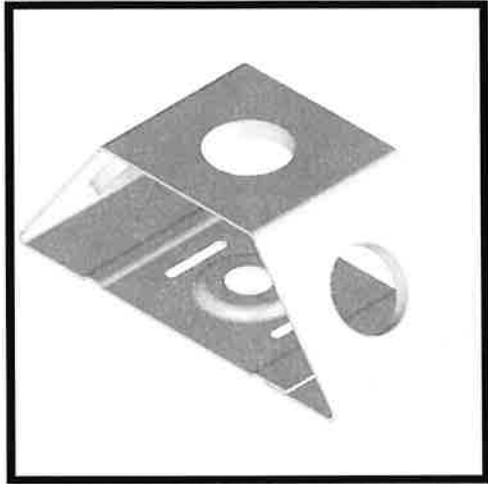
SKU: 506097

Channel Nut Hardware

FASTENAL 3/8"-16 Grade 316 Stainless Steel Channel Nut with Regular Spring for 1-3/8" and 1-5/8" Channel..

Technical Specs

Fastener Material	Stainless Steel
Manufacturer	Fastenal
Nut Type	Channel
Description	3/8"-16 Grade 316 Stainless Steel Channel Nut with Regular Spring for 1-3/8" and 1-5/8" Channel.
Qty/ Uom	1 Each
Thread Size	3/8-16



SKU: 204353

3-Way Standoff Adapter

10pk 3-way standoff Adapter.

Technical Specs

Round member diameter range	0-8 in
Kit	No
Threaded hole size	3/4 in
Item Width	2-1/2 in
Qty/ Uom	10 Pk
Tape Material	Butyl Rubber
Manufacturer	Sabre Site Solutions
Description	3-way standoff adapter



SKU: 488136

Connector/Splice Weatherproofing Kit

COMMScope Connector/Splice Weather- Proofing Kit. (6) rolls of 2-1/2"x24" butyl tape. (2) rolls of 3/4"x66' black electric tape, and (1) roll 2"x20' black electric tape

Technical Specs

temperature (Continuous/Intermittent)	up to 220 deg. F
Item Length	24 in
Color	Black
Item Width	2-1/2 in
Qty/ Uom	1 Each
Tape Material	Butyl Rubber
Thickness	7 mil
Manufacturer	CommScope
Description	Connector/Splice Weather- Proofing Kit. (6) rolls of 2-1/2"x24" butyl tape. (2) rolls of 3/4"x66' black electric tape, and (1) roll 2"x20' black electric tape

Model 250

Tone Remote Adapter

Features

- Exceptional audio quality
- Decodes all 15 industry standard function tone sequences
- Seven installer-selectable guard tone frequencies for compatibility with a wide range of applications
- BCD, "One-Of-N" and binary channel select
- Up to six control outputs; two relays
- Automatic line loss compensation
- Latched and momentary functions
- Two and four wire tone remote interface
- Control functions: PTT, Monitor, channel select, PL select, PL Strip, Wildcard
- Rugged metal enclosure, 19" rack mount option available
- 14 pre-set radio interface configurations to choose from - covers most popular applications
- Test modes facilitate setup and adjustment
- Pre-wired cables are available for popular radios
- Easy configuration setup from front panel dip switches
- Line integrity function



Tone Remote Control Summary

Tone remote equipment uses the Tone Remote Control (TRC) Protocol to send control information to the Model 250. The Model 250 in turn translates the tone remote commands into base station radio control.

Each tone remote command from a dispatch console or "radio remote" consists of a high level guard tone followed by a function tone and an optional holding tone that remains present as long as the transmitter is keyed. If the command is not intended to key the transmitter then the holding tone is omitted.

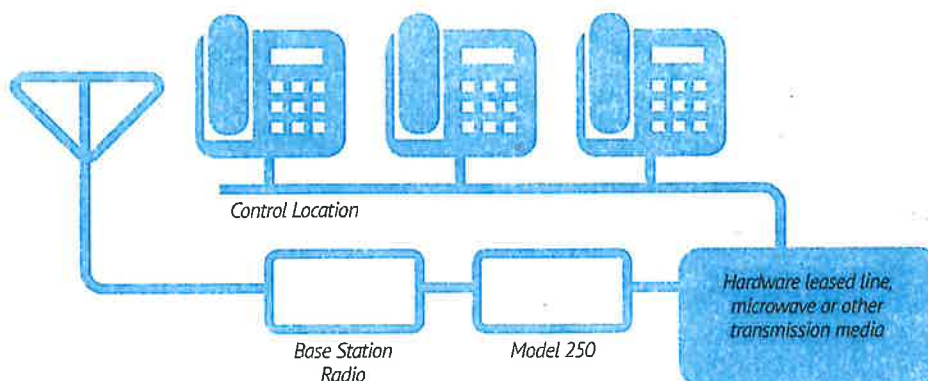
Due to its state-of-the-art DSP design, the Model 250 can accept a wide variation in TRC levels. Often, when multiple remotes are wired in parallel at varying distances, or when remotes from different manufacturers are connected, the signal levels from each remote will be quite different. The Model 250 has been designed to handle this situation with ease, amplifying audio from each remote as it connects and delivering the audio to the radio at the correct level.

Introduction

The Model 250 is a tone termination panel that includes features typically only found in high-end remote control stations.

It provides a means of connecting a base station radio to industry standard tone remote encoders, such as Zetron's radio remotes and dispatch consoles. The Model 250 Tone Remote Adapter connects to an audio circuit or leased line from the tone remote and to the unique interface of the base station radio.

The Model 250 includes integrated setup utilities that reduce the need for service equipment. Designed for fast installation and easy setup, it can be configured in the field without tools.





TELEX
Radio Dispatch

WORKS FOR YOU

IP-224 is the next generation of IP radio gateway to form the heart of the Telex Radio Dispatch System.

Based upon the Linux operating system, the IP-224 provides an extremely reliable means of remote-controlling two audio devices. The IP-224 can be easily configured to work with both digital and analog consoles, and it performs a wide variety of other tasks related to using radios on a digital network, including state-of-the-art system diagnostics.

PRODUCT INFORMATION

Base Hardware

- F.OIU.306.547** IP-224 Radio Gateway (includes MDC and Fleetsync)
- F.OIU.347.907** IP-224 Radio Gateway Advanced Options NA
- F.OIU.347.906** IP-224 Radio Gateway Advanced Options Export

Software Options

- F.OIU.343.869** IP-224 Field Code Advanced Options NA
- F.OIU.343.868** IP-224 Field Code Advanced Options Export

Bosch Security Systems, Inc.
Telex Dispatch Products
12000 Portland Avenue South
Burnsville, MN 55337
Ph: 1-800-898-6723
dispatch@us.bosch.com

Accessories

- F.OIU.319.163** IP-224 to Hytera DMR interface cable
- F.OIU.165.536** IP-224 mounting brackets (dual)
- F.OIU.165.539** IP-224 mounting brackets (single)
- F.OIU.165.540** IP-224 cable - Kenwood TK-X150/X180, 5X10 and NXDN radios
- F.OIU.165.541** IP-224 cable - Kenwood TK-X90 radio
- F.OIU.165.544** IP-224 DB-37 cable assembly to 4-Wire tone cable
- F.OIU.165.545** IP-224 Motorola CDM/PRO cable interface
- F.OIU.165.548** IP-224 EFJ 5300 radio interface (cable only)
- F.OIU.165.554** IP-224 MTRBI radio interface (includes cables)
- F.OIU.165.542** IP-224 to Sepura interface cable
- F.OIU.306.539** IP-224 to Hytera Tetra interface cable
- F.OIU.306.540** IP-224 to PowerTrunk TETRA interface cable
- F.OIU.306.543** IP-224 to Icom IDAS and DMR interface cable
- F.OIU.306.546** IP-224 to ICOM IDAS interface cable
- F.OIU.306.549** IP-224 to NOTOTREO interface cable
- F.OIU.317.426** Alignment handset

IP-224 IP RADIO GATEWAY



www.airradio.com | sales@airradio.com

www.airradio.com | sales@airradio.com

IP-224 IP Radio Gateway

The IP-224's sleek design combines form with function, allowing easy installation, operation, and servicing. The unit may be rack-mounted or placed directly on a desktop, and it is equipped with an LCD display to clearly provide user feedback when programming. VU meters are also provided via the display for alignment purposes. All other configurations are completed in the web browser configuration windows.

The IP-224 is backward compatible, allowing the use of IP-224 and IP-223 adapters in the same system. This will allow a migration to the new products when desired.



FEATURES:

PTT (Push-To-Talk), monitor, and F1 and F2 relays (programmable to any function tone or revert to F1)	Secure remote web-browser-based programming and configuration
Eight digital outputs for channel selection, completely programmable per function tone	Nine selectable PTT frequencies
CTCSS (Continuous Tone Coded Squelch System) generation (64 frequencies)	Software gain control
Local handset port for monitoring activity and transmission back to base or to radio, uses optional AHS-I alignment handset	Menu-driven front panel controls for TX, RX, spare audio, IP addressing, and CTCSS
ANI (Automatic Number Identification) over-the-air-protocol decode and display	Supports USB, RS485, CAN-bus, RS232, and TTL
RX AGC (Automatic Gain Control)	Single- or dual-function tone generation
RX (Receive) audio squelch	Backwards compatible with Telex Radio Dispatch equipment
SoIP (Serial-over-Internet Protocol)	Number of channels or talk groups up to 1000
Crosspatch mode, console mode, redundant ethernet	Four PTT modes and three monitor modes
Guard tone user-selectable for 2100 Hz, 2175 Hz, 2300 Hz, 2325 Hz, 2400 Hz, 2600 Hz, 2800 Hz, 2850 Hz, or 2900 Hz	SNMP
MDC-1200 and Fleetsync encode and decode	Generic API Available

Advanced Interface Option:

- P25 (Kenwood/Tait)
- Kenwood NEXEDGE[®]
- Icom IDAS[™]
- TETRA (Hytera/PowerTrunk/Sepura)
- Sprint Direct Connect
- MOTOTRBO[™]
- (This feature is only available for North America)
- E.F. Johnson RS5300 P25 radio interface
- DMR (Tait/Hytera)
- IDEN Interface

Available Accessories:

- Single or dual rack mounts
- AHS-I handset
- Radio interface cables, please see backside for list



American International Radio, Inc. (AIR)

www.airradio.com
sales@airradio.com

IP-224 Specifications

Power Requirements	+11 VDC to +16 VDC, 600 mA maximum
Ethernet Speed	10 BaseT or 100 BaseTX
Flash Memory	128 MB
SDRAM Memory	128 MB
Lease Line	2-Wire and 4-Wire supported
Radio Interface	345 VDC withstand rating
Hum and Noise	60 dB below rated output for each line
Non-Relay Outputs	Open collector, active low, 200 mA maximum, 40 V collector to emitter voltage
Radio Input Level	10 mVp-p to 10 Vp-p, adjustable
Line Output Level	10 mVp-p to 10Vp-p, adjustable (Single-Ended)/20 mVp-p to 40 Vp-p, adjustable (Balanced)
Tone Frequencies	Single or dual function tone generation
Function Tone Range	0-3200 Hz, adjustable in 1 Hz increments
Total Tone Duration	0-999 ms
Tone Magnitude	-60 dB to +12 dB
Vocoder	ADPCM 32/16 Kbits, 50 Kbits simplex (active channel) or 34 Kbits respectively, G.711 64Kbit at 82Kbit
Relay Contact Ratings	1A at 63V AC/DC
Digital I/O Ratings	Pull up/pull down/float 3.3 VDC/5 VDC/12 V 10K Ohm Pull up
Transmit Output Impedance	600 Ohms for balanced mode, 200 Ohms for single-ended mode
Receive Input Impedance	10/600/10 K Ohms (User-selectable)
Audio Distortion	2% THD maximum
Audio Frequency Response	300 Hz to 3000 Hz +1, -3 dB less than 3% distortion
LAM Sensitivity	-50 dB to +10 dB
COR Sensitivity	User selectable rising or falling edge from radio
DTMF Detection Bandwidth	325 Hz around center of frequency
Monitor Timer	10 ms to 9999 ms, adjustable
Control Type	32-bit Digital Media Processor
Electro Static Discharge Immunity	8 kV on all exposed operator control areas. At 8 kV no operation is disturbed. At 8 kV no permanent damage.
Line Protection	Fast-acting solid state surge protection
Memory Protection	Settings preserved in non-volatile memory
Level Controls	Menu driven front panel controls for TX, RX, spare audio and CTCSS
Operating Temperature Range	0° to 50° C (32° to 122° F) for full specifications
Storage Temperature Range	-30° to 65° C (-22° to 149° F) for full specifications
Dimensions (H x D x W)	1.625" x 11.5" x 8.5" (41.3 x 292.1 x 215.9 mm)
Actual Weight	4.125 lb (1.9 kg)
Shipping Weight and Dimensions (H x D x W)	7 lb (3.18 kg), 5" x 15" x 16" (127 x 381 x 406.4 mm)

