



Innovative Brands - Connectivity Solutions Delivered



LAND



AIR



SEA



SPACE



About Us

Innovative Brands – Connectivity Solutions Delivered



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Proudly Supporting the Aerospace & Defense Industry



The Marmon Group
A Berkshire Hathaway Company



BERKSHIRE
HATHAWAY



About Us

Innovative Brands – Connectivity Solutions Delivered





What We Do

Innovative Brands – Connectivity Solutions Delivered

Component Design



Mil-Spec W&C



Custom Cable



Coil Cords



Connectors Assembly



Cable Assembly



Kitting Integration



Marmon Aerospace & Defense is the only company 100% Department of Defense focused, that designs and manufactures mission critical Power, Instrumentation, Control, Communication, and Data wire & cable. Our breadth of mil-spec qualifications, material science, subject matter experts, and process capability are unmatched in the Defense market allowing us to deliver custom solutions in ½ the time of our competitors.

Training



Installation



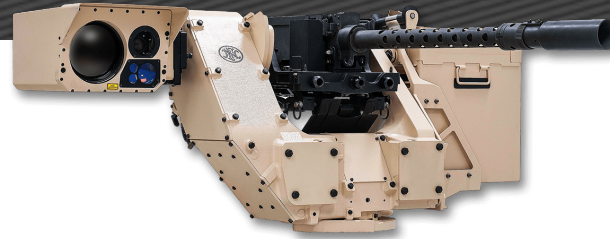


Markets

Innovative Brands – Connectivity Solutions Delivered



Aerospace & Missile



Weapons System



Ground & Radar



Soldier-Worn



Satellite & Space Vehicle



Shipboard



Testing

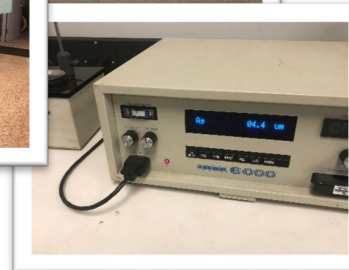
Innovative Brands – Connectivity Solutions Delivered

Compounds Laboratory & Manufacturers

- Gendon Polymer Services
- Banburys, Twinscrews, Buss
- Small and large scale compounding
- Analytical Lab DSC
- Oxygen Index

Materials & Flame Testing

- Smoke Chamber
- Toxicity Chamber
- Acid Gas
- Weathering
- Flame Tests FT1, FAR25, UL1685



Electrical Testing

- Coax and Category cables to 20 GHz

Cable Testing

- Heat Ageing (Up to 500°C)
- Cold Temp flex (down to -75°C)
- Immersion
- Fluoride content
- Water-Pressure up to 1500 PSI
- Kocour (Conductor Plating)
- Instron Physicals

Fiber Optic Laboratories

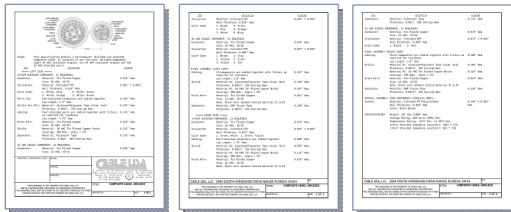
- FO Cable – Manchester, NH
- FO Cable Assembly – Virginia Beach, VA



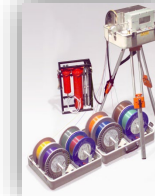
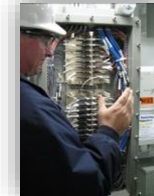
Services

Innovative Brands – Connectivity Solutions Delivered

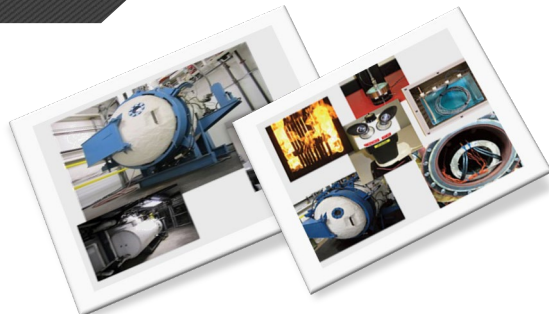
Engineering & Design Support



Installation & Field Services



Innovation & Technology, Testing



Interactive NAVSEA Certified Training





Products

Innovative Brands – Connectivity Solutions Delivered

Mil-Spec Wire, Cable, & Fiber Optics



Custom Cable & Coil Cords



Cable Assembly



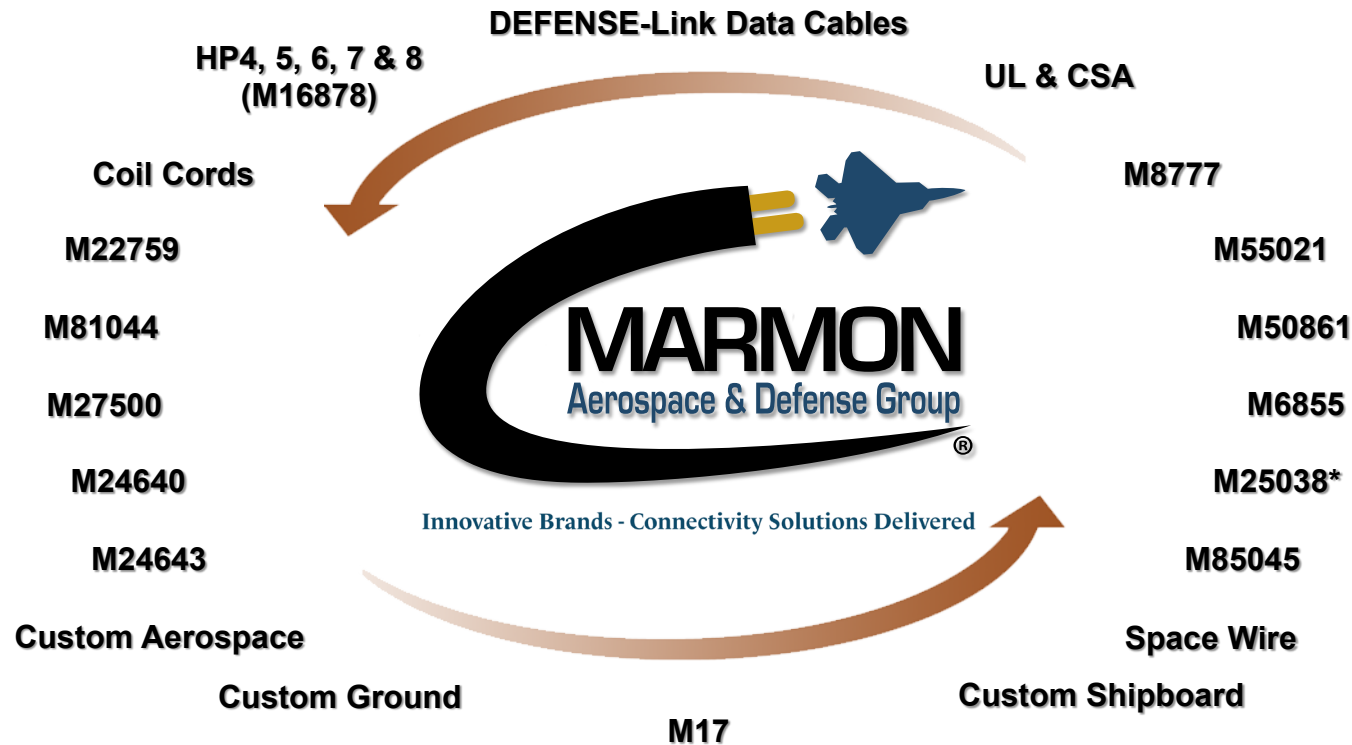
Installation, Test, & Sustainment Kits





Wire & Cable

Innovative Brands – Connectivity Solutions Delivered



Market Coverage Like None Other



Materials

Innovative Brands – Connectivity Solutions Delivered

Conductors

Size: 1000MCM - #40

Material: BC, TPC, NPC, SPC,
Specialty Alloys, Thermocouple,
Precious Metals, Optical Fibers

Polymers & Compounds

Insulation: PVC, PE (Polyethylene), Foam PE
TPE (Thermoplastic elastomer) PP (Polypropylene)
XLPVC, XLPE, XLPO, EPR (Ethylene Prop Rubber)
LS Zero Hal, ETFE, XLETFE, Silicone, FEP, PFA

Jacket: XLPolyo, TPE, Cablethane TPU (Urethane),
PES (Hytrel™) CPE, Hypalon, AD25 (DR25 Alt.)
EPDM (Ethylene Prop Monomer), LS Zero Hal
Neoprene (Polychloroprene), ETFE, XLETFE
Silicone, FEP, PFA, and many proprietary blends

Shielding / Options

EMP Hardened EMZ®

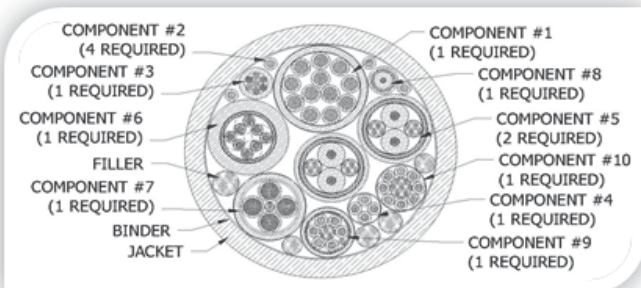
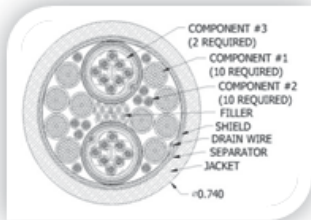
Metal Braid
Metal Serves
Flat Shields
Tape Shields
Textile Braids
Water-Blocking



Custom Cable

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Marmon Aerospace & Defense Group offers **custom engineered cable, coaxial, and coil cord** design & manufacturing. If standard, off-the-shelf cable doesn't fit your application, we can design and manufacture a cable or cord to your application's exact specifications. We specialize in **composite** constructions; any variety of components under a single jacket.



Custom Cable
100(+) component counts
PWR + Data Hybrids
Fiber Optic + Copper Hybrids
Future Proof
Enhanced Flex-Life
Exacting Weights and Dimensions





Custom Design

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Below: Example of custom design specification

ITEM	DESCRIPTION	QUANTITY	UNIT
3000*	30 AWG SINGLE COMPONENT, 10 REQUIRED Material: Extruded FEP Shield: 20 AWG, 20/18 Color Code: 1. Black 4. Green 2. Red 8. Orange 3. White 6. Blue	0.833'	ft
30 AWG SINGLE COMPONENT, 10 REQUIRED	Material: Tin Plated Copper Shield: 20 AWG, 20/18 Color Code: 1. Brown 4. Green 2. Yellow 5. Clear 3. Violet 6. Tan	0.833'	ft
30 AWG SINGLE COMPONENT, 10 REQUIRED	Material: Tin Plated Copper Shield: 20 AWG, 20/18 Color Code: 1. Brown 4. Green 2. Yellow 5. Clear 3. Violet 6. Tan	0.833'	ft
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End-to-End Support:

We have partnered with industry leading connector and assembly-houses to offer our customers 'turn-key' designs & product support that we cannot support in-house. We distance the competition by designing cables that meet and exceed application requirements while working within the tolerances of the accessories used on each end.



Key Products

Innovative Brands – Connectivity Solutions Delivered

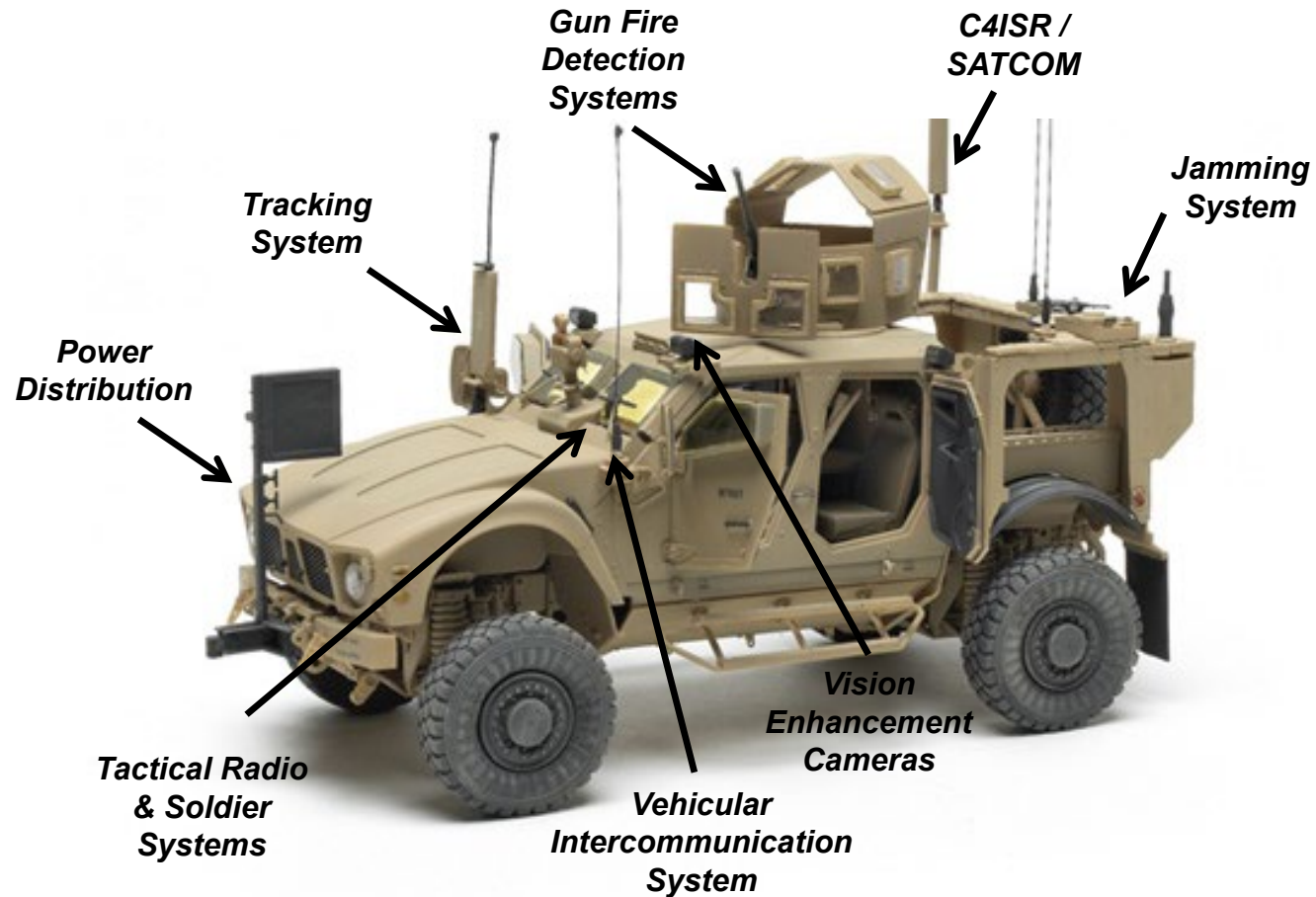


Ground Vehicle



Key Products

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Key Products

Innovative Brands – Connectivity Solutions Delivered



DEFENSE-Link® Copper Data Series

Connecting the Warfighter

High Performance Ethernet

- CAT 5e
- CAT 6
- CAT 6a
- Data Quad

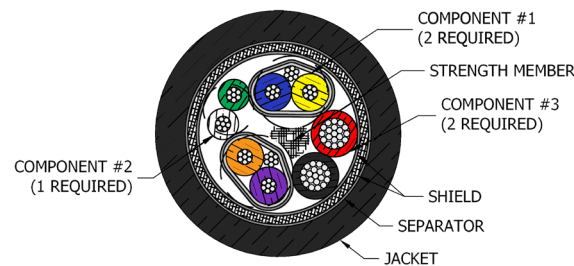
Universal Serial Bus (USB)

- USB 2.0
- USB 2.0 OTG
- USB 3.1A

CAN Bus

Databus

- Twinax MIL-STD-1553B



First Ruggedized USB 3.1A Cable

E-LINK® THE WARFIGHTER

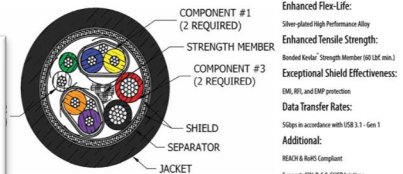
DEFENSE-Link® 3.1

Ruggedized USB 3.1

Rugged Data Cables for Defense Applications

PRODUCT ATTRIBUTES
DEFENSE-Link® 3.1 delivers the required performance boosts for USB storage, Display, and Docking applications. It enables users to move content across devices with bi-directional data flows without compatibility issues. DEFENSE-Link® 3.1 is

DESIGN FEATURES
Cablethane® Jacket Technology:
Flame Retardant (FR)
Cush, Cut, and Squeeze Resistant
NSC Compliant
Enhanced Flex-Life:
Shore-glass High Performance Alloy
Enhanced Tensile Strength:
Banded Kevlar® Strength Member (500 Lbf. min.)
Exceptional Shield Effectiveness:
EMI, RFI, and EMP protection
Data Transfer Rates:
50Mbps in accordance with USB 3.1 - Gen 1
Additional:
REACH & RoHS Compliant
Supports SMD-C & CGR Initiatives
Supports Injection Overmold Assembly Process
-55°C min to +50°C (Operating Temperature)
-57°C min to 105°C (Storage Temperature)



Properties altered to illustrate design detail

DEFENSE-LINK® CONNECTING THE WARFIGHTER

DEFENSE-Link® 2.0

Rugged USB

Ruggedized Data Cables for Defense Applications

PRODUCT ATTRIBUTES
USB 2.0 remains a popular protocol on many systems. Combat environments can damage or destroy the sensitive construction of commercial USB cables. Designed for the harsh condition of a battlefield DEFENSE-Link® 2.0 allows users to easily replace COTS USB cable with a proven ruggedized option. Also, available in the OTG configuration with the added benefit of a sense line.

DESIGN FEATURES
Cablethane® Jacket Technology:
Flame Retardant (FR)
Cush, Cut, and Squeeze Resistant
NSC Compliant
Enhanced Tensile Strength:
Banded Kevlar® Strength Member (500 Lbf. min.)
Exceptional Shield Effectiveness:
EMI, RFI, and EMP protection
Data Transfer Rates:
Up to 480 Mbps in accordance with standard
Additional:
REACH & RoHS Compliant
Supports SMD-C & CGR Initiatives
Supports Injection Overmold Assembly Process
-55°C min to +50°C (Operating Temperature)
-57°C min to 105°C (Storage Temperature)

Part Number	Conductor (AWG) Data 1 Power	EMI/RFI Protection	Nom. OD (Inches)	Wgt. (lbs./1000')	Print Legend
DL-USB2-D-28-28	28 2/C 28	Yes	.160"	17.6	"DEFENSE-LINK" DL-USB2-D-28-28 67050'
DL-USB2-D-28-28-01	28 3/C 28	Yes	.170"	19.8	"DEFENSE-LINK" DL-USB2-D-28-28-01 67050'

Typical Electrical Properties: DL-USB2-D-28-28				
Component #1:	Impedance	90Ω ± 15%	Attenuation (dB/cable)	4.0 MHz: 0.39
	Delay	26ns Max.		8.0 MHz: 0.57
	Skew	100 ps/cable		12.0 MHz: 0.67
				24.0 MHz: 0.95
				48.0 MHz: 1.35
				96.0 MHz: 1.90
				200.0 MHz: 3.20
				400.0 MHz: 5.80

Part Number	EMI/RFI Protection	Nom. OD (Inches)	Wgt. (lbs./1000')	Print Legend
24	Yes	.190"	24.5	"DEFENSE-LINK" DL-USB3-1A-30-24 67050'
24	Yes	.206"	30	"DEFENSE-LINK" DL-USB3-1A-28-24 67050'
26	Yes	.235"	39	"DEFENSE-LINK" DL-USB3-1A-26-26 67050'

USB3-1A-30-24			
90Ω ± 7Ω	Component #2:	Impedance	90Ω ± 15%
15 ps/m Nom.		Delay	26ns Max.
		Skew	100 ps/cable
0.625 GHz: 1.3 1.25 GHz: 1.9 2.50 GHz: 3.0 5.0 GHz: 4.6 7.50 GHz: 5.9		Attenuation (dB/cable)	4.0 MHz: 0.39
			8.0 MHz: 0.57
			12.0 MHz: 0.67
			24.0 MHz: 0.95
			48.0 MHz: 1.35
			96.0 MHz: 1.90
			200.0 MHz: 3.20
			400.0 MHz: 5.80



Key Products

Innovative Brands – Connectivity Solutions Delivered



Cablethane® Retractable Coil Cords

Product Features:

- Monaural and Binaural Headset Support
- Coil Body lengths available from 1” to 72”
- Enhanced Flex-life
- Tangent or Axial Tails
- Tangle Elimination
- Available with EMI / RFI / EMP protection
- Nuclear, Biological, and Chemical (NBC) Compliant
- Excellent “Snap-back” characteristics
- Designs can support high speed data transmission
- COMING SOON Cableprene® Retractable Coil Cords

Typical Applications:

- Handset and Headset
- Communication Systems
- Loudspeaker
- Data Transmission
- Telescoping Mast
- Portable Power
- Lighting
- Radar
- Robotic





Key Products

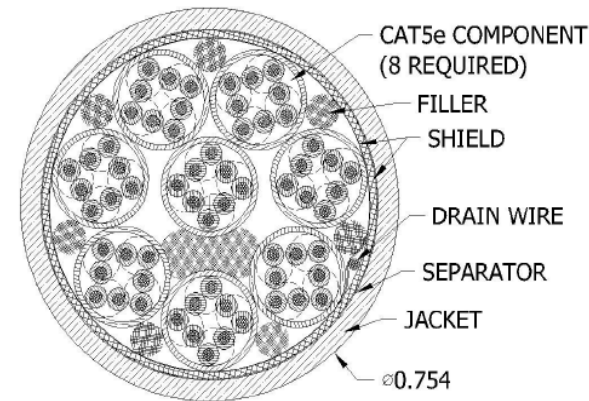
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Custom Composite Cables

Features:

- Consolidation of various media under one jacket
- SWaP-C focused designs
- WIN-T Proven products
- Supports C4 & C5ISR
- Ruggedized against EMI / RFI
- Surprenant EMZ[®] options available for +80dB EMP protection
- Various jacketing techniques to accommodate assembly method





Key Products

Innovative Brands – Connectivity Solutions Delivered



Missile Cable

- MIS20054 Cables with various constructions
- MIS20076 Cables, overall Shield and Jacket
- MIS20147 Singles 28 – 12 AWG
- MIS20148 Cable 28 – 16 AWG Spiral Shield and Jacketed
- MIS20185 Singles 26 - 12 AWG
- MIS20186 Cables with various constructions





Key Products

Innovative Brands – Connectivity Solutions Delivered



SurpreFlex® Power Distribution

Features:

- 3KV – 3.5KV, up to 260 °C (12awg – 450MCM)
- Flexibility: ‘Surpre’
- Fluid Immersion: In accordance to MIL-STD-810H
- Adhesion: Compatible with adhesives per MIL-A-46146, Group 1 or 2, Type 1
- Designed specifically for the Armored Vehicle Market



MILITARY GROUND

SurpreFlex™ Ultra-Flexible Power Distribution

AD961 Series

Conductor
Tin or Nickel plated copper
(high-strand count)

Insulation
Extruded Ultra-Flexible Polyisocane Rubber

APPLICATION
SurpreFlex™ cables are designed specifically for Armored Vehicle applications where ultra-flexibility, cold weather durability, and chemical resistance are required.

CONDUCTOR
Soft annealed Tin or Nickel plated copper, high strand count as listed in the below table.

INSULATION
Extruded Ultra-Flexible Polyisocane Rubber

TYPICAL PROPERTIES
Blocking: 20°C
Heat Aging: 200°C for 7 hours
Cold Bend: 0°C
Tensile Strength: 1000 psi min
Covering Thickness: 300% min
Flammability: 20 (max 3" flame), No flaming of outer jacket
Fluid Immersion: In accordance to MIL-STD-810H
Adhesives: Compatible with adhesives per MIL-A-46146, Group 1 or 2, Type 1
Halogen Content: Halogen free
Shrinkage: 1.5% max at 200°C
Simulate: 30°C
RoHS Compliant: Yes

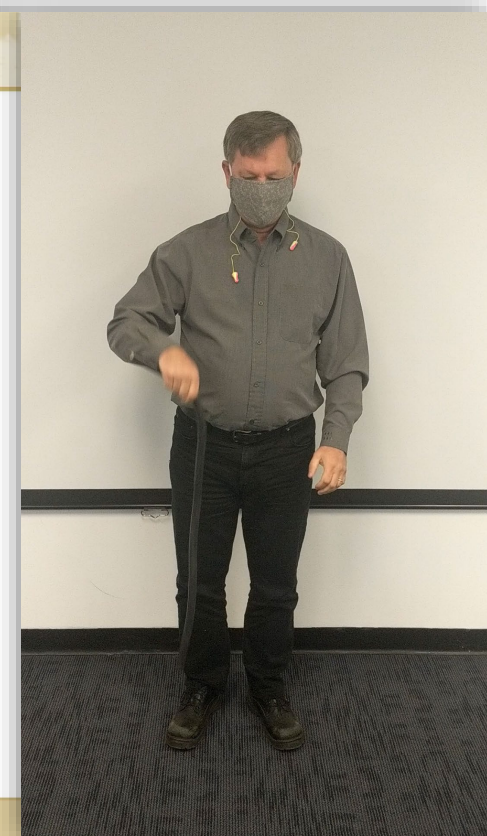
AD961-2 SurpreFlex .093" nom. wall, 5000VAC										AC961-2			Y			D			-10					
Base Number										AD961-2			AC961-2			Y			D			-10		
Plating										T - Tin Plated (150°C) N - Nickel Plated (200°C)			T - Tin Plated (150°C) N - Nickel Plated (200°C)			T - Tin Plated (150°C) N - Nickel Plated (200°C)			T - Tin Plated (150°C) N - Nickel Plated (200°C)			T - Tin Plated (150°C) N - Nickel Plated (200°C)		
AWG Size										D, E, F, G, H, L, K, L (See Table I)			A, B, C, D, E, G (See Table II)			A, B, C, D, E, G (See Table II)			A, B, C, D, E, G (See Table II)			A, B, C, D, E, G (See Table II)		
Color										See Table II			See Table II			See Table II			See Table II			See Table II		

Code	AWG Size	Strand Count	Conductor Diameter @ 20°C (Ø) [mm]	Resistance @ 20°C (R) [mΩ/1000ft]	Ampacity (AMPS) @ 60°C (A) [A]	Cable Weight (W) [1000ft/305m]	Cable Diameter (D) [mm]
A	12	259	.287	1.86	68	78	36
B	10	413	.325	1.17	136	90	42
C	8	665	.360	.725	219	124	48
D	6	1045	.410	.460	355	205	54
E	4	1666	.460	.300	540	278	60
F	3	2646	.510	.190	865	351	66
G	1/0	4214	.560	.119	1319	532	72
H	2/0	6292	.610	.074	1991	600	78
I	3/0	8784	.660	.047	2940	690	84
J	4/0	12312	.710	.030	4290	775	90
K	250 MCM	19175	.760	.018	6510	860	96
L	450 MCM	27955	.810	.010	9510	950	102

Code	Color
0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Grey
9	White

NOTES:
 1. Bend Radius is 3x outer diameter
 2. Cable will be marked with "Marmor Aerospace & Defense", AWG Size, Part Number, CMG Code #1133
 3. AD961-4 offering smaller AWG sizes at 1000VAC, available upon request.

Tel: 866.303.9473 / www.marmor-ad.com





Key Products

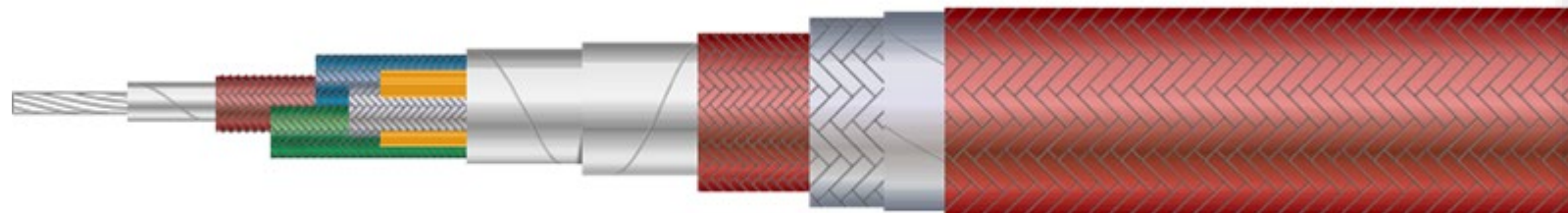
Innovative Brands – Connectivity Solutions Delivered



FG2000® Extreme Temperature

Features:

- 450°C UL Listed / 538°C non-UL
- Built-in Fluid Barrier
- Flexible to -160°F
- Excellent in Ignition, Launch, and Missile Defeat & Defense where extreme heat is a critical risk



MILITARY GROUND

FG2000®

High Temperature, 600V, 538°C

DESIGNED TO TAKE THE HEAT

APPLICATION
Control, Power, Signal cable where exposure to fire & extreme heat is a critical risk.

- Ignition
- Missile Defense
- Launch

ATTRIBUTES

- UL Listed 450°C
- Non-UL 538°C
- ETL Verified 3000°F (30-minutes)
- Built-in Fluid Barrier
- Flexible to -160°F
- Resistant to Moisture, Acids, Fuel, Impact

CONDUCTOR
27% nickel-clad copper per ASTM B355

INSULATION
Premium-grade Mica Tape

CONSTRUCTION
Cabled with inert, FR fillers, double-wrapped Mica, Fused Moisture Barrier, Impregnated Glass Braid covering

JACKET
Impregnated Glass Braid

OPTIONS
Electrical Shielding:
• Nickel-coated copper braid overall, over pairs or triads
Armoring:
• Stainless Steel Braid

Part Number	AWG Size	No. of Conductors	Nom. OD (inches)	Weight (lbs./1000')
492202C6	22	2	.250"	32
492204C6	22	4	.295"	52
492206C6	22	6	.355"	79
492002C6	20	2	.270"	40
492004C6	20	4	.315"	65
492006C6	20	6	.375"	93
491803C6	18	3	.316"	68
491804C6	18	4	.335"	74
491601C6	16	1	.170"	24
491602C6	16	2	.312"	56
491603C6	16	3	.332"	81
491401C6	14	1	.190"	30
491201C6	12	1	.208"	42
491001C6	10	1	.255"	63
490801C6	8	1	.285"	84
490601C6	6	1	.328"	122

The above part numbers represent the more popular constructions. However, other designs are available upon request. All products are manufactured to meet RoHS compliance. For exceptions, please contact our sales department.



Key Products

Innovative Brands – Connectivity Solutions Delivered



Hook-up & Power Cable :

- AD1044ZH™ Hook-up wire
(22-10awg)
- Surprenant® HTZR – XPO/XPO
Zero Halogen, 135°C High flexibility
- Surprenant® HTXE – XPO/XPO
125°C Standard flexibility
(US Army Specification 12293251)
- Surprenant® HTNR – XPO/N
125°C Highly flexible
(US Army Specification 10626721)

Other Available Products:

- RS-232
- RS-422
- RG & M-17 Equivalents
- Power Over Ethernet (PoE)
- M22759/16, 17, 18, 19
- M27500 TE, TF, TG, TH
- UL DP-1P
- Xtra-Guard 1, 2, 3, 4, & 5 Equivalents



Key Products

Innovative Brands – Connectivity Solutions Delivered

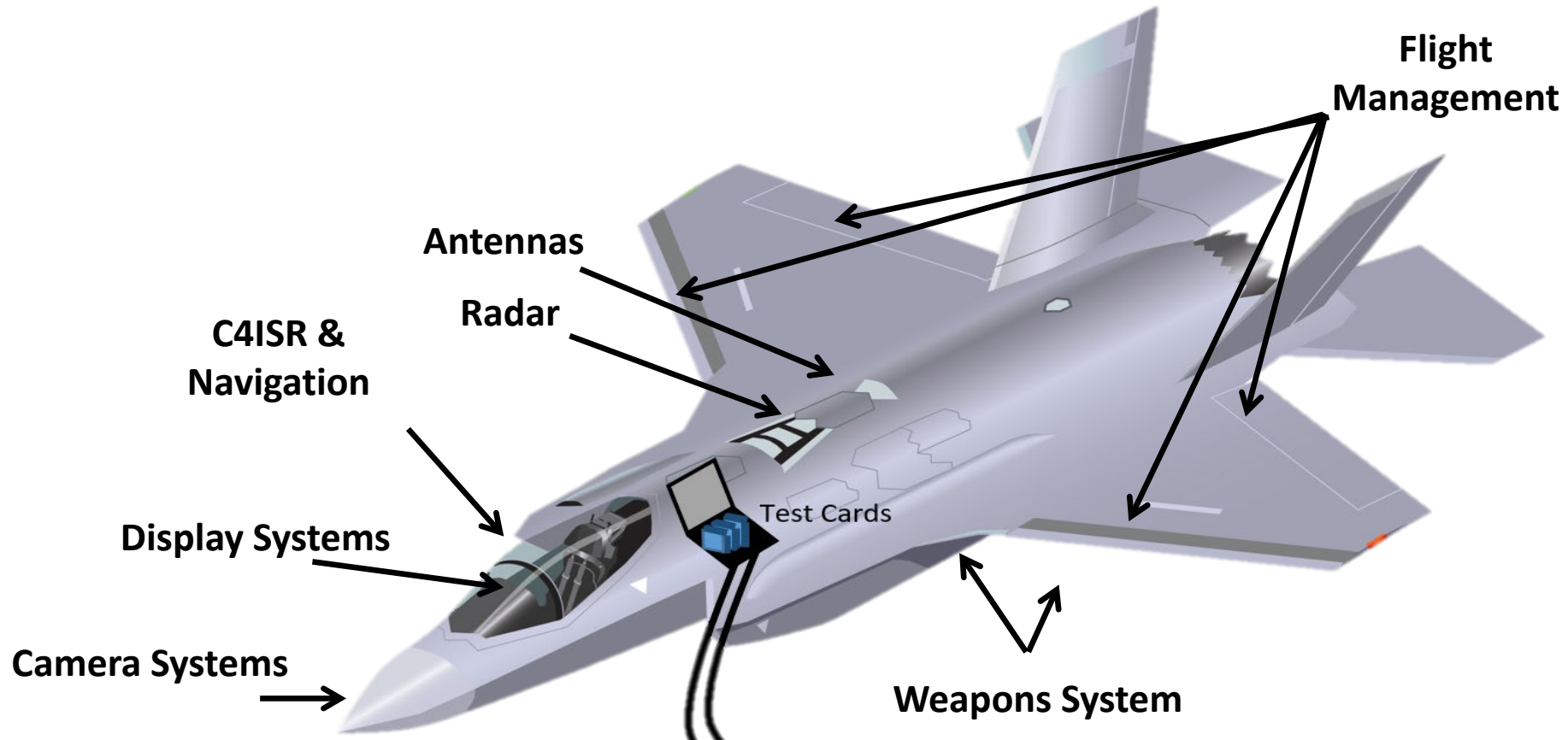


Aerospace



Key Products

Innovative Brands – Connectivity Solutions Delivered





Key Products

Innovative Brands – Connectivity Solutions Delivered



Standard Aerospace Wire & Cable

- **M81044 XLPA/XLPVF Insulated, Dual Layer, 150°C Aerospace Wire**
 - Slash Sheets, 8-13
- **M22759 Cross-Linked (Irradiated) ETFE (XLETFE) Insulated, 150-200°C Aerospace Wire**
 - Slash Sheets, 32- 35, 41-46
- **M22759 ETFE Insulated, 150°C Aerospace Wire**
 - Slash Sheets 16, 17, 18, 19
- **M25038 FIREZONE Type Aerospace Wire**
 - Slash Sheet 3
 - Slash Sheet 1 (Coming Soon)
- **M27500 Multi-Conductor Aerospace Cable**
 - Made with M22759, M81044
 - Made with M25038 (JA & JF) (Coming Soon)
- **M16878 (NEMA HP)**
 - Slash Sheets 1-3, 7, 8, 10 – 16, 20 – 22, 29 – 36
 - HP 4, 5, 6, 8
- **M55021 Multi-Conductor Cable**
 - Made with M16878 (NEMA HP)
- **M50861**
 - Slash Sheet 1 (10 - 22 AWG)



Key Products

Innovative Brands – Connectivity Solutions Delivered



LoFlo™ Technology

LoFlo™ is our low fluorine solution with **under 50PPM**

- Offered standard in AS22759 products
- Improves shelf life for silver, nickel, and tin-plated products
- Eliminates the fear of “Red Plague”
 - A study published by the University of Dayton showed that red plague **COULD NOT BE FORCED** on our M22759 wire using LoFlo™ technology
- Mitigates risk of corrosion of metal connectors and backshells
- Reduces the criticality of environmental storage conditions
- Superior Radiation Resistance





Key Products

Innovative Brands – Connectivity Solutions Delivered



Ultra Light-Weight AD12 Space-Grade Technology

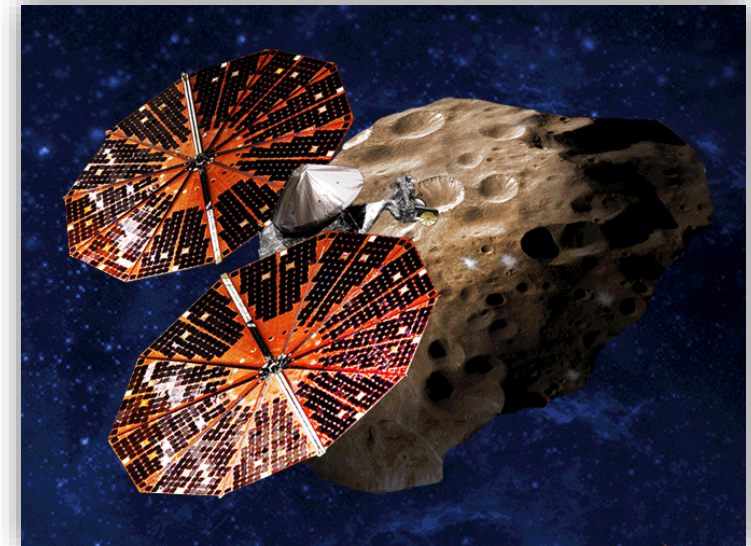
Construction Detail:

Size: 30AWG to 20AWG

Conductor: Silver Coated Copper & Copper Alloy

Insulation: Polyethylene (Very Light-weight .004")
(-150°C to +200°C)

- Non-QPL Alternative to M81381
- **Contains No Fluorine** and we can manufacture it
- Extremely Tough & Durable
- Extruded Technology – No Tape Edges
- **Highest Radiation Resistance of Any Wire Type – 500 Mega-rads minimum**
- Low outgassing and mass loss compliant for space applications





Key Products

Innovative Brands – Connectivity Solutions Delivered



Aerospace-Grade Market Equivalents

- **AD2 - Flexible XLETFE - Spec 82 Equiv**
- **AD4 – XLPolyalkene/PVDF - Spec 44 Equiv**
- **AD5 – XLETFE - Spec 55 Equiv**
- **AD5PC – XLETFE "tight tolerance" Spec 55PC Equiv**
- **AD12 – Space Grade Polyimide Tape Alternative**
- **AD13 – FEP/PVDF - M22759/13 Equiv**
- **AD45 – XLPolyalkene/XLETFE – Spec 2112 Equiv**
- **AD50 – Ultra Low Fluorine XLETFE (20 ppm max.)**
- **DEFENSE-Link Copper Data Series offers Equivalents to:**
 - **MX10G-24HP (Cat 6a)**
 - **MX10G-24 & MX10G-26 (Cat 6)**
 - **MX10G-24FLX & MX10G-26FLX (Cat 5e)**
 - **NF24-2Q100 & NF26-2Q100 (Data Quad)**
 - **28433/02171LX-4 (USB 2.0)**
 - **CAN24TST120 (CAN Bus)**



Key Products

Innovative Brands – Connectivity Solutions Delivered

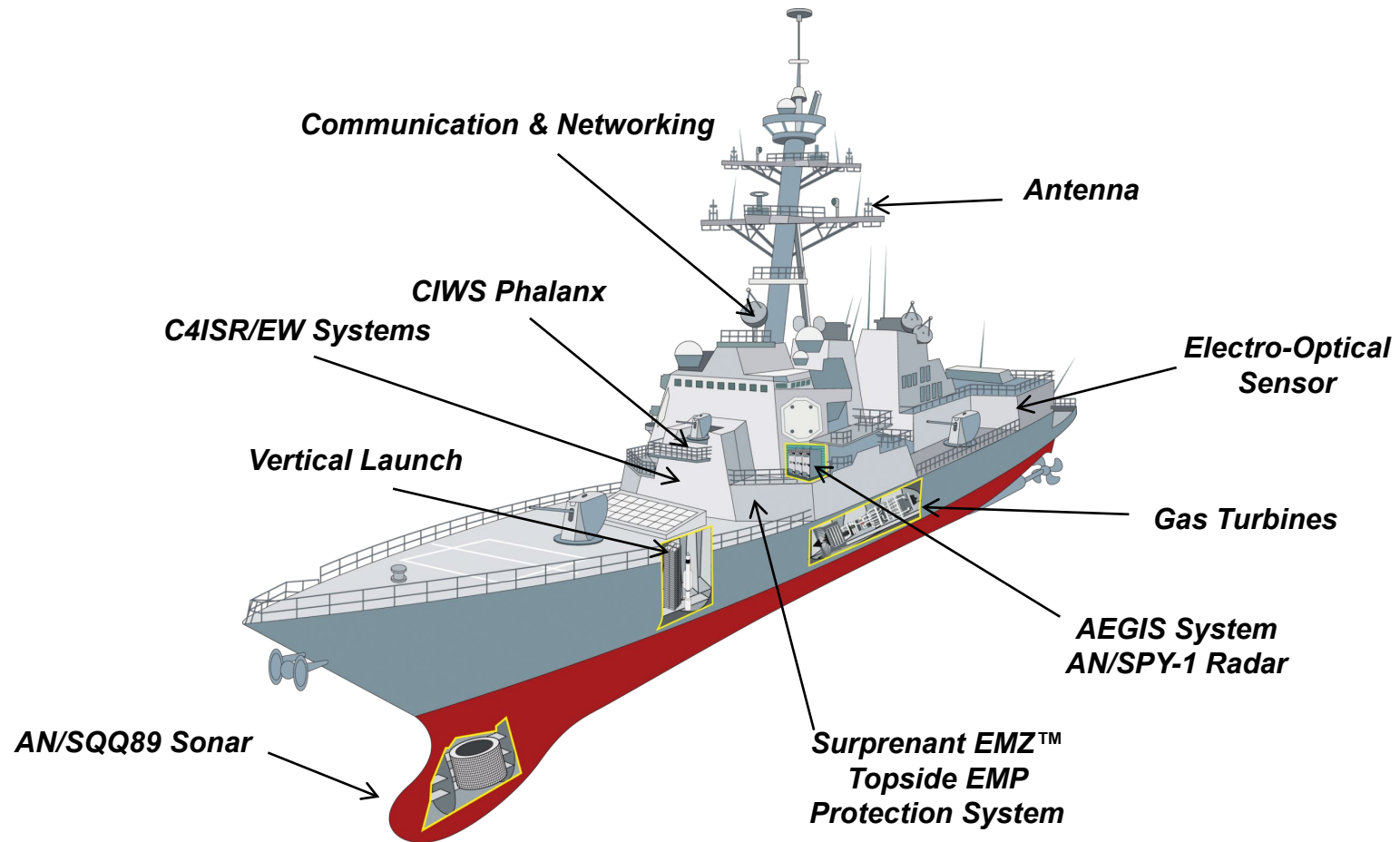


Shipboard



Key Products

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Key Products

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MIL-DTL-24640 Low Smoke Cables

Lightweight Cables (LS) Shipboard Cables

- **M24640 Slash Sheets 1 – 18, 25 & 26**
 - Electronic Shipboard Communication Cables
 - Watertight or Non-Watertight Conductors to SAE AS81044/12
 - Irradiated Cross-Linked Extruded Polyalkene Insulation
 - Irradiated Cross-Linked Modified Low Smoke Polyolefin Jackets



MIL-DTL-24640 /1-8
Types: Various

Lightweight Low Smoke

APPLICATION
Electronic, communication and instrumentation:
MIL-DTL-24640 Slash Sheets 1 thru 8 unless noted, utilize insulated conductors manufactured to SAE AS81044/12. These constructions are all OPL listed and are either watertight (W) or non-watertight. The overall jacket is an irradiation cross-linked modified low smoke polyolefin that is compounded without halogens.

PLEASE NOTE
"0" in the part number indicates that the cable has an optimized shield. The optimized shield is a single braid that is constructed to provide the same shielding performance.

MIL-DTL-24640 /9-13, 25 & 26
Types: Various

Lightweight Low Smoke

APPLICATION
Electronic, communication and instrumentation:
MIL-DTL-24640 Slash Sheets 9 thru 13, 25 & 26 unless noted, utilize insulated conductors manufactured to SAE AS81044/12. These constructions are all OPL listed and are either watertight (W) or non-watertight. The overall jacket is an irradiation cross-linked modified low smoke polyolefin that is compounded without halogens.

PLEASE NOTE
"0" in the part number indicates that the cable has an optimized shield. The optimized shield is a single braid that is constructed to provide the same shielding performance as a double braid in the MIL-DTL-24643 specification, while saving weight and reducing the cable diameter. The optimized shield provides 60 dB shielding from dc to 100 MHz.

Cable Type	No./Size	Slant Sheet	Military PIN	Conductor		Shield	Product Description
				AWG	Stranding		
DX	3	1	-01UN	16	19/29	N	2,3,7,10,14,19,24 & 30 Shielded Pairs, Overall Jacket
DXWB	4	1	-02UN	14	19/27	N	2,3,7,10,14,19,24 & 30 Shielded Pairs, Watertight, Overall Jacket
TX	3	2	-01UN	16	19/29	N	3,7,10,14,19 & 30 Shielded Pairs, Overall Shield & Jacket
TXWB	4	2	-02UN	14	19/27	N	3,7,10,14,19 & 30 Shielded Pairs, Watertight, Overall Shield & Jacket
FX	4	3	-02UN	14	19/27	N	2,9,21 & 37 Conductors, Watertight, Overall Shield & Jacket
FXWB	3	3	-03UN	16	7/24	N	7 Shielded Triads, Overall Jacket
TTX	3 & 15	4	-01UN & -02UN	20	19/32	N	7 Shielded Triads, Watertight, Overall Jacket
TTXWB	3 & 15	4	-01UN & -02UN	20	7/28	N	7 Shielded Triads, Watertight, Overall Jacket
TTXS	2 & 4	5	-01UN & -02UN	20	19/32	Y	4 Shielded Pairs, Overall Shield & Jacket
TTXSW	2 & 4	5	-01UN & -02UN	20	7/28	Y	4 Shielded Pairs, Watertight, Overall Shield & Jacket
TTXSO	2-10	5	-01UN thru -04UN	20	19/32	Y	4 Shielded Pairs, Watertight, Overall Shield & Jacket
TTXSOB	2-10	5	-05UN thru -08UN	20	7/28	Y	4 Shielded Pairs, Watertight, Overall Shield & Jacket
2XAO	2-40	6	-06UN thru -08UN	22	19/34	Y	6,18,24,42,60 & 77 Pairs, Overall Shield & Jacket
2XAOB	2-40	6	-06UN thru -08UN	22	7/30	Y	6,18,24,42,60 & 77 Pairs, Watertight, Overall Shield & Jacket
1XMSO	7-70	7	-01UN thru -03UN	22	19/34	Y	4 Shielded Pairs, Overall Shield & Jacket
1XMSOB	7-70	7	-01UN thru -03UN	22	7/30	Y	4 Shielded Pairs, Watertight, Overall Shield & Jacket
MXO	10 & 14	8	-01UN & -03UN	20	19/32	Y	4 Pairs & 1 Conductor, Overall Shield & Jacket
MXOB	10 & 14	8	-01UN & -03UN	20	7/28	Y	4 Pairs & 1 Conductor, Watertight, Overall Shield & Jacket
9XS	12	25	-02UN	10	37/28	Y	9 Pairs & 1 Conductor, Overall Shield & Jacket
8XS	8	25	-02UN	8	13/29	Y	8 Pairs & 1 Conductor, Overall Shield & Jacket
5XO	4	26	-03UN	14	19/27	Y	5 Conductors, Overall Shield & Jacket
	6	26	-03UN	12	37/28	Y	5 Conductors, Overall Shield & Jacket

The above part numbers represent the more popular constructions. However, other designs are available upon request. All products are manufactured to meet RoHS compliance. For exceptions, please contact our sales department.

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Key Products

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MIL-DTL-24643 Low Smoke, Zero Halogen Cables

LSZH Shipboard Cables

M24643/2 (Type LSDCOP, LSTCOP)



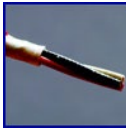
- Low Smoke Flexing Shipboard Cables
- Irradiation Cross-linked Polyolefin Insulation
- Non-shielded and NonWater-blocked
- Modified Low Smoke Zero Halogen

M24643/21,24



- Low Smoke Thermocouple Shipboard Cables
- Silicone and Glass Braid Insulation for Circuit Integrity in Catastrophic Fire
- Watertight Conductor Constructions
- Irradiated Cross-Linked Low Smoke Polyolefin or Silicone Rubber Jacket

M24643/25



- Low Smoke, Communication with Circuit Integrity Shipboard Cables
- Silicone Insulation
- NonWater-blocked
- Low Smoke Red Silicone Rubber, Armored with Aluminum Braid

M24643/26, 71-73



- Low Smoke Power Distribution Shipboard Cables
- Silicone and Glass Braided Insulated Conductor for Circuit Integrity
- Armored with Aluminum Braids or Non-Armored
- Irradiated Cross-Linked Low Smoke Polyolefin or Silicone Rubber Jacket

M24643/28,39,40



- Low Smoke Multi-Coaxial Shipboard Cables
- Multiple Coaxial Conductors
- Irradiated Cross-Linked Polyolefin Insulation
- Irradiated Cross-Linked Modified Low Smoke Zero Halogen Polyolefin Jacket

M24643/43



- Low Smoke Communications, Lighting, Power Circuits, and Combat Systems Shipboard Cables
- Shielded and NonWater-Blocked
- Irradiated Cross-Linked Polyolefin Insulation
- Irradiated Cross-Linked Modified Low Smoke Zero Halogen Polyolefin Jacket

SHIPBOARD

MIL-DTL-24643

/15-18, 20, 26, 66-68 & 71-73

Types: Various LS

Low Smoke Power Distribution and Lighting with Circuit Integrity Cables

SHIPBOARD

APPLICATION

These cables have insulated conductors manufactured with a combination of silicone and glass braids which provide circuit integrity in case of a catastrophic fire. All constructions are watertight with the exception of slant sheets 71 thru 73. The overall jacket is an irradiation cross-linked low smoke polyolefin for all slant sheets except 26 which is a low smoke red silicone rubber. The silicone rubber jacketed cables are armored with an aluminum braid to provide mechanical protection.

CONDUCTOR

Various, as listed in the table.

INSULATION

Watertight silicone and glass braids.

JACKET

Irradiation XL low smoke polyolefin. /26 is a low smoke red silicone rubber.

PLEASE NOTE

SHIPBOARD

MIL-DTL-24643

/2

Types: LSDCOP, LSTCOP

Low Smoke, Flexing Service, Shipboard Cables

SHIPBOARD

APPLICATION

MIL-DTL-24643 Slant Sheet 2. These cables are manufactured with polyolefin insulation. These constructions are non-shielded and non water blocked. The overall jacket is an irradiation cross-linked modified low smoke zero halogen polyolefin.

CONSTRUCTION

Nonshielded and non water blocked.

JACKET

Irradiation cross-linked modified low smoke zero halogen polyolefin.

Cable Type	Size	Slant Sheet	Conductor		Shield/Armor	Product Description
			AWG	Stranding		
LSDSGU	3-23	15				
LSTSGU	3-23	16				
LSPSGU	3-23	17				
LSMSCU	7-91	18				
LSMSC*	7-91	18				
LSTSGU	3	20				
	4	20				
LSDPS	3-14	26				
LSTPS	3-30	26				
LSFPS	14	26				
LSDPS	6.8-14	26				
LSZOW	3-200	66				
LS3OW	3 thru 400	67				
LS4OW	3 thru 200	68				
LSSCF	3 thru 400	71				
LSFCF	42	72				
LSTCF	200	73				

The above part numbers represent the most popular constructions. However, other designs are available upon request. All products are manufactured to meet MIL-DTL-24643.

APPLICATION

MIL-DTL-24643 Slant Sheet 2. These cables are manufactured with polyolefin insulation. These constructions are non-shielded and non water blocked. The overall jacket is an irradiation cross-linked modified low smoke zero halogen polyolefin.

CONSTRUCTION

Nonshielded and non water blocked.

JACKET

Irradiation cross-linked modified low smoke zero halogen polyolefin.

Cable Type	Slant Sheet	MIL Part Number	Conductor		Shield/Armor	Product Description	
			AWG	Stranding			
LSDCOP	1	2	010N	25	7	N	2 conductors, overall RLPO jacket.
LSDCOP	2	2	010N	18	16	N	2 conductors, overall RLPO jacket.
LSTCOP	2	2	048N	18	16	N	3 conductors, overall RLPO jacket.

The above part numbers represent the most popular constructions. However, other designs are available upon request. All products are manufactured to meet MIL-DTL-24643.

SHIPBOARD

SHIPBOARD

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Key Products

Innovative Brands – Connectivity Solutions Delivered



DEFENSE-Link® NAVSEA Series

Cable Developed for Deployment on US Navy and NATO Vessels



Features & Benefits

- Replaces fluoropolymer and PVC insulations typically used in commercial communications cables, minimizing smoke density and toxicity in the event of combat conditions or fire
- Exceptionally rugged cable for handling extreme conditions
- Provides data transmission capabilities in accordance with ANSI/TIA/EIA 568-C.2
- Provides exceptional shielding effectiveness and EMP protection
- Can be used in compartments subject to exposure of fuel, hydraulic fluids, lubricants, and other fluids normally encountered aboard ships
- Cable identification ensures traceability per ISO and NAVSEA standards
- Gigabit & 10-Gigabit Data Transmission

NAVSEA Part Number	Type	Marmon Part Number	Conductor		Water-blocked	Nom. OD (inches)	Wgt. (lbs./1000')	Product Description
			AWG	Type				
M24643/59-01UO	LSC5FS-4	LSC5FS-4	24	Solid	No	.325	50	Cat 5e 24 AWG solid, 4-pair, foil shield, non-waterblocked
M24643/59-03UO	LSC5OS-4	LSC5OS-4	24	Solid	No	.335	62	Cat 5e 24 AWG solid, 4-pair foil & braided shield, non-waterblocked
M24643/59-04UO	LSC5OSW-4	LSC5OSW-4	24	Solid	Yes	.370	73	Cat 5e 24 AWG solid, 4-pair foil & braided shield, waterblocked
M24643/61-02UD	LSC5POS-4	LSC5POS-4	24	Stranded	No	.335	62	Cat 5e 24 AWG stranded, 4-pair foil & braided shield, non-waterblocked
M24643/61-03UD	LSC5POSR-4	LSC5POSR-4	26	Stranded	No	.300	50	Cat 5e 26 AWG stranded, 4-pair foil & braided shield, non-waterblocked
M24643/77-03UO	LSC6OS-4	LSC6OS-4	23	Solid	No	.390	73	Cat 6A 23 AWG solid, 4-pair foil & braided shield, non-waterblocked
M24643/77-04UO	LSC6OSW-4	LSC6OSW-4	23	Solid	Yes	.430	85	Cat 6A 23 AWG solid, 4-pair foil & braided shield, waterblocked



Key Products

Innovative Brands – Connectivity Solutions Delivered



DEFENSE-Link® FIBER OPTIC

MIL-PRF-85045 (LSZH) Slant 16, 17, & 18 Multi-Mode Fiber



Features & Benefits

- Rugged & Flexible
- Watertight
- Enhanced-Gigabit Speeds
- Low Smoke, Zero Halogen (LSZH)
- Radiation, Chemical, Fluid, Fungus, Abrasion, Thermal Ageing Resistant

- M85045 Slant 16, 17, & 18 Single-Mode COMING SOON!

DEFENSE-Link®
CONNECTING THE WORLD'S FIBER

DEFENSE-Link® Fiber Optic

MIL-PRF-85045 (LSZH) Slant 16, 17, & 18
Multi-Mode Fiber for Shipboard Applications

DESIGN FEATURES (4 & 8 Fiber)
Component:
 Core: Class M4 fiber per MIL-PRF-49291/6
 Buffer: (LSZH) Flexible Polymer
 OFCC Strength Member: Aramid Yarn with Water-Blocking
 OFCC Jacket: (LSZH) Flexible Polymer
 Overall Cable: Cable: Bundle OFCC components helically over a central water-blocked FIB Core
 Strength Member: Helically applied layers of Aramid Yarn with Water-Blocking
 Jacket: Cross Linked (LSZH) Flexible Polymer
RATINGS
 • MIL-PRF-85045F
 • MIL-PRF-49291
 • 7.7 Hydrostatic Pressure-proof cable

PRODUCT ATTRIBUTES
 DEFENSE-Link® Fiber Optic is in a class by itself with superior flexibility. The Low Smoke Zero Halogen Jacket system provides the flexibility to ease installation and stripability to promote quicker preparation and termination time. Adhering to standards of the United States Department of Defense MIL-PRF-85045 specification Marmon Aerospace & Defense offers these cables in one, four, and eight multi-mode fiber optic configurations for enhanced gigabit data transmission and communication applications aboard any U.S. Navy platform.

PRODUCT BENEFITS

- Rugged & Flexible
- Watertight
- Enhanced-Gigabit Speeds
- Low Smoke Zero Halogen (LSZH)
- Radiation, Chemical, Fluid, Fungus, Abrasion, Thermal Ageing Resistant

Fiber Performance

Multi-Mode
Applicable Specification: MIL-PRF-49291/6
Core Diameter: 62.5um ± 3um
Cladding Diameter: 125um ± 1um
Coating Diameter: 250um ± 15um
Buffer Diameter: 900um ± 50um
Numerical Aperture: 0.275 nominal
Max. Attenuation: 3.25 dB/km @ 850nm 1.25 dB/km @ 1300nm
Min. Bandwidth
350MHz/km @ 850nm 800MHz/km @ 1300nm
Proof Test
100,000 psi
Radiation Resistance
per MIL-PRF-49291

Cable Specifications

Thermoset
Applicable Specification
MIL-PRF-85045
Strength Member
Water-blocked aramid yarn
OFCC nom. diameter
2.0mm (0.079in)
Storage Temperature
per MIL-PRF-85045
Operating Temperature
per MIL-PRF-85045
Life Aging
per MIL-PRF-85045
Smoke Index, NES 711
< 25
Toxicity, NES 713
< 5
Halogen Content
< 0.2% by weight
Flammability
UL-1685
Crush Resistance
2,000N per cm of cable dia.
Abrasion Resistance
750 Cycles
Cable-to-Cable Abrasion
500 Cycles
Low Temp Flexibility
-40°C
Electromagnetic Effects
per MIL-STD-1678-3
Fluid Immersion
per MIL-PRF-85045
Weathering & UV
per MIL-STD-1678-3
Cable Twist-Bending & Cyclic Flexing
500 cycles @ 25 ± 2°C 100 cycles @ -28 ± 2°C

Rev. 1

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Key Products

Innovative Brands – Connectivity Solutions Delivered



Surprenant EMZ®

US Navy EMP Protection Systems

- Cables exterior to the ship are run through conduit and are required to meet a US Navy Requirement of 60 dB EMP protection
- MARMON Aerospace & Defense has developed a system including a shield construction applied over the cables referred to as “**Surprenant EMZ®**” ensuring reliable and cost effective EMP protection for the vessel
 - Provides +80 dB of EMP protection
- **Approved to draft MIL-DTL-24643 sheets**

- Reduces material and labor costs
- Reduces system failure rates

US Navy has approved a full system, installation and test methods including grounding/sealing adapters for deck penetrations

A close-up photograph of a Surprenant EMZ cable. The cable has a black outer jacket with the text 'SURPRENANT EMZ®' printed in white. The inner conductors are visible, showing a braided shield and individual wires.

SURPRENANT EMZ®

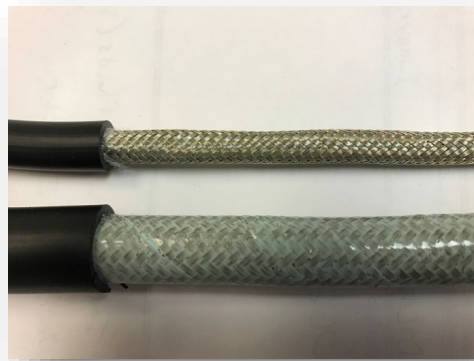
Key Products

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Dry-Block® Cables

- Current shipboard cables installed below the waterline of the vessel or passing through watertight bulkheads **require** water-blocking
- Silicone rubber is used to fill the interstices of the cable significantly increasing the preparation time for termination, particularly in the case of the braid shielded constructions
- Marmon Aerospace & Defense now offers qualified cables manufactured with 'dry' water-absorbent materials that are easily removed and save substantial termination time



Cable Type	Military Part#	Cable Type	Military Part#
1XSOW	MIL-DTL-24640/14	LS2SWAUS	MIL-DTL-24643/32
2XSAW	MIL-DTL-24640/15	LS2SWU	MIL-DTL-24643/33
2XSAOW	MIL-DTL-24640/15	LS3SWU	MIL-DTL-24643/36
2XSW	MIL-DTL-24640/16	LS3SWUS	MIL-DTL-24643/36
2XSOW	MIL-DTL-24640/16	LS2WAU	MIL-DTL-24643/46
2XOW	MIL-DTL-24640/17	LS1SMWU	MIL-DTL-24643/47
3XSW	MIL-DTL-24640/18	LS2SWL	MIL-DTL-24643/56
3XSOW	MIL-DTL-24640/18	LS2UW	MIL-DTL-24643/57
LS2SWAU	MIL-DTL-24643/32	LS2UWS	MIL-DTL-24643/57



Key Products

Innovative Brands – Connectivity Solutions Delivered



MIL-DTL-17 Coaxial Cables & Navsea Triaxial Cables

Low Smoke Radio Frequency Cables



Operating Temperature: -30°C to 85°C

Smoke Index: 25

Toxicity: 5 Maximum

Acid Gas Generation: 2.0% Maximum

Halogen Content: 0.2% Maximum

Applications

Low smoke radio frequency for naval shipboard. These cables have excellent abrasion characteristics, and low smoke, zero halogen, and low toxicity properties.

Numerous Non-QPL Equivalent Are Available

SHIPBOARD

MIL-DTL-17 Coaxes & Navsea Triaxes

Low Smoke Radio Frequency

US NAVY REQUIREMENTS
 Smoke Index: 25
 Toxicity Index: 5 Max.
 Acid Gas Generation: 2.0% Max.
 Halogen Content: .2% Max.
 Max. Operating Temp: -30°C to 85°C
 Exceptions:
 MIL-DTL-17/213,214 & 217: -40°C to 80°C
 Navsea #6262065 & 6322493: -40°C to 85°C

APPLICATION
 Low smoke radio frequency for naval shipboard. These cables have excellent abrasion characteristics, and low smoke, zero halogen, and low toxicity properties.

Part Number	Low Smoke Equivalent	Conductor AWG Stranding & Material	Shield	Nom. Diameter Inch	Cond. Resistance Ω/kft @20°C	Impedance Ω/kft	Capacitance pF/ft	Attenuation db/100 ft 400 MHz 1 GHz	Continuous Working Voltage V rms
M17/181-0001	RG11	18 7/26 TC	Tape/Braid	.405	6.6	75	22	5.2 9.4	3700
M17/183-0001	RG58	20 19/0071 TC	Tape/Braid	.195	14.8	50	22	17 28	1400
M17/184-0001	RG59	23 Solid Cu Steel	Tape/Braid	.242	48	75	22	9.0 16	1700
M17/185-0001	RG62	22 Solid Cu Steel	Tape/Braid	.242	44	93	14.5	8.0 13	750
M17/189-0001	-	12 7/0296 RC	Tape/Braid	.405	1.76	50	32.2	4.8 9.0	3700
M17/190-0001	-	12 7/0296 SC	Tape/Dbil Braid	.425	1.76	50	32.2	5.7 13	3700
M17/191-0001	-	18 7/26 TC	Tape/Dbil Braid	.425	6.6	75	22	6.5 -	3700
M17/194-0001	-	19 Solid SC	Tape/Dbil Braid	.212	8.97	50	32.2	12 20.5	1400
M17/196-0001	RG174	26 7/34 Cu Steel	Tape/Braid	.110	96.7	50	32.2	12.9 40	1100
M17/197	-	-	-	-	-	-	-	-	-
M17/213-0001	RG213	12 7/0296 RC	Tape/Braid	.405	1.76	50	32.2	4.7 -	3700
M17/214-0001	RG214	12 7/0296 SC	Tape/Dbil Braid	.425	1.73	50	32.2	5.5 -	3700
M17/217-0001	RG174	26 7/34 Cu Steel	Tape/Braid	.110	96.7	50	32.2	25 -	1100
NS6262065-1	TRIAx	12 7/20 SC	Dbil Tape/Dbil Braid	.450	1.90	50	29	5.4 9.2	2000
NS6322493	TRIAx	18 19/30TC	Dbil Tape/Dbil Braid	.465	6.6	75	20	6.0 11.2	2000

The above part numbers represent the more popular constructions. However, other designs are available upon request. All products are manufactured to meet RoHS compliance. For exceptions, please contact our sales department.



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Innovative Brands – Connectivity Solutions Delivered

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Innovative Brands – Connectivity Solutions Delivered



www.marmon-ad.com



Marmon Electrical
A Berkshire Hathaway Company

www.marmonelectrical.com



Thank You

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