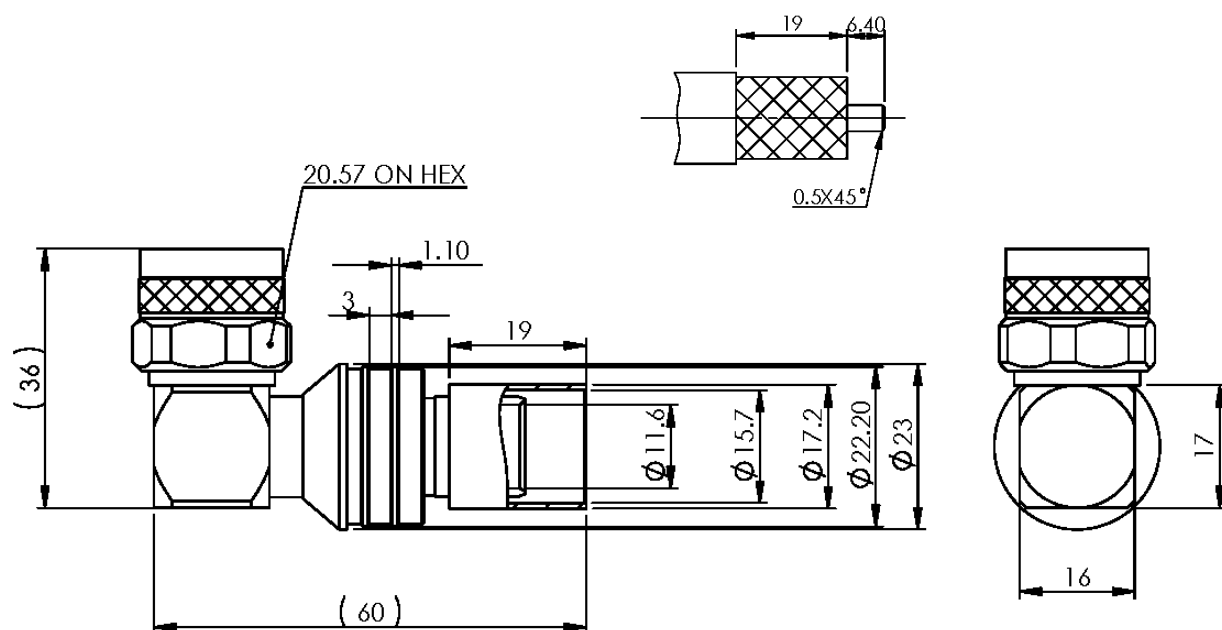


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| SYM | REVISION DESCRIPTION    | DFTM          | DATE    | APPD          | DATE   |
|-----|-------------------------|---------------|---------|---------------|--------|
| A   | RELEASED FOR PRODUCTION | <i>K.A.M.</i> | 5/20/11 | <i>J.D.B.</i> | 6/9/11 |



Reference standard IEC60169-16

### I. Electric Performance

|                                     |                                                    |
|-------------------------------------|----------------------------------------------------|
| Nominal Impedance( $\Omega$ ):      | 50                                                 |
| Frequency Range:                    | DC-6GHz                                            |
| VSWR:                               | $\leq 1.35$                                        |
| Insert Loss:                        | $\leq 0.10(0-3\text{ G})$                          |
| Insulation resistance (M $\Omega$ ) | $> 5000$                                           |
| Proof voltage (V)                   | 2500                                               |
| Conductor resistance (m $\Omega$ )  | outer conductor $< 0.4$<br>inner conductor $< 0.8$ |

## II、Mechanical Performance

|                              |      |
|------------------------------|------|
| Whorl pull                   | 500N |
| Nut torque                   | 5N.m |
| Tensile force(cable-connect) | 300N |
| Torsion(cable-connect)       | 3N.m |

### III、Material and plating :

| Component       | Material         | Plating             |
|-----------------|------------------|---------------------|
| inner conductor | Beryllium copper | Au>1.27um           |
| outer conductor | Brass            | Copper-tin-zinc>2um |
| insulator       | PTFE             |                     |
| nut             | Brass            | Copper-tin-zinc>2um |

#### IV、Environment

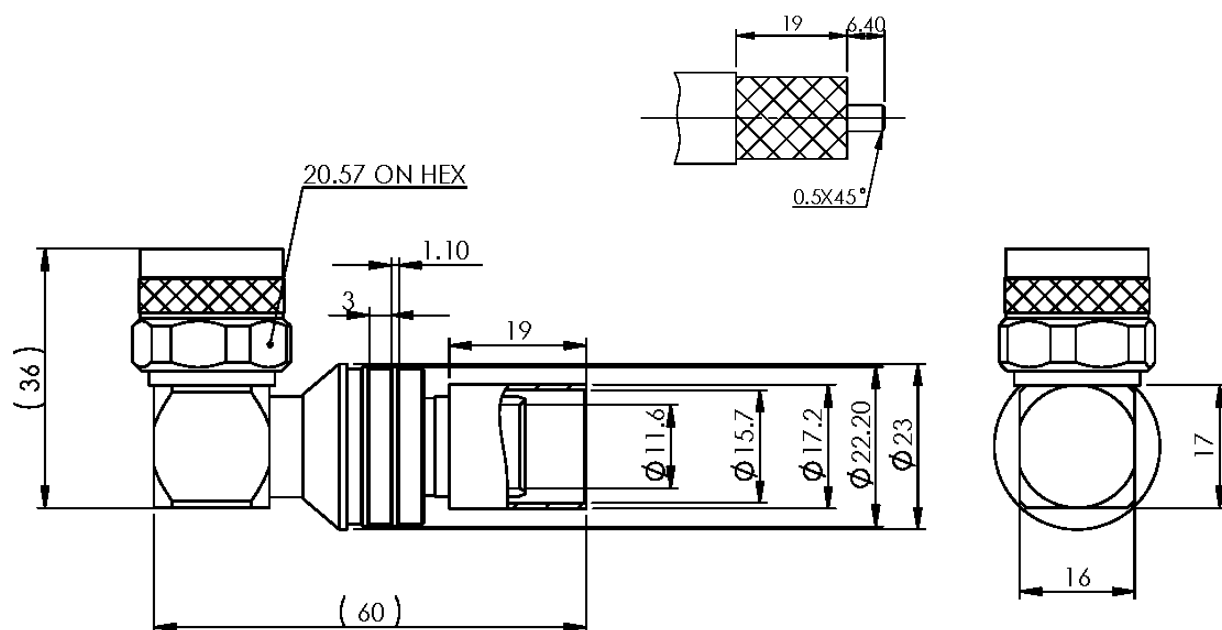
|                  |                                |
|------------------|--------------------------------|
| Temp.range       | -55℃~+155℃                     |
| Weather standard | IEC 60068 55 / 155/ 56         |
| Thermal shock    | US MIL-STD 202,Meth.107,Cond.B |
| Vibration        | US MIL-STD 202,Meth.204,Cond.B |
| Shock            | US MIL-STD 202,Meth.213,Cond.I |
| ROHS compliant   |                                |

V. Assemble: inner conductor installed and outer conductor crimped

|          |             |                            |            |       |                |              |                                                    |       |
|----------|-------------|----------------------------|------------|-------|----------------|--------------|----------------------------------------------------|-------|
| MATL:    |             | UNLESS OTHERWISE SPECIFIED |            |       | DFTM. K, A, M, |              | TIMES MICROWAVE SYSTEMS                            |       |
|          |             |                            |            |       | DATE 5/20/11   |              |                                                    |       |
| USED ON: |             |                            |            |       | CHKD. J, D, B, |              | CONNECTOR, 90° NM<br>FOR LMR-600 (EZ-600-NMH-RA-X) |       |
|          |             |                            |            |       | DATE 6/9/11    |              |                                                    |       |
|          |             |                            |            |       | APPD. J, D, B, |              |                                                    |       |
| SCALE: ~ | DWG. SIZE A | DO NOT SCALE DRAWING       | CODE IDENT | 68999 | DATE 6/9/11    | SHEET 1 of 1 | SD3190-2639                                        | REV A |

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| SYM | REVISION DESCRIPTION    | DFTM   | DATE    | APPD   | DATE   |
|-----|-------------------------|--------|---------|--------|--------|
| A   | RELEASED FOR PRODUCTION | K.A.M. | 5/20/11 | J.D.B. | 6/9/11 |



Reference standard IEC60169-16

#### I. Electric Performance

Nominal Impedance( $\Omega$ ): 50  
Frequency Range: DC-6GHz  
VSWR:  $\leq 1.35$   
Insert Loss:  $\leq 0.10(0-3G)$   
Insulation resistance ( $M\Omega$ ):  $>5000$   
Proof voltage (V): 2500  
Conductor resistance ( $m\Omega$ ): outer conductor  $<0.4$   
inner conductor  $<0.8$

#### II. Mechanical Performance

Whorl pull: 500N  
Nut torque: 5N.m  
Tensile force(cable-connect): 300N  
Torsion(cable-connect): 3N.m

#### III. Material and plating :

|                 |                  |                           |
|-----------------|------------------|---------------------------|
| Component       | Material         | Plating                   |
| inner conductor | Beryllium copper | Au $>1.27\mu m$           |
| outer conductor | Brass            | Copper-tin-zinc $>2\mu m$ |
| insulator       | PTFE             |                           |
| nut             | Brass            | Copper-tin-zinc $>2\mu m$ |

#### IV. Environment

Temp.range:  $-55^{\circ}C \sim +155^{\circ}C$   
Weather standard: IEC 60068 55 / 155 / 56  
Thermal shock: US MIL-STD 202,Meth.107,Cond.B  
Vibration: US MIL-STD 202,Meth.204,Cond.B  
Shock: US MIL-STD 202,Meth.213,Cond.I  
ROHS compliant

#### V. Assemble: inner conductor installed and outer conductor crimped

|          |             |                            |            |       |                |                                                    |             |       |
|----------|-------------|----------------------------|------------|-------|----------------|----------------------------------------------------|-------------|-------|
| MATL:    |             | UNLESS OTHERWISE SPECIFIED |            |       | DFTM. K. A. M. | TIMES MICROWAVE SYSTEMS                            |             |       |
|          |             | ALL DIMENSIONS ARE IN mm   |            |       | DATE 5/20/11   |                                                    |             |       |
| USED ON: |             |                            |            |       | CHKD. J. D. B. | CONNECTOR, 90° NM<br>FOR LMR-600 (EZ-600-NMH-RA-X) |             |       |
|          |             |                            |            |       | DATE 6/9/11    |                                                    |             |       |
|          |             |                            |            |       | APPD. J. D. B. |                                                    |             |       |
| SCALE: ~ | DWG. SIZE A | DO NOT SCALE DRAWING       | CODE IDENT | 68999 | DATE 6/9/11    | SHEET 1 of 1                                       | SD3190-2639 | REV A |

# LMR®-600 Flexible Low Loss Communications Coax

## Ideal for...

- Jumper Assemblies in Wireless Communications Systems
- Short Antenna Feeder runs
- Any application (e.g. WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Mobile Antennas) requiring an easily routed, low loss RF cable



• **LMR®** standard is a UV Resistant Polyethylene jacketed cable designed for 20-year service outdoor use. The bending and handling characteristics are significantly better than air-dielectric and corrugated hard-line cables.

• **LMR®-DB** is identical to standard LMR plus has the advantage of being watertight. The addition of waterproofing compound in and around the foil/braid insures continuous reliable service should the jacket be inadvertently damaged during installation or in the future.

• **LMR®-FR** is a non-halogen (non-toxic), low smoke, fire retardant cable designed for in-building runs that can be routed anywhere except air handling plenums. LMR-FR is UL/NEC & CSA rated 'CMR' and 'FT4' respectively, meets FAA FAR25 requirements and is MSHA-P for mining applications.

• **LMR®-FR-PVC** is a general-purpose indoor cable and has a UL/NEC & CSA rating of 'CMR' and 'FT4' respectively. It is less expensive than LMR-FR, however it emits toxic fumes (HCL) and greater smoke density when burned.

• **LMR®-PVC** is designed for low loss general-purpose applications and is somewhat more flexible than the standard polyethylene jacketed LMR.

• **LMR®-PVC-W** is a white-jacketed version of LMR-PVC for marine and other applications where color compatibility is desired.

• **Flexibility** and bendability are hallmarks of the LMR-600 cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-600.

Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-600 cables designed for outdoor exposure incorporate the best materials for UV resistance and have life expectancy in excess of 20 years.

• **Connectors:** A wide variety of connectors are available for LMR-600 cable, including all common interface types, reverse polarity, and a choice of solder or non-solder center pins. Most LMR connectors employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-600 cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

| Part Description |                          |              |       | Stock |
|------------------|--------------------------|--------------|-------|-------|
| Part Number      | Application              | Jacket Color | Code  |       |
| LMR-600          | Outdoor                  | PE           | Black | 54003 |
| LMR-600-DB       | Outdoor/Watertight       | PE           | Black | 54093 |
| LMR-600-FR       | Indoor/Outdoor Riser CMR | FRPE         | Black | 54032 |
| LMR-600-FR-PVC   | Indoor/Outdoor Riser CMR | FRPVC        | Black | 54074 |
| LMR-600-PVC      | General Purpose          | PVC          | Black | 54219 |
| LMR-600-PVC-W    | General Purpose          | PVC          | White | 54206 |

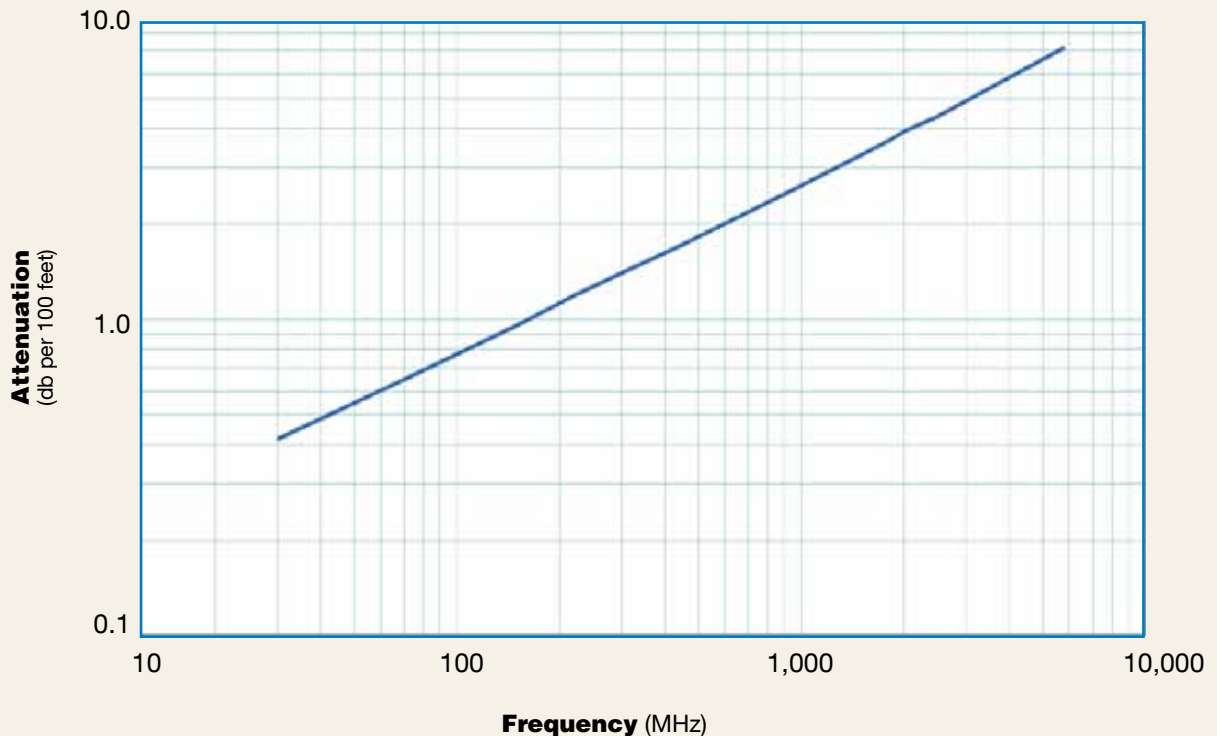
| Construction Specifications |                   |       |         |
|-----------------------------|-------------------|-------|---------|
| Description                 | Material          | In.   | (mm)    |
| Inner Conductor             | Solid BCCA        | 0.176 | (4.47)  |
| Dielectric                  | Foam PE           | 0.455 | (11.56) |
| Outer Conductor             | Aluminum Tape     | 0.461 | (11.71) |
| Overall Braid               | Tinned Copper     | 0.490 | (12.45) |
| Jacket                      | (see table above) | 0.590 | (14.99) |

| Mechanical Specifications |                |       |          |
|---------------------------|----------------|-------|----------|
| Performance Property      | Units          | US    | (metric) |
| Bend Radius: installation | in. (mm)       | 1.50  | (38.1)   |
| Bend Radius: repeated     | in. (mm)       | 6.0   | (152.4)  |
| Bending Moment            | ft-lb (N-m)    | 2.75  | (3.73)   |
| Weight                    | lb/ft (kg/m)   | 0.131 | (0.20)   |
| Tensile Strength          | lb (kg)        | 350   | (158.9)  |
| Flat Plate Crush          | lb/in. (kg/mm) | 60    | (1.07)   |

| Environmental Specifications   |          |         |
|--------------------------------|----------|---------|
| Performance Property           | °F       | °C      |
| Installation Temperature Range | -40/+185 | -40/+85 |
| Storage Temperature Range      | -94/+185 | -70/+85 |
| Operating Temperature Range    | -40/+185 | -40/+85 |

| Electrical Specifications |                   |       |          |
|---------------------------|-------------------|-------|----------|
| Performance Property      | Units             | US    | (metric) |
| Velocity of Propagation   | %                 | 87    |          |
| Dielectric Constant       | NA                | 1.32  |          |
| Time Delay                | nS/ft (nS/m)      | 1.17  | (3.83)   |
| Impedance                 | ohms              | 50    |          |
| Capacitance               | pF/ft (pF/m)      | 23.4  | (76.6)   |
| Inductance                | uH/ft (uH/m)      | 0.058 | (0.19)   |
| Shielding Effectiveness   | dB                | >90   |          |
| DC Resistance             |                   |       |          |
| Inner Conductor           | ohms/1000ft (/km) | 0.53  | (1.7)    |
| Outer Conductor           | ohms/1000ft (/km) | 1.2   | (3.9)    |
| Voltage Withstand         | Volts DC          | 4000  |          |
| Jacket Spark              | Volts RMS         | 8000  |          |
| Peak Power                | kW                | 40    |          |

Attenuation vs. Frequency (typical)



| Frequency (MHz)              | 30   | 50   | 150  | 220  | 450  | 900  | 1500 | 1800 | 2000 | 2500 | 5800 |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Attenuation dB/100 ft</b> | 0.4  | 0.5  | 1.0  | 1.2  | 1.7  | 2.5  | 3.3  | 3.7  | 3.9  | 4.4  | 7.3  |
| <b>Attenuation dB/100 m</b>  | 1.4  | 1.8  | 3.2  | 3.9  | 5.6  | 8.2  | 10.9 | 12.1 | 12.8 | 14.5 | 23.8 |
| <b>Avg. Power kW</b>         | 5.51 | 4.24 | 2.41 | 1.97 | 1.35 | 0.93 | 0.70 | 0.63 | 0.59 | 0.52 | 0.32 |

**Calculate Attenuation =**

$(0.075550) \cdot \sqrt{\text{FMHz}} + (0.000260) \cdot \text{FMHz}$  (interactive calculator available at [http://www.timesmicrowave.com/cable\\_calculators](http://www.timesmicrowave.com/cable_calculators))

**Attenuation:**

VSWR=1.0; Ambient = +25°C (77°F)

**Power:**

VSWR=1.0; Ambient = +40°C; Inner Conductor = 100°C (212°F); Sea Level; dry air; atmospheric pressure; no solar loading

## LMR®-600 Flexible Low Loss Communications Coax



## Connectors

| Interface       | Description      | Part Number      | Stock Code | VSWR**<br>Freq. (GHz) | Coupling<br>Nut | Inner<br>Contact Attach | Outer<br>Contact Attach | Finish*<br>Body /Pin | Length<br>in (mm) | Width<br>in (mm) | Weight<br>lb (g) |
|-----------------|------------------|------------------|------------|-----------------------|-----------------|-------------------------|-------------------------|----------------------|-------------------|------------------|------------------|
| 7/8 EIA         | Flange           | EZ-600-78EIA     | 3190-1373  | <1.25:1               | (2.5)           | NA                      | Spring Finger Clamp     | S/S                  | 2.3 (58)          | 2.60 (66.0)      | 0.873 (396.0)    |
| 7-16 DIN Female | Straight Jack    | TC-600-716FC     | 3190-375   | <1.25:1               | (2.5)           | NA                      | Solder Clamp            | S/S                  | 1.1 (28)          | 1.00 (25.4)      | 0.249 (112.9)    |
| 7-16 DIN Male   | Straight Plug    | EZ-600-716MH     | 3190-503   | <1.25:1               | (2.5)           | Hex                     | Spring Finger Crimp     | S/S                  | 2.0 (51)          | 1.30 (33.0)      | 0.254 (115.2)    |
|                 | Straight Plug    | TC-600-716MC     | 3190-502   | <1.25:1               | (2.5)           | Hex                     | Solder Clamp            | S/S                  | 2.0 (51)          | 1.30 (33.0)      | 0.347 (157.4)    |
|                 | Right Angle      | TC-600-716M-RA   | 3190-395   | <1.35:1               | (2.5)           | Hex                     | Solder Crimp            | S/S                  | 1.4 (36)          | 1.40 (35.6)      | 0.354 (160.8)    |
| 7/16 Male       | Right Angle      | EZ-600-716M-RA-X | 3190-2546  | <1.35:1               | (6)             | Hex                     | Spring Finger Crimp     | A/G                  | 1.6 (40)          | 1.38 (35.0)      | 0.462 (210.0)    |
|                 | Straight Jack    | EZ-600-716F      | 3190-2447  | <1.25:1               | (6)             | Hex                     | Spring Finger Crimp     | A/G                  | 1.8 (45)          | 1.32 (33.6)      | 0.158 (71.7)     |
| HN Male         | Straight Plug    | TC-600-HNM       | 3190-1429  | <1.25:1               | (<1)            | Knurl                   | Solder Clamp            | S/G                  | 2.3 (59.2)        | 0.88 (22.4)      | 0.25 (113)       |
| LC Male         | Straight Plug    | TC-600-LCM       | 3190-1406  | <1.25:1               | (<1)            | Hex                     | Solder Clamp            | N/S                  | 3.1 (78.0)        | 1.62 (41.1)      | 1.20 (544)       |
| N Female        | Straight Jack    | EZ-600-NF        | 3190-955   | <1.25:1               | (2.5)           | NA                      | Spring Finger Crimp     | S/G                  | 2.3 (59)          | 0.87 (22.1)      | 0.150 (68.0)     |
|                 | Bulkhead Jack    | EZ-600-NF-BH     | 3190-616   | <1.25:1               | (2.5)           | NA                      | Spring Finger Crimp     | S/G                  | 2.4 (61)          | 0.88 (22.4)      | 0.195 (88.5)     |
|                 | Bulkhead Jack    | TC-600-NF-BH     | 3190-589   | <1.25:1               | (2.5)           | NA                      | Solder Crimp            | S/G                  | 2.4 (61)          | 0.88 (22.4)      | 0.195 (88.5)     |
|                 | Bulkhead Jack    | TC-600-NFC-BH    | 3190-466   | <1.25:1               | (2.5)           | NA                      | Solder Clamp            | S/G                  | 2.2 (56)          | 0.94 (23.9)      | 0.214 (97.1)     |
| N Male          | Straight Plug    | EZ-600-NMK       | 3190-669   | <1.25:1               | (2.5)           | Knurl                   | Spring Finger Crimp     | S/G                  | 2.1 (53)          | 0.92 (23.4)      | 0.164 (74.4)     |
|                 | Straight Plug    | EZ-600-NMC-2     | 3190-2641  | <1.25:1               | (6)             | Hex/Knurl               | Spring Finger Clamp     | A/G                  | 2.1 (53)          | 0.92 (23.4)      | 0.202 (91.6)     |
|                 | Straight Plug    | TC-600-NMC       | 3190-357   | <1.25:1               | (2.5)           | Hex                     | Solder Clamp            | S/G                  | 2.1 (53)          | 0.92 (23.4)      | 0.208 (93.4)     |
|                 | Straight Plug    | EZ-600-NMH-X     | 3190-2627  | <1.25:1               | (8)             | Hex/Knurl               | Spring Finger Crimp     | A/G                  | 2.1 (53)          | 0.92 (23.4)      | 0.164 (74.4)     |
|                 | Straight Plug    | TC-600-NMH-X     | 3190-2628  | <1.25:1               | (8)             | Hex/Knurl               | Spring Finger Crimp     | A/G                  | 2.1 (53)          | 0.92 (23.4)      | 0.166 (75.3)     |
|                 | Right Angle      | EZ-600-NMH-RA-X  | 3190-2639  | <1.35:1               | (6)             | Hex                     | Spring Finger Crimp     | A/G                  | 2.0 (50)          | 1.42 (36.0)      | 0.224 (101.7)    |
|                 | Right Angle      | TC-600-NMH-RA-D  | 3190-2427  | <1.35:1               | (6)             | Hex                     | Solder Crimp            | A/G                  | 1.8 (46.5)        | 1.62 (41.2)      | 0.185 (84.3)     |
| QDS Male        | Straight Plug    | TC-600-QDSM      | 3190-846   | <1.25:1               | (<1)            | Knurl                   | Solder Clamp            | A/G                  | 2.2 (55.6)        | 1.00 (25.4)      | 0.25 (113)       |
|                 | Right Angle      | TC-600-QDSM-RA   | 3190-847   | <1.25:1               | (<1)            | Knurl                   | Solder Clamp            | A/G                  | 2.4 (61.5)        | 1.88 (47.8)      | 0.35 (159)       |
| TNC Male        | Straight Plug    | TC-600-TM-X      | 3190-2530  | <1.25:1               | (6)             | Hex/Knurl               | Solder Crimp            | A/G                  | 2.3 (57.6)        | 0.75 (19.0)      | 0.100 (45.6)     |
|                 | Straight Plug    | EZ-600-TM-X      | 3190-2531  | <1.25:1               | (6)             | Hex/Knurl               | Spring Finger Crimp     | A/G                  | 2.3 (57.6)        | 0.75 (19.0)      | 0.100 (45.6)     |
|                 | Reverse Polarity | EZ-600-TM-RP     | 3190-796   | <1.25:1               | (2.5)           | Knurl                   | Spring Finger Crimp     | A/G                  | 2.2 (56)          | 0.87 (22.0)      | 0.112 (50.8)     |
| TNC Female      | Reverse Polarity | EZ-600-TF-RP     | 3190-797   | <1.25:1               | (2.5)           | NA                      | Spring Finger Crimp     | A/G                  | 2.3 (58)          | 0.87 (22.0)      | 0.100 (45.4)     |
| UHF Male        | Straight Plug    | EZ-600-UM        | 3190-615   | <1.25:1               | (2.5)           | Knurl                   | Spring Finger Crimp     | S/G                  | 1.7 (43)          | 0.88 (22.4)      | 0.164 (74.4)     |
|                 | STRAIGHT PLUG    | TC-600-UMC       | 3190-213   | <1.25:1               | (2.5)           | KNURL                   | SOLDER CLAMP            | S/G                  | 1.7 (43)          | 0.88 (22.4)      | 0.198 (89.8)     |

Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alloy \*\*VSWR spec based on 3 foot cable with a connector pair \*Available in bulk pack



## Install Tools

| Type               | Part Number | Stock Code | Description                                                                                 |
|--------------------|-------------|------------|---------------------------------------------------------------------------------------------|
| Crimp Tool         | HX-4        | 3190-200   | Crimp Handle                                                                                |
| Crimp Dies         | Y1720       | 3190-203   | .610" Hex Dies                                                                              |
| Crimp Rings        | CR-600      | 3190-831   | Crimp Rings for TC/EZ-600 connectors (pkg of 10)                                            |
| Strip Tool         | CST-600     | 3192-052   | Combination prep tool for LMR-600 crimp and clamp style connectors                          |
| Replacement Blades | RB-456      | 3190-421   | Replacement Blades for Strip Tools                                                          |
| Deburr Tool        | DBT-U       | 3192-001   | Removes center conductor rough edges                                                        |
| Midspan Strip Tool | GST-600A    | 3190-1051  | For ground strap attachment                                                                 |
| Wrench             | WR600       | 3190-1435  | 15/16" Box Wrench (2 required for EZ-600-NMC-2)                                             |
| Cutting Tool       | CCT-01      | 3190-1544  | Cable end flush cut tool                                                                    |
| Replacement Blade  | RB-01       | 3190-1609  | Replacement blade for cutting tool                                                          |
| Replacement Blade  | RB-CST      | 3192-086   | Replacement blade kit for all CST strip tools                                               |
| Tool Kit           | TK-600EZ    | 3190-1602  | Tool kit for LMR crimp/clamp connectors (includes CCT-01, CST-600, HX-4, Y1720, Tool Pouch) |



## Hardware Accessories

| Type                             | Part Number | Stock Code | Description                                                |
|----------------------------------|-------------|------------|------------------------------------------------------------|
| Ground Kit                       | GK-S600TT   | GK-S600TT  | Standard Grounding Kit (each)                              |
| Hoisting Grip                    | HG-600T     | HG-600T    | Split/Laced Type (each)                                    |
| Cold Shrink                      | CS-A600T    | CS-A600T   | Cable to Antenna Junction (each)                           |
| Cold Shrink                      | CS-60120T   | CS-60120T  | LMR-600 to -1200 Junction (each)                           |
| Cold Shrink                      | CS-60170T   | CS-60170T  | LMR-600 to -1700 Junction (each)                           |
| Hanger Blocks                    | CB-600T     | CB-600T    | Dual Cable Support Block (kit of 10)                       |
| Standard Entry                   |             |            |                                                            |
| Port Cushion                     | SC-600T-3   | SC-600T-3  | Three cables (each)                                        |
| Snap-In Hangers                  | SH-U600T    | SH-U600T   | Snap-In Hangers (Kit of 10)                                |
| Hanger Block Supporting Hardware |             |            | Complete Range of Supporting Hardware & Adapters Available |