

## *Advanced Specialty Products Military Selection Guide*



# SPECTRUM ADVANCED SPECIALTY PROD

## ADVANCED CERAMICS

## COAXIAL FIL

### Specialty Ceramic Components



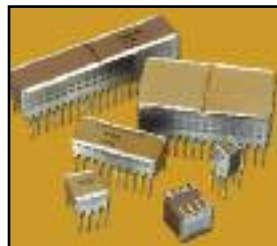
Medical implantable devices, EMI/RFI suppression filters, commercial and military applications, power supplies, converters

### Advanced Ceramics



Ignition and missile systems, battery chargers, circular connectors, launcher and control system

### Switched Mode Power Capacitors (SMPs)



Input/Output filtering for military and high reliability power supplies and high capacitance discharge units that work at high frequencies or high power

### Miniature & Solder-in Filters



Missile squibs, fin and nozzle assemblies, gyroscope aircraft navigation, radar systems

### Power Surface Mount (PSM) Square Surface Mount (SSM) Filters



Transceiver and receiver boards, hand held radios, secure communications, cockpit lighting, sonar and locating devices

Applications

Features / Benefits

Performance Characteristics

#### ■ Discoidals

Low inductance, non-polar  
Filtering and decoupling of high frequency applications  
Reliable, low profile, multi-layered designs

#### ■ Tubular Capacitors

Small, lightweight, reliable, high dielectric strength  
Uniform insertion loss over a broad frequency range

#### ■ Fed/MIL approvals

MIL-PRF-49470 approvals

#### ■ Structural Ceramics

High wear and corrosion resistance  
Temperature stability and strength  
Superior thermal shock resistance  
Custom solutions available

#### ■ Thin/Thick Film Circuits

Product can be manufactured to customer designs  
Various substrates available  
Flexibility in design to include resistive, capacitive and conductive elements  
Custom shapes easily produced

#### ■ Capacitor Arrays

Variable mounting style selection  
Decreased assembly time – one placement  
Reduced component stress  
Parallel and series configurations of chip capacitors

#### ■ Planars

Custom geometry configurations available  
Design flexibility with multiple capacitance values  
Established circular, D-sub and mini connector designs available

#### ■ Electrical features

High capacitance with low ESR & ESI

Better performance than tantalum and aluminum electrolytic capacitors

#### ■ Mechanical features

Available in the six standard DSCC Case Codes (1 to 6) or in custom sizes to meet your needs  
Offered in thru-hole and surface mount lead configurations (N, J, or L)

Ideal for DC-DC power supply applications

Leaded configuration safeguards the device against thermal and mechanical stresses  
BP, BX, BR or BQ ceramic available

#### ■ Military approvals –

DSCC 87106 parts  
– offer case size 1 to 6  
– 50 to 500 volts  
– 480 possible versions

#### ■ Small size options

Ideal for use when real estate is limited

Solder-in, Knurled press-in & 2-56 threaded Spanner

#### ■ Design flexibility

Wide range of solder-in bushings with a variety of circuits: C, L, and Pi  
Custom lead options available

#### ■ Construction

High temperature construction

#### ■ Plating

Suitable for gold bonding when specified

#### ■ Coaxial

Feed-through filtering

#### ■ FED/MIL approvals

Qualified to MIL-C-11015 and MIL-PRF-15733

#### ■ Current rating –

PSM - 20 Amps (FT) and 10 Amps (Pi)  
SSM - 10 Amps

#### ■ Construction –

High temperature construction

#### ■ Small size –

Square mechanical geometry

#### ■ Packaging –

Tape and reel packaging along with bulk packaging

#### ■ Discoidals

.080 to 0.600 in. diameter  
50 to 500 Volt

#### ■ Tubular Capacitors

Feed-through and Pi circuit  
0.081 to 0.122 in. diameter  
50 to 200 Volt

#### ■ Structural Ceramics

Materials: Steatite, Cordierite and Alumina

Finishing methods: glazing, tumbling, plating

#### ■ Thin/Thick Film Circuits

Substrates/Film: Alumina, Garnet, Quartz

Conductors Au, Ag, Ni

Resistors TaN, TiW, Au

#### ■ Planar & Capacitor Arrays

Capacitance values up to 40  $\mu$ F depending on array  
Voltage ratings up to 1500 VDC  
Temperature rating -55°C to 125°C

#### ■ Voltage –

50 to 500 VDC

#### ■ Capacitance –

Up to 180  $\mu$ F  
Tolerances of 10% or 20%

#### ■ Dielectric –

X7R or NPO

#### ■ Temperature range –

-55° to +125°C

#### ■ Insertion loss range

Effective filtering to 18 GHz in a shielded application

#### ■ Capacitance

Up to 30,000 pF

#### ■ Operating voltage

Up to 750 VDC

#### ■ Temperature range

-55°C to +125°C

#### ■ Insertion loss range –

Effective filtering to 18 GHz in a shielded application

#### ■ Capacitance –

Pi: 68 pF to 4000 pF

Feed-thru: 68 pF to .01  $\mu$ F

#### ■ Temperature range –

-55°C to +125°C

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[www.SpecEMC.com/smps](http://www.SpecEMC.com/smps)

[www.SpecEMC.com/lowpass](http://www.SpecEMC.com/lowpass)

[www.SpecEMC.com/psmssm](http://www.SpecEMC.com/psmssm)



## FILTERS & INTERCONNECTORS

### Hermetic/Resin Sealed Filters & MLFT Filters



Electro explosive devices, parachute release systems, magnetic anomaly detection, blower motor systems in tactical vehicles, encryption devices, infrared equipment

### Filter Plates & Shrouded Latch Plates & Assemblies



Communications equipment, remote sensory equipment, navigation equipment, smart weapons and FADEC controllers

### High Performance Filtered D-Subminiature & Combo Connectors



Secured and network communications equipment, ruggedized computers, aerospace control modules

## CONNECTORS & HARNESSING

### Custom Connectors



Communications, satellites, power supplies, electronic warfare, ground/air weapon systems, navigation equipment, and aerospace applications

### Harnessing Products & Services



Military avionics, communications, control modules, navigation equipment, weapons systems

- **Hermetic/Resin Sealed**
- **Cost-effective solutions**  
Low cost filters provide protection in hostile environments
- **Design flexibility**  
Wide range of bushing sizes, lead configuration options and circuit types including C, L, Pi, transient suppression Pi, T, & TT
- **Reliability**  
Built in accordance with MIL-PRF-15733 or MIL-PRF-28861
- **FED/MIL approvals**  
Qualified to MIL-PRF-15733, MIL-PRF-28861 and DSCC 84084
- **Safety**  
Some select filters U.L. 1459 recognized and CSAC22.2 certified
- **MLFT - Motor Line Feed-Through Filters**
- **One component solution**  
Eliminates the need for multiple capacitors, inductive coils, leads and PCB assemblies
- **Easy installation**  
Provides a connector interface for a space saving EMI solution

- **Total reduced costs**  
Economical method of meeting EMC requirements
- **Excellent filtering**  
Outperform surface mount filters at frequencies above 130 MHz; provide an EMI filtered signal line between electronic system modules
- **Reliability**  
Every filter plate is tested 100% for key parameters
- **Standard centers**  
0.100" and 2 mm centers allow for easy termination
- **Easy Mate™ filter plate**  
Design provides for quick installation into predefined cutout
- **Microcircuit packages**  
Custom designs available with a variety of materials, filtering and connectors
- **Rugged construction**  
Shroud protects filter element from potential damage

- **Excellent filtering**  
Filter types include Pi or feed-through capacitors; signal, power & coax contacts; groundplane design provides superior EMI shielding.
- **Design flexibility**  
9 through 50 line construction, standard, high density, mixed pin loading & selectively loaded lines
- **Reliability**  
Each connector position is tested 100% for critical electrical parameters to ensure consistent performance
- **Numerous options**  
Hardware, mounting, waved metal gaskets, hooded strain reliefs, combined filter types and plating
- **FED/MIL approvals**  
UL 94V-0, UL/CSA recognized

- **Excellent filtering**  
Tubular and planar filtered arrays using Pi, LC, T, and C circuits; TVS protection available
- **Design flexibility**  
Filtered MIL-DTL-38999, MIL-DTL-83723, MIL-DTL-26482, MIL-DTL-24308, MIL-DTL-55116 as well as custom filtered connectors
- **Reliability**  
Each connector position is tested 100% for critical electrical parameters
- **Specialty Unfiltered Connectors**  
Built to MIL specifications, custom shells to fit available space. Integral strain relief. Power, signal & coax line combinations

- **Standard assured**  
All harnessing built in accordance with IPC-A-610 & J-Std-001
- **Design flexibility**  
Harnesses can include a wide range of interconnects both unfiltered or Spectrum Advanced Specialty Products filtered product
- **Manufacturing expertise**  
Services include lead wire preparation, soldering & tinning, marking & ribbon cable processing
- **100% tested for continuity**

- **Insertion loss range**  
Effective filtering from 10 KHz to 18 GHz with proper installation
- **Capacitance and temperature characteristics**  
To 5.2 µF NPO, X7R, Y5V, Z5U
- **Temperature range**  
-55°C to +125°C
- **Voltage ratings (max.)**  
To 2500 VDC  
240 VAC @ 400 Hz
- **Current ratings (max.)**  
To 100 Amps

- **Insertion loss range**  
Effective insertion loss from 1 MHz to 18 GHz with proper installation
- **Capacitance**  
Pi: 68 pF to 5000 pF  
Feed-through: 10 pF to 4000 pF
- **Temperature characteristics**  
NPO, X7R, Y5V, Z5U
- **Temperature range**  
-55°C to +125°C
- **Voltage ratings (max.)**  
To 250 VDC
- **Current ratings (max.)**  
To 5 Amps standard

- **Insertion loss range**  
1 MHz to 18 GHz and beyond
- **Capacitance and temperature characteristics**  
To 5600 pF  
NPO, X7R, Y5V, Z5U
- **Temperature range**  
-55°C to +125°C
- **Voltage ratings (max.)**  
200 VDC
- **Current ratings (max.)**  
5 Amps

- **Insertion loss range**  
Effective insertion loss from 1 MHz to 18 GHz with proper installation
- **Capacitance and temperature characteristics**  
To 0.1 µF  
COG, X7R, Z5U
- **Temperature range**  
-55°C to +125°C
- **Voltage ratings (max.)**  
125 VAC @ 400 Hz  
up to 1000 VDC

- **Temperature range**  
-55 C to +200 C
- **Current ratings (max.)**  
To 400 Amps

## POWER FILTERS & FILM MODULES

### High Current Feed-Through Filters



COTS commercial equivalent to M15733-PRE/72, 73 and 74 QLP'd versions, for use in the tempest arena for communication shelters and secured communications

### Military/Aerospace Multisection Filters



Military avionics, secure communication, ruggedized computers, radar and electronic warfare systems, missiles and missile launchers, ballistic missile air defense systems, UAVs, communication shelters and land based vehicles as well as ship board systems

### Film Capacitors & Modules



Military amphibious vehicle, robotic support systems, UGV and UAV, laser pulse power and radar systems, and aircraft power supplies and weapons systems

- **Easy installation**  
Bolt-in style, surface mount
- **Design flexibility**  
Available with single, dual, triple and quad configurations, different stud lengths, mounting brackets hardware and EMI gasketing available
- **Performance**  
Ideally suited to help meet NEBS, GR1089, and EN55022
- **Agency approvals**  
Designed to meet agency approvals, some selected filters UL 1950 recognized, CSA C22.2 certified and TÜV approved
- **Custom options**  
Custom interfacing, contact pins, wire leads, multiple outputs
- **Environmental**  
Can be used in both indoor and outdoor applications

- **Rugged construction**  
Metal enclosures built to withstand MIL-STD environmental conditions, designed to perform in industrial or military environments
- **Design flexibility**  
Transient protection  
Circuit breakers  
Voltage cut-off  
Other options available
- **Performance**  
Provides quick and economical solutions to meet customers' specific requirements  
Increases speed-to-market and decreases development time  
Designs optimized through EMC verification
- **Military approvals**  
Available to meet MIL-PRF-15733 and MIL-STD-461  
Military testing IAW MIL-STD-202, MIL-STD-105  
Designed to meet NEBS and safety agency approvals
- **EMI design verification**  
Equipment verification can be accomplished through Spectrum Control's EMI test lab

- **Current ratings (max)**  
To 500 Amps
- **Voltage ratings (max)**  
To 1000 VDC and to 240 VAC
- **Insertion loss range**  
AC: 1 MHz to 1 GHz  
DC: 150 KHz to 10 GHz  
High performance options available with IL up to 100 dB
- **Temperature range**  
-55°C to +125°C
- **Capacitance**  
4.7µF max  
Class Y2 and Y4 available

- **Current ratings (max)**  
Up to 250 Amps
- **Voltage ratings (max)**  
400 VDC and 250 VAC standard; custom voltage ratings available
- **Insertion loss range**  
Effective filtering from 10 KHz to 10 GHz
- **Temperature range**  
-55°C to +125°C
- **Leakage current**  
Standard and low leakage designs available

[www.SpecEMC.com/power](http://www.SpecEMC.com/power)

- **Design flexibility**  
Wide range of dielectrics: polypropylene, polyester (mylar), polyphenylene sulphide (PPS)  
Variety of terminations: radial or axial leads, machined, stamped, lugs, PCB mount, threaded, inserts  
Multiple enclosures: metal case, pre-molded plastic, wrap and fill  
Hermetic, non-hermetic  
Various geometries: cylindrical, flat, modular, oval-wound  
Encapsulation options: Dry or impregnated  
Multitude of sizes: less than an inch to several cubic feet
- **Performance**  
Deliver high DC current, high pulse capability, high stability, low self-inductance, and low ESR
- **Compact size**
- **Testing & Verification**  
Simulation software replicates real work environment  
In house testing and verification insures function and compliance

- **Voltage ratings**  
AC: Up to 750 VAC  
DC: Up to 20,000 VDC
- **Temperature range**  
-55°C to +150°C
- **DF**  
0.3% to 0.15% typical
- **IR**  
3 GΩ min
- **Ripple currents**  
Up to 400 arms

[www.SpecEMC.com/film](http://www.SpecEMC.com/film)

## ANTENNAS & ASSEMBLIES

### Patch Antenna Elements



Satellite and wireless ground based data systems that utilizes GPS Military L2, homeland security, military asset tracking

### Antenna Assemblies



Military hardened assemblies, soldier wearable, directional finders, and short distance wireless or satellite data transfer

- **Design options**  
**Individual SMD components:**  
Small footprints of 13 mm to 78 mm square with profiles as low as 4 mm (Excluding ground plane) Designed and 100% tested for optimal performance on various ground planes  
**Sub Assemblies:**  
Single or multi-frequency designs on ground planes with a variety of available cables and connectors.  
**Full Assemblies:**  
"Plug & play" antennas in single or multiple frequency designs  
Completely packaged in protective radome optimized to center frequency  
**Dual Channel SMD**  
45 mm footprint with two frequencies packaged in single component
- **Engineering expertise**  
**Advanced 3-D Simulation**  
Radiation patterns optimized for superior performance integration  
**Design Knowledge**  
Vast experience in custom and military applications  
Quick "tuned" prototype capabilities

- **Performance Attributes**  
Capabilities from 900 MHz to 5.8 GHz  
Optimization for specific applications  
High Gain/Low return Loss  
Circular polarized with linear capabilities  
Low frequency drift vs. temperature  
Offset single-point feeding method  
Omni-directional
- **Impedance**  
50Ω Standard

[www.SpecEMC.com/patch](http://www.SpecEMC.com/patch)

- **Design knowledge**  
Vast experience in advanced computer simulation, custom solutions and military hardened assemblies  
Quick "tuned" prototype capabilities
- **Design Options**  
Multi-antenna systems  
Radomes  
Matching networks, baluns and amplifiers
- **Design considerations including resonant**  
Frequency vs size  
Pin tapping point  
Placement of antenna near foreign objects  
Impedance and resonant frequency  
Axial ratio & polarizations  
Voltage standing wave ratio  
Bandwidth

- **Performance Attributes**  
Low VSWR  
High Efficiency  
High Gain
- **Frequency Range**  
-300 MHz to 6 GHz

[www.SpecEMC.com/antennas](http://www.SpecEMC.com/antennas)

Applications

Features / Benefits

Performance Characteristics

# Spectrum Advanced Specialty Products

Since our founding in 1968, you've known us as Spectrum Control, the leading provider of custom application-specific EMI filter solutions. Now we've got a new name and lots of new products to help address the mechanical, electrical and/or power requirements of your next design. The NEW Spectrum Advanced Specialty Products not only has the industry's most complete line of coaxial EMI components, but also an expanded offering of advanced ceramics, film modules, filtered and unfiltered interconnects, and antenna assemblies.

- **Trusted Military Partner**

Spectrum has a long history of forming strategic partnerships with many of the defense industry's leading suppliers. We are proud to be a primary supplier on many of the aircraft, ship, land-based attack vehicle, and weapon programs maintained by many of the NATO defense branches.

- **MIL Qualified Products**

We offer over 800 standard QPL products & DSCC part numbers. Look to us for the largest number of MIL-PRF-15733, MIL-PRF-28861, DSCC 84084, MIL-PRF-49470 and MIL-C-11015 filters. Whether a COTS buy or engineered solution, we're the ideal source for your design.

- **Innovative New Solution**

Part of our decision to adopt a new name followed our continued growth into new product areas. New for this year are a greatly expanded line of antenna assemblies designed for critical data transmission, new unfiltered and filtered connectors and custom connector harnessing, advanced ceramics and ceramic capacitors, and our modular film capacitors engineered for military power applications.

- **Testing Expertise**

Integral to solving EMC problems is the ability to test for compliance. We conduct a wide range of EMC and environmental tests and use that data in our design process. The result is the most comprehensive EMI evaluation and design resource available.

- **In-House EMC Testing**

MIL-STD-461 A/B/C/D/E  
MIL-STD-1399  
RTCA/D0160 A/B/C/D

- **Unique In-House Testing Capabilities**

ESS – environmental stress screening  
Analytical circuit design  
Surge testing  
EN testing for European requirements  
Power handling

## In-House Environmental Testing

| Test                           | MIL-STD-1344  |           | MIL-STD-202 |           |
|--------------------------------|---|-----------|-------------|-----------|
| Description                    | Method  | Condition | Method      | Condition |
| Vibration                      | -   | -         | 204         | G         |
| Thermal Shock                  | -   | -         | 107         | A-1       |
| Immersion                      | 1016  | -         | 104         | A         |
| Salt Spray                     | 1001  | -         | 101         | B         |
| Moisture Resistance            | 1002  | II        | 106         | -         |
| Mechanical Shock               | 2004  | -         | 213         | I         |
| Barometric Pressure            | 3001  | -         | 105         | C         |
| Resistance to Solder Heat      | -   | -         | 210         | B         |
| Terminal Strength              | -   | -         | 211         | A         |
| Contact Resistance             | -   | -         | 307         | -         |
| Life                           | -   | -         | 108         | D         |
| Durability                     | -   | -         | -           | -         |
| Solderability                  | -   | -         | 208         | -         |
| AC Voltage Drop                | AC measurement across the terminals<br>Per MIL-STD-1344 with or without load<br>-55°C to 125°C<br>Per Mil-C-123<br>DPA to Mil-C-123 |           |             |           |
| Insertion Loss                 |   |           |             |           |
| Insertion Loss at temperatures |   |           |             |           |
| DPA Filter                     |   |           |             |           |
| DPA Capacitor                  |   |           |             |           |



**SPECTRUM**  
Advanced Specialty  
**PRODUCTS**

A Spectrum Control Business

[www.SpecEMC.com](http://www.SpecEMC.com)

ISO 9001:2000





## SpecEMC.com

Check out our online tools to help you find the product or system that meets your needs.

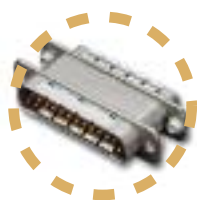
## Instant Inventory Information

Check Stock will provide you with distributor names, part numbers, quantity on hand, online ordering capability and the last date inventory was updated for that particular component.



## Project Starter

Design your product to meet the exact requirements of your application. Project Starter allows you to choose from multiple configurations to get a product that will best meet your application needs and you can even request a drawing, sample or quote of your custom product.



## Spectrum Advanced Specialty Products

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**SPECTRUM CONTROL, INC.**

## Our Family of Custom Solution Businesses SpectrumControl.com



- Amplifiers & Mixers to 28 GHz
- Filters & Switch Filter Assemblies to 40 GHz
- DROs, PLOs, VCOs & Synthesizers
- Integrated Assemblies to 47 GHz
- Hybrids to 50 GHz
- Advanced Thin Film Products

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- Filtered Interconnect Devices
- Antennas
- Advanced Ceramics and Assemblies
- Specialty Connectors

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- Position Sensors
- Temperature Sensors
- NTC and PTC Ceramic Components
- PTC Heater Assemblies
- Panel Input Controls

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- Remote Management Systems
- Monitoring Equipment Environmental, Electrical, Security, Mechanical

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