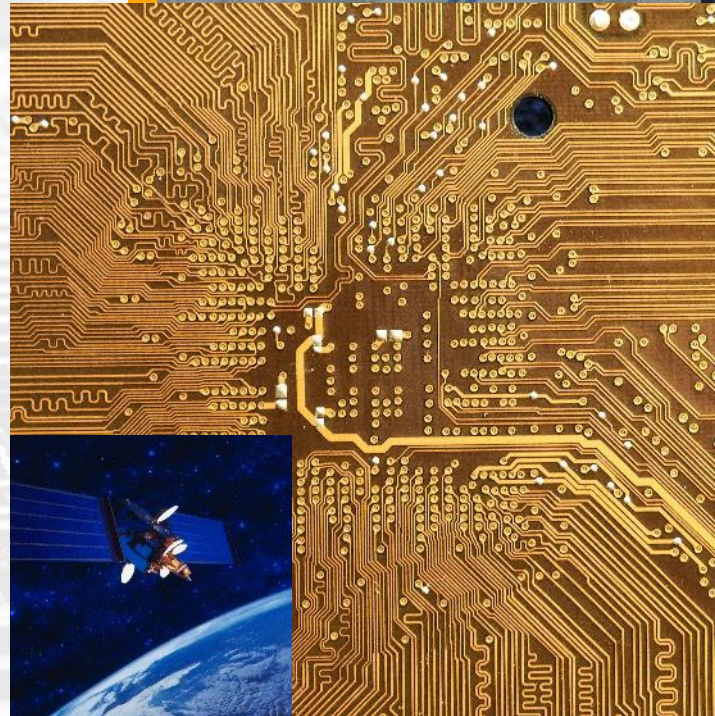


# Defining & Delivering the Future of Mission-Critical Electronics

January 14, 2023



# Quantic Overview

Defining & Delivering the Future  
of Mission-Critical Electronics

- > Global leader within military, space and commercial markets

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- > 15,000+ products across 14 Business Units

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- > 1,500+ customers worldwide

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- > ~800 employees in 20 offices

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- > 60+ years of history serving mission-critical electronics

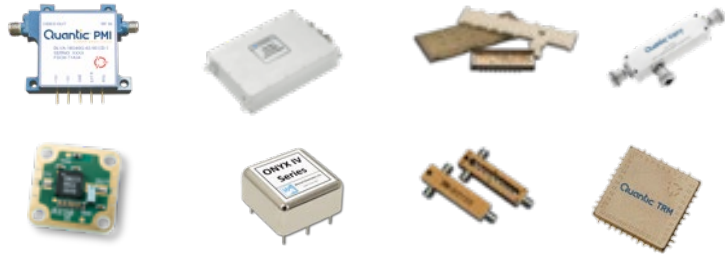
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- > Strong patent and IP position

# Three Verticals of Mission-Critical Electronics

## RF/MW Products

(Components to Integrated Assemblies)



Quantic™ Corry

Quantic™ MWD  
MICROWAVE DYNAMICS

Quantic™ TRM

Quantic™ PMI  
PLANAR MONOLITHICS

Quantic™ Wenzel

Quantic™ X-Microwave

Quantic™ Croven

## Sensing Products

(Encoders, Scanners & Accelerometers)

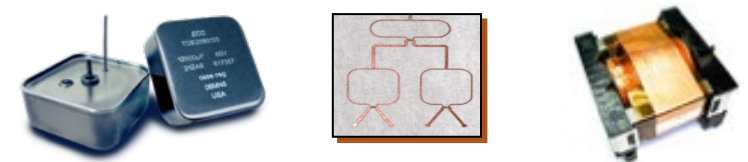


Quantic™ BEI

Quantic™ Thistle

## Power Products

(Capacitors, Resistors & Magnetics)



Quantic™ Evans

Quantic™ ECI

Quantic™ Eulex

Quantic™ Ohmega

Quantic™ Paktron

Quantic™ Ticer

Quantic™ UTC

# Why Quantic?

## A Broad Portfolio of RF, Sensing, and Power Products

Portfolio of 15,000+ Catalog Products and Fully Custom Offerings

- > Crystal Oscillators
- > Encoders & Accelerometers
- > High-Power Capacitors
- > Resistive Foils
- > Magnetics
- > Power Dividers
- > Filters
- > Converters
- > Amplifiers
- > Phase Shifters

## Decades of Experience Serving Mission-Critical Programs

COTS to Mil-Spec Capabilities / US and International EAR-99 Compliance

- > Joint Strike Fighter
- > Air & Missile Defense Radar
- > Apple iPhone
- > Key components on medical equipment for Abbott, GE Healthcare & Karl Storz
- > Over 60 years of space pedigree—NASA Orion, Mars Perseverance Rover, SBIRS, and ISS

## Serving a Diverse Set of Applications and Customers

Serving Industry Leaders Across All End Markets

- > Aerospace & Defense
- > Commercial
- > Industrial
- > Magnetics
- > Test & Measurement



## Small Company Flexibility with Large Company Stability

Engineer-to-engineer "hands on" approach

- > Ability to rapidly prototype w/attractive lead times
- > RF/MW systems optimization capabilities with modular, scalable building blocks
- > Multiple locations for complex problem solving
- > Ability to invest where customers have critical needs

# Servicing the A&D Supply Chain

From Components to Custom Modules - Including Rapid Prototyping

**Primes/Tier 1**  
Mission Integrated Systems

**Tier 2**  
Integrated Subsystems

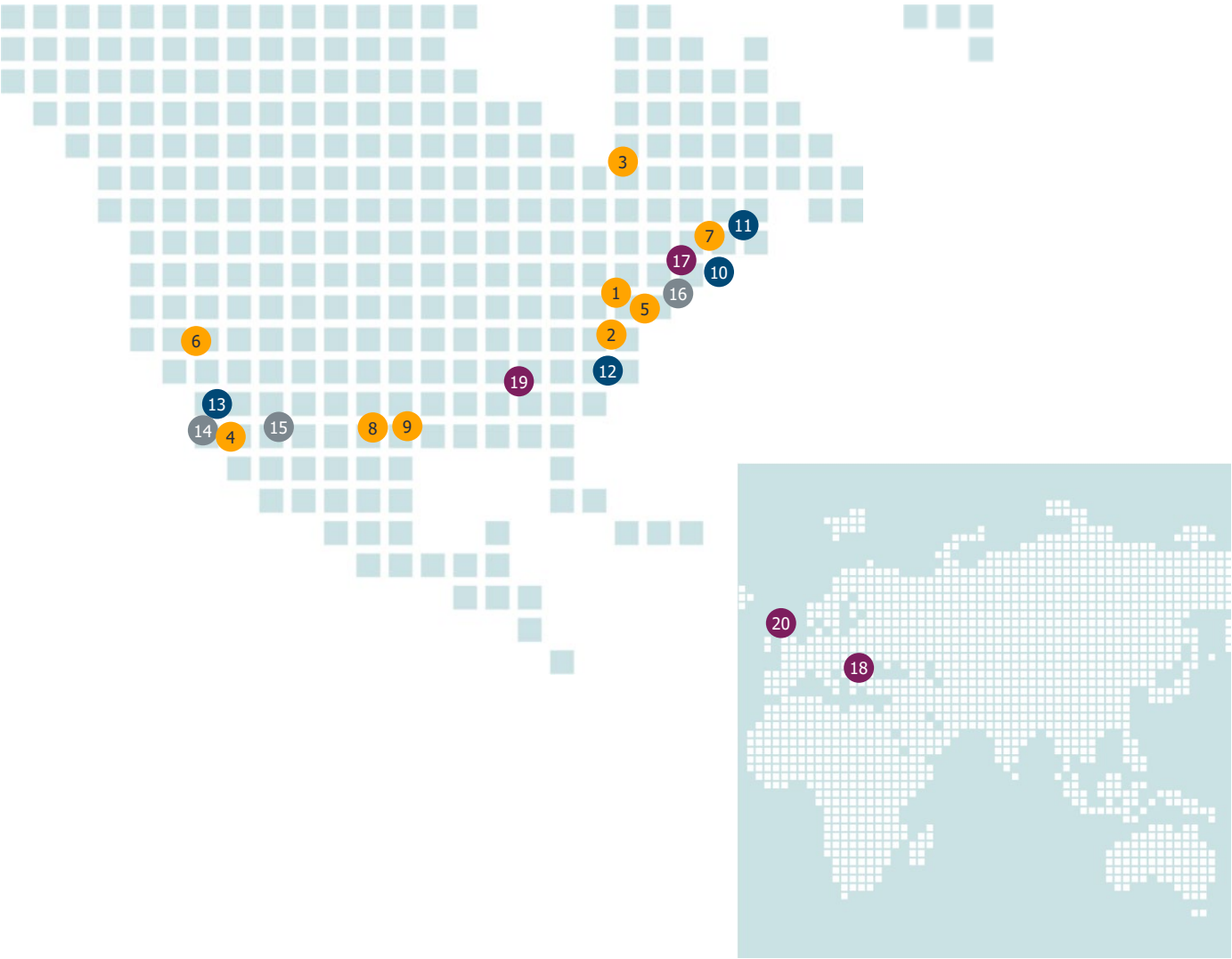
**Tier 3**  
Modules

**Tier 4**  
Components



**Our Focus.**

# Quantic Design and Manufacturing Locations



## RF & Microwave

- 1 Quantic Corry – Corry, Pennsylvania
- 2 Quantic Corry – Warrendale, Pennsylvania
- 3 Quantic Croven – Whitby, Ontario
- 4 Quantic MWD – Irvine, California
- 5 Quantic PMI – Frederick, Maryland
- 6 Quantic PMI – El Dorado Hills, California
- 7 Quantic TRM – Bedford, New Hampshire
- 8 Quantic Wenzel – Austin, Texas
- 9 Quantic X-Microwave – Austin, Texas

## Capacitors

- 10 Quantic Evans – East Providence, Rhode Island
- 11 Quantic Evans – Sanford, Maine
- 12 Quantic Paktron – Lynchburg, Virginia
- 13 Quantic Eulex & Quantic UTC – Monterey Park, California

## Resistors

- 14 Quantic Ohmega – Culver City, California
- 15 Quantic Ticer – Chandler, Arizona
- 16 Quantic Ticer – Windsor, Connecticut

## Magnetic & Sensing

- 17 Quantic ECI – Westfield, Massachusetts
- 18 Quantic ECI – Tatabanya, Hungary
- 19 Quantic BEI – Maumelle, Arkansas
- 20 Quantic Thistle – Midlothian, Scotland

# Quantic PMI Overview

Defining & Delivering the Future  
of Mission-Critical Electronics

- > Global leader within military, space and commercial markets

---

- > Design & manufacture of Quality RF & Microwave Components & Integrated Module Assemblies

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- > Offers more than 4000 commercial off-the-shelf models with test results, S-parameters, 3D models and detailed specs available.

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- > Every product is built to rigorous MIL-STD specs

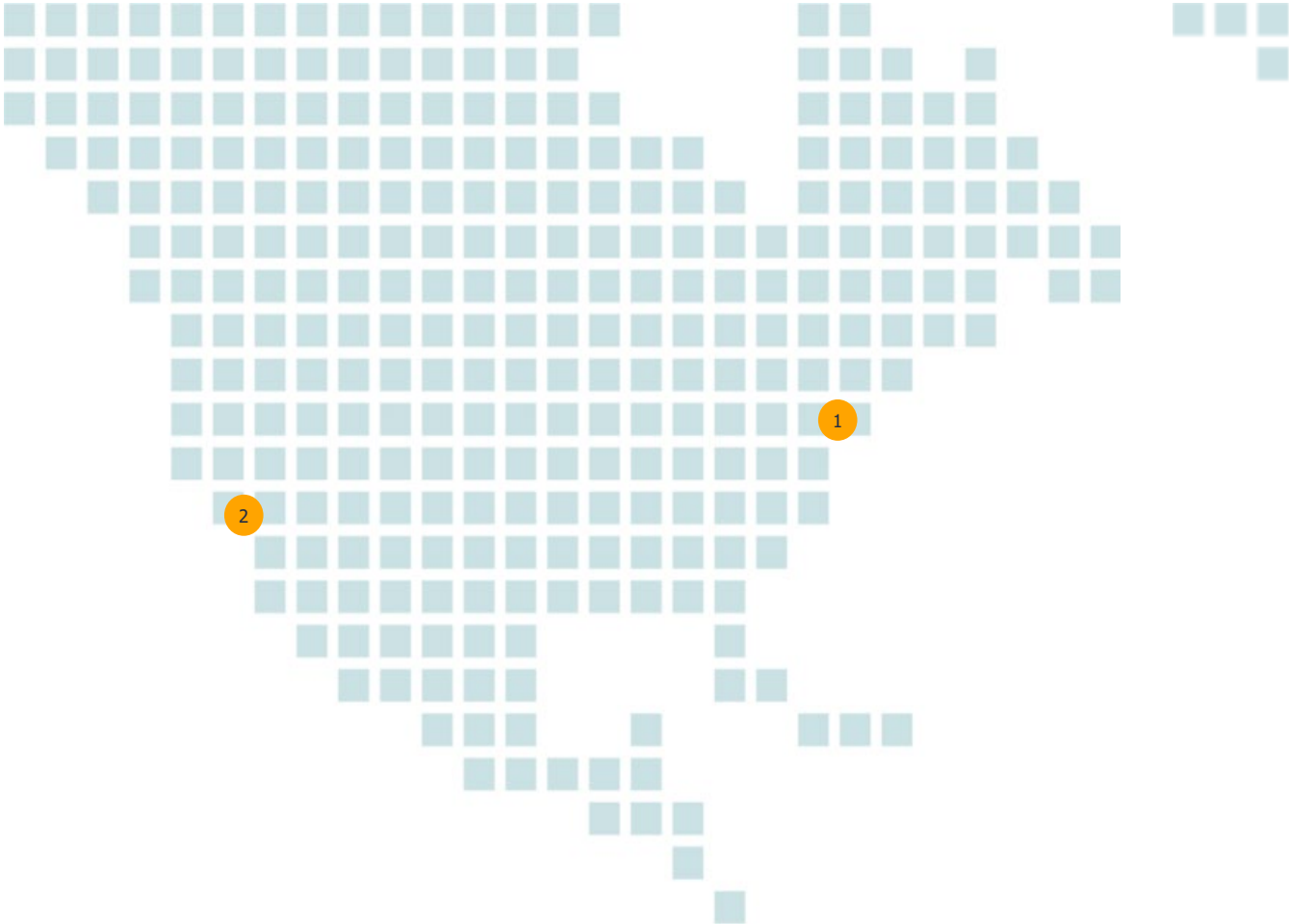
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- > ITAR & ISO-9001 Certifications

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- > Industry-leading sales and applications support, leading to lower costs and faster lead times than competitive options.

# Design and Manufacturing Locations



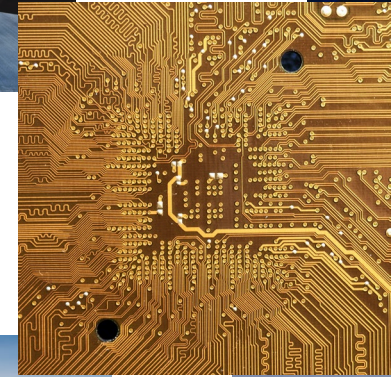
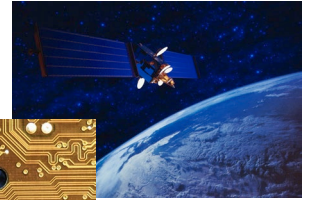
## RF & Microwave

- 1 Quantic PMI – Frederick, Maryland  
East Coast Operation  
7309-A Grove Road  
Frederick, MD 21704 USA  
  
Tel: 301-662-5019  
Fax: 301-662-1731
  
- 2 Quantic PMI – EL Dorado Hills, California  
West Coast Operation  
4921 Robert Mathews PKWY, Suite 1  
EL Dorado Hills, CA 95762 USA  
  
TEL: 916-542-1401  
FAX: 916-265-2597

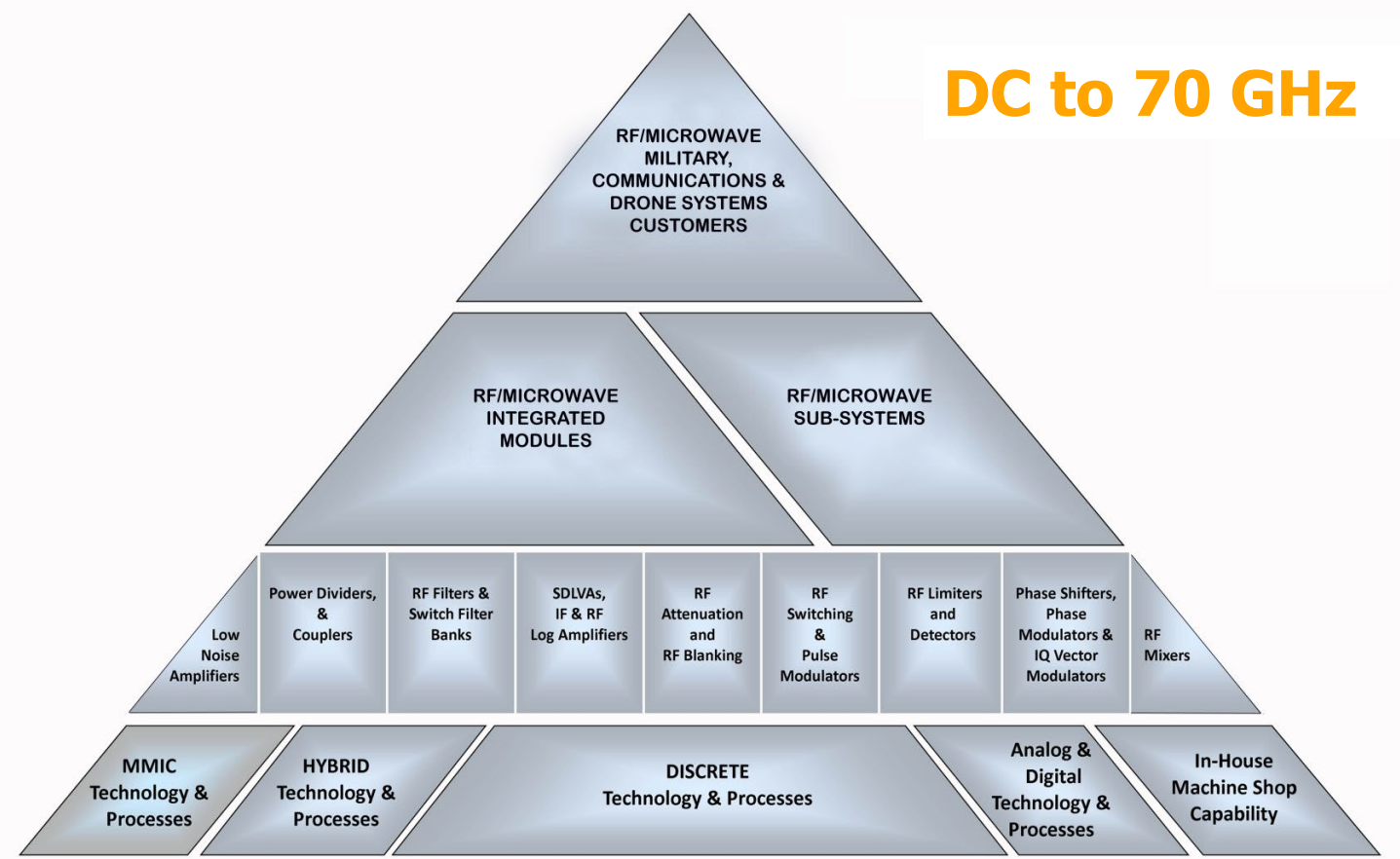
[sales@quanticpmi.com](mailto:sales@quanticpmi.com)

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

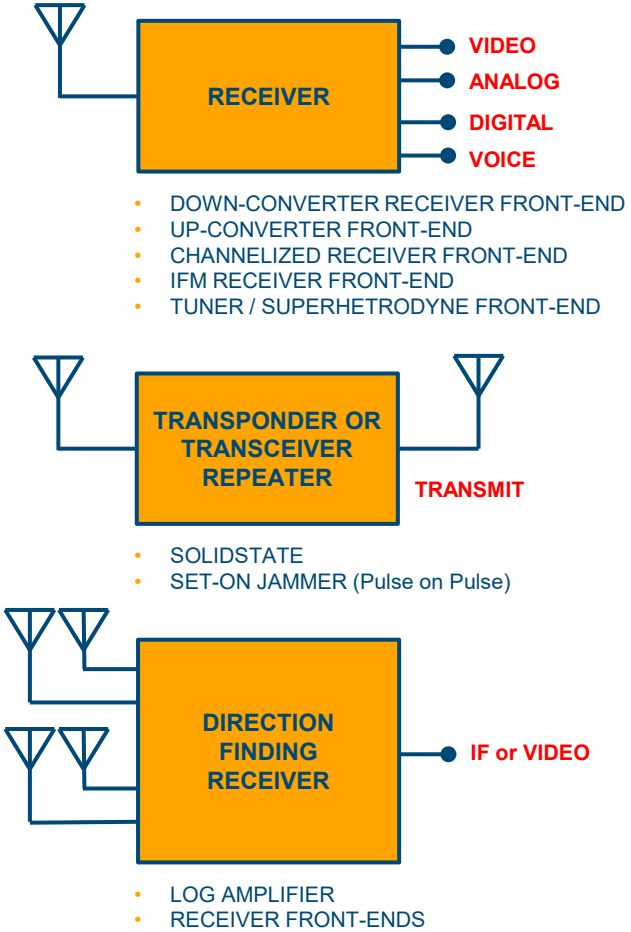
# Design & Applications



As a manufacturer Quantic PMI utilizes our own designs for all components, integrated modules and subsystems



# Applications of Quantic PMI Components & Sub-Systems



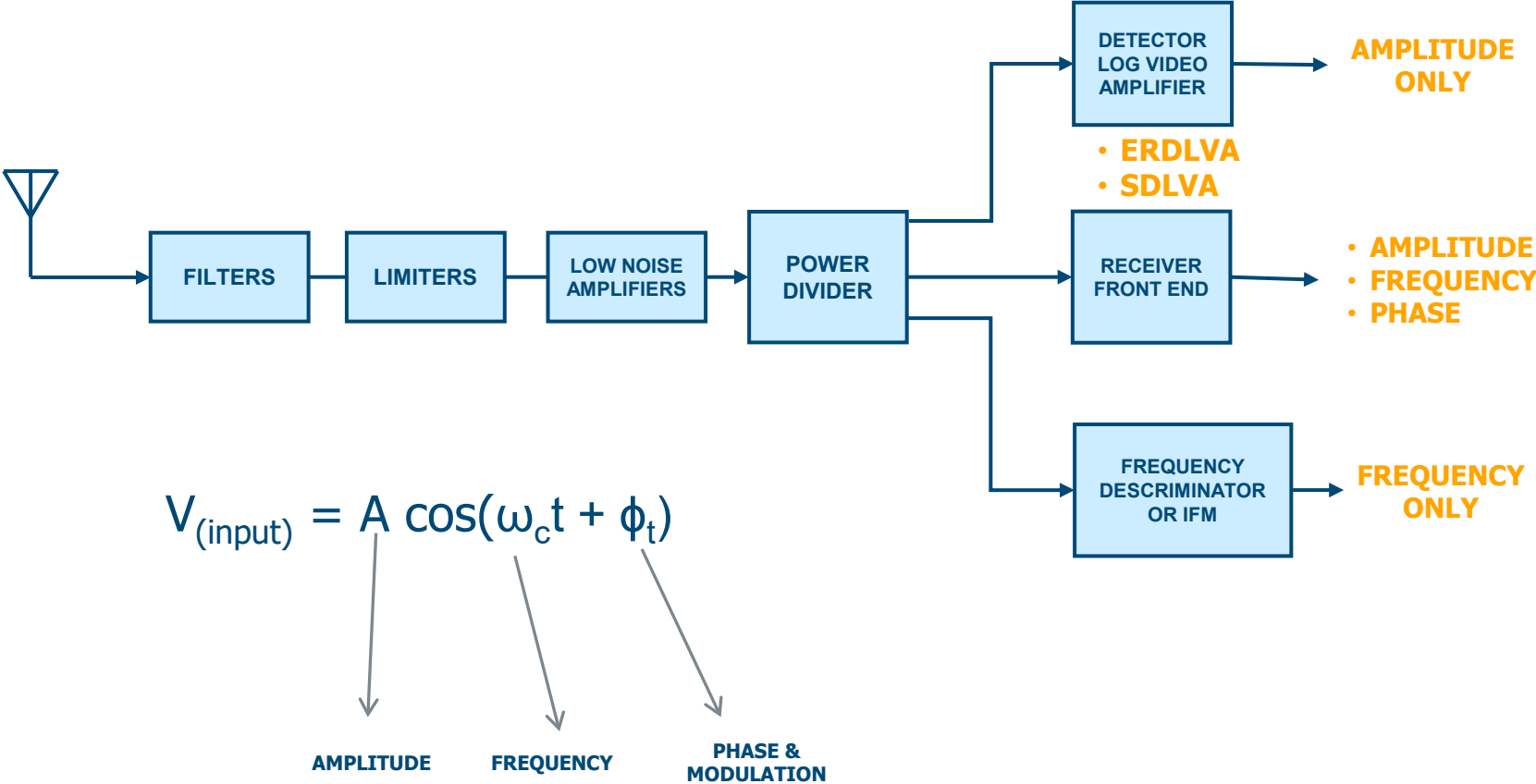
Quantic PMI (Planar Monolithics) has been in business for over 30 years as a world-class designer and manufacturer of electronic components and subsystems for defense applications such as **Receiver Front-Ends, Synthesizers, and Transceivers**. A large variety of **RF components and integrated modules** have been developed to compliment this target market. Our technical goal is to produce the finest products available that resolve this mathematical statement:

$$V_{(input)} = A \cos(\omega_c t + \phi_t)$$

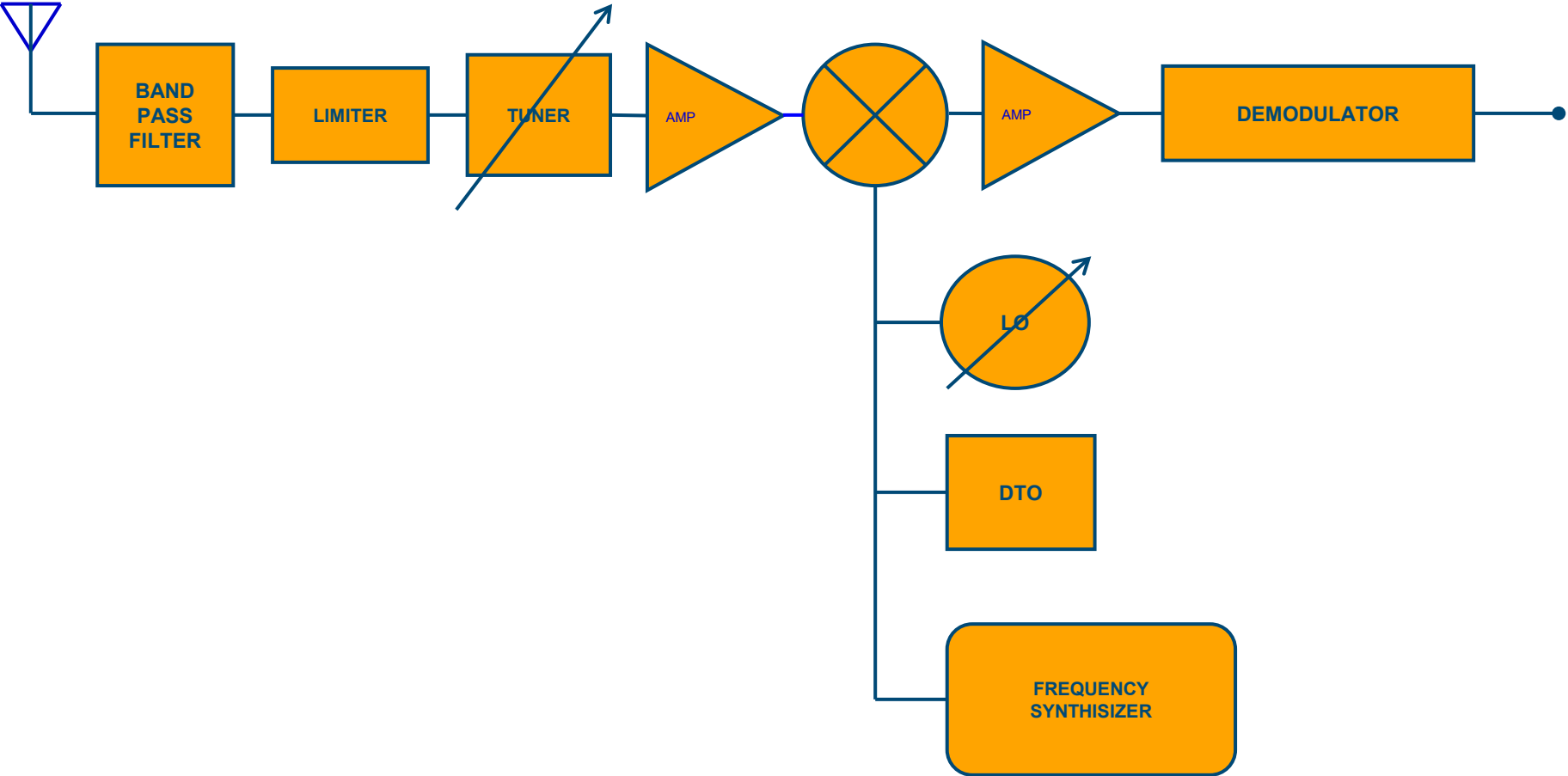
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AMPLITUDE      FREQUENCY      PHASE & MODULATION

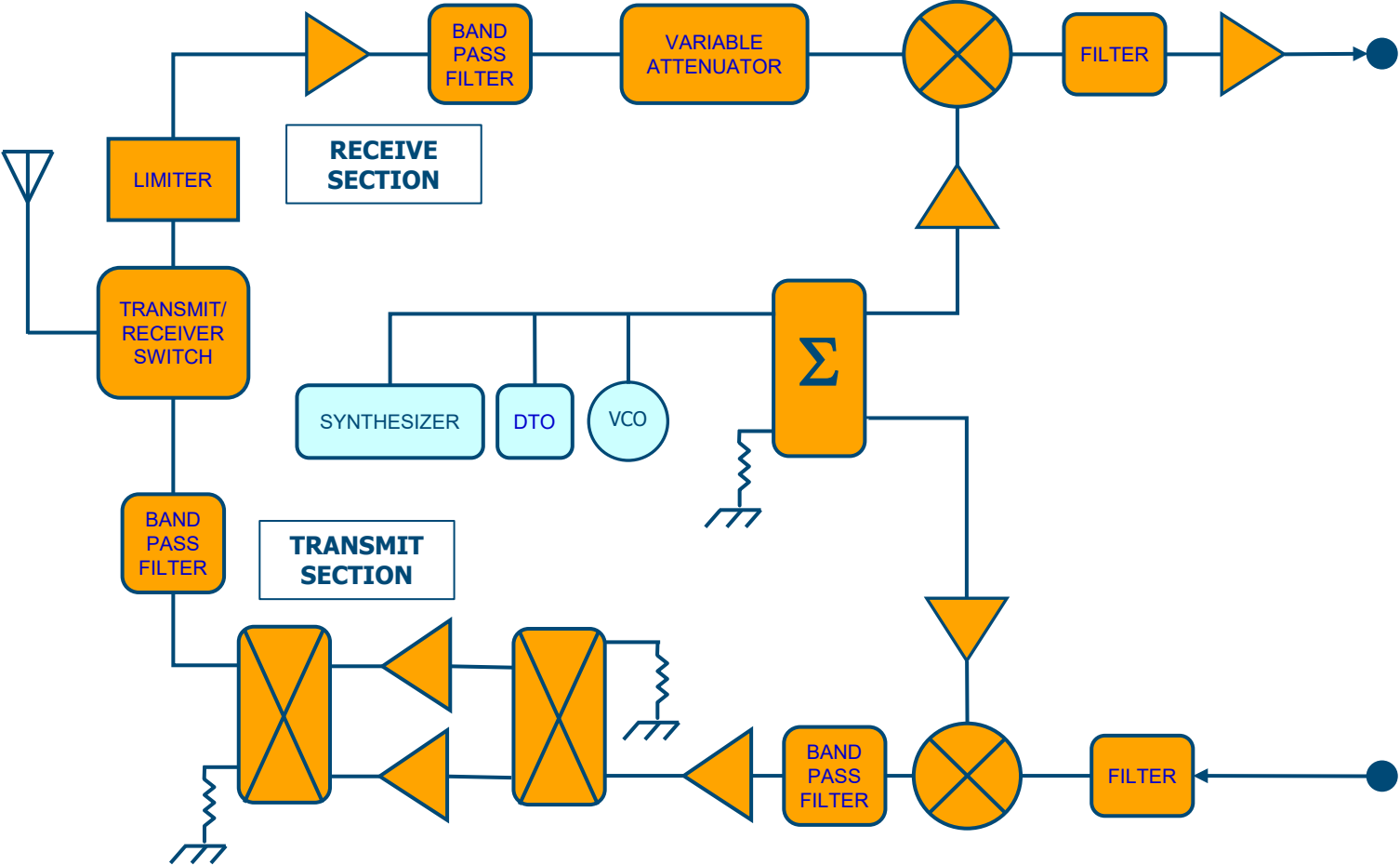
## TYPICAL EW, ECM, ESM RECEIVER FRONT-END



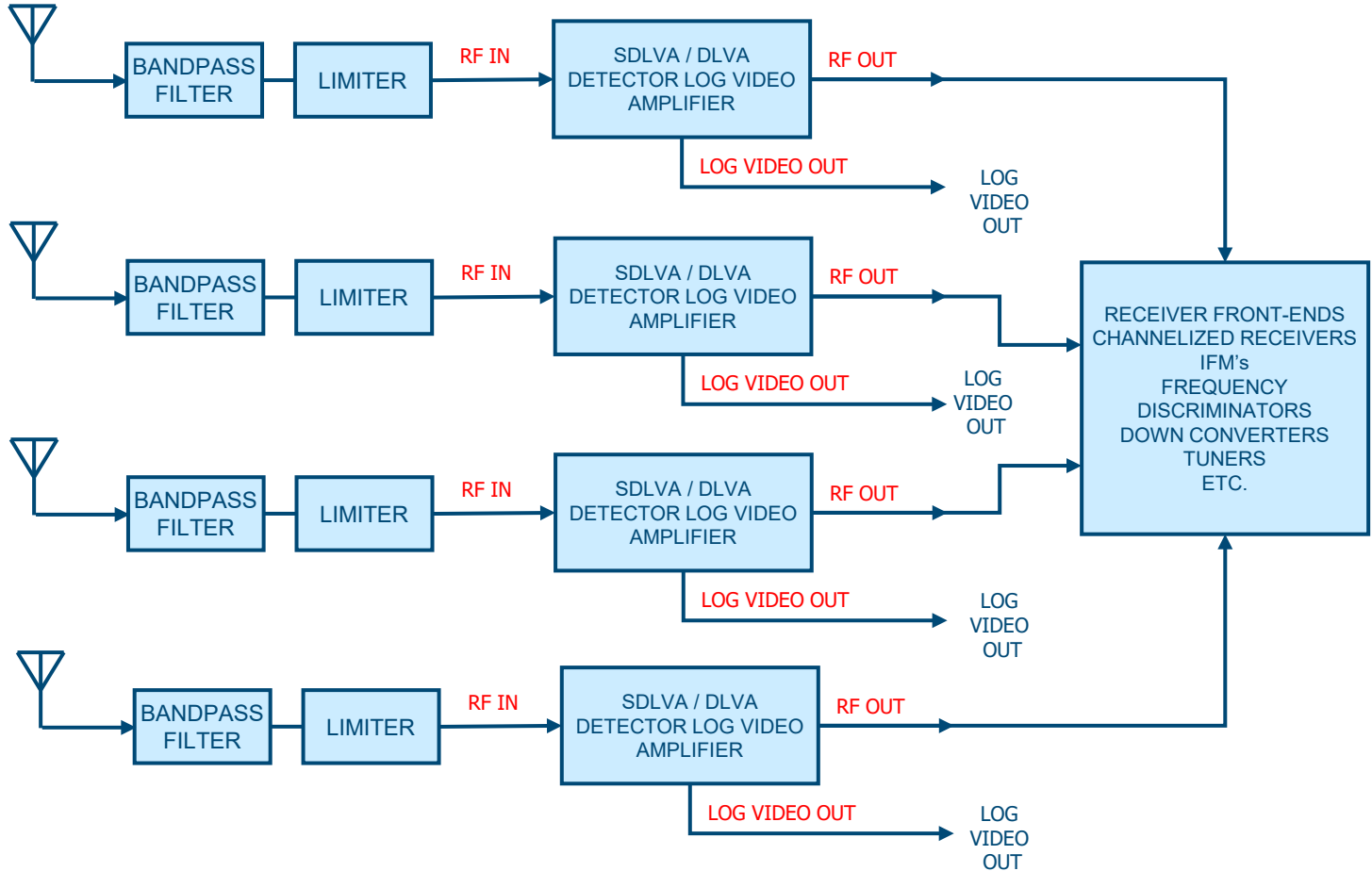
## TYPICAL EW, ECM, ESM RECEIVER FRONT-END



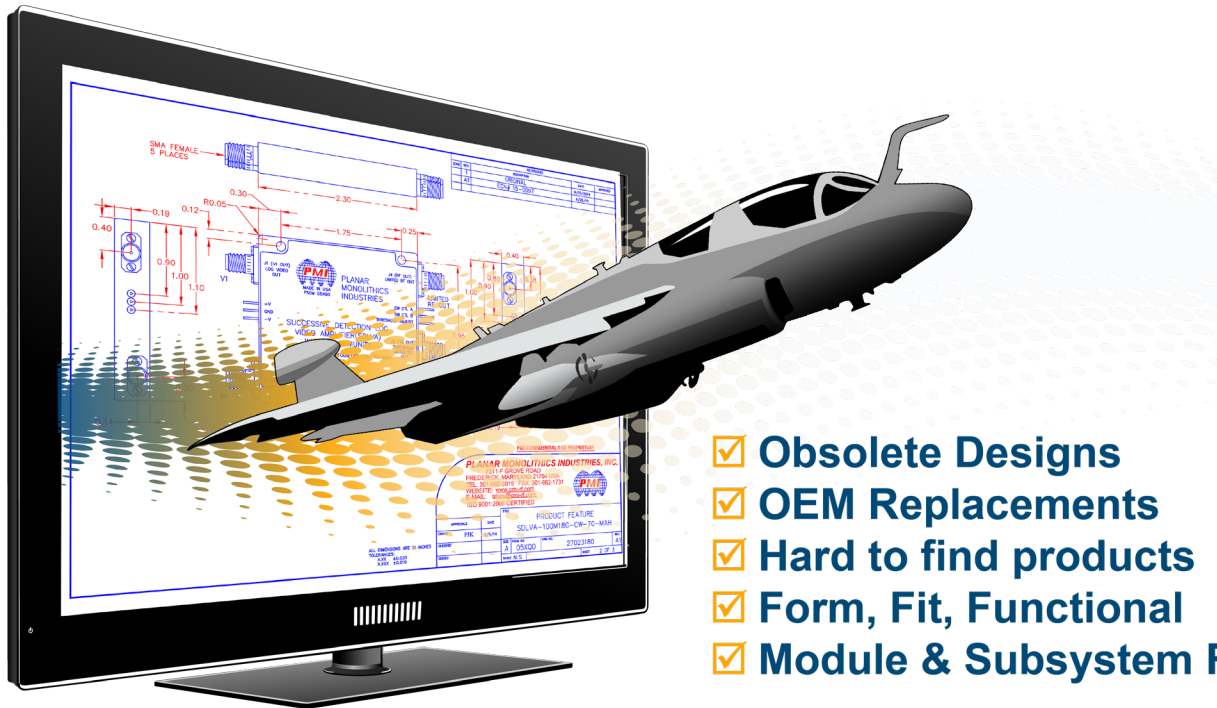
## TYPICAL TRANSCEIVER / TRANSPONDER BLOCK DIAGRAM



## TYPICAL RADAR WARNING RECEIVER FRONT-END OR DIRECTION FINDING RECEIVER FRONT-END SUB-SYSTEM



*Quantic PMI is a Leader in EOL and Obsolete Aftermarket Manufacturing*

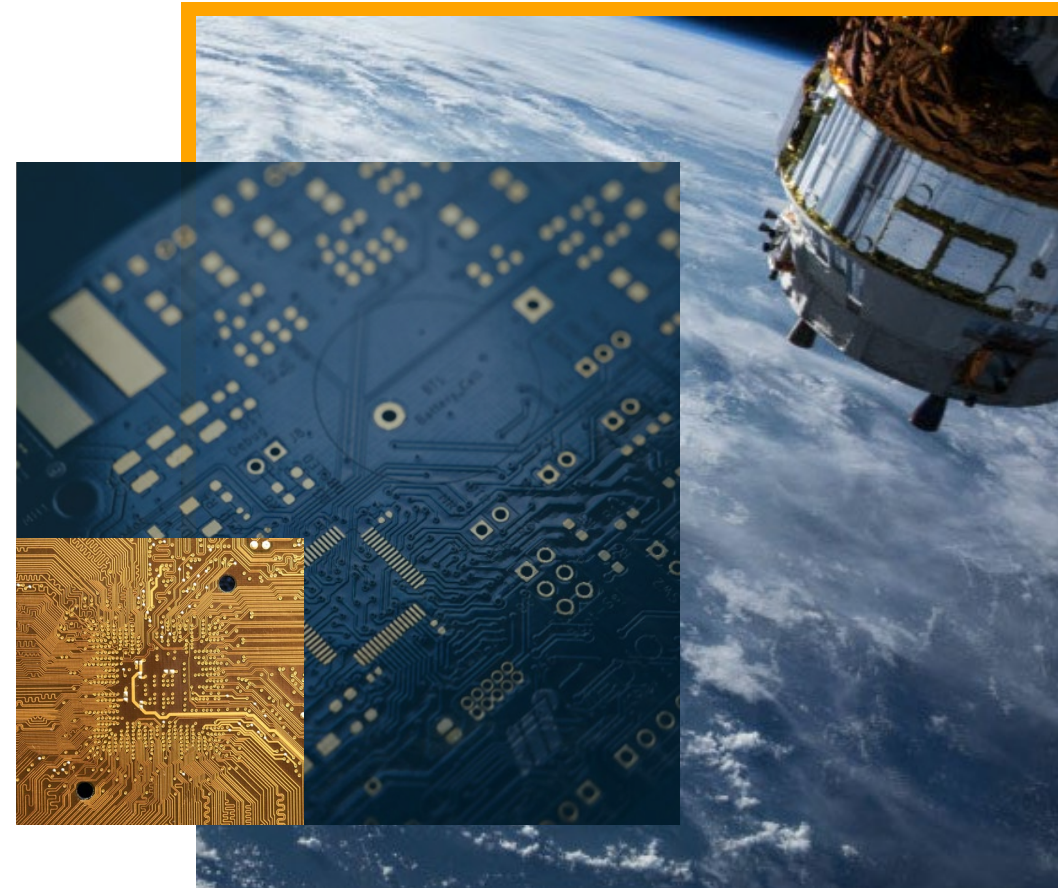


- ✓ **Obsolete Designs**
- ✓ **OEM Replacements**
- ✓ **Hard to find products**
- ✓ **Form, Fit, Functional**
- ✓ **Module & Subsystem Retrofits**

- > Using Source Control Drawings (SCD), Quantic PMI offers a complete solution to meet or exceed the electrical, mechanical and environmental specifications.
- > Specializing in aftermarket technology manufacturing and support for discontinued RF components, electronic circuits, digital circuits and Integrated circuits.
- > Quantic PMI has the technical expertise to manufacture, supply and support these requirements.
- > Quantic PMI is dedicated to assuring our customer base that older discontinued products will continue to be available.

# RF & Microwave Products

DC to 70 GHz

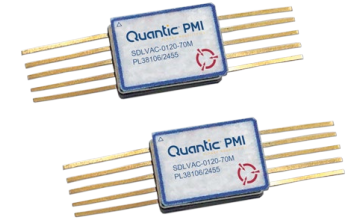


# DLVAs, ERDLVAs, SDLVAs & Log Amps

- > Exceptional Temperature Stability, Log Linearity & Frequency Response
- > TSS > -68 dBm & Fast Log Video Response Time
- > CW Immunity, Temperature Compensation & Matched Sets
- > Hermetic Sealing, Military or Aerospace Screening available
- > Connectorized or surface mount
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



0.7 to 1.3 GHz  
IF Logarithmic Amplifier  
(SDLVA)



0.1 to 2 GHz  
Miniature SDLVA



2 to 18 GHz,  
65 dB CW Immune ERDLVA



Detector Log Video Amplifier



18 to 40 GHz DLVA



0.5 to 4 GHz SDLVA

# Switches & Switch Matrices

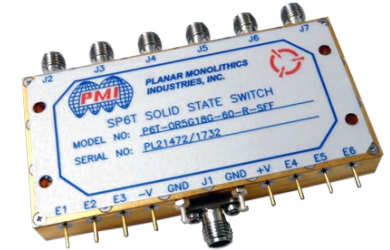
- > Broadband Performance to 60 GHz
- > Ultra-High Isolation
- > Low Insertion Loss
- > Ultra-High Speed
- > Low Power Consumption
- > SP1T - SP64T (Reflective or Absorptive)
- > Connectorized or Surface Mount
- > Hermetic Sealing, Military or Aerospace Screening available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



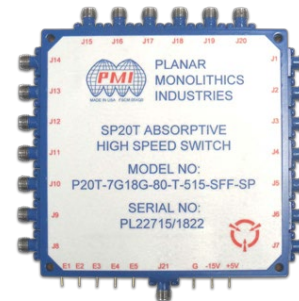
0.1 to 20 GHz  
SP4T Absorptive Switch



0.1 to 52 GHz  
SP16T Absorptive Switch



0.5 to 18 GHz  
SP6T Reflective Switch



7 to 18 GHz  
SP20T Absorptive Switch



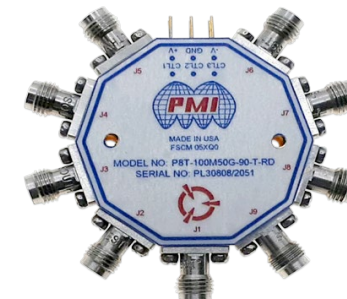
0.1 to 44 GHz  
SP2T Absorptive Switch



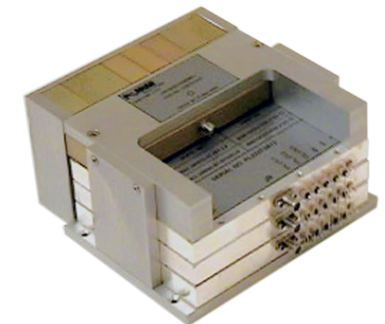
0.1 to 56 GHz  
SP2T Absorptive Switch



2 to 18 GHz  
SP2T Absorptive Switch



100 MHz to 50 GHz  
SP8T Absorptive Switch



20 MHz to 3 GHz, SP8T  
Switch Matrix Assembly

# Solid-State Amplifiers

- Low Noise Amplifiers (Broadband, Narrow Band & Multioctave)
- Variable Gain, High IP SIGINT & Limiting Amplifiers
- Coaxial, Power, Test & Lab Use Amplifiers
- Hermetic Sealing, Military or Aerospace Screening available
- Gain & Phase Matching
- Connectorized or surface mount
- Form, Fit & Function Products & Services
- Custom Designs to Your Specifications



2 to 18 GHz  
High-Power Amplifier



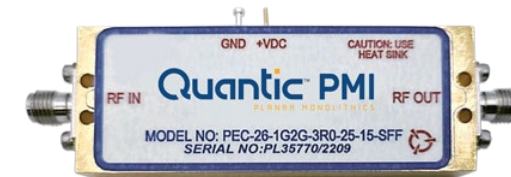
0.5 to 18 GHz  
Dual Gain Amplifier



Ultra-Low Noise Amplifier  
Dual use component



0.25 to 20 GHz  
Low Noise Amplifier



High Linearity,  
Low Noise Amplifier



1 to 18 GHz  
Portable Amplifier

# Limiters

- Broadband Performance to 62 GHz
- High Peak Power Handling
- Fast Recovery & Low RF Leakage
- Low Insertion Loss
- Small Size & Standardized Packaging
- Hermetic Sealing, Military Screening available
- Form, Fit & Function Products & Services
- Custom Designs to Your Specifications



10 MHz to 6 GHz  
2.5 W CW Limiter



10 MHz to 62 GHz  
1.5 W CW Limiter



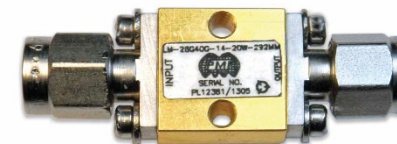
20 MHz to 18 GHz,  
100 W CW RF Limiter



1 to 18 GHz, 3 W CW Limiter



32 to 36 GHz  
20 W Peak Limiter



26.5 to 40 GHz  
20 W Peak Limiter



18 to 40 GHz  
2 W Limiter

# Detectors - (Diode, Directional, Threshold)

- Broadband Frequency coverage to 40 GHz
- Low VSWR & Insertion Loss
- Excellent Frequency Flatness
- Small Package Size
- Hermetic Sealing, Military or Aerospace Screening available
- Form, Fit & Function Products & Services
- Custom Designs to Your Specifications



10 MHz to 18 GHz  
Low Noise Tunnel  
Diode Detector



0.5 to 18 GHz, High Speed,  
High Sensitivity Diode Detector



18 to 40 GHz, Low Noise,  
Tunnel Diode Detector



4 to 26.5 GHz,  
Zero Bias Schottky Detector



6 to 18 GHz  
Biased Schottky Diode  
Detector



2 to 18 GHz, High Speed,  
High Sensitivity Diode Detector

# Attenuators – Variable / Programmable to 50 GHz

- > Ultra-Broadband Performance
- > High Attenuation Accuracy
- > Low Insertion Loss
- > Excellent Frequency Flatness
- > Analog or Digital Control Available
- > High Speed & Very Small Packaging
- > Hermetic Sealing, Military or Aerospace Screening available
- > Connectorized or surface mount
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



**13 to 14 GHz  
8-Bit Programmable Attenuator**



**1 to 18 GHz  
7-Bit Programmable Attenuator**



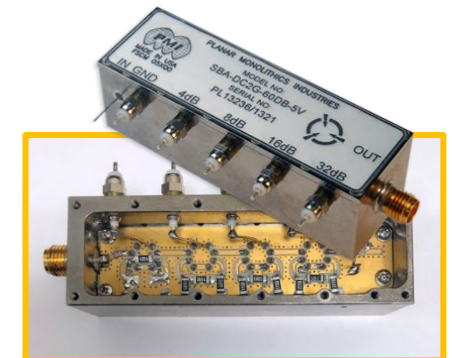
**0.1 to 0.3 GHz  
Voltage Controlled Attenuator**



**1 to 4 GHz,  
Voltage Variable Attenuator**



**3.1 to 3.5 GHz  
Bi-Directional Variable  
Attenuator**



**DC to 2 GHz, Electro-mechanical  
STEP Attenuator**

# Phase Shifters

- > 0 to 360°
- > Broadband to 40 GHz
- > Ideal for Industrial & Military Applications
- > Analog or Digital Controlled
- > Fast Speed & Response
- > Low Insertion Loss
- > High Phase Accuracy
- > Hermetic Sealing, Military or Aerospace Screening available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



85 MHz to 4 GHz  
Digitally Controlled Analog  
Phase Shifter



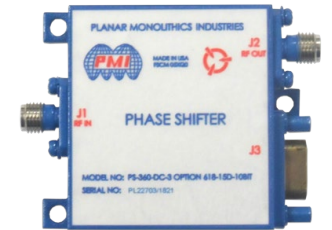
0.2 to 10 GHz  
8-Bit Digital Phase Shifter



2.0 to 18 GHz  
12-Bit Vector Phase Shifter



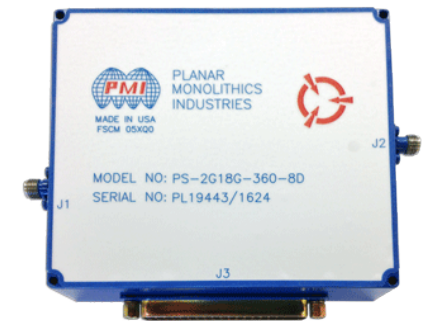
32 to 37 GHz  
8-Bit Digitally Controlled  
Phase Shifter



6.0 to 18.0 GHz  
10-Bit Digitally Controlled  
Phase Shifter



2 to 18 GHz  
8-Bit Phase Shifter



2 to 8 GHz, 8 Bit, 360°  
Digital Phase Shifter

# Bi-Phase Modulators

- 90°, 360° Models
- Low Insertion Loss
- Flat Response
- Digital Control
- High Phase Accuracy
- Hermetic Sealing, Military or Aerospace Screening available
- Form, Fit & Function Products & Services
- Custom Designs to Your Specifications



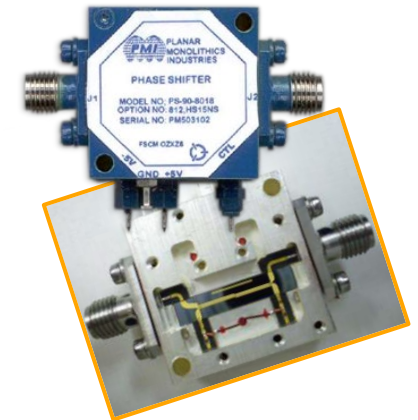
18 to 40 GHz  
Bi-Phase Modulator



2 to 18 GHz  
Bi-Phase Modulator



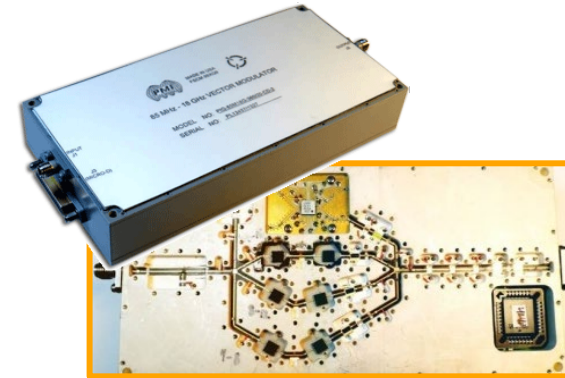
2 to 6 GHz  
Bi-Phase Modulator/Shifter



1.1 to 1.12 GHz,  
180° Bi-Phase  
Modulator/Phase Shifter

# I/Q Vector Modulators

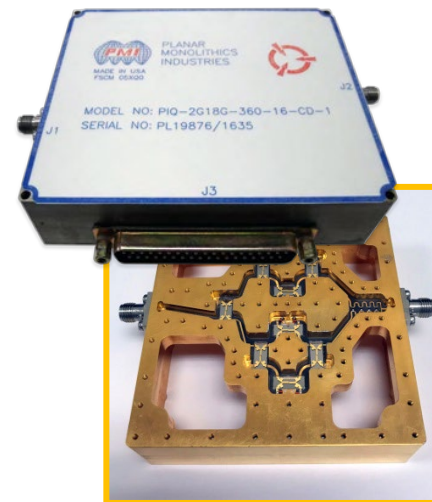
- > Ultra-Broadband Performance to 40 GHz
- > High Speed Modulation
- > Analog & Digital I/Q Inputs
- > Low Spurious Response
- > Low Insertion Loss
- > High Absolute Phase Accuracy
- > Low Current Consumption
- > Hermetic Sealing, Military Screening available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



Vector Modulator



0.5 to 2 GHz,  
I/Q Vector Modulator



6 to 18 GHz,  
I/Q Vector Modulator



85 MHz to 18 GHz, I/Q Vector Modulator

# USB Products

- > Broadband Performance to 40 GHz
- > Low Noise Amplifiers, Variable Attenuators & Switch Designs available
- > Low Insertion Loss
- > All Models use Standard USB 2.0 port
- > SMA or 2.92mm Female Connectors
- > Hermetic Sealing, Military or Aerospace Screening available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



50 MHz to 18 GHz, 12 dB Gain  
USB Powered LNA



50 MHz to 40 GHz, 12 dB Gain  
USB Powered LNA



100 MHz to 18 GHz, 30 dB  
USB Attenuator



100 MHz to 40 GHz, 30 dB  
USB Attenuator



500 MHz to 18 GHz  
USB Powered SP2T  
Switch



500 MHz to 40 GHz  
USB Powered SP2T  
Switch

# Filters & Switch Filter Banks

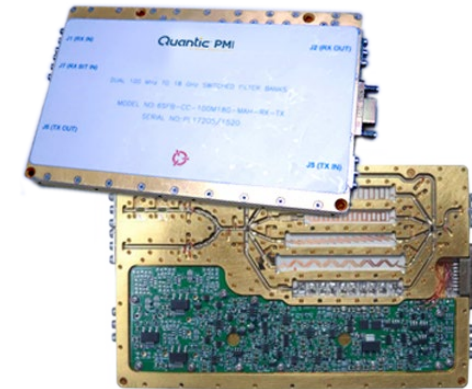
- > Low-Pass, High-Pass, Band-Pass, Notch or Bandstop, Duplexers & Multiplexers
- > Filter Types: Lumped-Element, Cavity, Compline, Printed, Hairpin, Suspended Substrate, Edge-coupled, Stripline
- > Hermetic Sealing, Military or Aerospace Screening available
- > Connectorized or surface mount
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



Band Pass Filter



Low Pass Filter with  
2400 MHz Cutoff  
Frequency



Double Sided, 100 MHz to 18.0 GHz  
6 Channel Switch Filter Bank



1 to 20 GHz  
6-Channel Switch Filter Bank



DC to 26 GHz  
5-Channel Switch Filter Bank



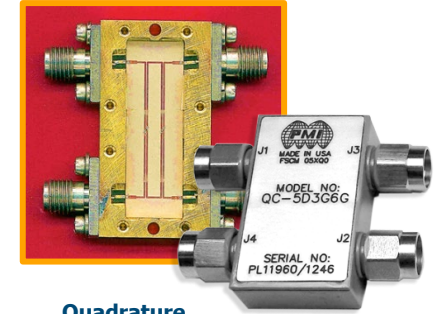
Miniature, 2 Channel Switch Filter Bank

# Couplers – Quadrature (90°), 180° Directional

- > Broadband Response
- > High Isolation
- > Excellent Phase & Amplitude Balance
- > Small Package Size
- > Hermetic Sealing, Military or Aerospace Screening available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



DC to 18.0 GHz  
Directional Coupler



Quadrature  
Couplers



5 to 10 GHz  
Hybrid Coupler



8.0 to 11.0 GHz  
Directional Coupler



0.02 to 6 GHz  
90° Hybrid Coupler



90° Hybrid Coupler

# Power Dividers/ Combiners (Passive & Active)

- Designs for Commercial, Military & Aerospace Applications
- Low Loss & High Isolation
- Excellent Amplitude & Phase Balance
- 2-Way to 16-Way Configurations
- Broadband Frequency coverage to 50 GHz
- Hermetic Sealing, Military or Aerospace Screening available
- Form, Fit & Function Products & Services
- Custom Designs to Your Specifications



18 to 40 GHz  
2-Way Power Divider



2 to 20 GHz  
8-Way Power Divider



20 MHz to 6 GHz, Amplified  
4-Way Power Divider



0.5 to 18 GHz  
16-Way Power Divider



2 to 26 GHz  
4-Way Power Divider



0.5 to 18 GHz  
16-Way Power Divider



4.4 to 18 GHz, SMPM  
4-Way Power Divider



100 MHz, Amplified  
8-Way Power Divider

# Monopulse Comparators

- > Frequency coverage up to 21.2 GHz
- > Rugged Coaxial Design
- > Low VSWR
- > High Power Handling with Minimum Insertion Loss
- > High Isolation between Channel Ports for Optimum Phase & Amplitude Balance
- > Hermetic Sealing, Military Screening or Aerospace Screening Available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



5 to 6 GHz  
Monopulse Comparator



3 to 3.7 GHz  
Monopulse Comparator



9.3 to 9.9 GHz  
4-Way Phase Divider



12 to 13 GHz  
Monopulse Comparator



20.2 to 21.2 GHz  
Monopulse Circuit

# Rack and Chassis Mount Products

- > Designs for Commercial, Military & Aerospace Applications
- > Supplied in Ruggedized, 1U to 6U chassis
- > A mixed set of functions:
  - Amplification
  - Attenuation (Digital Solid-State)
  - Switching (Ultra High Speed)
  - Power Detection / Fault Detection
  - Phase Shifting / Phase Modulation
  - Pulse Modulation / Noise Generation
  - RF Filtering / RF Limiting
  - Power Splitting
  - RF Signal Distribution
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



Ethernet Microcontroller Test Box



Multiagent Radio Frequency Path Simulator



10 MHz to 6 GHz, High Gain Amplifier  
Integrated Microwave Assembly



RF Signal Distribution Systems



0.1 to 18 GHz High Gain Amplifier  
Integrated Microwave Assembly



10-Way Switch Filter Bank



0.5 to 18 GHz  
16-Way Power Divider

# Frequency Sources

- > Designed for Industrial & Military Applications
  - Radar Warning, ECM, ESM & ELINT
  - EW / SIGINT
  - Radar Test Equipment
  - Microwave Radio
  - Instrumentation Modules
- > All models can withstand stringent military ground or airborne environments
- > Frequency Coverage up to 40 GHz
- > High Level of Frequency Accuracy
- > Low Frequency Drift, Phase Noise & Harmonic Content
- > Linearized Frequency Tuning
- > Internal Digital Calibration
- > Temperature Compensation
- > Form, Fit & Function Products & Services



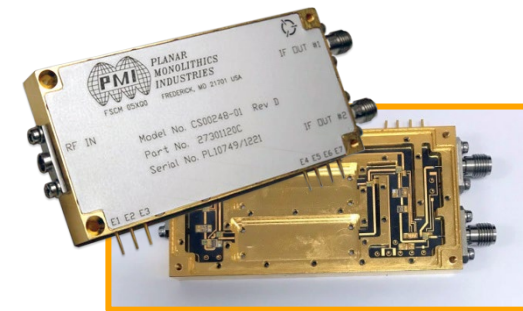
8.8 to 9.46 GHz  
Temperature Stabilized Output  
Medium Power X-Band Gunn-Effect  
Oscillator



2.0 to 18.0 GHz,  
Digitally Tuned Oscillator (DTO)



Digitally Tuned  
Oscillators (DTOs)



Custom Frequency Doubler Module



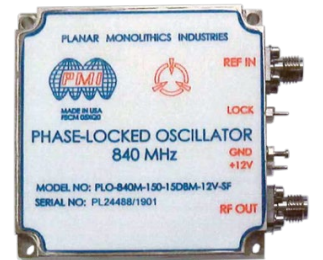
10 MHz Reference  
Source



6 to 18 GHz, Synthesizer



10.0 GHz, Integrated Phase  
Shifter Dielectric Resonator  
Oscillator (DRO) Module



840 MHz Phase-Locked Oscillator

# Frequency Discriminators & IFM

- > Designed for Industrial & Military Applications
  - Radar Warning (RW)
  - Electronic Countermeasures (ECM)
  - Electronic Support Measures (ESM)
  - Electronic Intelligence (ELINT) Applications
- > Narrow & Broadband Frequency Coverage up to 18 GHz
- > Hermetic Sealing, Military or Aerospace Screening available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



30 MHz, Frequency Discriminator



2.0 to 18.0 GHz Digital Frequency Discriminator



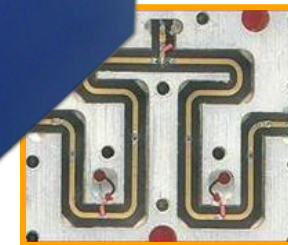
1 GHz, Frequency Discriminator



3.1 to 3.5 GHz Frequency Discriminator



1 to 18 GHz, Frequency Discriminator



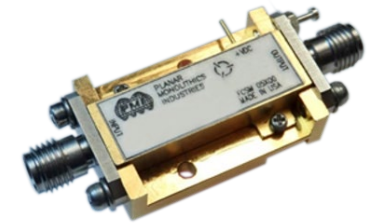
Delay Line in a Frequency Discriminator

# Miscellaneous Products

- Bias Tees & Pick-Off Tee
- Isolators/Circulators
- Mixers & Prescalers
- Through Package Housings
- Small Size & Standardized Packaging
- Hermetic Sealing, Military Screening available
- Form, Fit & Function Products & Services
- Custom Designs to Your Specifications



2 to 18 GHz  
Active Mixer



1 to 2 GHz Bias Tee



4 to 12 GHz  
Double Balanced Mixer



0.5 to 18 GHz  
Divide-by-4 Prescaler



6 to 20 GHz  
Double Balanced Mixer



8 to 12 GHz  
Image Reject Mixer

# Gain & Loss Equalizers

- Ideal for Equalizing Cable Loss or Gain Flatness
- Narrow-bandwidths or broadband up to 40 GHz
- Low Insertion Loss & VSWR
- Various frequency equalization values
- Multiple and Custom slope characteristics
- Surface Mount or Connectorized
- Hermetic Sealing, Military or Aerospace Screening Available
- Form, Fit & Function Products & Services
- Custom Designs to Your Specifications



26.5 to 40 GHz, 1.5 dB  
Passive Amplitude Equalizer



17.6 to 21.6 GHz, 12 dB  
Passive Amplitude Equalizer



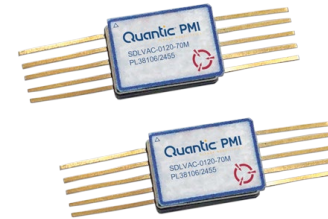
DC to 40 GHz  
Passive Equalizer



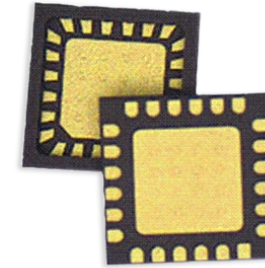
DC to 20 GHz  
Passive Equalizer

# SMT & QFN Products

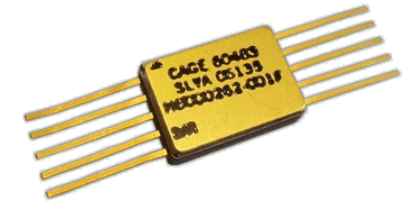
- > Quantic PMI offers Surface mount (SMT) & QFN packaging for many types of devices....SDLVA's, Log Amplifiers, Phase Shifters, Attenuators, Switches, as well as Low Noise Amplifiers.
- > Multifunction options available in a single QFN package such as Limiters / LNA or LNA / Detectors.
- > Custom devices that meet your specific control function can be designed & integrated into specified packaging with the required testing.



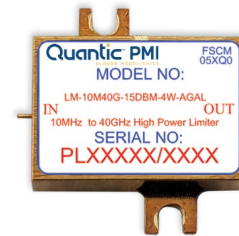
0.1 to 2 GHz  
Miniature SDLVA



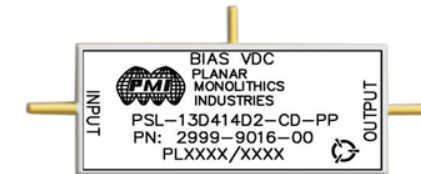
14.4 to 15.4 GHz  
RF Limiter & Low Noise Amplifier



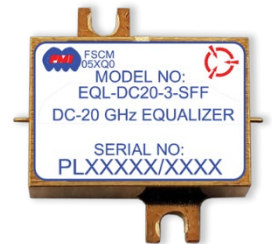
0.6 to 1.35 GHz  
Miniature SDLVA



10 MHz to 62 GHz  
High Power Limiter



13.4 to 14.2 GHz  
High Power Switch Limiter



DC to 20 GHz  
Equalizer



18.0 to 40 GHz  
High Power Limiter



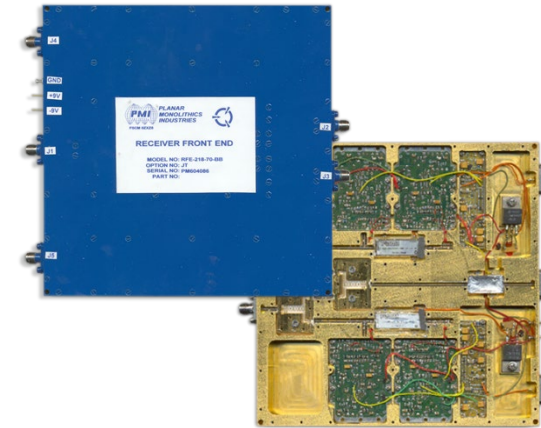
0.7 to 1.3 GHz  
Miniature SDLVA



14.4 to 15.4 GHz  
High Power SPST Switch

# Receiver Front End & Transceiver Products

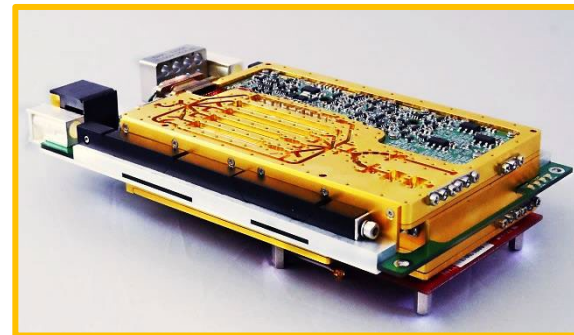
- > Designs for Commercial, Military & Aerospace Applications
- > Broadband Frequency coverage to 50 GHz
- > Hermetic Sealing, Military or Aerospace Screening available
- > Form, Fit & Function Products & Services
- > Custom Designs to Your Specifications



2 to 18 GHz  
Direction Finding Receiver Front End



100 MHz to 18 GHz  
Transceiver (Phase II)



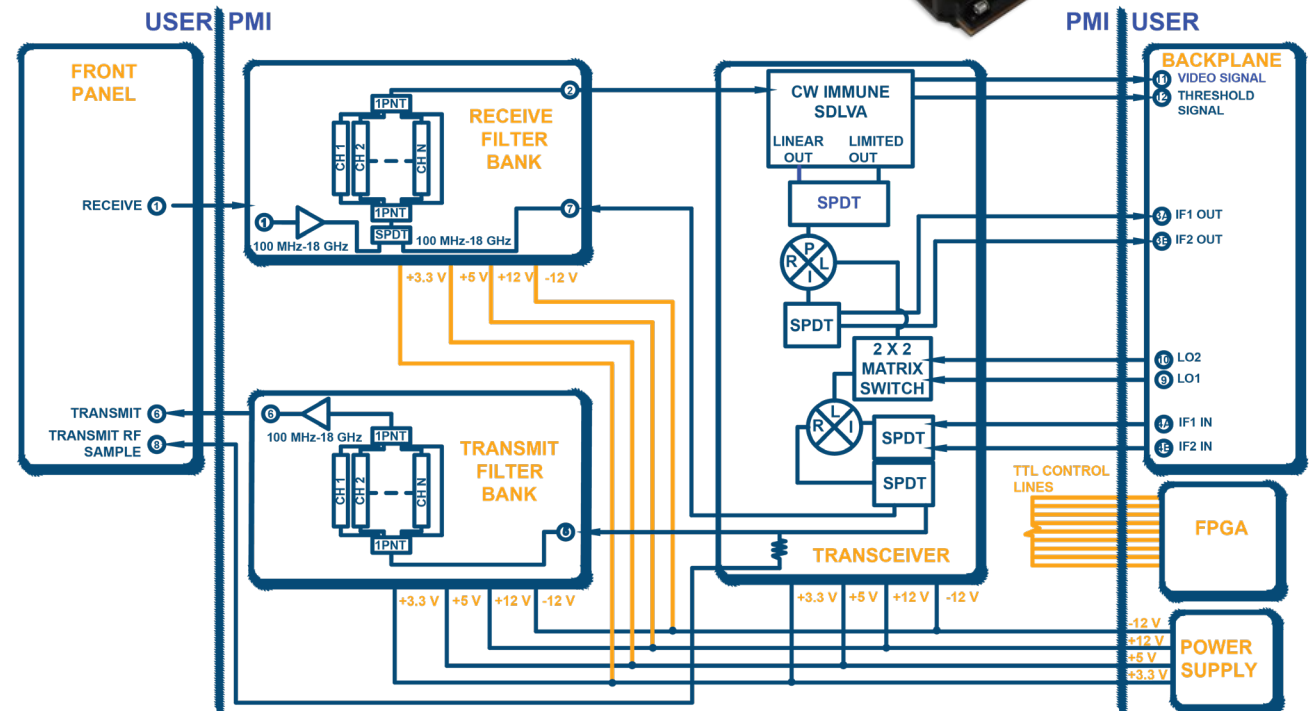
100 MHz to 18 GHz Transceiver (Phase III)



100 MHz to 18 GHz Transceiver Unit

## 100 MHz to 18 GHz Transceiver

- > Integrated Up and Down Converters
- > IF up to 4 GHz
- > Time Gated SDLVA for Pulse Blanking
- > -80 to -10 dBm Input Dynamic Range
- > Customizable Switch Filter Banks
- > 0 to +10 dBm Transmit Power
- > 100 ns Switching Speed
- > Fits into a 3U open VPX form factor utilizing the high-speed VITA 67 RF connector
- > CW Immunity



# Integrated MIC/MMIC Modules & Assemblies (IMAs)

- > Broadband to 50 GHz
- > Built to your specifications with functions:
  - Amplification
  - Attenuation
  - Filtering
  - Frequency Discrimination
  - Switching
  - Phase Shifting
  - Power Detection
  - Modulation/Demodulation
  - Coupling
  - Limiting
  - Digital/Analog Control
- > Hermetic Sealing, Military Screening available
- > Form, Fit & Function Products & Services
- > Build to Print or Built to your SCD



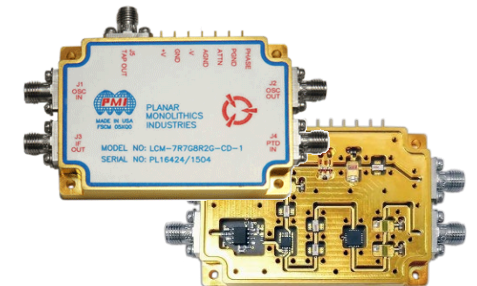
0.5 to 18.0 GHz, Custom Phase ( $\pm 10^\circ$ ) & Amplitude ( $\pm 1.5$  dB) Matched Integrated Modules/ Assemblies



2.6 to 5.2 GHz 8 Channel Selectable LO Frequency Source



10.0 GHz, Integrated Phase Shifter and Dielectric Resonator Oscillator (DRO) Module (Inside)



7.7 to 8.2 GHz Laser Control Module



100 MHz to 18 GHz Transceiver (Phase II)

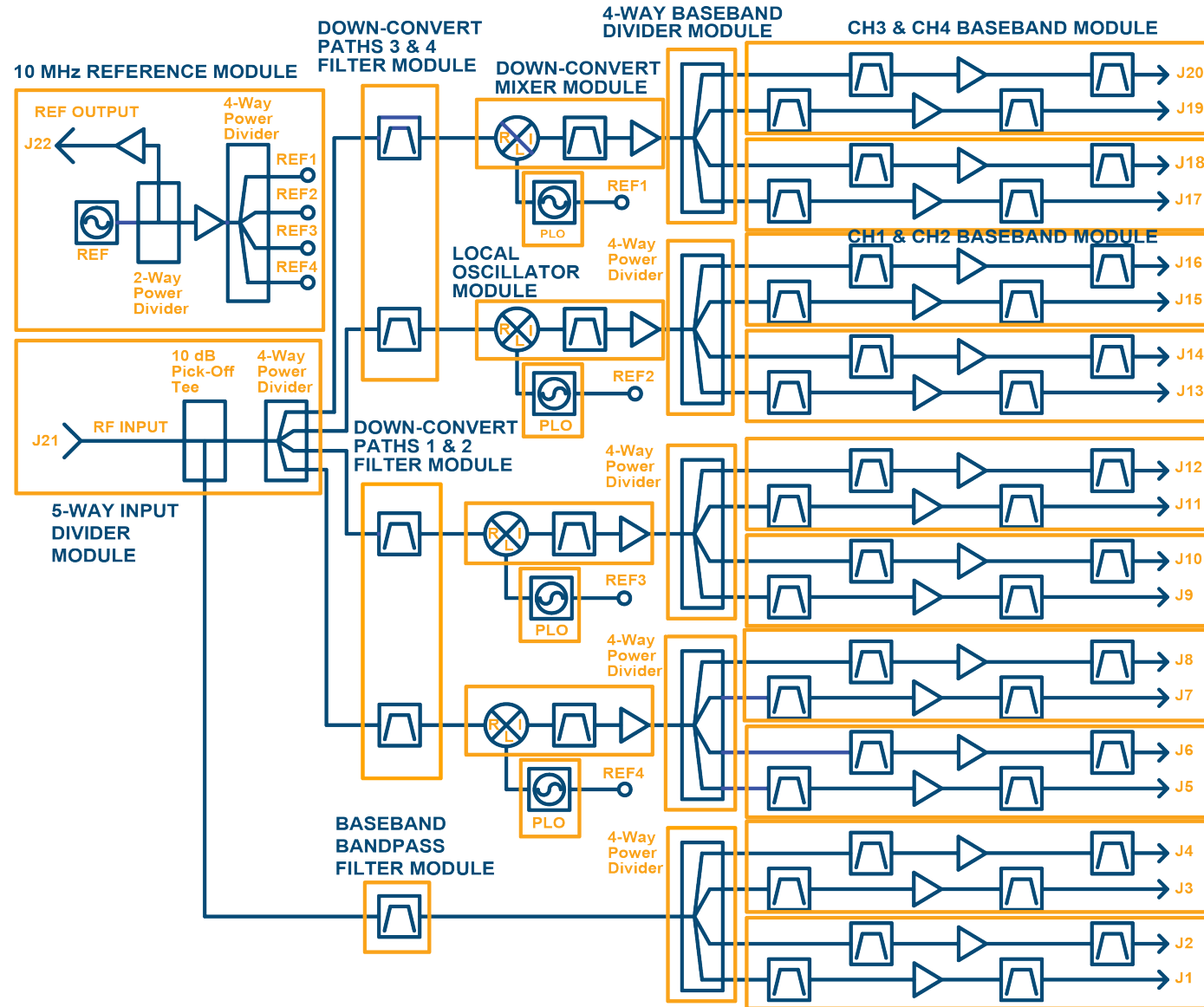
# Integrated MIC/MMIC Modules & Assemblies (IMAs)



2021 **Military & Aerospace Electronics** Innovators Awards  
**PLATINUM HONOREE**



**1 to 18 GHz Channelized Receiver**



# In-Stock Products – Same Day Shipping



> Select Quantic PMI products are available from stock that can be shipped from Quantic PMI directly or one of its authorized distributors to you the same day.

<https://www.quanticipmi.com/stock-items>

A screenshot of the Quantic PMI website. The top navigation bar includes 'Home', 'About Us', 'Product Categories', 'Literature', 'Stock Items', 'Events', and 'Contact Us'. The main content area displays the product page for 'LM-150M5G-200CW-2KWPK-AGAL', an Ultra-High Power Limiter. A 'Buy Now' button is highlighted with a callout box. Below this, a table lists various products with columns for Part Number, Availability, Input Power, Input/Output VSWR, Insertion Loss, Frequency Max, Frequency Min, and Status. Two items, 'LM-218-14-200W-SMF \*' and 'LM-6G18G-15-10W-SFF \*', are highlighted with callout boxes and 'Buy Now' buttons. The bottom of the page features a footer with social media icons, a 'Sign Up' button, and the Quantic PMI logo with the tagline 'Defining and delivering the future of mission-critical electronics.'

Part Number	Availability	Size	Frequency Max	Frequency Min	Status
FD-0518-10-812	Buy Now	2.00" x 1.82" x 0.50"	12 GHz	8 GHz	Active

Part Number	Availability	Input Power	Input/Output VSWR	Insertion Loss	Frequency Max	Frequency Min	Status
LM-218-14-200W-SMF *	Buy Now	1 W CW	2.0:1 max.	2.0 dB max. @ Pin = -10 dBm	18.0 GHz	2.0 GHz	Active
LM-6G18G-15-10W-SFF *	Buy Now						Active
LM-1G20-19-200W-SFF	Buy Now						Active
LM-1G18G-16-4W-SMF	Buy Now						Active
LM-218-14-200W-SMF-HERM *	Buy Now	1 W CW	2.0:1 max	2.0 dB Maximum	18 GHz	2 GHz	Active
LM-300M1G-21-360W-SFF	Buy Now	+54 dBm CW Max (250 W) Peak Power 360 W, Pulse 2 ms, 10% Duty Cycle	2:1 Max		1.0 GHz	0.3 GHz	Active
LM-10M37G-1509M-10W-AGAL	Buy Now	50 Watts Peak Max (0.02 to 12 GHz) 40 Watts Peak Max (18 GHz)	1.8:1 Max	0.01 to 8 GHz: 1.00 dB Max 8 to 18 GHz: 2.00 dB Max 18 to 30 GHz: 2.70 dB Max 30 to 37 GHz: 4.30 dB Max	37.0 GHz	0.01 GHz	Active
LM-10M12G-20-10W-SFF	Buy Now	+40 dBm CW Max Peak Power 100 W, Pulse 1 µs 1% Duty Cycle	2:1 Max	2 dB Max	12.0 GHz	0.01 GHz	Active
LM-0518-10-1W-SHS-1-F *	Buy Now	1 Watt CW, 100 Watts Peak, 1 µs Pulse, 0.1% Duty Cycle, Destined to 20% at 125 °C	2.0:1 Max	2.0 dB Max, 1.5 dB Typ	18 GHz	0.5 GHz	Active

# Our Clients



# Facilities



## **7309-A GROVE ROAD, FREDERICK, MD:**

- > 20,000 sq. ft. Facility
- > 7,500 sq. ft. Class 10,000 ppm Clean Room for Assembly, Test, ESS & Inventory
- > 4,000 sq. ft. Engineering Space
- > 2,800 sq. ft. Office space and Conference rooms
- > 2,500 sq. ft. Machine Shop, Paint Booth, and Random Vibration/Shock Testing
- > 2,200 sq. ft. Communal areas (2 breakrooms, restrooms, and lobby)
- > 1,000 sq. ft. Accounting, Human Resources and Sales & Marketing
- > Components & Sub-Assembly Manufacturing
- > Hybrid Assembly
- > Engineering & Test Departments
- > QA/QC, Sales, Marketing & Executive Offices
- > 3 Conference Rooms (Production, Engineering and S&M)

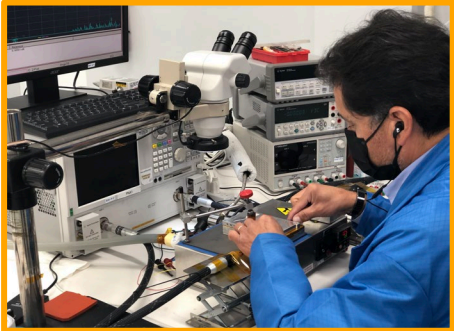
## **4921 Robert J. Mathews Pkwy, El Dorado Hills, CA:**

- > 5,100 sq. ft. Facility
- > Components Manufacturing
- > Hybrid Assembly
- > Test and Engineering Departments
- > Production and Quality Departments
- > EOL and Obsolete Aftermarket Manufacturing

# East Coast Operations



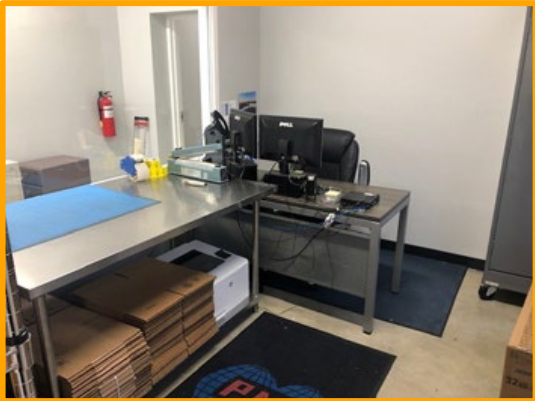
# East Coast Operations





Footer

# East Coast Operations



Footer



Random Vibration



Hermetic Laser Welder



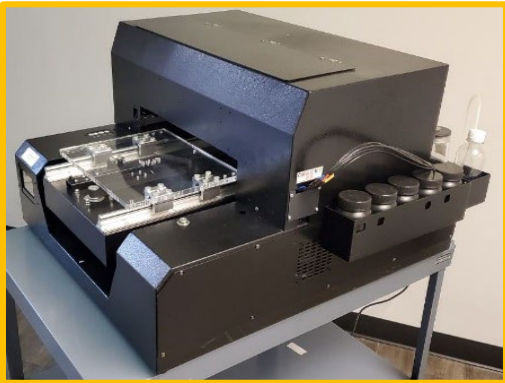
Shock Testing



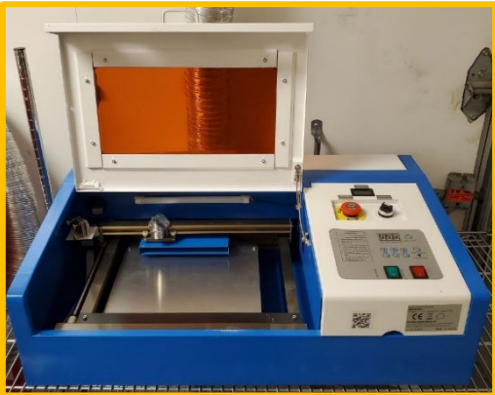
Hermetic Package Testing



Thermal Shock



UV Curing Light Printer



CO<sub>2</sub> Laser



Hot/Cold Plate



Cycling Chamber



**Thermal Shock**



**Plasma Cleaners**



**Metallurgic Microscope**



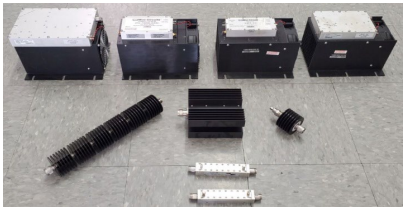
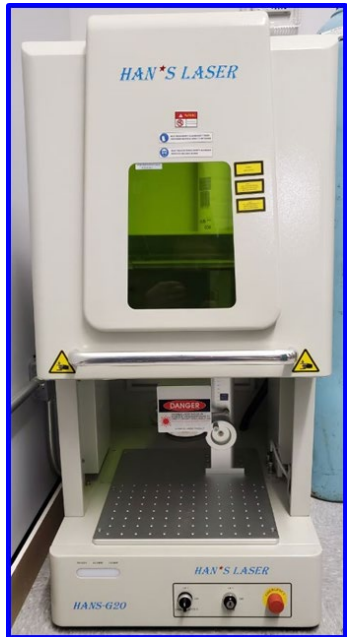
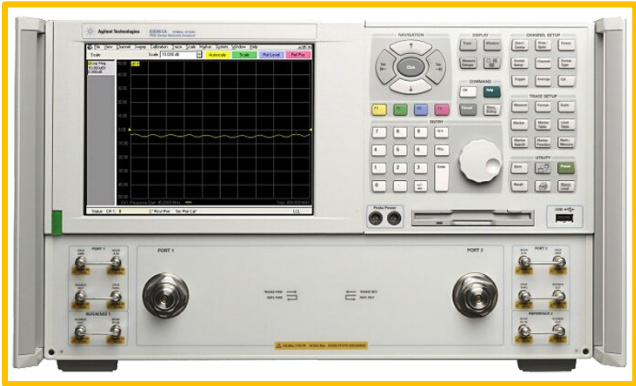
**HAAS DT1 CNC Milling Machine**



# East Coast Operations



Mazak Nexus 430A-II CNC Milling Machine



## Network Analyzers:

- > (1) Keysight E8361C PNA (10 MHz to 67 GHz)
- > (1) Keysight N4694A E-CAL Module (10 MHz to 67 GHz)
- > (3) Agilent N5230A PNA (10 MHz to 40 GHz)
- > (2) Agilent N5230A PNA (10 MHz to 20 GHz)
- > (2) Agilent N5230C-420 PNA-L (10 MHz to 40 GHz)
- > (2) Agilent N4691 E-CAL (10 MHz to 20 GHz)
- > (2) Agilent N4692 E-CAL (10 MHz to 40 GHz)
- > (1) Agilent E8363C PNA (10 MHz to 40 GHz)
- > (1) Keysight E8364B PNA Network Analyzer (10 MHz to 40 GHz)
- > (1) Keysight N5234A PNA-L Network Analyzer (10 MHz to 43.5 GHz)
- > (3) Keysight N5234A PNA-L Network Analyzer (10 MHz to 50 GHz)
- > (1) Keysight N4692A E-CAL (10 MHz to 50 GHz)
- > (1) Keysight 8362B Network Analyzer (10 MHz to 20 GHz)

## Noise Figure Meter:

- > (2) Agilent N8975A (10 MHz to 26.5 GHz) & Downconverter (40 GHz)
- > (1) HP 8970B

## Oscilloscopes:

- > (1) Tektronix TDS210
- > (1) Tektronix TDS2024C
- > (1) Agilent DS06034A
- > (1) Keysight DSO80204B
- > (1) Keysight DSOS204A
- > (4) Agilent DSOX3034A
- > (1) Keysight (2 GHz BW)

## Power Amplifiers:

- > (1) Varian TWTA 7 – 18 GHz, 20 W
- > (1) CPI TWT Amplifier (2-8 & 8-18 GHz) 300 W CW
- > (1) MC (3-3.5 GHz) 100 W
- > (1) MC (800 – 1000 MHz) 100 W
- > (1) MC (20 -512 MHz) 25-50 W
- > (1) MC (20-500 MHz) 100 W
- > (1) Spanawave GT-1051B Power Amplifier, 10 MHz to 50 GHz, 1/2 Watt to 40 GHz, 1/4 Watt to 50 GHz

## Power Meter:

- > (3) Gigatronics 8541B/C, 8542C
- > (4) Agilent E4418B
- > (1) Agilent N1913A

## Pulse/Signal Generators:

- > (1) Agilent E8257D
- > (1) Anritsu MG3692B
- > (1) HP 8015A
- > (1) HP 8013B
- > (1) HP 8012B
- > (1) HP 8350B Sweep Oscillator
- > (1) HP Arbitrary Waveform Generator 33120A
- > (1) HP 8664A
- > (1) Wavetek Model 801
- > (2) HP 8673D
- > (2) Agilent 33522A Arbitrary Waveform Generator
- > (2) Keysight E8257A PSG Analog Signal Generator
- > (5) Keysight E8257D PSG Analog Signal Generator
- > (1) Siglent SDG1062X and Siglent SDG1032X Waveform Generators

## Spectrum Analyzer:

- > (1) HP 8593E
- > (1) HP E4448A PSA Spectrum Analyzer (3 Hz to 50 GHz)
- > (1) Keysight N9030A Spectrum Analyzer (3 Hz to 50 GHz)
- > (1) Keysight 8563E Spectrum Analyzer (9 kHz - 26.5 GHz)

## Manufacturing Equipment:

- > (1) ESPEC TSE-12A Thermal Shock Chamber
- > (1) TSE-11-A ESPEC Thermal Shock Chamber
- > (1) T Shock Jr. Thermal Shock Chamber
- > (1) JEN410 IR Reflow Oven
- > (1) Thermo Electron Oven
- > (2) Anatech Plasma Cleaner
- > (1) Metallurgical Microscope MT1000
- > (5) Westbond 747677E-79 Convertible Wire Bonder
- > (1) Westbond 7476E-79 Wedge Wire Bonder
- > (1) Westbond 747630E-79 Wedge Wire Bonder
- > (1) Westbond 7400A Wedge Wire Bonder
- > (2) Westbond Bond Pull Center
- > (1) Dage Bond Puller / Die Shear
- > (1) Unitek Unibond-II Parallel Gap Welder
- > (3) HAAS DT1 CNC Milling Machine
- > (1) Mazak Nexus 430A-II CNC Milling Machine
- > (1) Hardinge Turret Lathe
- > (1) Di-Acro Power Shear
- > (1) Brady Label Machine BP-THT-600-11
- > (7) ESS Thermal Hot/Cold Plates
- > (1) Ling Dynamic V650 Random Vibration Setup

- > (1) Shock Tester
- > (1) Varian Helium Leak Tester
- > (1) 2.0 to 18.0 GHz 200 W CW TWT Amplifiers
- > (1) Keysight 50 GHz PNA
- > (1) SSPA 10 MHz to 2.0 GHz, 100 W CW
- > (1) 20 W Fiber Laser
- > (1) Hermetic Package Tester
- > (1) UV Curing Light Printer
- > (1) Hermetic Laser Welder
- > (1) Cycling Chamber
- > (1) CO2 Laser

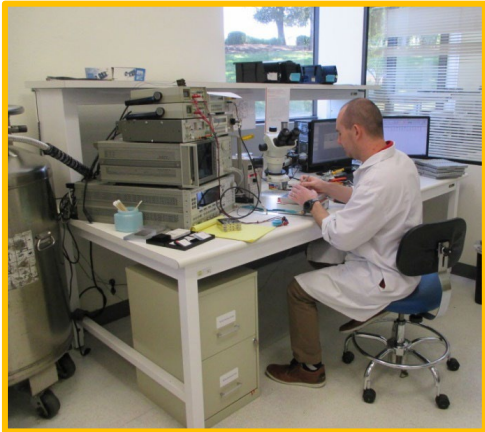
## Software:

- > Keysight - Genesys S/Filter Synthesis and Simulation
- > Ansys – HFSS, High Frequency Structural Simulator
- > Exact MAX – MRP/ERP Software
- > AutoCAD 2005
- > AutoCAD 2013
- > Altium Designer
- > Microwave Office
- > SolidWorks 2014
- > Gibbs Cam

## Standards:

- > ISO9001
- > MIL-STD-454
- > MIL-STD-202
- > MIL-STD-883
- > MIL-E-5400
- > MIL-I-45208
- > IPC-A-610 Workmanship Standard
- > IPC-J-STD-001 Soldering Standard
- > MIL-STD-45662 Calibration Standard

# West Coast Operations



# West Coast Operations





## Network & Spectrum Analyzers:

- > (1) Agilent N5230C PNA Network Analyzer 10 MHz-20 GHz (Mixer Option)
- > (5) HP 8757D Scalar Analyzers
- > (1) HP 8720D Network Analyzer
- > (1) HP 8565E Spectrum Analyzer (50 GHz)
- > (1) HP 8592L Spectrum Analyzer
- > (1) Keysight E8364B PNA Network Analyzer (10 MHz to 50 GHz)

## Noise Figure Meters:

- > (1) HP 8970A Noise Meter
- > (1) Keysight N4002A Noise Source

## Power Meters:

- > (1) HP EPM-442 Power Meter
- > (1) HP E4412A Power Meter
- > (1) HP 437B Power Meter
- > (1) HP 437A Power Meter

## Pulse/Signal Generators:

- > (1) HP 83731B Signal Generator
- > (1) HP 83620A Signal Generator
- > (1) HP 8013B Pulse Generator
- > (4) HP 83620A Sweep Generators

## Oscilloscopes:

- > (1) Infiniium Digital Scope & Probe
- > (1) Keysight MSO-X-3054A 500 MHz BW
- > (1) Tektronix 2246 100 MHz BW
- > (1) Tektronix 2465A 350 MHz BW

## Manufacturing Equipment:

- > (1) Quincy Model 40 Oven
- > (1) Sym-Tek P162P5J Oven
- > (1) Cole/Parm 05015-50 Oven
- > (1) Blue M Stable Therm Oven
- > (1) Branson 821D Ultrasonic Cleaner
- > (2) UNITEK Gap Welders
- > (1) Anatech Plasma Cleaner/Etcher
- > (3) Westbond 7400A Wedge Bonders
- > (1) Westbond 8850 Bond Pull Center
- > (3) Westbond 1200A Die Attach Stations
- > (1) HAAS DT1 CNC Milling Machine
- > (2) Westbond 8849 Convertible Wire Bonder
- > (1) Westbond 8850 Ball Bonder
- > (1) Westbond 7600B Ribbon Bonder
- > (4) Thermal Hot/Cold Plates
- > (4) Hot Plates

## Software:

- > Keysight - Genesys S/Filter Synthesis and Simulation
- > Ansys – HFSS, High Frequency Structural Simulator
- > Exact MAX – MRP/ERP Software
- > AutoCAD 2005
- > AutoCAD 2013
- > Gibbs Cam

## Standards:

- > ISO9001
- > MIL-STD-454
- > MIL-STD-202
- > MIL-STD-883
- > MIL-E-5400
- > MIL-I-45208
- > IPC-A-610 Workmanship Standard
- > IPC-J-STD-001 Soldering Standard
- > MIL-STD-45662 Calibration Standard

- > Equipment Calibration - ISO 17025 Standard with traceability to NIST
- > Trained and Experienced ITAR/Export Administrator
- > Export Compliance Manual
- > AES (Automated Export System) certified export staff
- > Long Term Relationships with both DDTC and SNAP-R Personnel
- > NIST SP 800-171 and DFARS 252.204-7012 Self-Certified and Compliant
- > U.S. Government Registration Numbers:
  - Cage Code: 05XQ0 (East Coast)
  - Cage Code: 71A34 (West Coast)
  - DUNS Number: 829998517
  - SAM (CCR) Registration: 1998E211401
  - Federal Tax ID (TIN): 52-1756966
  - DDTC Registrant Code: M16913
- > Able to support DoD contracts

# ISO9001 & ITAR Registrations



QMS Assessment, Training Solutions & Product Inspection Services since 1995

5216 Chairmans Ct., Suite 103  
Frederick, Maryland 21703  
(301) 696-9740 Office  
(301) 829-3729 Fax  
www.IQRCORP.COM

International Quality Registrars (IQR) Corporation  
herewith certifies that

**Planar Monolithics Industries, Inc.**

Headquarters: 7311-F Grove Road, Frederick, MD 21704 USA  
Site 2: Machine Shop: 5715 Unit 11 Industry Lane, Frederick, MD 21704 USA  
Site 3: Design & Mfg. 4921 Robert J. Mathews Parkway, Suite # 1, El Dorado Hills, CA 95762 USA

Additional Site Location(s):  No,  Yes, See Appendix A for additional information

has demonstrated a Quality Management System (QMS) which  
conforms with the requirements of the standard:

**ISO 9001:2015**  
Quality Management System - Requirements

The organization's QMS has been evaluated  
according to the International Quality Registrars (IQR)  
Corporation QMS certification scheme for the following scope:

**"Design, Development and Manufacture of Microwave Frequency Components, Sub-Systems and  
Systems, and Contract Manufacturing Services"**

Exclusion(s): None

This QMS certification is subject to periodic audits by  
International Quality Registrars (IQR) Corporation

This QMS certificate remains the property of International Quality Registrars Corporation and shall be returned immediately upon request, and is subject to being suspended or withdrawn where the organization fails to comply with the terms and conditions of the signed Registration Assessment Proposal and Agreement. An electronic or printed certificate can be authenticated on-line in accordance with IQR's procedure documented at www.IQRCORP.com

Registration No.: 18-120804.1Q  
Client ID: PM109  
Cert. Expiration Date: 09/15/24  
Cert. Issued Date: 09/15/21

Last Cert. Revision Date: 09/15/21  
Initial Cert. Issue Date: 02/24/09  
Sheet No.: 1 of 2

IQR QMS Certification Signature



FORM IQR-2510 Rev. A

FORM IQR-2503 Rev. C



United States Department of State  
Bureau of Political-Military Affairs  
Directorate of Defense Trade Controls  
Washington, D.C. 20522-0112

SEBASTIAN PALACIO  
Vice-President  
Planar Monolithics Industries Inc.  
7311-F Grove Road  
Frederick, MD 21704

2022-08-04

REGISTRANT CODE: M16913  
EXPIRATION DATE: 2023-08-31

Reference: Manufacturer/Exporter Registration Statement and Fee Submission

Dear SEBASTIAN PALACIO:

The Office of Defense Trade Controls Compliance received your registration statement and fee to register as a manufacturer and exporter. We have reviewed your registration statement and your registration code is M16913, which expires on 2023-08-31.

Any person who engages in the United States in the business of either manufacturing or exporting defense articles or furnishing defense services is required to register and keep that registration current with this office pursuant to the Arms Export Control Act (AECA) and the International Traffic in Arms Regulations (ITAR Part 122). Registration serves as a precondition to submitting an application for an export license or other approval from the Directorate of Defense Trade Controls (DDTC), or to use export exemptions. This registration does not satisfy the requirements for registering as a broker pursuant to ITAR Part 129.

As you are the senior officer empowered to sign the registration statement, we ask you to maintain records consistent with ITAR Section 122.5 regarding: 1) The key senior officer listed on the registration who will oversee the compliance program and be responsible for designating the direct employees who will serve as "empowered officials" at their place of employment, and 2) A list of qualified, direct employees who will serve as "empowered officials" by name, position, business unit, phone and fax numbers and email addresses. Please note that third parties (individuals who are not direct employees, such as consultants, subcontractors or outside counsel, for example) cannot serve as "empowered officials."

ITAR Section 122.5 requires you to maintain records concerning your registration and the manufacture, acquisition and disposition of defense articles; the provision of defense services; and information on political contributions, fees, or commissions furnished or obtained, as required by ITAR Part 130. Records maintained shall be available at all times for inspection and copying by this office or by Customs officials. To maintain such records, managers, supervisors and employees need appropriate training on AECA and ITAR requirements and must understand the individual and organizational ramifications of failure to comply. Ramifications may include shipment delay and/or shipment seizure by Customs and Border Protection, loss of export privileges, or criminal charges.

You may refer to the DDTC website for a Compliance Guide at <http://www.pmdtc.state.gov/> and then click on the ITAR Compliance tab, next click on How to Comply tab. The DDTC website also includes a copy of the ITAR, explanations of export licensing procedures, how to submit a license

application, country sanctions, individuals / companies debarred by the Department of State, and other export matters. The website also includes procedures for requesting a commodity jurisdiction determination (ITAR Section 120.4) should you have questions on whether an article, services, or technical data is covered by the ITAR Part 121 (U.S. Munitions List).

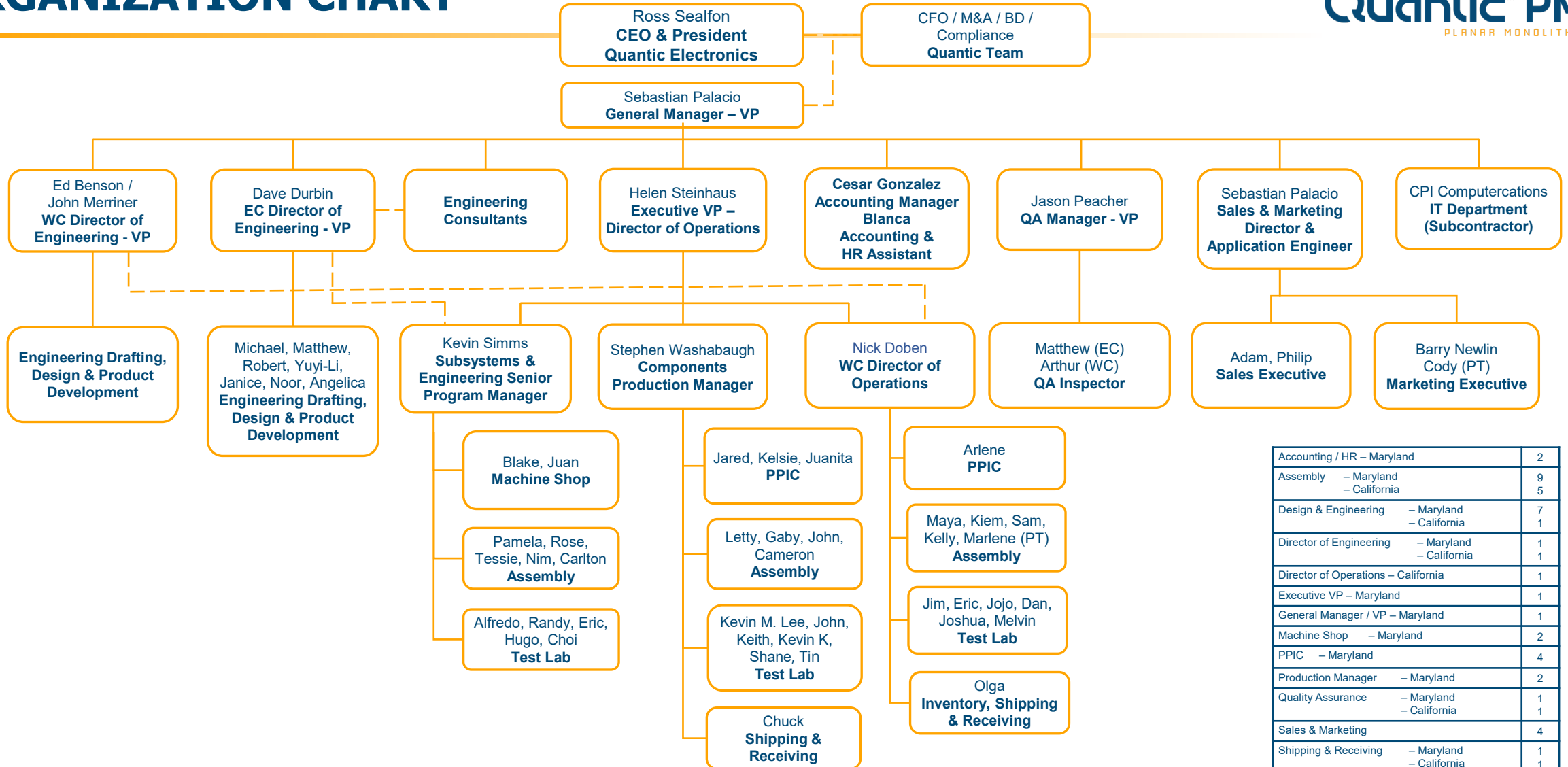
Please include your registration code and the following statement on all registration correspondence to this office: "Under penalty according to federal law (22 CFR 127.2, 22 USC 2778, 18 USC 1001) I, [insert your name], as authorized by [name of company, if applicable] warrant the truth of the statements made herein." We recommend submitting for registration renewal well in advance to ensure this office receives the request up to 60 days before registration expiration date. However, your registration must be received at least 30 days prior to this new expiration date. Registration must be current to apply for export licenses or other approvals, or to use export exemptions. Your registration is not current, for example, if you have not notified this office of any material change in the information contained in your Registration Statement (ITAR Section 122.4).

For general registration related questions, please contact the DDTC Response Team at 202-663-1282 or by email at [ddtc.customerservice@state.gov](mailto:ddtc.customerservice@state.gov). For questions related to this matter, please contact Telethia Thomas at 202-632-2153.

Sincerely,

Daniel Cook  
Chief, Registration, Compliance, & Analysis

# ORGANIZATION CHART



Accounting / HR – Maryland	2
Assembly – Maryland	9
– California	5
Design & Engineering – Maryland	7
– California	1
Director of Engineering – Maryland	1
– California	1
Director of Operations – California	1
Executive VP – Maryland	1
General Manager / VP – Maryland	1
Machine Shop – Maryland	2
PPIC – Maryland	4
Production Manager – Maryland	2
Quality Assurance – Maryland	1
– California	1
Sales & Marketing	4
Shipping & Receiving – Maryland	1
– California	1
Test Techs – Maryland	12
– California	5
<b>TOTAL</b>	<b>62</b>

**Thank You!**

