PLANAR MONOLITHICS INDUSTRIES, INC.

RF / MICROWAVE COMPONENTS & MULTIFUNCTION MODULES / SUBSYSTEMS

TECHNICAL CAPABILITIES & FACILITIES PRESENTATION

October 2, 2018

PMI WEST COAST:
4921 ROBERT J. MATHews PKWY, SUITE 1
EL DORADO HILLS, CA 95762, USA
Tel: 916-542-1401

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http:\\www.pmi-rf.com

PMI EAST COAST:
7311 - F GROVE ROAD
FREDERICK, MD 21704, USA
Tel: 301-662-5019
EAST AND WEST COAST OFFICES

**EAST COAST FACILITY:**
7311-F Grove Road
Frederick, MD 21704 • USA•
Phone: 301-662-5019

**WEST COAST FACILITY:**
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PMI West Coast
El Dorado Hills, CA

PMI East Coast
Frederick, MD

**PRODUCTS**
- Amplifiers – Solid State
- Attenuators – Variable/Programmable
- Couplers (Quadrature, 180° & Directional)
- Detectors – RF/Microwave
- DLVAs, ERDLVAs & SDLVAs
- DTOs, VCOs, PLO, DROs, & Frequency Synthesizers
- Filters & Switched Filter Banks
- Form, Fit, Functional Products & Services
- Frequency Discriminators & IFMs
- Integrated MIC/MMIC Assemblies (IMAs)
- IQ Vector Modulators
- Limiters – RF/Microwave
- Log Amplifiers
- Millimeter Wave Components (Up to 50 GHz)
- Miscellaneous Products
- Multifunction Integrated Assemblies (MIAs)
- Phase Shifters & Bi-Phase Modulators
- Power Dividers/Combiners (Passive & Active)
- Pulse Modulators (SPST)
- Rack & Chassis Mount Products
- Receiver Front Ends & Transceivers
- SDLVAs, ERDLVAs & DLVAs
- Single Side Band Modulators
- SMT & QFN Products
- Switch Matrices
- Switched Filter Banks
- Switches – Solid State
- Systems - Radar Sense & Avoid
- Systems – Fly Eye Radars
- Threshold Detectors
- USB Products
Planar Monolithics Industries, Inc. (PMI), an “S” Corporation, was founded by Dr. Ash (Ashok) Gorwara on November 11th, 1989 to take advantage of the growing demand in monolithic based products using Hybrid MIC/MMIC technology. PMI offers its unique DC to 50 GHz products for applications in space, military, telecommunications, communications and consumer electronics.

Today, PMI is being directed into the 21st Century by expanding the applications of RF/Microwave components and subsystems into new, low cost, RF/Microwave receiving and transmitting systems for both civilian and military customers.

Effective April 30 2013, PMI, 7311-F Grove Road, Frederick, Maryland, USA 21704, USA, http://www.pmi-rf.com acquired 100% of all the assets & property of HARI, LLC, www.harillc.com (Formerly operating as Genesis Microwave Inc., www.genesismicrowave.com) located at 4980 Hillsdale Circle, Suite B, El Dorado Hills, CA 95762, USA.

These assets include all the test and manufacturing equipment and machinery, designs, Documentation, drawings and Intellectual property in the form of hard copies and in computer format in servers, CD's, storage areas, etc. Also included in these assets are the Office Equipment & Machinery, etc. and Computers, Office furniture, Finished goods, In-process and Raw Materials & Inventories and other Miscellaneous items. In addition to these assets, included are, all the stock in trade, merchandise, fixtures, equipment, goodwill and trade of the known business as "HARI LLC".

All the RF/MICROWAVE products, components, subsystems, etc. being designed, manufactured, serviced and produced by HARI, LLC www.harillc.com (Formerly operating as Genesis Microwave Inc., www.genesismicrowave.com) until 30th April 30 2013, will now be offered, provided, produced, manufactured and serviced by PMI, at its West Coast Facilities Operations located at 4921 Robert J. Mathews Parkway, Suite 1, El Dorado Hills, CA 95762, USA.
PMI was founded to take advantage of the growing demand in monolithic-based products using the Hybrid MIC/MMIC technology innovations that are mushrooming in a big way all over the world. High performance and reliable products can be obtained by using this technology.

A vacuum existed in the demand for state-of-the-art Hybrid MIC/MMIC Components and Subsystems. PMI has been setup to Design, Develop, Manufacture, Test, and Market complex state-of-the-art:

- Hybrid RF/Microwave and Monolithics Integrated Circuits (MIC/MMIC) and Components
- Hybrid MIC/MMIC Supercomponents and Subsystems

PMI provides its unique products for applications in space, military, communications, telecommunications and industrial electronics systems.

PMI has been set up to perform research, design, develop, manufacture and market various MIC/MMIC (Microwave Integrated Circuits and Monolithics Microwave Integrated Circuits) Components, Supercomponents, and Subsystems for applications in Telecommunications, Terrestrial, Satellite, and Mobile-Radio Communications, UAVs (Unmanned Aerial Vehicles) & Drones, Defense (ECM, ECCM, ESM, Radars, SIGINT, and Electronic Warfare), Navigation and Marine Electronics, FAA/DOT-Avionics, Ground Based Systems, and Microwave Landing Systems.

Worldwide demand exists for High Reliability, Low Cost systems. Such needs can be satisfied by PMI by using its unique Hybrid MIC/MMIC Technologies and products that the team has developed called Application Specific Hybrid Microwave/Monolithics Integrated Circuits (ASHMIC/ASHMMIC*). *Trademark of PMI.
As a manufacturer PMI utilizes our own designs for all components, integrated modules and subsystems:

**PMI Evolution and Purpose**

RF/MICROWAVE
MILITARY, COMMUNICATIONS & DRONE SYSTEMS CUSTOMERS

RF/MICROWAVE INTEGRATED MODULES

RF Filters & Switch Filter Banks
SDLVAs, IF & RF Log Amplifiers
RF Attenuation and RF Blanking
RF Switching & Pulse Modulators
RF Limiters and Detectors
Phase Shifters, Phase Modulators & IQ Vector Modulators
RF Mixers

Low Noise Amplifiers
Power Dividers, & Couplers

RF/MICROWAVE SUB-SYSTEMS

MMIC Technology & Processes
HYBRID Technology & Processes
DISCRETE Technology & Processes

Analog & Digital Technology & Processes
In-House Machine Shop Capability

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Application of PMI DC to 50 GHz
Components & Sub-Systems

Planar Monolithics Industries, Inc. has been in business for over 25 years as a manufacturer of electronic components for defense applications. Applications such as Receiver Front-Ends, Synthesizers and Transceivers. As well as a large variety of RF components that compliment this target market. Our technical goal is to produce the finest products available that resolve this mathematical statement:

\[ V_{\text{Input}} = A \cos(\omega_c t + \phi_t) \]

**Amplifiers – Solid State**
**Attenuators – Variable/Programmable**
**Couplers (Quadrature, 180° & Directional)**
**Detectors – RF/Microwave**
**DLVAs, ERDLVAs & SDLVAs**
**DTOs, VCOs, PLO, DROs, & Frequency Synthesizers**
**Filters & Switched**
**Filter Banks**
**Form, Fit, Functional Products & Services**
**Frequency Discriminators & IFMs**
**Integrated MIC/MMIC Assemblies (IMAs)**
**IQ Vector Modulators**
**Limiters – RF/Microwave**
**Log Amplifiers**
**Millimeter Wave Components (Up to 50 GHz)**
**Miscellaneous Products**
**Multifunction Integrated Assemblies (MIAs)**
**Phase Shifters & Bi-Phase Modulators**
**Power Dividers/Combiners (Passive & Active)**
**Pulse Modulators (SPST)**
**Rack & Chassis Mount Products**
**Receiver Front Ends & Transceivers**
**SDLVAs, ERDLVAs & DLVAs**
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**SMT & QFN Products**
**Switch Matrices**
**Switched Filter Banks**
**Switches – Solid State**
**Systems - Radar Sense & Avoid**
**Systems – Fly Eye Radars**
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Application of PMI DC to 50 GHz Components & Sub-Systems

TYPICAL EW, ECM, ESM RECEIVER FRONT-END

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

AMPLITUDE
FREQUENCY
PHASE & MODULATION

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TUNER / SUPERHETEROODYNE FRONT-END

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TYPICAL TRANSCEIVER / TRANSPONDER BLOCK DIAGRAM

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

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Attenuators – Variable/Programmable
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PMI specializes in replacing obsolete parts on old systems. We offer Form-Fit-Functional replacement Parts for any system. If a Source Control Drawing (SCD) is available we can offer a complete solution to meet all of the given electrical, mechanical and environmental specifications. PMI has designed, manufactured and delivered many of these replacement components such as:

- IF & RF LOG AMPLIFIERS, SDLVAs & DLVAs
- LOW NOISE AMPLIFIERS, VARIABLE GAIN AMPLIFIERS & LIMITING AMPLIFIERS
- LIMITERS, DETECTORS, HYBRID COUPLERS & POWER DIVIDERS
- PHASE SHIFTERS & BI-PHASE MODULATORS
- I & Q VECTOR & SINGLE SIDE-BAND MODULATORS
- FILTERS AND SWITCH FILTER BANKS
- SWITCHES AND ATTENUATORS

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PMI PRODUCTS

20 MHz to 18.0 GHz, SP8T
24.0 to 40.0 GHz, SPST
50 MHz to 40.0 GHz, SP4T
Ultra High Speeds
20 Watt Surface Mount SPDT
SP6T Miniature Design

SP3T Pin Diode Switch
100 Watt SP2T
DC to 40.0 GHz, SPST
GPO or Conventional Coaxial Connectors

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Amplifiers – Solid State
Attenuators – Variable/Programmable
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USB Products
PMI PRODUCTS

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1.0 to 18.0 GHz, 60 dB Digital Attenuator

DC to 2.0 GHz, Switched Bit Attenuator

8.0 to 18.0 GHz, 8-BIT Digital Attenuator

2.0 to 4.0 GHz, Voltage Variable Attenuator

Digitally Tuned Attenuators

0.5 to 18.0 GHz, 20 dB Switched Bit Attenuator

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12.0 to 18.0 GHz Frequency Discriminator
0.1 to 18.0 GHz, CW Immune SDLVA
8.0 to 18.0 GHz, SDLVA
1.1 to 1.12 GHz, 180° Bi-Phase Modulator/Phase Shifter
6.0 to 18.0 GHz, 360° Digital Phase Shifter
8.0 to 10.0 GHz, 360° Digital Phase Shifter
SP3T Switch
1.0 to 2.0 GHz, LNA w/35 dB Gain & 1.4 dB Noise Figure

1.6 to 2.7 GHz, Limiting Amplifier w/40 dB Gain & Limited RF Output of +15 dBm

2.0 to 18.0 GHz, LNA w/30 dB Gain & 4 dB Noise Figure

10 MHz to 6.0 GHz Portable Amplifier with 30 dB Gain

2.0 to 18.0 GHz, Limiting Amplifier with +21 dBm Limited Output

9.0 to 10.0 GHz, LNA w/37 dB Gain & 3 dB Noise Figure

Dual Gain & Variable Gain Amplifiers

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0.01 to 2.5 GHz, 100 W CW, 1 kW Peak, RF Limiter
0.03 to 3.0 GHz, High Power Limiter
18.0 to 40.0 GHz, High Power Limiter
0.5 to 8.0 GHz, Active Limiter

0.4 to 2.0 GHz, Coaxial Limiter
18.0 to 40.0 GHz, Low Loss Diplexer
750 MHz Cavity Filter with 500 MHz, 1 dB Bandwidth

0.01 to 2.5 GHz, 100 W CW, 1 kW Peak, RF Limiter
18.0 to 40.0 GHz, Low Loss Diplexer
6.0 to 18.0 GHz, Filter/Detector

Bandpass Filter, centered at 160 MHz with a 3 dB Bandwidth of 20 MHz ±5%

Low Pass Filter with 2400 MHz Cutoff Frequency
PMI PRODUCTS

- 5.4 to 5.9 GHz, Digitally Controlled Analog Phase Shifter
- 8.0 to 18.0 GHz, Lange Coupler
- 0.5 to 18.0 GHz, Threshold Detector
- 6.0 to 18.0 GHz, Synthesizer, Switch Filter Bank, Amplifier Module
- 0.5 to 18.0 GHz, SP6T Switch
- Miniature, 2 Channel Switch Filter Bank
- DC to 2.0 GHz, Electro-mechanical STEP Attenuator
- 16.0 GHz Fo, 2.0 GHz Bandwidth, Cavity Filter

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PMI PRODUCTS

2.0 to 18.0 GHz, Threshold Detector

18.0 to 40.0 GHz, Low Noise, Tunnel Diode Detector

0.5 to 18.0 GHz, High Speed, High Sensitivity Diode Detector

4.0 to 26.5 GHz, Zero Bias Schottky Detector

2.0 to 18.0 GHz, High Speed, LVPECL Logic Output Threshold Detector

0.5 to 18.0 GHz, High Speed, High Sensitivity Diode Detector

2.5 to 3.5 GHz, High Speed, DC-Coupled, Directional Detector

16.0 to 40.0 GHz, High Speed Threshold Detector

3.8 to 4.6 GHz, High Speed Threshold Detector

4.0 to 4.5 GHz, Ultra-High Speed, High Sensitivity Threshold Detector

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PMI PRODUCTS

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

21.0 GHz, Beam Forming Monopulse Circuit

2.0 to 18.0 GHz, Digitally Tuned Oscillator (DTO)

6.0 to 18.0 GHz, Synthesizer

2.0 to 18.0 GHz, Frequency Discriminator

Delay Line in a Frequency Discriminator

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

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18.0 to 40.0 GHz, 65 dB SDLVA

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7.0 to 18.0 GHz, 75 dB SDLVA

2.0 to 18.0 GHz, 65 dB CW Immune ERDLVA

0.5 to 18.0 GHz, 50 dB DLVA

2.0 to 18.0 GHz, 45 dB DLVA

3.0 to 18.0 GHz, 70 dB SDLVA

100 to 700 MHz, 55 dB SDLVA

7.0 to 18.0 GHz, 75 dB SDLVA

700 to 1250 MHz, 70 dB SDLVA
PMI PRODUCTS

0.25 to 18.0 GHz, Limiting Amplifier

IF Logarithmic Amplifier (SDLVA)

32.0 to 40.0 GHz, Bandpass Filter

0.75 to 18.0 GHz, 8 Channel Switch Filter Bank

0.1 to 18.0 GHz, Threshold Detector

6.0 to 18.0 GHz, I/Q Vector Modulator

85 MHz to 18.0 GHz, I/Q Vector Modulator

Custom Frequency Doubler Module

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PMI PRODUCTS

- 2.0 to 18.0 GHz, I/Q Vector Modulator
- 1.0 to 18.0 GHz, Triplexer
- 10 MHz to 18.0 GHz, Amplified Detector Module
- 9410 MHz, Multi-Function Module
- 14.65 to 15.35 GHz Integrated Limiter and Attenuator
- 7.7 to 8.2 GHz Laser Control Module
- 1030 MHz ±0.01 MHz, Power Detector Module

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PMI PRODUCTS

**100 MHz to 18.0 GHz Transceiver (Phase II)**

**0.5 to 40.0 GHz, USB Powered LNA**

**4.0 to 18.0 GHz, Up/Down Converter**

**100 MHz to 18.0 GHz Transceiver (Phase III)**

**500 MHz to 40.0 GHz USB Powered SP2T Switch**

**85 MHz to 2.0 GHz, 8 bit 360° Phase Shifter**

**2.0 to 6.0 GHz, 8 Bit 360° Phase Shifter**

**Vector Modulator**

**Double Sided 100 MHz to 18.0 GHz Switch Filter Bank**

**Input filters**

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PLANAR MONOLITHICS INDUSTRIES, INC.
FACILITIES INFORMATION

7311-F GROVE ROAD, FREDERICK, MD:
- 5,000 sq. ft. Facility
- Components Manufacturing
- Sub-Assembly Manufacturing
- Hybrid Assembly
- 1,000 sq. ft. Class 100,000 ppm Clean Room
- Engineering Department
- Test Department
- Production Officer
- QA/QC Office
- Sales & Marketing
- Executive Offices
- Conference Room

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
- Continued Manufacturing Previous HARI, LLC
- (formally Genesis Microwave)
- Products as listed at www.harillc.com
  and www.genesismicrowave.com

ACCOUNTING & CORPORATE INFO:
- Type “S” Corporation, Pennsylvania
- Peachtree Sage 50, 2013
- EXACT MAX MRP
- Accrual Basis Accounting Practice
- Fiscal Year is December 31st
- GAAP Guidelines Followed
- Monthly Internal Financial Reports
- Weekly Cash Flow Analysis Reports

7310 GROVE ROAD, FREDERICK, MD:
- 1,000 sq. ft. Facility
- Accounting & Human Resources Offices
- Executive Vice President's Office

5715 INDUSTRY LANE, FREDERICK, MD:
- 2,500 sq. ft. Facility
- High Power Equipment Test Laboratory
- Conference Room
- 600 sq. ft. 10,000 ppm Clean Room
- Machine Shop
- Assembly & Test
- ESS Test Room

WEST COAST FACILITY:
4921 Robert J. Mathews Pkwy, Suite 1
El Dorado Hills, CA 95762 •USA•
Phone: 916-542-1401

sales@pmi-rf.com
http://www.pmi-rf.com/about

6590 WATERS EDGE CT, NEW MARKET, MD:
- 4,000 sq. ft. Facility
- CORPORATE HQ
- Conference Rooms & Executive Offices

EAST COAST FACILITY:
7311-F Grove Road
Frederick, MD 21704 •USA•
Phone: 301-662-5019
<table>
<thead>
<tr>
<th>CUSTOMER</th>
<th>PROGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTHROP GRUMMAN CORPORATION BALTIMORE, MD &amp; ROLLING MEADOWS, IL</td>
<td>CABIN FEVER CORVAIR EA-18G ICAP-III LR-100 FALCON EDGE ALQ-188 PDF</td>
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<td>BAE SYSTEMS, NH</td>
<td>DEWS, F15 EPAWSS, F15 KNIGHT PROGRAM U2 PROGRAM</td>
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<td>TRANSFORMATIONAL SECURITY, MD</td>
<td>CUSTOM THRESHOLD DETECTORS</td>
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<td>MITSUBISHI-MELCO, JAPAN</td>
<td>SUCCESSIVE DETECTION LOG VIDEO AMPLIFIERS (SDLVAs), F-2 / F15 LIMITERS &amp; SOLID STATE SWITCHES FOR DESTROYER SHIP, TP-1 (HELICOPTER) &amp; SUBMARINE</td>
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<td>TOKYO-KEIKI, JAPAN</td>
<td>CH 47 HELICOPTER UH-60J HELICOPTER</td>
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<tr>
<td>NAVAL RESEARCH LAB, WASHINGTON, DC</td>
<td>AMPLIFIED DETECTOR RF MONITOR FOR ANACHOIC CHAMBER 100 MHz TO 18 GHz TRANSCIEVER</td>
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<tr>
<td>RAYTHEON MISSILE SYSTEMS, AZ</td>
<td>SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVAs)</td>
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<tr>
<td>L-3 COMMUNICATIONS, TX</td>
<td>SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVAs) 16 CHANNEL CUSTOM SWITCH FILTER BANK</td>
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<td>LOCKHEED MARTIN CO, AL</td>
<td>MK92 FIRE CONTROL SYSTEM (FORM, FIT &amp; FUNCTION SPARES)</td>
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<tr>
<td>MIKES, TURKEY</td>
<td>SPEWS-II (F16)</td>
</tr>
<tr>
<td>ARGONST, VA</td>
<td>RF DISTRIBUTION UNIT</td>
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<tr>
<td>ISRAELI AIR FORCE (IAF), ISRAEL</td>
<td>GUNN DIODE OSCILLATORS (F-16)</td>
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<td>ELBIT SYSTEMS, ISRAEL</td>
<td>SOLID STATE OSCILLATORS WITH LOW VIDEO TRANSIENTS (NAVAL EW SYSTEMS)</td>
</tr>
<tr>
<td>WARNER ROBINS AFB, GA</td>
<td>IF LOG AMPLIFIERS (FORM, FIT &amp; FUNCTION SPARES), B-1B</td>
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</table>

**WEST COAST FACILITY:**
4921 Robert J. Mathews Pkwy, Suite 1
El Dorado Hills, CA 95762 •USA•
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Frederick, MD 21704 •USA•
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**sales@pmi-rf.com**
http://www.pmi-rf.com/about
<table>
<thead>
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<td>L-3 COMMUNICATIONS, UT</td>
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<td>MARS-1, BRAZILIAN AF</td>
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<td>AIRBUS DEFENCE &amp; SPACE, GERMANY</td>
<td>PEGASUS, CUSTOM IMA</td>
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<td>SAAB AB ELECTRONIC DEFENSE SYSTEMS, SWEDEN</td>
<td>CUSTOM SWITCHES</td>
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<td>BHARAT ELECTRONICS, INDIA</td>
<td>CUSTOM AMPLIFIER, JAS 39 GRIPEN</td>
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<td>L3-MICREO, AUSTRALIA</td>
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<td>DEFENCE AVIONICS RESEARCH ESTABLISHMENT (DARE), INDIA</td>
<td>DF SYSTEM COMPONENTS</td>
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<td>DSO NATIONAL LABORATORIES, SINGAPORE</td>
<td>CUSTOM HIGH POWER SWITCHES</td>
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<td>ASELSAN INC., TURKEY</td>
<td>SUCCESSIVE INTEGRATED LIMITER/ATTENUATOR, AIRBORNE</td>
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<td>TUBITAK, TURKEY</td>
<td>40.0 GHz SWITCHES</td>
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<tr>
<td>DANAM SYSTEMS, SOUTH KOREA</td>
<td>HIGH POWER SWITCHES, LRM (LONG RANGE MISSILE)</td>
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<td>AMPLIFIERS &amp; SWITCHES</td>
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<td>MARINA DE GUERRA (Peruvian Navy), PERU</td>
<td>RF COMPONENTS FOR DF SYSTEM</td>
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<td>SOUTH KOREAN NAVY, BUSAN</td>
<td>RF COMPONENTS FOR DF SYSTEM</td>
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<td>VARIOUS COMPONENTS FOR R &amp; D</td>
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<td>SPACE VECTOR, CA</td>
<td>ATLAS ROCKET</td>
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<tr>
<td>PASTERNACK ENTERPRISES, CA</td>
<td>OVER 150 DIFFERENT IN STOCK MODELS</td>
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<td>56 NETWORKS</td>
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<td>FOCUS MICROWAVES, CANADA</td>
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<td>MC COUNTERMEASURES, CANADA</td>
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</table>

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http://www.pmi-rf.com/about

EAST COAST FACILITY:
7311-F Grove Road
Frederick, MD 21704 • USA•
Phone: 301-662-5019
## Orders Booked Statistics by Country 2014 through 2017

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<thead>
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<th>Year</th>
<th>Country</th>
<th>No.</th>
<th>% of Orders Booked</th>
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<td>2014 Total</td>
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<td>2015 Total</td>
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<td>2016 Total</td>
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<tr>
<td>2017 Total</td>
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<td>100.00%</td>
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</tbody>
</table>

Confidential & Proprietary

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**EAST COAST FACILITY:**
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PMI EAST COAST OPERATIONS

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EAST COAST FACILITY:
7311-F Grove Road
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Phone: 301-662-5019

Amplifiers – Solid State
Attenuators – Variable/Programmable
Couplers (Quadrature, 180° & Directional)
Detectors – RF/Microwave
DLVAs, ERDLVAs & SDLVAs
DTOs, VCOs, PLO, DROs, & Frequency Synthesizers
Filters & Switched Filter Banks
Form, Fit, Functional Products & Services
Frequency Discriminators & IFMs
Integrated MIC/MMIC Assemblies (IMAs)
IQ Vector Modulators
Limiters – RF/Microwave
Log Amplifiers
Millimeter Wave Components
(Up to 50 GHz)
Miscellaneous Products
Multifunction Integrated Assemblies (MIAs)
Phase Shifters & Bi-Phase Modulators
Power Dividers/Combiners (Passive & Active)
Pulse Modulators (SPST)
Rack & Chassis Mount Products
Receiver Front Ends & Transceivers
SDLVAs, ERDLVAs & DLVAs
Single Side Band Modulators
SMT & QFN Products
Switch Matrices
Switched Filter Banks
Switches – Solid State
Systems - Radar Sense & Avoid
Systems – Fly Eye Radars
Threshold Detectors
USB Products
PMI EAST COAST OPERATIONS

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Amplifiers – Solid State
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- DLVAs, ERDLVAs & SDLVAs
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- Switch Matrices
- Switched Filter Banks
- Switches – Solid State
- Systems - Radar Sense & Avoid
- Systems – Fly Eye Radars
- Threshold Detectors
- USB Products
Network Analyzers:

- (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) HP Network Analyzer (10 kHz to 300 MHz)
- (1) HP 5100 Network Analyzer (0.5 to 26.5 GHz)
- (1) Agilent N5230C PNA Network Analyzer (10 MHz to 20 GHz)
- (1) Keysight E8364B PNA Network Analyzer (10 MHz to 40 GHz)
- (1) 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

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)

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

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, 20W
- (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

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PMI East Coast Operations
Manufacturing and Standards

Manufacturing Equipment:

- (1) TSE-11-A ESPEC Thermal Shock Chamber
- (1) JEN410 IR Reflow Oven
- (1) Thermo Electron Oven
- (1) Anatech Plasma Cleaner
- (1) Metallurgical Microscope MT1000
- (4) Westbond 747677E-79 Convertible Wire Bonder
- (1) Westbond 7476E-79 Wedge Wire Bonder
- (1) Westbond 74630E-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
- (1) HAAS VF0 CNC Milling Machine
- (1) HAAS DT1 CNC Milling Machine
- (1) Hardinge Turret Lathe
- (1) Di-Acro Power Shear
- (1) Brady Label Machine BP-THT-600-11
- (4) Thermal Hot/Cold Plates
- (1) Ling Dynamic V650 Random Vibration Setup
- (1) Shock Tester
- (1) Varian Helium Leak Tester

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
PMI West Coast Operations

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Amplifiers – Solid State
Attenuators – Variable/Programmable
Couplers (Quadrature, 180° & Directional)
Detectors – RF/Microwave
DLVAs, ERDLVAs & SDLVAs
DTos, VCOs, PLO, DROs, & Frequency Synthesizers
Filters & Switched
Filter Banks
Form, Fit, Functional
Products & Services
Frequency Discriminators
& IFMs
Integrated MIC/MMIC
Assemblies (IMAs)
IQ Vector Modulators
Limiters – RF/Microwave
Log Amplifiers
Millimeter Wave
Components
(Up to 50 GHz)
Miscellaneous Products
Multifunction Integrated
Assemblies (MIAs)
Phase Shifters & Bi-Phase
Modulators
Power Dividers/Combiners
(Passive & Active)
Pulse Modulators (SPST)
Rack & Chassis Mount
Products
Receiver Front Ends
& Transceivers
SDLVAs, ERDLVAs
& DLVAs
Single Side Band
Modulators
SMT & QFN Products
Switch Matrices
Switched Filter Banks
Switches – Solid State
Systems - Radar Sense & Avoid
Systems – Fly Eye Radars
Threshold Detectors
USB Products
PMI West Coast Operations

WEST COAST FACILITY:
4921 Robert J. Mathews Pkwy, Suite 1
El Dorado Hills, CA 95762 • USA•
Phone: 916-542-1401

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7311-F Grove Road
Frederick, MD 21704 • USA•
Phone: 301-662-5019

Amplifiers – Solid State
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Switch Matrices
Switched Filter Banks
Switches – Solid State
Systems - Radar Sense & Avoid
Systems – Fly Eye Radars
Threshold Detectors
USB Products
Network & Spectrum Analyzers:
- (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) Infinium 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
- (1) 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

PMI West Coast Operations
Manufacturing and Standards

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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

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
- DSS Cleared Facility
International Traffic in Arms Regulations

ITAR

Sebastian Palacios, Vice President
Planar Monolithics Industries, Inc.
7111-F Grove Road
Frederick, MD 21704
SPALAC@PMI-RF.COM

REGISTRANT CODE: M16913
EXPIRATION DATE: 08/31/2019

Reference: Manufacturer and Exporter Registration Statement and Fee Submission

Dear Mr. Palacios:

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 08/31/2019.

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 (AEDC) 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, and 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 AEDC 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.pmiclase.state.gov/ and click on the Compliance tab. The DDTC website also includes a copy of the ITAR, explanations of export licensing procedures, and how to submit a license application, country sanctions, individuals/companies deemed 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, service, 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: "I certify under penalty of federal law (22 U.S.C. 2478, 18 USC 1001) that [insert your name], as authorized by [name of company if applicable], has furnished 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 45 days before the 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 122.6).

If you have any questions regarding registration, please contact us at (302) 661-1200 or DDTCResponseTeam@state.gov.

Sincerely,

[Signature]
Chief Compliance, Registration & Enforcement

---

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PMI ISO9001 REGISTRATION

International Quality Registrars Corporation
GMS Assessment, Training, Auditing & Product Inspection Services since 1985

International Quality Registrars (IQR) Corporation hereby certifies that

Planar Monolithics Industries, Inc.
Headquarters/23F/F Grove Road, Frederick, MD 21704 USA
Site 1: Mariner St., S.C.P., 7715 Unit 31, Indialantic, Lake, 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): X 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

Registration No.: 18-120804-1Q
Client ID: PM109
Cert. Expiration Date: 09/17/21
Cert. Issued Date: 09/17/18

Last Cert. Revision Date: 09/17/18
Initial Cert. Issue Date: 02/24/09
Sheet No.: 1 of 1

IQR QMS Certification Signature

 FORM IQR-2510 Rev. A

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PMI EAST COAST ORGANIZATION CHART

Dr. Ashok Govara
President & CEO
Director Of Engineering

Helen Steinhaus
Executive Vice President

Dave Durbin
Vice President
Director of RF/Microwave Subsystems & Special Projects

Shanmugam Narayanaswamy
Chief Technical Officer

John Mott
Plant & Machinery Maintenance

Engineering Assembler
Engineering Technician
Project Engineering

Jason Peacher
QA/QC Manager
Assistant FSO

John Mott
Assistant Production Manager

Jason Peacher
Production Planning & Inventory Control

Production Planning & Inventory Control

IT Department

Production Test Lab

Assembly

Machine Shop & Painting

Engineering Drafting & Design

QA Inspector

Drafting & Design

P Jobs

Shubabhan Palazzo
Vice President
Director of Sales & Marketing/Principal Applications Engineer/Compliance/Compliance

Accounting Department

Donald Horner
Executive Assistant

Donald Horner
Certified Public Accountant

Corporate

2

Administration

1

Accounting/Finance/CPA

3

Sales & Marketing

5

Quality Assurance Manager

1

Design Engineering (Electrical & Mechanical)

9

Manufacturing Assemblers

10

Manufacturing Technicians

8

Machine Shop

3

Production Planning, & Inventory Control

3

Quality Control Inspector

1

Engineering Consultants

5

TOTAL

51

Corporate Products

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