MERRIMAC INDUSTRIES INC
Form 10-K
March 31, 2006

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

FORM 10-K

ANNUAL REPORT PURSUANT TO SECTIONS 13 OR 15(d)
OF THE SECURITIES EXCHANGE ACT OF 1934

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2005

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to

Commission file number 0-11201

MERRIMAC INDUSTRIES, INC.

(Exact Name of Registrant as Specified in Its Charter)

Delaware	22-1642321
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)
41 Fairfield Place, West Caldwell, New Jersey	07006
(Address of Principal Executive Offices)	(Zip Code)

(973) 575-1300

(Registrant's telephone number, including area code)

WEBSITE: www.merrimacind.com

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Exchange on Which Registered

Common Stock	The American Stock Exchange
Common Stock Purchase Rights	The American Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.
Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.
Yes No

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, or a non-accelerated filer. See definition of "accelerated filer and large accelerated filer" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer Accelerated filer Non-accelerated filer

Indicate by check mark whether the registrant is a shell Company (as defined in Rule 12b-2 of the Exchange Act).
Yes No

As of March 24, 2006, 3,150,796 shares of common stock of the registrant were outstanding. The aggregate market value of common stock held by non-affiliates of the registrant as of July 2, 2005 was approximately $19,539,596.

DOCUMENTS INCORPORATED BY REFERENCE

The registrant’s Proxy Statement for its 2006 Annual Meeting of stockholders is hereby incorporated by reference into Part III of this Form 10-K.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains statements relating to future results of the Company (including certain projections and business trends) that are ‘‘forward-looking statements’’ as defined in the Private Securities Litigation Reform Act of 1995. Actual results may differ materially from those projected as a result of certain risks and uncertainties. These risks and uncertainties include, but are not limited to: risks associated with demand for and market acceptance of existing and newly developed products as to which the Company has made significant investments, particularly its Multi-Mix® products; the possibilities of impairment charges to the carrying value of our Multi-Mix® assets, thereby resulting in charges to our earnings; slower than anticipated penetration into the satellite communications, defense and wireless markets; failure of our Original Equipment Manufacturer, or OEM, customers to successfully incorporate our products into their systems; changes in product mix resulting in unexpected engineering and research and development costs; delays and increased costs in product development, engineering and production; reliance on a small number of significant customers; the emergence of new or stronger competitors as a result of consolidation movements in the market; the timing and market acceptance of our or our OEM customers' new or enhanced products; general economic and industry conditions; the risk that the benefits expected from the Company's acquisition of Filtran Microcircuits Inc. are not realized; the ability to protect proprietary information and technology; competitive products and pricing pressures; our ability and the ability of our OEM customers to keep pace with the rapid technological changes and short product life cycles in our industry and gain market acceptance for new products and technologies; foreign currency fluctuations between the U.S. and Canadian dollars; risks relating to governmental regulatory actions in communications and defense programs; and inventory risks due to technological innovation and product obsolescence, as well as other risks and uncertainties as are detailed from time to time in the Company's Securities and Exchange Commission filings. These forward-looking statements are made only as of the

date of the filing of this Form 10-K, and the Company undertakes no obligation to update or revise the forward-looking statements, whether as a result of new information, future events or otherwise.

PART I

ITEM 1. BUSINESS

GENERAL

Merrimac is a leader in the design and manufacture of passive RF (Radio Frequency) and microwave components for industry, government and science. Merrimac components are today found in applications as diverse as satellites, military and commercial aircraft, radar, cellular radio systems, medical and dental diagnostic instruments, personal communications systems (‘‘PCS’’) and wireless internet connectivity.

Merrimac is a versatile technologically oriented company specializing in miniature radio frequency lumped-element components, integrated networks, microstrip and stripline microwave components, subsystems and ferrite attenuators. Of special significance has been the combination of two or more of these technologies into single components to achieve superior performance and reliability while minimizing package size and weight.

Merrimac was originally incorporated as Merrimac Research and Development, a New York corporation, in 1954. Merrimac was reincorporated as a New Jersey corporation in 1994 and subsequently reincorporated as a Delaware corporation in 2001.

ELECTRONIC COMPONENTS AND SUBSYSTEMS PRODUCTS

Merrimac manufactures and sells approximately 1,500 components and subsystems used in signal processing systems (the extraction of useable information from radio signals) in the frequency spectrum of zero to sixty-five GHz. Merrimac's products are designed to process signals having wide bandwidths and are of relatively small size and light weight. When integrated into subsystems, advantages of lower cost and smaller size are realized due to the reduced number of connectors, cases and headers. Merrimac's components range in price from $0.50 to more than $10,000 and its subsystems range from $500 to more than $1,000,000.

Merrimac has traditionally developed and offered for sale products built to specific customer needs, as well as standard catalog items. The following table provides a breakdown of electronic components sales as derived from initial orders for products custom designed for specific customer applications, repeat orders for such products and from catalog sales:

	2005	2004	2003
Initial designs	27%	27%	35%
Repeat designs	57%	58%	48%
Catalog sales	16%	15%	17%

Merrimac maintains a current product catalog on its internet website. The Merrimac catalog includes hundreds of standard components, and provides a selection of passive signal processing components. These components often

form the platform-basis for customization of designs in which the size, package, finish, electrical parameters, environmental performance, reliability and other features are tailored for a specific customer application.

Merrimac's strategy is to be a reliable supplier of high quality, technically innovative signal processing products. Merrimac coordinates its marketing, research and development, and manufacturing operations to develop new products and expand its markets. Merrimac's marketing and development activities focus on identifying and producing prototypes for new military and commercial programs and applications in aerospace, navigational systems, telecommunications and cellular analog and digital wireless telecommunications electronics. Merrimac's research and development efforts are targeted towards providing customers with more complex, reliable, and compact products at lower costs.

The major aerospace companies purchase components and subsystems from Merrimac. Merrimac design engineers work to develop solutions to customer requirements that are unique or require

special performance. Merrimac is committed to continuously enhancing its leading position in high-performance electronic signal processing components for communications, defense and aerospace applications.

Improved production efficiencies coupled with the capacity of the Company's low-cost manufacturing facility in Costa Rica and more extensive use of automated test equipment such as Agilent network analyzers have resulted in a considerable reduction of the set-up time to take measurements, calibrate test equipment and provide data electronically. In addition, computerized cost controls such as closed job history and up-to-date work in process costs are also enhancing Merrimac's competitive position. Merrimac is continuing to invest in manufacturing capital equipment in all three of our facilities to provide greater capacity and flexibility and reduce operating costs.

In 1998, Merrimac introduced Multi-Mix® Microtechnology capabilities, an innovative process for microwave, multilayer integrated circuits and micro-multifunction module (MMFM®) technology and subsystems. This process is based on fluoropolymer composite substrates, which are bonded together into a multilayer structure using a fusion bonding process. The fusion process provides a homogeneous dielectric medium for superior electrical performance at microwave frequencies. This 3-dimensional Multi-Mix® design consisting of stacked circuit layers permits the manufacture of components and subsystems that are a fraction of the size and weight of conventional microstrip and stripline products.

In 2001, Merrimac introduced its Multi-Mix PICO® Microtechnology. Through Multi-Mix PICO® technology, Merrimac offers a group of products at a greatly reduced size, weight and cost that includes hybrid junctions, directional couplers, quadrature hybrids, power dividers and inline couplers, filters and vector modulators along with 802.11a, 802.11b, and 802.11g Wireless Local Area Network modules. When compared to conventional multilayer quadrature hybrids and directional coupler products, Multi-Mix PICO® is more than 84% smaller in size, without the loss of power or performance. Merrimac continues to add new designs to its Multi-Mix PICO® product line.

In 2001, Merrimac received and started to ship its first 3G production order for a Multi-Mix PICO® integrated solution to be used by one of the world's largest suppliers of wireless power amplifiers in the design of new third-generation broadband basestations.

In 2004, Merrimac introduced its Multi-Mix Zapper® product line. The Multi-Mix Zapper® addresses the demands of the wireless market for high quality products manufactured in volume with continued improvement in performance,

power and cost.

In addition to wireless basestation communications, Multi-Mix PICO® products have been or are currently under evaluation for applications in airborne electronic countermeasures, radar systems, smart antennas, satellite communications receiver modules, missiles, commercial Wi-Fi (Wireless Fidelity), WLANs (Wireless Local Area Networks), WiMAX (World Interoperability for Microwave Access), the U.S. Department of Defense's next generation fighter jet JSF (Joint Strike Fighter), FCS (Future Combat Systems) and JTRS (Joint Tactical Radio System).

Merrimac customers prefer our value-added Multi-Mix PICO® approach over traditional solutions because it enables them to minimize considerable costs of design, test and measurement, packaging, and manufacturing, as well as the unpredictable follow-on costs typically associated with factory tuning and optimization. Multi-Mix PICO® enables customers to gain access to integrated solutions that simplify their internal design and manufacturing processes while reducing the time and costs it takes to implement manufacturable and repeatable products.

Multi-Mix PICO® also enables customers to outsource certain ancillary functions, which in turn allows them to maintain focus on their own core business competencies.

In the area of broadband communications, Merrimac continues to work on high frequency solutions that will bring multimedia internet access to homes and offices through broadband systems.

Merrimac's major electronic components and subsystems product categories are:

- power dividers/combiners that equally divide input signals or combine coherent signals for nearly lossless power combinations;

- I&Q networks (a subassembly of circuits which allows two information signals (incident and quadrature) to be carried on a single radio signal for use in digital communication and navigational positioning);
- directional couplers that allow for signal sampling along transmission lines;
- phase shifters that accurately and repeatedly alter a signal's phase transmission to achieve desired signal processing or demodulation;
- hybrid junctions that serve to split input signals into two output signals with 0 degree phase difference or 180 degrees out of phase with respect to each other;
- balanced mixers that convert input frequencies to another frequency; variable attenuators that serve to control or reduce power flow without distortion;
- Beamformers that permit an antenna to electronically track or transmit a signal; and
- quadrature couplers that serve to split input signals into two output signals 90 degrees out of phase with respect to each other or combine equal amplitude quadrature signals.

These components can be utilized in a variety of applications including satellite communications, radar, digital communication systems, global positioning and navigation systems, electronic warfare, electronic countermeasures and cellular and wireless communications.

Merrimac's other product categories include single side band modulators, image reject mixers, vector modulators and a wide variety of specialized integrated Micro-Multifunction Modules (MMFM®) assemblies. In the last fiscal year, no one product accounted for more than ten percent of total net sales.

In 2005, Merrimac focused its design and manufacturing efforts on Multi-Mix® multilayer subsystem products for sale to several satcom and military customers during 2005 and 2006.

In addition, in 2005 Merrimac started the design of a high power amplifier for use in basestation infrastructure, military and satcom applications based upon a U.S. Notice of Allowance for a Patent that is expected to be issued shortly. An important part of basestation infrastructure equipment is the high power transmit amplifier, which must provide extremely linear performance in order to boost signals carrying voice, data and video services without distortion.

Approximately 54% of Merrimac's sales in fiscal 2005 were derived from the sales of products for use in high-reliability aerospace, satellite, and missile applications. These products are designed to withstand severe environments without failure or maintenance over prolonged periods of time (from 5 to 20 years). Merrimac provides facilities dedicated to the design, development, manufacture, and testing of these products along with special program management and documentation personnel.

Merrimac's products are also used in a broad range of other defense and commercial applications, including radar, navigation, missiles, satellites, electronic warfare and countermeasures, cellular analog and digital wireless telecommunications electronics and communications equipment. Merrimac's products are also utilized in systems to receive and distribute television signals from satellites and through other microwave networks including cellular radio.

FILTRAN MICROCIRCUITS INC.

GENERAL

Established in 1983, and acquired by Merrimac in February 1999, Filtran Microcircuits Inc. (‘‘FMI’’) is a leading manufacturer of microwave micro-circuitry for the high frequency communications industry. FMI produces microstrip, bonded stripline, and thick metal-backed Teflon® (PTFE) microcircuits for RF applications including satellite, aerospace, PCS, fiber optic telecommunications, automotive, navigational and defense applications worldwide. FMI participates in the market for millimeter-wave applications. FMI also supplies mixed dielectric multilayer and high speed interconnect circuitry to meet customer demand for high performance and cost-effective packaging.

FMI's strong technical team, proprietary processes and equipment allow FMI to manufacture precise circuits, with edge resolution of .0005 inch or better. The accuracy provided by FMI is particularly valued by customers in high-end applications who require microwave circuitry with significant reliability and performance.

FMI has successfully pioneered sputtering techniques for PTH applications on thick-metal backed PTFE circuitry that offer superior reliability, performance and mechanical strength which allows for fabricated integrated three-dimensional shapes ideally suited for aerospace applications.

FMI has also achieved significant results in the area of accuracy of circuit board imaging. FMI employs specially developed processes using liquid photo-resists and high-intensity, collimated UV exposure techniques in fine line processing for single, double-sided and multilayer PTH boards.

PRODUCTS

FMI produces precision microwave circuitry, having operating frequencies that typically range from 500 MHz to 100 GHz, through the processing of microstrip, bonded stripline, thick metal-backed PTFE and mixed dielectric multilayer. FMI also produces aluminum, copper and brass backed circuits. Although FMI generally purchases pre-bonded materials, it also has the capability to bond substrates to thick metal carriers when requested by customers. FMI also processes thin film circuits on hard substrates such as ceramic, ferrite and glass.

FMI has developed innovative processing that provides customers with reliable and high performance circuitry. FMI has the capability to process:

- 1 mil lines and spaces with +/− .2 mil tolerance;
- embedded resistors;
- proprietary sputtering techniques for blind holes in thick metal-backed PTFE;
- proprietary copper Thin Film metallization on ceramic;
- high purity, wire-bondable gold;
- plated through hole aspect ratios up to 10:1;
- multilayer bonding;
- conductive bonding; and
- conductive and non-conductive filled via holes.

FMI has machining capabilities in computer numerically controlled routing, drilling, milling and laser machining. Machining tolerance ranges from +/− .005 inch to +/− .001 inch.

FMI maintains an ISO 9001:2000 registered quality assurance program. This quality assurance program along with stringent statistical process control and gate inspections assure that when customers request specified standards based on certain needs, such needs are met. FMI typically works to the standard of IPC 6018 unless otherwise indicated by the customer. FMI can also work in full compliance to MIL-PRF-31032 (preceded by MIL-P-55110) or can adopt the requirements of IPC-HF-318, depending on customer needs.

Worldwide applications include: millimeter wave (PCS backhaul, local and multipoint distribution systems, automotive radar, sensors and point to multipoint), satellite, aerospace, automotive and defense.

STRATEGIC OVERVIEW

Merrimac seeks to leverage its core competencies in the development of High Power, High Frequency and High Performance products across its three main platforms for growth:

- RF Microwave electronic components and subsystems;

- Microwave micro-circuitry; and
- Multi-Mix®.

Our strategy focuses on:

- Providing unique and cutting-edge customized technology solutions;
- Expanding existing customer relationships and attracting new customers with our smaller, more complex, more reliable, lower cost product offerings;