

SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

FORM S-3  
REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

**AMTECH SYSTEMS, INC.**

(Exact name of registrant as specified in its charter)

**131 South Clark Drive  
Tempe, AZ 85281**

**(480) 967-5146**

**Arizona**  
(State or other  
jurisdiction of  
incorporation or  
organization)

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

**86-0411215**  
(I.R.S. Employer  
Identification No.)

**Bradley C. Anderson  
Chief Financial Officer  
Amtech Systems, Inc.  
131 South Clark Drive  
Tempe, AZ 85281  
(480) 967-5146**

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copy to:

Christopher D. Johnson, Esq.  
Linda Park, Esq.  
Squire, Sanders & Dempsey (US) LLP  
1 East Washington Street  
Suite 2700  
Phoenix, AZ 85004  
(602) 528-4000

Approximate date of commencement of proposed sale to the public: From time to time after this registration statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer  Accelerated filer  Non-accelerated filer  (do not check if a smaller reporting company)

Smaller reporting company

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	Amount to be Registered (1)	Proposed Maximum Offering Price per Unit	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Common Stock, par value \$0.01 per share	153,090 (2)	\$11.48 (3)	\$1,757,473 (3)	\$204.04

(1) The shares of common stock set forth in the Calculation of Registration Fee Table, and which may be offered pursuant to this registration statement, include pursuant to Rule 416 under the Securities Act, such additional number of shares of the registrant's common stock that may become issuable as a result of any stock splits, stock dividends or similar events.

(2) Represents 153,090 shares of common stock issued to certain selling stockholders in connection with the acquisition of 55% ownership interest in Kingstone Technology

Hong Kong Limited (“Kingstone”), which is a Hong Kong-based holding company that owns 100% of Shanghai Kingstone Semiconductor Company Ltd (“Kingstone Semiconductor”).

(3) Estimated solely for purposes of calculating the registration fee pursuant to Rule 457(c) under the Securities Act based on the average of the high and low prices of the registrant's common stock reported on August 11, 2011 on the Nasdaq Global Market.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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The information in this prospectus is not complete and may be changed. These securities may not be sold until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

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SUBJECT TO COMPLETION, DATED AUGUST 12, 2011

PROSPECTUS



153,090 Shares of Common Stock

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This prospectus relates to up to 153,090 shares of our common stock, which may be sold by the selling stockholders named in this prospectus. In connection with our acquisition of a 55% ownership interest in Kingstone Technology Hong Kong Limited (“Kingstone”), which is a Hong Kong-based holding company that owns 100% of Kingstone Semiconductor Company Ltd (“Kingstone Semiconductor”), a Shanghai-based technology company specializing in ion implant solutions for the solar and semiconductor industries, we issued to certain selling stockholders and agreed to register 153,090 shares of our common stock pursuant to a Stock Purchase and Sale Agreement (the “Purchase Agreement”), effective as of January 27, 2011, among us, Kingstone, Silicon Jade Limited (“Silicon Jade”), the sole shareholder of Kingstone, and certain shareholders of Silicone Jade. This prospectus may be used by the selling stockholders to resell the common stock received by them pursuant to the Purchase Agreement.

We are not selling any common stock under this prospectus and will not receive any of the proceeds from the sale of shares by the selling stockholders.

No underwriting is being used in connection with this offering of common stock. The shares of common stock are being offered without underwriting discounts. The expenses of this registration will be paid by us. Normal brokerage commissions, discounts and fees will be payable by the selling stockholders.

Our common stock is traded on The Nasdaq Global Market under the symbol “ASYS”. On August 11, 2011, the last reported sale price for our common stock on The Nasdaq Global Market was \$11.77 per share.

INVESTING IN OUR COMMON STOCK INVOLVES A HIGH DEGREE OF RISK. PLEASE CONSIDER THE “RISK FACTORS” BEGINNING ON PAGE 4 OF THIS PROSPECTUS, THE SECTION ENTITLED “RISK FACTORS” IN OUR ANNUAL REPORT ON FORM 10-K FOR THE YEAR ENDED SEPTEMBER 30, 2010, AND ALL OTHER INFORMATION INCLUDED OR INCORPORATED BY REFERENCE INTO THIS PROSPECTUS IN ITS ENTIRETY BEFORE PURCHASING ANY OF OUR COMMON STOCK OFFERED UNDER THIS PROSPECTUS.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is \_\_\_\_\_, 2011.

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## SUMMARY

### Our Company

Amtech was incorporated in Arizona in October 1981, under the name Quartz Engineering & Materials, Inc. We changed to our present name in 1987. We conduct operations through four wholly-owned subsidiaries: Tempres Systems, Inc., a Texas corporation with all of its operations in The Netherlands, acquired in 1994, also referred to herein as Tempres Systems or Tempres®; P.R. Hoffman Machine Products, Inc. (PR Hoffman), an Arizona corporation based in Carlisle, Pennsylvania, acquired in July 1997; Bruce Technologies, Inc. (Bruce Technologies®), a Massachusetts corporation based in Billerica, Massachusetts, acquired in July 2004, or Bruce Technologies; and R2D Automation SAS (R2D), a French corporation located near Montpellier, France, acquired in October 2007.

We are a leading supplier of horizontal diffusion furnace systems used for solar (photovoltaic) cell and semiconductor manufacturing, and are recognized in the markets we serve for our technology and our brands. Our solar and semiconductor equipment is sold under the well-known and respected brand names of Tempres Systems and Bruce Technologies, which have customers in both the solar industry and the semiconductor industry. Within the solar industry, we provide diffusion and automation equipment to solar cell manufacturers and we also offer PECVD (plasma enhanced chemical vapor deposition) and PSG (phosphosilicate glass) removal equipment. Within the semiconductor industry, we provide equipment to manufacturers of analog, power, automotive and microcontroller chips with geometries greater than 0.3 micron, a strategy we believe minimizes direct competition with significantly larger suppliers of semiconductor equipment. Under the PR Hoffman brand, we believe we are also a leading supplier of insert carriers to manufacturers of silicon wafers, and we provide lapping and polishing consumable products as well as equipment used in various industries, including fabrication of LEDs, optics, quartz, ceramics, metal parts and medical equipment components.

We have been providing manufacturing solutions to the semiconductor industry for over 30 years and are leveraging our semiconductor technology and industry presence in an effort to capitalize on growth opportunities in the solar industry. Our customers use our furnaces to manufacture solar cells, semiconductors, silicon wafers and microelectromechanical systems (MEMS), which are used in end markets such as solar power, telecommunications, consumer electronics, computers, automotive and hand-held devices. To complement our research and development efforts, we also sell our furnaces to research institutes and universities.

References in this prospectus to “Amtech”, “the company”, “we”, “us” and “our” are to Amtech, Inc. unless the context indicates otherwise.

### Our Offices

We maintain our principal executive offices at 131 South Clark Drive, Tempe, Arizona 85281. Our telephone number is (480) 967-5146. Our website is located at [www.amtechsystems.com](http://www.amtechsystems.com). Other than as described in “How To Obtain More Information” below, the information on, or that can be accessed through, our web site is not incorporated by reference in this prospectus or any prospectus supplement, and you should not consider it to be a part of this prospectus or any prospectus supplement. Our web site address is included as an inactive textual reference only.

### Kingstone Acquisition

On February 18, 2011, the Company consummated the acquisition of a 55% ownership interest in Kingstone Technology Hong Kong Limited (“Kingstone”), which is a Hong Kong-based holding company that owns 100% of Shanghai Kingstone Semiconductor Company Ltd, a Shanghai-based technology company specializing in ion implant solutions for the solar and semiconductor industries pursuant to a Stock Purchase and Sale Agreement (the “Purchase Agreement”), effective as of January 27, 2011, among the Company, Kingstone, Silicon Jade Limited (“Silicon Jade”), the sole shareholder of Kingstone, and certain shareholders of Silicone Jade.

The consideration paid by us at the closing was equal to approximately \$9.3 million in cash, stock and debt, which included: (1) \$5.3 million to Silicon Jade, comprised of a cash payment in the amount of \$1.4 million and 153,090 of the Company's common stock with a value of approximately \$3.8 million and (2) \$4 million to Kingstone comprised of a promissory note in the amount

of \$3.7 million, and a cash payment of \$0.3 million already paid by the Company pursuant to a prior agreement in exchange for newly issued Kingstone shares. The Purchase Agreement provides for contractual restrictions on certain of the shares of issued common stock. Such contractual restrictions are subject to the occurrence of certain events which relate to the achievement of specified milestones in the development of a solar ion implanter; however, all restrictions expire no later than the second anniversary of the closing date regardless of whether the milestones are achieved.

## THE OFFERING

Common Stock Offered by the Company:	None
Common Stock Offered by the Selling Stockholders:	153,090 shares
Shares of Common Stock Outstanding Prior to this Offering:	9,580,771 shares
Shares of Common Stock Outstanding After this Offering:	9,580,771 shares
Selling Stockholders	Recipients of consideration shares pursuant to the Stock Purchase and Sale Agreement by the Company, Kingstone Technology Hong Kong Limited, Silicon Jade Limited, the sole shareholder of Kingstone and certain shareholders of Silicone Jade.
Use of Proceeds	We will not receive any of the proceeds from the sale of shares of Common Stock by the selling stockholders identified in this prospectus. The selling stockholders will receive all net proceeds from the sale of the shares of our Common Stock offered by this prospectus.
NASDAQ Global Market Ticker	“ASYS”
Risk Factors	Investing in our securities involves risks. See “Risk Factors” and other information included in, or incorporated by reference into, this prospectus supplement and the accompanying prospectus, including our Annual Report on Form 10-K for the year ended September 30, 2010, for a discussion of factors you should carefully consider before deciding to invest in our shares of common stock.

The number of shares of common stock to be outstanding after this offering is based on 9,580,771 shares outstanding as of August 11, 2011, and excludes as of that date:

- 601,634 shares of common stock issuable upon the exercise of stock options outstanding with a weighted average exercise price of \$10.01 per share;
- and
- 792,587 shares of our common stock available as of that date for future grant or issuance pursuant to our stock plans.

## **RISK FACTORS**

Investment in any securities offered pursuant to this prospectus involves a high degree of risk. You should carefully consider the information included and incorporated by reference in this prospectus before you decide to purchase these securities, including the risk factors incorporated by reference from our Annual Report on Form 10-K for the year ended September 30, 2010, as updated by periodic and current reports that we file with the SEC after the Form 10-K was filed and after the date of this prospectus. Any of these risks could cause our actual results to vary materially from recent results or from anticipated future results or could materially and adversely affect our business, financial condition and results of operations, which in turn could materially and adversely affect the price of our common stock or other securities. The occurrence of any of these risks might cause you to lose all or part of your investment in these securities. Please also refer to the section below entitled "Forward-Looking Statements".

## **USE OF PROCEEDS**

The selling stockholders will receive all of the proceeds from sales of our common stock by them pursuant to this prospectus. We will not receive any proceeds from the sales.



## SELLING STOCKHOLDERS

The shares of our common stock that may be resold hereunder by the selling stockholders are shares delivered by us in connection with the consummation of the transactions under the Purchase Agreement, which shares include 153,090 shares of our common stock issued to certain selling stockholders in connection with the acquisition of a 55% ownership interest in Kingstone, some of the shares of which are subject to transfer restrictions until the occurrence of certain milestones pursuant to the Purchase Agreement.

We are registering the shares of common stock in order to permit the selling stockholders to offer the shares for resale from time to time. Except as otherwise disclosed in this prospectus (or as disclosed in any document incorporated by reference), none of the selling stockholders has, or within the past three years has had, any position, office or other material relationship with us.

The following table sets forth information, as of August 11, 2011, with respect to the selling stockholders and the shares of our common stock beneficially owned by each selling stockholder that may be offered pursuant to this prospectus. The information is based on information provided by or on behalf of the selling stockholders. The selling stockholders may offer all, some or none of the shares of our common stock. Because the selling stockholders may offer all or some portion of the shares of our common stock, we cannot estimate the amount of our common stock that will be held by the selling stockholders upon termination of any of these sales. In addition, the selling stockholders identified below may have sold, transferred or otherwise disposed of all or a portion of their shares of our common stock since the date on which they provided the information regarding their shares in transactions exempt from the registration requirements of the Securities Act. No other selling stockholder named in the table below beneficially owns one percent or more of our common stock.

All of the shares received by the selling stockholders at the closing of the transactions under the Purchase Agreement were “restricted securities” under the Securities Act prior to this registration. Some shares of common stock will continue to be restricted (no longer than two years from the closing date) until certain milestones related to the development of a solar ion implanter as provided in the Purchase Agreement are achieved.

Name of Selling Stockholder	Number of Shares of Common Stock Owned Prior to the Offering	Number of Shares of Common Stock Being Offered
Donald Wayne Berrian	10,716	10,716
Jeffrey Scott Boeker	10,716	10,716
Jiong Chen	46,999	46,999
Lihui Chen	49,448	49,448
Wei Chen	10,716	10,716
Wen-Lung Ho	6,124	6,124
Junhua Hong	10,716	10,716
Guangjiang Yu	7,655	7,655

## PLAN OF DISTRIBUTION

The selling stockholders may sell our common stock covered by this prospectus (the “registered securities”) from time to time in one or more transactions at:

- fixed prices;
- prevailing market prices at the time of sale;
- varying prices determined at the time of sale; or
- negotiated prices.

The selling stockholders will act independently of us in making decisions regarding the timing, manner and size of each sale. The selling stockholders may effect these transactions by selling the registered securities to or through broker-dealers or directly to investors. Broker-dealers engaged by the selling stockholders may arrange for other broker-dealers to participate in the sales.

The registered securities may be sold in one or more of the following transactions:

- a block trade in which a broker-dealer attempts to sell the shares of the registered securities as agent but may resell a portion of the block as principal to facilitate the transaction;
- a purchase by a broker-dealer as principal and resale by the broker-dealer for its account under this prospectus;
- an exchange distribution in accordance with the rules of the exchange;
- ordinary brokerage transactions and transactions in which a broker solicits purchasers;
- privately negotiated transactions, including directly to investors; and
- a combination of any of the above transactions.

We may amend or supplement this prospectus from time to time to describe a specific plan of distribution. If the plan of distribution involves an arrangement with a broker-dealer for the sale of the registered securities through a block trade, special offering, exchange distribution or secondary distribution, or a purchase by a broker-dealer, the amendment or supplement will disclose:

- the name of the selling stockholders and the participating broker-dealer;
- the number of shares of the registered securities involved;
- the price at which the shares of the registered securities are sold;
- the commissions paid or discounts or concessions allowed to the broker-dealer;
- that the broker-dealer did not conduct any investigation to verify the information contained or incorporated by reference in this prospectus; and
- other facts material to the transaction.

The selling stockholders may enter into hedging transactions with broker-dealers or affiliates thereof in connection with distributions of the registered securities. In these transactions, broker-dealers or affiliates may engage in short sales of the registered securities pursuant to this prospectus to offset the positions they assume with the selling stockholders and use shares of the registered securities received from the selling stockholders to close out their short positions. The selling stockholders also may sell the registered securities short, deliver this prospectus in connection with some or all of those sales and redeliver the registered securities to close out their short positions. The selling stockholders may enter into option or other transactions with broker-dealers which require the delivery to the broker-dealer or an affiliate thereof of shares of the registered securities. The broker-dealer may then resell or otherwise transfer the shares of the registered securities under this prospectus. The selling stockholders also may loan, pledge or grant a security interest in some or all of the registered securities covered by this prospectus to a broker-dealer or an affiliate thereof. The broker-dealer may sell the loaned or pledged registered securities under this prospectus.

Broker-dealers or agents may receive compensation from the selling stockholders in the form of commissions, discounts or concessions. Broker-dealers or agents may also receive compensation from the purchasers of the registered securities for whom they act as agents or to whom they sell as principals, or both. A broker-dealer's compensation will be negotiated in connection with the sale and may exceed the broker-dealer's customary commissions. Broker-dealers, agents or the selling stockholders may be deemed to be “underwriters” within the meaning of the Securities Act in connection with sales of the registered securities. Any commission, discount or concession received by these broker-dealers or agents and any profit on the sale of the registered securities purchased by them may be deemed to be underwriting discounts or commissions under the Securities Act.

Because the selling stockholders may be deemed to be “underwriters” within the meaning of the Securities Act, they will be subject to the prospectus delivery requirements of the Securities Act. In addition, any securities covered by this prospectus which qualify for sale pursuant to Rule 144 under the Securities Act may be sold under Rule 144 rather than under this prospectus. The selling stockholders have advised us that they have not entered into any agreements, understandings or arrangements with any underwriter or broker-dealer regarding the sale of the registered securities. There is currently no coordinating broker acting

in connection with the proposed sale of the registered securities by the selling stockholders.

We agreed to keep this prospectus effective until the earlier of (i) February 18, 2013, (ii) the date on which all of the shares of the registered securities have been sold pursuant to this prospectus, (iii) the expiration of the holding period that would be applicable to the registered securities under Rule 144 under the Securities Act were it not held by an affiliate of ours, or (iv) the sale of all of the shares of the registered securities pursuant to Rule 144.

In order to comply with the applicable securities laws of particular states, if applicable, the shares of registered securities will be sold in the jurisdictions only through registered or licensed brokers or dealers. In addition, in particular states, the shares of registered securities may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

The selling stockholders and any broker-dealers or agents that participate with the selling stockholders in the distribution of the shares of registered securities may be deemed to be “underwriters” within the meaning of the Securities Act, and any commissions received by them and any profit on the resale of the registered securities may be deemed to be underwriting commissions or discounts under the Securities Act.

Under applicable rules and regulations under the Securities Exchange Act of 1934, as amended, or the Exchange Act, any person engaged in the distribution of the registered securities may not simultaneously engage in market making activities with respect to the registered securities for a period of two business days prior to the commencement of the distribution. In addition, the selling stockholders will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, including Regulation M, which may limit the timing of purchases and sales of shares of the registered securities by the selling stockholders or any other person. We will make copies of this prospectus available to the selling stockholders and have informed them of the need to deliver a copy of this prospectus to each purchaser at or prior to the time of the sale.

We will pay all costs, expenses and fees associated with the registration of the registered securities, including without limitation, SEC filing fees and expenses of compliance with state securities or “blue sky” laws. The selling stockholders will pay all underwriting commissions and discounts, selling or placement agent fees or broker fees and commissions, and transfer taxes, if any, associated with the sale of the registered securities. The selling stockholders may agree to indemnify any broker-dealer or agent that participates in sales of the registered securities against specified liabilities, including liabilities arising under the Securities Act.

## LEGAL MATTERS

The validity of the issuance of the common stock offered by this prospectus will be passed upon by Squire, Sanders & Dempsey (US) LLP.

## EXPERTS

The consolidated financial statements of Amtech Systems, Inc. incorporated in this prospectus by reference to our Annual Report on Form 10-K for the year ended September 30, 2010 have been so incorporated in reliance on the reports of Mayer Hoffman McCann P.C., an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

## HOW TO OBTAIN MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC under the Securities Exchange Act of 1934, as amended, or the Exchange Act. You may access our filings through our website at [www.amtechsystems.com](http://www.amtechsystems.com), free of charge, as soon as reasonably practical after we electronically file them with or furnish them to the SEC. Other information contained in our website is not incorporated by reference in, and should not be considered a part of, this prospectus or any accompanying prospectus supplement. You also may read and copy any document we file at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the Public Reference Room. Our SEC filings are also available to the public from the SEC's website at [www.sec.gov](http://www.sec.gov).

In accordance with the Securities Act of 1933, as amended, or the Securities Act, we have filed with the SEC a registration statement on Form S-3. This prospectus does not contain all of the information included in the registration statement and its attached exhibits. Some items are omitted in accordance with the rules and regulations of the SEC. For further information about us and our common stock, reference is made to the registration statement and the exhibits to the registration statement. Statements contained in this prospectus as to the contents of any contract or other document referred to are not necessarily complete and, in each instance, if the contract or document is filed as an exhibit to the registration statement, reference is made to the copy of the contract or other document we have filed as an exhibit, each statement being qualified in all respects by such reference. You may read and obtain copies of the registration statement and any amendments to it, including exhibits, as described above.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

This prospectus constitutes a part of a registration statement on Form S-3 filed under the Securities Act. As permitted by the SEC's rules, this prospectus and any prospectus supplement, which form a part of the registration statement, do not contain all the information that is included in the registration statement. You will find additional information about us in the registration statement. Any statements made in this prospectus or any prospectus supplement concerning legal documents are not necessarily complete and you should read the documents that are filed as exhibits to the registration statement or otherwise filed with the SEC for a more complete understanding of the document or matter.

The SEC allows us to incorporate by reference the information we file with the SEC, which means that we can disclose important information to you by referring you to those documents. The information that we incorporate by reference is considered to be part of this prospectus. Information that we file with the SEC in the future and incorporate by reference in this prospectus automatically updates and supersedes previously filed information as applicable.

We incorporate by reference into this prospectus the following documents filed by us with the SEC, other than any portion of any such documents that are not deemed "filed" under the Exchange Act in accordance with the Exchange Act and applicable SEC rules:

- Annual Report on Form 10-K for the fiscal year ended September 30, 2010
- Quarterly Report on Form 10-Q for the quarter ended December 31, 2010
- Quarterly Report on Form 10-Q for the quarter ended March 31, 2011
- Quarterly Report on Form 10-Q for the quarter ended June 30, 2011
- Current Report on Form 8-K filed with the SEC on November 18, 2010
- Current Report on Form 8-K filed with the SEC on December 23, 2010
- Current Report on Form 8-K filed with the SEC on January 26, 2011
- Current Report on Form 8-K filed with the SEC on February 1, 2011
- Current Report on Form 8-K filed with the SEC on April 26, 2011
- Current Report on Form 8-K filed with the SEC on July 13, 2011
- The information specifically incorporated by reference into our Annual Report on Form 10-K for the fiscal year ended September 30, 2010 from our definitive proxy statement on Schedule 14A filed with the SEC on December 21, 2010.
- The description of our common stock contained in the Registration Statement on Form 8-A filed with the SEC, including any amendments or reports filed for the purpose of updating such description.

We also incorporate by reference into this prospectus all documents (other than any portions of any such documents that are not deemed "filed" under the Exchange Act in accordance with the Exchange Act and applicable SEC rules) filed by us under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of the initial registration statement and before effectiveness of the registration statement, and after the date of this prospectus.

You may request a copy of these filings, which we shall deliver to you, together with all exhibits thereto, at no cost, by writing or telephoning us as follows:

Amtech Systems, Inc.  
Attention: Corporate Secretary  
131 South Clark Drive  
Tempe, Arizona 85281  
(480) 967-5146

Any statement contained in a document that is incorporated by reference will be modified or superseded for all purposes to the extent that a statement contained in this prospectus or any accompanying prospectus supplement, or in any other document that is subsequently filed with the SEC and incorporated by reference, modifies or is contrary to that previous statement. Any statement so modified or superseded will not be deemed a part of this prospectus or any accompanying prospectus supplement, except as so modified or superseded. Since information that we later file with the SEC will update and supersede previously incorporated information, you should look at all of the SEC filings that we incorporate by reference to determine if any of the statements in this prospectus or any accompanying prospectus supplement or in any documents previously incorporated by reference have been modified or superseded.

## FORWARD-LOOKING STATEMENTS

This prospectus and each prospectus supplement include and incorporate forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act. All statements, other than statements of historical facts, included or incorporated in this prospectus or any prospectus supplement regarding our strategy, prospects, plans, objectives, future operations, future revenue and earnings, projected margins and expenses, technological innovations, future products or product development, product development strategies, potential acquisitions or strategic alliances, the success of particular product or marketing programs, the amount of revenue generated as a result of sales to significant customers, financial position, and liquidity and anticipated cash needs and availability are forward-looking statements. The words “anticipates,” “believes,” “could,” “confident,” “estimates,” “expects,” “forecasts,” “hopes,” “intends,” “likely,” “may,” “plans,” “possible,” “potential,” “predicts,” “projects,” “should,” “will,” “would” and variations of such words and similar expressions are intended to identify forward-looking statements.

Actual results or events could differ materially from the forward-looking statements we make. Among the factors that could cause actual results to differ materially are the factors discussed under the “Risk Factors” heading in our Annual Report on Form 10-K for the fiscal year ended September 30, 2010. We also will include or incorporate by reference in each prospectus supplement important factors that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Should one or more known or unknown risks or uncertainties materialize, or should underlying assumptions prove inaccurate, actual results could differ materially from past results and those anticipated, estimated, projected or implied by these forward-looking statements. You should consider these factors and the other cautionary statements made in this prospectus, any prospectus supplement or the documents we incorporate by reference in this prospectus as being applicable to all related forward-looking statements wherever they appear in this prospectus, any prospectus supplement or the documents incorporated by reference. While we may elect to update forward-looking statements wherever they appear in this prospectus, any prospectus supplement or the documents incorporated by reference, we do not assume, and specifically disclaim, any obligation to do so, whether as a result of new information, future events or otherwise. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.



**153,090 Shares of Common Stock**

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**PROSPECTUS**

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August , 2011

You should rely only on the information contained or incorporated by reference in this prospectus. We have not authorized anyone to provide you with different information. You should not assume that the information contained or incorporated by reference in this prospectus is accurate as of any date other than the date of this prospectus. We are not making an offer of these securities in any state where the offer is not permitted.

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**PART II**

**INFORMATION NOT REQUIRED IN PROSPECTUS**

**Item 14. Other Expenses of Issuance and Distribution.**

The following table sets forth the estimated fees and expenses, other than underwriting discounts and other fees and expenses associated with offerings of particular securities, in connection with the issuance and distribution of the securities being registered. All of the amounts shown are estimates, except for the SEC registration fee:

Description	Amount to be Paid (\$)
SEC Registration Fee	\$204
Accountants' Fees and Expenses	10,000
Legal Fees and Expenses	25,000
Printing and Miscellaneous Fees	1,500
<b>Total</b>	<b>\$36,704</b>

**Item 15. Indemnification of Directors and Officers.**

Pursuant to Amtech's Articles of Incorporation, it shall indemnify any and all of its existing and former directors, officers, employees and agents against all expenses incurred by them and each of them, including, but not limited to legal fees, judgments, penalties and amounts paid in settlement or compromise, which may arise or be incurred, rendered, or levied in any legal action brought or threatened against any of them for or on account of any action or omission alleged to have been committed while acting within the scope of employment as director, officer, employee or agent of the Company, whether or not any action is or has been filed against them and whether or not any settlement or compromise is approved by a court, indemnification shall be made by the Company whether the legal action brought or threatened is by or in the right of the Company or by any other person. Whenever any existing or former director, officer, employee, or agent shall report to the President of the Company or the chairman of the Board of Directors that he or she has incurred or may incur expenses, including, but not limited to, legal fees, judgments, penalties and amounts paid in settlement or compromise in a legal action brought or threatened against him or her for or on account of any action or omission alleged to have been committed by him or her while acting within the scope of his or her employment as a director, officer, employee or agent of the Company, the Board of Directors shall, at its next regular or at a special meeting held within a reasonable time thereafter, determine in good faith, whether in regard to the matter involved in the action or contemplated action, such person acted, failed to act, or refused to act willfully or with gross negligence or with fraudulent or criminal intent. If the Board of Directors determines, in good faith, that such person did not act, fail to act, or refuse to act willfully or with gross negligence or with fraudulent or criminal intent, in regard to the matter involved in the action or contemplated action, such person acted, failed to act, or refused to act willfully or with gross negligence or with fraudulent criminal intent, indemnification shall be mandatory and shall be automatically extended as specified herein; provided, that the Company shall have the right to refuse indemnification in any instance in which the person to whom indemnification would otherwise have been applicable shall have unreasonably refused to permit the Company, at its own expense and through counsel of its own choosing, to defend him or her in the action.

Section 10-851 of Arizona's Revised Statutes enables a corporation to eliminate or limit personal liability of members of its board of directors for violations of their fiduciary duty of care. However, Arizona law does not permit the elimination of a director's or officer's liability: (i) in connection with a proceeding by or in the right of the corporation in which the director was adjudged liable to the corporation; and (ii) in connection with any other proceeding charging improper financial benefit to the director, whether or not involving action in the director's official capacity, in which the director was adjudged liable on the basis that financial benefit was improperly received by the director.

We have also obtained director's and officer's liability insurance.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers or persons controlling Amtech pursuant to the foregoing provision, Amtech has been informed that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in such Act and is therefore unenforceable.

**Item 16. Exhibits.**



Exhibit	Description
4.1	Articles of Incorporation, incorporated by reference to Amtech's Form S-1 Registration Statement No. 2-83934-LA
4.2	Articles of Amendment to Articles of Incorporation, dated April 27, 1983, incorporated by reference to Amtech's Form S-1 Registration Statement No. 2-83934-LA
4.3	Articles of Amendment to Articles of Incorporation, dated May 19, 1987, incorporated by reference to Amtech's Annual Report on Form 10-K for the year ended September 30, 1987
4.4	Articles of Amendment to Articles of Incorporation, dated May 2, 1988, incorporated by reference to Amtech's Annual Report on Form 10-K for the year ended September 30, 1988
4.5	Articles of Amendment to Articles of Incorporation, dated May 28, 1993, incorporated by reference to Amtech's Form S-1 Registration Statement (File No. 33-77368)
4.6	Articles of Amendment to Articles of Incorporation, dated March 14, 1999, incorporated by reference to Amtech's Annual Report on Form 10-K for the year ended September 30, 1999
4.7	Certificate of Designations, Preferences and Privileges of the Series A Convertible Preferred Stock, dated April 21, 2005, incorporated by reference to Amtech's Current Report on Form 8-K filed with the Securities and Exchange Commission on April 28, 2005
4.8	Amended and Restated Bylaws, incorporated by reference to Amtech's Current Report on Form 8-K filed with the Securities and Exchange Commission on January 8, 2008
5.1	Opinion of counsel regarding legality of securities
23.1	Consent of counsel (included in Exhibit 5.1 hereto)
23.2	Consent of Mayer Hoffman McCann P.C.
24.1	Power of attorney

**Item 17. Undertakings.**

(a) The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in the volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement;

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

*Provided, however,* that paragraphs (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) of this section do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser:

(i) If the registrant is relying on Rule 430B:

(A) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(B) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof. *Provided, however*, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

(5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities:

The undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

**SIGNATURES**

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Tempe, State of Arizona, on August 12, 2011.

Amtech Systems, Inc.

By: /s/ Bradley C. Anderson  
 Bradley C. Anderson  
 Executive Vice President - Finance and Chief Financial Officer

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the date indicated.

Signature	Title	Date
* Jong S. Whang	Chairman and Chief Executive Officer (principal executive officer)	August 12, 2011
<u>/s/ Bradley C. Anderson</u> Bradley C. Anderson	Executive Vice President - Finance and Chief Financial Officer (principal financial officer)	August 12, 2011
* Robert T. Haas	Vice President and Chief Accounting Officer (principal accounting officer)	August 12, 2011
* Michael Gamreiter	Director	August 12, 2011
* Robert F. King	Director	August 12, 2011
* Egbert J. G. Goudena	Director	August 12, 2011
* Alfred W. Giese	Director	August 12, 2011
* Dr. SooKap Hahn	Director	August 12, 2011

\* Bradley C. Anderson, the undersigned attorney-in-fact, by signing his name hereto, does hereby sign and execute this registration statement on behalf of the above indicated directors of the registrant (constituting all of the directors) pursuant to a Power of Attorney filed with this registration statement as Exhibit 24.1.

Amtech Systems, Inc.

August 12, 2011 By: /s/ Bradley C. Anderson

Bradley C. Anderson  
 Vice President - Finance and Chief Financial Officer

**Exhibits.**

<b>Exhibit</b>	<b>Description</b>
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5.1	Opinion of counsel regarding legality of securities
23.1	Consent of counsel (included in Exhibit 5.1 hereto)
23.2	Consent of Mayer Hoffman McCann P.C.
24.1	Power of attorney

[Letterhead of Squire, Sanders & Dempsey (US) LLP]

August 12, 2011

Amtech Systems, Inc.  
131 South Clark Drive  
Tempe, Arizona 85281

Re: *Amtech Systems, Inc.-  
Registration Statement on Form S-3*

Ladies and Gentlemen:

We have acted as counsel to Amtech Systems, Inc., an Arizona corporation (the "Corporation"), in connection with a Registration Statement on Form S-3, as may be amended from time to time (the "Registration Statement") filed by the Corporation with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933 (the "Securities Act") for the immediate registration of 153,090 shares of the Corporation's common stock, par value \$0.01 per share (the "Shares"). All of the Shares are being registered on behalf of the stockholders identified in the Registration Statement.

We have examined originals, or copies certified or otherwise identified to our satisfaction, of such documents, corporate records, certificates of officers of the Corporation and of public officials and other instruments as we have deemed necessary or advisable to enable us to render this opinion. In rendering our opinions set forth below, we have assumed the authenticity of all documents submitted to us as originals, the genuineness of all signatures, the conformity to authentic originals of all documents submitted to us as copies and the authenticity of the originals of such copies.

We have also assumed the legal capacity for all purposes relevant hereto of all natural persons and, with respect to all parties to agreements or instruments relevant hereto other than the Corporation, that such parties had the requisite power and authority (corporate or otherwise) to execute, deliver and perform such agreements or instruments, that such agreements or instruments have been duly authorized by all requisite action (corporate or otherwise), executed and delivered by such parties and that such agreements or instruments are the valid, binding and enforceable obligations of such parties. As to questions of fact material to our opinion, we have relied upon certificates of officers of the Corporation and of public officials. Capitalized terms used herein and not otherwise defined herein shall have the meanings assigned to them in the Registration Statement.

Based upon the foregoing examination and in reliance thereon, and subject to the assumptions stated and in reliance on statements of fact contained in the documents that we have examined, we are of the opinion that, the Shares covered by the Registration Statement have been duly authorized, and will, when sold as contemplated by the Registration Statement, be validly issued, fully paid and non-assessable.

Our opinions expressed above are limited to the current state of the laws of the States of New York and Arizona and the federal laws of the United States of America and the facts as they currently exist. We assume no obligation to revise or supplement this opinion in the event of future changes in such laws or the interpretations thereof or such facts.

We hereby consent to your filing this opinion as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the reference to our firm under the caption "Legal Matters" contained in the Prospectus included therein. In giving these consents, we do not thereby admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act or the Rules and Regulations of the Commission.

Very truly yours,

/s/ Squire, Sanders & Dempsey (US) LLP  
\_\_\_\_\_  
Squire, Sanders & Dempsey (US) LLP

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

As independent registered public accountants, we hereby consent to the incorporation by reference in this registration statement on Form S-3 of our report dated November 15, 2010, relating to the consolidated balance sheets of Amtech Systems, Inc. and subsidiaries as of September 30, 2010 and 2009 and the related consolidated statements of operations, stockholders' equity and comprehensive income (loss) and cash flows for each of the years in the three year period ended September 30, 2010, included in the 2010 Annual Report on Form 10-K for the year ended September 30, 2010 and the effectiveness of internal control over financial reporting of Amtech Systems, Inc. and subsidiaries as of September 30, 2010 included in the 2010 Annual Report on Form 10-K for the year ended September 30, 2010, filed with the Securities and Exchange Commission. We also consent to the reference to our firm under the heading "Experts" in this registration statement.

/s/ Mayer Hoffman McCann P.C.  
MAYER HOFFMAN MCCANN P.C.

Phoenix, Arizona  
August 12, 2011

## POWER OF ATTORNEY

Know all men by these presents, that each person whose signature appears below constitutes and appoints jointly and severally, Jong S. Whang and Bradley C. Anderson, and each of them, his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to sign a registration statement or registration statements on Form S-3 and any and all amendments (including post-effective amendments) and supplements, with all exhibits thereto, and other documents in connection therewith, to be filed by Amtech, Inc. (the “**Company**”) with the Securities and Exchange Commission (the “**Commission**”) for the purpose of registering under the Securities Act of 1933, as amended (the “**Securities Act**”), resales of shares of Common Stock, par value \$0.01 per share, of the Company (the “**Common Stock**”) delivered or to be delivered by the Company in connection with the Company's entry into a Stock Purchase and Sale Agreement for the acquisition of a 55% ownership interest in Kingstone Technology Hong Kong Limited, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all which said attorneys-in-fact and agents, or any of them or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

This Power of Attorney may be executed in multiple counterparts, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same document.

IN WITNESS WHEREOF, the undersigned have hereunto set their hands as of the dates set forth below.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/Jong S. Whang</u> Jong S. Whang	Chairman and Chief Executive Officer (principal executive officer)	August 4, 2011
<u>/s/Bradley C. Anderson</u> Bradley C. Anderson	Executive Vice President - Finance and Chief Financial Officer (principal financial officer)	August 4, 2011
<u>/s/Robert T. Hass</u> Robert T. Hass	Vice President and Chief Accounting Officer (principal accounting officer)	August 4, 2011
<u>/s/Michael Garnreiter</u> Michael Garnreiter	Director	August 4, 2011
<u>/s/Alfred W. Giese</u> Alfred W. Giese	Director	August 4, 2011
<u>/s/Egbert J. G. Goudena</u> Egbert J. G. Goudena	Director	August 4, 2011
<u>/s/SooKap Hahn</u> SooKap Hahn	Director	August 4, 2011
<u>/s/Robert F. King</u> Robert F. King	Director	August 4, 2011