

SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

FORM S-3

REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933

AASTROM BIOSCIENCES, INC.  
(Exact Name of Registrant as Specified in Its Charter)

Michigan  
(State or Other Jurisdiction  
of Incorporation or Organization)

94-3096597  
(IRS Employer  
Identification Number)

24 FRANK LLOYD WRIGHT DRIVE  
P.O. BOX 376  
ANN ARBOR, MICHIGAN 48106  
(734) 930-5555  
(Address, Including Zip Code, and Telephone Number, Including  
Area Code, of Registrant's Principal Executive Offices)

R. DOUGLAS ARMSTRONG, PH.D.  
PRESIDENT AND CHIEF EXECUTIVE OFFICER  
AASTROM BIOSCIENCES, INC.  
24 FRANK LLOYD WRIGHT DRIVE  
P.O. BOX 376  
ANN ARBOR, MICHIGAN 48106  
(734) 930-5555  
(Name, Address, Including Zip Code, and Telephone Number, Including  
Area Code, of Agent for Service)

COPIES TO:

DOUGLAS J. REIN, ESQ.  
GRAY CARY WARE & FREIDENRICH LLP  
4365 EXECUTIVE DRIVE, SUITE 1600  
SAN DIEGO, CA 92121  
TELEPHONE: (619) 677-1400  
FACSIMILE: (619) 677-1477

APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC:  
From time to time as described in the Prospectus.

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 delivery of the prospectus is expected to be made pursuant to Rule 434, please check the following box.

CALCULATION OF REGISTRATION FEE

TITLE OF SHARES TO BE REGISTERED	AMOUNT TO BE REGISTERED	PROPOSED MAXIMUM AGGREGATE PRICE PER UNIT (2)	PROPOSED MAXIMUM AGGREGATE OFFERING PRICE (2)	AMOUNT OF REGISTRATION FEE (2)
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Common Stock, (\$0 par value) 3,788,369(1) \$3.375 \$12,785,745 \$3,771.79

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(1) Includes shares of Common Stock which may be offered pursuant to this Registration Statement consisting of an estimated 2,367,731 shares issuable upon conversion of 5,000 Series I Shares (as defined below) and 1,402,638 shares issuable upon conversion of 3,000 Series II Shares (as defined below). For purposes of estimating the number of shares of Common Stock to be included in this Registration Statement, the Company calculated 150% of the number of shares of Common Stock issuable in connection with the conversion of the Company's 1998 Series Shares (as defined below) (based on a conversion price of \$3.18, which is the average of the closing bid prices of the Common Stock reported on the Nasdaq National Market for the lowest five consecutive trading days during the twenty trading days preceding July 28, 1998, multiplied by 94% pursuant to the terms of the 1998 Series Shares). In accordance with Rule 416, this Registration Statement also covers such indeterminate number of additional shares as may become issuable upon conversion of or in respect of 1998 Series Shares as a result of any future stock splits, stock dividends or similar transactions and antidilution provisions (including floating conversion prices).

(2) Estimated, pursuant to Rule 457(c), solely for the purpose of calculating the registration fee based on the average of the high and low prices for the Common Stock on July 27, 1998, as reported on the Nasdaq National Market of \$3.375.

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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INFORMATION CONTAINED HEREIN IS SUBJECT TO COMPLETION OR AMENDMENT. A  
REGISTRATION STATEMENT RELATING TO THESE SECURITIES HAS BEEN FILED WITH THE  
SECURITIES AND EXCHANGE COMMISSION. THESE SECURITIES MAY NOT BE SOLD NOR MAY  
OFFERS TO BUY BE ACCEPTED PRIOR TO THE TIME THE REGISTRATION STATEMENT BECOMES  
EFFECTIVE. THIS PROSPECTUS SHALL NOT CONSTITUTE AN OFFER TO SELL OR THE  
SOLICITATION OF AN OFFER TO BUY NOR SHALL THERE BE ANY SALE OF THESE SECURITIES  
IN ANY STATE IN WHICH SUCH OFFER, SOLICITATION OR SALE WOULD BE UNLAWFUL PRIOR  
TO REGISTRATION OR QUALIFICATION UNDER THE SECURITIES LAWS OF ANY SUCH STATE.  
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SUBJECT TO COMPLETION, DATED JULY 28, 1998

PROSPECTUS  
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3,788,369 SHARES OF COMMON STOCK  
AASTROM BIOSCIENCES, INC.

This Prospectus relates to the offer and sale of up to 3,788,369 shares (the "Shares") of Common Stock of Aastrom Biosciences, Inc., a Michigan corporation (the "Company"). The Shares are issuable upon conversion of shares of 1998 Series I Convertible Preferred Stock of the Company (the "Series I Shares") and shares of 1998 Series II Convertible Preferred Stock of the Company (the "Series II Shares", and collectively with the Series I Shares the "1998 Series Shares"). The Shares may be offered for sale from time to time after such conversion by or on behalf of the holder of 1998 Series Shares (the "Selling Shareholder"). The Series I Shares were issued in connection with an equity financing pursuant to a Securities Purchase Agreement (the "Purchase Agreement") and the Series II Shares will be issued in connection with the second closing of this equity financing upon satisfaction of certain conditions set forth in the Purchase Agreement, including the effectiveness of the Registration Statement of which this Prospectus is a part. None of these conditions is within the control of the Selling Shareholder, and the Selling Shareholder is obligated under the Purchase Agreement to purchase the Series II Shares upon satisfaction of these conditions. See "Selling Shareholder." The Company will not receive any proceeds from sales of the Shares by the Selling Shareholders or from conversions, if any, of the 1998 Series Shares. The Company has agreed to register the Shares for resale under the Securities Act of 1933, as amended (the "Securities Act"). The Company is also obligated to list the Shares on the Nasdaq National Market. See "Plan of Distribution."

The Shares may be offered for sale in one or more transactions (which may include block transactions) effected on the Nasdaq National Market (or any national securities exchange or U.S. inter-dealer quotation system of a registered national securities association, on which the Shares are then listed), in sales occurring in the public market off such exchange, in private negotiated transactions, through the writing of options on the Shares, short sales or in a combination of such methods of sale, and on terms and at prices then obtainable. The Company has agreed to indemnify in certain circumstances the Selling Shareholder against certain liabilities, including liabilities under the Securities Act. The Selling Shareholder has agreed to indemnify the Company under certain circumstances against certain liabilities, including liabilities under the Securities Act. See "Plan of Distribution."

The Company will bear all reasonable expenses incurred in connection with the registration of the Shares for resale, including, without limitation, all registration and filing fees imposed by the Securities and Exchange Commission (the "Commission"), the National Association of Securities Dealers, Inc. (the "NASD") and blue sky laws, printing expenses, transfer agents' and registrars' fees, and the reasonable fees and disbursements of the Company's outside counsel and independent accountants, but excluding brokerage commissions, underwriting discounts or commissions, if any, and other expenses incurred by the Selling Stockholder in the offer and sale of the Shares.

The Company's Common Stock is quoted on The Nasdaq National Market under the symbol "ASTM." On July 27, 1998, the last sale price of the Company's Common Stock as reported on The Nasdaq National Market was \$3.375.

AN INVESTMENT IN THESE SECURITIES INVOLVES A HIGH DEGREE OF RISK.  
SEE "RISK FACTORS" BEGINNING ON PAGE 4.

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THESE SECURITIES HAVE NOT BEEN APPROVED OR DISAPPROVED BY THE SECURITIES AND  
EXCHANGE COMMISSION NOR HAS THE COMMISSION PASSED UPON THE ACCURACY  
OR ADEQUACY OF THIS PROSPECTUS. ANY REPRESENTATION TO THE  
CONTRARY IS A CRIMINAL OFFENSE.

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THE DATE OF THIS PROSPECTUS IS JULY 28, 1998.

#### AVAILABLE INFORMATION

The Company is subject to the informational requirements of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and in accordance therewith, files periodic reports, proxy statements and other information with the Commission. Such reports, proxy statements and other information may be inspected and copied at the public reference facilities maintained by the Commission at 450 Fifth Street, N.W., Washington, D.C. 20549 and at the Regional Offices of the Commission at 230 South Dearborn Street, Chicago, Illinois 60604; and at 75 Park Place, New York, New York 10007. In addition, copies of such material can also be obtained at prescribed rates from the Public Reference Section of the Commission at its principal office at 450 Fifth Street, N.W., Washington, D.C. 20549. The Company's Common Stock is traded on The Nasdaq National Market. Reports and other information concerning the Company can also be inspected at the offices of the National Association of Securities Dealers, Inc., Market Listing Section, 1735 K Street, N.W., Washington, D.C. 20006. Such reports and other information may also be inspected without charge at a Web site maintained by the Commission. The address of the site is <http://www.sec.gov>.

#### INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The following documents filed with the Commission by the Company (Commission File No. 0-22025), pursuant to the Exchange Act are incorporated herein by reference:

- (1) The Company's Annual Report on Form 10-K for the fiscal year ended June 30, 1997 and all amendments thereto.
- (2) Form 8-K filed by the Company on July 15, 1997.
- (3) Form 10-Q filed by the Company on November 14, 1997.
- (4) Form 10-Q filed by the Company on February 10, 1998.
- (5) Form 10-Q filed by the Company on May 7, 1998.
- (6) The portions of the registration statement on Form 8-A filed by the Company pursuant to the Exchange Act which contain a description of the Common Stock.

All documents and reports subsequently filed by the Company pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the termination of the Registration Statement (the "Registration Statement") shall be deemed to be incorporated by reference herein and to be a part hereof from the date of filing of such documents or reports. Any statement contained in a document incorporated by reference or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of the Registration Statement to the extent that a statement contained herein or in any other subsequently filed document which also is or is deemed to be incorporated by reference herein modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of the Registration Statement.

The Company will provide without charge to each person to whom this Prospectus is delivered, upon oral or written request, a copy of any or all of the foregoing documents incorporated herein by reference (other than exhibits to such documents unless such exhibits are specifically incorporated by reference into the information that this Prospectus incorporates). Written or telephone requests should be directed to Mr. Todd E. Simpson, Chief Financial Officer, Aastrom Biosciences, Inc., 24 Frank Lloyd Wright Drive, P.O. Box 376, Ann Arbor, Michigan, 48106, telephone number (734) 930-5555.

## RISK FACTORS

In addition to the other information in this Prospectus, prospective investors should consider the following risk factors in evaluating the Company and its business before purchasing any of the Common Stock offered hereby. This Prospectus contains forward-looking statements which involve risks and uncertainties. The Company's actual results may differ significantly from the results discussed in the forward-looking statements. Factors that might cause such differences include, but are not limited to, those discussed below.

### UNCERTAINTIES RELATED TO PRODUCT DEVELOPMENT AND MARKETABILITY

The Company has not completed the development or clinical trials of any of its cell culture technologies or product candidates and, accordingly, has not begun to market or generate revenue from their commercialization. Furthermore, the Company's technologies and product candidates are based on cell culture processes and methodologies which are not widely employed. Commercialization of the Company's lead product candidate, the AastromReplicell(TM) Cell Production System (the "AastromReplicell(TM) System"), will require substantial additional research and development by the Company as well as substantial clinical trials. There can be no assurance that the Company will successfully complete development of the AastromReplicell(TM) System or its other product candidates, or successfully market its technologies or product candidates, which lack of success would have a material adverse effect on the Company's business, financial condition and results of operations.

The Company or its collaborators may encounter problems and delays relating to research and development, regulatory approval and intellectual property rights of the Company's technologies and product candidates. There can be no assurance that the Company's research and development programs will be successful, that its cell culture technologies and product candidates will facilitate the ex vivo production of cells with the expected biological activities in humans, that its technologies and product candidates, if successfully developed, will prove to be safe and efficacious in clinical trials, that the necessary regulatory approvals for any of the Company's technologies or product candidates and the cells produced in such products will be obtained or, if obtained, will be as broad as sought, that patents will issue on the Company's patent applications or that the Company's intellectual property protections will be adequate. The Company's product development efforts are primarily directed toward obtaining regulatory approval to market the AastromReplicell(TM) System as an alternative to the bone marrow harvest and peripheral blood progenitor cell ("PBPC") stem cell collection methods. These stem cell collection methods have been widely practiced for a number of years, and there can be no assurance that any of the Company's technologies or product candidates will be accepted by the marketplace as readily as these or other competing processes and methodologies, or at all. The failure by the Company to achieve any of the foregoing would have a material adverse effect on the Company's business, financial condition and results of operations.

### UNCERTAINTIES RELATED TO CLINICAL TRIALS

The approval of the U.S. Food and Drug Administration (the "FDA") will be required before any commercial sales of the Company's product candidates may commence in the United States, and approvals from foreign regulatory authorities will be required before international sales may commence. Prior to obtaining necessary regulatory approvals in the U.S., the Company will be required to demonstrate the safety and efficacy of its processes and product candidates and the cells produced by such processes and in such products for application in the treatment of humans through extensive preclinical studies and clinical trials. The Company is currently conducting pre-pivotal clinical trials to demonstrate the safety and biological activity of patient-derived or umbilical cord blood cells ("UCB cells") produced in the Company's prototype of the AastromReplicell(TM) System in a limited number of patients. If the results from these pre-pivotal trials are successful, the Company intends to seek clearance from the FDA to commence pivotal clinical trials. The results of preclinical studies and clinical trials of the Company's product candidates, however, may not necessarily be predictive of results that will be obtained from subsequent or more extensive clinical trials. Further, there can be no assurance that pre-pivotal or pivotal clinical trials of any of the Company's product candidates will demonstrate the safety, reliability and efficacy of such products, or of the cells produced in such products, to the extent necessary to obtain required regulatory approvals or market acceptance.

The ability of the Company to complete its clinical trials in a timely manner is dependent upon many factors, including the rate of patient enrollment. Patient enrollment is a function of many factors, including the size of the patient population, the proximity of suitable patients to clinical sites and the eligibility criteria for the study. The Company has experienced delays in patient accrual in its current pre-pivotal clinical trials. Further delays in patient accrual, in the Company's current pre-pivotal clinical trials, or in pivotal trials planned to be conducted, could result in increased costs associated with clinical trials or delays in receiving regulatory approvals and commercialization, if any. Furthermore, the progress of clinical investigations with the AastromReplicell(TM/) System and the Company's other product candidates will be monitored by the FDA, which has the authority to cease clinical investigations, at any time, due to patient safety or other considerations. Any of the foregoing would have a material adverse effect on the Company's business, financial condition and results of operations. See "Uncertainty of Regulatory Approval; Extensive Government Regulation."

The Company's current pre-pivotal trials are designed to demonstrate specific biological safety and activity of cells produced in the AastromReplicell(TM/) System, but are not designed to demonstrate long-term sustained engraftment of such cells. The patients enrolled in these pre-pivotal trials will have undergone extensive chemotherapy treatment prior to the infusion of cells produced in the AastromReplicell(TM/) System. Such treatments will have substantially weakened these patients and may have irreparably damaged their hematopoietic systems. Due to these and other factors, it is possible that patients may die or suffer severe complications during the course of the current pre-pivotal trials or future trials. For example, in the trials to date, patients who were in the transplant recovery process have died from complications related to the patient's clinical condition that, according to the physicians involved, were unrelated to the AastromReplicell(TM/) System procedure. Further, there can be no assurance that patients receiving cells produced with the Company's technologies and product candidates will demonstrate long-term engraftment in a manner comparable to cells obtained from current stem cell therapy procedures, or at all. The failure to adequately demonstrate the safety or efficacy of the Company's technologies and product candidates, including long-term sustained engraftment, or the death of, or occurrence of severe complications in, one or more patients could substantially delay, or prevent, regulatory approval of such product candidates and have a material adverse effect on the Company's business, financial condition and results of operations.

#### MANUFACTURING AND SUPPLY UNCERTAINTIES; DEPENDENCE ON THIRD PARTIES

The Company does not operate and has no current intention to operate manufacturing facilities for the production of its product candidates. The Company currently arranges for the manufacture of its product candidates and their components, including certain cytokines, serum and media, with third parties, and expects to continue to do so in the foreseeable future. The Company has entered into collaborative product development and supply agreements with SeaMED Corporation ("SeaMED"), Ethox Corporation ("Ethox") and Anchor Advanced Products, Inc., Mid-State Plastics Division ("MSP"), for the collaborative development and manufacture of certain components of the AastromReplicell(TM/) System and is dependent upon those suppliers to manufacture its products. The Company is also dependent upon Immunex Corporation ("Immunex"), Life Technologies, Inc. and Biowittaker for the supply of certain cytokines, serum and media to be used in the AastromReplicell System. With regard to cytokines that are not commercially available from other sources, Immunex is currently the Company's sole supplier and few alternative supply sources exist. Apart from SeaMED, Ethox, MSP and Immunex, the Company currently does not have contractual commitments from any of these manufacturers or suppliers. There can be no assurance that the Company's supply of such key cytokines, components and other materials will not become limited, be interrupted or become restricted to certain geographic regions. Additionally, there can be no assurance that the Company will not require additional cytokines, components and other materials to manufacture, use or market its product candidates, or that necessary key components will be available for use on a sustained basis, if at all, by the Company in the markets in which it intends to sell its products. There can also be no assurance that the Company will be able to obtain alternative components and materials from other manufacturers of acceptable quality, or on terms or in quantities acceptable to the Company. In the event that any of the Company's key manufacturers or suppliers fail to perform their respective obligations or the Company's supply of such cytokines, components or other materials becomes limited or interrupted, the Company would not be able to conduct clinical trials or market its product candidates on a timely and cost-competitive basis, if at all, which would have a material adverse effect on the Company's business, financial condition and results of operations.

Certain of the compounds used by the Company in its current stem cell expansion process involve the use of animal-derived products. The availability of these compounds for clinical and commercial use may become limited by suppliers or restricted by regulatory authorities, which may impose a potential competitive disadvantage for the Company's products compared to competing products and procedures. There can be no assurance that the Company will not experience delays or disadvantages related to the future availability of such materials. Any restriction on the use of such materials could have a material adverse effect on the Company's business, financial condition and results of operations, and there can be no assurance that the Company will be able to develop or obtain alternative compounds.

Like SeaMED, Ethox, MSP and Immunex, other suppliers would need to meet FDA manufacturing requirements and undergo rigorous facility and process validation tests required by federal and state regulatory authorities. Any significant delays in the completion and validation of such facilities could have a material adverse effect on the ability of the Company to complete clinical trials and to market its products on a timely and profitable basis, which in turn would have a material adverse effect on the Company's business, financial condition and results of operations.

There can be no assurance that the Company will be able to continue its present arrangements with its suppliers, supplement existing relationships or establish new relationships or that the Company will be able to identify and obtain the ancillary materials that are necessary to develop its product candidates in the future. The Company's dependence upon third parties for the supply and manufacture of such items could adversely affect the Company's ability to develop and deliver commercially feasible products on a timely and competitive basis.

#### HISTORY OF OPERATING LOSSES; ANTICIPATION OF FUTURE LOSSES

The Company is a development stage company and there can be no assurance that its product applications for cell therapy will be successful. The Company has not yet completed the development and clinical trials of any of its product candidates and, accordingly, has not yet begun to generate revenues from the commercialization of any of its product candidates. Aastrom was incorporated in 1989 and has experienced substantial operating losses since inception. As of March 31, 1998, the Company has incurred net operating losses totaling approximately \$54.7 million. Such losses have resulted principally from costs incurred in the research and development of the Company's cell culture technologies and the AastromReplicell(TM) System, general and administrative expenses, and the prosecution of patent applications. The Company expects to incur significant and increasing operating losses until product sales commence, primarily owing to the expansion of its research and development programs, including preclinical studies and clinical trials. The amount of future losses and when, if ever, the Company will achieve profitability, are uncertain. The Company's ability to achieve profitability will depend, among other things, on successfully completing the development of its product candidates, obtaining regulatory approvals, establishing manufacturing, sales and marketing arrangements with third parties, and raising sufficient funds to finance its activities. No assurance can be given that the Company's product development efforts will be successful, that required regulatory approvals will be obtained, that any of the Company's product candidates will be manufactured at a competitive cost and will be of acceptable quality, or that the Company will be able to achieve profitability or that profitability, if achieved, can be sustained.

#### LIMITED SALES AND MARKETING CAPABILITIES; DEPENDENCE ON COLLABORATIVE RELATIONSHIPS

The Company has limited internal sales, marketing and distribution capabilities. If any of the Company's product candidates are successfully developed and the necessary regulatory approvals are obtained, the Company intends to market such products through collaborative relationships with companies that have established sales, marketing and distribution capabilities. The Company has established a strategic alliance with Cobe Laboratories, Inc. and Cobe BCT, Inc. (collectively, "Cobe") for the worldwide distribution of the AastromReplicell(TM) System for stem cell therapy and related uses. Cobe has the right to terminate its Distribution Agreement with the Company upon twelve months notice upon a change of control of the Company, other than to Cobe, or if Cobe determines that commercialization of the AastromReplicell(TM) System for stem cell therapy on or prior to December 31, 1998 is unlikely. See "Consequences of Cobe Relationship."

The amount and timing of resources that Cobe commits to its strategic alliance activities with the Company are, to a significant extent, outside of the control of the Company. There can be no assurance that Cobe will pursue the marketing and distribution of the Company's products, continue to perform its obligations under its agreements with the Company or that the Company's strategic alliance with Cobe will result in the successful commercialization and distribution of the Company's technologies and product candidates. There can also be no assurance that Cobe will be successful in its efforts to market and distribute the Company's products for stem cell therapy. The suspension or termination of the Company's strategic alliance with Cobe or the failure of the strategic alliance to be successful may have a material adverse effect on the Company's business, financial condition and results of operations.

Subject to the contractual requirements of the Cobe relationship, the Company will seek to enter into other agreements relating to the development and marketing of product candidates and in connection with such agreements may rely upon corporate partners to conduct clinical trials, seek regulatory approvals for, manufacture and market its potential products. There can be no assurance that the Company will be able to establish collaborative relationships for the development or marketing of the Company's product candidates on acceptable terms, if at all, and if such relationships are established, that they will be successful or sustained on a long-term basis. The inability of the Company to establish such collaborative relationships may require the Company to curtail its development or marketing activities with regard to its potential products which would have a material adverse effect on the Company's business, financial condition and results of operations.

#### FUTURE CAPITAL NEEDS; UNCERTAINTY OF ADDITIONAL FUNDING

To date, Aastrom has funded its operations primarily through the sale of equity securities and corporate collaborations. The Company anticipates that the net proceeds from the sale of the Series I Shares, together with the Company's available cash and expected interest income thereon, will be sufficient to finance the development and manufacture of the AastromReplicell(TM) System for use in clinical trials, expanded clinical trials, other research and development and working capital and other corporate requirements until mid 1999. This estimate is based on certain assumptions which could be negatively impacted by the matters discussed under this heading and elsewhere under the caption "Risk Factors." In order to grow and expand its business, and to introduce its product candidates into the marketplace, the Company will need, among other things, to raise additional funds. The development of the Company's products for the expansion of additional cell types will require the Company to raise additional funds or to seek collaborative partners, or both, to finance related research and development activities.

The Company's future capital requirements will depend upon many factors, including, but not limited to, continued scientific progress in its research and development programs, costs and timing of conducting clinical trials and seeking regulatory approvals and patent prosecutions, competing technological and market developments, possible changes in existing collaborative relationships, the ability of the Company to establish additional collaborative relationships, and effective commercialization activities and facilities expansions if and as required. Because of the Company's potential long-term funding requirements, it may attempt to access the public or private equity markets if and whenever conditions are favorable, even if it does not have an immediate need for additional capital at that time. There can be no assurance that any such additional funding will be available to the Company on reasonable terms, or at all. If adequate funds are not available, the Company may be required to delay or terminate research and development programs, curtail capital expenditures, and reduce business development and other operating activities. The Company intends to seek additional collaborative partners to assist in the development of certain of its products. If the Company is not successful in finding, entering into and maintaining such arrangements, its development efforts could be delayed. Furthermore, there can be no assurance that the Company will be able to implement collaborative development agreements under acceptable terms, if at all. Any of the foregoing capital constraints would have a material adverse effect on the Company's business, financial condition and results of operations.

#### UNCERTAINTY OF REGULATORY APPROVAL; EXTENSIVE GOVERNMENT REGULATION

The Company's research and development activities, preclinical studies, clinical trials, and the anticipated manufacturing and marketing of its product candidates are subject to extensive regulation by the FDA and other



regulatory authorities in the United States. These activities are also regulated in other countries where the Company intends to test and market its product candidates. The approval of the FDA will be required before any commercial sales of the Company's product candidates may commence in the United States. Additionally, the Company will be required to obtain approvals from foreign regulatory authorities before international sales may commence.

The Company's products are potentially subject to regulation as medical devices under the Federal Food, Drug and Cosmetic Act, or as biological products under the Public Health Service Act, or both. Different regulatory requirements may apply to the Company's products depending on how they are categorized by the FDA under these laws. To date, the FDA has indicated that it intends to regulate the AastromReplicell(TM/) System for stem cell therapy as a Class III medical device through the Center for Biologics Evaluation and Research. However, there can be no assurance that the FDA will ultimately regulate the AastromReplicell System(TM/) for stem cell therapy as a medical device or that regulatory approval for such product will be obtained in a timely fashion or at all.

Further, it is unclear whether the FDA will separately regulate the cell therapies derived from the AastromReplicell System(TM/). The FDA is in the process of developing its requirements with respect to somatic cell therapy and gene cell therapy products, and recently proposed a new type of license for autologous cells manipulated ex vivo and intended for structural repair or reconstruction; autologous cells are cells obtained from, and administered to the same patient. This proposal may indicate that the FDA will impose a similar approval requirement on other types of autologous cellular therapies, such as autologous cells for stem cell therapy. Any such additional regulatory or approval requirement could significantly delay the introduction of the Company's product candidates to the market, and have a material adverse effect on the Company's business, financial condition and results of operations. Until the FDA issues definitive regulations covering the Company's product candidates, the regulatory guidelines or requirements for approval of such product candidates will continue to be subject to significant uncertainty.

Before marketing, the AastromReplicell System(TM/) or other product candidates developed by the Company must undergo an extensive regulatory approval process. The regulatory process, which includes preclinical studies and clinical trials to establish safety and efficacy, takes many years and requires the expenditure of substantial resources. Data obtained from preclinical and clinical activities are susceptible to varying interpretations which could delay, limit or prevent FDA approval. In addition, delays or rejections may be encountered based upon changes in FDA policy for medical product approvals during the period of product development, changes in FDA classification of the Company's products, and FDA regulatory review of applications submitted by the Company for product approval. Similar delays may also be encountered in foreign countries. There can be no assurance that, even after the expenditures of substantial time and financial resources, regulatory approval will be obtained for any products developed by the Company. Moreover, if regulatory approval of a product is obtained, such approval may be subject to limitations on the indicated uses for which it may be marketed. Further, even if such regulatory approval is obtained, a marketed product, its manufacturer and its manufacturing facilities are subject to continual review and periodic inspections by the FDA, and later discovery of previously unknown problems with a product, manufacturer or facility may result in restrictions on such product or manufacturer, including a withdrawal of the product from the market. Failure to comply with the applicable regulatory requirements can, among other things, result in fines, suspensions of regulatory approvals, product recalls, operating restrictions and criminal prosecution. Further, additional governmental regulation may be established which could prevent or delay regulatory approval of the Company's products.

The Company believes that the AastromReplicell(TM/) System's components will be regulated in Europe as Class I Sterile, Class IIb and Class III medical devices, under the authority of the new Medical Device Directives ("MDD") being implemented by European Union ("EU") member countries. In order for the Company to market its products in Europe, it must obtain a CE Mark from a Notified Body to certify that the Company and its operations comply with certain minimum quality standards and compliance procedures, or, alternatively, that its manufactured products meet a more limited set of requirements. There can be no assurance that the Company and its suppliers will be able to meet these minimum requirements, or, if met, that the Company and its suppliers will be able to maintain such compliance. The result of such non-compliance would have a material adverse effect on the Company's business, financial condition and results of operations. There can be no assurance, however, that the AastromReplicell(TM/) System will ultimately be regulated in Europe as currently expected, and, if the

AstromReplicell(TM/) System is not so regulated, the Company could be forced to obtain additional regulatory approvals and could be subject to additional regulatory requirements and uncertainty, which would have a material adverse effect on the Company's business, financial condition and results of operations.

#### CONSEQUENCES OF COBE RELATIONSHIP

Cobe is the largest single shareholder of the Company, beneficially owning approximately 20.3% of the outstanding Common Stock (prior to conversion of any 1998 Series Shares into Common Stock, but including the shares of Common Stock issuable upon conversion of the outstanding 5 1/2% Convertible Preferred Stock as of June 30, 1998). In addition, Cobe has certain preemptive rights to maintain its relative percentage ownership and voting interest in the Company. Cobe also has an option, until February 2000, to purchase from the Company an amount of Common Stock equal to 30% of the Company's fully diluted shares after the exercise of such option, at a purchase price equal to 120% of the public market trading price of the Company's Common Stock. If such option is exercised, Cobe would significantly increase its ownership interest in the Company and, as a consequence of such share ownership, obtain effective control of the Company. Such effective control would include the ability to influence the outcome of shareholder votes, including votes concerning the election of directors, the amendment of provisions of the Company's Restated Articles of Incorporation or Bylaws, and the approval of mergers and other significant transactions. Cobe also has been granted a "right of first negotiation" in the event that the Company determines to sell all, or any material portion, of its assets to another company or to merge with another company. Edward C. Wood, Jr., the President of Cobe BCT, is a director of the Company. Furthermore, the Company has agreed to use reasonable and good faith efforts to cause a nominee designated by Cobe to be elected to the Board of Directors for as long as Cobe owns at least 15% of the outstanding Common Stock. The existence of the foregoing rights or the exercise of such control by Cobe could have the effect of delaying, deterring or preventing certain takeovers or changes in control of the management of the Company, including transactions in which shareholders might otherwise receive a premium for their shares over then current market prices.

#### COMPETITION AND TECHNOLOGICAL CHANGE

The Company is engaged in the development of medical products and processes which will face competition in a marketplace characterized by rapid technological change. Many of the Company's competitors have significantly greater resources than the Company, and have developed and may develop product candidates and processes that directly compete with the Company's products. Moreover, competitors that are able to achieve patent protection, obtain regulatory approvals and commence commercial sales of their products before the Company, and competitors that have already done so, may enjoy a significant competitive advantage. The Company's product development efforts are primarily directed toward obtaining regulatory approval to market the AstromReplicell(TM/) System for stem cell therapy. That market is currently dominated by the bone marrow harvest and PBPC collection methods. The Company's clinical data, although early, suggests that cells expanded in the AstromReplicell(TM/) System using its current process will enable hematopoietic recovery within the time frames currently achieved by bone marrow harvest, however, neutrophil and platelet recovery times may be slower than with PBPC collection methods. The Company is evaluating techniques and methods to optimize the cells produced in the AstromReplicell(TM/) System to reduce the recovery time of neutrophils and platelets in patients. There can be no assurance that if such procedure optimization does not lead to recovery times equal to or faster than those of PBPC collection methods, such outcome would not have a material adverse effect on the Company's business, financial condition and results of operations. In addition, the bone marrow harvest and PBPC collection methods have been widely practiced for a number of years and, recently, the patient costs associated with these procedures have begun to decline. There can be no assurance that the AstromReplicell(TM/) System method, if approved for marketing, will prove to be competitive with these established collection methods on the basis of hematopoietic recovery time, cost or otherwise. The Company also is aware of certain other products manufactured or under development by competitors that are used for the prevention or treatment of certain diseases and health conditions which the Company has targeted for product development. In particular, the Company is aware that competitors such as Amgen, Inc., CellPro, Incorporated, Novartis, A.G., VimRx Pharmaceuticals, Inc. and Rhone-Poulenc Rorer Inc. ("RPR") are in advanced stages of development of technologies and products for use in stem cell therapy and other market applications currently being pursued by the Company. In addition, Cobe, a significant shareholder of the Company, is a market leader in the blood cell processing products industry and, accordingly, a potential

competitor of the Company. There can be no assurance that developments by others will not render the Company's product candidates or technologies obsolete or noncompetitive, that the Company will be able to keep pace with new technological developments or that the Company's product candidates will be able to supplant established products and methodologies in the therapeutic areas that are targeted by the Company. The foregoing factors could have a material adverse effect on the Company's business, financial condition and results or operations.

#### UNCERTAINTY REGARDING PATENTS AND PROPRIETARY RIGHTS

Astrom's success depends in part on its ability, and the ability of its licensors, to obtain patent protection for its products and processes, preserve its trade secrets, defend and enforce its rights against infringement and operate without infringing the proprietary rights of third parties, both in the United States and in other countries. The validity and breadth of claims in medical technology patents involve complex legal and factual questions and, therefore, may be highly uncertain. No assurance can be given that any patents based on pending patent applications or any future patent applications of the Company or its licensors will be issued, that the scope of any patent protection will exclude competitors or provide competitive advantages to the Company, that any of the patents that have been or may be issued to the Company or its licensors will be held valid if subsequently challenged or that others will not claim rights in or ownership of the patents and other proprietary rights held or licensed by the Company. Furthermore, there can be no assurance that others have not developed or will not develop similar products, duplicate any of the Company's products or design around any patents that have been or may be issued to the Company or its licensors. Since patent applications in the United States are maintained in secrecy until patents issue, the Company also cannot be certain that others did not first file applications for inventions covered by the Company's and its licensors' pending patent applications, nor can the Company be certain that it will not infringe any patents that may issue to others on such applications. The Company relies on certain licenses granted by the University of Michigan for certain of its patent rights. If the Company breaches such agreements or otherwise fails to comply with such agreements, or if such agreements expire or are otherwise terminated, the Company may lose its rights under the patents held by the University of Michigan, which would have a material adverse effect on the Company's business, financial condition and results of operations. The Company also relies on trade secrets and unpatentable know-how which it seeks to protect, in part, by confidentiality agreements with its employees, consultants, suppliers and licensees. There can be no assurance that these agreements will not be breached, that the Company would have adequate remedies for any breach, or that the Company's trade secrets or unpatentable know-how will not otherwise become known or be independently developed by competitors.

The Company's success will also depend in part on its ability to develop commercially viable products without infringing the proprietary rights of others. The Company has not conducted freedom of use patent searches and no assurance can be given that patents do not exist or could not be filed which would have an adverse effect on the Company's ability to market its products or maintain its competitive position with respect to its products. If the Company's technology components, devices, designs, products, processes or other subject matter are claimed under the existing United States or foreign patents or are otherwise protected by third party proprietary rights, the Company may be subject to infringement actions. In such event, the Company may challenge the validity of such patents or other proprietary rights or be required to obtain licenses from such companies in order to develop, manufacture or market its products. There can be no assurance that the Company would be able to obtain such licenses or that such licenses, if available, could be obtained on commercially reasonable terms. Furthermore, the failure to either develop a commercially viable alternative or obtain such licenses could result in delays in marketing the Company's proposed products or the inability to proceed with the development, manufacture or sale of products requiring such licenses, which could have a material adverse effect on the Company's business, financial condition and results of operations. If the Company is required to defend itself against charges of patent infringement or to protect its own proprietary rights against third parties, substantial costs will be incurred regardless of whether the Company is successful. Such proceedings are typically protracted with no certainty of success. An adverse outcome could subject the Company to significant liabilities to third parties, and force the Company to curtail or cease its development and sale of its products and processes.

## NO ASSURANCE OF THIRD PARTY REIMBURSEMENT

The Company's ability to successfully commercialize its product candidates will depend in part on the extent to which payment for the Company's products and related treatments will be available from government healthcare programs, such as Medicare and Medicaid, as well as private health insurers, health maintenance organizations and other third party payors. Government and other third-party payors are increasingly attempting to contain health care costs, in part by challenging the price of medical products and services. Reimbursement by third-party payors depends on a number of factors, including the payor's determination that use of the product is safe and effective, not experimental or investigational, medically necessary, appropriate for the specific patient and cost-effective. Since reimbursement approval is required from each payor individually, seeking such approvals is a time-consuming and costly process which will require the Company to provide scientific and clinical support of the use of each of the Company's products to each payor separately. Significant uncertainty exists as to the payments status of newly approved medical products, and there can be no assurance that adequate third-party payments will be available to enable the Company to establish or maintain price levels sufficient to realize an appropriate return on its investment in product development. If adequate payment levels are not provided by government and third-party payors for use of the Company's products, the market acceptance of those products will be adversely affected.

There can be no assurance that reimbursement in the United States or foreign countries will be available for any of the Company's product candidates, that any reimbursement granted will be maintained, or that limits on reimbursement available from third-party payors will not reduce the demand for, or negatively affect the price of, the Company's products. The unavailability or inadequacy of third-party reimbursement for the Company's product candidates would have a material adverse effect on the Company. Finally, the Company is unable to forecast what additional legislation or regulation relating to the healthcare industry or third-party coverage and reimbursement may be enacted in the future, or what effect such legislation or regulation would have on the Company's business.

## HAZARDOUS MATERIALS

The Company's research and development activities involve the controlled use of hazardous materials, chemicals and various radioactive compounds. The Company is subject to federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of such materials and certain waste products. In the event of any contamination or injury from these materials, the Company could be held liable for any damages that result and any such liability could exceed the resources of the Company. Furthermore, the failure to comply with current or future regulations could result in the imposition of substantial fines against the Company, suspension of production, alteration of its manufacturing processes or cessation of operations. There can be no assurance that the Company will not be required to incur significant costs to comply with any such laws and regulations in the future, or that such laws or regulations will not have a material adverse effect on the Company's business, financial condition and results of operations. Any failure by the Company to control the use, disposal, removal or storage of, or to adequately restrict the discharge of, or assist in the cleanup of, hazardous chemicals or hazardous, infectious or toxic substances could subject the Company to significant liabilities, including joint and several liability under certain statutes. The imposition of such liabilities would have a material adverse effect on the Company's business, financial condition and results of operations.

## PRODUCT LIABILITY AND LIMITED INSURANCE

The Company faces an inherent business risk of exposure to product liability claims in the event that the use of the AastromReplicell System during research and development efforts, including clinical trials, or after commercialization results in adverse effects. As a result, the Company may incur significant product liability exposure. There can be no assurance that existing insurance coverage will be adequate or that adequate insurance coverage for future clinical trials or commercial activities will be available at an acceptable cost, if at all, or that a product liability claim would not materially adversely affect the business, financial condition or results of operations of the Company.

#### DEPENDENCE ON KEY PERSONNEL

The success of the Company depends in large part upon the Company's ability to attract and retain highly qualified scientific and management personnel. The Company faces competition for such personnel from other companies, research and academic institutions and other entities. There can be no assurance that the Company will be successful in hiring or retaining key personnel.

#### SHARES ELIGIBLE FOR FUTURE SALE; POTENTIAL FOR DILUTION

Future sales of shares by existing stockholders could adversely affect the market price of the Company's Common Stock. Substantially all of the outstanding shares of Common Stock and the shares issuable upon the conversion of the various series of preferred stock of the Company are freely tradeable, subject to restrictions imposed by Rule 144 under the Securities Act of 1933, as amended, with respect to sales by affiliates.

As of July 27, 1998, 5,000 of the Series I Shares were issued and outstanding, and none of the Series II Shares were outstanding, though the Selling Shareholder is obligated under the Purchase Agreement to purchase 3,000 Series II Shares upon satisfaction of certain conditions. See "Selling Shareholder." The 1998 Series Shares are each convertible into such number of shares of Common Stock as is determined by dividing the stated value (\$1,000) of each 1998 Series Share (as such value is increased by a premium based on the number of days the 1998 Series Shares are held) by the then current conversion price (which is determined by reference to the then current market price). If circumstances were such that the Selling Shareholder was able to and did convert all of its Series I Shares as of July 28, 1998, the Selling Shareholder would have received 1,409,997 shares of Common Stock, but this number of shares could prove to be significantly greater in the event of a decrease in the trading price of the Common Stock. Purchasers of Common Stock could therefore experience substantial dilution of their investment upon conversion of the 1998 Series Shares. Similarly, issuance and sale of the shares of Common Stock upon conversion of the Series II Shares could result in substantial dilution of existing shareholders and could adversely affect the market price for the Common Stock. The 1998 Series Shares are not registered and may be sold only if registered under the Securities Act or sold in accordance with an applicable exemption from registration, such as Rule 144. The shares of Common Stock into which the 1998 Series Shares may be converted are being registered pursuant to this Registration Statement.

#### CONTROL BY EXISTING MANAGEMENT AND SHAREHOLDERS

As of June 30, 1998, the Company's directors, executive officers, and certain principal shareholders, including Cobe, affiliated with members of the Board of Directors and their affiliates beneficially own approximately 29.0% of the outstanding shares of Common Stock (prior to conversion of any 1998 Series Shares into Common Stock, but including the shares of Common Stock issuable upon conversion of the outstanding 5 1/2% Convertible Preferred Stock). Accordingly, such shareholders, acting together, may have the ability to exert significant influence over the election of the Company's Board of Directors and other matters submitted to the Company's shareholders for approval. The voting power of these holders may discourage or prevent certain takeovers or changes in control of the management of the Company unless the terms are approved by such holders.

#### POSSIBLE STOCK PRICE AND VOLUME VOLATILITY

The trading price and volume of the Company's Common Stock has experienced significant volatility. The trading price and volume of the Common Stock and the price at which the Company may sell securities in the future could be subject to wide fluctuations in response to announcements of clinical results, research activities, technological innovations or new products by the Company or competitors, changes in government regulation, developments concerning proprietary rights, variations in the Company's operating results, announcements by the Company of regulatory developments, litigation, disputes concerning patents or proprietary rights or public concern regarding the safety, efficacy or other implications of the products or methodologies to be developed by the Company or its collaborators or enabled by the Company's technology, general market conditions, the liquidity of the Company or its ability to raise additional funds, and other factors or events. In addition, the stock market has experienced extreme fluctuations in price and volume. This volatility has significantly affected the market prices for securities of emerging technology companies for reasons frequently unrelated to or disproportionate to the

operating performance of the specific companies. These market fluctuations, as well as shortfalls in revenue or earnings as compared with public market analysts' expectations, changes in such analysts' recommendations or projections and fluctuations in the stock markets generally, as well as sales or offers of the large amounts of Shares, may adversely affect the market price of the Common Stock. In addition, since the Company's initial public offering in February 1997, the average daily trading volume of the Common Stock on the Nasdaq National Market has generally been relatively low. There can be no assurance that a more active trading market will develop in the future.

#### ANTI-TAKEOVER EFFECT OF CHARTER AND BYLAW PROVISIONS AND MICHIGAN LAW

The Company's Restated Articles of Incorporation authorize the Board of Directors to issue, without shareholder approval, an additional 2,792,000 shares of preferred stock with voting, conversion, and other rights and preferences that could materially and adversely affect the voting power or other rights of the holders of Common Stock. The issuance of preferred stock or of rights to purchase preferred stock could be used to discourage an unsolicited acquisition proposal. The Company's Bylaws contain procedural restrictions on director nominations by shareholders and the submission of other procedures required for director nominations and shareholder proposals could discourage a proxy contest, make more difficult the acquisition of a substantial block of Common Stock, or limit the price that investors might be willing to pay in the future for shares of Common Stock. The Company's Restated Articles of Incorporation eliminate the right of shareholders to act without a meeting, do not provide for cumulative voting in the election of directors and provide that the holders of at least two-thirds of the outstanding shares of Common Stock must approve certain transactions resulting in a change of control of the Company. In addition, certain provisions of Michigan laws applicable to the Company, including, but not limited to, provisions requiring class or series votes in certain circumstances with respect to proposed business combinations, could also delay or make more difficult a merger, tender offer or proxy contest involving the Company.

#### ABSENCE OF DIVIDENDS

The Company has never paid cash dividends on its Common Stock and does not anticipate paying any cash dividends on its Common Stock in the foreseeable future. The Company's 5 1/2% Convertible Preferred Stock accrues a dividend at 5 1/2% per annum, payable, at the Company's option, in cash or through the issuance of shares of Common Stock of the Company. As of June 30, 1998, 72,940 shares have been issued as payment of this dividend.

#### FORWARD-LOOKING STATEMENTS

This Prospectus contains certain forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934, as amended, including, but not limited to, statements regarding: uncertainties related to product development and marketability; uncertainties related to clinical trials; manufacturing and supply uncertainties and dependence on third parties; history of operating losses and anticipation of future losses; limited sales and marketing capabilities and dependence on collaborative relationships; future capital needs and uncertainty of additional funding; uncertainty of regulatory approval and extensive government regulation; consequences of Cobe relationship; competition and technological change; uncertainty regarding patents and proprietary rights; no assurance of third party reimbursement; hazardous materials; and potential product liability and availability of insurance. These statements are subject to risks and uncertainties, including those set forth under this caption, and actual results could differ materially from those expressed or implied in these statements. All forward-looking statements included in this Prospectus are made as of the date hereof, and the Company assumes no obligation to update any such forward-looking statement or reason why actual results might differ.

## THE COMPANY

Aastrom Biosciences, Inc. is developing proprietary process technologies and devices for a range of cell therapy applications, including stem cell therapies and selected emerging therapies such as immunotherapy, solid tissue repair and ex vivo gene therapy. The AastromReplicell(TM) System is the Company's lead product under development, and consists of a clinical cell culture system that operates single-use therapy kits tailored for each patient therapy for use in the rapidly growing cell therapy market. The Company is currently conducting pre-pivotal trials at multiple sites in the United States and Europe of the AastromReplicell(TM) System for use in stem cell therapy in preparation for pivotal trials in the United States and potential marketing in Europe. The Company believes that the AastromReplicell(TM) System method will be cost-effective, less invasive and a less time consuming alternative to currently available stem cell collection methods and may enhance the clinical utility of umbilical cord blood ("UCB") transplants by expanding the number of cells available for transplant. For stem cell therapy, the Company has entered into a strategic collaboration for the marketing, distribution and customer service of the AastromReplicell(TM) System with Cobe BCT, Inc., a subsidiary of Gambro AB and a leading provider of blood cell processing products.

The AastromReplicell(TM) System is designed as a platform product which implements the Company's pioneering stem cell replication technology. The Company also believes that the AastromReplicell(TM) System can be modified to produce a wide variety of other cell types for selected emerging therapies being developed by other companies and institutions. The Company intends to develop additional strategic collaborations for the development of the AastromReplicell(TM) System in certain of these other cell therapy market segments. In ex vivo gene therapy, the Company is also developing the Aastrom Gene Loader, which is being designed to address the production of gene-modified cells.

Stem cell therapy is a rapidly growing form of cell therapy used to restore blood and immune system function to cancer patients following chemotherapy or radiation therapy. Other novel applications of stem cell therapy are under development by third parties, which include the treatment of autoimmune diseases and augmenting recipient acceptance of organ transplants. Current stem cell collection methods, including bone marrow harvest and peripheral blood progenitor cell mobilization, are costly, invasive and time-consuming for both medical personnel and patients. Technologies which facilitate a more readily available source of cells may contribute to additional growth in cell therapy procedures. UCB is emerging as a new source of cells for stem cell therapy, offering additional market opportunity, although the more widespread use of UCB transplants has been restricted by cell quantity limitations, which the Company believes may ultimately be addressed by the AastromReplicell(TM) System.

The Company believes that the AastromReplicell(TM) System will offer significant advantages over traditional stem cell collection methods. The AastromReplicell(TM) System is intended to be used to produce cells used for stem cell therapy from a small starting volume of bone marrow or UCB cells. The AastromReplicell(TM) System may also permit higher and more frequent doses of chemotherapy to be administered to cancer patients by enabling the production of multiple doses of cells from patient samples taken at the initial collection. Further, in an evaluation of seven tumor-contaminated bone marrow samples that were expanded with the AastromReplicell(TM) System process, the presence of breast cancer cells in each sample was either substantially reduced or was no longer detectable. The Company believes that the combination of passive depletion during culture with the lower starting volume of tumor cells may result in a tumor-free or tumor-reduced cell product for transplant.

Aastrom is currently conducting pre-pivotal stem cell therapy clinical trials in patients with cancer and other genetic diseases at multiple sites in the U.S. and Europe. These clinical trials are designed to demonstrate that cells produced using the AastromReplicell(TM) System can provide hematopoietic recovery in accordance with trial endpoints in such patients who have received myeloablative chemotherapy. Pending a positive outcome of these and other related trials, the Company intends to seek FDA approval to begin a multi-center pivotal trial for use of the AastromReplicell(TM) System in stem cell therapy. It is anticipated that the results of this pivotal trial will be used to support the Company's Pre-Market Approval ("PMA")

submission to the FDA. The Company has also initiated two clinical sites in Europe. The Company may not market the AastromReplicell(/TM/) System in the United States for stem cell therapy unless and until FDA and other necessary regulatory approvals are received and in Europe until CE Mark certification is obtained. The Company is currently attempting to complete product development versions of the AastromReplicell(/TM/) System and obtain permission to affix the CE Mark to such versions to allow for their limited marketing in Europe.

The Company's business strategy is to: (i) establish a consumable-based business model; (ii) focus initially on the currently-reimbursed stem cell therapy market; (iii) leverage Aastrom's cell production technology across multiple cell therapy market opportunities; and (iv) establish multiple strategic collaborations.

For stem cell therapy, Aastrom has entered into a strategic collaboration with Cobe BCT to be the Company's exclusive worldwide marketing, distribution and service provider for the AastromReplicell(/TM/) System. In 1993, the Company entered into a series of agreements, pursuant to which Code BCT purchased an aggregate of \$20,000,000 of the Company's equity securities, and acquired the worldwide distribution rights to the AastromReplicell(/TM/) System for stem cell therapy. Under the terms of the collaboration, Aastrom retains manufacturing rights and 58% to 62% of all revenue generated by Cobe BCT's sale of the AastromReplicell(/TM/) System, subject to the Company's obligation to make certain royalty payments. Aastrom also retains all marketing and distribution rights to the AastromReplicell(/TM/) System for other cell types and ex vivo gene therapy applications, including stem cells.

The Company has exclusive rights to 14 issued U.S. patents, including patents relating to production methods and composition of matter for stem and progenitor cells and the genetic modification of stem and other cell types, as well as patents for cell culture devices for human cells.

The Company's principal executive offices are located at 24 Frank Lloyd Wright Drive, P. O. Box 376, Ann Arbor, MI 48106.

#### SELLING SHAREHOLDER

This Prospectus relates to the offering by the Selling Shareholder for resale of up to 3,788,369 shares of Common Stock. After giving effect to the Offering, the Selling Shareholder will beneficially own no shares of Common Stock of the Company. RGC International Investors, LDC ("RGC") will acquire the Shares upon (i) conversion, from time to time, of the Series I Shares that it acquired pursuant to the Purchase Agreement in July 1998, and (ii) conversion, from time to time, of the 3,000 Series II Shares that it is obligated to purchase under the Purchase Agreement upon satisfaction of conditions contained in the Purchase Agreement which are outside of the control of the Selling Shareholder, including the trading of the Common Stock of the Company at a price greater than \$6.00 per share for any twenty consecutive Trading Days (as defined in the Certificate of Designations, Preferences and Rights of the Series I Shares) during the period from October 2, 1998 through July 2, 1999. If circumstances were such that RGC was able to and did convert all of its Series I Shares as of July 28, 1998, RGC would have received 1,409,997 shares of Common Stock. The following table sets forth certain information with respect to the Selling Shareholder as of July 28, 1998, as follows: (i) the name and position or other relationship with the Company within the past three years, if any, of the Selling Shareholder; (ii) the number of the Company's outstanding shares of Common Stock beneficially owned by the Selling Shareholder (including shares obtainable under options exercisable within sixty (60) days of such date) prior to the offering hereby; (iii) the number of shares of Common Stock being offered hereby; and (iv) the number and percentage of the Company's outstanding shares of Common Stock to be beneficially owned by the Selling Shareholder after completion of the sale of Common Stock being offered hereby. There is no assurance that the Selling Shareholder will sell any or all of the shares offered hereby.



SELLING SHAREHOLDER	NUMBER OF SHARES BENEFICIALLY OWNED PRIOR TO THE OFFERING	NUMBER OF SHARES BEING OFFERED	NUMBER OF SHARES BENEFICIALLY OWNED AFTER THE OFFERING
RGC International Investors, LDC (1) (2)	2,255,995	2,255,995	0

(1) The number of shares set forth in the table represents an estimate of the number of shares of Common stock to be offered by the Selling Stockholder. The actual number of shares of Common Stock issuable upon conversion of 1998 Series Shares is indeterminate, is subject to adjustment and could be materially less or more than such estimated number depending on factors which cannot be predicted by the Company at this time, including, among other factors, the future market price of the Common Stock. The actual number of shares of Common Stock offered hereby, and included in the Registration Statement of which this Prospectus is a part, includes such additional number of shares of Common Stock as may be issued or issuable upon conversion of the 1998 Series Shares by reason of floating conversion price mechanisms, or by reason of any stock split, stock dividend or similar transaction involving the Common Stock, in order to prevent dilution, in accordance with Rule 416 under the Securities Act.

(2) The number of shares of Common Stock beneficially owned by the Selling Stockholder with respect to 1998 Series Shares is based on a conversion price of \$3.56. If circumstances were such that the Selling Shareholder was able to and did convert the 1998 Series Shares on July 28, 1998, the conversion price would have been \$3.56 (the average of the closing bid prices of the Common Stock for the lowest five consecutive trading days during the twenty trading days preceding such date, multiplied by 105% pursuant to the terms of the 1998 Series Shares). The 1998 Series Shares are convertible by any holder only to the extent that the number of shares of Common Stock owned by such holder and its affiliates (but not including shares of Common Stock underlying unconverted 1998 Series Shares) after such conversion would not exceed 4.9% of the then outstanding Common Stock as determined in accordance with Section 13(d) of the Exchange Act. Accordingly, the number of shares of Common Stock set forth in the table for the Selling Stockholder exceeds the number of shares of Common Stock that the Selling Stockholder could own beneficially at any given time through its ownership of 1998 Series Shares. In that regard, beneficial ownership of the Selling Stockholder set forth in the table is not determined in accordance with Rule 13d-3 under the Exchange Act.

#### PLAN OF DISTRIBUTION

The Shares being offered by the Selling Shareholder or its permitted donees, pledgees, transferees, or other successors in interest, will be sold in one or more transactions (which may involve block transactions) on the Nasdaq National Market or on such other market on which the Common Stock may from time to time be trading (the Purchase Agreement requires the Company to obtain and maintain listing of the Shares on the Nasdaq National Market), in privately-negotiated transactions, through the writing of options on the Shares, short sales or any combination thereof. The sale price to the public may be the market price prevailing at the time of sale, a price related to such prevailing market price or such other price as the Selling Shareholder determines from time to time. The Shares may also be sold pursuant to Rule 144. The Selling Stockholder shall have the sole and absolute discretion not to accept any purchase offer or make any sale of Shares if they deem the purchase price to be unsatisfactory at any particular time.

The Selling Shareholder or its permitted donees, pledgees, transferees, or other successors in interest, may also sell the Shares directly to market makers acting as principals and/or broker-dealers acting as agents for themselves or their customers. Brokers acting as agents for the Selling Shareholder will receive usual and customary commissions for brokerage transactions, and market makers and block purchasers purchasing the Shares will do so

for their own account and at their own risk. It is possible that the Selling Shareholder will attempt to sell shares of Common Stock in block transactions to market makers or other purchasers at a price per share which may be below the then market price. There can be no assurance that all or any of the Shares offered hereby will be issued to, or sold by, the Selling Shareholder.

The Selling Shareholder, alternatively, may sell all or any part of the Shares through an underwriter. The Selling Shareholder has not entered into any agreement with a prospective underwriter and there is no assurance that any such agreement will be entered into. If a Selling Shareholder enters into such an agreement or agreements, the relevant details will be set forth in a supplement or revisions to this Prospectus.

The Selling Shareholder and any other persons participating in the sale or distribution of the Shares will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, which provisions may limit the timing of purchases and sales of any of the Shares by the Selling Shareholder or any other such person. The foregoing may affect the marketability of the Shares.

The Company has agreed to indemnify the Selling Shareholder, or certain transferees or assignees, against certain liabilities, including liabilities under the Securities Act, or to contribute to payments the Selling Shareholder, or certain transferees or assignees, may be required to make in respect thereof. The Selling Shareholder has agreed to indemnify the Company against certain liabilities, including liabilities under the Securities Act, or to contribute to payments the Company may be required to make in respect thereof.

#### USE OF PROCEEDS

The Company will not receive any proceeds from sales of the Shares or from conversions of the 1998 Series Shares, if any.

#### LEGAL MATTERS

The validity of the Common Stock offered hereby will be passed upon for the Company by Pepper Hamilton LLP, Detroit, Michigan. Gray Cary Ware & Freidenrich LLP, San Diego, California, has acted as special counsel to the Company in connection with this offering.

#### EXPERTS

The financial statements incorporated in this prospectus by reference to the Company's Annual Report on Form 10-K for the year ended June 30, 1997 and all amendments thereto have been so incorporated in reliance upon the report of PricewaterhouseCoopers LLP, independent accountants, given on the authority of said firm as experts in accounting and auditing.

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 No dealer, salesman or other person has been authorized to give any information or to make any representations other than those contained or incorporated by reference in this prospectus in connection with the offering described herein, and, if given or made, such information or representation must not be relied upon as having been authorized by the Company. This prospectus does not constitute an offer to sell, or a solicitation of an offer to buy, any securities other than the registered securities to which it relates, or an offer to sell, or a solicitation of an offer to buy, in any jurisdiction in which it is unlawful to make such offer or solicitation. Neither the delivery of this prospectus nor any sale made hereunder shall, under any circumstances, create an implication that there has been no change in the affairs of the Company since the date hereof or that the information contained herein is correct as of any time subsequent to the date hereof.

3,788,369 SHARES

COMMON STOCK

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 PROSPECTUS  
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July 28, 1998

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PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

ITEM 14. OTHER EXPENSES OF ISSUANCE AND DISTRIBUTION.

Other expenses in connection with the registration of the Common Stock hereunder will be substantially as follows:

Item -----	Company Expense -----
SEC Registration Fee.....	\$ 3,540.00
Printing and engraving expenses.....	\$ 5,000.00
Legal fees and expenses.....	\$ 6,000.00
Accounting Fees and expenses.....	\$ 5,000.00
Miscellaneous.....	\$40,000.00
Total.....	\$59,540.00 -----

\* Estimated for purposes of this filing.

ITEM 15. INDEMNIFICATION OF DIRECTORS AND OFFICERS.

Sections 1561 through 1565 of the Michigan Business Corporation Act (the "MBCA") authorize a corporation to grant or a court to award indemnity to directors, officers, employees and agents in terms sufficiently broad to permit such indemnification under certain circumstances for liabilities (including reimbursement for expenses incurred) arising under the Securities Act of 1933.

The Bylaws of the Registrant, provide that the Registrant shall, to the fullest extent authorized or permitted by the MBCA, or other applicable law, indemnify a director or officer who was or is a party or is threatened to be made a party to any proceeding by or in the right of the Registrant to procure a judgment in its favor by reason of the fact that such person is or was a director, officer, employee or agent of the Registrant, against expenses, including actual and reasonable attorneys' fees, and amounts paid in settlement incurred in connection with the action or suit, if the indemnitee acted in good faith and in a manner the person reasonably believed to be in, or not opposed to, the best interests of the Registrant or its shareholders. This section also authorizes the Registrant to advance expenses incurred by any agent of the Registrant in defending any proceeding prior to the final disposition of such proceeding upon receipt of an undertaking by or on behalf of the agent to repay such amount unless it shall be determined ultimately that the agent is entitled to be indemnified.

The Bylaws also authorize the Registrant to purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the Registrant against any liability asserted against or incurred by such person in such capacity or arising out of such person's status as such, regardless of whether the Registrant would have the power to indemnify such person against such liability under the provisions of the MBCA.

The Registrant has entered into an indemnification agreement with certain of its directors, officers and other key personnel, which contains provisions that may in some respects be broader than the specific indemnification provisions contained under applicable law. The indemnification agreement may require the Registrant, among other things, to indemnify such directors, officers and key personnel against certain liabilities that may arise by reason of their status or service as directors, officers or employees of the Registrant, to advance the expenses incurred by such parties as a result of any threatened claims or proceedings brought against them as to which they could be indemnified and, to the maximum extent that insurance coverage of such directors, officers and key employees under the Registrant's directors' and officers' liability insurance policies is maintained.

Section 1209 of the MBCA permits a Michigan corporation to include in its Articles of Incorporation a provision eliminating or limiting a director's liability to a corporation or its shareholders for monetary damages for breaches of fiduciary duty. The enabling statute provides, however, that liability for breaches of the duty of loyalty, acts or omissions not in good faith or involving intentional misconduct or knowing violation of the law, or the receipt of improper personal benefits cannot be eliminated or limited in this manner. The Registrant's Restated Articles of Incorporation include a provision which eliminates, to the fullest extent permitted by the MBCA, director liability for monetary damages for breaches of fiduciary duty.

ITEM 16. EXHIBITS.

EXHIBIT NUMBER	DESCRIPTION OF DOCUMENT
3.1	Certificate of Designations, Preferences and Rights of Series I Shares
3.2	Form of Certificate of Designations, Preferences and Rights of Series II Shares
5.1	Consent and Opinion of Pepper Hamilton LLP
10.1	Securities Purchase Agreement for 1998 Series Shares
10.2	Registration Rights Agreement for 1998 Series Shares
23.1	Consent of PricewaterhouseCoopers, independent accountants
23.2	Consent of Gray Cary Ware & Freidenrich LLP
23.3	Consent of Pepper Hamilton LLP (included in Exhibit 5.1)
24.1	Power of Attorney (included in the Signature Page contained in Part II of the Registration Statement)

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 (the "Securities Act");

(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 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 a 20% 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) and (a)(1)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in periodic reports filed 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.

(2) That, for the purpose of determining any liability under the Securities Act, 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.

B. The undersigned Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to section 13(a) or 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. The undersigned Registrant hereby undertakes to deliver or cause to be delivered with the prospectus, to each person to whom the prospectus is sent or given, the latest annual report to security holders that is incorporated by reference in the prospectus and furnished pursuant to and meeting the requirements of Rule 14a-3 or Rule 14c-3 under the Securities Exchange Act of 1934; and, where interim financial information required to be presented by Article 3 of Regulation S-X are not set forth in the prospectus, to deliver, or cause to be delivered to each person to whom the prospectus is sent or given, the latest quarterly report that is specifically incorporated by reference in the prospectus to provide such interim financial information.

D. Insofar as indemnification for liabilities arising under the Securities Act 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 Securities 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 Securities Act and will be governed by the final adjudication of such issue.

E. The undersigned Registrant hereby undertakes that:

(1) For the purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of the registration statement as of the time it was declared effective.

(2) For the purposes of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus 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.

SIGNATURES

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Pursuant to the requirements of the Securities Act, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements of 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 Ann Arbor, State of Michigan, on July 28, 1998.

AASTROM BIOSCIENCES, INC.

By: /s/ R. Douglas Armstrong, Ph.D.

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 R. Douglas Armstrong, Ph.D.  
 President and Chief Executive Officer  
 (Principal Executive Officer)

POWER OF ATTORNEY

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KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints R. Douglas Armstrong and Todd E. Simpson, or either of them, as his attorney-in-fact, each with full power of substitution for him in any and all capacities, to sign any and all amendments to this registration statement, including, but not limited to, post-effective amendments and any and all new registration statements filed pursuant to Rule 462 under the Securities Act of 1933 in connection with or related to the offering contemplated by this registration statement, as amended, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each said attorney-in-fact or his substitute or substitutes may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed below by the following persons in the capacities and on the dates indicated.

Signature -----	Title -----	Date ----
/s/ R. Douglas Armstrong, Ph.D. ----- R. Douglas Armstrong, Ph.D.	President, Chief Executive Officer and Director (Principal Executive Officer)	July 28, 1998
/s/ Todd E. Simpson ----- Todd E. Simpson	Vice President, Finance and Administration, Chief Financial Officer, Secretary and Treasurer (Principal -Financial and Accounting Officer)	July 28, 1998
/s/ Robert J. Kunze ----- Robert J. Kunze	Chairman of the Board and Director	July 28, 1998
/s/ Stephen G. Emerson, M.D., Ph.D. ----- Stephen G. Emerson, M.D., Ph.D.	Director	July 28, 1998
/s/ Horst R. Witzel, Dr.-Ing. ----- Horst R. Witzel, Dr.-Ing.	Director	July 28, 1998
/s/ Edward C. Wood, Jr. ----- Edward C. Wood, Jr.	Director	July 28, 1998

INDEX TO EXHIBITS

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CERTIFICATE OF  
DESIGNATIONS, PREFERENCES, AND RIGHTS

OF

1998 SERIES I CONVERTIBLE PREFERRED STOCK

OF

AASTROM BIOSCIENCES, INC.

(Pursuant to Section 450.1302 of the  
Michigan Business Corporation Act)

Aastrom Biosciences, Inc., a corporation organized and existing under the Michigan Business Corporation Act (the "CORPORATION"), hereby certifies that the following resolutions were adopted by the Board of Directors of the Corporation on May 20, 1998 pursuant to authority of the Board of Directors as required by Section 450.1302 of the Michigan Business Corporation Act:

RESOLVED, that pursuant to the authority granted to and vested in the Board of Directors of this Corporation (the "BOARD OF DIRECTORS" or the "BOARD") in accordance with the provisions of its Articles of Incorporation, the Board of Directors hereby authorizes a Series of the Corporation's previously authorized Preferred Stock, no par value, (the "PREFERRED STOCK"), and hereby states the designation and number of shares, and fixes the relative rights, preferences, privileges, powers and restrictions thereof as follows:

1998 Series I Convertible Preferred Stock:

I. Designation and Amount  
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The designation of this series, which consists of 5,000 shares of Preferred Stock, is 1998 Series Convertible Preferred Stock (the "1998 SERIES I PREFERRED STOCK") and the stated value shall be One Thousand Dollars (\$1,000) per share (the "STATED VALUE").

II. Certain Definitions  
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For purposes of this Certificate of Designation, the following terms shall have the following meanings:

A. "Applicable Percentage" means 94%; provided, however that for conversions taking place prior to two hundred seventy (270) days from the Issue Date, the Applicable Percentage shall mean (i) 100%, if the Market Price is \$4.00 or greater and (ii) 105%, if the Market Price is less than \$4.00.

B. "Applicable Premium" shall mean, with respect to a share or shares of 1998 Series I Preferred Stock, an amount equal to five and one half percent (5.5%) per annum of the Stated Value of such share or shares; provided, -----  
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however that if the Corporation has elected to increase the Applicable Premium  
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pursuant to Section 2(c)(2) of the Registration Rights Agreement, the Applicable Premium shall mean fifteen percent (15%) per annum of the Stated Value of such share or shares for the periods specified in the Registration Rights Agreement.

C. "Bloomberg" means Bloomberg Financial Markets or an equivalent reliable reporting service mutually acceptable to and hereafter designated by the holders of a majority in interest of the shares of 1998 Series I Preferred Stock and the Corporation.

D. "Closing Bid Price" means, for any security as of any date, the closing bid price on Nasdaq as reported by Bloomberg or, if Nasdaq is not the principal trading market for such security, the closing bid price of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the closing bid price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no closing bid price of such security in the over-the-counter market on the electronic bulletin board for such security or in any of the foregoing manners, the average of the bid prices of any market makers for such security that are listed in the "pink sheets" by the National Quotation Bureau, Inc. If the Closing Bid Price cannot be calculated for such security on such date in the manner provided above, the Closing Bid Price shall be the fair market value as mutually determined by the Corporation and the holders of a majority in interest of shares of 1998 Series I Preferred Stock being converted for which the calculation of the Closing Bid Price is required in order to determine the Conversion Price of such 1998 Series I Preferred Stock.

E. "Closing Price" as of any date, means the last sale price of the Common Stock on Nasdaq as reported or, if Nasdaq is not the principal trading market for such security, the last sale price of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the last sale price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no last sale price of such security or in the over-the-counter market on the electronic bulletin board for such security in any of the foregoing manners the average of the bid prices of any market makers for such security that are listed in the "pink sheets" by the National Quotation Bureau, Inc. If the Closing Price cannot be calculated for such security on such date in the manner provided above, the Closing Price shall be the fair market value as mutually determined by the Corporation and the holders of a majority in interest of shares of 1998 Series I Preferred Stock being converted for which the calculation of the Closing Price is required in order to determine the Conversion Price of such 1998 Series I Preferred Stock.

F. "Common Stock" means the Corporation's common stock, no par value.

G. "Fixed Conversion Price" means 130% times the average Closing Bid Prices during the five consecutive (5) Trading Day period ending one (1) Trading Day prior to the Issue Date.

H. "Issue Date" means the date of issuance of the 1998 Series I Preferred Stock.

I. "Market Price" means the average of the Closing Bid Prices during the Market Price Days.

J. "Market Price Days" means any five (5) consecutive Trading Days designated by the converting holder at the time of conversion, from among the days comprising the Pricing Period, as such designation is set forth in the Notice of Conversion (as defined in Article VIII.E).

K. "Nasdaq" means the Nasdaq National Market.

L. "Person" shall mean any individual, corporation, limited liability company, partnership, association, trust or other entity or organization.

M. "Pricing Period" means the twenty (20) consecutive Trading Day period ending one (1) Trading Day prior to the Conversion Date (as defined in Article VIII.E).

N. "Purchase Agreement" shall mean that certain Securities Purchase Agreement dated as of the Issue Date, by and between the Corporation and the signatories thereto.

O. "Redemption Market Price" means the Closing Price of the Common Stock on the Conversion Date (as defined in Article VIII.F(d)).

P. "Redemption Threshold" means \$3.25.

Q. "Registration Rights Agreement" shall mean that certain Registration Rights Agreements dated as of the Issue Date, by and among the Corporation and the signatories thereto.

R. "Trading Day" shall mean any day on which the Common Stock is traded for any period on Nasdaq, or on the principal securities exchange or other securities market on which the Common Stock is then being traded.

III. Rank  
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The 1998 Series I Preferred Stock shall rank (i) prior to the Common Stock; (ii) prior to any class or Series of capital stock of the Corporation hereafter created (unless, with the consent of the holders of 1998 Series I Preferred Stock obtained in accordance with Article XI hereof, such class or Series of capital stock specifically, by its terms, ranks senior to or pari passu with  
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the 1998 Series I Preferred Stock) (collectively, with the Common Stock, "JUNIOR SECURITIES"); (iii) pari passu with (A) any class or Series of the Corporation's

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preferred stock existing as of the date hereof and (B) any class or Series of capital stock of the Corporation hereafter created specifically ranking, by its terms, on parity with the 1998 Series I Preferred Stock (collectively, "PARI

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PASSU SECURITIES"); and (iv) junior to any class or Series of capital stock of

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the Corporation hereafter created (with the consent of the holders of 1998 Series I Preferred Stock obtained in accordance with Article XI hereof) specifically ranking, by its terms, senior to the 1998 Series I Preferred Stock ("SENIOR SECURITIES"), in each case as to distribution of assets upon liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary.

#### IV. Dividends

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The 1998 Series I Preferred Stock shall not bear any dividends. In no event, so long as any 1998 Series I Preferred Stock shall remain outstanding, shall any dividend whatsoever be declared or paid upon, nor shall any distribution be made upon (excluding any distribution received in connection with a Change in Control Transaction (as defined below)), any Junior Securities, nor shall any shares of Junior Securities be purchased or redeemed by the Corporation nor shall any moneys be paid to or made available for a sinking fund for the purchase or redemption of any Junior Securities (other than a distribution of Junior Securities), without, in each such case, the written consent of the holders of a majority of the outstanding shares of 1998 Series I Preferred Stock, voting together as a class.

#### V. Liquidation Preference

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A. If the Corporation shall commence a voluntary case under the Federal bankruptcy laws or any other applicable Federal or State bankruptcy, insolvency or similar law, or consent to the entry of an order for relief in an involuntary case under any law or to the appointment of a receiver, liquidator, assignee, custodian, trustee, sequestrator (or other similar official) of the Corporation or of any substantial part of its property, or make an assignment for the benefit of its creditors, or admit in writing its inability to pay its debts generally as they become due, or if a decree or order for relief in respect of the Corporation shall be entered by a court having jurisdiction in the premises in an involuntary case under the Federal bankruptcy laws or any other applicable Federal or state bankruptcy, insolvency or similar law resulting in the appointment of a receiver, liquidator, assignee, custodian, trustee, sequestrator (or other similar official) of the Corporation or of any substantial part of its property, or ordering the winding up or liquidation of its affairs, and any such decree or order shall be unstayed and in effect for a period of thirty (30) consecutive days and, on account of any such event, the Corporation shall liquidate, dissolve or wind up, or if the Corporation shall otherwise liquidate, dissolve or wind up (each such event being considered a "LIQUIDATION EVENT"), no distribution shall be made to the holders of any shares of capital stock of the Corporation (other than Senior Securities and, subject to the following sentence, Pari Passu Securities) upon liquidation, dissolution

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or winding up unless prior thereto, the holders of shares of 1998 Series I Preferred Stock, subject to Article VIII, shall have received the Liquidation Preference (as defined in Article V.C) with respect to each share. If upon the occurrence of a Liquidation Event, the assets

and funds available for distribution among the holders of the 1998 Series I Preferred Stock and holders of Pari Passu Securities shall be insufficient to

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permit the payment to such holders of the preferential amounts payable thereon, then the entire assets and funds of the Corporation legally available for distribution to the 1998 Series I Preferred Stock and the Pari Passu Securities

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shall be distributed ratably among such shares in proportion to the ratio that the Liquidation Preference payable on each such share bears to the aggregate liquidation preference payable on all such shares.

B. Subject to Article VII.B below, at the option of the Corporation, the sale, conveyance or disposition of all or substantially all of the assets of the Corporation, the effectuation by the Corporation of a transaction or series of related transactions in which more than 50% of the voting power of the Corporation is disposed of, or the consolidation, merger or other business combination of the Corporation with or into any other Person or Persons when the Corporation is not the survivor (other than a merger or other business combination solely for the purposes of reincorporating to a new jurisdiction) (each, a "CHANGE IN CONTROL TRANSACTION") shall either: (i) be deemed to be a liquidation, dissolution or winding up of the Corporation pursuant to which the Corporation shall be required to distribute upon consummation of such transaction an amount equal to 115% of the Liquidation Preference with respect to each outstanding share of 1998 Series I Preferred Stock in accordance with and subject to the terms of this Article V or (ii) be treated pursuant to Article VIII.C(b) hereof. For purposes of the Michigan Business Corporation Act (the "MCBA") and Article XI(A) of this Certificate, any such Change in Control Transaction shall be deemed to alter or change the powers, preferences, or special rights of the holders of shares of 1998 Series I Preferred Stock so as to affect such holders adversely.

C. For purposes hereof, the "LIQUIDATION PREFERENCE" with respect to a share of the 1998 Series I Preferred Stock shall mean an amount equal to the sum of (i) the Stated Value thereof plus (ii) the Applicable Premium for the period beginning on the Issue Date and ending on the date of final distribution to the holder thereof (prorated for any portion of such period). The liquidation preference with respect to any Pari Passu Securities shall be as set forth in

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the Certificate of Designation filed in respect thereof.

#### VI. Redemption

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A. If any of the following events (each, a "REDEMPTION EVENT") shall occur:

(i) The Corporation fails to issue shares of Common Stock to the holders of 1998 Series I Preferred Stock upon exercise by the holders of their conversion rights in accordance with the terms of this Certificate of Designation (for a period of at least sixty (60) days if such failure is solely as a result of the circumstances governed by the second paragraph of Article VIII.F below and the Corporation is using all commercially reasonable efforts to authorize a sufficient number of shares of Common Stock as soon as practicable), fails to transfer or to cause its transfer agent to transfer (electronically or in certificated form) any certificate for shares of Common Stock issued to the holders upon conversion of the 1998 Series I Preferred Stock as and when required by this Certificate of Designation or the Registration Rights

Agreement, fails to remove any restrictive legend (or to withdraw any stop transfer instructions in respect thereof) on any certificate or any shares of Common Stock issued to the holders of 1998 Series I Preferred Stock upon conversion of the 1998 Series I Preferred Stock as and when required by this Certificate of Designation, the Purchase Agreement or the Registration Rights Agreement, or fails to fulfill its obligations pursuant to Sections 4(c), 4(e), 4(h), 4(i), 4(j) or 5 of the Purchase Agreement (or makes any announcement, statement or threat that it does not intend to honor the obligations described in this paragraph) and any such failure shall continue uncured (or any announcement, statement or threat not to honor its obligations shall not be rescinded in writing) for ten (10) business days;

(ii) The Corporation fails to obtain effectiveness with the Securities and Exchange Commission (the "SEC") of the Registration Statement (as defined in the Registration Rights Agreement) prior to one hundred eighty (180) days from the Issue Date or such Registration Statement lapses in effect (or sales otherwise cannot be made thereunder, whether by reason of the Company's failure to amend or supplement the prospectus included therein in accordance with the Registration Rights Agreement or otherwise) for more than thirty (30) consecutive days or more than sixty (60) days in any twelve (12) month period after such Registration Statement becomes effective;

(iii) the Corporation shall make an assignment for the benefit of creditors, or apply for or consent to the appointment of a receiver or trustee for it or for all or substantially all of its property or business; or such a receiver or trustee shall otherwise be appointed;

(iv) Bankruptcy, insolvency, reorganization or liquidation proceedings or other proceedings for relief under any bankruptcy law or any law for the relief of debtors shall be instituted by or against the Corporation or any subsidiary of the Corporation; provided, however, that in the case of any

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involuntary bankruptcy, such involuntary bankruptcy shall continue undischarged or undismissed for a period of thirty (30) days; or

(v) The Corporation shall fail to maintain the listing of the Common Stock on Nasdaq, the Nasdaq SmallCap Market, the New York Stock Exchange or the American Stock Exchange,

then, upon the occurrence and during the continuation of any Redemption Event specified in subparagraphs (i), (ii) or (v) at the option of the holders of at least 50% of the then outstanding shares of 1998 Series I Preferred Stock by written notice (the "REDEMPTION NOTICE") to the Corporation of such Redemption Event, or upon the occurrence of any Redemption Event specified in subparagraphs (iii) or (iv) the Corporation shall purchase each holder's shares of 1998 Series I Preferred Stock for an amount equal to the greater of (1) 115% multiplied by the sum of (A) the aggregate Stated Value of the shares to be redeemed plus (b) the Applicable Premium for the period beginning on the Issue Date and ending on the date of payment of the Redemption Amount (the "REDEMPTION DATE"), or (2) the parity value of the shares to be redeemed, where "parity value" means the product of (A) the highest number of shares of Common Stock issuable upon conversion of such shares in accordance with Article VIII below

(without giving any effect to any limitations on conversions of shares set forth in Article VIII.A(b) below, and treating the Trading Day immediately preceding the Redemption Date as the "Conversion Date" (as defined in Article VII.B(a)) for purposes of determining the lowest applicable Conversion Price), unless the Redemption Event arises as a result of a breach in respect of a specific Conversion Date, in which case such Conversion Date shall be the Conversion Date), multiplied by (b) the Closing Price for the Common Stock on such "Conversion Date" (the greater of such amounts being referred to as the "REDEMPTION AMOUNT").

In the case of a Redemption Event, if the Corporation fails to pay the Redemption Amount for each share within five (5) business days of written notice that such amount is due and payable, then (assuming there are sufficient authorized shares) in addition to all other available remedies, each holder of 1998 Series I Preferred Stock shall have the right at any time, so long as the Redemption Event continues, to require the Corporation, upon written notice, to immediately issue (in accordance with and subject to the terms of Article VIII below), in lieu of the Redemption Amount, with respect to each outstanding share of 1998 Series I Preferred Stock held by such holder, the number of shares of Common Stock of the Corporation equal to the Redemption Amount divided by the Conversion Price then in effect.

B. If the 1998 Series I Preferred Stock held by any holder ceases to be convertible as a result of the limitations described in Article VIII.A(c) below (a "19.99% REDEMPTION EVENT"), and the Corporation has not prior to, or within thirty (30) days of, the date that such 19.99% Redemption Event arises, (i) obtained approval of the issuance of the additional shares of Common Stock by the requisite vote of the holders of the then-outstanding Common Stock (not including any shares of Common Stock held by present or former holders of 1998 Series I Preferred Stock that were issued upon conversion of 1998 Series I Preferred Stock) or (ii) received other permission pursuant to Nasdaq Rule 4460(i) allowing the Corporation to resume issuances of shares of Common Stock upon conversion of 1998 Series I Preferred Stock, then the Corporation shall be obligated to redeem immediately all of the then outstanding 1998 Series I Preferred Stock, in accordance with this Article VI.B. An irrevocable redemption notice (the "19.99% REDEMPTION NOTICE") shall be delivered promptly to the holders of 1998 Series I Preferred Stock at their registered address appearing on the records of the Corporation and shall state (1) that 19.99% of the Outstanding Common Amount (as defined in Article VIII.A) has been issued upon exercise of the 1998 Series I Preferred Stock, (2) that the Corporation is obligated to redeem all of the outstanding 1998 Series I Preferred Stock and (3) the Redemption Date, which shall be a date within five (5) business days of the earlier of (i) the date of the 19.99% Redemption Notice or (ii) the date on which the holders of the 1998 Series I Preferred Stock notify the Corporation of the occurrence of a 19.99% Redemption Event. On Redemption Date, the Corporation shall make payment of the Redemption Amount (as defined in Article VI.A above) in cash.

C. Notwithstanding anything to the contrary contained in this Article VI, so long as (i) no Redemption Event shall have occurred and be continuing and (ii) the Registration Statement is then in effect and has been in effect and sales can be made thereunder for at least twenty (20) days prior to the Optional Redemption Date (as defined below), then at any time

after the Issue Date if the average Closing Bid Prices of the Common Stock for any five (5) consecutive Trading Days is below the Redemption Threshold, the Corporation shall have the right, exercisable on not less than fifteen (15) Trading Days prior written notice to the holders of 1998 Series I Preferred Stock (which notice may not be sent to the holders of the 1998 Series I Preferred Stock until the Corporation is permitted to redeem the 1998 Series I Preferred Stock pursuant to this Article VI.C), to redeem all of the outstanding shares of 1998 Series I Preferred Stock in accordance with this Article VI. A notice (the "OPTIONAL REDEMPTION NOTICE") of any redemption hereunder (an "OPTIONAL REDEMPTION") shall be delivered to the holders of 1998 Series I Preferred Stock at their registered addresses appearing on the books and records of the Corporation and shall state (1) that the Corporation is exercising its right to redeem all of the outstanding shares of 1998 Series I Preferred Stock issued on the Issue Date and (2) the date of redemption (the "OPTIONAL REDEMPTION DATE"). On the Optional Redemption Date, the Corporation shall make payment of the Optional Redemption Amount (as defined below) to or upon the order of the holders as specified by the holders in writing to the Corporation at least one (1) business day prior to the Optional Redemption Date. If the Corporation exercises its right to redeem the 1998 Series I Preferred Stock, the Corporation shall make payment to the holders of an amount in cash per share (the "OPTIONAL REDEMPTION AMOUNT") equal to the sum of (i) 115% multiplied by the Stated Value thereof plus (ii) the Applicable Premium for the period beginning on the Issue Date and ending on the Optional Redemption Date, for each share of 1998 Series I Preferred Stock then held. Notwithstanding notice of an Optional Redemption, the holders shall at all times prior to the Optional Redemption Date maintain the right to convert all or any shares of 1998 Series I Preferred Stock in accordance with Article VIII and any shares of 1998 Series I Preferred Stock so converted after receipt of an Optional Redemption Notice and prior to the Optional Redemption Date set forth in such notice and payment of the aggregate Optional Redemption Amount shall be deducted from the shares of 1998 Series I Preferred Stock which are otherwise subject to redemption pursuant to such notice.

D. Notwithstanding anything to the contrary contained in this Article VI, if the Closing Price of the Common Stock is below the Redemption Threshold on any Conversion Date, the Corporation shall have the option, in lieu of issuing shares of Common Stock to the holders of 1998 Series I Preferred Stock upon conversion in accordance with the terms of Article VIII below, to redeem all of the shares of 1998 Series I Preferred Stock submitted for conversion for an amount in cash equal to the number of shares of Common Stock that would have otherwise been issued upon conversion of the 1998 Series I Preferred Stock at the applicable Conversion Price (as defined in Article VIII) multiplied by the Redemption Market Price. If the Closing Price of the Common Stock is below the Redemption Threshold, the Corporation shall promptly notify the holders of 1998 Series I Preferred Stock as to whether the Corporation will issue shares of Common Stock or deliver cash in redemption in respect of 1998 Series I Preferred Stock submitted for conversion pursuant to Article VIII. The Corporation will be bound by such notice for a period of twenty (20) Trading Days (the "TERM") from the date of such notice, after which the Corporation may elect to renew such notice. A failure to issue or renew within two (2) business days after the expiration of any Term shall be deemed to be an election not to redeem the 1998 Series I Preferred Stock during the subsequent Term. Any redemption amounts payable hereunder shall be paid to the converting holders within two (2) Trading Days of the Conversion Date.



VII. Conversion by the Corporation

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A. So long as (i) no Redemption Event shall have occurred and be continuing and (ii) the Registration Statement is then in effect and has been in effect and sales can be made thereunder for at least twenty (20) days prior to the Corporation Conversion Date (as defined below), then, at any time after the one (1) year anniversary of the date the Registration Statement is declared effective by the SEC (subject to extension for each Trading Day following effectiveness that sales cannot be made pursuant to the Registration Statement (whether by reason of the Company's failure to properly supplement or amend the prospectus included therein in accordance with the terms of the Registration Rights Agreement, during an Allowed Delay or otherwise), if the average Closing Bid Price of the Common Stock over any five (5) consecutive Trading Days is greater than 200% of the Fixed Conversion Price, the Corporation shall have the right, exercisable on not less than fifteen (15) Trading Days prior written notice (the "CORPORATION CONVERSION NOTICE") to the holders of 1998 Series I Preferred Stock (which notice may not be sent to the holders of the 1998 Series I Preferred Stock until the Corporation is permitted to convert the 1998 Series I Preferred Stock pursuant to this Article VII.A), to convert all of the outstanding shares of 1998 Series I Preferred Stock into shares of Common Stock in accordance with this Article VII.A and Article VIII. Any conversion hereunder (a "CORPORATION CONVERSION") shall be as of the date (the "CORPORATION CONVERSION DATE") the Corporation Conversion Notice is delivered to the holders of 1998 Series I Preferred Stock at their registered addresses appearing on the books and records of the Corporation, which notice shall contain substantially the same information as the Notice of Conversion described in Article VIII.E. The Corporation Conversion Date shall be the "Conversion Date" for purposes of determining the Conversion Price and the time within which certificates representing the Common Stock must be delivered to the holder upon a Corporation Conversion.

B. If, in the event of a Change in Control Transaction (as defined in Article V.B above), the consideration per share to be received by the holders of the Common Stock of the Corporation in such Change in Control Transaction is equal to at least 115% of the Fixed Conversion Price, then, at the option of the Corporation, simultaneously with the consummation of the Change in Control Transaction, each share of 1998 Series I Preferred Stock issued and outstanding at that time automatically shall be converted into shares of Common Stock on such date at the then effective Conversion Price in accordance with, and subject to, the provisions of this Article VII.B and Article VIII hereof (the "CHANGE IN CONTROL CONVERSION"). The date on which the Change in Control Transaction is consummated shall be the "Conversion Date" for purposes of determining the Conversion Price and the time within which certificates representing the Common Stock must be delivered to the holder upon a Change in Control Conversion

VIII. Conversion at the Option of the Holder

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A. (a) Subject to the conversion schedule set forth in Article VIII.A(b) below, each holder of shares of 1998 Series I Preferred Stock may, at its option at any time and from time to time, upon surrender of the certificates therefor, convert any or all of its shares of

1998 Series I Preferred Stock into Common Stock as follows (an "OPTIONAL CONVERSION"). Each share of 1998 Series I Preferred Stock shall be convertible into such number of fully paid and nonassessable shares of Common Stock as is determined by dividing (1) the sum of (A) the Stated Value thereof plus (b) the Applicable Premium for the period beginning on the Issue Date and ending on and including the Conversion Date (as defined in Article VIII.B, below), by (2) the then effective Conversion Price (as defined below); provided, however, that,

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 unless the holder delivers a waiver in accordance with the immediately following sentence, in no event (other than pursuant to the Automatic Conversion (as defined in Article IX)) shall a holder of shares of 1998 Series I Preferred Stock be entitled to convert any such shares in excess of that number of shares upon conversion of which the sum of (x) the number of shares of Common Stock beneficially owned by the holder and its affiliates (other than shares of Common Stock which may be deemed beneficially owned through the ownership of the unconverted portion of the shares of 1998 Series I Preferred Stock) and (y) the number of shares of Common Stock issuable upon the conversion of the shares of 1998 Series I Preferred Stock with respect to which the determination of this proviso is being made, would result in beneficial ownership by a holder and such holder's affiliates of more than 4.9% of the outstanding shares of Common Stock. For purposes of the proviso to the immediately preceding sentence, (i) beneficial ownership shall be determined in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended, and Regulation 13D-G thereunder, except as otherwise provided in clause (x) of such proviso, and (ii) a holder may waive the limitations set forth therein by written notice to the Corporation upon not less than sixty-one (61) days prior written notice (with such waiver taking effect only upon the expiration of such sixty-one (61) day notice period).

(b) Each holder of shares of 1998 Series I Preferred Stock may convert only up to that percentage of the aggregate Stated Value of all shares of 1998 Series I Preferred Stock received by such holder on the Issue Date specified below during the time period set forth opposite such percentage.

Percentage	Time Period
0.0%	0-270 days following the Issue Date
33.3%	271-300 days following the Issue Date
66.6%	301-330 days following the Issue Date
100.0%	331 days following the Issue Date

; provided, however, that the restrictions on conversion set forth above shall  
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 not apply to conversions taking place on any Conversion Date (i) that the Common Stock trades on Nasdaq or the principal trading market on which the Common Stock is then listed as reported by Bloomberg at a price greater than or equal to (A) 117% of the Market Price or (b) the Fixed Conversion Price or (ii) occurring on or after the date the Corporation makes a public announcement that it intends to merge or consolidate with any other corporation or sell or transfer substantially all of the assets of the Corporation or (iii) occurring on or after the date any person, group or entity (including the Corporation) publicly announces a tender offer to purchase 50% or more of the Corporation's Common Stock or otherwise publicly announces an intention to replace a majority of the Corporation's Board of Directors by waging a proxy battle or otherwise or (iv) occurring

on or after there is a material adverse change in the business, operation, assets, financial condition or prospects of the Corporation or its subsidiaries, taken as a whole or (v) upon the occurrence of a Redemption Grant or the delivery by the Company of an Optional Redemption Notice. If, pursuant to clause (i)(A) of the preceding proviso, the 1998 Series I Preferred Stock is permitted to be converted prior to the date which is two hundred seventy (270) days from the Issue Date, and the then applicable Conversion Price is less than \$3.25, each holder of 1998 Series I Preferred Stock during such 270-day period may not convert more than both (i) 10% of the number of shares of 1998 Series I Preferred Stock received on the Issue Date during any thirty (30) day period (within such 270-day period) and (ii) 50% of the number of shares of 1998 Series I Preferred Stock received on the Issue Date.

(c) So long as the Common Stock is listed for trading on Nasdaq or an exchange or quotation system with a rule substantially similar to Nasdaq Rule 4460(i) then, notwithstanding anything to the contrary contained herein if, at any time, the aggregate number of shares of Common Stock then issued upon conversion of the 1998 Series I Preferred Stock (including any shares of capital stock or rights to acquire shares of capital stock issued by the Corporation which are aggregated or integrated with the Common Stock issued or issuable upon conversion of the 1998 Series I Preferred Stock for purposes of such rule) equals 19.99% of the "OUTSTANDING COMMON AMOUNT" (as hereinafter defined), the 1998 Series I Preferred Stock shall, from that time forward, cease to be convertible into Common Stock in accordance with the terms of this Article VIII and Article IX below, unless the Corporation (i) has obtained approval of the issuance of the Common Stock upon conversion of the 1998 Series I Preferred Stock by a majority of the total votes cast on such proposal, in person or by proxy, by the holders of the then-outstanding Common Stock (not including any shares of Common Stock held by present or former holders of 1998 Series I Preferred Stock that were issued upon conversion of 1998 Series I Preferred Stock) (the "STOCKHOLDER APPROVAL"), or (ii) shall have otherwise obtained permission to allow such issuances from Nasdaq in accordance with Nasdaq Rule 4460(i). If the Corporation's Common Stock is not then listed on Nasdaq or an exchange or quotation system that has a rule substantially similar to Nasdaq Rule 4460(i) then the limitations set forth herein shall be inapplicable and of no force and effect. For purposes of this paragraph, "OUTSTANDING COMMON AMOUNT" means (i) the number of shares of the Common Stock outstanding on the date of issuance of the 1998 Series I Preferred Stock pursuant to the Purchase Agreement plus (ii) any additional shares of Common Stock issued thereafter in respect of such shares pursuant to a stock dividend, stock split or similar event. The maximum number of shares of Common Stock issuable as a result of the 19.99% limitation set forth herein is hereinafter referred to as the "MAXIMUM SHARE AMOUNT." With respect to each holder of 1998 Series I Preferred Stock, the Maximum Share Amount shall refer to such holder's pro rata share thereof

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determined in accordance with Article XI below. In the event that Corporation obtains Stockholder Approval or the approval of Nasdaq, by reason of the inapplicability of the rules of Nasdaq or otherwise and concludes that it is able to increase the number of shares to be issued above the Maximum Share Amount (such increased number being the "NEW MAXIMUM SHARE AMOUNT"), the references to Maximum Share Amount, above, shall be deemed to be, instead, references to the greater New Maximum Share Amount. In the event that Stockholder Approval is obtained but there are insufficient reserved or authorized shares or a registration statement covering the additional shares of Common Stock which constitute the New Maximum Share Amount is not

effective prior to the Maximum Share Amount being issued (if such registration statement is necessary to allow for the public resale of such securities), the Maximum Share Amount shall remain unchanged; provided, however, that the holders

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of the 1998 Series I Preferred Stock may grant an extension to obtain a sufficient reserved or authorized amount of shares or of the effective date of such registration statement. In the event that (A) the aggregate number of shares of Common Stock actually issued upon conversion of the 1998 Series I Preferred Stock represents at least twenty percent (20%) of the Maximum Share Amount and (b) the sum of (x) the aggregate number of shares of Common Stock actually issued upon conversion of the outstanding 1998 Series I Preferred Stock plus (y) the aggregate number of shares of Common Stock that remain issuable

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upon conversion of 1998 Series I Preferred Stock, represents at least one hundred percent (100%) of the Maximum Share Amount (the "TRIGGERING EVENT"), the Corporation will use its best efforts to seek and obtain Stockholder Approval (or obtain such other relief as will allow conversions hereunder in excess of the Maximum Share Amount) as soon as practicable following the Triggering Event and before the Redemption Date.

B. The "CONVERSION PRICE" shall be the lesser of (i) the Applicable Percentage multiplied by the Market Price and (ii) the Fixed Conversion Price, subject to adjustments pursuant to the provisions of Article VIII.C below.

C. The Conversion Price shall be subject to adjustment from time to time as follows:

(a) Adjustment to Conversion Price Due to Stock Split, Stock

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Dividend, Etc. If at any time when 1998 Series I Preferred Stock is issued and

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outstanding, the number of outstanding shares of Common Stock is increased or decreased by a stock split, stock dividend, combination, reclassification, rights offering below the Trading Price (as defined in Article VIII.D) to all holders of Common Stock or other similar event, which event shall have taken place during the reference period for determination of the Conversion Price for any Optional Conversion or Automatic Conversion of the 1998 Series I Preferred Stock, then the Conversion Price shall be calculated giving appropriate effect to the stock split, stock dividend, combination, reclassification or other similar event. In such event, the Corporation shall notify the Transfer Agent of such change on or before the effective date thereof.

(b) Adjustment Due to Merger, Consolidation, Etc. If, at any

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time when 1998 Series I Preferred Stock is issued and outstanding and prior to the conversion of all 1998 Series I Preferred Stock, there shall be any merger, consolidation, exchange of shares, recapitalization, reorganization, or other similar event, as a result of which shares of Common Stock of the Corporation shall be changed into the same or a different number of shares of another class or classes of stock or securities of the Corporation or another entity, or in case of any sale or conveyance of all or substantially all of the assets of the Corporation other than in connection with a plan of complete liquidation of the Corporation, then the holders of 1998 Series I Preferred Stock shall thereafter have the right to receive upon conversion of the 1998 Series I Preferred Stock, upon the bases and upon the terms and conditions specified herein and in lieu of the shares of Common Stock immediately theretofore issuable upon conversion, such stock, securities or assets which the holders of 1998 Series I Preferred Stock would have been

entitled to receive in such transaction had the 1998 Series I Preferred Stock been converted in full (without regard to any limitations on conversion contained herein) immediately prior to such transaction, and in any such case appropriate provisions shall be made with respect to the rights and interests of the holders of 1998 Series I Preferred Stock to the end that the provisions hereof (including, without limitation, provisions for adjustment of the Conversion Price and of the number of shares of Common Stock issuable upon conversion of the 1998 Series I Preferred Stock) shall thereafter be applicable, as nearly as may be practicable in relation to any securities or assets thereafter deliverable upon the conversion of 1998 Series I Preferred Stock. The Corporation shall not effect any transaction described in this subsection (b) unless (A) it first gives, to the extent practical, thirty (30) days' prior written notice (but in any event at least fifteen (15) business days prior written notice) of such merger, consolidation, exchange of shares, recapitalization, reorganization or other similar event or sale of assets (during which time the holders of 1998 Series I Preferred Stock shall be entitled to convert the 1998 Series I Preferred Stock) and (b) the resulting successor or acquiring entity (if not the Corporation) assumes by written instrument the obligations of this subsection (b). The above provisions shall similarly apply to successive consolidations, mergers, sales, transfers or share exchanges.

(c) [Reserved.]  
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(d) Adjustment Due to Distribution. Subject to Article IV, if  
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the Corporation shall declare or make any distribution of its assets (or rights to acquire its assets) to holders of Common Stock as a dividend, stock repurchase, by way of return of capital or otherwise (including any dividend or distribution to the Corporation's shareholders in cash or shares (or rights to acquire shares) of capital stock of a subsidiary (i.e., a spin-off)) (a "DISTRIBUTION"), then the holders of 1998 Series I Preferred Stock shall be entitled, upon any conversion of shares of 1998 Series I Preferred Stock after the date of record for determining shareholders entitled to such Distribution, to receive the amount of such assets which would have been payable to the holder with respect to the shares of Common Stock issuable upon such conversion had such holder been the holder of such shares of Common Stock on the record date for the determination of shareholders entitled to such Distribution.

(e) Purchase Rights. Subject to Article IV, if at any time when  
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any 1998 Series I Preferred Stock is issued and outstanding, the Corporation issues any convertible securities or rights to purchase stock, warrants, securities or other property (the "PURCHASE RIGHTS") pro rata to the record holders of any class of Common Stock, then the holders of 1998 Series I Preferred Stock will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which such holder could have acquired if such holder had held the number of shares of Common Stock acquirable upon complete conversion of the 1998 Series I Preferred Stock (without regard to any limitations on conversion contained herein) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights.

(f) Adjustment for Restricted Periods. In the event that (1)  
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the Corporation fails to obtain effectiveness with the Securities and Exchange Commission of the

Registration Statement (as defined in the Registration Rights Agreement) on or prior to one hundred twenty (120) days following the Issue Date, or (2) such Registration Statement lapses in effect, or sales otherwise cannot be made thereunder, whether by reason of the Corporation's failure or inability to amend or supplement the prospectus (the "PROSPECTUS") included therein in accordance with the Registration Rights Agreement or otherwise, after such Registration Statement becomes effective (including, without limitation, during an Allowed Delay (as defined in Section 3(f) of the Registration Rights Agreement), then the Pricing Period shall be comprised of, (i) in the case of an event described in clause (1), the twenty (20) Trading Days preceding the 120th day following the Issue Date plus all Trading Days through and including the third Trading Day following the date of effectiveness of the Registration Statement; and (ii) in the case of an event described in clause (2), the twenty (20) Trading Days preceding the date on which the holder of the 1998 Series I Preferred Stock is first notified that sales may not be made under the Prospectus, plus all Trading Days through and including the third Trading Day following the date on which the Holder is first notified that such sales may again be made under the Prospectus. If a holder of 1998 Series I Preferred Stock determines that sales may not be made pursuant to the Prospectus (whether by reason of the Corporation's failure or inability to amend or supplement the Prospectus or otherwise) it shall so notify the Corporation in writing and, unless the Corporation provides such holder with a written opinion of the Corporation's counsel to the contrary, such determination shall be binding for purposes of this paragraph.

(g) Notice of Adjustments. Upon the occurrence of each

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adjustment or readjustment of the Conversion Price pursuant to this Article VIII.C, the Corporation, at its expense, shall promptly compute such adjustment or readjustment and prepare and furnish to each holder of 1998 Series I Preferred Stock a certificate setting forth such adjustment or readjustment and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, upon the written request at any time of any holder of 1998 Series I Preferred Stock, furnish to such holder a like certificate setting forth (i) such adjustment or readjustment, (ii) the Conversion Price at the time in effect and (iii) the number of shares of Common Stock and the amount, if any, of other securities or property which at the time would be received upon conversion of a share of 1998 Series I Preferred Stock.

D. For purposes of Article VIII.C(A) above, "TRADING PRICE," which shall be measured as of the record date in respect of the rights offering means (i) the average of the last reported sale prices for the shares of Common Stock on Nasdaq as reported by Bloomberg, as applicable, for the five (5) Trading Days immediately preceding such date, or (ii) if Nasdaq is not the principal trading market for the shares of Common Stock, the average of the last reported sale prices on the principal trading market for the Common Stock during the same period as reported by Bloomberg, or (iii) if market value cannot be calculated as of such date on any of the foregoing bases, the Trading Price shall be the fair market value as reasonably determined in good faith by (A) the Board of Directors of the Corporation or, (b) at the option of a majority-in-interest of the holders of the outstanding 1998 Series I Preferred Stock by an independent investment bank of nationally recognized standing in the valuation of businesses similar to the business of the Corporation.

E. In order to convert 1998 Series I Preferred Stock into full shares of Common Stock, a holder of 1998 Series I Preferred Stock shall: (i) submit a copy of the fully executed notice of conversion in the form attached as Exhibit D to the Purchase Agreement ("NOTICE OF CONVERSION") to the Corporation

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by facsimile dispatched on the Conversion Date (or by other means resulting in, or reasonably expected to result in, notice to the Corporation on the Conversion Date) at the office of the Corporation or its designated Transfer Agent for the 1998 Series I Preferred Stock that the holder elects to convert the same, which notice shall specify the number of shares of 1998 Series I Preferred Stock to be converted, the applicable Conversion Price, the Market Price Days and a calculation of the number of shares of Common Stock issuable upon such conversion (together with a copy of the first page of each certificate to be converted) prior to Midnight, New York City time (the "CONVERSION NOTICE DEADLINE") on the date of conversion specified on the Notice of Conversion; and (ii) surrender the original certificates representing the 1998 Series I Preferred Stock being converted (the "PREFERRED STOCK CERTIFICATES"), duly endorsed, along with a copy of the Notice of Conversion to the office of the Corporation or the Transfer Agent for the 1998 Series I Preferred Stock as soon as practicable thereafter. The Corporation shall not be obligated to issue certificates evidencing the shares of Common Stock issuable upon such conversion, unless either the Preferred Stock Certificates are delivered to the Corporation or its Transfer Agent as provided above, or the holder notifies the Corporation or its Transfer Agent that such certificates have been lost, stolen or destroyed (subject to the requirements of subparagraph (A) below). In the case of a dispute as to the calculation of the Conversion Price, the Corporation shall promptly issue such number of shares of Common Stock that are not disputed in accordance with subparagraph (b) below. The Corporation shall submit the disputed calculations to its outside accountant via facsimile within two (2) business days of receipt of the Notice of Conversion. The accountant shall audit the calculations and notify the Corporation and the holder of the results no later than 48 hours from the time it receives the disputed calculations. The accountant's calculation shall be deemed conclusive absent manifest error.

(a) Lost or Stolen Certificates. Upon receipt by the

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Corporation of evidence of the loss, theft, destruction or mutilation of any Preferred Stock Certificates representing shares of 1998 Series I Preferred Stock, and (in the case of loss, theft or destruction) of indemnity reasonably satisfactory to the Corporation, and upon surrender and cancellation of the Preferred Stock Certificate(s), if mutilated, the Corporation shall execute and deliver new Preferred Stock Certificate(s) of like tenor and date.

(b) Delivery of Common Stock Upon Conversion. Upon the

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surrender of certificates as described above together with a Notice of Conversion, the Corporation shall issue and, within two (2) business days after such surrender (or, in the case of lost, stolen or destroyed certificates, after provision of agreement and indemnification pursuant to subparagraph (A) above) (the "DELIVERY PERIOD"), deliver (or cause its Transfer Agent to so issue and deliver) to or upon the order of the holder (i) that number of shares of Common Stock for the portion of the shares of 1998 Series I Preferred Stock converted as shall be determined in accordance herewith and (ii) a certificate representing the balance of the shares of 1998 Series I Preferred Stock not converted, if any. In addition to any other remedies available to the holder, including actual damages and/or equitable relief, the Corporation shall pay to a holder \$2,000 per day in

cash for each day beyond a two (2) business day grace period following the Delivery Period that the Corporation fails to deliver Common Stock (a "DELIVERY DEFAULT") issuable upon surrender of shares of 1998 Series I Preferred Stock with a Notice of Conversion until such time as the Corporation has delivered all such Common Stock (the "DELIVERY DEFAULT PAYMENTS"). Such cash amount shall be paid to such holder by the fifth day of the month following the month in which it has accrued or, at the option of the holder (by written notice to the Corporation by the first day of the month following the month in which it has accrued), shall be convertible into Common Stock in accordance with the terms of this Article VIII.

In lieu of delivering physical certificates representing the Common Stock issuable upon conversion, provided the Corporation's Transfer Agent is participating in the Depository Trust Company ("DTC") Fast Automated Securities Transfer ("FAST") program, in compliance with the provisions contained in Article VIII.A and in this Article VIII.E, the Corporation shall use its best efforts to cause its Transfer Agent to electronically transmit the Common Stock issuable upon conversion to the holder by crediting the account of holder's Prime Broker with DTC through its Deposit Withdrawal Agent Commission ("DWAC") system. The time periods for delivery and penalties described in the immediately preceding paragraph shall apply to the electronic transmittals described herein.

(c) No Fractional Shares. If any conversion of 1998 Series I

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Preferred Stock would result in a fractional share of Common Stock or the right to acquire a fractional share of Common Stock, such fractional share shall be disregarded and the number of shares of Common Stock issuable upon Conversion of the 1998 Series I Preferred Stock shall be the next higher number of shares.

(d) Conversion Date. The "CONVERSION DATE" shall be the date

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specified in the Notice of Conversion, provided that the Notice of Conversion is submitted by facsimile (or by other means resulting in, or reasonably expected to result in, notice) to the Corporation or its Transfer Agent before Midnight, New York City time, on the Conversion Date. The person or persons entitled to receive the shares of Common Stock issuable upon conversion shall be treated for all purposes as the record holder or holders of such securities as of the Conversion Date and all rights with respect to the shares of 1998 Series I Preferred Stock surrendered shall forthwith terminate except the right to receive the shares of Common Stock or other securities or property issuable on such conversion and except that the holders preferential rights as a holder of 1998 Series I Preferred Stock shall survive to the extent the Corporation fails to deliver such securities.

F. A number of shares of the authorized but unissued Common Stock sufficient to provide for the conversion of the 1998 Series I Preferred Stock outstanding at the then current Conversion Price shall at all times be reserved by the Corporation, free from preemptive rights, for such conversion or exercise. As of the date of issuance of the 1998 Series I Preferred Stock, 2,712,000 authorized and unissued shares of Common Stock have been duly reserved for issuance upon conversion of the 1998 Series I Preferred Stock (the "RESERVED AMOUNT"). The Reserved Amount shall be increased from time to time in accordance with the Company's obligations pursuant to Section 4(h) of the Purchase Agreement. In addition, if the



Corporation shall issue any securities or make any change in its capital structure which would change the number of shares of Common Stock into which each share of the 1998 Series I Preferred Stock shall be convertible at the then current Conversion Price, the Corporation shall at the same time also make proper provision so that thereafter there shall be a sufficient number of shares of Common Stock authorized and reserved, free from preemptive rights, for conversion of the outstanding 1998 Series I Preferred Stock.

If at any time a holder of shares of 1998 Series I Preferred Stock submits a Notice of Conversion, and the Corporation does not have sufficient authorized but unissued shares of Common Stock available to effect such conversion in accordance with the provisions of this Article VIII (a "CONVERSION DEFAULT"), the Corporation shall issue to the holder (or holders, if more than one holder submits a Notice of Conversion in respect of the same Conversion Date, pro rata based on the ratio that the number of shares of 1998 Series I Preferred Stock then held by each such holder bears to the aggregate number of such shares held by such holders) all of the shares of Common Stock which are available to effect such conversion. The number of shares of 1998 Series I Preferred Stock included in the Notice of Conversion which exceeds the amount which is then convertible into available shares of Common Stock (the "EXCESS AMOUNT") shall, notwithstanding anything to the contrary contained herein, not be convertible into Common Stock in accordance with the terms hereof until (and at the holder's option at any time after) the date additional shares of Common Stock are authorized by the Corporation to permit such conversion, at which time the Conversion Price in respect thereof shall be the lesser of (i) the Conversion Price on the Conversion Default Date (as defined below) and (ii) the Conversion Price on the Conversion Date elected by the holder in respect thereof. The Corporation shall use its best efforts to effect an increase in the authorized number of shares of Common Stock as soon as possible following a Conversion Default. In addition, the Corporation shall either (i) pay to the holder payments ("CONVERSION DEFAULT PAYMENTS") for a Conversion Default in the amount of (A)  $(N/365)$ , multiplied by (b) the sum of the Stated Value plus the Applicable Premium per share of 1998 Series I Preferred Stock through the Authorization Date (as defined below), multiplied by (c) the Excess Amount on the day the holder submits a Notice of Conversion giving rise to a Conversion Default (the "CONVERSION DEFAULT DATE"), multiplied by (d) .24, where N = the number of days from the Conversion Default Date to the date (the "AUTHORIZATION DATE") that the Corporation authorizes a sufficient number of shares of Common Stock to effect conversion of the full number of shares of 1998 Series I Preferred Stock or (ii) provided no similar adjustment has been made pursuant to Section 2(c)(1) of the Registration Rights Agreement, increase the Applicable Premium to an amount equal to fifteen percent (15%) of the Stated Value through the Authorization Date; provided, however, that if the Conversion Default

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continues for more than sixty (60) days, each holder of the 1998 Series I Preferred Stock shall have the option to cause the Corporation to either pay the Conversion Default Payments pursuant to clause (i) of this sentence or increase the Applicable Premium pursuant to clause (ii) of this sentence. The Corporation shall send notice to the holder of the authorization of additional shares of Common Stock, the Authorization Date and the amount of holder's accrued Conversion Default Payments. The accrued Conversion Default Payment for each calendar month shall be paid in cash or shall be convertible into Common Stock at the Conversion Price, at the holder's option, as follows:

(a) In the event the holder elects to take such payment in cash, cash payment shall be made to holder by the fifth day of the month following the month in which it has accrued; and

(b) In the event the holder elects to take such payment in Common Stock, the holder may convert such payment amount into Common Stock at the Conversion Price (as in effect at the time of Conversion) at any time after the fifth day of the month following the month in which it has accrued in accordance with the terms of this Article VIII (so long as there is then a sufficient number of authorized shares).

Nothing herein shall limit the holder's right to pursue actual damages for the Corporation's failure to maintain a sufficient number of authorized shares of Common Stock, and each holder shall have the right to pursue all remedies available at law or in equity (including a decree of specific performance and/or injunctive relief).

G. Upon the occurrence of each adjustment or readjustment of the Conversion Price pursuant to this Article VIII, the Corporation, at its expense, shall promptly compute such adjustment or readjustment in accordance with the terms hereof and prepare and furnish to each holder of 1998 Series I Preferred Stock a certificate setting forth such adjustment or readjustment and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, upon the written request at any time of any holder of 1998 Series I Preferred Stock, furnish or cause to be furnished to such holder a like certificate setting forth (i) such adjustment or readjustment, (ii) the Conversion Price at the time in effect and (iii) the number of shares of Common Stock and the amount, if any, of other securities or property which at the time would be received upon conversion of a share of 1998 Series I Preferred Stock.

H. Upon submission of a Notice of Conversion by a holder of 1998 Series I Preferred Stock, (i) the shares covered thereby (other than the shares, if any, which cannot be issued because their issuance would exceed such holder's allocated portion of the Reserved Amount) shall be deemed converted into shares of Common Stock and (ii) the holder's rights as a holder of such converted shares of 1998 Series I Preferred Stock shall cease and terminate, excepting only the right to receive certificates for such shares of Common Stock and to any remedies provided herein or otherwise available at law or in equity to such holder because of a failure by the Corporation to comply with the terms of this Certificate of Designation. Notwithstanding the foregoing, if a holder has not received certificates for all shares of Common Stock prior to the tenth (10th) business day after the expiration of the Delivery Period with respect to a conversion of shares of 1998 Series I Preferred Stock for any reason, then (unless the holder otherwise elects to retain its status as a holder of Common Stock by so notifying the Corporation) the holder shall regain the rights of a holder of such shares of 1998 Series I Preferred Stock with respect to such unconverted shares of 1998 Series I Preferred Stock and the Corporation shall, as soon as practicable, return such unconverted shares of 1998 Series I Preferred Stock to the holder or, if such shares of 1998 Series I Preferred Stock have not been surrendered, adjust its records to reflect that such shares of 1998 Series I Preferred Stock have not been converted. In all cases, the holder shall retain all of its rights and remedies (including,

without limitation, the right to receive Delivery Default Payments pursuant to Article V.E to the extent required thereby for such Delivery Default and any subsequent Delivery Default).

IX. Automatic Conversion

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So long as the Registration Statement is effective and there is not then a continuing Redemption Event, each share of 1998 Series I Preferred Stock issued and outstanding on the date which is three (3) years from the Issue Date (the "AUTOMATIC CONVERSION DATE"), subject to any adjustment pursuant to this Article, automatically shall be converted into shares of Common Stock on such date at the then effective Conversion Price in accordance with, and subject to, the provisions of Article VIII hereof (the "AUTOMATIC CONVERSION"). The Automatic Conversion Date shall be delayed by one (1) Trading Day each for each Trading Day occurring prior thereto and prior to the full conversion of the 1998 Series I Preferred Stock that (i) sales cannot be made pursuant to the Registration Statement (whether by reason of the Company's failure to properly supplement or amend the prospectus included therein in accordance with the terms of the Registration Rights Agreement or otherwise including any Allowed Delays (as defined in Section 3(f) of the Registration Rights Agreement) after the earlier of (A) the date the Registration Statement is declared effective, and (b) the date the Registration Statement is required to be declared effective pursuant to Section 2(c) of the Registration Rights Agreement or (ii) any Redemption Event (as defined in Article VI.A) exists, without regard to whether any cure periods shall have run. The Automatic Conversion Date shall be the "Conversion Date" for purposes of determining the Conversion Price and the time within which certificates representing the Common Stock must be delivered to the holder upon an Automatic Conversion.

X. Voting Rights

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The holders of the 1998 Series I Preferred Stock have no voting power whatsoever, except as otherwise provided by the MBCA, in this Article X, and in Article XI below.

Notwithstanding the above, the Corporation shall provide each holder of 1998 Series I Preferred Stock with prior notification of any meeting of the shareholders (and copies of proxy materials and other information sent to shareholders). In the event of any taking by the Corporation of a record of its shareholders for the purpose of determining shareholders who are entitled to receive payment of any dividend or other distribution, any right to subscribe for, purchase or otherwise acquire (including by way of merger, consolidation or recapitalization) any share of any class or any other securities or property, or to receive any other right, or for the purpose of determining shareholders who are entitled to vote in connection with any proposed sale, lease or conveyance of all or substantially all of the assets of the Corporation, or any proposed liquidation, dissolution or winding up of the Corporation, the Corporation shall mail a notice to each holder, at least ten (10) days prior to the record date specified therein (or thirty (30) days prior to the consummation of the transaction or event, whichever is earlier), of the date on which any such record is to be taken for the purpose of such dividend, distribution, right or other event, and a brief statement regarding the amount and character of such dividend, distribution, right or other event to the extent known at such time.

To the extent that under the MBCA the vote of the holders of the 1998 Series I Preferred Stock, voting separately as a class or Series as applicable, is required to authorize a given action of the Corporation, the affirmative vote or consent of the holders of at least a majority of the shares of the 1998 Series I Preferred Stock represented at a duly held meeting at which a quorum is present or by written consent of a majority of the shares of 1998 Series I Preferred Stock (except as otherwise may be required under the MCBA) shall constitute the approval of such action by the class. To the extent that under the MCBA holders of the 1998 Series I Preferred Stock are entitled to vote on a matter with holders of Common Stock, voting together as one class, each share of 1998 Series I Preferred Stock shall be entitled to a number of votes equal to the number of shares of Common Stock into which it is then convertible using the record date for the taking of such vote of shareholders as the date as of which the Conversion Price is calculated. Holders of the 1998 Series I Preferred Stock shall be entitled to notice of all shareholder meetings or written consents (and copies of proxy materials and other information sent to shareholders) with respect to which they would be entitled to vote, which notice would be provided pursuant to the Corporation's bylaws and the MBCA.

XI. Protective Provisions  
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So long as shares of 1998 Series I Preferred Stock are outstanding, the Corporation shall not, without first obtaining the approval (by vote or written consent, as provided by the MBCA) of the holders of at least a majority of the then outstanding shares of 1998 Series I Preferred Stock:

(a) alter or change the rights, preferences or privileges of the 1998 Series I Preferred Stock or any Senior Securities so as to affect adversely the 1998 Series I Preferred Stock;

(b) create any new class or Series of capital stock having a preference over the 1998 Series I Preferred Stock as to distribution of assets upon liquidation, dissolution or winding up of the Corporation (as previously defined in Article III hereof, "SENIOR SECURITIES");

(c) increase the authorized number of shares of 1998 Series I Preferred Stock; or

(d) do any act or thing not authorized or contemplated by this Certificate of Designation which would result in taxation of the holders of shares of the 1998 Series I Preferred Stock under Section 305 of the Internal Revenue Code of 1986, as amended (or any comparable provision of the Internal Revenue Code as hereafter from time to time amended).

In the event holders of at least a majority of the then outstanding shares of 1998 Series I Preferred Stock agree to allow the Corporation to alter or change the rights, preferences or privileges of the shares of 1998 Series I Preferred Stock, pursuant to subsection (A) above, so as to affect the 1998 Series I Preferred Stock, then the Corporation will deliver notice of such approved change to the holders of the 1998 Series I Preferred Stock that did not agree to such alteration or change (the "DISSENTING HOLDERS") and Dissenting Holders shall have the right for a

period of thirty (30) days to convert pursuant to the terms of this Certificate of Designation as they exist prior to such alteration or change or continue to hold their shares of 1998 Series I Preferred Stock.

XII. Pro Rata Allocations

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The Maximum Share Amount and the Reserved Amount (including any increases thereto) shall be allocated by the Corporation pro rata among the holders of 1998 Series I Preferred Stock based on the number of shares of 1998 Series I Preferred Stock then held by each holder relative to the total aggregate number of shares of 1998 Series I Preferred Stock then outstanding.

IN WITNESS WHEREOF, this Certificate of Designation is executed on behalf of the Corporation this \_\_\_ day of June, 1998.

AASTROM BIOSCIENCES, INC.

By: \_\_\_\_\_  
R. Douglas Armstrong  
President & Chief Executive Officer

CERTIFICATE OF  
DESIGNATIONS, PREFERENCES, AND RIGHTS

OF

1998 SERIES II CONVERTIBLE PREFERRED STOCK

OF

AASTROM BIOSCIENCES, INC.

(Pursuant to Section 450.1302 of the  
Michigan Business Corporation Act)

Aastrom Biosciences, Inc., a corporation organized and existing under the Michigan Business Corporation Act (the "CORPORATION"), hereby certifies that the following resolutions were adopted by the Board of Directors of the Corporation on May 20, 1998 pursuant to authority of the Board of Directors as required by Section 450.1302 of the Michigan Business Corporation Act:

RESOLVED, that pursuant to the authority granted to and vested in the Board of Directors of this Corporation (the "BOARD OF DIRECTORS" or the "BOARD") in accordance with the provisions of its Articles of Incorporation, the Board of Directors hereby authorizes a series of the Corporation's previously authorized Preferred Stock, no par value, (the "PREFERRED STOCK"), and hereby states the designation and number of shares, and fixes the relative rights, preferences, privileges, powers and restrictions thereof as follows:

Series II Convertible Preferred Stock:

I. Designation and Amount

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The designation of this series, which consists of 3,000 shares of Preferred Stock, is 1998 Series Convertible Preferred Stock (the "1998 SERIES I PREFERRED STOCK") and the stated value shall be One Thousand Dollars (\$1,000) per share (the "STATED VALUE").

II. Certain Definitions

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For purposes of this Certificate of Designation, the following terms shall have the following meanings:

- A. "Applicable Percentage" means 94%; provided, however that for conversions taking place prior to March \_\_, 1999, the Applicable Percentage shall mean (i) 100%, if the Market Price is \$4.00 or greater and (ii) 105%, if the Market Price is less than \$4.00.
- B. "Applicable Premium" shall mean, with respect to a share or shares of 1998 Series II Preferred Stock, an amount equal to five and one half percent (5.5%) per annum of the Stated Value of such share or shares; provided, however that if the Corporation has elected to increase the Applicable Premium pursuant to Section 2(c)(2) of the Registration Rights Agreement, the Applicable Premium shall mean fifteen percent (15%) per annum of the Stated Value of such share or shares for the periods specified in the Registration Rights Agreement.
- C. "Bloomberg" means Bloomberg Financial Markets or an equivalent reliable reporting service mutually acceptable to and hereafter designated by the holders of a majority in interest of the shares of 1998 Series II Preferred Stock and the Corporation.
- D. "Closing Bid Price" means, for any security as of any date, the closing bid price on Nasdaq as reported by Bloomberg or, if Nasdaq is not the principal trading market for such security, the closing bid price of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the closing bid price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no closing bid price of such security in the over-the-counter market on the electronic bulletin board for such security or in any of the foregoing manners, the average of the bid prices of any market makers for such security that are listed in the "pink sheets" by the National Quotation Bureau, Inc. If the Closing Bid Price cannot be calculated for such security on such date in the manner provided above, the Closing Bid Price shall be the fair market value as mutually determined by the Corporation and the holders of a majority in interest of shares of 1998 Series II Preferred Stock being

converted for which the calculation of the Closing Bid Price is required in order to determine the Conversion Price of such 1998 Series II Preferred Stock.

- E. "Closing Price" as of any date, means the last sale price of the Common Stock on Nasdaq as reported or, if Nasdaq is not the principal trading market for such security, the last sale price of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the last sale price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no last sale price of such security or in the over-the-counter market on the electronic bulletin board for such security in any of the foregoing manners the average of the bid prices of any market makers for such security that are listed in the "pink sheets" by the National Quotation Bureau, Inc. If the Closing Price cannot be calculated for such security on such date in the manner provided above, the Closing Price shall be the fair market value as mutually determined by the Corporation and the holders of a majority in interest of shares of 1998 Series II Preferred Stock being converted for which the calculation of the Closing Price is required in order to determine the Conversion Price of such 1998 Series II Preferred Stock.
- F. "Common Stock" means the Corporation's common stock, no par value.
- G. "Fixed Conversion Price" means 130% times the average Closing Bid Prices during the five (5) Trading Day period ending one (1) Trading Day prior to the Issue Date.
- H. "Issue Date" means the date of issuance of the 1998 Series II Preferred Stock.
- I. "Market Price" means the average of the Closing Bid Prices during the Market Price Days.
- J. "Market Price Days" means any five (5) consecutive Trading Days designated by the converting holder at the time of conversion, from among the days comprising the Pricing Period, as such designation is set forth in the Notice of Conversion (as defined in Article VIII.E).
- K. "Nasdaq" means the Nasdaq National Market.
- L. "Person" shall mean any individual, corporation, limited liability company, partnership, association, trust or other entity or organization.
- M. "Pricing Period" means the twenty (20) consecutive Trading Day period ending one (1) Trading Day prior to the Conversion Date (as defined in Article VIII.E).



- N. "Purchase Agreement" shall mean that certain Securities Purchase Agreement dated as of June \_\_\_\_, 1998, by and between the Corporation and the signatories thereto.
- O. "Redemption Market Price" means the Closing Price of the Common Stock on the Conversion Date (as defined in Article VIII.F(d)).
- P. "Redemption Threshold" means \$3.25.
- Q. "Registration Rights Agreement" shall mean that certain Registration Rights Agreements dated June \_\_\_\_, 1998 by and among the Corporation and the signatories thereto.
- R. "Trading Day" shall mean any day on which the Common Stock is traded for any period on Nasdaq, or on the principal securities exchange or other securities market on which the Common Stock is then being traded.

### III. Rank

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The 1998 Series II Preferred Stock shall rank (i) prior to the Common Stock; (ii) prior to any class or series of capital stock of the Corporation hereafter created (unless, with the consent of the holders of 1998 Series II Preferred Stock obtained in accordance with Article XI hereof, such class or series of capital stock specifically, by its terms, ranks senior to or pari passu with the 1998 Series II Preferred Stock) (collectively, with the Common Stock, "JUNIOR SECURITIES"); (iii) pari passu with (A) any class or series of the Corporation's preferred stock existing as of the date hereof, (B) any class or series of capital stock of the Corporation hereafter created specifically ranking, by its terms, on parity with the 1998 Series II Preferred Stock and (C) the 1998 Series I Preferred Stock (collectively, "PARI PASSU SECURITIES"); and (iv) junior to any class or series of capital stock of the Corporation hereafter created (with the consent of the holders of 1998 Series II Preferred Stock obtained in accordance with Article XI hereof) specifically ranking, by its terms, senior to the 1998 Series II Preferred Stock ("SENIOR SECURITIES"), in each case as to distribution of assets upon liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary.

### IV. Dividends

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The 1998 Series II Preferred Stock shall not bear any dividends. In no event, so long as any 1998 Series II Preferred Stock shall remain outstanding, shall any dividend whatsoever be declared or paid upon, nor shall any distribution be made upon (excluding any distribution received in connection with a Change in Control Transaction (as defined below)), any Junior Securities, nor shall any shares of Junior Securities be purchased or redeemed by the Corporation nor shall any moneys be paid to or made available for a sinking fund for the purchase or redemption of any Junior Securities (other than a distribution of Junior Securities), without, in

each such case, the written consent of the holders of a majority of the outstanding shares of 1998 Series II Preferred Stock, voting together as a class.

V. Liquidation Preference

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A. If the Corporation shall commence a voluntary case under the Federal bankruptcy laws or any other applicable Federal or State bankruptcy, insolvency or similar law, or consent to the entry of an order for relief in an involuntary case under any law or to the appointment of a receiver, liquidator, assignee, custodian, trustee, sequestrator (or other similar official) of the Corporation or of any substantial part of its property, or make an assignment for the benefit of its creditors, or admit in writing its inability to pay its debts generally as they become due, or if a decree or order for relief in respect of the Corporation shall be entered by a court having jurisdiction in the premises in an involuntary case under the Federal bankruptcy laws or any other applicable Federal or state bankruptcy, insolvency or similar law resulting in the appointment of a receiver, liquidator, assignee, custodian, trustee, sequestrator (or other similar official) of the Corporation or of any substantial part of its property, or ordering the winding up or liquidation of its affairs, and any such decree or order shall be unstayed and in effect for a period of thirty (30) consecutive days and, on account of any such event, the Corporation shall liquidate, dissolve or wind up, or if the Corporation shall otherwise liquidate, dissolve or wind up (each such event being considered a "LIQUIDATION EVENT"), no distribution shall be made to the holders of any shares of capital stock of the Corporation (other than Senior Securities and, subject to the following sentence, Pari Passu Securities) upon liquidation, dissolution

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or winding up unless prior thereto, the holders of shares of 1998 Series II Preferred Stock, subject to Article VIII, shall have received the Liquidation Preference (as defined in Article V.C) with respect to each share. If upon the occurrence of a Liquidation Event, the assets and funds available for distribution among the holders of the 1998 Series II Preferred Stock and holders of Pari Passu Securities shall be insufficient to permit the payment to such

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holders of the preferential amounts payable thereon, then the entire assets and funds of the Corporation legally available for distribution to the 1998 Series II Preferred Stock and the Pari Passu Securities shall be distributed ratably

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among such shares in proportion to the ratio that the Liquidation Preference payable on each such share bears to the aggregate liquidation preference payable on all such shares.

B. Subject to Article VII.B below, at the option of the Corporation, the sale, conveyance or disposition of all or substantially all of the assets of the Corporation, the effectuation by the Corporation of a transaction or series of related transactions in which more than 50% of the voting power of the Corporation is disposed of, or the consolidation, merger or other business combination of the Corporation with or into any other Person or Persons when the Corporation is not the survivor (other than a merger or other business combination solely for the purposes of reincorporating to a new jurisdiction) (each, a "CHANGE IN CONTROL TRANSACTION") shall either: (i) be deemed to be a liquidation, dissolution or winding up of the Corporation pursuant to which the Corporation shall be required to distribute upon consummation of such transaction an amount equal to 115% of the Liquidation Preference with respect to each outstanding share of 1998 Series II Preferred Stock in accordance with and subject to the terms

of this Article V or (ii) be treated pursuant to Article VIII.C(b) hereof. For purposes of the Michigan Business Corporation Act (the "MCBA") and Article XI(a) of this Certificate, any such Change in Control Transaction shall be deemed to alter or change the powers, preferences, or special rights of the holders of shares of 1998 Series II Preferred Stock so as to affect such holders adversely.

C. For purposes hereof, the "LIQUIDATION PREFERENCE" with respect to a share of the 1998 Series II Preferred Stock shall mean an amount equal to the sum of (i) the Stated Value thereof plus (ii) the Applicable Premium for the period beginning on the Issue Date and ending on the date of final distribution to the holder thereof (prorated for any portion of such period). The liquidation preference with respect to any Pari Passu Securities shall be as set forth in -----  
the Certificate of Designation filed in respect thereof.

VI. Redemption  
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A. If any of the following events (each, a "REDEMPTION EVENT") shall occur:

(i) The Corporation fails to issue shares of Common Stock to the holders of 1998 Series II Preferred Stock upon exercise by the holders of their conversion rights in accordance with the terms of this Certificate of Designation (for a period of at least sixty (60) days if such failure is solely as a result of the circumstances governed by the second paragraph of Article VIII.F below and the Corporation is using all commercially reasonable efforts to authorize a sufficient number of shares of Common Stock as soon as practicable), fails to transfer or to cause its transfer agent to transfer (electronically or in certificated form) any certificate for shares of Common Stock issued to the holders upon conversion of the 1998 Series II Preferred Stock as and when required by this Certificate of Designation or the Registration Rights Agreement, fails to remove any restrictive legend (or to withdraw any stop transfer instructions in respect thereof) on any certificate or any shares of Common Stock issued to the holders of 1998 Series II Preferred Stock upon conversion of the 1998 Series II Preferred Stock as and when required by this Certificate of Designation, the Purchase Agreement or the Registration Rights Agreement, or fails to fulfill its obligations pursuant to Sections 4(c), 4(e), 4(h), 4(i), 4(j) or 5 of the Purchase Agreement (or makes any announcement, statement or threat that it does not intend to honor the obligations described in this paragraph) and any such failure shall continue uncured (or any announcement, statement or threat not to honor its obligations shall not be rescinded in writing) for ten (10) business days;

(ii) The Corporation fails to obtain effectiveness with the Securities and Exchange Commission (the "SEC") of the Registration Statement (as defined in the Registration Rights Agreement) prior to December \_\_, 1998 or such Registration Statement lapses in effect (or sales otherwise cannot be made thereunder, whether by reason of the Company's failure to amend or supplement the prospectus included therein in accordance with the Registration Rights Agreement or otherwise) for more than thirty (30) consecutive days or more than sixty (60) days in any twelve (12) month period after such Registration Statement becomes effective;

(iii) the Corporation shall make an assignment for the benefit of creditors, or apply for or consent to the appointment of a receiver or trustee for it or for all or substantially all of its property or business; or such a receiver or trustee shall otherwise be appointed;

(iv) Bankruptcy, insolvency, reorganization or liquidation proceedings or other proceedings for relief under any bankruptcy law or any law for the relief of debtors shall be instituted by or against the Corporation or any subsidiary of the Corporation; provided, however, that in the case of any

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involuntary bankruptcy, such involuntary bankruptcy shall continue undischarged or undismissed for a period of thirty (30) days; or

(v) The Corporation shall fail to maintain the listing of the Common Stock on Nasdaq, the Nasdaq SmallCap Market, the New York Stock Exchange or the American Stock Exchange,

then, upon the occurrence and during the continuation of any Redemption Event specified in subparagraphs (i), (ii) or (v) at the option of the holders of at least 50% of the then outstanding shares of 1998 Series II Preferred Stock by written notice (the "REDEMPTION NOTICE") to the Corporation of such Redemption Event, or upon the occurrence of any Redemption Event specified in subparagraphs (iii) or (iv) the Corporation shall purchase each holder's shares of 1998 Series II Preferred Stock for an amount equal to the greater of (1) 115% multiplied by the sum of (a) the aggregate Stated Value of the shares to be redeemed plus (b) the Applicable Premium for the period beginning on the Issue Date and ending on the date of payment of the Redemption Amount (the "REDEMPTION DATE"), or (2) the parity value of the shares to be redeemed, where "parity value" means the product of (a) the highest number of shares of Common Stock issuable upon conversion of such shares in accordance with Article VIII below (without giving any effect to any limitations on conversions of shares set forth in Article VIII.A(b) below, and treating the Trading Day immediately preceding the Redemption Date as the "Conversion Date" (as defined in Article VII.B(a)) for purposes of determining the lowest applicable Conversion Price), unless the Redemption Event arises as a result of a breach in respect of a specific Conversion Date, in which case such Conversion Date shall be the Conversion Date), multiplied by (b) the Closing Price for the Common Stock on such "Conversion Date" (the greater of such amounts being referred to as the "REDEMPTION AMOUNT").

In the case of a Redemption Event, if the Corporation fails to pay the Redemption Amount for each share within five (5) business days of written notice that such amount is due and payable, then (assuming there are sufficient authorized shares) in addition to all other available remedies, each holder of 1998 Series II Preferred Stock shall have the right at any time, so long as the Redemption Event continues, to require the Corporation, upon written notice, to immediately issue (in accordance with and subject to the terms of Article VIII below), in lieu of the Redemption Amount, with respect to each outstanding share of 1998 Series II Preferred Stock held by such holder, the number of shares of Common Stock of the Corporation equal to the Redemption Amount divided by the Conversion Price then in effect.

B. If the 1998 Series II Preferred Stock held by any holder ceases to be convertible as a result of the limitations described in Article VIII.A(c) below (a "19.99% REDEMPTION EVENT"), and the Corporation has not prior to, or within thirty (30) days of, the date that such 19.99% Redemption Event arises, (i) obtained approval of the issuance of the additional shares of Common Stock by the requisite vote of the holders of the then-outstanding Common Stock (not including any shares of Common Stock held by present or former holders of 1998 Series II Preferred Stock that were issued upon conversion of 1998 Series II Preferred Stock) or (ii) received other permission pursuant to Nasdaq Rule 4460(i) allowing the Corporation to resume issuances of shares of Common Stock upon conversion of 1998 Series II Preferred Stock, then the Corporation shall be obligated to redeem immediately all of the then outstanding 1998 Series II Preferred Stock, in accordance with this Article VI.B. An irrevocable redemption notice (the "19.99% REDEMPTION NOTICE") shall be delivered promptly to the holders of 1998 Series II Preferred Stock at their registered address appearing on the records of the Corporation and shall state (1) that 19.99% of the Outstanding Common Amount (as defined in Article VIII.A) has been issued upon exercise of the 1998 Series II Preferred Stock, (2) that the Corporation is obligated to redeem all of the outstanding 1998 Series II Preferred Stock and (3) the Redemption Date, which shall be a date within five (5) business days of the earlier of (i) the date of the 19.99% Redemption Notice or (ii) the date on which the holders of the 1998 Series II Preferred Stock notify the Corporation of the occurrence of a 19.99% Redemption Event. On Redemption Date, the Corporation shall make payment of the Redemption Amount (as defined in Article VI.A above) in cash.

C. Notwithstanding anything to the contrary contained in this Article VI, so long as (i) no Redemption Event shall have occurred and be continuing and (ii) the Registration Statement is then in effect and has been in effect and sales can be made thereunder for at least twenty (20) days prior to the Optional Redemption Date (as defined below), then at any time after the Issue Date if the average Closing Bid Prices of the Common Stock for any five (5) consecutive Trading Days is below the Redemption Threshold, the Corporation shall have the right, exercisable on not less than fifteen (15) Trading Days prior written notice to the holders of 1998 Series II Preferred Stock (which notice may not be sent to the holders of the 1998 Series II Preferred Stock until the Corporation is permitted to redeem the 1998 Series II Preferred Stock pursuant to this Article VI.C), to redeem all of the outstanding shares of 1998 Series II Preferred Stock in accordance with this Article VI. A notice (the "OPTIONAL REDEMPTION NOTICE") of any redemption hereunder (an "OPTIONAL REDEMPTION") shall be delivered to the holders of 1998 Series II Preferred Stock at their registered addresses appearing on the books and records of the Corporation and shall state (1) that the Corporation is exercising its right to redeem all of the outstanding shares of 1998 Series II Preferred Stock issued on the Issue Date and (2) the date of redemption (the "OPTIONAL REDEMPTION DATE"). On the Optional Redemption Date, the Corporation shall make payment of the Optional Redemption Amount (as defined below) to or upon the order of the holders as specified by the holders in writing to the Corporation at least one (1) business day prior to the Optional Redemption Date. If the Corporation exercises its right to redeem the 1998 Series II Preferred Stock, the Corporation shall make payment to the holders of an amount in cash per share (the "OPTIONAL REDEMPTION AMOUNT") equal to the sum of (i) 115% multiplied by the Stated Value thereof plus (ii) the Applicable Premium for the period beginning on the Issue Date and ending on the Optional Redemption Date, for each share of 1998

Series II Preferred Stock then held. Notwithstanding notice of an Optional Redemption, the holders shall at all times prior to the Optional Redemption Date maintain the right to convert all or any shares of 1998 Series II Preferred Stock in accordance with Article VIII and any shares of 1998 Series II Preferred Stock so converted after receipt of an Optional Redemption Notice and prior to the Optional Redemption Date set forth in such notice and payment of the aggregate Optional Redemption Amount shall be deducted from the shares of 1998 Series II Preferred Stock which are otherwise subject to redemption pursuant to such notice.

D. Notwithstanding anything to the contrary contained in this Article VI, if the Closing Price of the Common Stock is below the Redemption Threshold on any Conversion Date, the Corporation shall have the option, in lieu of issuing shares of Common Stock to the holders of 1998 Series II Preferred Stock upon conversion in accordance with the terms of Article VIII below, to redeem all of the shares of 1998 Series II Preferred Stock submitted for conversion for an amount in cash equal to the number of shares of Common Stock that would have otherwise been issued upon conversion of the 1998 Series II Preferred Stock at the applicable Conversion Price (as defined in Article VIII) multiplied by the Redemption Market Price. If the Closing Price of the Common Stock is below the Redemption Threshold, the Corporation shall promptly notify the holders of 1998 Series II Preferred Stock as to whether the Corporation will issue shares of Common Stock or deliver cash in redemption in respect of 1998 Series II Preferred Stock submitted for conversion pursuant to Article VIII. The Corporation will be bound by such notice for a period of twenty (20) Trading Days (the "TERM") from the date of such notice, after which the Corporation may elect to renew such notice. A failure to issue or renew within two (2) business days shall be deemed to be an election not to redeem the 1998 Series II Preferred Stock during the Term. Any redemption amounts payable hereunder shall be paid to the converting holders within two (2) Trading Days of the Conversion Date.

#### VII. Conversion by the Corporation

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A. So long as (i) no Redemption Event shall have occurred and be continuing and (ii) the Registration Statement is then in effect and has been in effect and sales can be made thereunder for at least twenty (20) days prior to the Corporation Conversion Date (as defined below), then, at any time after the one (1) year anniversary of the date the Registration Statement is declared effective by the SEC (subject to extension for each Trading Day following effectiveness that sales cannot be made pursuant to the Registration Statement (whether by reason of the Company's failure to properly supplement or amend the prospectus included therein in accordance with the terms of the Registration Rights Agreement, during an Allowed Delay or otherwise), if the average Closing Bid Price of the Common Stock over any five (5) consecutive Trading Days is greater than 200% of the Fixed Conversion Price, the Corporation shall have the right, exercisable on not less than fifteen (15) Trading Days prior written notice (the "CORPORATION CONVERSION NOTICE") to the holders of 1998 Series II Preferred Stock (which notice may not be sent to the holders of the 1998 Series II Preferred Stock until the Corporation is permitted to convert the 1998 Series II Preferred Stock pursuant to this Article VII.A), to convert all of the outstanding shares of 1998 Series II Preferred Stock into shares of Common Stock in accordance with this Article VII.A and Article VIII. Any conversion hereunder (a

"CORPORATION CONVERSION") shall be as of the date (the "CORPORATION CONVERSION DATE") the Corporation Conversion Notice is delivered to the holders of 1998 Series II Preferred Stock at their registered addresses appearing on the books and records of the Corporation, which notice shall contain substantially the same information as the Notice of Conversion described in Article VIII.E. The Corporation Conversion Date shall be the "Conversion Date" for purposes of determining the Conversion Price and the time within which certificates representing the Common Stock must be delivered to the holder upon a Corporation Conversion.

B. If, in the event of a Change in Control Transaction (as defined in Article V.B above), the consideration per share to be received by the holders of the Common Stock of the Corporation in such Change in Control Transaction is equal to at least 115% of the Fixed Conversion Price, then, at the option of the Corporation, simultaneously with the consummation of the Change in Control Transaction, each share of 1998 Series II Preferred Stock issued and outstanding at that time automatically shall be converted into shares of Common Stock on such date at the then effective Conversion Price in accordance with, and subject to, the provisions of this Article VII.B and Article VIII hereof (the "CHANGE IN CONTROL CONVERSION"). The date on which the Change in Control Transaction is consummated shall be the "Conversion Date" for purposes of determining the Conversion Price and the time within which certificates representing the Common Stock must be delivered to the holder upon a Change in Control Conversion

VIII. Conversion at the Option of the Holder  
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A. (a) Subject to the conversion schedule set forth in Article VIII.A(b) below, each holder of shares of 1998 Series II Preferred Stock may, at its option at any time and from time to time, upon surrender of the certificates therefor, convert any or all of its shares of 1998 Series II Preferred Stock into Common Stock as follows (an "OPTIONAL CONVERSION"). Each share of 1998 Series II Preferred Stock shall be convertible into such number of fully paid and nonassessable shares of Common Stock as is determined by dividing (1) the sum of (a) the Stated Value thereof plus (b) the Applicable Premium for the period beginning on the Issue Date and ending on and including the Conversion Date (as defined in Article VIII.B, below), by (2) the then effective Conversion Price (as defined below); provided, however, that, unless the holder delivers a

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waiver in accordance with the immediately following sentence, in no event (other than pursuant to the Automatic Conversion (as defined in Article IX)) shall a holder of shares of 1998 Series II Preferred Stock be entitled to convert any such shares in excess of that number of shares upon conversion of which the sum of (x) the number of shares of Common Stock beneficially owned by the holder and its affiliates (other than shares of Common Stock which may be deemed beneficially owned through the ownership of the unconverted portion of the shares of 1998 Series II Preferred Stock) and (y) the number of shares of Common Stock issuable upon the conversion of the shares of 1998 Series II Preferred Stock with respect to which the determination of this proviso is being made, would result in beneficial ownership by a holder and such holder's affiliates of more than 4.9% of the outstanding shares of Common Stock. For purposes of the proviso to the immediately preceding sentence, (i) beneficial ownership shall be determined in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended, and Regulation 13D-G thereunder, except as otherwise provided in clause (x) of such

proviso, and (ii) a holder may waive the limitations set forth therein by written notice to the Corporation upon not less than sixty-one (61) days prior written notice (with such waiver taking effect only upon the expiration of such sixty-one (61) day notice period).

(b) Each holder of shares of 1998 Series II Preferred Stock may convert only up to that percentage of the aggregate Stated Value of all shares of 1998 Series II Preferred Stock received by such holder on the Issue Date specified below during the time period set forth opposite such percentage.

Percentage	Time Period
0.0%	0-270 days following June __, 1998
33.3%	271-300 days following June __, 1998
66.6%	301-330 days following June __, 1998
100.0%	331 days following June __, 1998

; provided, however, that the restrictions on conversion set forth above shall

not apply to conversions taking place on any Conversion Date (i) that the Common Stock trades on Nasdaq or the principal trading market on which the Common Stock is then listed as reported by Bloomberg at a price greater than or equal to (a) 117% of the Market Price or (b) the Fixed Conversion Price or (ii) occurring on or after the date the Corporation makes a public announcement that it intends to merge or consolidate with any other corporation or sell or transfer substantially all of the assets of the Corporation or (iii) occurring on or after the date any person, group or entity (including the Corporation) publicly announces a tender offer to purchase 50% or more of the Corporation's Common Stock or otherwise publicly announces an intention to replace a majority of the Corporation's Board of Directors by waging a proxy battle or otherwise or (iv) occurring on or after there is a material adverse change in the business, operation, assets, financial condition or prospects of the Corporation or its subsidiaries, taken as a whole or (v) upon the occurrence of a Redemption Grant or the delivery by the Company of an Optional Redemption Notice. If, pursuant to clause (i)(a) of the preceding proviso, the terms hereof, the 1998 Series II Preferred Stock is permitted to be converted prior to the date which is two hundred seventy (270) days from the June \_\_, 1998, and the then applicable Conversion Price is less than \$3.25, each holder of 1998 Series II Preferred Stock during such 270-day period may not convert more than both (i) 10% of the number of shares of 1998 Series II Preferred Stock received on the Issue Date during any thirty (30) day period (within such 270-day period) and (ii) 50% of the number of shares of 1998 Series II Preferred Stock received on the Issue Date.

(c) So long as the Common Stock is listed for trading on Nasdaq or an exchange or quotation system with a rule substantially similar to Nasdaq Rule 4460(i) then, notwithstanding anything to the contrary contained herein if, at any time, the aggregate number of shares of Common Stock then issued upon conversion of the 1998 Series II Preferred Stock (including any shares of capital stock or rights to acquire shares of capital stock issued by the Corporation which are aggregated or integrated with the Common Stock issued or issuable upon



conversion of the 1998 Series II Preferred Stock for purposes of such rule) equals 19.99% of the "OUTSTANDING COMMON AMOUNT" (as hereinafter defined), the 1998 Series II Preferred Stock shall, from that time forward, cease to be convertible into Common Stock in accordance with the terms of this Article VIII and Article IX below, unless the Corporation (i) has obtained approval of the issuance of the Common Stock upon conversion of the 1998 Series II Preferred Stock by a majority of the total votes cast on such proposal, in person or by proxy, by the holders of the then-outstanding Common Stock (not including any shares of Common Stock held by present or former holders of 1998 Series II Preferred Stock that were issued upon conversion of 1998 Series II Preferred Stock) (the "STOCKHOLDER APPROVAL"), or (ii) shall have otherwise obtained permission to allow such issuances from Nasdaq in accordance with Nasdaq Rule 4460(i). If the Corporation's Common Stock is not then listed on Nasdaq or an exchange or quotation system that has a rule substantially similar to Nasdaq Rule 4460(i) then the limitations set forth herein shall be inapplicable and of no force and effect. For purposes of this paragraph, "OUTSTANDING COMMON AMOUNT" means (i) the number of shares of the Common Stock outstanding on the date of issuance of the 1998 Series II Preferred Stock pursuant to the Purchase Agreement plus (ii) any additional shares of Common Stock issued thereafter in respect of such shares pursuant to a stock dividend, stock split or similar event. The maximum number of shares of Common Stock issuable as a result of the 19.99% limitation set forth herein is hereinafter referred to as the "MAXIMUM SHARE AMOUNT." With respect to each holder of 1998 Series II Preferred Stock, the Maximum Share Amount shall refer to such holder's pro rata share thereof

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determined in accordance with Article XI below. In the event that Corporation obtains Stockholder Approval or the approval of Nasdaq, by reason of the inapplicability of the rules of Nasdaq or otherwise and concludes that it is able to increase the number of shares to be issued above the Maximum Share Amount (such increased number being the "NEW MAXIMUM SHARE AMOUNT"), the references to Maximum Share Amount, above, shall be deemed to be, instead, references to the greater New Maximum Share Amount. In the event that Stockholder Approval is obtained but there are insufficient reserved or authorized shares or a registration statement covering the additional shares of Common Stock which constitute the New Maximum Share Amount is not effective prior to the Maximum Share Amount being issued (if such registration statement is necessary to allow for the public resale of such securities), the Maximum Share Amount shall remain unchanged; provided, however, that the holders of the

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1998 Series II Preferred Stock may grant an extension to obtain a sufficient reserved or authorized amount of shares or of the effective date of such registration statement. In the event that (a) the aggregate number of shares of Common Stock actually issued upon conversion of the 1998 Series II Preferred Stock represents at least twenty percent (20%) of the Maximum Share Amount and (b) the sum of (x) the aggregate number of shares of Common Stock actually issued upon conversion of the outstanding 1998 Series II Preferred Stock plus

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(y) the aggregate number of shares of Common Stock that remain issuable upon conversion of 1998 Series II Preferred Stock, represents at least one hundred percent (100%) of the Maximum Share Amount (the "TRIGGERING EVENT"), the Corporation will use its best efforts to seek and obtain Stockholder Approval (or obtain such other relief as will allow conversions hereunder in excess of the Maximum Share Amount) as soon as practicable following the Triggering Event and before the Redemption Date.

B. The "CONVERSION PRICE" shall be the lesser of (i) the Applicable Percentage multiplied by the Market Price and (ii) the Fixed Conversion Price, subject to adjustments pursuant to the provisions of Article VIII.C below.

C. The Conversion Price shall be subject to adjustment from time to time as follows:

(a) Adjustment to Conversion Price Due to Stock Split, Stock

Dividend, Etc. If at any time when 1998 Series II Preferred Stock is issued and

outstanding, the number of outstanding shares of Common Stock is increased or decreased by a stock split, stock dividend, combination, reclassification, rights offering below the Trading Price (as defined in Article VIII.D) to all holders of Common Stock or other similar event, which event shall have taken place during the reference period for determination of the Conversion Price for any Optional Conversion or Automatic Conversion of the 1998 Series II Preferred Stock, then the Conversion Price shall be calculated giving appropriate effect to the stock split, stock dividend, combination, reclassification or other similar event. In such event, the Corporation shall notify the Transfer Agent of such change on or before the effective date thereof.

(b) Adjustment Due to Merger, Consolidation, Etc. If, at any time

when 1998 Series II Preferred Stock is issued and outstanding and prior to the conversion of all 1998 Series II Preferred Stock, there shall be any merger, consolidation, exchange of shares, recapitalization, reorganization, or other similar event, as a result of which shares of Common Stock of the Corporation shall be changed into the same or a different number of shares of another class or classes of stock or securities of the Corporation or another entity, or in case of any sale or conveyance of all or substantially all of the assets of the Corporation other than in connection with a plan of complete liquidation of the Corporation, then the holders of 1998 Series II Preferred Stock shall thereafter have the right to receive upon conversion of the 1998 Series II Preferred Stock, upon the bases and upon the terms and conditions specified herein and in lieu of the shares of Common Stock immediately theretofore issuable upon conversion, such stock, securities or assets which the holders of 1998 Series II Preferred Stock would have been entitled to receive in such transaction had the 1998 Series II Preferred Stock been converted in full (without regard to any limitations on conversion contained herein) immediately prior to such transaction, and in any such case appropriate provisions shall be made with respect to the rights and interests of the holders of 1998 Series II Preferred Stock to the end that the provisions hereof (including, without limitation, provisions for adjustment of the Conversion Price and of the number of shares of Common Stock issuable upon conversion of the 1998 Series II Preferred Stock) shall thereafter be applicable, as nearly as may be practicable in relation to any securities or assets thereafter deliverable upon the conversion of 1998 Series II Preferred Stock. The Corporation shall not effect any transaction described in this subsection (b) unless (a) it first gives, to the extent practical, thirty (30) days' prior written notice (but in any event at least fifteen (15) business days prior written notice) of such merger, consolidation, exchange of shares, recapitalization, reorganization or other similar event or sale of assets (during which time the holders of 1998 Series II Preferred Stock shall be entitled to convert the 1998 Series II Preferred Stock) and (b) the resulting successor or acquiring entity (if not the Corporation) assumes by written instrument the obligations of this subsection (b). The above provisions shall similarly apply to successive consolidations, mergers, sales, transfers or share exchanges.

(c) [Reserved.]  
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(d) Adjustment Due to Distribution. Subject to Article IV, if the  
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Corporation shall declare or make any distribution of its assets (or rights to acquire its assets) to holders of Common Stock as a dividend, stock repurchase, by way of return of capital or otherwise (including any dividend or distribution to the Corporation's shareholders in cash or shares (or rights to acquire shares) of capital stock of a subsidiary (i.e., a spin-off)) (a "DISTRIBUTION"), then the holders of 1998 Series II Preferred Stock shall be entitled, upon any conversion of shares of 1998 Series II Preferred Stock after the date of record for determining shareholders entitled to such Distribution, to receive the amount of such assets which would have been payable to the holder with respect to the shares of Common Stock issuable upon such conversion had such holder been the holder of such shares of Common Stock on the record date for the determination of shareholders entitled to such Distribution.

(e) Purchase Rights. Subject to Article IV, if at any time when any  
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1998 Series II Preferred Stock is issued and outstanding, the Corporation issues any convertible securities or rights to purchase stock, warrants, securities or other property (the "PURCHASE RIGHTS") pro rata to the record holders of any class of Common Stock, then the holders of 1998 Series II Preferred Stock will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which such holder could have acquired if such holder had held the number of shares of Common Stock acquirable upon complete conversion of the 1998 Series II Preferred Stock (without regard to any limitations on conversion contained herein) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights.

(f) Adjustment for Restricted Periods. In the event that (1) the  
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Corporation fails to obtain effectiveness with the Securities and Exchange Commission of the Registration Statement (as defined in the Registration Rights Agreement) on or prior to one hundred twenty (120) days following the Issue Date, or (2) such Registration Statement lapses in effect, or sales otherwise cannot be made thereunder, whether by reason of the Corporation's failure or inability to amend or supplement the prospectus (the "PROSPECTUS") included therein in accordance with the Registration Rights Agreement or otherwise, after such Registration Statement becomes effective (including, without limitation, during an Allowed Delay (as defined in Section 3(f) of the Registration Rights Agreement), then the Pricing Period shall be comprised of, (i) in the case of an event described in clause (1), the twenty (20) Trading Days preceding the 120th day following the Issue Date plus all Trading Days through and including the third Trading Day following the date of effectiveness of the Registration Statement; and (ii) in the case of an event described in clause (2), the twenty (20) Trading Days preceding the date on which the holder of the 1998 Series II Preferred Stock is first notified that sales may not be made under the Prospectus, plus all Trading Days through and including the third Trading Day following the date on which the Holder is first notified that such sales may again be made under the Prospectus. If a holder of 1998 Series II Preferred Stock determines that sales may not be made pursuant to the Prospectus (whether by reason of the Corporation's failure or inability to amend or supplement the Prospectus or otherwise) it shall so notify the Corporation in writing and, unless the

Corporation provides such holder with a written opinion of the Corporation's counsel to the contrary, such determination shall be binding for purposes of this paragraph.

(g) Notice of Adjustments. Upon the occurrence of each adjustment or

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readjustment of the Conversion Price pursuant to this Article VIII.C, the Corporation, at its expense, shall promptly compute such adjustment or readjustment and prepare and furnish to each holder of 1998 Series II Preferred Stock a certificate setting forth such adjustment or readjustment and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, upon the written request at any time of any holder of 1998 Series II Preferred Stock, furnish to such holder a like certificate setting forth (i) such adjustment or readjustment, (ii) the Conversion Price at the time in effect and (iii) the number of shares of Common Stock and the amount, if any, of other securities or property which at the time would be received upon conversion of a share of 1998 Series II Preferred Stock.

D. For purposes of Article VIII.C(a) above, "TRADING PRICE," which shall be measured as of the record date in respect of the rights offering means (i) the average of the last reported sale prices for the shares of Common Stock on Nasdaq as reported by Bloomberg, as applicable, for the five (5) Trading Days immediately preceding such date, or (ii) if Nasdaq is not the principal trading market for the shares of Common Stock, the average of the last reported sale prices on the principal trading market for the Common Stock during the same period as reported by Bloomberg, or (iii) if market value cannot be calculated as of such date on any of the foregoing bases, the Trading Price shall be the fair market value as reasonably determined in good faith by (a) the Board of Directors of the Corporation or, (b) at the option of a majority-in-interest of the holders of the outstanding 1998 Series II Preferred Stock by an independent investment bank of nationally recognized standing in the valuation of businesses similar to the business of the Corporation.

E. In order to convert 1998 Series II Preferred Stock into full shares of Common Stock, a holder of 1998 Series II Preferred Stock shall: (i) submit a copy of the fully executed notice of conversion in the form attached hereto as Exhibit A ("NOTICE OF CONVERSION") to the Corporation by facsimile dispatched on

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the Conversion Date (or by other means resulting in, or reasonably expected to result in, notice to the Corporation on the Conversion Date) at the office of the Corporation or its designated Transfer Agent for the 1998 Series II Preferred Stock that the holder elects to convert the same, which notice shall specify the number of shares of 1998 Series II Preferred Stock to be converted, the applicable Conversion Price, the Market Price Days and a calculation of the number of shares of Common Stock issuable upon such conversion (together with a copy of the first page of each certificate to be converted) prior to Midnight, New York City time (the "CONVERSION NOTICE DEADLINE") on the date of conversion specified on the Notice of Conversion; and (ii) surrender the original certificates representing the 1998 Series II Preferred Stock being converted (the "PREFERRED STOCK CERTIFICATES"), duly endorsed, along with a copy of the Notice of Conversion to the office of the Corporation or the Transfer Agent for the 1998 Series II Preferred Stock as soon as practicable thereafter. The Corporation shall not be obligated to issue certificates evidencing the shares of Common Stock issuable upon such conversion, unless either the Preferred Stock Certificates are delivered to the Corporation or its Transfer Agent as provided above, or the holder notifies the Corporation or its Transfer Agent

that such certificates have been lost, stolen or destroyed (subject to the requirements of subparagraph (a) below). In the case of a dispute as to the calculation of the Conversion Price, the Corporation shall promptly issue such number of shares of Common Stock that are not disputed in accordance with subparagraph (b) below. The Corporation shall submit the disputed calculations to its outside accountant via facsimile within two (2) business days of receipt of the Notice of Conversion. The accountant shall audit the calculations and notify the Corporation and the holder of the results no later than 48 hours from the time it receives the disputed calculations. The accountant's calculation shall be deemed conclusive absent manifest error.

(a) Lost or Stolen Certificates. Upon receipt by the Corporation of

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evidence of the loss, theft, destruction or mutilation of any Preferred Stock Certificates representing shares of 1998 Series II Preferred Stock, and (in the case of loss, theft or destruction) of indemnity reasonably satisfactory to the Corporation, and upon surrender and cancellation of the Preferred Stock Certificate(s), if mutilated, the Corporation shall execute and deliver new Preferred Stock Certificate(s) of like tenor and date.

(b) Delivery of Common Stock Upon Conversion. Upon the surrender of

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certificates as described above together with a Notice of Conversion, the Corporation shall issue and, within two (2) business days after such surrender (or, in the case of lost, stolen or destroyed certificates, after provision of agreement and indemnification pursuant to subparagraph (a) above) (the "DELIVERY PERIOD"), deliver (or cause its Transfer Agent to so issue and deliver) to or upon the order of the holder (i) that number of shares of Common Stock for the portion of the shares of 1998 Series II Preferred Stock converted as shall be determined in accordance herewith and (ii) a certificate representing the balance of the shares of 1998 Series II Preferred Stock not converted, if any. In addition to any other remedies available to the holder, including actual damages and/or equitable relief, the Corporation shall pay to a holder \$2,000 per day in cash for each day beyond a two (2) business day grace period following the Delivery Period that the Corporation fails to deliver Common Stock (a "DELIVERY DEFAULT") issuable upon surrender of shares of 1998 Series II Preferred Stock with a Notice of Conversion until such time as the Corporation has delivered all such Common Stock (the "DELIVERY DEFAULT PAYMENTS"). Such cash amount shall be paid to such holder by the fifth day of the month following the month in which it has accrued or, at the option of the holder (by written notice to the Corporation by the first day of the month following the month in which it has accrued), shall be convertible into Common Stock in accordance with the terms of this Article VIII.

In lieu of delivering physical certificates representing the Common Stock issuable upon conversion, provided the Corporation's Transfer Agent is participating in the Depository Trust Company ("DTC") Fast Automated Securities Transfer ("FAST") program, in compliance with the provisions contained in Article VIII.A and in this Article VIII.E, the Corporation shall use its best efforts to cause its Transfer Agent to electronically transmit the Common Stock issuable upon conversion to the holder by crediting the account of holder's Prime Broker with DTC through its Deposit Withdrawal Agent Commission ("DWAC") system. The time periods for delivery and penalties described in the immediately preceding paragraph shall apply to the electronic transmittals described herein.

(c) No Fractional Shares. If any conversion of 1998 Series II

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Preferred Stock would result in a fractional share of Common Stock or the right to acquire a fractional share of Common Stock, such fractional share shall be disregarded and the number of shares of Common Stock issuable upon Conversion of the 1998 Series II Preferred Stock shall be the next higher number of shares.

(d) Conversion Date. The "CONVERSION DATE" shall be the date specified in the Notice of Conversion, provided that the Notice of Conversion is submitted by facsimile (or by other means resulting in, or reasonably expected to result in, notice) to the Corporation or its Transfer Agent before Midnight, New York City time, on the Conversion Date. The person or persons entitled to receive the shares of Common Stock issuable upon conversion shall be treated for all purposes as the record holder or holders of such securities as of the Conversion Date and all rights with respect to the shares of 1998 Series II Preferred Stock surrendered shall forthwith terminate except the right to receive the shares of Common Stock or other securities or property issuable on such conversion and except that the holders preferential rights as a holder of 1998 Series II Preferred Stock shall survive to the extent the Corporation fails to deliver such securities.

F. A number of shares of the authorized but unissued Common Stock sufficient to provide for the conversion of the 1998 Series II Preferred Stock outstanding at the then current Conversion Price shall at all times be reserved by the Corporation, free from preemptive rights, for such conversion or exercise. As of the date of issuance of the 1998 Series II Preferred Stock, \_\_\_\_\_ [2x currently required] authorized and unissued shares of Common Stock have been duly reserved for issuance upon conversion of the 1998 Series II Preferred Stock (the "RESERVED AMOUNT"). The Reserved Amount shall be increased from time to time in accordance with the Company's obligations pursuant to Section 4(h) of the Purchase Agreement. In addition, if the Corporation shall issue any securities or make any change in its capital structure which would change the number of shares of Common Stock into which each share of the 1998 Series II Preferred Stock shall be convertible at the then current Conversion Price, the Corporation shall at the same time also make proper provision so that thereafter there shall be a sufficient number of shares of Common Stock authorized and reserved, free from preemptive rights, for conversion of the outstanding 1998 Series II Preferred Stock.

If at any time a holder of shares of 1998 Series II Preferred Stock submits a Notice of Conversion, and the Corporation does not have sufficient authorized but unissued shares of Common Stock available to effect such conversion in accordance with the provisions of this Article VIII (a "CONVERSION DEFAULT"), the Corporation shall issue to the holder (or holders, if more than one holder submits a Notice of Conversion in respect of the same Conversion Date, pro rata based on the ratio that the number of shares of 1998 Series II Preferred Stock then held by each such holder bears to the aggregate number of such shares held by such holders) all of the shares of Common Stock which are available to effect such conversion. The number of shares of 1998 Series II Preferred Stock included in the Notice of Conversion which exceeds the amount which is then convertible into available shares of Common Stock (the "EXCESS AMOUNT") shall, notwithstanding anything to the contrary contained herein, not be convertible into Common Stock in accordance with the terms hereof until (and at the holder's option at any time after) the

date additional shares of Common Stock are authorized by the Corporation to permit such conversion, at which time the Conversion Price in respect thereof shall be the lesser of (i) the Conversion Price on the Conversion Default Date (as defined below) and (ii) the Conversion Price on the Conversion Date elected by the holder in respect thereof. The Corporation shall use its best efforts to effect an increase in the authorized number of shares of Common Stock as soon as possible following a Conversion Default. In addition, the Corporation shall either (i) pay to the holder payments ("CONVERSION DEFAULT PAYMENTS") for a Conversion Default in the amount of (a)  $(N/365)$ , multiplied by (b) the sum of the Stated Value plus the Applicable Premium per share of 1998 Series II Preferred Stock through the Authorization Date (as defined below), multiplied by (c) the Excess Amount on the day the holder submits a Notice of Conversion giving rise to a Conversion Default (the "CONVERSION DEFAULT DATE"), multiplied by (d) .24, where N = the number of days from the Conversion Default Date to the date (the "AUTHORIZATION DATE") that the Corporation authorizes a sufficient number of shares of Common Stock to effect conversion of the full number of shares of 1998 Series II Preferred Stock or (ii) provided no similar adjustment has been made pursuant to Section 2(c)(1) of the Registration Rights Agreement, increase the Applicable Premium to an amount equal to fifteen percent (15%) of the Stated Value through the Authorization Date; provided, however, that if the

Conversion Default continues for more than sixty (60) days, each holder of the 1998 Series II Preferred Stock shall have the option to cause the Corporation to either pay the Conversion Default Payments pursuant to clause (i) of this sentence or increase the Applicable Premium pursuant to clause (ii) of this sentence. The Corporation shall send notice to the holder of the authorization of additional shares of Common Stock, the Authorization Date and the amount of holder's accrued Conversion Default Payments. The accrued Conversion Default Payment for each calendar month shall be paid in cash or shall be convertible into Common Stock at the Conversion Price, at the holder's option, as follows:

(a) In the event the holder elects to take such payment in cash, cash payment shall be made to holder by the fifth day of the month following the month in which it has accrued; and

(b) In the event the holder elects to take such payment in Common Stock, the holder may convert such payment amount into Common Stock at the Conversion Price (as in effect at the time of Conversion) at any time after the fifth day of the month following the month in which it has accrued in accordance with the terms of this Article VIII (so long as there is then a sufficient number of authorized shares).

Nothing herein shall limit the holder's right to pursue actual damages for the Corporation's failure to maintain a sufficient number of authorized shares of Common Stock, and each holder shall have the right to pursue all remedies available at law or in equity (including a decree of specific performance and/or injunctive relief).

G. Upon the occurrence of each adjustment or readjustment of the Conversion Price pursuant to this Article VIII, the Corporation, at its expense, shall promptly compute such adjustment or readjustment in accordance with the terms hereof and prepare and furnish to each holder of 1998 Series II Preferred Stock a certificate setting forth such adjustment or

readjustment and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, upon the written request at any time of any holder of 1998 Series II Preferred Stock, furnish or cause to be furnished to such holder a like certificate setting forth (i) such adjustment or readjustment, (ii) the Conversion Price at the time in effect and (iii) the number of shares of Common Stock and the amount, if any, of other securities or property which at the time would be received upon conversion of a share of 1998 Series II Preferred Stock.

H. Upon submission of a Notice of Conversion by a holder of 1998 Series II Preferred Stock, (i) the shares covered thereby (other than the shares, if any, which cannot be issued because their issuance would exceed such holder's allocated portion of the Reserved Amount) shall be deemed converted into shares of Common Stock and (ii) the holder's rights as a holder of such converted shares of 1998 Series II Preferred Stock shall cease and terminate, excepting only the right to receive certificates for such shares of Common Stock and to any remedies provided herein or otherwise available at law or in equity to such holder because of a failure by the Corporation to comply with the terms of this Certificate of Designation. Notwithstanding the foregoing, if a holder has not received certificates for all shares of Common Stock prior to the tenth (10th) business day after the expiration of the Delivery Period with respect to a conversion of shares of 1998 Series II Preferred Stock for any reason, then (unless the holder otherwise elects to retain its status as a holder of Common Stock by so notifying the Corporation) the holder shall regain the rights of a holder of such shares of 1998 Series II Preferred Stock with respect to such unconverted shares of 1998 Series II Preferred Stock and the Corporation shall, as soon as practicable, return such unconverted shares of 1998 Series II Preferred Stock to the holder or, if such shares of 1998 Series II Preferred Stock have not been surrendered, adjust its records to reflect that such shares of 1998 Series II Preferred Stock have not been converted. In all cases, the holder shall retain all of its rights and remedies (including, without limitation, the right to receive Delivery Default Payments pursuant to Article V.E to the extent required thereby for such Delivery Default and any subsequent Delivery Default).

#### IX. Automatic Conversion

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So long as the Registration Statement is effective and there is not then a continuing Redemption Event, each share of 1998 Series II Preferred Stock issued and outstanding on \_\_\_\_\_, 200\_ [three (3) years from Issue Date] (the "AUTOMATIC CONVERSION DATE"), subject to any adjustment pursuant to this Article, automatically shall be converted into shares of Common Stock on such date at the then effective Conversion Price in accordance with, and subject to, the provisions of Article VIII hereof (the "AUTOMATIC CONVERSION"). The Automatic Conversion Date shall be delayed by one (1) Trading Day each for each Trading Day occurring prior thereto and prior to the full conversion of the 1998 Series II Preferred Stock that (i) sales cannot be made pursuant to the Registration Statement (whether by reason of the Company's failure to properly supplement or amend the prospectus included therein in accordance with the terms of the Registration Rights Agreement or otherwise including any Allowed Delays (as defined in Section 3(f) of the Registration Rights Agreement) after the earlier of (a) the date the Registration Statement is declared effective, and (b) the date the Registration Statement is required to be declared effective pursuant to Section 2(c) of the Registration Rights Agreement



or (ii) any Redemption Event (as defined in Article VI.A) exists, without regard to whether any cure periods shall have run. The Automatic Conversion Date shall be the "Conversion Date" for purposes of determining the Conversion Price and the time within which certificates representing the Common Stock must be delivered to the holder upon an Automatic Conversion.

#### X. Voting Rights

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The holders of the 1998 Series II Preferred Stock have no voting power whatsoever, except as otherwise provided by the MBCA, in this Article X, and in Article XI below.

Notwithstanding the above, the Corporation shall provide each holder of 1998 Series II Preferred Stock with prior notification of any meeting of the shareholders (and copies of proxy materials and other information sent to shareholders). In the event of any taking by the Corporation of a record of its shareholders for the purpose of determining shareholders who are entitled to receive payment of any dividend or other distribution, any right to subscribe for, purchase or otherwise acquire (including by way of merger, consolidation or recapitalization) any share of any class or any other securities or property, or to receive any other right, or for the purpose of determining shareholders who are entitled to vote in connection with any proposed sale, lease or conveyance of all or substantially all of the assets of the Corporation, or any proposed liquidation, dissolution or winding up of the Corporation, the Corporation shall mail a notice to each holder, at least ten (10) days prior to the record date specified therein (or thirty (30) days prior to the consummation of the transaction or event, whichever is earlier), of the date on which any such record is to be taken for the purpose of such dividend, distribution, right or other event, and a brief statement regarding the amount and character of such dividend, distribution, right or other event to the extent known at such time.

To the extent that under the MBCA the vote of the holders of the 1998 Series II Preferred Stock, voting separately as a class or series as applicable, is required to authorize a given action of the Corporation, the affirmative vote or consent of the holders of at least a majority of the shares of the 1998 Series II Preferred Stock represented at a duly held meeting at which a quorum is present or by written consent of a majority of the shares of 1998 Series II Preferred Stock (except as otherwise may be required under the MCBA) shall constitute the approval of such action by the class. To the extent that under the MCBA holders of the 1998 Series II Preferred Stock are entitled to vote on a matter with holders of Common Stock, voting together as one class, each share of 1998 Series II Preferred Stock shall be entitled to a number of votes equal to the number of shares of Common Stock into which it is then convertible using the record date for the taking of such vote of shareholders as the date as of which the Conversion Price is calculated. Holders of the 1998 Series II Preferred Stock shall be entitled to notice of all shareholder meetings or written consents (and copies of proxy materials and other information sent to shareholders) with respect to which they would be entitled to vote, which notice would be provided pursuant to the Corporation's bylaws and the MBCA.

#### XI. Protective Provisions

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So long as shares of 1998 Series II Preferred Stock are outstanding, the Corporation shall not, without first obtaining the approval (by vote or written consent, as provided by the MBCA) of the holders of at least a majority of the then outstanding shares of 1998 Series II Preferred Stock:

(a) alter or change the rights, preferences or privileges of the 1998 Series II Preferred Stock or any Senior Securities so as to affect adversely the 1998 Series II Preferred Stock;

(b) create any new class or series of capital stock having a preference over the 1998 Series II Preferred Stock as to distribution of assets upon liquidation, dissolution or winding up of the Corporation (as previously defined in Article III hereof, "SENIOR SECURITIES");

(c) increase the authorized number of shares of 1998 Series II Preferred Stock; or

(d) do any act or thing not authorized or contemplated by this Certificate of Designation which would result in taxation of the holders of shares of the 1998 Series II Preferred Stock under Section 305 of the Internal Revenue Code of 1986, as amended (or any comparable provision of the Internal Revenue Code as hereafter from time to time amended).

In the event holders of at least a majority of the then outstanding shares of 1998 Series II Preferred Stock agree to allow the Corporation to alter or change the rights, preferences or privileges of the shares of 1998 Series II Preferred Stock, pursuant to subsection (a) above, so as to affect the 1998 Series II Preferred Stock, then the Corporation will deliver notice of such approved change to the holders of the 1998 Series II Preferred Stock that did not agree to such alteration or change (the "DISSENTING HOLDERS") and Dissenting Holders shall have the right for a period of thirty (30) days to convert pursuant to the terms of this Certificate of Designation as they exist prior to such alteration or change or continue to hold their shares of 1998 Series II Preferred Stock.

#### XII. Pro Rata Allocations

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The Maximum Share Amount and the Reserved Amount (including any increases thereto) shall be allocated by the Corporation pro rata among the holders of 1998 Series II Preferred Stock based on the number of shares of 1998 Series II Preferred Stock then held by each holder relative to the total aggregate number of shares of 1998 Series II Preferred Stock then outstanding.

IN WITNESS WHEREOF, this Certificate of Designation is executed on behalf of the Corporation this \_\_\_ day of \_\_\_\_\_, 199\_.

AASTROM BIOSCIENCES, INC.

By:  
R. Douglas Armstrong  
President & Chief Executive Officer

EXHIBIT A

NOTICE OF CONVERSION

(To be Executed by the Registered Holder  
in order to Convert the 1998 Series II Preferred Stock)

The undersigned hereby irrevocably elects to convert \_\_\_\_\_ shares of 1998 Series II Preferred Stock, represented by stock certificate No(s). \_\_\_\_\_ (the "PREFERRED STOCK CERTIFICATES") into shares of common stock ("COMMON STOCK") of Aastrom Biosciences, Inc. (the "CORPORATION") according to the conditions of the Certificate of Designation of 1998 Series II Preferred Stock, as of the date written below. If securities are to be issued in the name of a person other than the undersigned, the undersigned will pay all transfer taxes payable with respect thereto and is delivering herewith such certificates. No fee will be charged to the Holder for any conversion, except for transfer taxes, if any. A copy of each Preferred Stock Certificate is attached hereto (or evidence of loss, theft or destruction thereof).

The undersigned represents and warrants that all offers and sales by the undersigned of the securities issuable to the undersigned upon conversion of the 1998 Series II Preferred Stock shall be made pursuant to registration of the securities under the Securities Act of 1933, as amended (the "ACT"), or pursuant to an exemption from registration under the Act and that it is in compliance with covenants set forth in Section 4(m) of the Securities Purchase Agreement.

Date of Conversion: \_\_\_\_\_

Applicable Conversion Price: \_\_\_\_\_

Market Price Days: \_\_\_\_\_

Number of Shares of Common Stock to be Issued: \_\_\_\_\_

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\*The Corporation is not required to issue shares of Common Stock until the original 1998 Series II Preferred Stock Certificate(s) (or evidence of loss, theft or destruction thereof) to be converted are received by the Corporation or its Transfer Agent. The Corporation shall issue and deliver shares of Common Stock to an overnight courier not later than two (2) business days following receipt of the original Preferred Stock Certificate(s) to be converted, and shall make payments pursuant to the Certificate of Designation for the number of business days such issuance and delivery is late.

[LETTERHEAD OF PEPPER HAMILTON LLP]

313.393.7438  
baxterr@pepperlaw.com

July 27, 1998

Securities and Exchange Commission  
Judiciary Plaza  
450 Fifth Street, N.W.  
Washington, D.C. 20549

Re: Aastrom Biosciences, Inc. Registration  
Statement on Form S-3  
File No.: 333-\_\_\_\_\_

Gentlemen:

We have acted as special counsel to Aastrom Biosciences, Inc., a Michigan corporation (the "Company"), in connection with the preparation and filing with the Securities and Exchange Commission (the "Commission") of a registration statement filed with the SEC on July 28, 1998, as amended (the "Registration Statement") of the Company on Form S-3 under the Securities Act of 1933, as amended (the "Act"). The Registration Statement relates to the proposed issuance by the Company of shares of the Company's Common Stock (the "Shares") covered by the Registration Statement.

In this connection, we have examined the Registration Statement, including the exhibits thereto, the originals or copies, certified or otherwise identified to our satisfaction, of the Articles of Incorporation and the By-Laws of the Company amended to date, resolutions of the Company's Board of Directors and such other documents and corporate records relating to the Company, and the issuance and sale of the Company's 1998 Series I Convertible Preferred Stock and 1998 Series II Convertible Preferred Stock (collectively, the "1998 Series Shares") and the conversion of the 1998 Series Shares into the Shares, as we have deemed appropriate. The opinion expressed herein is based exclusively on the applicable provisions of the Michigan Business Corporation Act as in effect on the date hereof.

On the basis of the foregoing, we are of the opinion that the Shares to be issued by the Company upon conversion of the Company's 1998 Series I Convertible Preferred Stock will be, upon the effectiveness of the Registration Statement, duly authorized validly issued, fully paid, and non-assessable; and, in the case of the Shares to be issued upon conversion of the Company's 1998 Series II Convertible Preferred Stock (the "Series II Shares"), upon (i) the effectiveness of the Registration Statement, (ii) the filing of the Certificate of Designation filed as Exhibit 3.2 to the Registration Statement with the Michigan Department of Commerce and Industry Services, (iii) receipt by the Company of payment for the Series II Shares, and (iv) issuance by the Company of the Series II Shares, the Shares to be issued upon conversion of the Series II Shares will be duly authorized, validly issued, fully paid, and non-assessable.

We hereby consent to the reference to our firm under the caption "Legal Matters" in the Registration Statement and to the filing of this opinion as an exhibit to the Registration Statement. Such consent does not constitute a consent under Section 7 of the Act, since we have not certified any part of such Registration Statement and do not otherwise come within the categories of persons whose consent is required under Section 7 of the Act or the rules and regulations of the Commission promulgated thereunder.

Very truly yours,

PEPPER HAMILTON LLP

By: /s/ Michael B. Staebler

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Michael B. Staebler

## SECURITIES PURCHASE AGREEMENT

SECURITIES PURCHASE AGREEMENT (this "AGREEMENT"), dated as of July 2, 1998, by and among Aastrom Biosciences, Inc., a Michigan corporation, with headquarters located at 24 Frank Lloyd Wright Drive, Ann Arbor, Michigan 48106 ("COMPANY"), and each of the purchasers set forth on the signature pages hereto (the "BUYERS").

## WHEREAS:

A. The Company and the Buyers are executing and delivering this Agreement in reliance upon the exemption from securities registration afforded by Rule 506 under Regulation D ("REGULATION D") as promulgated by the United States Securities and Exchange Commission (the "SEC") under the Securities Act of 1933, as amended (the "1933 ACT");

B. The Company has authorized two new series of preferred stock, one designated as the 1998 Series I Convertible Preferred Stock (the "SERIES I PREFERRED STOCK"), having the rights, preferences and privileges set forth in the Certificate of Designations, Rights and Preferences attached hereto as EXHIBIT "A-1" (the "SERIES I CERTIFICATE OF DESIGNATION") and the second as the 1998 Series II Convertible Preferred Stock (the "SERIES II PREFERRED STOCK" and, collectively with the Series I Preferred Stock, the "PREFERRED STOCK"), having the rights, preferences and privileges set forth in the Certificate of Designations, Rights and Preferences attached hereto as EXHIBIT "A-2" (the "SERIES II CERTIFICATE OF DESIGNATION" and, collectively with the Series I Certificate of Designation, the "CERTIFICATE OF DESIGNATIONS");

C. The Preferred Stock is convertible into shares of common stock, no par value, of the Company (the "COMMON STOCK"), upon the terms and subject to the limitations and conditions set forth in the Certificate of Designation and pursuant to the notice of conversion attached hereto as EXHIBIT "D";

D. The Buyers desire to purchase and the Company desires to issue and sell, upon the terms and conditions set forth in this Agreement, an aggregate of Five Thousand (5,000) shares of Series I Preferred Stock and Three Thousand (3,000) shares of Series II Preferred Stock, for an aggregate purchase price of Eight Million Dollars (\$8,000,000).

E. Each Buyer wishes to purchase, upon the terms and conditions stated in this Agreement, the number of shares of Preferred Stock is set forth immediately below its name on the signature pages hereto;

F. Contemporaneous with the execution and delivery of this Agreement, the parties hereto are executing and delivering a Registration Rights Agreement, in the form attached hereto as EXHIBIT "B" (the "REGISTRATION RIGHTS AGREEMENT"), pursuant to which the Company has agreed to provide certain registration rights under the 1933 Act and the rules and regulations promulgated thereunder, and applicable state securities laws; and

NOW THEREFORE, the Company and each of the Buyers severally (and not jointly) hereby agree as follows:

1. PURCHASE AND SALE OF PREFERRED SHARES.  
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(a) Purchase of Preferred Shares. The Company shall issue and sell to each Buyer and each Buyer severally agrees to purchase from the Company such number of shares of Series I Preferred Stock (collectively, together with any Series I Preferred Stock issued in replacement thereof or as a dividend thereon or otherwise with respect thereto in accordance with the terms thereof, the "SERIES I PREFERRED SHARES") and Series II Preferred Stock (collectively, together with any Series II Preferred Stock issued in replacement thereof or as a dividend thereon or otherwise with respect thereto in accordance with the terms thereof, the "SERIES II PREFERRED SHARES" and, collectively with the Series I Preferred Shares, the "PREFERRED SHARES") for the aggregate purchase price with respect to the First Closing (as defined below) and the Second Closing (as defined below) (each, a "PURCHASE PRICE" and collectively, the "PURCHASE PRICES") as is set forth immediately below such Buyer's name on the signature pages hereto. The issuance sale and purchase of the Preferred Shares shall take place at two (2) closings, the first of which is hereinafter referred to as the "FIRST CLOSING" and the second of which is hereinafter referred to as the "SECOND CLOSING." The aggregate number of Series I Preferred Shares to be issued at the First Closing is Five Thousand (5,000), for an aggregate purchase price of Five Million Dollars (\$5,000,000) and the aggregate number of Series II Preferred Shares to be issued at the Second Closing is three thousand (3,000), for an aggregate purchase price of Three Million Dollars (\$3,000,000). Subject to the satisfaction (or waiver) of the conditions thereto set forth in Section 6 and Section 7 below, (i) at the First Closing, the Company shall issue and sell to each Buyer and each Buyer shall purchase from the Company the number of Series I Preferred Shares which such Buyer is purchasing hereunder and as set forth below such Buyer's name on the signature pages hereto for the Purchase Price to be paid by such Buyer in respect of the First Closing and (ii) at the Second Closing, the Company shall issue and sell to each Buyer and each Buyer shall purchase from the Company the number of Series II Preferred Shares which such Buyer is purchasing hereunder and as set forth below such Buyer's name on the signature pages hereto for the Purchase Price to be paid by such Buyer in respect of the Second Closing.

(b) Form of Payment. On each Closing Date (as defined below), (i)  
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each Buyer shall pay the Purchase Price for the Preferred Shares to be issued and sold to it at each Closing by wire transfer of immediately available funds to the Company, in accordance with the Company's written wiring instructions, against delivery of duly executed certificates representing such number of Preferred Shares which such Buyer is purchasing and (ii) the Company shall deliver such certificates duly executed on behalf of the Company, to the Buyer, against delivery of such Purchase Price.

(c) Closing Date. Subject to the satisfaction (or waiver) of the  
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conditions thereto set forth in Section 6 and Section 7 below, the date and time of the issuance and sale of the Preferred Shares pursuant to this Agreement (the "CLOSING DATE") shall be (i) in the case of the First Closing, 12:00 noon Eastern Standard Time on July 2, 1998 and (ii) in the case of the Second Closing, 12:00 noon Eastern Standard Time as soon as practicable (but no less than three



(3) business days) following the satisfaction (or waiver) of the conditions to the Second Closing set forth in Sections 6(b) and 7(b) or, in each case, such other mutually agreed upon time. Each Closing shall occur on each Closing Date at the offices of Morgan, Lewis & Bockius LLP, 2000 One Logan Square, Philadelphia, Pennsylvania 19103, or at such other location as may be agreed to be the parties.

2. BUYERS' REPRESENTATIONS AND WARRANTIES. Each Buyer severally (and not jointly) represents and warrants to the Company solely as to such Buyer that:

(a) Investment Purpose. As of the date hereof, the Buyer is purchasing the Preferred Shares and the shares of Common Stock issuable upon conversion thereof (the "CONVERSION SHARES" and, collectively with the Preferred Shares, the "SECURITIES") for its own account for investment only and not with a present view towards the public sale or distribution thereof, except pursuant to sales registered or exempted from registration under the 1933 Act.

(b) Accredited Investor Status. The Buyer is an "accredited investor" as that term is defined in Rule 501(a) of Regulation D.

(c) Reliance on Exemptions. The Buyer understands that the Securities are being offered and sold to it in reliance upon specific exemptions from the registration requirements of United States federal and state securities laws and that the Company is relying upon the truth and accuracy of, and the Buyer's compliance with, the representations, warranties, agreements, acknowledgments and understandings of the Buyer set forth herein in order to determine the availability of such exemptions and the eligibility of the Buyer to acquire the Securities.

(d) Information. The Buyer and its advisors, if any, have been furnished with all materials relating to the business, finances and operations of the Company and materials relating to the offer and sale of the Securities which have been requested by the Buyer or its advisors. The Buyer and its advisors, if any, have been afforded the opportunity to ask questions of the Company. Neither such inquiries nor any other due diligence investigation conducted by Buyer or any of its advisors or representatives shall modify, amend or affect Buyer's right to rely on the Company's representations and warranties contained in Section 3 below. The Buyer has reviewed the risk factors discussed in the Company's SEC Documents (as defined below) and understands that its investment in the Securities involves a significant degree of risk.

(e) Governmental Review. The Buyer understands that no United States federal or state agency or any other government or governmental agency has passed upon or made any recommendation or endorsement of the Securities.

(f) Transfer or Resale. The Buyer understands that (i) except as provided in the Registration Rights Agreement, the Securities have not been and are not being registered under the 1933 Act or any applicable state securities laws, and may not be transferred unless (a) subsequently included in an effective registration statement thereunder, (b) the Buyer shall have delivered to the Company an opinion of counsel (which opinion shall be reasonably acceptable to the Company) to the effect that the Securities to be sold or transferred may be sold

or transferred pursuant to an exemption from such registration, (c) so long as the Buyer otherwise complies with applicable securities laws, sold or transferred to an "affiliate"(as defined in Rule 144 promulgated under the 1933 Act (or a successor rule) ("RULE 144")) or (d) sold pursuant to Rule 144; (ii) any sale of such Securities made in reliance on Rule 144 may be made only in accordance with the terms of said Rule and further, if said Rule is not applicable, any resale of such Securities under circumstances in which the seller (or the person through whom the sale is made) may be deemed to be an underwriter (as that term is defined in the 1933 Act) may require compliance with some other exemption under the 1933 Act or the rules and regulations of the SEC thereunder; and (iii) neither the Company nor any other person is under any obligation to register such Securities under the 1933 Act or any state securities laws or to comply with the terms and conditions of any exemption thereunder (in each case, other than pursuant to the Registration Rights Agreement). Notwithstanding the foregoing or anything else contained herein to the contrary, the Securities may be pledged as collateral in connection with a bona fide margin account or other lending arrangement. Except for transfers

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by a Buyer (i) to its "affiliates" (as defined in Rule 144) or (ii) to the holders of interests in a Buyer upon a liquidation of a Buyer's assets in accordance with its governing documents, the Preferred Shares may be transferred by a Buyer only with the prior written consent of the Company, which consent will not be unreasonably withheld.

(g) Legends. The Buyer understands that the Preferred Shares and,

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until such time as the Conversion Shares have been registered under the 1933 Act as contemplated by the Registration Rights Agreement, the Conversion Shares, may bear a restrictive legend in substantially the following form (and a stop-transfer order may be placed against transfer of the certificates for such Securities):

"The securities represented by this certificate have not been registered under the Securities Act of 1933, as amended. The securities have been acquired for investment and may not be sold, transferred or assigned in the absence of an effective registration statement for the securities under said Act, or an opinion of counsel, in form, substance and scope reasonably acceptable to the Company, that registration is not required under said Act or unless sold pursuant to Rule 144 under said Act."

The legend set forth above shall be removed and the Company shall issue a certificate without such legend to the holder of any Security upon which it is stamped, if, unless otherwise required by applicable state securities laws, (a) the resale of such Security is covered by an effective registration statement filed under the 1933 Act, or (b) such holder provides the Company with an opinion of counsel, in form, substance and scope reasonably acceptable to the Company, to the effect that a public sale or transfer of such Security may be made without registration under the 1933 Act and such sale or transfer is effected or (c) such holder provides the Company with reasonable assurances that such Security can be sold pursuant to Rule 144 under the 1933 Act (or a successor rule thereto) without any restriction as to the number of Securities acquired as of a particular date that can then be immediately sold. The Buyer agrees to sell all Securities, including those represented by a certificate(s) from which the legend has been

removed, in compliance with applicable requirements for delivery of a prospectus contained in an effective registration statement, if any.

(h) Authorization; Enforcement. This Agreement and the Registration

Agreement have been duly and validly authorized, executed and delivered on behalf of the Buyer and are valid and binding agreements of the Buyer enforceable in accordance with their terms.

(i) Residency. The Buyer is a resident of the jurisdiction set forth

immediately below such Buyer's name on the signature pages hereto.

3. REPRESENTATIONS AND WARRANTIES OF THE COMPANY. The Company

represents and warrants to each Buyer that:

(a) Organization and Qualification. The Company is a corporation

duly organized, validly existing and in good standing under the laws of the jurisdiction in which it is incorporated, with full power and authority (corporate and other) to own, lease, use and operate its properties and to carry on its business as and where now owned, leased, used, operated and conducted. The Company has no Subsidiaries (as defined below). The Company is duly qualified as a foreign corporation to do business and is in good standing in every jurisdiction in which its ownership or use of property or the nature of the business conducted by it makes such qualification necessary except where the failure to be so qualified or in good standing would not have a Material Adverse Effect. "MATERIAL ADVERSE EFFECT" means any material adverse effect on the business, operations, assets, financial condition or prospects of the Company or its Subsidiaries, if any, taken as a whole, or on the transactions contemplated hereby or by the agreements or instruments to be entered into in connection herewith. "SUBSIDIARIES" means any corporation or other organization, whether incorporated or unincorporated, in which the Company owns, directly or indirectly, any equity or other ownership interest.

(b) Authorization; Enforcement. (i) The Company has all requisite

power and authority to file and perform its obligations under the Certificate of Designations and to enter into and perform this Agreement and the Registration Rights Agreement and to consummate the transactions contemplated hereby and thereby and to issue the Securities, in accordance with the terms hereof and thereof, (ii) the execution and delivery of this Agreement and the Registration Rights Agreement by the Company and the consummation by it of the transactions contemplated hereby and thereby (including without limitation, the issuance of the Preferred Shares and the issuance and reservation for issuance of the Conversion Shares issuable upon conversion thereof) have been duly authorized by the Company's Board of Directors and no further consent or authorization of the Company, its Board of Directors, or its shareholders is required, (iii) this Agreement has been duly executed and delivered and the Series I Certificate of Designation has been duly filed by the Company and, as of the Second Closing, the Series II Certificate of Designation will be duly filed by the Company, and (iv) each of this Agreement and the Series I Certificate of Designation constitutes, and upon execution and delivery by the Company of the Registration Rights Agreement and the filing of the Series II Certificate of Designation by the Company such instrument will constitute, a legal, valid and binding obligation of the Company enforceable against the Company in accordance with its terms.

(c) Capitalization. As of the date hereof, the authorized capital

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stock of the Company consists of (i) 40,000,000 shares of Common Stock of which 13,639,817 shares are issued and outstanding, 1,479,186 shares are reserved for issuance pursuant to the Company's stock option plans, 2,705,544 shares are reserved for issuance pursuant to securities (other than the Preferred Shares) exercisable for, or convertible into or exchangeable for shares of Common Stock and 2,712,000 shares are reserved for issuance upon conversion of the Series I Preferred Shares and, prior to the Second Closing, if applicable, a number of shares will be reserved equal to two (2) times the number of shares of Common Stock then issuable upon conversion of the Series II Preferred Shares (in each case subject to adjustment pursuant to the Company's covenant set forth in Section 4(h) below); and (ii) 5,000,000 shares of preferred stock, 2,200,000 of which shares are issued and outstanding. All of such outstanding shares of capital stock are, or upon issuance will be, duly authorized, validly issued, fully paid and nonassessable. Except as disclosed on SCHEDULE 3(C), no shares of capital stock of the Company are subject to preemptive rights or any other similar rights of the stockholders of the Company or any liens or encumbrances imposed through the actions or failure to act of the Company. Except as disclosed in SCHEDULE 3(C), as of the effective date of this Agreement, (i) there are no outstanding options, warrants, scrip, rights to subscribe for, puts, calls, rights of first refusal, agreements, understandings, claims or other commitments or rights of any character whatsoever relating to, or securities or rights convertible into or exchangeable for any shares of capital stock of the Company, or arrangements by which the Company is or may become bound to issue additional shares of capital stock of the Company, (ii) there are no agreements or arrangements under which the Company is obligated to register the sale of any of its or their securities under the 1933 Act (except the Registration Rights Agreement) and (iii) there are no anti-dilution or price adjustment provisions contained in any security issued by the Company (or in any agreement providing rights to security holders) that will be triggered by the issuance of the Preferred Shares or the Conversion Shares. The Company has furnished to the Buyer true and correct copies of the Company's Certificate of Incorporation as in effect on the date hereof ("CERTIFICATE OF INCORPORATION"), the Company's By-laws, as in effect on the date hereof (the "BY-LAWS"), and the terms of all securities convertible into or exercisable for Common Stock of the Company and the material rights of the holders thereof in respect thereto. The Company shall provide the Buyer with a written update of this representation signed by the Company's Chief Executive or Chief Financial Officer on behalf of the Company as of the Closing Date.

(d) Issuance of Shares. The Preferred Shares and Conversion Shares

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are duly authorized and, upon issuance in accordance with the terms of this Agreement (including the issuance of the Conversion Shares upon conversion of the Preferred Shares in accordance with the Certificate of Designations) will be validly issued, fully paid and non-assessable, and free from all taxes, liens and charges with respect to the issue thereof and shall not be subject to preemptive rights or other similar rights of stockholders of the Company. The term Conversion Shares includes, without limitation, such additional shares, if any, as are issuable as a result of the events described in Article V, Article VII.E(b) or Article VII.F of the Certificate of Designations and Section 2(c) of the Registration Rights Agreement. The Company understands and acknowledges the potentially dilutive effect to the Common Stock upon the issuance of the Conversion Shares. The Company further acknowledges that its obligation to issue Conversion Shares in accordance with this Agreement and the Certificate of Designations is absolute and

unconditional regardless of the dilutive effect that such issuance may have on the ownership interests of other stockholders of the Company.

(e) Series of Preferred Stock. The terms, designations, powers,

preferences and relative, participating and optional or special rights, and the qualifications, limitations and restrictions of each series of preferred stock of the Company (other than the Preferred Stock) are as stated in the Certificate of Incorporation and the previous certificate of designation, filed on or prior to the date hereof, and the Bylaws. The terms, designations, powers, preferences and relative, participating and optional or special rights, and the qualifications, limitations and restrictions of the Preferred Stock are as stated in the Certificate of Designations.

(f) No Conflicts. The execution, delivery and performance of this

Agreement and the Registration Rights Agreement by the Company and the consummation by the Company of the transactions contemplated hereby and thereby (including, without limitation, the filing of the Certificate of Designations and the issuance and reservation for issuance of the Conversion Shares) will not (i) conflict with or result in a violation of any provision of the Certificate of Incorporation or By-laws or (ii) violate or conflict with, or result in a breach of any provision of, or constitute a default (or an event which with notice or lapse of time or both could become a default) under, or give to others any rights of termination, amendment, acceleration or cancellation of, any agreement, indenture or instrument to which the Company is a party, or result in a violation of any law, rule, regulation, order, judgment or decree (including federal and state securities laws and regulations) applicable to the Company or by which any property or asset of the Company is bound or affected (except for such conflicts, defaults, terminations, amendments, accelerations, cancellations and violations as would not, individually or in the aggregate, have a Material Adverse Effect). The Company is not in violation of its Certificate of Incorporation, By-laws or other organizational documents and the Company is not in default (and no event has occurred which with notice or lapse of time or both could put the Company in default) under, and the Company has not taken any action or failed to take any action that would give to others any rights of termination, amendment, acceleration or cancellation of, any agreement, indenture or instrument to which the Company is a party or by which any property or assets of the Company is bound or affected, except for possible defaults as would not, individually or in the aggregate, have a Material Adverse Effect. The businesses of the Company is not being conducted, and shall not be conducted so long as a Buyer owns any of the Securities, in violation of any law, ordinance or regulation of any governmental entity, which violations individually or in the aggregate would have a Material Adverse Effect. Except (i) as specifically contemplated by this Agreement, (ii) as required under the 1933 Act and any applicable state securities laws, (iii) for filings with Nasdaq, and (iv) for filings with the Secretary of State of the State of Michigan, the Company is not required to obtain any consent, authorization or order of, or make any filing or registration with, any court or governmental agency or any regulatory or self regulatory agency in order for it to execute, deliver or perform any of its obligations under this Agreement or the Registration Rights Agreement in accordance with the terms hereof or thereof. Except as disclosed in SCHEDULE 3(f), all consents, authorizations, orders, filings and registrations which the Company is required to obtain pursuant to the preceding sentence have been obtained or effected on or prior to the date hereof. The Company is not in violation of the listing requirements of the Nasdaq National Market ("NASDAQ") and does not reasonably

anticipate that the Common Stock will be delisted by Nasdaq in the foreseeable future. Except for anticipated losses as described in the SEC Documents (as defined below), the Company is unaware of any facts or circumstances which might give rise to any of the foregoing.

(g) SEC Documents; Financial Statements. Since February 6, 1997,  
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the Company has timely filed all reports, schedules, forms, statements and other documents required to be filed by it with the SEC pursuant to the reporting requirements of the Exchange Act of 1934, as amended (the "1934 ACT") (all of the foregoing filed prior to the date hereof and all exhibits included therein and financial statements and schedules thereto and documents (other than exhibits) incorporated by reference therein, being hereinafter referred to herein as the "SEC DOCUMENTS"). The Company has delivered or made available to each Buyer true and complete copies of the SEC Documents, except for such exhibits and incorporated documents. As of their respective dates, the SEC Documents complied in all material respects with the requirements of the 1934 Act and the rules and regulations of the SEC promulgated thereunder applicable to the SEC Documents, and none of the SEC Documents, at the time they were filed with the SEC, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading. As of their respective dates, the financial statements of the Company included in the SEC Documents complied as to form in all material respects with applicable accounting requirements and the published rules and regulations of the SEC with respect thereto. Such financial statements have been prepared in accordance with generally accepted accounting principles, consistently applied, during the periods involved (except (i) as may be otherwise indicated in such financial statements or the notes thereto, or (ii) in the case of unaudited interim statements, to the extent they may not include footnotes or may be condensed or summary statements) and fairly present in all material respects the consolidated financial position of the Company and its consolidated Subsidiaries as of the dates thereof and the consolidated results of their operations and cash flows for the periods then ended (subject, in the case of unaudited statements, to normal year-end audit adjustments). Except as set forth in the financial statements of the Company included in the SEC Documents, the Company has no liabilities, contingent or otherwise, other than (i) liabilities incurred in the ordinary course of business subsequent to June 30, 1997 and (ii) obligations under contracts and commitments incurred in the ordinary course of business and not required under generally accepted accounting principles to be reflected in such financial statements, which, individually or in the aggregate, are not material to the financial condition or operating results of the Company.

(h) Absence of Certain Changes. Except for operating losses  
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incurred in the normal course of business, since June 30, 1997, there has been no material adverse change and no material adverse development in the assets, liabilities, business, properties, operations, financial condition, results of operations or prospects of the Company.

(i) Absence of Litigation. There is no action, suit, claim,  
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proceeding, inquiry or investigation before or by any court, public board, government agency, self-regulatory organization or body pending or, to the knowledge of the Company, threatened against or affecting the Company, or its officers or directors in their capacity as such, that could have a Material Adverse Effect. SCHEDULE 3(i) contains a complete list and summary description of any

pending or, to the Company's knowledge, threatened proceeding against or affecting the Company, without regard to whether it would have a Material Adverse Effect. Except as set forth on SCHEDULE 3(i), the Company is unaware of any facts or circumstances which might give rise to any of the foregoing.

(j) Patents, Copyrights, etc. The Company and each of its

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Subsidiaries owns or possesses the requisite licenses or rights to use all patents, patent rights, inventions, know-how, trade secrets, trademarks, service marks, service names, trade names and copyrights ("INTELLECTUAL PROPERTY") necessary to enable it to conduct its business as now operated (and, except as set forth in SCHEDULE 3(j) hereof, to the best of the Company's knowledge, as presently contemplated to be operated in the future); there is no claim or action by any person pertaining to, or proceeding pending, or to the Company's knowledge threatened which challenges the right of the Company or of a Subsidiary with respect to any Intellectual Property necessary to enable it to conduct its business as now operated (and, except as set forth in SCHEDULE 3(j) hereof, to the best of the Company's knowledge, as presently contemplated to be operated in the future); to the best of the Company's knowledge, the Company's or its Subsidiaries, current and intended products, services and processes do not infringe on any Intellectual Property or other rights held by any person; and the Company is unaware of any facts or circumstances which might give rise to any of the foregoing. The Company and each of its Subsidiaries have taken reasonable security measures to protect the secrecy, confidentiality and value of their Intellectual Property.

(k) No Materially Adverse Contracts, Etc. The Company is not

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subject to any charter, corporate or other legal restriction, or any judgment, decree, order, rule or regulation which in the judgment of the Company's officers has or is expected in the future to have a Material Adverse Effect. Except as set forth on SCHEDULE 3(k), the Company is not a party to any contract or agreement which in the judgment of the Company's officers has or is expected to have a Material Adverse Effect.

(l) Tax Status. Except as set forth on SCHEDULE 3(l), the Company

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has made or filed all federal and state income and all other tax returns, reports and declarations required by any jurisdiction to which it is subject (unless and only to the extent that the Company has set aside on its books provisions reasonably adequate for the payment of all unpaid and unreported taxes) and has paid all taxes and other governmental assessments and charges that are material in amount, shown or determined to be due on such returns, reports and declarations, except those being contested in good faith and has set aside on its books provisions reasonably adequate for the payment of all taxes for periods subsequent to the periods to which such returns, reports or declarations apply. There are no unpaid taxes in any material amount claimed to be due by the taxing authority of any jurisdiction, and the officers of the Company know of no basis for any such claim.

(m) Certain Transactions. Except as set forth on SCHEDULE 3(m) and

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except for arm's length transactions pursuant to which the Company makes payments in the ordinary course of business upon terms no less favorable than the Company could obtain from third parties and other than the grant of stock options disclosed on SCHEDULE 3(c), none of the officers, directors, or employees of the Company is presently a party to any transaction with the Company (other

than for services as employees, officers and directors), including any contract, agreement or other arrangement providing for the furnishing of services to or by, providing for rental of real or personal property to or from, or otherwise requiring payments to or from any officer, director or such employee or, to the knowledge of the Company, any corporation, partnership, trust or other entity in which any officer, director, or any such employee has a substantial interest or is an officer, director, trustee or partner.

(n) Disclosure. All information relating to or concerning the

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Company set forth in this Agreement and provided to the Buyers pursuant to Section 2(d) hereof and otherwise in connection with the transactions contemplated hereby is true and correct in all material respects and the Company has not omitted to state any material fact necessary in order to make the statements made herein or therein, in light of the circumstances under which they were made, not misleading. Other than the transactions contemplated by this Agreement, no event or circumstance has occurred or exists with respect to the Company or its business, properties, prospects, operations or financial conditions, which, under applicable law, rule or regulation, requires public disclosure or announcement by the Company but which has not been so publicly announced or disclosed (assuming for this purposes that the Company's reports filed under the 1934 Act are being incorporated into an effective registration statement filed by the Company under the 1933 Act).

(o) Acknowledgment Regarding Buyers' Purchase of Securities. The

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Company acknowledges and agrees that the Buyers are acting solely in the capacity of arm's length purchasers with respect to this Agreement and the transactions contemplated hereby. The Company further acknowledges that no Buyer is acting as a financial advisor or fiduciary of the Company (or in any similar capacity) with respect to this Agreement and the transactions contemplated hereby and any advice given by any Buyer or any of their respective representatives or agents in connection with this Agreement and the transactions contemplated hereby is merely incidental to the Buyers' purchase of the Securities. The Company further represents to each Buyer that the Company's decision to enter into this Agreement has been based solely on the independent evaluation of the Company and its representatives.

(p) No Integrated Offering. Neither the Company, nor any of its

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affiliates, nor any person acting on its or their behalf, has directly or indirectly made any offers or sales in any security or solicited any offers to buy any security under circumstances that would require registration under the 1933 Act of the issuance of the Securities to the Buyers. The issuance of the Securities to the Buyers will not be integrated with any other issuance of the Company's securities (past, current or future) which requires stockholder approval under the rules of the Nasdaq.

(q) No Brokers. The Company has taken no action which would give

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rise to any claim by any person for brokerage commissions, finder's fees or similar payments relating to this Agreement or the transactions contemplated hereby, except for dealings with The Shemano Group, Inc., whose commissions and fees will be paid for by the Company.



(r) Permits; Compliance. The Company is in possession of all

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franchises, grants, authorizations, licenses, permits, easements, variances, exemptions, consents, certificates, approvals and orders necessary to own, lease and operate its properties and to carry on its business as it is now being conducted (collectively, the "COMPANY PERMITS"), except where the failure to possess such Company Permit would not have a Material Adverse Effect, and there is no action pending or, to the knowledge of the Company, threatened regarding suspension or cancellation of any of the Company Permits. The Company is not in conflict with, or in default or violation of, any of the Company Permits, except for any such conflicts, defaults or violations which, individually or in the aggregate, would not reasonably be expected to have a Material Adverse Effect. Since June 30, 1997, the Company has not received any notification with respect to possible conflicts, defaults or violations of applicable laws, except for notices relating to possible conflicts, defaults or violations, which conflicts, defaults or violations would not have a Material Adverse Effect.

(s) Environmental Matters.

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(i) Except as set forth in SCHEDULE 3(s), there are, to the Company's knowledge, with respect to the Company or any predecessor of the Company, no past or present violations of Environmental Laws (as defined below), releases of any material into the environment, actions, activities, circumstances, conditions, events, incidents, or contractual obligations which may give rise to any common law environmental liability or any liability under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 or similar federal, state, local or foreign laws and the Company has not received any notice with respect to any of the foregoing, nor is any action pending or, to the Company's knowledge, threatened in connection with any of the foregoing. The term "ENVIRONMENTAL LAWS" means all federal, state, local or foreign laws relating to pollution or protection of human health or the environment (including, without limitation, ambient air, surface water, groundwater, land surface or subsurface strata), including, without limitation, laws relating to emissions, discharges, releases or threatened releases of chemicals, pollutants contaminants, or toxic or hazardous substances or wastes (collectively, "HAZARDOUS MATERIALS") into the environment, or otherwise relating to the manufacture, processing, distribution, use, treatment, storage, disposal, transport or handling of Hazardous Materials, as well as all authorizations, codes, decrees, demands or demand letters, injunctions, judgments, licenses, notices or notice letters, orders, permits, plans or regulations issued, entered, promulgated or approved thereunder.

(ii) Other than those that are or were stored, used or disposed of in compliance with applicable law, no Hazardous Materials are contained on or about any real property currently owned, leased or used by the Company, and no Hazardous Materials were released on or about any real property previously owned, leased or used by the Company during the period the property was owned, leased or used by the Company, except in the normal course of the Company's business.

(iii) To the Company's knowledge, there are no underground storage tanks on or under any real property owned, leased or used by the Company that are not in compliance with applicable law.

(t) Title to Property. The Company has good and marketable title

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in fee simple to all real property and good and marketable title to all personal property owned by them which is material to the business of the Company, in each case free and clear of all liens, encumbrances and defects except such as are described in SCHEDULE 3(t) or such as would not have a Material Adverse Effect. Any real property and facilities held under lease by the Company is held by it under valid, subsisting and enforceable leases with such exceptions as would not have a Material Adverse Effect.

(u) Insurance. The Company is insured by insurers of recognized

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financial responsibility against such losses and risks and in such amounts as management of the Company believes to be prudent and customary in the businesses in which the Company is engaged. The Company has no reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business at a cost that would not have a Material Adverse Effect.

(v) Internal Accounting Controls. The Company maintains a system

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of internal accounting controls sufficient, in the judgment of the Company's board of directors, to provide reasonable assurance that (i) transactions are executed in accordance with management's general or specific authorizations, (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles and to maintain asset accountability, (iii) access to assets is permitted only in accordance with management's general or specific authorization and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences.

(w) Foreign Corrupt Practices. Neither the Company, nor any

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director, officer, agent, employee or other person acting on behalf of the Company has, in the course of his actions for, or on behalf of, the Company, used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expenses relating to political activity; made any direct or indirect unlawful payment to any foreign or domestic government official or employee from corporate funds; violated or is in violation of any provision of the U.S. Foreign Corrupt Practices Act of 1977; or made any bribe, rebate, payoff, influence payment, kickback or other unlawful payment to any foreign or domestic government official or employee.

#### 4. COVENANTS.

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(a) Best Efforts. The parties shall use their best efforts to

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satisfy timely each of the conditions described in Section 6 and 7 of this Agreement.

(b) Form D; Blue Sky Laws. The Company agrees to file a Form D

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with respect to the Securities as required under Regulation D and to provide a copy thereof to each Buyer promptly after such filing. The Company shall, on or before the Closing Date with respect to the First Closing, take such action as the Company shall reasonably determine is necessary to qualify the Securities for sale to the Buyers at the applicable closing pursuant to this Agreement under applicable securities or "blue sky" laws of the states of the United States (or to obtain an

exemption from such qualification), and shall provide evidence of any such action so taken to each Buyer on or prior to the Closing Date with respect to the First Closing.

(c) Reporting Status; Eligibility to Use Form S-3. The Company's

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Common Stock is registered under Section 12(g) of the 1934 Act. So long as any Buyer beneficially owns any of the Securities, the Company shall timely file all reports required to be filed with the SEC pursuant to the 1934 Act, and the Company shall not terminate its status as an issuer required to file reports under the 1934 Act even if the 1934 Act or the rules and regulations thereunder would permit such termination. The Company currently meets, and will take all necessary action to continue to meet, the "registrant eligibility" requirements set forth in the general instructions to Form S-3.

(d) Use of Proceeds. The Company shall use the proceeds from the

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sale of the Preferred Shares in the manner set forth in SCHEDULE 4(d) attached hereto and made a part hereof and shall not, directly or indirectly, use such proceeds for any loan to or investment in any other corporation, partnership, enterprise or other person (except in connection with its currently existing direct or indirect Subsidiaries).

(e) Additional Equity Capital; Right To Purchase. Subject to the

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exceptions described below, the Company will not, without the prior written consent of RGC International Investors, LDC ("RGCI"), register any equity financing (including debt financing with an equity component) or otherwise allow any public resales of equity interests in the Company's securities, issued after April 24, 1998, pursuant to Rule 144 or otherwise during the period (the "LOCK-UP PERIOD") (i) beginning on the Closing Date with respect to the First Closing and ending one hundred eighty (180) days from the date the Registration Statement (as defined in the Registration Rights Agreement) is declared effective (plus any trading days after the Registration Statement is declared effective and prior to such 180th day during which sales cannot be made thereunder) and (ii) beginning on the Closing Date with respect to the Second Closing and ending sixty (60) days from the Closing Date with respect to the Second Closing. In addition, subject to the exceptions described below, the Company will not conduct any equity financing (including debt financing with an equity component) ("FUTURE OFFERINGS") during the Lock-up Period, unless it shall have first delivered to RGCI, at least fifteen (15) business days prior to the closing of such Future Offering, written notice describing the proposed Future Offering, including the terms and conditions thereof and proposed definitive documentation to be entered into in connection therewith, and providing each Buyer an option during the ten (10) day period following delivery of such notice to purchase at least the percentage equal to (a) the number of outstanding shares of Preferred Stock at the time of the notice multiplied by 1,000, divided by (b) the Company's then current market capitalization, of the securities being offered in the Future Offering on the same terms as contemplated by such Future Offering (the limitations referred to in this sentence and the preceding sentence are collectively referred to as the "CAPITAL RAISING LIMITATIONS"). In the event the terms and conditions of a proposed Future Offering are amended in any material respect after delivery of the notice to RGCI concerning the proposed Future Offering, the Company shall deliver a new notice to RGCI describing the amended terms and conditions of the proposed Future Offering and RGCI thereafter shall have an option during the ten (10) day period following delivery of such new notice to purchase at least the percentage

equal to (a) the number of outstanding shares of Preferred Stock at the time of the notice multiplied by 1,000, divided by (b) the Company's then current market capitalization, of the securities being offered on the same terms as contemplated by such proposed Future Offering, as amended. The foregoing sentence shall apply to successive amendments to the terms and conditions of any proposed Future Offering during the Lock-Up Period. The Capital Raising Limitations shall not apply to any transaction involving (i) issuances of securities in a firm commitment underwritten public offering (excluding a continuous offering pursuant to Rule 415 under the 1933 Act) or (ii) issuances of securities as consideration for a merger, consolidation or purchase of assets, or in connection with any strategic partnership or joint venture (the primary purpose of which is not to raise equity capital), or in connection with the disposition or acquisition of a business, product or license by the Company. The Capital Raising Limitations also shall not apply to the issuance of securities upon exercise or conversion of the Company's options, warrants or other convertible securities outstanding as of the date hereof or to the grant of additional options or warrants, or the issuance of additional securities, under any Company stock option or stock purchase plan previously in effect or approved by a majority of the Company's disinterested directors.

(f) Expenses. The Company shall reimburse Rose Glen Capital

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Management, L.P. ("RGC") for all expenses incurred by it in connection with the negotiation, preparation, execution, delivery and performance of this Agreement and the other agreements to be executed in connection herewith, including, without limitation, attorneys' and consultants' fees and expenses. The Company's obligation to reimburse RGC's expenses under this Section 4(f) and the Registration Rights Agreement shall be limited to an aggregate of Twenty-Five Thousand Dollars (\$25,000) of which Five Thousand Dollars (\$5,000) was advanced previously.

(g) Financial Information. The Company agrees to send the following

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reports to each Buyer until such Buyer transfers, assigns, or sells all of the Securities: (i) within one (1) day after release, copies of all press releases issued by the Company or any of its Subsidiaries; and (ii) contemporaneously with the making available or giving to the stockholders of the Company, copies of any notices or other information the Company makes available or gives to such stockholders.

(h) Reservation of Shares. The Company shall at all times have

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authorized, and reserved for the purpose of issuance, a sufficient number of shares of Common Stock to provide for the full conversion of the outstanding Preferred Shares and issuance of the Conversion Shares in connection therewith (based on the Conversion Price of the Preferred Shares in effect from time to time). The Company shall not reduce the number of shares of Common Stock reserved for issuance upon conversion of Preferred Shares without the consent of each Buyer. The Company shall use its best efforts at all times to maintain the number of shares of Common Stock so reserved for issuance at no less than two (2) times the number that is then actually issuable upon full conversion of the Preferred Shares (based on the Conversion Price of the Preferred Shares in effect from time to time). If at any time the number of shares of Common Stock authorized and reserved for issuance is below the number of Conversion Shares issued and issuable upon conversion of the Preferred Shares (based on the Conversion Price of the Preferred Shares then in effect), the Company will promptly take all corporate action necessary to

authorize and reserve a sufficient number of shares, including, without limitation, calling a special meeting of shareholders to authorize additional shares to meet the Company's obligations under this Section 4(h), in the case of an insufficient number of authorized shares, and using its best efforts to obtain shareholder approval of an increase in such authorized number of shares.

(i) Listing. The Company shall promptly, but no later than ten (10)

days from each Closing Date, secure the listing of the Conversion Shares issuable with respect to the Preferred Shares issued at each respective Closing upon each national securities exchange or automated quotation system, if any, upon which shares of Common Stock are then listed (subject to official notice of issuance) and shall maintain, so long as any other shares of Common Stock shall be so listed, such listing of all Conversion Shares from time to time issuable upon conversion of the Preferred Shares. The Company will obtain and maintain the listing and trading of its Common Stock on Nasdaq, the Nasdaq SmallCap Market ("NASDAQ SMALLCAP"), the New York Stock Exchange ("NYSE"), or the American Stock Exchange ("AMEX") and will comply in all respects with the Company's reporting, filing and other obligations under the bylaws or rules of the National Association of Securities Dealers ("NASD") and such exchanges, as applicable. The Company shall promptly provide to each Buyer copies of any notices it receives from Nasdaq and any other exchanges or quotation systems on which the Common Stock is then listed regarding the continued eligibility of the Common Stock for listing on such exchanges and quotation systems.

(j) Corporate Existence. Subject to the Company's right to

exercise the right described in Article IV.B(i) of the Certificate of Designations, so long as a Buyer beneficially owns any Preferred Shares, the Company shall maintain its corporate existence and shall not sell all or substantially all of the Company's assets, except in the event of a merger or consolidation or sale of all or substantially all of the Company's assets, where the surviving or successor entity in such transaction (i) assumes the Company's obligations hereunder and under the agreements and instruments entered into in connection herewith and (ii) if the consideration to be received for such transaction is equity securities, is a publicly traded corporation whose Common Stock is listed for trading on Nasdaq, Nasdaq SmallCap, NYSE or AMEX.

(k) No Integration. The Company will not conduct any future

offering that will be integrated with the issuance of the Securities solely for purposes of Rule 4460(i) of the Nasdaq Stock Market.

(l) Solvency. The Company (both before and after giving effect to

the transactions contemplated by this Agreement) is solvent (i.e., its assets have a fair market value in excess of the amount required to pay its probable liabilities on its existing debts as they become absolute and matured) and currently subject to SCHEDULE 4(1), the Company has no information that would lead it to reasonably conclude that the Company would not have, nor does it intend to take any action that would impair, its ability to pay its debts from time to time incurred in connection therewith as such debts mature. The Company did not receive a qualified opinion from its auditors with respect to its most recent fiscal year end and does not anticipate or know of any basis upon which its auditors might issue a qualified opinion in respect of its current fiscal year.

(m) Trading Restrictions. Each Buyer covenants and agrees that,

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during any Pricing Period (as defined in the Certificate of Designations) during which a Conversion Price (as defined in the Certificate of Designations) is computed, if a Buyer (or others acting on its behalf) engages in short sale transactions or other hedging activities which involve, among other things, sales of shares of Common Stock, such Buyer will place its sale orders for Common Stock in the course of such activities so as not to complete or effect any such sale on any trading day during such period at a price which is lower than the lowest sale effected on such day by persons other than the Buyers (or others acting on their behalf).

5. TRANSFER AGENT INSTRUCTIONS. The Company shall issue irrevocable

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instructions to its transfer agent to issue certificates, registered in the name of each Buyer or its nominee, for the Conversion Shares in such amounts as specified from time to time by each Buyer to the Company upon conversion of the Preferred Shares in accordance with the terms thereof (the "IRREVOCABLE TRANSFER AGENT INSTRUCTIONS"). Prior to registration of the Conversion Shares under the 1933 Act, all such certificates shall bear the restrictive legend specified in Section 2(g) of this Agreement. The Company warrants that no instruction other than the Irrevocable Transfer Agent Instructions referred to in this Section 5, and stop transfer instructions to give effect to Section 2(f) hereof (in the case of the Conversion Shares, prior to registration of the Conversion Shares under the 1933 Act), will be given by the Company to its transfer agent and that the Conversion Shares shall otherwise be freely transferable on the books and records of the Company as and to the extent provided in this Agreement and the Registration Rights Agreement. Nothing in this Section shall affect in any way the Buyer's obligations and agreement set forth in Section 2(g) hereof to comply with all applicable prospectus delivery requirements, if any, upon resale of the Conversion Shares. If a Buyer provides the Company with an opinion of counsel, reasonably satisfactory to the Company in form, substance and scope, that registration of a resale by such Buyer of any of the Securities is not required under the 1933 Act, the Company shall permit the transfer, and, in the case of the Conversion Shares, promptly instruct its transfer agent to issue one or more certificates in such name and in such denominations as specified by such Buyer. The Company acknowledges that a breach by it of its obligations hereunder will cause irreparable harm to the Buyers, by vitiating the intent and purpose of the transaction contemplated hereby. Accordingly, the Company acknowledges that the remedy at law for a breach of its obligations under this Section 5 will be inadequate and agrees, in the event of a breach or threatened breach by the Company of the provisions of this Section, that the Buyers shall be entitled, in addition to all other available remedies, to an injunction restraining any breach and requiring immediate transfer, without the necessity of showing economic loss and without any bond or other security being required.

6. CONDITIONS TO THE COMPANY'S OBLIGATION TO SELL. The obligation of the

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Company hereunder to issue and sell the Preferred Shares to a Buyer at each of the First Closing and Second Closing, as applicable, is subject to the satisfaction, at or before the Closing Date in respect of such closing, of each of the following conditions thereto, provided that these conditions are for the Company's sole benefit and may be waived by the Company at any time in its sole discretion:

(a) With respect to the First Closing and the Second Closing:

(i) the applicable Buyer shall have executed this Agreement and the Registration Rights Agreement, and delivered the same to the Company.

(ii) The applicable Buyer shall have delivered the Purchase Price in accordance with Section 1(b) above.

(iii) The Series I Certificate of Designation shall have been accepted for filing with the Secretary of State of the State of Michigan.

(iv) The representations and warranties of the applicable Buyer shall be true and correct in all material respects as of the date when made and as of each Closing Date as though made at that time (except for representations and warranties that speak as of a specific date), and the applicable Buyer shall have performed, satisfied and complied in all material respects with the covenants, agreements and conditions required by this Agreement to be performed, satisfied or complied with by the applicable Buyer at or prior to each Closing Date.

(v) No litigation, statute, rule, regulation, executive order, decree, ruling or injunction shall have been enacted, entered, promulgated or endorsed by or in any court or governmental authority of competent jurisdiction or any self-regulatory organization having authority over the matters contemplated hereby which prohibits the consummation of any of the transactions contemplated by this Agreement.

(b) With respect to the Second Closing:

(i) The Series II Certificate of Designation shall have been accepted for filing with the Secretary of State of the State of Michigan, and a copy thereof certified by such Secretary of State shall have been delivered to such Buyer.

(ii) At any time on or after the 90th day following the Closing Date in respect of the First Closing, the Closing Bid Price of the Common Stock is greater than \$6.00 for any twenty (20) consecutive Trading Days and the Company provides notice to the Buyers to that effect.

(iii) The Closing Bid Price (as defined in the Certificate of Designation) of the Common Stock on the Trading Day (as defined in the Certificate of Designation) immediately preceding the Closing Date with respect to the Second Closing is greater than \$6.00.

(iv) Ninety (90) days shall have elapsed since the Closing Date with respect to the First Closing and no more than one (1) year shall have elapsed since the Closing Date with respect to the First Closing.

7. CONDITIONS TO EACH BUYER'S OBLIGATION TO PURCHASE. The obligation  
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of each Buyer hereunder to purchase the Preferred Shares at each of the First Closing

and Second Closing, as applicable, is subject to the satisfaction, at or before the Closing Date in respect of such closing of each of the following conditions, provided that these conditions are for such Buyer's sole benefit and may be waived by such Buyer at any time in its sole discretion:

(a) With respect to the First Closing and the Second Closing:

(i) The Company shall have executed this Agreement and the Registration Rights Agreement, and delivered the same to the Buyer.

(ii) The Company shall have delivered to such Buyer duly executed certificates (in such denominations as the Buyer shall request) representing the Preferred Shares in accordance with Section 1(b) above.

(iii) The Series I Certificate of Designation shall have been accepted for filing with the Secretary of State of the State of Michigan, and a copy thereof certified by such Secretary of State shall have been delivered to such Buyer.

(iv) The Irrevocable Transfer Agent Instructions, in form and substance satisfactory to a majority-in-interest of the Buyers, shall have been delivered to and acknowledged in writing by the Company's Transfer Agent.

(v) The representations and warranties of the Company shall be true and correct in all material respects as of the date when made and as of each Closing Date as though made at such time (except for representations and warranties that speak as of a specific date and in each case subject to the schedules referred to in such representations and warranties provided by the Company as of each Closing Date) and the Company shall have performed, satisfied and complied in all material respects with the covenants, agreements and conditions required by this Agreement to be performed, satisfied or complied with by the Company at or prior to each Closing Date. The Buyer shall have received a certificate or certificates, executed on behalf of the Company by the chief executive officer of the Company, dated as of each Closing Date, to the foregoing effect and as to such other matters as may be reasonably requested by such Buyer including, but not limited to, those matters described in Section 3(c) above, and certificates with respect to the Company's Certificate of Incorporation, By-laws and Board of Directors' resolutions relating to the transactions contemplated hereby.

(vi) No litigation, statute, rule, regulation, executive order, decree, ruling or injunction shall have been enacted, entered, promulgated or endorsed by or in any court or governmental authority of competent jurisdiction or any self-regulatory organization having authority over the matters contemplated hereby which prohibits the consummation of any of the transactions contemplated by this Agreement.

(vii) Trading in the Common Stock on Nasdaq shall not have been suspended by the SEC or Nasdaq.



(viii) The Buyer shall have received opinions of the Company's counsel, dated as of each Closing Date, in form, scope and substance reasonably satisfactory to the Buyer and in substantially the same form as EXHIBIT "C-1" and EXHIBIT "C-2" attached hereto.

(ix) The Company shall have obtained waivers of any preemptive rights and pari passu limitations in respect of the sale of the Preferred Shares to be issued at each Closing from the holders of shares of any other existing series of the Company's preferred stock.

(b) With respect to the Second Closing:

(i) The Series II Certificate of Designation shall have been accepted for filing with the Secretary of State of the State of Michigan, and a copy thereof certified by such Secretary of State shall have been delivered to such Buyer.

(ii) At any time on or after the 90th day following the Closing Date in respect of the First Closing, the Closing Bid Price of the Common Stock is greater than \$6.00 for any twenty (20) consecutive Trading Days and the Company provides notice to the Buyers to that effect.

(iii) The Closing Bid Price (as defined in the Certificate of Designation) of the Common Stock on the Trading Day (as defined in the Certificate of Designation) immediately preceding the Closing Date with respect to the Second Closing is greater than \$6.00.

(iv) Ninety (90) days shall have elapsed since the Closing Date with respect to the First Closing and no more than one (1) year shall have elapsed since the Closing Date with respect to the First Closing.

(v) The registration statement(s) filed by the Company pursuant to Section 2(a) of the Registration Rights Agreement covering the resale of the Registrable Securities (as defined in the Registration Rights Agreement) underlying the Preferred Shares issued or issuable at the First Closing and the Second Closing and shall be effective and no stop order shall have been issued in respect thereof.

(vi) If Section 4(e) is not then in effect, the Company shall not, prior to the Closing Date with respect to the Second Closing, have obtained any equity financing (including debt financing with an equity component) that would otherwise be covered by Section 4(e) had such section been in effect.

8. GOVERNING LAW; MISCELLANEOUS.  
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(a) Governing Law. This Agreement shall be governed by and  
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interpreted in accordance with the laws of the State of Michigan without regard to the principles of conflict of laws. The parties hereto hereby submit to the exclusive jurisdiction of the United States Federal Courts located in Delaware with respect to any dispute arising under this Agreement, the

agreements entered into in connection herewith or the transactions contemplated hereby or thereby.

(b) Counterparts; Signatures by Facsimile. This Agreement may be

executed in two or more counterparts, all of which shall be considered one and the same agreement and shall become effective when counterparts have been signed by each party and delivered to the other party. This Agreement, once executed by a party, may be delivered to the other party hereto by facsimile transmission of a copy of this Agreement bearing the signature of the party so delivering this Agreement.

(c) Headings. The headings of this Agreement are for convenience of

reference and shall not form part of, or affect the interpretation of, this Agreement.

(d) Severability. If any provision of this Agreement shall be invalid or

unenforceable in any jurisdiction, such invalidity or unenforceability shall not affect the validity or enforceability of the remainder of this Agreement or the validity or enforceability of this Agreement in any other jurisdiction.

(e) Entire Agreement; Amendments. This Agreement and the instruments

referenced herein contain the entire understanding of the parties with respect to the matters covered herein and therein and, except as specifically set forth herein or therein, neither the Company nor the Buyer makes any representation, warranty, covenant or undertaking with respect to such matters. No provision of this Agreement may be waived or amended other than by an instrument in writing signed by the party to be charged with enforcement.

(f) Notices. Any notices required or permitted to be given under the

terms of this Agreement shall be sent by certified or registered mail (return receipt requested) or delivered personally or by courier (including a recognized overnight delivery service) or by facsimile and shall be effective five days after being placed in the mail, if mailed by regular U.S. mail, or upon receipt, if delivered personally or by courier (including a recognized overnight delivery service) or by facsimile, in each case addressed to a party. The addresses for such communications shall be:

If to the Company:

Aastrom Biosciences, Inc.  
24 Frank Lloyd Wright Drive  
P.O. Box 376  
Ann Arbor, Michigan 48106

Attention: R. Douglas Armstrong  
President & Chief Executive Officer

Facsimile: (734) 930-5546

With copy to:

Gray Cary Ware & Freidenrich LLP  
4365 Executive Drive, Suite 1600  
San Diego, CA 92121-2189

Attention: Douglas J. Rein, Esq.

Facsimile: (619) 677-1477

If to a Buyer: To the address set forth immediately below such Buyer's name on the signature pages hereto.

Each party shall provide notice to the other party of any change in address.

(g) Successors and Assigns. This Agreement shall be binding

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upon and inure to the benefit of the parties and their successors and assigns. Neither the Company nor any Buyer shall assign this Agreement or any rights or obligations hereunder without the prior written consent of the other. Notwithstanding the foregoing, subject to Section 2(f), any Buyer may assign its rights hereunder to any person that purchases Securities in a private transaction from a Buyer or to any of its "affiliates," as that term is defined under the 1934 Act, without the consent of the Company.

(h) Third Party Beneficiaries. This Agreement is intended for

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the benefit of the parties hereto and their respective permitted successors and assigns, and is not for the benefit of, nor may any provision hereof be enforced by, any other person.

(i) Survival. The representations and warranties of the

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Company and the agreements and covenants set forth in Sections 3, 4, 5 and 8 shall survive each Closing hereunder notwithstanding any due diligence investigation conducted by or on behalf of the Buyers.

(j) Publicity. The Company and each of the Buyers shall have

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the right to review a reasonable period of time before issuance of any press releases, SEC, Nasdaq or NASD filings, or any other public statements with respect to the transactions contemplated hereby; provided, however, that the  
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Company shall be entitled, without the prior approval of each of the Buyers, to make any press release or SEC, Nasdaq or NASD filings with respect to such transactions as is required by applicable law and regulations (although each of the Buyers shall be consulted by the Company in connection with any such press release prior to its release and shall be provided with a copy thereof and be given an opportunity to comment thereon).

(k) Further Assurances. Each party shall do and perform, or

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cause to be done and performed, all such further acts and things, and shall execute and deliver all such other agreements, certificates, instruments and documents, as the other party may reasonably request in order to carry out the intent and accomplish the purposes of this Agreement and the consummation of the transactions contemplated hereby.

(1) No Strict Construction. The language used in this Agreement

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will be deemed to be the language chosen by the parties to express their mutual intent, and no rules of strict construction will be applied against any party.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the undersigned Buyers and the Company have caused this Agreement to be duly executed as of the date first above written.

AASTROM BIOSCIENCES, INC.

By: \_\_\_\_\_  
R. Douglas Armstrong, Ph.D.  
President & Chief Executive Officer

RGC INTERNATIONAL INVESTORS, LDC

By: \_\_\_\_\_  
Rose Glen Capital Management, L.P.,  
Investment Manager

By: \_\_\_\_\_  
RGC General Partner Corp., as General Partner

By: \_\_\_\_\_  
Wayne D. Bloch  
Managing Director

RESIDENCE: Cayman Islands

ADDRESS:

c/o Rose Glen Capital Management, L.P.  
3 Bala Plaza East, Suite 200  
251 St. Asaphs Road  
Bala Cynwyd, PA 19004  
Facsimile: (610) 617-0570  
Telephone: (610) 617-5900

AGGREGATE SUBSCRIPTION AMOUNT:

First Closing

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Number of Shares of Series I Preferred Stock:5,000  
Aggregate Purchase Price:\$5,000,000

Second Closing

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Number of Shares of Series II Preferred Stock:3,000  
Aggregate Purchase Price:\$3,000,000

EXHIBIT D

NOTICE OF CONVERSION

(To be Executed by the Registered Holder  
in order to Convert the 1998 Series I Preferred Stock)

The undersigned hereby irrevocably elects to convert \_\_\_\_\_ shares of 1998 Series I Preferred Stock, represented by stock certificate No(s). \_\_\_\_\_ (the "PREFERRED STOCK CERTIFICATES") into shares of common stock ("COMMON STOCK") of Aastrom Biosciences, Inc. (the "CORPORATION") according to the conditions of the Certificate of Designation of 1998 Series I Preferred Stock, as of the date written below. If securities are to be issued in the name of a person other than the undersigned, the undersigned will pay all transfer taxes payable with respect thereto and is delivering herewith such certificates. No fee will be charged to the Holder for any conversion, except for transfer taxes, if any. A copy of each Preferred Stock Certificate is attached hereto (or evidence of loss, theft or destruction thereof).

The undersigned represents and warrants that all offers and sales by the undersigned of the securities issuable to the undersigned upon conversion of the 1998 Series I Preferred Stock shall be made pursuant to registration of the securities under the Securities Act of 1933, as amended (the "ACT"), or pursuant to an exemption from registration under the Act and that it is in compliance with covenants set forth in Section 4(m) of the Securities Purchase Agreement.

Date of Conversion: \_\_\_\_\_

Applicable Conversion Price: \_\_\_\_\_

Market Price Days: \_\_\_\_\_

Number of Shares of Common Stock to be Issued: \_\_\_\_\_

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\* The Corporation is not required to issue shares of Common Stock until the original 1998 Series I Preferred Stock Certificate(s) (or evidence of loss, theft or destruction thereof) to be converted are received by the Corporation or its Transfer Agent. The Corporation shall issue and deliver shares of Common Stock to an overnight courier not later than two (2) business days following receipt of the original Preferred Stock Certificate(s) to be converted, and shall make payments pursuant to the Certificate of Designation for the number of business days such issuance and delivery is late.

## REGISTRATION RIGHTS AGREEMENT

REGISTRATION RIGHTS AGREEMENT (this "AGREEMENT"), dated as of July 2, 1998, by and among Aastrom Biosciences, Inc., a Michigan corporation, with its headquarters located at 24 Frank Lloyd Wright Drive, Ann Arbor, Michigan 48106 (the "COMPANY"), and each of the undersigned (together with their respective affiliates and any assignee or transferee of all of their respective rights hereunder, the "INITIAL INVESTORS").

## WHEREAS:

A. In connection with the Securities Purchase Agreement by and among the parties hereto of even date herewith (the "SECURITIES PURCHASE AGREEMENT"), the Company has agreed, upon the terms and subject to the conditions contained therein, to issue and sell to the Initial Investors shares of its 1998 Series I Convertible Preferred Stock (the "SERIES I PREFERRED STOCK") and 1998 Series II Preferred Stock (the "SERIES II PREFERRED STOCK" and, collectively with the Series I Preferred Stock, the "PREFERRED STOCK") that are convertible into shares (the "CONVERSION SHARES") of the Company's common stock, no par value (the "COMMON STOCK"), upon the terms and subject to the limitations and conditions set forth in the Certificate of Designations, Rights, Preferences, Privileges and Restrictions with respect to the Series I Preferred Stock (the "SERIES I CERTIFICATE OF DESIGNATION") and the Certificate of Designations, Rights, Preferences, Privileges and Restrictions with respect to the Series II Preferred Stock (the "SERIES II CERTIFICATE OF DESIGNATION" and, collectively with the Series I Certificate of Designation, the "CERTIFICATE OF DESIGNATIONS"); and

B. To induce the Initial Investors to execute and deliver the Securities Purchase Agreement, the Company has agreed to provide certain registration rights under the Securities Act of 1933, as amended, and the rules and regulations thereunder, or any similar successor statute (collectively, the "1933 ACT"), and applicable state securities laws;

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company and each of the Initial Investors hereby agree as follows:

## 1. DEFINITIONS.

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(a) As used in this Agreement, the following terms shall have the following meanings:

(i) "INVESTORS" means the Initial Investors and any transferee or assignee who agrees to become bound by the provisions of this Agreement in accordance with Section 9 hereof.

(ii) "REGISTER," "REGISTERED," and "REGISTRATION" refer to a registration effected by preparing and filing a Registration Statement or Statements in compliance with the 1933 Act and pursuant to Rule 415 under the 1933 Act or any successor rule providing for



offering securities on a continuous basis ("RULE 415"), and the declaration or ordering of effectiveness of such Registration Statement by the United States Securities and Exchange Commission (the "SEC").

(iii) "REGISTRABLE SECURITIES" means the Conversion Shares (including any shares issued pursuant to Articles V, VII.E(b) and VII.F of the Certificate of Designations) issued or issuable and any shares of capital stock issued or issuable as a dividend on or in exchange for or otherwise with respect to any of the foregoing.

(iv) "REGISTRATION STATEMENT" means a registration statement of the Company under the 1933 Act.

(b) Capitalized terms used herein and not otherwise defined herein shall have the respective meanings set forth in the Securities Purchase Agreement.

2. REGISTRATION.  
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(a) Mandatory Registration. The Company shall prepare, and, on or prior  
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to the date which is twenty (20) business days after the Date of the First Closing under the Securities Purchase Agreement (the "CLOSING DATE"), file with the SEC a Registration Statement on Form S-3 (or, if Form S-3 is not then available, on such form of Registration Statement as is then available to effect a registration of the Registrable Securities, subject to the consent of the Initial Investors, which consent will not be unreasonably withheld) covering the resale of the Registrable Securities underlying the Preferred Stock issued or issuable at the First Closing and the Second Closing pursuant to the Securities Purchase Agreement, which Registration Statement, to the extent allowable under the 1933 Act and the rules promulgated thereunder (including Rule 416), shall state that such Registration Statement also covers such indeterminate number of additional shares of Common Stock as may become issuable upon conversion of the Preferred Stock (i) to prevent dilution resulting from stock splits, stock dividends or similar transactions or (ii) by reason of changes in the Conversion Price of the Preferred Stock in accordance with the terms thereof. The number of shares of Common Stock initially included in such Registration Statement shall be no less than one and one-half (1 1/2) times the sum of the number of Conversion Shares that are then issuable upon conversion of the Preferred Stock, without regard to any limitation on the Investor's ability to convert the Preferred Stock. The Company acknowledges that the number of shares initially included in the Registration Statement represents a good faith estimate of the maximum number of shares issuable upon conversion of the Preferred Stock.

(b) Underwritten Offering. If any offering pursuant to a Registration  
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Statement pursuant to Section 2(a) hereof involves an underwritten offering, the Investors who hold a majority in interest of the Registrable Securities subject to such underwritten offering, with the consent of a majority-in-interest of the Initial Investors, shall have the right to select one legal counsel and an investment banker or bankers and manager or managers to administer the offering, which investment banker or bankers or manager or managers shall be reasonably satisfactory to the Company.

(c) Payments by the Company. The Company shall use its best efforts to

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obtain effectiveness of the Registration Statement as soon as practicable. If (i) the Registration Statement(s) covering the Registrable Securities required to be filed by the Company pursuant to Section 2(a) hereof is not declared effective by the SEC within one hundred twenty (120) days after the Closing Date with respect to the First Closing or if, after the Registration Statement has been declared effective by the SEC, sales cannot be made pursuant to the Registration Statement, or (ii) the Common Stock is not listed or included for quotation on the Nasdaq National Market ("NASDAQ"), the Nasdaq SmallCap Market ("NASDAQ SMALLCAP"), the New York Stock Exchange (the "NYSE") or the American Stock Exchange (the "AMEX") after being so listed or included for quotation, then the Company will make payments to the Investors in such amounts and at such times as shall be determined pursuant to this Section 2(c) as partial relief for the damages to the Investors by reason of any such delay in or reduction of their ability to sell the Registrable Securities (which remedy shall not be exclusive of any other remedies available at law or in equity). Without limiting the generality of the preceding sentence, the Company shall, at its election, by providing the Investors with written notice of such election within two (2) business days following the first day of any such delay in or reduction of their ability to sell the Registrable Securities, either:

(1) pay to each holder of the Preferred Stock or Registerable Securities an amount equal to the then outstanding principal amount of the Preferred Stock (and, in the case of holders of Registerable Securities, the principal amount of Preferred Stock from which such Registerable Securities were converted) ("AGGREGATE SHARE PRICE") multiplied by two hundredths (.02) times the sum of: (i) the number of months (prorated for partial months) after the end of such 120-day period and prior to the date the Registration Statement is declared effective by the SEC, provided, however, that there shall be excluded from such period any delays which are solely attributable to changes required by the Investors in the Registration Statement with respect to information relating to the Investors, including, without limitation, changes to the plan of distribution, or to the failure of the Investors to conduct their review of the Registration Statement pursuant to Section 3(h) below in a reasonably prompt manner; (ii) the number of months (prorated for partial months) that sales cannot be made pursuant to the Registration Statement after the Registration Statement has been declared effective (including, without limitation, when sales cannot be made by reason of the Company's failure to properly supplement or amend the prospectus included therein in accordance with the terms of this Agreement, but excluding any days during an Allowed Delay (as defined in Section 3(f)); and (iii) the number of months (prorated for partial months) that the Common Stock is not listed or included for quotation on the Nasdaq, Nasdaq SmallCap, NYSE or AMEX or that trading thereon is halted after the Registration Statement has been declared effective. (For example, if the Registration Statement becomes effective one (1) month after the end of such 120-day period, the Company would pay \$20,000 for each \$1,000,000 of Aggregate

Share Price. If thereafter, sales could not be made pursuant to the Registration Statement for an additional period of one (1) month, the Company would pay an additional \$20,000 for each \$1,000,000 of Aggregate Share Price.) Such amounts shall be paid in cash within five (5) days after the end of each period that gives rise to such obligation, provided that, if any such period extends for more than thirty (30) days, interim payments shall be made for each such thirty (30) day period; or

(2) increase the AApplicable Premium@ (as defined in Article IV.C of the Certificate of Designations) to an amount equal to fifteen percent (15%) per annum of the Stated Value (as defined in the Certificate of Designations) for: (i) the period beginning on the end of such 120-day period and ending on the date the Registration Statement is declared effective by the SEC, provided, however, that there shall be excluded from such period any delays which are solely attributable to changes required by the Investors in the Registration Statement with respect to information relating to the Investors, including, without limitation, changes to the plan of distribution, or to the failure of the Investors to conduct their review of the Registration Statement pursuant to Section 3(h) below in a reasonably prompt manner; (ii) each period during which sales cannot be made pursuant to the Registration Statement after the Registration Statement has been declared effective (including, without limitation, when sales cannot be made by reason of the Company's failure to properly supplement or amend the prospectus included therein in accordance with the terms of this Agreement, but excluding any days during an Allowed Delay (as defined in Section 3(f)); and (iii) each period during which the Common Stock is not listed or included for quotation on the Nasdaq, Nasdaq SmallCap, NYSE or AMEX or that trading thereon is halted after the Registration Statement has been declared effective.

(d) Piggy-Back Registrations. Subject to the last sentence of this

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Section 2(d), if at any time prior to the expiration of the Registration Period (as hereinafter defined) the Company shall file with the SEC a Registration Statement relating to an offering for its own account or the account of others under the 1933 Act of any of its equity securities (other than on Form S-4 or Form S-8 or their then equivalents relating to equity securities to be issued solely in connection with any acquisition of any entity or business or equity securities issuable in connection with stock option or other employee benefit plans), the Company shall send to each Investor who is entitled to registration rights under this Section 2(d) written notice of such determination and, if within fifteen (15) days after the effective date of such notice, such Investor shall so request in writing, the Company shall include in such Registration Statement all or any part of the Registrable Securities such Investor requests to be registered, except that if, in connection with any underwritten public offering for the account of the Company the managing underwriter(s) thereof shall impose a limitation on the number of shares of Common Stock which may be included in the Registration Statement because, in such underwriter(s)' judgment, marketing or other factors dictate such limitation is necessary to facilitate public distribution, then the Company shall be obligated to include in such Registration Statement only such limited portion of the Registrable Securities with respect to which such Investor has requested inclusion hereunder as the underwriter shall permit. Any exclusion of Registrable Securities shall be made pro rata among the Investors seeking to include Registrable Securities in proportion to the number of Registrable Securities sought to be included by such Investors; provided, however,

that the Company shall not exclude any Registrable Securities unless the Company has first excluded all outstanding securities, the holders of which are not entitled to inclusion of such securities in such Registration Statement or are not entitled to pro rata inclusion with the Registrable Securities; and provided, further, however, that, after giving effect to

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the immediately preceding proviso, any exclusion of Registrable Securities shall be made pro rata with holders of other securities having the right to include such securities in the Registration Statement other than holders of securities entitled to inclusion of their securities in such Registration Statement by reason of demand registration rights. No right to registration of Registrable Securities under this Section 2(d) shall be construed to limit any registration required under Section 2(a) hereof. If an offering in connection with which an Investor is entitled to registration under this Section 2(d) is an underwritten offering, then each Investor whose Registrable Securities are included in such Registration Statement shall, unless otherwise agreed by the Company, offer and sell such Registrable Securities in an underwritten offering using the same underwriter or underwriters and, subject to the provisions of this Agreement, on the same terms and conditions as other shares of Common Stock included in such underwritten offering. Notwithstanding anything to the contrary set forth herein, the registration rights of the Investors pursuant to this Section 2(d) shall only be available in the event the Company fails to timely file, obtain effectiveness or maintain effectiveness of the Registration Statement to be filed pursuant to Section 2(a) in accordance with the terms of this Agreement.

(e) Eligibility for Form S-3. The Company represents and warrants that

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it meets the registrant eligibility and transaction requirements for the use of Form S-3 for registration of the sale by the Initial Investors and any other Investors of the Registrable Securities and the Company shall file all reports required to be filed by the Company with the SEC in a timely manner so as to maintain such eligibility for the use of Form S-3.

### 3. OBLIGATIONS OF THE COMPANY.

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In connection with the registration of the Registrable Securities, the Company shall have the following obligations:

(a) The Company shall prepare promptly, and file with the SEC not later than twenty (20) business days after the Closing Date, a Registration Statement with respect to the number of Registrable Securities provided in Section 2(a), and thereafter use its best efforts to cause such Registration Statement relating to Registrable Securities to become effective as soon as possible after such filing, and keep the Registration Statement effective pursuant to Rule 415 at all times until such date as is the earlier of (i) the date on which all of the Registrable Securities have been sold and (ii) the date on which the Registrable Securities (in the opinion of counsel to the Company, reasonably satisfactory in form and substance to the Initial Investors) may be immediately sold without restriction (including without limitation as to volume by each holder thereof) without registration under the 1933 Act (the "REGISTRATION PERIOD"), which Registration Statement (including any amendments or supplements thereto and prospectuses contained therein) shall not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein, or necessary to make the statements therein not misleading.

(b) The Company shall prepare and file with the SEC such amendments (including post-effective amendments) and supplements to the Registration Statement and the prospectus used in connection with the Registration Statement as may be necessary to keep the Registration Statement effective at all times during the Registration Period, and, during such period, comply with the provisions of the 1933 Act with respect to the disposition of all Registrable Securities of the Company covered by the Registration Statement until such time as all of such Registrable Securities have been disposed of in accordance with the intended methods of disposition by the seller or sellers thereof as set forth in the Registration Statement. In the event the number of shares available under a Registration Statement filed pursuant to this Agreement is insufficient to cover all of the Registrable Securities issued or issuable upon conversion of the Preferred Stock, the Company shall amend the Registration Statement, or file a new Registration Statement (on the short form available therefore, if applicable), or both, so as to cover all of the Registrable Securities, in each case, as soon as practicable, but in any event within twenty (20) business days after the necessity therefor arises (based on the market price of the Common Stock and other relevant factors on which the Company reasonably elects to rely). The Company shall use its best efforts to cause such amendment and/or new Registration Statement to become effective as soon as practicable following the filing thereof. The provisions of Section 2(c) above shall be applicable with respect to such obligation, with the one hundred twenty (120) days running from the day after the date on which the Company reasonably first determines (or reasonably should have determined) the need therefor.

(c) The Company shall furnish to each Investor whose Registrable Securities are included in the Registration Statement and its legal counsel (i) promptly after the same is prepared and publicly distributed, filed with the SEC, or received by the Company, one copy of the Registration Statement and any amendment thereto, each preliminary prospectus and prospectus and each amendment or supplement thereto, and, in the case of the Registration Statement referred to in Section 2(a), each letter written by or on behalf of the Company to the SEC or the staff of the SEC, and each item of correspondence from the SEC or the staff of the SEC, in each case relating to such Registration Statement (other than any portion of any thereof which contains information for which the Company has sought confidential treatment), and (ii) such number of copies of a prospectus, including a preliminary prospectus, and all amendments and supplements thereto and such other documents as such Investor may reasonably request in order to facilitate the disposition of the Registrable Securities owned by such Investor. The Company will immediately notify each Investor by facsimile of the effectiveness of the Registration Statement or any post-effective amendment. The Company will promptly respond to any and all comments received from the SEC, with a view towards causing any Registration Statement or any amendment thereto to be declared effective by the SEC as soon as practicable and shall promptly file an acceleration request as soon as practicable following the resolution or clearance of all SEC comments or, if applicable, following notification by the SEC that the Registration Statement or any amendment thereto will not be subject to review.

(d) The Company shall use reasonable efforts, to the extent required, to (i) register and qualify the Registrable Securities covered by the Registration Statement under such other securities or "blue sky" laws of such jurisdictions in the United States as the Investors who hold a majority in interest of the Registrable Securities being offered reasonably request,

(ii) prepare and file in those jurisdictions such amendments (including post-effective amendments) and supplements to such registrations and qualifications as may be necessary to maintain the effectiveness thereof during the Registration Period, (iii) take such other actions as may be necessary to maintain such registrations and qualifications in effect at all times during the Registration Period, and (iv) take all other actions reasonably necessary or advisable to qualify the Registrable Securities for sale in such jurisdictions; provided, however, that the Company shall not be required in connection

therewith or as a condition thereto to (a) qualify to do business in any jurisdiction where it would not otherwise be required to qualify but for this Section 3(d), (b) subject itself to general taxation in any such jurisdiction, (c) file a general consent to service of process in any such jurisdiction, (d) provide any undertakings that cause the Company undue expense or burden, or (e) make any change in its charter or bylaws, which in each case the Board of Directors of the Company determines to be contrary to the best interests of the Company and its stockholders.

(e) In the event Investors who hold a majority-in-interest of the Registrable Securities being offered in the offering (with the approval of a majority-in-interest of the Initial Investors) select underwriters for the offering, the Company shall enter into and perform its obligations under an underwriting agreement, in usual and customary form, including, without limitation, customary indemnification and contribution obligations, with the underwriters of such offering.

(f) As promptly as practicable after becoming aware of such event, the Company shall notify each Investor of the happening of any event, of which the Company has knowledge, as a result of which the prospectus included in the Registration Statement, as then in effect, includes an untrue statement of a material fact or omission to state a material fact required to be stated therein or necessary to make the statements therein not misleading, and use its best efforts promptly to prepare a supplement or amendment to the Registration Statement to correct such untrue statement or omission, and deliver such number of copies of such supplement or amendment to each Investor as such Investor may reasonably request; provided that, for not more than twenty (20) consecutive trading days (or a total of not more than forty (40) trading days in any twelve (12) month period), the Company may delay the disclosure of material non-public information concerning the Company (as well as prospectus or Registration Statement updating) the disclosure of which at the time is not, in the good faith opinion of the Company, the best interests of the Company (an "ALLOWED DELAY"); provided, further, that the Company shall promptly (i) notify the Investors in writing of the existence of (but in no event, without the prior written consent of an Investor, shall the Company disclose to such investor any of the facts or circumstances regarding) material non-public information giving rise to an Allowed Delay and (ii) advise the Investors in writing to cease all sales under the Registration Statement until the end of the Allowed Delay. Upon expiration of the Allowed Delay, the Company shall again be bound by the first sentence of this Section 3(f) with respect to the information giving rise thereto.

(g) The Company shall use its best efforts to prevent the issuance of any stop order or other suspension of effectiveness of a Registration Statement, and, if such an order is issued, to obtain the withdrawal of such order at the earliest possible moment and to notify each

Investor who holds Registrable Securities being sold (or, in the event of an underwritten offering, the managing underwriters) of the issuance of such order and the resolution thereof.

(h) The Company shall permit a single firm of counsel designated by the Initial Investors to review the Registration Statement and all amendments and supplements thereto (as well as all requests for acceleration of effectiveness thereof) a reasonable period of time prior to their filing with the SEC, and not file any document in a form to which such counsel reasonably objects and will not request acceleration of the Registration Statement without prior notice to such counsel. The sections of the Registration Statement covering information with respect to the Investors, the Investor's beneficial ownership of securities of the Company or the Investors intended method of disposition of Registrable Securities shall conform to the information provided to the Company by each of the Investors.

(i) The Company shall make generally available to its security holders as soon as practical, but not later than ninety (90) days after the close of the period covered thereby, an earnings statement (in form complying with the provisions of Rule 158 under the 1933 Act) covering a twelve-month period beginning not later than the first day of the Company's fiscal quarter next following the effective date of the Registration Statement.

(j) At the request of any Investor, the Company shall furnish, on the date that Registrable Securities are delivered to an underwriter, if any, for sale in connection with the Registration Statement (i) an opinion, dated as of such date, from counsel representing the Company for purposes of such Registration Statement, in form, scope and substance as is customarily given in an underwritten public offering, addressed to the underwriters, if any, and the Investors and (ii) a letter, dated such date, from the Company's independent certified public accountants in form and substance as is customarily given by independent certified public accountants to underwriters in an underwritten public offering, addressed to the underwriters, if any, and the Investors.

(k) The Company shall make available for inspection by (i) any Investor, (ii) any underwriter participating in any disposition pursuant to the Registration Statement, (iii) one firm of attorneys and one firm of accountants or other agents retained by the Initial Investors, (iv) one firm of attorneys and one firm of accountants or other agents retained by all other Investors, and (v) one firm of attorneys retained by all such underwriters (collectively, the "INSPECTORS") all pertinent financial and other records, and pertinent corporate documents and properties of the Company (collectively, the "RECORDS"), as shall be reasonably deemed necessary by each Inspector to enable each Inspector to exercise its due diligence responsibility, and cause the Company's officers, directors and employees to supply all information which any Inspector may reasonably request for purposes of such due diligence; provided, however, that

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each Inspector shall hold in confidence and shall not make any disclosure (except to an Investor) of any Record or other information which the Company determines in good faith to be confidential, and of which determination the Inspectors are so notified, unless (a) the disclosure of such Records is necessary to avoid or correct a misstatement or omission in any Registration Statement, (b) the release of such Records is ordered pursuant to a subpoena or other order from a court or government body of competent jurisdiction, or (c) the information in such Records has

been made generally available to the public other than by disclosure in violation of this or any other agreement. The Company shall not be required to disclose any confidential information in such Records to any Inspector until and unless such Inspector shall have entered into confidentiality agreements (in form and substance satisfactory to the Company) with the Company with respect thereto, substantially in the form of this Section 3(k). Each Investor agrees that it shall, upon learning that disclosure of such Records is sought in or by a court or governmental body of competent jurisdiction or through other means, give prompt notice to the Company and allow the Company, at its expense, to undertake appropriate action to prevent disclosure of, or to obtain a protective order for, the Records deemed confidential. Nothing herein (or in any other confidentiality agreement between the Company and any Investor) shall be deemed to limit the Investor's ability to sell Registrable Securities in a manner which is otherwise consistent with applicable laws and regulations.

(l) The Company shall hold in confidence and not make any disclosure of information concerning an Investor provided to the Company unless (i) disclosure of such information is necessary to comply with federal or state securities laws, (ii) the disclosure of such information is necessary to avoid or correct a misstatement or omission in any Registration Statement, (iii) the release of such information is ordered pursuant to a subpoena or other order from a court or governmental body of competent jurisdiction, or (iv) such information has been made generally available to the public other than by disclosure in violation of this or any other agreement. The Company agrees that it shall, upon learning that disclosure of such information concerning an Investor is sought in or by a court or governmental body of competent jurisdiction or through other means, give prompt notice to such Investor prior to making such disclosure, and allow the Investor, at its expense, to undertake appropriate action to prevent disclosure of, or to obtain a protective order for, such information.

(m) The Company shall (i) cause all the Registrable Securities covered by the Registration Statement to be listed on each national securities exchange on which securities of the same class or series issued by the Company are then listed, if any, if the listing of such Registrable Securities is then permitted under the rules of such exchange, or (ii) secure the designation and quotation, of all the Registrable Securities covered by the Registration Statement on the Nasdaq or, if not eligible for the Nasdaq on the Nasdaq SmallCap and, without limiting the generality of the foregoing, to arrange for at least two market makers to register with the National Association of Securities Dealers, Inc. ("NASD") as such with respect to such Registrable Securities.

(n) The Company shall provide a transfer agent and registrar, which may be a single entity, for the Registrable Securities not later than the effective date of the Registration Statement.

(o) The Company shall cooperate with the Investors who hold Registrable Securities being offered and the managing underwriter or underwriters, if any, to facilitate the timely preparation and delivery of certificates (not bearing any restrictive legends) representing Registrable Securities to be offered pursuant to the Registration Statement and enable such certificates to be in such denominations or amounts, as the case may be, as the managing underwriter or underwriters, if any, or the Investors may reasonably request and registered in such names as the managing



underwriter or underwriters, if any, or the Investors may reasonably request, and, within three (3) business days after a Registration Statement which includes Registrable Securities is ordered effective by the SEC, the Company shall deliver, and shall cause legal counsel selected by the Company to deliver, to the transfer agent for the Registrable Securities (with copies to the Investors whose Registrable Securities are included in such Registration Statement) an instruction in the form attached hereto as EXHIBIT 1 and an opinion of such counsel in the form attached hereto as EXHIBIT 2.

(p) At the request of the holders of a majority-in-interest of the Registrable Securities, the Company shall prepare and file with the SEC such amendments (including post-effective amendments) and supplements to a Registration Statement and the prospectus used in connection with the Registration Statement as may be necessary in order to change the plan of distribution set forth in such Registration Statement.

(q) From and after the date of this Agreement, the Company shall not, and shall not agree to, allow the holders of any securities of the Company to include any of their securities in any Registration Statement under Section 2(a) hereof or any amendment or supplement thereto under Section 3(b) hereof without the consent of the holders of a majority-in-interest of the Registrable Securities.

(r) The Company shall take all other reasonable actions necessary to expedite and facilitate disposition by the Investors of Registrable Securities following their transfer pursuant to the Registration Statement.

#### 4. OBLIGATIONS OF THE INVESTORS.

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In connection with the registration of the Registrable Securities, the Investors shall have the following obligations:

(a) It shall be a condition precedent to the obligations of the Company to complete the registration pursuant to this Agreement with respect to the Registrable Securities of a particular Investor that such Investor shall furnish to the Company such information regarding itself, the Registrable Securities held by it and the intended method of disposition of the Registrable Securities held by it as shall be reasonably required to effect the registration of such Registrable Securities and shall execute such documents in connection with such registration as the Company may reasonably request. At least three (3) business days prior to the first anticipated filing date of the Registration Statement, the Company shall notify each Investor of the information the Company requires from each such Investor.

(b) Each Investor, by such Investor's acceptance of the Registrable Securities, agrees to cooperate with the Company as reasonably requested by the Company in connection with the preparation and filing of the Registration Statement hereunder.

(c) In the event Investors holding a majority-in-interest of the Registrable Securities being registered (with the approval of the Initial Investors) determine to engage the

services of an underwriter, each Investor agrees to enter into and perform such Investor's obligations under an underwriting agreement, in usual and customary form, including, without limitation, customary indemnification and contribution obligations, with the managing underwriter of such offering and take such other actions as are reasonably required in order to expedite or facilitate the disposition of the Registrable Securities, unless such Investor has notified the Company in writing of such Investor's election to exclude all of such Investor's Registrable Securities from the Registration Statement.

(d) Each Investor agrees that, upon receipt of any notice from the Company of the happening of any event of the kind described in Section 3(f) or 3(g), such Investor will immediately discontinue disposition of Registrable Securities pursuant to the Registration Statement covering such Registrable Securities until such Investor's receipt of the copies of the supplemented or amended prospectus contemplated by Section 3(f) or 3(g) and, if so directed by the Company, such Investor shall deliver to the Company (at the expense of the Company) or destroy (and deliver to the Company a certificate of destruction) all copies in such Investor's possession, of the prospectus covering such Registrable Securities current at the time of receipt of such notice.

(e) No Investor may participate in any underwritten registration hereunder unless such Investor (i) agrees to sell such Investor's Registrable Securities on the basis provided in any underwriting arrangements in usual and customary form entered into by the Company, (ii) completes and executes all questionnaires, powers of attorney, indemnities, underwriting agreements and other documents reasonably required under the terms of such underwriting arrangements, and (iii) agrees to pay its pro rata share of all underwriting discounts and commissions and any expenses in excess of those payable by the Company pursuant to Section 5 below.

(f) The underwriters in connection with any firm commitment public offering of the Company's common stock resulting in gross proceeds of at least \$20,000,000 led by at least one of the underwriters listed on SCHEDULE 4(F) attached hereto and made a part hereof, shall have the right to require that the Investors enter into an agreement restricting the Investors from selling Common Shares pursuant to the Registration Statement held by such Investors in any public sale for a period not to exceed ninety (90) days following the closing of such underwriting, if they deem this to be reasonably necessary to effect such underwritten public offering; provided that all executive officers and directors shall have also agreed to identical (or more restrictive) restrictions. The Investors shall be subject to no more than one such restriction during the Registration Period.

5. EXPENSES OF REGISTRATION.  
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All reasonable expenses, other than underwriting discounts and commissions, incurred in connection with registrations, filings or qualifications pursuant to Sections 2 and 3, including, without limitation, all registration, listing and qualification fees, printers and accounting fees, the fees and disbursements of counsel for the Company, and subject to Section 4(f) of the Purchase Agreement, the reasonable fees and disbursements of one counsel

selected by the Initial Investors pursuant to Sections 2(b) and 3(h) hereof shall be borne by the Company.

6. INDEMNIFICATION.

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In the event any Registrable Securities are included in a Registration Statement under this Agreement:

(a) To the extent permitted by law, the Company will indemnify, hold harmless and defend (i) each Investor who holds such Registrable Securities, (ii) the directors, officers, partners, employees, agents and each person who controls any Investor within the meaning of the 1933 Act or the Securities Exchange Act of 1934, as amended (the "1934 ACT"), if any, (iii) any underwriter (as defined in the 1933 Act) for the Investors, and (iv) the directors, officers, partners, employees and each person who controls any such underwriter within the meaning of the 1933 Act or the 1934 Act, if any (each, an "INDEMNIFIED PERSON"), against any joint or several losses, claims, damages, liabilities or expenses (collectively, together with actions, proceedings or inquiries by any regulatory or self-regulatory organization, whether commenced or threatened, in respect thereof, "CLAIMS") to which any of them may become subject insofar as such Claims arise out of or are based upon: (i) any untrue statement or alleged untrue statement of a material fact in a Registration Statement or the omission or alleged omission to state therein a material fact required to be stated or necessary to make the statements therein not misleading; (ii) any untrue statement or alleged untrue statement of a material fact contained in any preliminary prospectus if used prior to the effective date of such Registration Statement, or contained in the final prospectus (as amended or supplemented, if the Company files any amendment thereof or supplement thereto with the SEC) or the omission or alleged omission to state therein any material fact necessary to make the statements made therein, in light of the circumstances under which the statements therein were made, not misleading; or (iii) any violation or alleged violation by the Company of the 1933 Act, the 1934 Act, any other law, including, without limitation, any state securities law, or any rule or regulation thereunder relating to the offer or sale of the Registrable Securities (the matters in the foregoing clauses (i) through (iii) being, collectively, "VIOLATIONS"). Subject to the restrictions set forth in Section 6(c) with respect to the number of legal counsel, the Company shall reimburse the Indemnified Person, promptly as such expenses are incurred and are due and payable, for any reasonable legal fees or other reasonable expenses incurred by them in connection with investigating or defending any such Claim. Notwithstanding anything to the contrary contained herein, the indemnification agreement contained in this Section 6(a): (i) shall not apply to a Claim arising out of or based upon a Violation which occurs in reliance upon and in conformity with information furnished in writing to the Company by any Indemnified Person or underwriter for such Indemnified Person expressly for use in connection with the preparation of the Registration Statement or any such amendment thereof or supplement thereto, if such prospectus was timely made available by the Company pursuant to Section 3(c) hereof; (ii) shall not apply to amounts paid in settlement of any Claim if such settlement is effected without the prior written consent of the Company, which consent shall not be unreasonably withheld; and (iii) with respect to any preliminary prospectus, shall not inure to the benefit of any Indemnified Person if the untrue statement or omission of material fact contained in the preliminary prospectus was

corrected on a timely basis in the prospectus, as then amended or supplemented, such corrected prospectus was timely made available by the Company pursuant to Section 3(c) hereof, and the Indemnified Person was promptly advised in writing not to use the incorrect prospectus prior to the use giving rise to a Violation and such Indemnified Person, notwithstanding such advice, used it. Such indemnity shall remain in full force and effect regardless of any investigation made by or on behalf of the Indemnified Person and shall survive the transfer of the Registrable Securities by the Investors pursuant to Section 9.

(b) In connection with any Registration Statement in which an Investor is participating, each such Investor agrees severally and not jointly to indemnify, hold harmless and defend, to the same extent and in the same manner set forth in Section 6(a), the Company, each of its directors, each of its officers who signs the Registration Statement, each person, if any, who controls the Company within the meaning of the 1933 Act or the 1934 Act, any underwriter and any other stockholder selling securities pursuant to the Registration Statement or any of its directors or officers or any person who controls such stockholder or underwriter within the meaning of the 1933 Act or the 1934 Act (collectively and together with an Indemnified Person, an "INDEMNIFIED PARTY"), against any Claim to which any of them may become subject, under the 1933 Act, the 1934 Act or otherwise, insofar as such Claim arises out of or is based upon any Violation by such Investor, in each case to the extent (and only to the extent) that such Violation occurs in reliance upon and in conformity with written information furnished to the Company by such Investor expressly for use in connection with such Registration Statement; and subject to Section 6(c) such Investor will reimburse any legal or other expenses (promptly as such expenses are incurred and are due and payable) reasonably incurred by them in connection with investigating or defending any such Claim; provided, however, that the

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indemnity agreement contained in this Section 6(b) shall not apply to amounts paid in settlement of any Claim if such settlement is effected without the prior written consent of such Investor, which consent shall not be unreasonably withheld; provided, further, however, that the Investor shall be liable under

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this Agreement (including this Section 6(b) and Section 7) for only that amount as does not exceed the net proceeds to such Investor as a result of the sale of Registrable Securities pursuant to such Registration Statement. Such indemnity shall remain in full force and effect regardless of any investigation made by or on behalf of such Indemnified Party and shall survive the transfer of the Registrable Securities by the Investors pursuant to Section 9. Notwithstanding anything to the contrary contained herein, the indemnification agreement contained in this Section 6(b) with respect to any preliminary prospectus shall not inure to the benefit of any Indemnified Party if the untrue statement or omission of material fact contained in the preliminary prospectus was corrected on a timely basis in the prospectus, as then amended or supplemented.

(c) Promptly after receipt by an Indemnified Person or Indemnified Party under this Section 6 of notice of the commencement of any action (including any governmental action), such Indemnified Person or Indemnified Party shall, if a Claim in respect thereof is to be made against any indemnifying party under this Section 6, deliver to the indemnifying party a written notice of the commencement thereof, and the indemnifying party shall have the right to participate in, and, to the extent the indemnifying party so desires, jointly with any other indemnifying party similarly noticed, to assume control of the defense thereof with counsel mutually satisfactory to the indemnifying party and the Indemnified Person or the Indemnified

Party, as the case may be; provided, however, that an Indemnified Person or

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Indemnified Party shall have the right to retain its own counsel with the fees and expenses to be paid by the indemnifying party, if, in the reasonable opinion of counsel retained by the indemnifying party, the representation by such counsel of the Indemnified Person or Indemnified Party and the indemnifying party would be inappropriate due to actual or potential differing interests between such Indemnified Person or Indemnified Party and any other party represented by such counsel in such proceeding. The indemnifying party shall pay for only one separate legal counsel for the Indemnified Persons or the Indemnified Parties, as applicable, and such legal counsel shall be selected by Investors holding a majority-in-interest of the Registrable Securities included in the Registration Statement to which the Claim relates (with the approval of a majority-in-interest of the Initial Investors), if the Investors are entitled to indemnification hereunder, or the Company, if the Company is entitled to indemnification hereunder, as applicable. The failure to deliver written notice to the indemnifying party within a reasonable time of the commencement of any such action shall not relieve such indemnifying party of any liability to the Indemnified Person or Indemnified Party under this Section 6, except to the extent that the indemnifying party is actually prejudiced in its ability to defend such action. The indemnification required by this Section 6 shall be made by periodic payments of the amount thereof during the course of the investigation or defense, as such expense, loss, damage or liability is incurred and is due and payable.

7. CONTRIBUTION.  
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To the extent any indemnification by an indemnifying party is prohibited or limited by law, the indemnifying party agrees to make the maximum contribution with respect to any amounts for which it would otherwise be liable under Section 6 to the fullest extent permitted by law; provided, however, that (i) no

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contribution shall be made under circumstances where the maker would not have been liable for indemnification under the fault standards set forth in Section 6, (ii) no seller of Registrable Securities guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the 1933 Act) shall be entitled to contribution from any seller of Registrable Securities who was not guilty of such fraudulent misrepresentation, and (iii) contribution (together with any indemnification or other obligations under this Agreement) by any seller of Registrable Securities shall be limited in amount to the net amount of proceeds received by such seller from the sale of such Registrable Securities.

8. REPORTS UNDER THE 1934 ACT.  
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With a view to making available to the Investors the benefits of Rule 144 promulgated under the 1933 Act or any other similar rule or regulation of the SEC that may at any time permit the investors to sell securities of the Company to the public without registration ("RULE 144"), the Company agrees to:

(a) make and keep public information available, as those terms are understood and defined in Rule 144;

(b) file with the SEC in a timely manner all reports and other documents required of the Company under the 1933 Act and the 1934 Act so long as the Company remains

subject to such requirements (it being understood that nothing herein shall limit the Company's obligations under Section 4(c) of the Securities Purchase Agreement) and the filing of such reports and other documents is required for the applicable provisions of Rule 144; and

(c) furnish to each Investor so long as such Investor owns Registrable Securities, promptly upon request, (i) a written statement by the Company that it has complied with the reporting requirements of Rule 144, the 1933 Act and the 1934 Act, (ii) a copy of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company, and (iii) such other information as may be reasonably requested to permit the Investors to sell such securities pursuant to Rule 144 without registration.

9. ASSIGNMENT OF REGISTRATION RIGHTS.  
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The rights under this Agreement shall be automatically assignable by the Investors to any transferee of all or any portion of Registrable Securities if: (i) the Investor agrees in writing with the transferee or assignee to assign such rights, and a copy of such agreement is furnished to the Company within a reasonable time after such assignment, (ii) the Company is, within a reasonable time after such transfer or assignment, furnished with written notice of (a) the name and address of such transferee or assignee, and (b) the securities with respect to which such registration rights are being transferred or assigned, (iii) following such transfer or assignment, the further disposition of such securities by the transferee or assignee is restricted under the 1933 Act and applicable state securities laws, (iv) at or before the time the Company receives the written notice contemplated by clause (ii) of this sentence, the transferee or assignee agrees in writing with the Company to be bound by all of the provisions contained herein, (v) such transfer shall have been made in accordance with the applicable requirements of the Securities Purchase Agreement, and (vi) such transferee shall be an "ACCREDITED INVESTOR" as that term defined in Rule 501 of Regulation D promulgated under the 1933 Act.

10. AMENDMENT OF REGISTRATION RIGHTS.  
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Provisions of this Agreement may be amended and the observance thereof may be waived (either generally or in a particular instance and either retroactively or prospectively), only with written consent of the Company, each of the Initial Investors (to the extent such Initial Investor still owns Registrable Securities) and Investors who hold a majority interest of the Registrable Securities. Any amendment or waiver effected in accordance with this Section 10 shall be binding upon each Investor and the Company.

11. MISCELLANEOUS.  
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(a) A person or entity is deemed to be a holder of Registrable Securities whenever such person or entity owns of record such Registrable Securities. If the Company receives conflicting instructions, notices or elections from two or more persons or entities with respect to the same Registrable Securities, the Company shall act upon the basis of instructions, notice or election received from the registered owner of such Registrable Securities.

(b) Any notices required or permitted to be given under the terms hereof shall be sent by certified or registered mail (return receipt requested) or delivered personally or by courier (including a recognized overnight delivery service) or by facsimile and shall be effective five days after being placed in the mail, if mailed by regular U.S. mail, or upon receipt, if delivered personally or by courier (including a recognized overnight delivery service) or by facsimile, in each case addressed to a party. The addresses for such communications shall be:

If to the Company:

Aastrom Biosciences, Inc.  
24 Frank Lloyd Wright Drive  
P.O. Box 376  
Ann Arbor, Michigan 48106

Attention: R. Douglas Armstrong  
President & Chief Executive Officer

Facsimile: 734-930-5546

With copy to:

Gray Cary Ware & Freidenrich LLP  
4365 Executive Drive, Suite 1600  
San Diego, CA 92121-2189

Attention: Douglas J. Rein

Facsimile: 619-677-1477

If to an Investor: to the address set forth immediately below such Investor's name on the signature pages to the Securities Purchase Agreement.

(c) Failure of any party to exercise any right or remedy under this Agreement or otherwise, or delay by a party in exercising such right or remedy, shall not operate as a waiver thereof.

(d) This Agreement shall be enforced, governed by and construed in accordance with the laws of the State of Michigan applicable to agreements made and to be performed entirely within such State. In the event that any provision of this Agreement is invalid or unenforceable under any applicable statute or rule of law, then such provision shall be deemed inoperative to the extent that it may conflict therewith and shall be deemed modified to conform with such statute or rule of law. Any provision hereof which may prove invalid or unenforceable under any law shall not affect the validity or enforceability of any other provision hereof. The parties hereto hereby submit to the exclusive jurisdiction of the United States Federal Courts located in Delaware with respect to any dispute arising under this Agreement or the transactions contemplated hereby.

(e) This Agreement and the Securities Purchase Agreement (including all schedules and exhibits thereto) constitute the entire agreement among the parties hereto with respect to the subject matter hereof and thereof. There are no restrictions, promises, warranties or undertakings, other than those set forth or referred to herein and therein. This Agreement and the Securities Purchase Agreement supersede all prior agreements and understandings among the parties hereto with respect to the subject matter hereof and thereof.

(f) Subject to the requirements of Section 9 hereof, this Agreement shall inure to the benefit of and be binding upon the successors and assigns of each of the parties hereto.

(g) The headings in this Agreement are for convenience of reference only and shall not limit or otherwise affect the meaning hereof.

(h) This Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which shall constitute one and the same agreement. This Agreement, once executed by a party, may be delivered to the other party hereto by facsimile transmission of a copy of this Agreement bearing the signature of the party so delivering this Agreement.

(i) Each party shall do and perform, or cause to be done and performed, all such further acts and things, and shall execute and deliver all such other agreements, certificates, instruments and documents, as the other party may reasonably request in order to carry out the intent and accomplish the purposes of this Agreement and the consummation of the transactions contemplated hereby.

(j) Except as otherwise provided herein, all consents and other determinations to be made by the Investors pursuant to this Agreement shall be made by Investors holding a majority of the Registrable Securities, determined as if the all of the shares of Preferred Stock then outstanding have been converted into for Registrable Securities.

(k) The language used in this Agreement will be deemed to be the language chosen by the parties to express their mutual intent, and no rules of strict construction will be applied against any party.

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IN WITNESS WHEREOF, the Company and the undersigned Initial Investors have caused this Agreement to be duly executed as of the date first above written.

AASTROM BIOSCIENCES, INC.

By: \_\_\_\_\_  
R. Douglas Armstrong, Ph.D.  
President & Chief Executive Officer

RGC INTERNATIONAL INVESTORS, LDC

By: \_\_\_\_\_  
Rose Glen Capital Management, L.P.,  
Investment Manager

By: \_\_\_\_\_  
RGC General Partner Corp., as General  
Partner

By: \_\_\_\_\_  
Wayne D. Bloch  
Managing Director

Consent of Independent Accountants

We hereby consent to the incorporation by reference in the Prospectus constituting part of this Registration Statement on Form S-3 of our report dated August 15, 1997 appearing on page 39 of Aastrom Biosciences, Inc.'s Annual Report on Form 10-K for the year ended June 30, 1997. We also consent to the reference to us under the heading "Experts."

/s/ PRICEWATERHOUSECOOPERS LLP  
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PRICEWATERHOUSECOOPERS LLP

Bloomfield Hills, Michigan  
July 27, 1998

[LETTERHEAD OF GRAY CARY WARE & FREIDENRICH LLP]

July 28, 1998

Securities and Exchange Commission  
Judiciary Plaza  
450 Fifth Street, N.W.  
Washington, D.C. 20549

Re: Aastrom Biosciences, Inc. Registration Statement on Form S-3  
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Ladies and Gentlemen:

As counsel to Aastrom Biosciences, Inc., a Michigan corporation (the "Company"), in connection with the proposed offer and sale of those certain shares of the Company's Common Stock, \$0 par value, as set forth in the Registration Statement on Form S-3 (the "Registration Statement"), we hereby consent to the use of our name wherever it appears in the Registration Statement, including the Prospectus constituting a part thereof, as originally filed or as subsequently amended.

Respectfully submitted,

/s/ GRAY CARY WARE & FREIDENRICH LLP

GRAY CARY WARE & FREIDENRICH LLP