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PIONEER MUNICIPAL HIGH INCOME TRUST  
Form N-Q  
March 28, 2008

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UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

FORM N-Q

CERTIFIED SHAREHOLDER REPORT OF REGISTERED  
MANAGEMENT INVESTMENT COMPANIES

Investment Company Act file number 811-21043

Pioneer Municipal High Income Trust  
(Exact name of registrant as specified in charter)

60 State Street, Boston, MA 02109  
(Address of principal executive offices) (ZIP code)

Dorothy E. Bourassa, Pioneer Investment Management, Inc.,  
60 State Street, Boston, MA 02109  
(Name and address of agent for service)

Registrant's telephone number, including area code: (617) 742-7825

Date of fiscal year end: April 30

Date of reporting period: January 31, 2008

Form N-Q is to be used by management investment companies, other than small business investment companies registered on Form N-5 (239.24 and 274.5 of this chapter), to file reports with the Commission, not later than 60 days after close of the first and third fiscal quarters, pursuant to Rule 30b1-5 under the Investment Company Act of 1940 (17 CFR 270.30b-5). The Commission may use the information provided on Form N-Q in its regulatory, disclosure review, inspection, and policymaking roles.

A registrant is required to disclose the information specified by Form N-Q, and the Commission will make this information public. A registrant is not required to respond to the collection of information contained in Form N-Q unless the Form displays a currently valid Office of Management and Budget ("OMB") control number. Please direct comments concerning the accuracy of the information collection burden estimate and any suggestions for reducing the burden to Secretary, Securities and Exchange Commission, 450 Fifth Street, NW, Washington, DC 20549-0609. The OMB has reviewed this collection of information under the clearance requirements of 44 U.S.C. ss. 3507.

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### ITEM 1. Schedule of Investments.

Pioneer Municipal High Income Trust  
SCHEDULE OF INVESTMENTS 1/31/08 (unaudited)

| Principal<br>Amount |  | Value        |
|---------------------|--|--------------|
|                     | TAX EXEMPT OBLIGATIONS - 123.8% of Net Assets      |              |
|                     | Alabama - 1.3%                                     |              |
| 1,500,000           | Camden Alabama Industrial Development Board, \$    | 1,550,715    |
| 1,000,000           | Huntsville-Redstone Village Special Care Facil     | 911,990      |
| 2,000,000           | Huntsville-Redstone Village Special Care Facil     | 1,762,340    |
|                     | \$   | 4,225,045    |
|                     | Arizona - 5.4%                                     |              |
| 5,000,000           | Apache County Industrial Development Authorit\$    | 4,930,050    |
| 5,000,000           | Apache County Industrial Development Authority     | 4,906,450    |
| 7,000,000           | (a)Downtown Phoenix Hotel Corp., RIB, 5.646%, 7/1  | 6,488,510    |
| 980,000             | Pima County Industrial Development Authority,      | 1,031,107    |
| 500,000             | Yavapai County Industrial Development Authorit     | 515,790      |
|                     | \$   | 17,871,907   |
|                     | California - 6.2%                                  |              |
| 5,150,000           | + Golden State Tobacco Securitization Corp., 7.\$  | 6,369,108    |
| 7,000,000           | + Golden State Tobacco Securitization Corp., 7.8   | 8,681,610    |
| 2,500,000           | University of California Revenue, 5.0%, 5/15/2     | 2,572,950    |
| 5,000,000           | Valley Health System Hospital Revenue, 6.5%, 5     | 2,925,000    |
|                     | \$   | 20,548,668   |
|                     | Connecticut - 1.5%                                 |              |
| 5,000,000           | Mohegan Tribe Indians Gaming Authority, 6.25%\$    | 5,028,900    |
|                     | Delaware - 0.4%                                    |              |
| 765,000             | Sussex County Delaware Revenue, 5.9%, 1/1/26 \$    | 746,464      |
| 600,000             | Sussex County Delaware Revenue, 6.0%, 1/1/35       | 569,340      |
|                     | \$   | 1,315,804    |
|                     | District of Columbia - 3.4%                        |              |
| 5,000,000           | District of Columbia Tobacco Settlement Finan\$    | 5,144,300    |
| 6,000,000           | District of Columbia Tobacco Settlement Financ     | 6,130,920    |
|                     | \$   | 11,275,220   |
|                     | Florida - 2.9%                                     |              |
| 2,000,000           | Beacon Lakes Community Development, 6.9%, 5/1\$    | 1,992,400    |
| 1,000,000           | St. Johns County Industrial Development Author     | 904,550      |
| 2,000,000           | St. Johns County Industrial Development Author     | 1,746,780    |
| 5,000,000           | Tallahassee Health Facilities Revenue, 6.375%,     | 5,103,700    |
|                     | \$   | 9,747,430    |
|                     | Georgia - 2.9%                                     |              |
| 4,240,000           | (a)Atlanta Georgia Water & Waste Revenue, RIB, 1\$ | 4,582,889    |
| 2,400,000           | Fulton County Residential Care Facilities Reve     | 2,053,152    |
| 2,600,000           | Fulton County Residential Care Facilities Reve     | 2,150,408    |
| 1,000,000           | Rockdale County Development Authority Revenue,     | 980,220      |
|                     | \$   | 9,766,669    |
|                     | Guam - 1.4%  |              |
| 5,000,000           | Northern Mariana Islands, 5.0%, 10/1/22            | \$ 4,735,700 |
|                     | Idaho - 1.5%                                       |              |
| 5,000,000           | Power County Industrial Development Corp., 6.\$    | 5,113,050    |
|                     | Illinois - 6.0%                                    |              |
| 1,000,000           | Centerpoint Intermodal Center, 8.0%, 6/15/23 \$    | 970,860      |
| 2,000,000           | Chicago Illinois O'Hare International Airport      | 1,994,260    |
| 1,000,000           | Illinois Finance Authority Revenue, 6.0%, 11/1     | 966,220      |

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|            |   |            |
|------------|---|------------|
| 1,000,000  | Illinois Finance Authority Revenue, 6.0%, 11/1    | 949,710    |
| 1,500,000  | Illinois Health Facilities Authority Revenue,     | 1,334,580  |
| 16,880,000 | (b)Metropolitan Pier & Exposition Authority Dedic | 11,976,529 |
| 1,800,000  | Southwestern Illinois Development Authority Re    | 1,694,556  |
|            | \$  | 19,886,715 |
|            | Indiana - 3.0%                                    |            |
| 5,000,000  | Indiana Health & Educational Facility Financi\$   | 4,787,350  |
| 1,000,000  | Indiana State Development Finance Authority Re    | 1,004,920  |
| 4,300,000  | Indiana State Development Finance Authority Re    | 4,334,873  |
|            | \$  | 10,127,143 |
|            | Louisiana - 1.5%                                  |            |
| 5,000,000  | Louisiana Public Facilities Authority Revenue\$   | 5,029,550  |
|            | Maryland - 1.5%                                   |            |
| 5,000,000  | Maryland State Health & Higher Educational Fa\$   | 4,933,000  |
|            | Massachusetts - 9.0%                              |            |
| 3,000,000  | Massachusetts Bay Transportation Authority, 5\$   | 3,336,300  |
| 7,050,000  | Massachusetts Health & Educational Facilities     | 7,409,127  |
| 3,500,000  | Massachusetts Health & Educational Facilities     | 3,639,580  |
| 5,000,000  | Massachusetts Health & Educational Facilities     | 5,213,850  |
| 9,810,000  | (a)Massachusetts State Development Finance Agency | 10,541,335 |
|            | \$  | 30,140,192 |
|            | Michigan - 3.0%                                   |            |
| 950,000    | Doctor Charles Drew Academy, 5.7%, 11/1/36        | \$ 834,869 |
| 1,700,000  | Flint Michigan Hospital Building Authority Rev    | 1,656,531  |
| 1,500,000  | John Tolfree Health System Corp., 6.0%, 9/15/2    | 1,515,420  |
| 2,000,000  | Michigan State Hospital Finance Authority Reve    | 1,835,420  |
| 4,010,000  | Michigan State Hospital Finance Authority Reve    | 4,012,085  |
| 7,720,000  | Wayne Charter County Special Airport Facilitie    | -          |
|            | \$  | 9,854,325  |
|            | Minnesota - 2.2%                                  |            |
| 1,675,000  | Duluth Economic Development Authority Health \$   | 1,750,810  |
| 1,500,000  | North Oaks Senior Housing Revenue, 6.0%, 10/1/    | 1,472,895  |
| 2,000,000  | North Oaks Senior Housing Revenue, 6.125%, 10/    | 1,981,840  |
| 2,000,000  | North Oaks Senior Housing Revenue, 6.5%, 10/1/    | 2,042,920  |
|            | \$  | 7,248,465  |
|            | Mississippi - 0.9%                                |            |
| 3,000,000  | Mississippi Business Finance Corp. Pollution \$   | 3,015,000  |
|            | Montana - 0.4%                                    |            |
| 1,600,000  | Two Rivers Authority, Inc. Correctional Facil\$   | 1,175,920  |
|            | Nevada - 2.1%                                     |            |
| 1,000,000  | Clark County Industrial Development Revenue, \$   | 1,045,010  |
| 4,600,000  | Clark County Industrial Development Revenue, 5    | 4,247,134  |
| 2,000,000  | Nevada State Department of Business & Industry    | 1,600,020  |
|            | \$  | 6,892,164  |
|            | New Hampshire - 0.9%                              |            |
| 3,000,000  | Manchester School Facilities Revenue, 5.125%,\$   | 3,089,970  |
|            | New Jersey - 10.1%                                |            |
| 2,000,000  | New Jersey Economic Development Authority Rev\$   | 1,932,620  |
| 13,350,000 | New Jersey Economic Development Authority Reve    | 12,508,950 |
| 1,000,000  | New Jersey Economic Development Authority Reve    | 958,990    |
| 6,150,000  | New Jersey Economic Development Authority Reve    | 6,195,080  |
| 10,000,000 | + Tobacco Settlement Financing Corp., 6.75%, 6/1  | 11,984,900 |
|            | \$  | 33,580,540 |
|            | New Mexico - 1.3%                                 |            |
| 1,500,000  | Otero County New Mexico Project Revenue, 6.0%\$   | 1,455,015  |
| 2,960,000  | Otero County New Mexico Project Revenue, 6.0%,    | 2,834,378  |
|            | \$  | 4,289,393  |

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|            |   |            |
|------------|---|------------|
|            | New York - 12.4%                                  |            |
| 2,500,000  | Albany New York Industrial Development Agency\$   | 2,463,500  |
| 2,000,000  | Nassau County New York Industrial Development     | 2,034,600  |
| 2,000,000  | New York City Industrial Development Agency, 5    | 2,003,640  |
| 12,990,000 | New York City Industrial Development Agency, 6    | 12,721,367 |
| 5,000,000  | New York City Trust Cultural Resources Revenue    | 5,113,300  |
| 7,040,000  | (a)New York State Dormitory Authority Revenue, RI | 8,691,373  |
| 2,000,000  | Suffolk County Industrial Development Agency,     | 2,051,400  |
| 6,000,000  | Triborough Bridge & Tunnel Authority Revenue,     | 6,282,720  |
|            | \$  | 41,361,900 |
|            | North Carolina - 2.5%                             |            |
| 4,030,000  | Charlotte North Carolina Special Facilities R\$   | 3,618,980  |
| 4,600,000  | Charlotte North Carolina Special Facilities Re    | 4,729,214  |
|            | \$  | 8,348,194  |
|            | Oklahoma - 6.4%                                   |            |
| 3,000,000  | + Oklahoma Development Finance Authority Revenu\$ | 3,183,600  |
| 8,000,000  | + Oklahoma Development Finance Authority Revenue  | 8,489,600  |
| 4,100,000  | Tulsa Municipal Airport Revenue, 5.65%, 12/1/3    | 4,078,024  |
| 1,225,000  | Tulsa Municipal Airport Revenue, 6.25%, 6/1/20    | 1,186,057  |
| 4,350,000  | Tulsa Municipal Airport Revenue, 7.35%, 12/1/1    | 4,352,567  |
|            | \$  | 21,289,848 |
|            | Pennsylvania - 6.8%                               |            |
| 3,000,000  | Allegheny County Hospital Development Authori\$   | 2,598,000  |
| 1,550,000  | Allegheny County Hospital Development Authorit    | 1,550,046  |
| 12,300,000 | + Allegheny County Hospital Development Authorit  | 14,733,309 |
| 1,000,000  | Columbia County Hospital Authority Health Care    | 883,580    |
| 1,000,000  | Hazleton Health Services Authority Hospital Re    | 985,960    |
| 1,280,000  | Langhorne Manor Borough Higher Education & Hea    | 1,287,296  |
| 500,000    | Pennsylvania Higher Educational Facilities Aut    | 503,270    |
|            | \$  | 22,541,461 |
|            | Rhode Island - 1.3%                               |            |
| 4,000,000  | Central Falls Detention Facilities Revenue, 7\$   | 4,267,120  |
|            | South Carolina - 2.1%                             |            |
| 5,185,000  | + South Carolina Jobs Economic Development Auth\$ | 6,114,567  |
| 665,000    | + South Carolina Jobs Economic Development Autho  | 782,366    |
|            | \$  | 6,896,933  |
|            | Tennessee - 3.3%                                  |            |
| 7,000,000  | Johnson City Health & Educational Facilities \$   | 8,530,200  |
| 2,480,000  | Knox County Health Educational & Housing Facil    | 2,597,850  |
|            | \$  | 11,128,050 |
|            | Texas - 11.3%                                     |            |
| 1,345,000  | Bexar County Housing Finance Corp., 8.0%, 12/\$   | 1,377,993  |
| 1,000,000  | Dallas-Fort Worth International Airport Revenu    | 943,720    |
| 4,000,000  | Decatur Hospital Authority Revenue, 7.0%, 9/1/    | 4,140,000  |
| 1,000,000  | + Georgetown Health Facilities Development Corp.  | 1,080,120  |
| 2,000,000  | Gulf Coast Industrial Development Authority Re    | 1,880,100  |
| 3,750,000  | Houston Airport System Special Facilities Reve    | 3,334,050  |
| 5,340,000  | Lubbock Health Facilities Development Corp., 6    | 5,401,036  |
| 2,450,000  | (a)Northside Independent School District, RIB, 10 | 2,740,374  |
| 500,000    | Sabine River Authority Pollution Control Reven    | 469,020    |
| 7,040,000  | (a)Texas State, RIB, 10.068%, 4/1/30 (144A)       | 7,875,789  |
| 1,365,000  | (c)Willacy County Local Government Corp. Revenue, | 1,392,901  |
| 1,500,000  | Willacy County Local Government Corp. Revenue,    | 1,509,975  |
| 5,250,000  | Willacy County Local Government Corp. Revenue,    | 5,403,720  |
|            | \$  | 37,548,798 |
|            | Utah - 0.2%                                       |            |
| 800,000    | Spanish Fork City Charter School Revenue, 5.5\$   | 760,712    |
|            | Vermont - 0.5%                                    |            |
| 1,500,000  | Vermont Educational & Health Buildings Financ\$   | 1,637,175  |

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|                |   |     |              |
|----------------|---|-----|--------------|
|                | Virginia - 0.3%   |     |              |
| 1,000,000      | Peninsula Ports Authority, 6.0%, 4/1/33                       | \$  | 1,026,810    |
|                | Washington - 7.3%   |     |              |
| 4,710,000      | Spokane Public Facilities District Hotel/Motel                | \$  | 5,124,574    |
| 7,025,000      | Tobacco Settlement Authority Revenue, 6.625%,                 |     | 7,170,839    |
| 14,315,000     | Washington State General Obligation, 0.0%, 6/1                |     | 7,438,217    |
| 5,000,000      | Washington State Housing Finance Committee Non                |     | 4,687,350    |
|                |   | \$  | 24,420,980   |
|                | Wisconsin - 0.6%  |     |              |
| 2,400,000      | Aztalan Wisconsin Exempt Facilities Revenue,                  | \$  | 2,138,376    |
|                | TOTAL TAX-EXEMPT OBLIGATIONS                                  |     |              |
|                | (Cost \$384,745,017)  | \$  | 412,257,127  |
|                | MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 2.9% of Net Assets |     |              |
| 10,000,000 (d) | Non-Profit Preferred Funding Trust I, Series                  | \$  | 9,652,500    |
|                | TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION                |     |              |
|                | (Cost \$10,000,000)   | \$  | 9,652,500    |
| Shares         | COMMON STOCK - 1.0% of Net Assets                             |     |              |
| 184,048        | Northwest Airlines Corp.                                      | \$  | 3,443,538    |
|                | TOTAL COMMON STOCK  |     |              |
|                | (Cost \$6,612,756)  | \$  | 3,443,538    |
|                | TAX-EXEMPT MONEY MARKET MUTUAL FUND - 1.3% of Net Assets      |     |              |
| 4,278,574      | BlackRock Liquidity Funds MuniFund Portfolio                  | \$  | 4,278,574    |
|                | TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND                     |     |              |
|                | (Cost \$4,278,574)  | \$  | 4,278,574    |
|                | TOTAL INVESTMENTS IN SECURITIES - 129.0%                      |     |              |
|                | (Cost \$405,636,347) (e) (f)                                  | \$  | 429,631,739  |
|                | OTHER ASSETS AND LIABILITIES - 1.3%                           | \$  | 4,436,109    |
|                | PREFERRED SHARES AT REDEMPTION VALUE,                         |     |              |
|                | INCLUDING DIVIDENDS PAYABLE - (30.3)%                         | \$  | -101,012,956 |
|                | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS                   | -\$ | 333,054,892  |

RIB Residual Interest Bonds

NR Security not rated by S&P or Moody's.

(144A) Security is exempt from registration under Rule 144A of the Securities Act of 1933. Such securities may be resold normally to qualified institutional buyers in a transaction exempt from registration. At January 31, 2008 the value of these securities amounted to \$42,651,842 or 12.8% of net assets applicable to common shareowners.

+ Prerefunded bonds have been collateralized by U.S. Treasury securities or U.S. Government Agencies which are held in escrow to pay interest and principal on the tax exempt issue and to retire the bonds in full at the earliest refunding date.

(a) The interest rate is subject to change periodically and inversely based upon prevailing market rates. The interest rate shown is the rate at January 31, 2008.

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(b) Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date.

The rate shown is the rate at January 31, 2008.

(c) Escrow to maturity.

(d) The interest rate is subject to change periodically. The interest rate shown is the rate at January 31, 2008.

(e) The concentration of investments by type of obligation/market sector is as follows:

|                           |      |
|---------------------------|------|
| Insured                   | 13%  |
| General Obligation        | 7    |
| Revenue Bonds:            |      |
| Health Revenue            | 27   |
| Airport Revenue           | 12   |
| Tobacco Revenue           | 11   |
| Development Revenue       | 5    |
| Pollution Control Revenue | 5    |
| Facilities Revenue        | 5    |
| Education Revenue         | 4    |
| Housing Revenue           | 3    |
| Power Revenue             | 3    |
| Other Revenue             | 2    |
| Transportation Revenue    | 1    |
| Gaming Revenue            | 1    |
| School District Revenue   | 1    |
| Utilities Revenue         | 0    |
|                           | 100% |

(f) At January 31, 2008, the net unrealized gain on investments based on cost for federal income tax purposes of \$403,825,220 was as follows:

Aggregate gross unrealized gain for all invest\$ 36,777,359  
there is an excess of value over tax cost

Aggregate gross unrealized loss for all invest (10,970,840)  
there is an excess of tax cost over value \$ 25,806,519  
Net unrealized gain

For financial reporting purposes net unrealized gain on investments was \$23,995,392

and cost of investments aggregated \$405,636,347.

### ITEM 2. CONTROLS AND PROCEDURES.

(a) Disclose the conclusions of the registrant's principal executive officer or officers and principal financial officer or officers, or persons performing similar functions, about the effectiveness of the registrant's disclosure controls and procedures (as defined in Rule 30a-3(c) under the Act (17 CFR 270.30a-3(c))) as of a date within 90 days of the filing date of the report that includes the disclosure required by this paragraph, based on their evaluation of these controls and procedures required by Rule 30a-3(b) under the Act (17 CFR270.30a-3(b)) and Rule 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR240.13a-15(b) or 240.15d-15(b)).

The registrant's principal executive officer and principal financial officer have concluded that the registrant's disclosure controls and procedures are

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effective based on their evaluation of these controls and procedures as of a date within 90 days of the filing date of this report.

(b) Disclose any change in the registrant's internal controls over financial reporting (as defined in Rule 30a-3(d) under the Act (17 CFR270.30a-3(d)) that occurred during the registrant's last fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

There were no significant changes in the registrant's internal control over financial reporting that occurred during the second fiscal quarter of the period covered by this report that have materially affected, or are reasonably likely to materially affect, the registrant's internal control over financial reporting.

### ITEM 3. EXHIBITS.

(a) A separate certification for each principal executive officer and principal financial officer of the registrant as required by Rule 30a-2 under the Act (17 CFR 270.30a-2).

Filed herewith.

### SIGNATURES

[See General Instruction F]

Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

(Registrant) Pioneer Municipal High Income Trust

By (Signature and Title)\* /s/ John F. Cogan, Jr.  
John F. Cogan, Jr, President

Date March 31, 2008

Pursuant to the requirements of the Securities Exchange Act of 1934 and the Investment Company Act of 1940, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

By (Signature and Title)\* /s/ John F. Cogan, Jr.  
John F. Cogan, Jr., President

Date March 31, 2008

By (Signature and Title)\* /s/ Vincent Nave

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Vincent Nave, Treasurer

Date March 31, 2008

\* Print the name and title of each signing officer under his or her signature.