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PIONEER MUNICIPAL HIGH INCOME TRUST
Form N-Q
September 29, 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 811-21321

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: July 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 7/31/08 (unaudited)

| Principal Amount (\$) | | Value (\$) |
|--------------------------|---|------------|
| | TAX EXEMPT OBLIGATIONS - 129.0% of Net Assets | |
| | Alabama - 1.3% | |
| 1,500,000 | Camden Alabama Industrial Development Board, 6.125%, | 1,462,860 |
| 1,000,000 | Huntsville-Redstone Village Special Care Facilities F | 847,610 |
| 2,000,000 | Huntsville-Redstone Village Special Care Facilities F | 1,583,660 |
| | | 3,894,130 |
| | Arizona - 2.1% | |
| 5,000,000 | Apache County Industrial Development Authority, 5.85% | 4,775,550 |
| 980,000 | Pima County Industrial Development Authority, 7.25%, | 1,004,304 |
| 500,000 | Yavapai County Industrial Development Authority, 6.0% | 496,800 |
| | | 6,276,654 |
| | California - 5.9% | |
| 5,150,000 + | Golden State Tobacco Securitization Corp., 7.8%, 6/1/ | 6,110,114 |
| 7,000,000 + | Golden State Tobacco Securitization Corp., 7.875%, 6/ | 8,327,130 |
| 2,500,000 | University of California Revenue, 5.0%, 5/15/25 | 2,530,575 |
| 655,000 | Valley Health System Hospital Revenue, 6.5%, 5/15/25 | 480,639 |
| | | 17,448,458 |
| | Connecticut - 5.1% | |
| 10,335,00 (a) | Lehman Municipal Trust Receipts, RIB, 8.573%, 7/1/42 | 10,636,369 |
| 5,000,000 | Mohegan Tribe Indians Gaming Authority, 6.25%, 1/1/31 | 4,531,500 |
| | | 15,167,869 |
| | Delaware - 0.4% | |
| 765,000 | Sussex County Delaware Revenue, 5.9%, 1/1/26 | 691,682 |
| 600,000 | Sussex County Delaware Revenue, 6.0%, 1/1/35 | 524,928 |
| | | 1,216,610 |
| | District of Columbia - 3.6% | |
| 5,000,000 | District of Columbia Tobacco Settlement Financing Cor | 4,714,350 |
| 6,000,000 | District of Columbia Tobacco Settlement Financing Cor | 5,937,180 |
| | | 10,651,530 |
| | Florida - 6.4% | |
| 2,000,000 | Beacon Lakes Community Development, 6.9%, 5/1/35 | 1,888,320 |
| 7,000,000 (a) | Lehman Municipal Trust Receipts, RIB, 8.16%, 11/1/39 | 7,190,470 |
| 2,500,000 | Liberty County Subordinate Revenue, 8.25%, 7/1/28 | 2,461,375 |
| 1,000,000 | St. Johns County Industrial Development Authority Rev | 839,080 |
| 2,000,000 | St. Johns County Industrial Development Authority Rev | 1,550,880 |
| 5,000,000 | Tallahassee Health Facilities Revenue, 6.375%, 12/1/3 | 5,033,250 |
| | | 18,963,375 |
| | Georgia - 6.6% | |
| 4,240,000 (a) | Atlanta Georgia Water & Waste Revenue, RIB, 8.049%, 1 | 3,967,877 |
| 2,400,000 | Fulton County Residential Care Facilities Revenue, 5. | 1,957,080 |
| 2,600,000 | Fulton County Residential Care Facilities Revenue, 5. | 1,980,342 |
| 7,500,000 | Main Street Natural Gas Project Revenue, 6.25%, 7/15/ | 6,775,350 |
| 4,500,000 | Main Street Natural Gas Project Revenue, 6.375%, 7/15 | 4,102,290 |
| 1,000,000 | Rockdale County Development Authority Revenue, 6.125% | 954,780 |
| | | 19,737,719 |
| | Guam - 1.5% | |
| 5,000,000 | Northern Mariana Islands, 5.0%, 10/1/22 | 4,370,800 |
| | Idaho - 1.6% | |
| 5,000,000 | Power County Industrial Development Corp., 6.45%, 8/1 | 4,904,400 |

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| | | |
|---------------|---|------------|
| | Illinois - 5.6% | |
| 1,000,000 | Centerpoint Intermodal Center, 8.0%, 6/15/23 (144A) | 913,550 |
| 1,000,000 | Illinois Finance Authority Revenue, 6.0%, 11/15/27 | 910,630 |
| 1,000,000 | Illinois Finance Authority Revenue, 6.0%, 11/15/39 | 871,350 |
| 1,500,000 | Illinois Health Facilities Authority Revenue, 6.9%, 1 | 1,137,150 |
| 16,880,00 (b) | Metropolitan Pier & Exposition Authority Dedicated St | 11,387,923 |
| 1,800,000 | Southwestern Illinois Development Authority Revenue, | 1,584,828 |
| | | 16,805,431 |
| | Indiana - 3.3% | |
| 5,000,000 | Indiana Health & Educational Facility Financing Autho | 4,437,050 |
| 1,000,000 | Indiana State Development Finance Authority Revenue, | 939,340 |
| 4,300,000 | Indiana State Development Finance Authority Revenue, | 4,332,981 |
| | | 9,709,371 |
| | Louisiana - 2.0% | |
| 1,500,000 | Louisiana Local Government Environmental Facilities R | 1,456,140 |
| 5,000,000 | Louisiana Public Facilities Authority Revenue, 5.5%, | 4,665,250 |
| | | 6,121,390 |
| | Massachusetts - 6.1% | |
| 7,050,000 | Massachusetts Health & Educational Facilities Authori | 7,152,295 |
| 3,500,000 | Massachusetts Health & Educational Facilities Authori | 3,520,300 |
| 2,500,000 | Massachusetts Health & Education Facilities Authority | 2,362,625 |
| 5,000,000 | Massachusetts Health & Educational Facilities Authori | 4,990,350 |
| | | 18,025,570 |
| | Michigan - 3.2% | |
| 950,000 | Doctor Charles Drew Academy, 5.7%, 11/1/36 | 639,084 |
| 1,700,000 | Flint Michigan Hospital Building Authority Revenue, 5 | 1,586,457 |
| 1,500,000 | John Tolfree Health System Corp., 6.0%, 9/15/23 | 1,445,085 |
| 2,000,000 | Michigan State Hospital Finance Authority Revenue, 5. | 1,806,260 |
| 4,010,000 | Michigan State Hospital Finance Authority Revenue, 6. | 4,010,000 |
| | | 9,486,886 |
| | Minnesota - 2.3% | |
| 1,675,000 | Duluth Economic Development Authority Health Care Fac | 1,739,069 |
| 1,500,000 | North Oaks Senior Housing Revenue, 6.0%, 10/1/33 | 1,384,905 |
| 2,000,000 | North Oaks Senior Housing Revenue, 6.125%, 10/1/39 | 1,856,760 |
| 2,000,000 | North Oaks Senior Housing Revenue, 6.5%, 10/1/47 | 1,955,400 |
| | | 6,936,134 |
| | Mississippi - 1.0% | |
| 3,000,000 | Mississippi Business Finance Corp. Pollution Control | 2,885,040 |
| | Montana - 0.4% | |
| 1,600,000 | Two Rivers Authority, Inc. Correctional Facility Impr | 1,146,592 |
| | Nebraska - 0.7% | |
| 2,000,000 | Grand Island Solid Waste Disposal Facilities Revenue, | 1,988,800 |
| | Nevada - 1.5% | |
| 4,600,000 | Clark County Industrial Development Revenue, 5.5%, 10 | 3,915,198 |
| 2,000,000 | Nevada State Department of Business & Industry, 7.25% | 575,760 |
| | | 4,490,958 |
| | New Jersey - 9.5% | |
| 2,000,000 | New Jersey Economic Development Authority Revenue, 6. | 1,575,460 |
| 13,350,000 | New Jersey Economic Development Authority Revenue, 6. | 9,564,340 |
| 1,000,000 | New Jersey Economic Development Authority Revenue, 6. | 763,580 |
| 6,150,000 | New Jersey Economic Development Authority Revenue, 7. | 4,804,749 |
| 10,000,00 + | Tobacco Settlement Financing Corp., 6.75%, 6/1/39 | 11,619,800 |
| | | 28,327,929 |
| | New Mexico - 1.4% | |
| 1,500,000 | Otero County New Mexico Project Revenue, 6.0%, 4/1/23 | 1,389,540 |
| 2,960,000 | Otero County New Mexico Project Revenue, 6.0%, 4/1/28 | 2,628,776 |
| | | 4,018,316 |
| | New York - 9.5% | |
| 2,500,000 | Albany New York Industrial Development Agency Civic F | 2,380,400 |

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| | | |
|---------------|---|------------|
| 2,000,000 | Nassau County New York Industrial Development Agency | 1,972,860 |
| 2,000,000 | New York City Industrial Development Agency, 5.375%, | 1,837,640 |
| 12,990,000 | New York City Industrial Development Agency, 6.9%, 8/ | 5,849,657 |
| 7,040,000 (a) | New York State Dormitory Authority Revenue, RIB, 9.97 | 7,920,986 |
| 2,000,000 | Suffolk County Industrial Development Agency, 7.25%, | 2,035,660 |
| 6,000,000 | Triborough Bridge & Tunnel Authority Revenue, 5.25%, | 6,115,920 |
| | | 28,113,123 |
| | North Carolina - 2.2% | |
| 4,030,000 | Charlotte North Carolina Special Facilities Revenue, | 2,697,642 |
| 4,600,000 | Charlotte North Carolina Special Facilities Revenue, | 3,952,596 |
| | | 6,650,238 |
| | Oklahoma - 7.0% | |
| 3,000,000 + | Oklahoma Development Finance Authority Revenue, 5.625 | 3,139,260 |
| 8,000,000 + | Oklahoma Development Finance Authority Revenue, 5.625 | 8,371,360 |
| 4,100,000 | Tulsa Municipal Airport Revenue, 5.65%, 12/1/35 | 4,051,005 |
| 1,225,000 | Tulsa Municipal Airport Revenue, 6.25%, 6/1/20 | 965,276 |
| 4,350,000 | Tulsa Municipal Airport Revenue, 7.35%, 12/1/11 | 4,119,059 |
| | | 20,645,960 |
| | Pennsylvania - 7.3% | |
| 3,000,000 | Allegheny County Hospital Development Authority Reven | 2,382,180 |
| 1,550,000 | Allegheny County Hospital Development Authority Reven | 1,459,278 |
| 12,300,00 + | Allegheny County Hospital Development Authority Reven | 14,361,357 |
| 1,000,000 | Columbia County Hospital Authority Health Care Revenu | 832,560 |
| 925,000 | Hazleton Health Services Authority Hospital Revenue, | 870,221 |
| 1,280,000 | Langhorne Manor Borough Higher Education & Health Aut | 1,233,587 |
| 500,000 | Pennsylvania Higher Educational Facilities Authority | 477,795 |
| | | 21,616,978 |
| | Rhode Island - 1.3% | |
| 4,000,000 | Central Falls Detention Facilities Revenue, 7.25%, 7/ | 4,009,600 |
| | South Carolina - 2.3% | |
| 5,185,000 + | South Carolina Jobs Economic Development Authority Re | 5,926,196 |
| 665,000 + | South Carolina Jobs Economic Development Authority Re | 757,428 |
| | | 6,683,624 |
| | Tennessee - 3.7% | |
| 7,000,000 + | Johnson City Health & Educational Facilities Board Ho | 8,296,400 |
| 2,480,000 | Knox County Health Educational & Housing Facilities B | 2,579,051 |
| | | 10,875,451 |
| | Texas - 14.6% | |
| 1,345,000 | Bexar County Housing Finance Corp., 8.0%, 12/1/36 | 1,335,814 |
| 1,000,000 | Dallas-Fort Worth International Airport Revenue, 6.0% | 510,460 |
| 4,000,000 | Decatur Hospital Authority Revenue, 7.0%, 9/1/25 | 4,023,200 |
| 1,000,000 + | Georgetown Health Facilities Development Corp., 6.25% | 1,057,990 |
| 2,000,000 | Gulf Coast Industrial Development Authority Revenue, | 1,746,240 |
| 3,750,000 | Houston Airport System Special Facilities Revenue, 5. | 2,459,400 |
| 5,340,000 | Lubbock Health Facilities Development Corp., 6.625%, | 5,087,258 |
| 10,000,000 | North Texas Tollway Authority Revenue, 5.75%, 1/1/33 | 9,718,500 |
| 2,450,000 (a) | Northside Independent School District, RIB, 9.169%, 6 | 2,491,944 |
| 500,000 | Sabine River Authority Pollution Control Revenue, 6.1 | 402,770 |
| 7,040,000 (a) | Texas State, RIB, 9.134%, 4/1/30 (144A) | 7,305,830 |
| 735,000 (c) | Willacy County Local Government Corp. Revenue, 6.0%, | 751,420 |
| 1,500,000 | Willacy County Local Government Corp. Revenue, 6.0%, | 1,484,160 |
| 5,250,000 | Willacy County Local Government Corp. Revenue, 6.875% | 4,948,493 |
| | | 43,323,479 |
| | Utah - 0.2% | |
| 800,000 | Spanish Fork City Charter School Revenue, 5.55%, 11/1 | 703,128 |
| | Vermont - 0.5% | |
| 1,500,000 | Vermont Educational & Health Buildings Financing Agen | 1,549,740 |
| | Virginia - 0.3% | |
| 1,000,000 | Peninsula Ports Authority, 6.0%, 4/1/33 | 938,850 |

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| | | |
|---------------|--|---------------|
| | Washington - 7.9% | |
| 4,710,000 | Spokane Public Facilities District Hotel/Motel Tax & | 5,023,121 |
| 7,025,000 | Tobacco Settlement Authority Revenue, 6.625%, 6/1/32 | 6,871,995 |
| 14,315,000 | Washington State General Obligation, 0.0%, 6/1/22 | 7,065,455 |
| 5,000,000 | Washington State Housing Finance Committee Nonprofit | 4,529,850 |
| | | 23,490,421 |
| | Wisconsin - 0.7% | |
| 2,400,000 | Aztalan Wisconsin Exempt Facilities Revenue, 7.5%, 5/ | 2,005,752 |
| | TOTAL TAX-EXEMPT OBLIGATIONS | |
| | (Cost \$385,918,633) | 383,180,306 |
| | MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 3.3% of Net Assets | |
| 10,000,00 (d) | (Non-Profit Preferred Funding Trust I, 12.0%, 9/15/37 (| 9,654,600 |
| | TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION | |
| | (Cost \$10,000,000) | 9,654,600 |
| Shares | COMMON STOCK - 0.6% of Net Assets | |
| 194,770 (f) | Northwest Airlines Corp. | 1,784,093 |
| | TOTAL COMMON STOCK | |
| | (Cost \$6,612,756) | 1,784,093 |
| | TOTAL INVESTMENTS IN SECURITIES - 132.9% | |
| | (Cost \$402,531,389) (g) (h) | 394,618,999 |
| | OTHER ASSETS AND LIABILITIES - 1.1% | 3,407,266 |
| | PREFERRED SHARES AT REDEMPTION VALUE, | |
| | INCLUDING DIVIDENDS PAYABLE - (34.0)% | (101,014,388) |
| | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100.0% | 297,011,877 |
| 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 July 31, 2008 the value of these securities amounted to \$50,784,754 or 17.1% 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 coupon rate at July 31, 2008. | |
| (b) | Debt obligation initially issued at one coupon which converts to a higher coupon at a specific date. The rate shown is the coupon rate at July 31, 2008. | |
| (c) | Escrow to maturity. | |
| (d) | The interest rate is subject to change periodically. The interest rate shown is the coupon rate at July 31, 2008. | |

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- (e) Indicates a security that has been deemed illiquid. The aggregate cost of illiquid securities is \$10,000,000. The aggregate value \$9,654,600 represents 3.3% of the net assets.
- (f) Non-income producing.
- (g) The concentration of investments by type of obligation/market sector is as follows:
- | | | |
|----------|---------------------------|------|
| Insured: | | |
| | MBIA | |
| 5.7% | | |
| | FGIC | 1.8 |
| | FSA | 1.0 |
| | ACA | 0.9 |
| | AMBAC | 0.7 |
| | General Obligation | 7.3 |
| | Revenue Bonds: | |
| | Health Revenue | 27.0 |
| | Tobacco Revenue | 11.1 |
| | Airport Revenue | 10.3 |
| | Other Revenue | 6.1 |
| | Development Revenue | 5.2 |
| | Facilities Revenue | 4.7 |
| | Education Revenue | 4.5 |
| | Pollution Control Revenue | 3.5 |
| | Utilities Revenue | 2.8 |
| | Housing Revenue | 2.8 |
| | Transportation Revenue | 2.6 |
| | Gaming Revenue | 1.2 |
| | School District Revenue | 0.6 |
| | Power Revenue | 0.2 |

100.0%

- (h) At July 31, 2008, the net unrealized loss on investments based on cost for federal income tax purposes of \$400,665,447 was as follows:
- | | | |
|----|--|----|
| 2 | Aggregate gross unrealized gain for all investments i \$ | |
| | there is an excess of value over tax cost | |
| (2 | Aggregate gross unrealized loss for all investments i | |
| (| there is an excess of tax cost over value | \$ |
| | Net unrealized loss | |
| | For financial reporting purposes net unrealized loss on investments was \$(7,912,390) and cost of investments aggregated \$402,531,389 | |

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

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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 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 September 29, 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

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Date September 29, 2008

By (Signature and Title)* /s/ Mark Bradley
Mark Bradley, Treasurer

Date September 29, 2008

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