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PIONEER MUNICIPAL HIGH INCOME TRUST
Form N-Q
September 28, 2006

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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, 2006

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 7/31/06 (unaudited)

| Principal Amount | | Value |
|---------------------|---|--------------|
| | TAX EXEMPT OBLIGATIONS - 128.0% of Net Assets | |
| | Alabama - 0.5% | |
| 1,500,000 | Camden Alabama Industrial Development Board, 6.125%, 1 | \$1,624,710 |
| | Arizona - 6.5% | |
| 5,000,000 | Apache County Industrial Development Authority, 5.85% | \$5,002,000 |
| 5,000,000 | Apache County Industrial Development Authority, 5.875% | 5,002,100 |
| 7,000,000 | (a)Downtown Phoenix Hotel Corp., RIB, 6.103%, 7/1/40 (144 | 7,357,630 |
| 3,000,000 | + Maricopa County Industrial Development Authority, 7.87 | 3,132,690 |
| 1,000,000 | Pima County Industrial Development Authority, 7.25%, 7 | 1,072,200 |
| 500,000 | Yavapai County Industrial Development Authority, 6.0%, | 531,655 |
| | | \$22,098,275 |
| | California - 10.8% | |
| 7,270,000 | California State General Obligation, 5.25%, 2/1/28 | \$7,581,011 |
| 5,000,000 | California Statewide Communities Development Authority | 5,078,000 |
| 5,150,000 | Golden State Tobacco Securitization Corp., 7.8%, 6/1/4 | 6,156,516 |
| 7,000,000 | Golden State Tobacco Securitization Corp., 7.875%, 6/1 | 8,398,670 |
| 2,000,000 | San Diego Unified School District, 5.0%, 7/1/25 | 2,085,040 |
| 2,500,000 | University of California Revenue, 5.0%, 5/15/25 | 2,580,075 |
| 5,000,000 | Valley Health System Hospital Revenue, 6.5%, 5/15/25 | 5,006,050 |
| | | \$36,885,362 |
| | Connecticut - 4.0% | |
| 2,000,000 | Bridgeport Senior Living Facility Revenue, 7.25%, 4/1/ | \$1,506,120 |
| 2,205,000 | Connecticut State Health & Educational Facilities Auth | 2,222,927 |
| 4,800,000 | Connecticut State Health & Educational Facilities Auth | 4,782,048 |
| 5,000,000 | Mohegan Tribe Indians Gaming Authority, 6.25%, 1/1/31 | 5,311,400 |
| | | \$13,822,495 |
| | Delaware - 0.3% | |
| 500,000 | Sussex County Delaware Revenue, 5.9%, 1/1/26 | \$509,735 |
| 600,000 | Sussex County Delaware Revenue, 6.0%, 1/1/35 | 611,628 |
| | | \$1,121,363 |
| | District of Columbia - 3.6% | |
| 5,000,000 | District of Columbia Tobacco Settlement Financing Corp | \$5,688,400 |
| 6,000,000 | District of Columbia Tobacco Settlement Financing Corp | 6,518,400 |
| | | \$12,206,800 |
| | Florida - 2.8% | |
| 2,000,000 | Beacon Lakes Community Development, 6.9%, 5/1/35 | \$2,172,100 |
| 1,650,000 | Polk County Industrial Development Revenue, 5.85%, 12/ | 1,680,657 |
| 5,500,000 | Tallahassee Health Facilities Revenue, 6.375%, 12/1/30 | 5,843,695 |
| | | \$9,696,452 |
| | Georgia - 2.0% | |
| 4,240,000 | (a)Atlanta Georgia Water & Waste Revenue, RIB, 6.193%, 11 | \$4,502,541 |
| 2,325,000 | Brunswick & Glynn County Development Authority Revenue | 2,291,241 |
| | | \$6,793,782 |
| | Idaho - 1.6% | |
| 5,000,000 | Power County Industrial Development Corp., 6.45%, 8/1/ | \$5,324,100 |
| | Illinois - 5.9% | |
| 1,000,000 | Centerpoint Intermodal Center, 8.0%, 6/15/23 (144A) | \$1,010,200 |
| 5,000,000 | Chicago Illinois O'Hare International Airport Revenue, | 5,124,350 |

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| | | |
|------------|---|--------------|
| 1,000,000 | Illinois Finance Authority Revenue, 6.0%, 11/15/27 | 1,007,520 |
| 1,000,000 | Illinois Finance Authority Revenue, 6.0%, 11/15/39 | 1,000,350 |
| 1,500,000 | Illinois Health Facilities Authority Revenue, 6.9%, 11 | 1,632,765 |
| 16,880,000 | (b)Metropolitan Pier & Exposition Authority Dedicated Sta | 10,520,798 |
| | | \$20,295,983 |
| | Indiana - 1.6% | |
| 1,000,000 | Indiana State Development Finance Authority Revenue, 5 | \$1,028,800 |
| 4,300,000 | Indiana State Development Finance Authority Revenue, 5 | 4,439,965 |
| | | \$5,468,765 |

Pioneer Municipal High Income Trust

SCHEDULE OF INVESTMENTS 7/31/06 (unaudited) (continued)

| Principal Amount | | Value |
|------------------|---|--------------|
| | Massachusetts - 11.1% | |
| 5,000,000 | Massachusetts Bay Transportation Authority, 5.0%, 7/1/ | \$5,364,250 |
| 2,335,000 | Massachusetts Health & Educational Facilities Authorit | 2,402,995 |
| 7,050,000 | Massachusetts Health & Educational Facilities Authorit | 7,306,972 |
| 3,500,000 | Massachusetts Health & Educational Facilities Authorit | 3,742,095 |
| 5,000,000 | Massachusetts Health & Educational Facilities Authorit | 5,417,900 |
| 75,000 | Massachusetts State Development Finance Agency, 5.25%, | 69,270 |
| 9,810,000 | (a)Massachusetts State Development Finance Agency, RIB, | 610,633,255 |
| 3,055,000 | Massachusetts State Housing Finance Agency, 5.25%, 12/ | 3,102,078 |
| | | \$38,038,815 |
| | Michigan - 3.6% | |
| 1,500,000 | John Tolfree Health System Corp., 6.0%, 9/15/23 | \$1,523,520 |
| 2,000,000 | Michigan State Hospital Finance Authority Revenue, 5.5 | 1,927,160 |
| 4,010,000 | Michigan State Hospital Finance Authority Revenue, 6.0 | 4,010,802 |
| 7,720,000 | (c)Wayne Charter County Michigan Special Airport Faciliti | 4,800,296 |
| | | \$12,261,778 |
| | Minnesota - 2.3% | |
| 1,675,000 | Duluth Economic Development Authority Health Care Faci | \$1,787,811 |
| 8,760,000 | (c)Minneapolis/St. Paul Metropolitan Airports, 7.0%, 4/1/ | 6,013,565 |
| | | \$7,801,376 |
| | Mississippi - 0.9% | |
| 3,000,000 | Mississippi Business Finance Corp. Pollution Control R | \$3,009,210 |
| | Missouri - 1.5% | |
| 5,500,000 | St. Louis Industrial Development Authority Revenue, 7. | \$5,166,810 |
| | Montana - 0.5% | |
| 1,600,000 | Two Rivers Authority, Inc. Correctional Facility Impro | \$1,556,816 |
| | Nevada - 1.4% | |
| 1,000,000 | Clark County Industrial Development Revenue, 5.45%, 3/ | \$1,047,770 |
| 1,850,000 | Clark County Industrial Development Revenue, 5.5%, 10/ | 1,824,784 |
| 2,000,000 | Nevada State Department of Business & Industry, 7.25%, | 2,037,960 |
| | | \$4,910,514 |
| | New Hampshire - 0.9% | |
| 3,000,000 | Manchester School Facilities Revenue, 5.125%, 6/1/28 | \$3,118,530 |
| | New Jersey - 10.1% | |
| 2,000,000 | New Jersey Economic Development Authority Revenue, 6.2 | \$2,045,440 |
| 13,350,000 | New Jersey Economic Development Authority Revenue, 6.2 | 13,643,833 |
| 1,000,000 | New Jersey Economic Development Authority Revenue, 6.4 | 1,026,340 |
| 6,150,000 | New Jersey Economic Development Authority Revenue, 7.0 | 6,443,109 |
| 10,000,000 | Tobacco Settlement Financing Corp., 6.75%, 6/1/39 | 11,216,500 |
| | | \$34,375,222 |

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| | | |
|-----------|--|--------------|
| | New Mexico - 0.4% | |
| 1,350,000 | Santa Fe Educational Facilities Revenue, 5.75%, 10/1/2 | \$1,404,257 |
| | New York - 8.8% | |
| 2,000,000 | New York City Industrial Development Agency, 5.375%, 6 | \$2,058,720 |
| 6,225,000 | New York City Industrial Development Agency, 6.9%, 8/1 | 6,209,126 |
| 5,000,000 | New York City Trust Cultural Resources Revenue, 5.125% | 5,163,200 |
| 7,040,000 | (a) New York State Dormitory Authority Revenue, RIB, 6.41% | 8,275,520 |
| 2,000,000 | Suffolk County Industrial Development Agency, 7.25%, 1 | 2,046,400 |
| 6,000,000 | Triborough Bridge & Tunnel Authority Revenue, 5.25%, 1 | 6,303,240 |
| | | \$30,056,206 |
| | North Carolina - 2.6% | |
| 4,030,000 | Charlotte North Carolina Special Facilities Revenue, 5 | \$3,979,464 |
| 4,600,000 | Charlotte North Carolina Special Facilities Revenue, 7 | 4,932,764 |
| | | \$8,912,228 |

Pioneer Municipal High Income Trust

SCHEDULE OF INVESTMENTS 7/31/06 (unaudited) (continued)

| Principal Amount | | Value |
|------------------|--|--------------|
| | Oklahoma - 6.3% | |
| 3,000,000 | + Oklahoma Development Finance Authority Revenue, 5.625% | \$3,178,890 |
| 8,000,000 | + Oklahoma Development Finance Authority Revenue, 5.625% | 8,477,040 |
| 4,100,000 | Tulsa Municipal Airport Revenue, 5.65%, 12/1/35 | 4,113,653 |
| 1,225,000 | Tulsa Municipal Airport Revenue, 6.25%, 6/1/20 | 1,227,916 |
| 4,350,000 | Tulsa Municipal Airport Revenue, 7.35%, 12/1/11 | 4,349,217 |
| | | \$21,346,716 |
| | Oregon - 4.3% | |
| 1,000,000 | Klamath Falls Electric Revenue, 5.75%, 1/1/13 | \$928,730 |
| 7,000,000 | Klamath Falls Electric Revenue, 6.0%, 1/1/25 | 6,282,500 |
| 7,500,000 | Western Generation Agency Cogeneration Project Revenue | 7,525,725 |
| | | \$14,736,955 |
| | Pennsylvania - 5.8% | |
| 1,550,000 | Allegheny County Hospital Development Authority Revenue | \$1,522,767 |
| 12,300,000 | Allegheny County Hospital Development Authority Revenue | 14,534,910 |
| 1,000,000 | Columbia County Hospital Authority Health Care Revenue | 882,220 |
| 1,000,000 | Hazleton Health Services Authority Hospital Revenue, 5 | 978,040 |
| 1,280,000 | Langhorne Manor Borough Higher Education & Health Auth | 1,280,115 |
| 500,000 | Pennsylvania Higher Educational Facilities Authority R | 517,490 |
| | | \$19,715,542 |
| | Rhode Island - 1.3% | |
| 4,000,000 | Central Falls Detention Facilities Revenue, 7.25%, 7/1 | \$4,406,000 |
| | South Carolina - 2.9% | |
| 3,000,000 | + Greenville County School District, 5.5%, 12/1/28 | \$3,286,860 |
| 5,185,000 | + South Carolina Jobs Economic Development Authority Rev | 5,937,188 |
| 665,000 | South Carolina Jobs Economic Development Authority Rev | 739,586 |
| | | \$9,963,634 |
| | Tennessee - 3.8% | |
| 7,000,000 | Johnson City Health & Educational Facilities Board Hos | \$8,094,100 |
| 4,480,000 | Knox County Health Educational & Housing Facilities Bo | 4,837,638 |
| | | \$12,931,738 |
| | Texas - 12.2% | |
| 7,500,000 | Alliance Airport Authority Special Facilities Revenue, | \$7,537,575 |
| 1,345,000 | Bexar County Housing Finance Corp., 8.0%, 12/1/36 | 1,368,564 |
| 1,000,000 | Dallas-Fort Worth International Airport Revenue, 6.0%, | 990,680 |
| 5,000,000 | Dallas-Fort Worth International Airport Revenue, 6.15% | 5,013,350 |
| 4,000,000 | Decatur Hospital Authority Revenue, 7.0%, 9/1/25 | 4,319,360 |
| 1,000,000 | + Georgetown Health Facilities Development Corp., 6.25%, | 1,080,600 |

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| | | |
|------------|--|---------------|
| 3,750,000 | Houston Airport System Special Facilities Revenue, 5.7 | 3,610,650 |
| 5,340,000 | Lubbock Health Facilities Development Corp., 6.625%, 7 | 5,434,625 |
| 2,450,000 | (a) Northside Independent School District, RIB, 6.604%, 6/ | 2,711,047 |
| 500,000 | Sabine River Authority Pollution Control Revenue, 6.15 | 539,575 |
| 7,040,000 | (a) Texas State, RIB, 6.077%, 4/1/30 (144A) | 7,709,082 |
| 1,500,000 | Willacy County Local Government Corp. Revenue, 6.0%, 3 | 1,518,825 |
| | | \$41,833,933 |
| | Vermont - 0.5% | |
| 1,500,000 | Vermont Educational & Health Buildings Financing Agenc | \$1,656,915 |
| | Virginia - 1.5% | |
| 1,000,000 | Peninsula Ports Authority, 6.0%, 4/1/33 | \$1,062,960 |
| 4,000,000 | + Pocahontas Parkway Association of Virginia Toll Road R | 4,208,640 |
| | | \$5,271,600 |
| | Washington - 5.7% | |
| 4,710,000 | Spokane Public Facilities District Hotel/Motel Tax & S | \$5,142,143 |
| 7,025,000 | Tobacco Settlement Authority Revenue, 6.625%, 6/1/32 | 7,654,159 |
| 14,315,000 | Washington State General Obligation, 0.0%, 6/1/22 | 6,765,412 |
| | | \$19,561,714 |
| | TOTAL TAX-EXEMPT OBLIGATIONS | |
| | (Cost \$397,630,910) | \$437,374,596 |

Pioneer Municipal High Income Trust

SCHEDULE OF INVESTMENTS 7/31/06 (unaudited) (continued)

| | | |
|------------------|--|---------------|
| Shares | TAX-EXEMPT MONEY MARKET MUTUAL FUND - 0.3% of Net Assets | |
| 1,080,401 | BlackRock Provident Institutional Municipal Fund | \$1,080,401 |
| | TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND | |
| | (Cost \$1,080,401) | \$1,080,401 |
| | TOTAL INVESTMENTS IN SECURITIES - 128.3% | |
| | (Cost \$398,711,311) (d) (e) | \$438,454,997 |
| | OTHER ASSETS AND LIABILITIES - 1.3% | \$4,275,134 |
| | PREFERRED SHARES AT REDEMPTION VALUE, | |
| | INCLUDING DIVIDENDS PAYABLE - (29.6)% | |
| \$ (101,050,559) | | |
| | NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100.0% | \$341,679,572 |

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, 2006 the value of these securities amounted to \$42,199,275 or 12.4% of net assets applicable to common shareowners.

+ Prerefunded bonds have been collateralized by U.S. Treasury securities 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 was the rate at July 31, 2006.

(b) Debt obligation initially issued at one coupon which converts to a

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higher coupon at a specific date.

The rate shown is the rate at period end.

(c) Security is in default and is non-income producing.

(d) At July 31, 2006, the net unrealized gain on investments based on cost for federal income tax purposes of \$397,221,262 was as follows:

| | |
|--|------------|
| Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost | 48,144,789 |
|--|------------|

| | |
|--|------------|
| Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value | -6,911,054 |
| Net unrealized gain | 41,233,735 |

For financial reporting purposes net unrealized gain on investments was \$39,743,686 and cost of investments aggregated \$398,711,311

RIB Residual Interest Bonds

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 CFR 270.30a-3(b)) and Rule 13a-15(b) or 15d-15(b) under the Exchange Act (17 CFR 240.13a-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 CFR 270.30a-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.

The registrant's principal executive officer and principal financial officer, however, voluntarily are reporting the following information:

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In August of 2006 the registrant's investment adviser enhanced its internal procedures for reporting performance information required to be included in prospectuses. Those enhancements involved additional internal controls over the appropriateness of performance data generated for this purpose. Such enhancements were made following an internal review which identified prospectuses relating to certain classes of shares of a limited number of registrants where, inadvertently, performance information not reflecting the deduction of applicable sales charges was included. Those prospectuses were revised, and the revised prospectuses were distributed to shareholders.

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, 2006

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 September 29, 2006

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By (Signature and Title)* /s/ Vincent Nave
Vincent Nave, Treasurer

Date September 29, 2006

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