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PIONEER MUNICIPAL HIGH INCOME TRUST  
Form N-Q  
September 29, 2004

OMB APPROVAL  
OMB Number: 3235-0578  
Expires: February 28, 2006  
Estimated average burden  
hours per response.....  
20.0

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, 2004

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

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under the clearance requirements of 44 U.S.C. ss. 3507.

### ITEM 1. Schedule of Investments.

Pioneer Municipal High Income Trust

SCHEDULE OF INVESTMENTS 7/31/04 (unaudited)

| Principal<br>Amount | S&P/Moody's<br>Ratings |
|---------------------|------------------------|
|---------------------|------------------------|

|               |   |
|---------------|---|
|               | TAX EXEMPT OBLIGATIONS - 127.6% OF NET ASSETS   |
|               | Alabama - 3.6%  |
| \$ 10,000,000 | AAA/Aaa   |
| 1,500,000     | BBB/NR  |
|               | Birmingham Alabama General Obligation, 5.0%, 12/1/32  |
|               | Camden Alabama Industrial Development Board, 6.125%, 12/1/24  |
|               | Arizona - 6.0%  |
| 5,000,000     | BB+/Ba3   |
| 5,000,000     | BB+/Ba3   |
| 3,000,000     | NR/NR   |
| 5,880,000     | AA/Aa2  |
|               | Salt River Project Agriculture Improvement and Power District Electric System Revenue, 5.0%, 1/1/31 |
| 500,000       | NR/Baa2   |
|               | Yavapai County Industrial Development Authority, 6.0%, 8/1/33                                       |
|               | California - 10.9%  |
| 7,270,000     | BBB/A3  |
| 5,150,000     | BBB/Baa3  |
| 7,000,000     | BBB/Baa3  |
| 4,000,000     | AAA/Aaa   |
| 3,000,000     | AAA/Aaa   |
| 2,500,000     | AAA/Aaa   |
| 7,000,000     | BB+/NR  |
|               | California State General Obligation, 5.25%, 2/1/28  |
|               | Golden State Tobacco Securitization Corp., 7.8%, 6/1/42   |
|               | Golden State Tobacco Securitization Corp., 7.875%, 6/1/42   |
|               | Palm Desert Financing Authority Tax Allocation Revenue, 5.0%, 4/1/30                                |
|               | San Diego Unified School District, 5.0%, 7/1/25   |
|               | University of California Revenue, 5.0%, 5/15/25   |
|               | Valley Health System Hospital Revenue, 6.5%, 5/15/25  |
|               | Connecticut - 1.6%  |
| 2,205,000     | BB/Ba1  |
| 4,400,000     | BB/Ba1  |
|               | Connecticut State Health & Educational Facilities Authority Revenue, 5.0%                           |
|               | Connecticut State Health & Educational Facilities Authority Revenue, 5.0%                           |
|               | District of Columbia - 3.4%   |
| 5,000,000     | BBB/Baa3  |
| 7,325,000     | BBB/Baa3  |
|               | District of Columbia Tobacco Settlement Financing Corp., 6.5%, 5/15/33                              |
|               | District of Columbia Tobacco Settlement Financing Corp., 6.75%, 5/15/40                             |
|               | Florida - 4.5%  |
| 2,000,000     | NR/NR   |
| 2,300,000     | CCC-/Caa3   |
| 1,650,000     | BBB-/Baa2   |
| 2,000,000     | NR/NR   |
| 1,900,000     | NR/NR   |
| 5,000,000     | NR/Baa2   |
|               | Beacon Lakes Community Development, 6.9%, 5/1/35  |
|               | Hillsborough County Aviation Authority Revenue, 6.8%, 1/1/24  |
|               | Polk County Industrial Development Revenue, 5.85%, 12/1/30  |
|               | Seminole Tribe Convention-A, 8.95%, 10/1/33   |
|               | Seminole Tribe Convention-A, 10.0%, 10/1/33   |
|               | Tallahassee Health Facilities Revenue, 6.375%, 12/1/30  |
|               | Idaho - 1.6%  |
| 5,000,000     | BB+/Ba3   |
|               | Power County Industrial Development Corp., 6.45%, 8/1/32  |
|               | Illinois - 3.9%   |
| 1,000,000     | NR/NR   |
| 2,790,000     | CCC-/Ca   |
| 1,500,000     | NR/NR   |
|               | Centerpoint Intermodal Center, 8.0%, 6/15/23 (144A)   |
|               | Chicago Illinois O'Hare International Airport, 6.45%, 5/1/18  |
|               | Illinois Health Facilities Authority Revenue, 6.9%, 11/15/33  |

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|           |           |  |
|-----------|-----------|--|
| 16,880,   | (aAAA/Aaa | Metropolitan Pier & Exposition Authority Dedicated State Tax Revenue,<br>0.0%, 6/15/22 |
|           |           | Indiana - 1.1%   |
| 4,300,000 | CCC/Caa3  | Indiana State Development Finance Authority Revenue, 5.75%, 10/1/11                    |

Pioneer Municipal High Income Trust

SCHEDULE OF INVESTMENTS 7/31/04 (unaudited) (continued)

| Principal<br>Amount | S&P/Moody's<br>Ratings |   |
|---------------------|------------------------|---|
|                     |                        | Kentucky - 2.2%   |
| \$ 7,050,000        | CCC-/Caa2              | Kenton County Airport Revenue, 7.5%, 2/1/12                             |
| 1,965,000           | CCC-/Caa2              | Kenton County Airport Revenue, 7.5%, 2/1/20                             |
|                     |                        | Massachusetts - 8.4%  |
| 2,435,000           | AAA/Aaa                | Massachusetts Health & Educational Facilities Authority Revenue, 5.0%,  |
| 7,050,000           | AAA/Aaa                | Massachusetts Health & Educational Facilities Authority Revenue, 5.125% |
| 1,000,000           | AA/NR                  | Massachusetts Health & Educational Facilities Authority Revenue, 5.25%  |
| 2,640,000           | BBB/Baa3               | Massachusetts Health & Educational Facilities Authority Revenue, 5.75%  |
| 3,500,000           | BBB/Baa3               | Massachusetts Health & Educational Facilities Authority Revenue, 6.25%  |
| 5,000,000           | BBB-/NR                | Massachusetts Health & Educational Facilities Authority Revenue, 6.75%  |
| 75,000              | BB/NR                  | Massachusetts State Development Finance Agency, 5.25%, 10/1/18          |
| 5,055,000           | AA-/Aa3                | Massachusetts State Housing Finance Agency, 5.25%, 12/1/33              |
|                     |                        | Michigan - 4.3%   |
| 1,500,000           | BBB-/NR                | John Tolfree Health System Corp., 6.0%, 9/15/23                         |
| 4,010,000           | BBB-/Baa3              | Michigan State Hospital Finance Authority Revenue, 6.0%, 2/1/24         |
| 2,000,000           | NR/NR                  | Michigan State Hospital Finance Authority Revenue, 6.4%, 1/1/15         |
| 7,690,000           | NR/NR                  | Wayne Charter County Special Airport Facilities Revenue, 6.75%, 12/1/15 |
|                     |                        | Minnesota - 3.9%  |
| 13,260,000          | NR/NR                  | Minneapolis/St. Paul Metropolitan Airports, 7.0%, 4/1/25                |
| 1,500,000           | BB/Ba2                 | St. Paul Housing & Redevelopment Authority, 6.625%, 11/1/17             |
|                     |                        | Mississippi - 0.9%  |
| 3,000,000           | BBB-/Ba1               | Mississippi Business Finance Corp. Pollution Control Revenue, 5.9%, 5/1 |
|                     |                        | Missouri - 1.5%   |
| 5,500,000           | NR/Ba3                 | St. Louis Industrial Development Authority Revenue, 7.25%, 12/15/35     |
|                     |                        | Nevada - 1.4%   |
| 1,000,000           | BBB-/Baa2              | Clark County Industrial Development Revenue, 5.45%, 3/1/38              |
| 1,850,000           | B-/NR                  | Clark County Industrial Development Revenue, 5.5%, 10/1/30              |
| 2,000,000           | NR/NR                  | Nevada State Department of Business & Industry, 7.25%, 1/1/23           |
|                     |                        | New Hampshire - 0.9%  |
| 3,000,000           | AAA/Aaa                | Manchester School Facilities Revenue, 5.125%, 6/1/28                    |
|                     |                        | New Jersey - 8.0%   |
| 2,000,000           | B/Caa2                 | New Jersey Economic Development Authority Revenue, 6.25%, 9/15/19       |
| 11,700,000          | B/Caa2                 | New Jersey Economic Development Authority Revenue, 6.25%, 9/15/29       |
| 1,000,000           | B/Caa2                 | New Jersey Economic Development Authority Revenue, 6.4%, 9/15/23        |
| 6,150,000           | B/Caa2                 | New Jersey Economic Development Authority Revenue, 7.0%, 11/15/30       |
| 10,750,000          | BBB/Baa3               | Tobacco Settlement Financing Corp., 6.75%, 6/1/39                       |
|                     |                        | New Mexico - 1.3%   |

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|           |          |  |
|-----------|----------|--|
| 3,700,000 | NR/NR    | New Mexico Hospital Equipment Loan Council, 6.4%, 6/1/16             |
|           |          | New York - 5.8%  |
| 2,000,000 | A/NR     | New York City Industrial Development Agency, 5.375%, 6/1/23          |
| 5,625,000 | CCC/Caa2 | New York City Industrial Development Agency, 6.9%, 8/1/24            |
| 5,000,000 | AAA/Aaa  | New York City Trust Cultural Resources Revenue, 5.125%, 7/1/31       |
| 2,000,000 | NR/NR    | Suffolk County Industrial Development Agency, 7.25%, 1/1/30          |
| 6,000,000 | AAA/Aaa  | Triborough Bridge & Tunnel Authority Revenue, 5.25%, 11/15/30        |
|           |          | North Carolina - 1.4%  |
| 2,000,000 | AA+/Aa2  | Charlotte North Carolina Certificates of Participation, 5.0%, 6/1/33 |
| 4,600,000 | NR/NR    | Charlotte North Carolina Special Facilities Revenue, 7.75%, 2/1/28   |

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SCHEDULE OF INVESTMENTS 7/31/04 (unaudited) (continued)

| Principal Amount | S&P/Moody's Ratings |  |
|------------------|---------------------|--|
|                  |                     | Oklahoma - 4.9%  |
| \$ 3,000,000     | 00B-/B1             | Oklahoma Development Finance Authority Revenue, 5.625%, 8/15/19                  |
| 8,000,000        | B-/B1               | Oklahoma Development Finance Authority Revenue, 5.625%, 8/15/29                  |
| 4,100,000        | B-/Caa2             | Tulsa Municipal Airport Revenue, 5.65%, 12/1/35                                  |
| 1,225,000        | B-/Caa2             | Tulsa Municipal Airport Revenue, 6.25%, 6/1/20                                   |
|                  |                     | Oregon - 4.8%  |
| 1,000,000        | NR/NR               | Klamath Falls Electric Revenue, 5.75%, 1/1/13                                    |
| 7,000,000        | NR/NR               | Klamath Falls Electric Revenue, 6.0%, 1/1/25                                     |
| 7,500,000        | NR/NR               | Western Generation Agency Cogeneration Project Revenue, 7.125%, 1/1/21           |
|                  |                     | Pennsylvania - 10.9%   |
| 1,550,000        | NR/Baa1             | Allegheny County Hospital Development Authority Revenue, 5.125%, 5/1/25          |
| 12,300,000       | B/B2                | Allegheny County Hospital Development Authority Revenue, 9.25%, 11/15/30         |
| 2,500,000        | BBB-/Baa2           | Beaver County Industrial Development Authority, 7.625%, 5/1/25                   |
| 1,000,000        | BB-/NR              | Columbia County Hospital Authority Health Care Revenue, 5.9%, 6/1/29             |
| 5,000,000        | BBB/Baa3            | Delaware County Industrial Development Authority Revenue, 6.1%, 7/1/13           |
| 1,280,000        | NR/B2               | Langhorne Manor Borough Higher Education & Health Authority Revenue, 7.0%        |
| 2,500,000        | BBB+/NR             | Pennsylvania Higher Educational Facilities Authority Revenue, 5.4%, 7/1/25       |
| 2,230,000        | AAA/Aaa             | Pennsylvania State Turnpike Commission, 5.0%, 7/15/10                            |
| 5,000,000        | BBB-/Baa2           | Philadelphia Hospitals & Higher Education Facilities Authority Revenue, 7.0%     |
|                  |                     | South Carolina - 8.7%  |
| 4,250,000        | BBB/Baa2            | Georgetown County Environmental Improvement Revenue, 5.95%, 3/15/14              |
| 15,000,000       | AA-/A1              | Greenville County School District, 5.5%, 12/1/28                                 |
| 1,900,000        | BBB/Baa2            | South Carolina Jobs Economic Development Authority Revenue, 6.25%, 8/1/25        |
| 5,850,000        | BBB/Baa2            | South Carolina Jobs Economic Development Authority Revenue, 6.375%, 8/1/25       |
|                  |                     | Tennessee - 5.2%   |
| 7,000,000        | BBB+/Baa2           | Johnson City Health & Educational Facilities Board Hospital Revenue, 7.0%        |
| 4,480,000        | NR/Baa2             | Knox County Health Educational & Housing Facilities Board Hospital Revenue, 7.0% |
| 4,055,000        | BBB/Baa2            | Memphis-Shelby County Airport Authority Special Facilities Revenue, 5.0%         |
|                  |                     | Texas - 7.7%   |
| 6,500,000        | CCC/Caa2            | Alliance Airport Authority Special Facilities Revenue, 7.0%, 12/1/11             |
| 7,500,000        | CCC/Caa2            | Alliance Airport Authority Special Facilities Revenue, 7.5%, 12/1/29             |
| 1,345,000        | NR/Baa3             | Bexar County Housing Finance Corp., 8.0%, 12/1/36                                |
| 5,500,000        | CCC-/Caa2           | Dallas-Fort Worth International Airport Revenue, 7.125%, 11/1/26                 |
| 2,800,000        | CCC-/Caa2           | Dallas-Fort Worth International Airport Revenue, 7.6%, 11/1/11                   |
| 750,000          | CCC-/Caa2           | Dallas-Fort Worth International Airport Revenue, 7.625%, 11/1/21                 |

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|            |          |   |
|------------|----------|---|
| 1,000,000  | BB/NR    | Georgetown Health Facilities Development Corp., 6.25%, 8/15/29          |
| 3,750,000  | B-/Caa2  | Houston Airport System Special Facilities Revenue, 5.7%, 7/15/29        |
| 5,000,000  | BBB/NR   | Lufkin Health Facilities Development Corp. 5.7%, 2/15/28                |
| 500,000    | BBB/Baa2 | Sabine River Authority Pollution Control Revenue, 6.15%, 8/1/22         |
|            |          | Vermont - 0.5%  |
| 1,500,000  | A-/A3    | Vermont Educational & Health Buildings Financing Agency Revenue, 6.0%,  |
|            |          | Virginia - 1.4%   |
| 1,000,000  | BBB/Baa3 | Peninsula Ports Authority, 6.0%, 4/1/33                                 |
| 4,000,000  | BB/NR    | Pocahontas Parkway Association of Virginia Toll Road Revenue, 5.5%, 8/1 |
|            |          | Washington - 5.3%   |
| 4,710,000  | AAA/Aaa  | Spokane Public Facilities District Hotel/Motel Tax & Sales, 5.75%, 12/1 |
| 7,025,000  | BBB/Baa3 | Tobacco Settlement Authority Washington, 6.625%, 6/1/32                 |
| 14,315,000 | AAA/Aaa  | Washington State General Obligation, 0.0%, 6/1/22                       |

Pioneer Municipal High Income Trust

SCHEDULE OF INVESTMENTS 7/31/04 (unaudited) (continued)

| Principal Amount | S&P/Moody's Ratings |  |
|------------------|---------------------|--|
|                  |                     | Wyoming - 1.6%   |
| \$ 5,000,000     | BB+/Ba3             | Sweetwater County Solid Waste Disposal Revenue, 6.9%, 9/1/24 |

TOTAL TAX-EXEMPT OBLIGATIONS  
(Cost \$405,609,905)

|           |  |
|-----------|--|
| Shares    | TAX-EXEMPT MONEY MARKET MUTUAL FUND - 1.1% OF NET ASSETS |
| 3,452,361 | BlackRock Provident Institutional Municipal Fund         |
|           | TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND                |
|           | (Cost \$3,452,361)                                       |

TOTAL INVESTMENTS IN SECURITIES - 128.7%  
(Cost \$409,062,266) (b) (c) (d)  
Other Assets in Excess of Liabilities - 2.8%  
Preferred Shares at Redemption Value - (31.5)%  
NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100.0%

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. securities may be resold normally to qualified institutional buyers in a transaction from registration. At July 31, 2004 the value of these securities amounted to \$971,310 or 0.3% of net assets applicable to common shareholders.

(a) Indicates a security that has a zero coupon that remains in effect until a predetermined stated coupon rate becomes effective until final maturity.

(b) The concentration of investments by type of obligation/market sector is as follows:  
Insured  
General Obligation  
Revenue Bonds:

Health Revenue  
Airport Revenue  
Tobacco Revenue  
Education Revenue  
Pollution Control Revenue

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Power Revenue  
Development Revenue  
Other  
Facilities Revenue  
Housing Revenue  
Transportation Revenue  
Utilities Revenue

- (c) At July 31, 2004, the net unrealized gain on investments based on cost for federal income tax purposes of \$408,488,776 was as follows:

Aggregate gross unrealized gain for all investments in which there is an excess of value over tax cost

Aggregate gross unrealized loss for all investments in which there is an excess of tax cost over value

Net unrealized gain

For financial reporting purposes net unrealized gain on investments was \$3,685,968 and cost of investments aggregated \$409,062,266

### 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 certifying officers have determined that the registrant's disclosure controls and procedures are effective based on an evaluation of these controls and procedures as of a date within 90 days prior to 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 controls over financial reporting that occurred during the registrant's last fiscal quarter that have materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

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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 28, 2004

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 28, 2004

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

Date September 28, 2004

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