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PIONEER MUNICIPAL HIGH INCOME TRUST  
Form N-Q  
March 31, 2010

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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: January 31, 2010

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 1/31/10 (unaudited)

Principal Amount (\$)	Value (\$)
TAX EXEMPT OBLIGATIONS - 126.5% of Net Assets	
Alabama - 1.4%	
1,000,000	Huntsville-Redstone Village Special Care Facilities 828,530
4,500,000	Huntsville-Redstone Village Special Care Facilities 3,329,190
	4,157,720
Arizona - 2.1%	
5,000,000	Apache County Industrial Development Authority, 5.854,984,750
970,000	Pima County Industrial Development Authority, 7.25%, 938,756
500,000	Yavapai County Industrial Development Authority, 6.0 501,090
	6,424,596
California - 8.3%	
7,885,000	(a) California State University Revenue, RIB, 10.72%, 117,897,222
602,382	(b) California Statewide Communities Development Authority Environmental Facilities Revenue, 9.0%, 12/1/38 118,970
1,000,000	California Statewide Communities Development Authorit1,009,130
5,150,000	+ Golden State Tobacco Securitization Corp., 7.8%, 6/ 6,208,428
7,000,000	+ Golden State Tobacco Securitization Corp., 7.875%, 68,454,880
1,000,000	University of California Revenue, 5.0%, 5/15/25 1,057,060
655,000	(b) Valley Health System Hospital Revenue, 6.5%, 5/15/25 360,578
	25,106,268
Connecticut - 5.2%	
10,335,000	(a) Connecticut Health & Educational Facilities Authorit11,682,167
5,000,000	Mohegan Tribe Indians Gaming Authority, 6.25%, 1/1/34,004,950
	15,687,117
District of Columbia - 3.6%	
5,000,000	District of Columbia Tobacco Settlement Financing Co4,940,300
6,000,000	District of Columbia Tobacco Settlement Financing Co6,011,760
	10,952,060
Florida - 5.4%	
1,700,000	Beacon Lakes Community Development, 6.9%, 5/1/35 1,610,614
2,000,000	Brevard County Health Facilities Authority Revenue, 1,783,280
1,000,000	Hillsborough County Industrial Development Authority1,107,060
2,445,000	Liberty County Subordinate Revenue, 8.25%, 7/1/28 2,090,402
2,500,000	Miami-Dade County Aviation Revenue, 5.5%, 10/1/41 2,477,550
1,000,000	St. Johns County Industrial Development Authority Re 773,480
2,000,000	St. Johns County Industrial Development Authority Rel1,412,860
5,000,000	Tallahassee Health Facilities Revenue, 6.375%, 12/1/5,015,400
	16,270,646
Georgia - 2.6%	
4,240,000	(a) Atlanta Georgia Water & Waste Revenue, RIB, 10.72%, 4,122,298
500,000	Clayton County Development Authority Revenue, 9.0%, 502,065
2,400,000	Fulton County Residential Care Facilities Revenue, 51,772,808
1,100,000	Fulton County Residential Care Facilities Revenue, 5 723,415
1,000,000	Rockdale County Development Authority Revenue, 6.125 805,920
	7,926,506
Idaho - 1.7%	
5,000,000	Power County Industrial Development Corp., 6.45%, 8/4,988,200
Illinois - 11.3%	
2,000,000	(c) Centerpoint Intermodal Center, 7.5%, 6/15/23 (144A) 1,995,900

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12,000,000	Chicago O'Hare International Airport Special Facilit	8,160,960
1,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15/27	838,330
2,000,000	Illinois Finance Authority Revenue, 6.0%, 8/15/39	2,190,020
4,000,000	Illinois Finance Authority Revenue, 6.0%, 11/15/39	3,034,760
2,500,000	Illinois Finance Authority Revenue, 6.5%, 4/1/39	2,578,975
1,500,000	(b) Illinois Health Facilities Authority Revenue, 6.9%,	661,620
16,880,000	(d) Metropolitan Pier & Exposition Authority Dedicated S	13,383,139
1,745,000	Southwestern Illinois Development Authority Revenue,	1,227,224
		34,070,928
	Indiana - 4.0%	
5,000,000	Indiana Health & Educational Facility Financing Auth	4,505,850
1,000,000	Indiana State Development Finance Authority Revenue,	979,980
4,300,000	Indiana State Development Finance Authority Revenue,	4,398,384
2,570,000	Vigo County Hospital Authority Revenue, 5.8%, 9/1/47	2,093,933
		11,978,147
	Louisiana - 2.0%	
1,500,000	Louisiana Local Government Environmental Facilities	1,546,830
5,000,000	Louisiana Public Facilities Authority Revenue, 5.5%,	4,541,700
		6,088,530
	Massachusetts - 6.1%	
5,000,000	Massachusetts Development Finance Agency Revenue,	5,296,350
2,385,000	Massachusetts Development Finance Agency Revenue,	7,185,750
1,000,000	Massachusetts Educational Financing Authority Revenu	1,064,540
3,500,000	Massachusetts Health & Educational Facilities Author	3,520,055
2,500,000	Massachusetts Health & Educational Facilities Author	2,193,375
5,000,000	Massachusetts Health & Educational Facilities Author	4,528,150
		18,461,220
	Michigan - 3.7%	
935,000	Doctor Charles Drew Academy, 5.7%, 11/1/36	563,468
1,525,000	Flint Michigan Hospital Building Authority Revenue,	1,418,921
1,500,000	John Tolfree Health System Corp., 6.0%, 9/15/23	1,345,200
2,000,000	Michigan State Hospital Finance Authority Revenue,	51,725,960
5,830,000	Michigan Tobacco Settlement Finance Authority, 6.0%,	4,627,271
1,470,000	Star International Academy Certificates of Participa	1,293,747
		10,974,567
	Minnesota - 0.6%	
1,675,000	Duluth Economic Development Authority Health Care Fa	1,700,996
	Mississippi - 1.0%	
3,000,000	Mississippi Business Finance Corp. Pollution Control	2,999,670
	Montana - 0.1%	
1,600,000	(b) Two Rivers Authority, Inc. Correctional Facility Imp	246,528
	Nebraska - 0.3%	
2,000,000	Grand Island Solid Waste Disposal Facilities Revenue	1,001,520
	Nevada - 0.0%	
2,000,000	(b) Nevada State Department of Business & Industry,	7.25 80,000
	New Jersey - 12.0%	
2,000,000	New Jersey Economic Development Authority Revenue,	61,872,080
13,350,000	New Jersey Economic Development Authority Revenue,	611,660,290
1,000,000	New Jersey Economic Development Authority Revenue,	6 911,760
6,150,000	(c) New Jersey Economic Development Authority Revenue,	75,864,947
10,370,000	New Jersey Transportation Trust Fund Authority, 0.0%	4,106,001
10,000,000	+ Tobacco Settlement Financing Corp., 6.75%, 6/1/39	11,836,200
		36,251,278
	New Mexico - 1.2%	
1,500,000	Otero County New Mexico Project Revenue, 6.0%, 4/1/21,	231,740
2,960,000	Otero County New Mexico Project Revenue, 6.0%, 4/1/22,	311,938
		3,543,678

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	New York - 8.5%		
2,500,000	Albany New York Industrial Development Agency Civic	2,415,675	
3,000,000	Dutchess County Industrial Development Agency Revenue	2,949,000	
2,000,000	Hempstead Local Development Corp. Revenue Bonds,	5.71,997,080	
2,450,000	Nassau County New York Industrial Development Agency	2,192,627	
990,000	New York City Industrial Development Agency,	6.9%, 8 796,821	
7,040,000	(a) New York State Dormitory Authority Revenue, RIB,	12.9,125,530	
2,000,000	Suffolk County Industrial Development Agency,	7.25%,1,849,740	
4,000,000	Triborough Bridge & Tunnel Authority Revenue,	5.25%,4,141,400	
			25,467,873
	North Carolina - 2.8%		
4,790,000	Charlotte North Carolina Special Facilities Revenue,	3,376,950	
5,740,000	Charlotte North Carolina Special Facilities Revenue,	4,933,932	
			8,310,882
	Oklahoma - 1.8%		
1,225,000	Tulsa Municipal Airport Revenue, 6.25%, 6/1/20	1,038,433	
4,350,000	Tulsa Municipal Airport Revenue, 7.35%, 12/1/11	4,302,585	
			5,341,018
	Pennsylvania - 7.9%		
3,000,000	Allegheny County Hospital Development Authority Reve	2,270,040	
1,550,000	Allegheny County Hospital Development Authority Revel	1,391,637	
12,300,000 +	Allegheny County Hospital Development Authority Revel	13,414,995	
1,000,000	Columbia County Hospital Authority Health Care Reven	837,820	
845,000	Hazleton Health Services Authority Hospital Revenue,	771,713	
1,280,000	Langhorne Manor Borough Higher Education & Health Au	640,000	
5,000,000	Pennsylvania Economic Development Financing Authority		
	Solid Waste Disposal Revenue,		
	6.0%, 6/1/31		4,085,200
500,000	Pennsylvania Higher Educational Facilities Authority	473,100	
			23,884,505
	Rhode Island - 1.7%		
6,000,000	Central Falls Detention Facilities Revenue, 7.25%,	75,124,780	
	South Carolina - 2.3%		
5,185,000 +	South Carolina Jobs Economic Development Authority R6,	6,075,316	
665,000 +	South Carolina Jobs Economic Development Authority R	782,186	
			6,857,502
	Tennessee - 4.9%		
7,000,000 +	Johnson City Health & Educational Facilities Board H7,	911,610	
2,480,000	Knox County Health, Educational & Housing Facilities Board		
	Hospital Revenue,		
	6.375%, 4/15/22		2,633,636
4,600,000	Sullivan County Health, Educational & Housing Facilities Board		
	Hospital Revenue,		
	5.25%, 9/1/36		4,061,064
			14,606,310
	Texas - 13.5%		
1,345,000	Bexar County Housing Finance Corp., 8.0%, 12/1/36	1,007,580	
1,000,000	Dallas-Fort Worth International Airport Revenue, 6.0	902,540	
4,000,000	Decatur Hospital Authority Revenue, 7.0%, 9/1/25	3,936,440	
769,709	(b) Gulf Coast Industrial Development Authority Revenue,	152,018	
3,750,000	Houston Airport System Special Facilities Revenue,	53,035,175	
5,340,000	Lubbock Health Facilities Development Corp., 6.625%,	4,707,797	
10,000,000	North Texas Tollway Authority Revenue, 5.75%, 1/1/33	10,242,100	
2,810,000	(a) Northside Independent School District, RIB, 11.15%,	3,097,182	
500,000	Sabine River Authority Pollution Control Revenue, 6.	313,605	
7,040,000	(a) Texas State, RIB, 12.03%, 4/1/30 (144A)	8,028,557	
630,000	Willacy County Local Government Corp. Revenue, 6.0%,	628,740	
5,130,000	Willacy County Local Government Corp. Revenue, 6.875%	4,442,529	
			40,494,263
	Utah - 0.2%		
800,000	Spanish Fork City Charter School Revenue, 5.55%, 11/	663,624	

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	Vermont - 0.5%	
1,500,000	Vermont Educational & Health Buildings Financing Age1,	552,170
	Virginia - 0.3%	
1,000,000	Peninsula Ports Authority, 6.0%, 4/1/33	1,015,350
	Washington - 9.4%	
4,710,000	Spokane Public Facilities District Hotel/Motel Tax &	4,916,816
7,025,000	Tobacco Settlement Authority Revenue, 6.625%, 6/1/32	7,035,608
14,315,000	Washington State General Obligation, 0.0%, 6/1/22	8,590,145
3,795,000	Washington State Health Care Facilities Authority Re	3,871,355
5,000,000	Washington State Housing Finance Committee Nonprofit	3,807,050
		28,220,974
	Wisconsin - 0.1%	
2,320,000	(b) (Aztalan Wisconsin Exempt Facilities Revenue, 7.5%, 5	321,320
	TOTAL TAX-EXEMPT OBLIGATIONS	
	(Cost \$376,396,780)	380,770,746
	MUNICIPAL COLLATERALIZED DEBT OBLIGATION - 2.5% of Net Assets	
10,000,000	(c) (Non-Profit Preferred Funding Trust I, 12.0%, 9/15/37	7,652,200
	TOTAL MUNICIPAL COLLATERALIZED DEBT OBLIGATION	
	(Cost \$10,000,000)	7,652,200
Shares	COMMON STOCK - 1.0% of Net Assets	
249,158	(f) Delta Air Lines, Inc.	3,047,203
	TOTAL COMMON STOCK	
	(Cost \$6,612,756)	3,047,203
	TAX-EXEMPT MONEY MARKET MUTUAL FUND - 2.7% of Net Assets	
8,000,000	BlackRock Liquidity Funds MuniFund Portfolio	8,000,000
	TOTAL TAX-EXEMPT MONEY MARKET MUTUAL FUND	
	(Cost \$8,000,000)	8,000,000
	TOTAL INVESTMENTS IN SECURITIES - 132.7%	
	(Cost \$401,009,536) (g) (h)	399,470,149
	OTHER ASSETS AND LIABILITIES 0.9%	2,643,094
	PREFERRED SHARES AT REDEMPTION VALUE,	
	INCLUDING DIVIDENDS PAYABLE - (33.6)%	(101,004,277)
	NET ASSETS APPLICABLE TO COMMON SHAREOWNERS - 100.0%	301,108,966
RIB	Residual Interest Bonds	
(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, 2010 the value of these securities amounted to \$56,358,613 or 18.7% 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 January 31, 2010.	

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- (b) Security is in default and is non-income producing.
- (c) The interest rate is subject to change periodically.  
The interest rate shown is the coupon rate at January 31, 2010.
- (d) 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 January 31, 2010.
- (e) Indicates a security that has been deemed illiquid.  
The aggregate cost of illiquid securities is \$12,320,000.  
The aggregate value of \$7,973,520, represents 2.6% of the net assets applicable to common shareowners.
- (f) Non-income producing.
- (h) At January 31, 2010, the net unrealized gain on investments based on cost for federal income tax purposes of \$399,054,708 was as follows:

Aggregate gross unrealized gain for all investments \$30,043,414  
there is an excess of value over tax cost

Aggregate gross unrealized loss for all investments (29,627,973)  
there is an excess of tax cost over value \$415,441  
Net unrealized gain

For financial reporting purposes net unrealized loss on investments was \$1,539,387 and cost of investments aggregated \$401,009,536.

Various inputs are used in determining the value of the Fund's investments. These inputs are summarized in the three broad levels listed below.

Highest priority is given to Level 1 inputs and lowest priority is given to Level 3.

Level 1 - quoted prices in active markets for identical securities

securities

Level 2 - other significant observable inputs (including quoted prices for similar securities, interest rates, prepayment

speeds,

credit risk, etc.)

Level 3 - significant unobservable inputs (including the Fund's own assumptions in determining fair value of investments)

The following is a summary of the inputs used as of January 31, 2010, in valuing the Fund's assets:

	Level 1	Level 2	Level 3	Total
Municipal bonds	\$0	\$380,770,746	\$0	\$380,770,746
Municipal collateralized debt	0	7,652,200	0	7,652,200
Common stock	3,047,203	0	0	3,047,203
Temporary cash investments	8,000,000	0	0	8,000,000
Total	\$11,047,203	\$388,422,946	\$0	\$399,470,149

### 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

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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 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, 2010

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.

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

Date March 31, 2010

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

Date March 31, 2010

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