```
`timescale 1ns / 1ps
//////////////////////////////////////////////////////////////////////////////////
// Company:
// Engineer:
//
// Create Date: 03/06/2018 10:26:34 PM
// Design Name:
// Module Name: Gate
// Project Name:
// Target Devices:
// Tool Versions:
// Description:
//
// Dependencies:
//
// Revision:
// Revision 0.01 - File Created
// Additional Comments:
//
//////////////////////////////////////////////////////////////////////////////////


module Gate(
input clk,
input NewFrame,
input GameReset,
input MovePieces,
input GateTop,
input [3:0] plusminus,
input [3:0] prevgateH,
input [15:0] initV,
input [3:0] initH,
output [3:0] GHP,
output [15:0] GVP

    );
    wire [15:0] resetVal;
    wire [3:0] NGHP, Hin;

    //Generate next Gate Values
    GHPgen GateGen(.prevgate(prevgateH), .plusminus(plusminus), .thisgate(NGHP));
    m4_1x4 GHMux(.in0(NGHP), .in1(initH), .in2(4'b0), .in3(4'b0),
.sel({1'b0,GameReset}), .e(1'b1), .o(Hin));
    //Horizontal Registers for Gate1
    FDRE #(.INIT(1'b0)) GFF1 (.C(clk), .CE(GVP == 0 && NewFrame || GameReset),
.D(Hin[0]), .Q(GHP[0]));
```

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    FDRE #(.INIT(1'b0)) GFF2 (.C(clk), .CE(GVP == 0 && NewFrame || GameReset),
.D(Hin[1]), .Q(GHP[1]));
    FDRE #(.INIT(1'b0)) GFF3 (.C(clk), .CE(GVP == 0 && NewFrame || GameReset),
.D(Hin[2]), .Q(GHP[2]));
    FDRE #(.INIT(1'b0)) GFF4 (.C(clk), .CE(GVP == 0 && NewFrame || GameReset),
.D(Hin[3]), .Q(GHP[3]));
    //Gate Vertical Counter
    m2_1x16 GVmux(.in0(16'b0000000111100000), .in1(initV), .sel(GameReset),
.o(resetVal));
    counterUD16L GVCount (.clk(clk), .Din(resetVal), .up(1'b0),
.dw(NewFrame&MovePieces), .r(1'b0),
     .ld(GVP == 10'd0 && NewFrame && GateTop|| GameReset), .Q(GVP));


endmodule
```