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# PAC-MAN HHZ

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CSEE 4840 Embedded System Design



Yuedong Huang  
Electrical Engineering Department  
yh2566@columbia.edu

Youwei Hou  
Electrical Engineering Department  
yh2551@columbia.edu

Yizhong Zhang  
Electrical Engineering Department  
yz2482@columbia.edu

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COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

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## 1. Overview

The theme of our project is to create a Pac-Man-Like video game. The game is like the classical Pac-Man game and it should be running on a FPGA board and displayed on a VGA screen.

The player will control Pac-Man through keyboard's arrow keys to direct Pac-Man through a maze, eating Pac-dots. When all Pac-dots are eaten, Pac-Man is taken to the next stage. Ghosts roam the maze, trying to catch Pac-Man. If a ghost touches Pac-Man, a life is lost. When all lives have been lost, the game ends. Some extra feature has been added, e.g. Pac-pellets that enables Pac-Man to temporarily have the ability to eat ghosts.

We also create a two player mode which is a new feature compared to the original Pac-Man game.

Wolfson WM8731 audio CODEC is used to play in-game music.

PS2 keyboard controller is used to get input from keyboard to control the movement of Pac-Man and in-game choice.

## 2. Design and Implementation

### 2.1 Global Architecture

This is the global architecture of our design

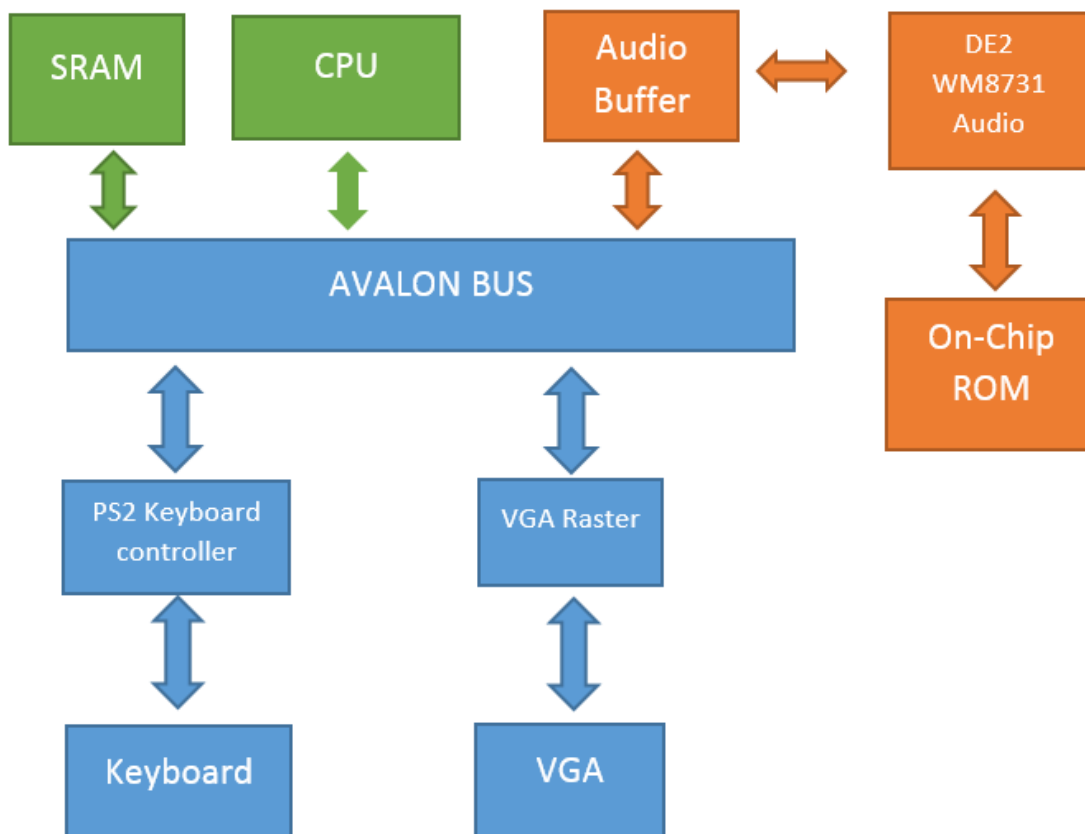


Figure 1 - Global Architecture

The function and implementation of each component will be elaborated in the following sections.

## 2.2 VGA & KEYBOARD

A typical VGA display of our game is shown below:

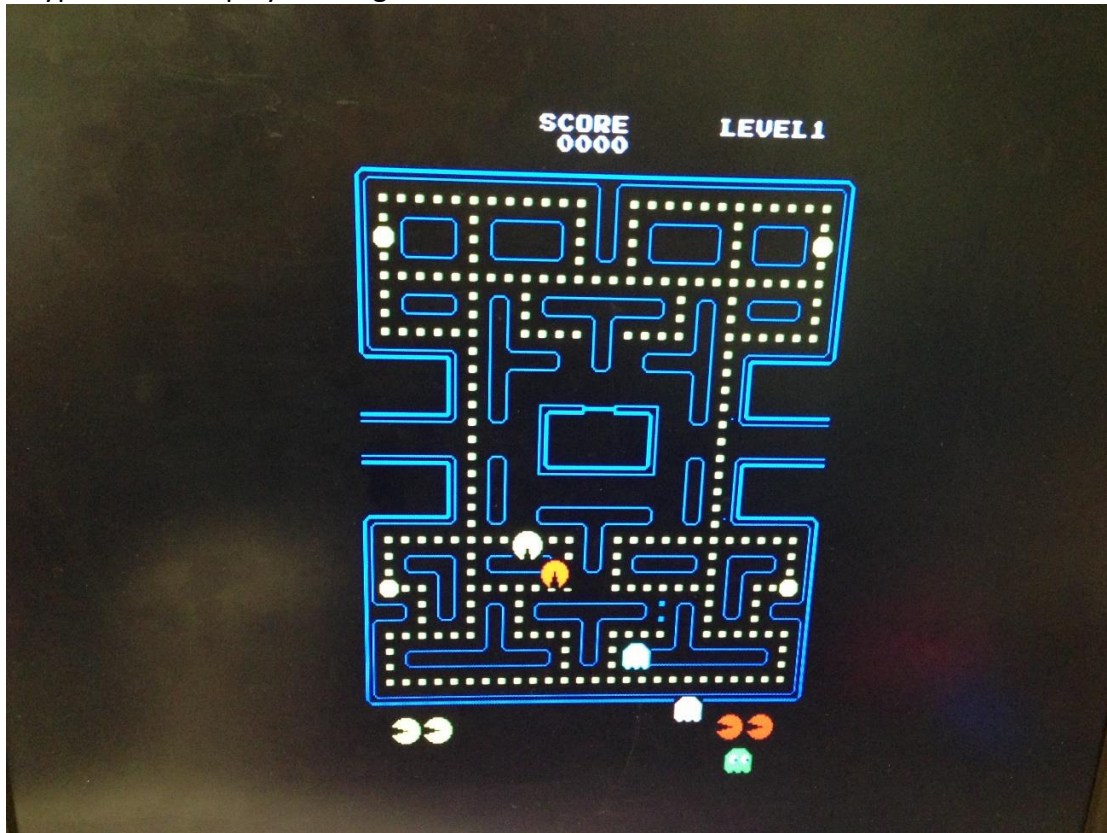


Figure 2 - typical VGA display

Note this picture was taken when we were still working on the project. This explains when some ghost went out of bound.

The VGA structural graph is as follows:

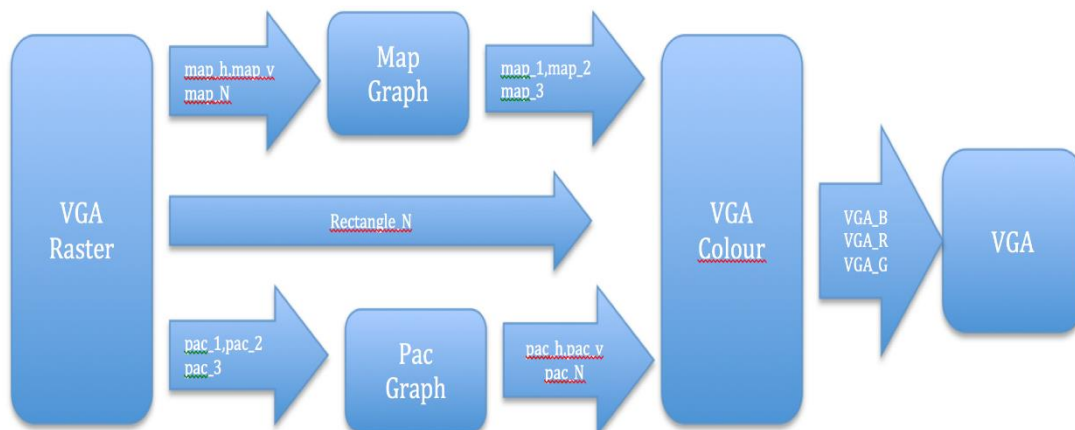


Figure 3 - VGA flow chart

At the beginning of one clock cycle, the VGA Raster determines which color to show next clock cycle by: first, determine whether next point is Pac man or ghosts. The two kinds of graph have the highest priority. If so, the VGA Raster transfer the

vertical axis and horizontal axis to Pac Graph and Pac Graph use vertical axis and horizontal axis to decide whether next point has color or not. And the VGA color rectangle\_N to decide the color of next point.

On the other hand, if next point is not Pac man of ghosts, VGA raster decide whether it is map of pea, or other things like letters or numbers. Then VGA raster transfer the vertical axis and horizontal axis to Map Graph and Map Graph uses vertical axis and horizontal axis to decide whether next point has color or not. And the VGA color rectangle\_N to decide the color of next point.

A showing table is used to control the maze. If Pac man eats a "Pacdot", the software change the relevant number of the showing table to tell the hardware that that pea has been eaten. Then during the next cycle of showing, the pea will not show on the screen.

All sprites and mazes in this game are drawn by our own hands and we used 17\*17 matrix to represent ghosts and pac-man and 9\*9 matrix to represent maze walls.

Below is a sample of our drawing:

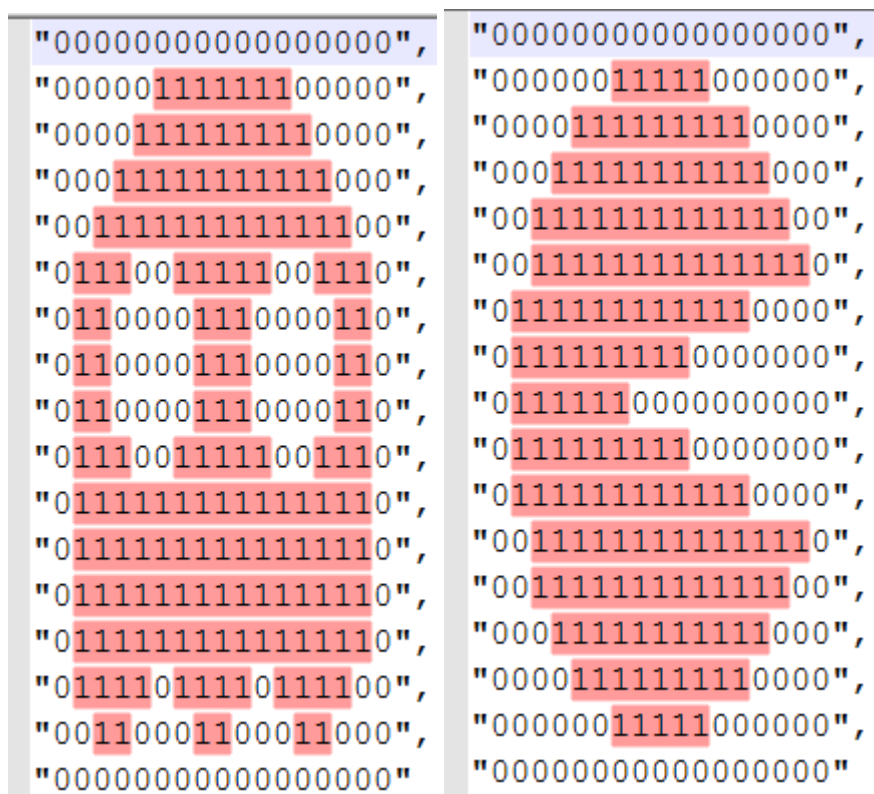


Figure 4 - Drawings of Pac-man and ghosts

In order to make Pac-man mouth move and ghost change its shape during move, we have to draw a series of sprites and interleave them together.

The following is a sample of some maze wall we draw:

```

"000111111", "111111111",
"001111111", "111111111",
"011000000", "000000000",
"110000000", "000000000",
"110000111", "111111111",
"110001000", "000000000",
"110010000", "000000000",
"110010000", "000000000",
"110010000", "000000000"

```

Figure 5 - Maze walls

The keyboard is simple, it just connects the keyboard with the avolon bus, when it detect that one key is pressed, it first tells cpu that one key has been pressed, then it transferred the key word to cpu for further operation.

### 2.3 Audio

We implemented all game music and sound effect of the original pac-man game. The music and sound effects we have include: "Beginning music", "intermission music", "pac-man chomps (eating dots)", "pac-man eats ghost", "pac-man eats fruits", "pac-man dies".

We stored all sound effects describing pac-man's actions in the on-chip ROM. The reason is that they are relatively short sound so the capacity of ROM (approximately 60 KB) is enough. Also, since ROM is built in with FPGA (thus the name on-chip), we can build an entity of ROM that can be directly connected in the top level design. This greatly simplifies this design as we can directly feed addresses to ROM and feed the corresponding output data directly to the Wolfson WM8731 audio CODEC entity.

We used matlab to read the downloaded .wav files containing the sound effects and converted each sample into 8 bit hexadecimal word. The source wave files are sampled at the frequency of 11.2 KHz and in 8 bit words per sample. We wrote the converted hexadecimal words into .mif file (memory initialization file) to initialize ROM memory. The beginning of the file is shown below:

```

7 WIDTH=8;
8 DEPTH=53612;
9
10 ADDRESS_RADIX=UNS;
11 DATA_RADIX=HEX;
12
13 CONTENT BEGIN
14 0 : 00;
15 1 : FF;
16 2 : 00;
17 3 : FF;
18 4 : 00;
19 5 : FF;
20 6 : 00;
21 7 : FF;
22 8 : 00;
23 9 : FF;
24 10 : 00;
25 11 : FF;
26 12 : 00;
27 13 : FF;
28 14 : 00;

```

Figure 6 - Memory Initialization File

As you can see, we stored a total 53612 samples in ROM which accounts for roughly 53.6 KB of space in ROM. This is pretty much all we could get from ROM.

As for beginning and intermission music, they are relatively long with a duration of 6 seconds. Each of them would contain around 50 thousand samples (equivalent to 50 KB of data). Therefore we would need a much bigger storage. That is why we went for SRAM to store those music. We store those music in a similar format as of those sound effects mentioned earlier, but instead of directly initializing memory, we defined all samples in a character array and stored them in .h header file. Here is the beginning of the header file:

```

unsigned char begin [] = {
    0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00,
    0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00,
    0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00,
    0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0x00,
    0x1C, 0x20, 0x26, 0x2C, 0x32, 0x37, 0x37, 0x38, 0x35, 0x34, 0x3
    0x0B, 0x08, 0x09, 0x09, 0x09, 0x0D, 0x12, 0x19, 0x1C, 0x1A, 0x1
    0xF8, 0xED, 0xE8, 0xF2, 0xF3, 0xF1, 0xF0, 0xF4, 0x05, 0x10, 0x1
    0x20, 0x1E, 0x15, 0x0B, 0x04, 0xFA, 0xF0, 0xE6, 0xDC, 0xD9, 0xD
    0xF7, 0xFD, 0x01, 0x05, 0x07, 0x07, 0x05, 0x04, 0xFE, 0xF7, 0xE

```

Figure 7 - beginning music stored in a character array

The header file containing the definition of this character array is included in the main function so when we build and download the software into the DE2 board, all data is stored in SRAM.

Because those sound samples are stored in off-chip SRAM, we need nios-CPU to access those data through Avalon bus and write those data to Wolfson WM8731 audio CODEC at a rate at least higher than the sampling rate of the music. The CPU is clocked by a 25 MHz Clock which is much higher than the sampling rate (11KHz) therefore we need a buffer to store data coming from the CPU. We designed a VHDL entity to do the job.

```
library ieee;
use ieee.std_logic_1164.all;
use ieee.numeric_std.all;

entity audio_buffer is
```

Figure 8 - A VHDL audio\_buffer entity

This audio buffer has several functions. First it stores the data coming from CPU. It can store up to 256 samples of 8 bit word. When it is full, it tells the CPU to stop writing to it. It is also connected to the audio CODEC so that the CODEC can take data out of it and play music. At last, it can also take command from the CPU and pass it to the audio CODEC if the system decided to switch from playing music from SRAM to playing sound effect directly from on-chip ROM.

Finally, we modified the original audio CODEC VHDL file to make it work at the desired 11.2 KHz sampling rate. We also modified it so the CODEC can take data either from audio buffer or on-chip ROM.

## 2.4 Software

### A. Two major components

- Linking Hardware: VGA, Audio, Keyboard.
- Logic: Pacman & Ghost Movement, Game Feature Implementation, etc.

### B. Constants

```
#define PAC_V 1 // Pacman's speed
#define GHOST_V 1 // Ghosts' speed
#define PAC_R 9 // Pacman's radius
#define GHOST_R 9 // Ghosts' radius
#define INITIAL_GAME_SPEED 5000
#define TOTAL_PACDOT_NUM 240
#define INITIAL_PACX 14 // Pacman's initial horizontal position in maze
#define INITIAL_PACY 23 // Pacman's initial vertical position in maze
#define INITIAL_GHOST_X 13 // Ghosts' initial horizontal position in maze
#define INITIAL_GHOST_Y 14 // Ghosts' initial vertical position in maze
#define INITIAL_PAC_LIFE 3
#define PAC_MOUTH_SPEED 15 // Pacman's mouth movement speed
#define PAC_DIE_TIME 30 // Pacman's death animation running time
#define GHOST_FLOAT_SPEED 20 // Ghosts' floating effect changing time
#define GHOST_WEAK_TIME 600 // Ghosts' weak time
#define GHOST_BLINK_TIME 30 // blinking time at the end of weak mode
#define AUDIO_TIME1 43 // First song's length
#define AUDIO_TIME2 40 // Second song's length
```

### C. I/O Functions

- VGA



```
#define IOWR_VGA(base, offset, data) IOWR_16DIRECT(base, (offset) * 2, data)
#define IORD_VGA(base, offset) IORD_16DIRECT(base, (offset) * 2)
```

### ● Keyboard

```
IORD_8DIRECT(KEYBOARD_BASE, 0) // decide whether a key is pressed
IORD_8DIRECT(KEYBOARD_BASE, 1) // read the keyboard code
```

### ● Audio

#### 1. SDRAM

```
IORD_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0) // flag, 0 → able to write
IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0, song[i]) // write song
```

#### 2. ROM

```
IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x01); // play song
IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x02); // change indicator
```

## D. Display Functions

### ● Animation

```
void paintScore()
void paintLife(int pacNum)
void paintPac(int pacNum)
void paintGhost(int ghostNum)
```

### ● Audio

```
void audioPlaySDRAM(int audioNum)
void audioPlayROM(int audioNum)
```

## E. Logic Functions

### ● Game Mode

```
int main() // main, Pacman program runs on NIOS II
int modeChoose() // returns game mode (0 → 1 Pac, 1 → 2 Pac(s))
void startPac() // game starts
void initializeStage() // reset a new level
void createPac(int pacNum) // reset Pacman's position in maze & on VGA
void createGhost() // reset Ghosts's position in maze & on VGA
```

### ● Pacman Movement

```
void movePac(int pacNum) // move Pacman according to keyboard operation,
// Pacman's current moving direction
& maze layout
```

### ● Ghost AI

```
int isAvailable(int ghostNum, int direction) // returns value indicating
// that for certain ghost if certain direction is available for moving
// 0 → unavailable, 1 → available
int randomMode(int ghostNum) // returns random direction among available
// path (no backward direction)
int chaseMode(int ghostNum, int x, int y) // returns correct direction
// towards target (represented by its coordinates at VGA)
void moveGhost(int ghostNum) // moves the Ghost
```

## F. Ghost Behavior

- Two Modes: Random or Chasing, normally, ghosts alternate between the two modes.
- Random Mode: Randomly select one of the available paths at certain time (no backward path).
- Chasing Mode: Select path depending on current available directions & target

position with the policy that if there are available paths towards target select one of them, and if not, randomly select another path, but not backward direction. For example, Pacman as the target:

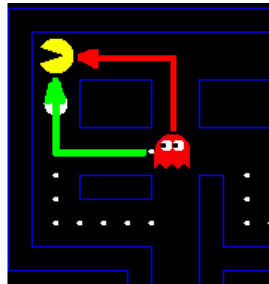


Figure 9 - Ghost chasing mode

In the example above, the target (Pacman) is on left – top of the ghost, so the ghost will choose one from the available two paths (red & green) as its direction.

- After the Pacman eats an energizer, the ghosts enter the “weak mode”, during which the Pacman has the temporary ability of eating the ghost. Once a ghost is eaten by Pacman during its weak time, its policy of selecting direction changes to set its initial position as target in chasing mode, and when it final reaches its initial position, it goes back to normal.
- Ghosts’ eyeballs move with its body movement
- The image of Ghosts during their weak time changes from original to black body with white eyes & mouth.

#### G. Pacman Movement

- Priority: first listen to keyboard, and if the direction selected by user is available, goes in that direction, otherwise continue moves in its current direction.
- If the moving direction is blocked, Pacman simply stops.
- Pacman’s mouth open towards the same direction as its movement.

#### H. Animation

- Created by using loops & mod animation time

### 3. Lessons learned and role participation

#### 3.1 lessons learned

- Team work means everything. We divided our work evenly so everyone in our group can participate and contribute to the project.
- Never stop trying. As for the audio part, we firstly chose ROM to store music data but later found it too small to hold all needed data. We then tried to use another more complex storage (SRAM) and it worked at last. Everyone was happy.
- Choosing making games as a project is always desired as it is fun and incentive to design it.
- Plan everything way ahead of time as you never know what you would step on in the future.

#### 3.2 Role Participation

- Yuedong Huang: responsible for art designing and audio player, including storing and

calling start game music, game over music and other sound effects and designing maze and pac-man.

- Yizhong Zhang: responsible for building up hardware platform for software, including pac-man ghosts and maze displaying and keyboard.
- Youwei Hou: responsible for all software part, including basic game control, algorithm for smart ghosts and two-pac mode.

## 4. Listing of source code

### 4.1 Pac-mac.c

```
//-----  
#include <stdio.h>  
#include <system.h>  
#include <io.h>  
#include "begin.h"  
#include "intermission.h"  
//-----  
#define IOWR_VGA(base,offset,data) IOWR_16DIRECT(base,(offset)*2,data)  
#define IORD_VGA(base,offset) IORD_16DIRECT(base,(offset)*2)  
#define PAC_V 1  
#define GHOST_V 1  
#define PAC_R 9  
#define GHOST_R 9  
//-----  
#define INITIAL_GAME_SPEED 5000  
#define TOTAL_PACDOT_NUM 240  
#define INITIAL_PACX 14  
#define INITIAL_PACY 23  
#define INITIAL_GHOST_X 13  
#define INITIAL_GHOST_Y 14  
#define INITIAL_PAC_LIFE 3  
#define PAC_MOUTH_SPEED 15  
#define PAC_DIE_TIME 120  
#define GHOST_FLOAT_SPEED 20  
#define GHOST_WEAK_TIME 600  
#define GHOST_BLINK_TIME 30  
#define AUDIO_TIME1 43  
#define AUDIO_TIME2 40  
//-----  
int gameSpeed = INITIAL_GAME_SPEED;  
int pacX[2] = {INITIAL_PACX, INITIAL_PACX};  
int pacY[2] = {INITIAL_PACY, INITIAL_PACY};  
int pacImgX[2] = {203 + 9 * INITIAL_PACX, 203 + 9 * INITIAL_PACX};  
int pacImgY[2] = {105 + 9 * (INITIAL_PACY - 6), 105 + 9 * INITIAL_PACY};  
int pacLife[2] = {INITIAL_PAC_LIFE, INITIAL_PAC_LIFE};  
int pacMove[2] = {1, 3};  
int pacMouth[2] = {0, 0};  
int pacDie[2] = {0, 0};  
int ghostX[3];  
int ghostY[3];  
int ghostV[3] = {GHOST_V, GHOST_V, GHOST_V};  
int ghostImgX[3];  
int ghostImgY[3];  
int ghostOption[3][4];  
int ghostMove[3];  
int ghostOperation[3];  
int ghostFloat[] = {0, 0, 0};  
int ghostWeakMode[] = {0, 0, 0};  
int ghostEaten[] = {0, 0, 0};  
int ghostModeSwitchTime[] = {800, 1000, 1200};  
int ghostMode[] = {0, 0, 0};  
int pacDot = TOTAL_PACDOT_NUM;  
int score = 0;  
int level = 1;  
unsigned keyBoardCode[2] = {0, 0};  
int gameMode = 0; //1P or 2P  
//-----  
int audioFlag1 = 0;  
int audioFlag2 = 0;  
int audioFlag3 = 0;  
//-----  
void createPac(int pacNum) {  
    keyBoardCode[pacNum] = 0;  
    if(pacNum <= gameMode && pacLife[pacNum] > 0) {  
        pacX[pacNum] = INITIAL_PACX;  
        pacY[pacNum] = INITIAL_PACY - 6 * pacNum;  
        pacImgX[pacNum] = 203 + 9 * INITIAL_PACX;  
        pacImgY[pacNum] = 105 + 9 * pacY[pacNum];  
        pacDie[pacNum] = 0;  
        pacMove[pacNum] = 1;  
    }  
    else {  
        pacX[pacNum] = 0;  
        pacY[pacNum] = 0;  
        pacImgX[pacNum] = 0;  
        pacImgY[pacNum] = 0;  
        pacDie[pacNum] = 0;  
        pacMove[pacNum] = 1;  
    }  
}
```

```

IOWR_VGA(VGA_BASE, 0 + 16 * pacNum, 0);
IOWR_VGA(VGA_BASE, 1 + 16 * pacNum, 0);
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 28);
}
}
//-----
void createGhost() {
    int i;
    for(i = 0; i < 3; i++) {
        ghostX[i] = INITIAL_GHOST_X;
        ghostY[i] = INITIAL_GHOST_Y;
        ghostImgX[i] = 203 + 9 * ghostX[i];
        ghostImgY[i] = 105 + 9 * ghostY[i];
        ghostMove[i] = 1;
        ghostV[i] = GHOST_V;
        ghostWeakMode[i] = 0;
        ghostEaten[i] = 0;
        ghostMode[i] = 0;
    }
}
//-----
void initializeStage() {
    if(level < 10) {
        IOWR_VGA(VGA_BASE, 12, 882); //write level to VGA
        IOWR_VGA(VGA_BASE, 13, 38 + level++);
        if(level > 1)
            gameSpeed -= 250;
    }
    IOWR_VGA(VGA_BASE, 14, 3); //display level
    audioPlaySDRAM(1);
    IOWR_VGA(VGA_BASE, 14, 0); //create maze
    pacDot = TOTAL_PACDOT_NUM; //initialize game parameters
    createPac(0);
    createPac(1);
    createGhost();
    audioFlag1 = 0;
    audioFlag2 = 0;
    audioFlag3 = 0;
}
//-----
void paintScore() {
    int scoreDigi[4];
    scoreDigi[0] = score / 1000;
    scoreDigi[1] = (score - scoreDigi[0] * 1000) / 100;
    scoreDigi[2] = (score - scoreDigi[0] * 1000 - scoreDigi[1] * 100) / 10;
    scoreDigi[3] = score - scoreDigi[0] * 1000 - scoreDigi[1] * 100 - scoreDigi[2] * 10;
    int i;
    for(i = 0; i < 4; i++) {
        IOWR_VGA(VGA_BASE, 12, 873 + i);
        IOWR_VGA(VGA_BASE, 13, 38 + scoreDigi[i]);
    }
}
//-----
void paintScore2() {
    int scoreDigi[4];
    scoreDigi[0] = score / 1000;
    scoreDigi[1] = (score - scoreDigi[0] * 1000) / 100;
    scoreDigi[2] = (score - scoreDigi[0] * 1000 - scoreDigi[1] * 100) / 10;
    scoreDigi[3] = score - scoreDigi[0] * 1000 - scoreDigi[1] * 100 - scoreDigi[2] * 10;
    int i;
    for(i = 0; i < 4; i++) {
        IOWR_VGA(VGA_BASE, 20, 20 + i);
        IOWR_VGA(VGA_BASE, 21, 38 + scoreDigi[i]);
    }
}
//-----
void paintLife(int pacNum) {
    switch(pacLife[pacNum]) {
        case 3:
            IOWR_VGA(VGA_BASE, 12, 883 + 2 * pacNum);
            IOWR_VGA(VGA_BASE, 13, 50);
            IOWR_VGA(VGA_BASE, 12, 884 + 2 * pacNum);
            IOWR_VGA(VGA_BASE, 13, 50);
            break;
        case 2:
            IOWR_VGA(VGA_BASE, 12, 883 + 2 * pacNum);
            IOWR_VGA(VGA_BASE, 13, 28);
            IOWR_VGA(VGA_BASE, 12, 884 + 2 * pacNum);
            IOWR_VGA(VGA_BASE, 13, 50);
            break;
        case 1:
        case 0:
            IOWR_VGA(VGA_BASE, 12, 883 + 2 * pacNum);

```

```

IOWR_VGA(VGA_BASE, 13, 28);
IOWR_VGA(VGA_BASE, 12, 884 + 2 * pacNum);
IOWR_VGA(VGA_BASE, 13, 28);
break;
default:
break;
}
}
}
//-----
void paintPac(int pacNum) {
IOWR_VGA(VGA_BASE, 0 + 16 * pacNum, pacImgX[pacNum]);
IOWR_VGA(VGA_BASE, 1 + 16 * pacNum, pacImgY[pacNum]);
if(pacDie[pacNum] == 0) {
if(pacMouth[pacNum] < PAC_MOUTH_SPEED / 3) {
switch(pacMove[pacNum]) {
case 1:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 1);
break;
case 2:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 3);
break;
case 3:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 5);
break;
case 4:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 7);
break;
default:
break;
}
}
if(pacMouth[pacNum] < 2 * PAC_MOUTH_SPEED / 3) {
switch(pacMove[pacNum]) {
case 1:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 2);
break;
case 2:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 4);
break;
case 3:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 6);
break;
case 4:
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 8);
break;
default:
break;
}
}
else
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 0);
pacMouth[pacNum] = (pacMouth[pacNum] + 1) % PAC_MOUTH_SPEED;
}
else {
if(pacDie[pacNum] < PAC_DIE_TIME / 3)
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 17);
else if(pacDie[pacNum] < 2 * PAC_DIE_TIME / 3)
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 18);
else
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 19);
pacDie[pacNum] = (pacDie[pacNum] + 1) % PAC_DIE_TIME;
if(pacDie[pacNum] == 0) {
if(pacLife[0] + pacLife[1] > 0) {
createPac(pacNum);
createGhost();
audioFlag3 = 0;
}
else {
printf("[Game Over]\n");
printf("[Your Score] %d Press any key to continue...\n", score);
}
}
}
}
if(pacLife[pacNum] == 0 && pacDie[pacNum] == 0) {
pacX[pacNum] = 0;
pacY[pacNum] = 0;
pacImgX[pacNum] = 0;
pacImgY[pacNum] = 0;
IOWR_VGA(VGA_BASE, 0 + 16 * pacNum, pacImgX[pacNum]);
IOWR_VGA(VGA_BASE, 1 + 16 * pacNum, pacImgY[pacNum]);
IOWR_VGA(VGA_BASE, 2 + 17 * pacNum, 28);
}
}
}

```

```

paintScore();
paintLife(pacNum);
if(audioFlag1 > 0)
    audioFlag1 = (audioFlag1 + 1) % (AUDIO_TIME1 * (gameMode + 1));
if(audioFlag2 > 0)
    audioFlag2 = (audioFlag2 + 1) % (AUDIO_TIME2 * (gameMode + 1));
}
//-----
void paintGhost(int ghostNum) {
    IOWR_VGA(VGA_BASE, 3 + 3 * ghostNum, ghostImgX[ghostNum]);
    IOWR_VGA(VGA_BASE, 4 + 3 * ghostNum, ghostImgY[ghostNum]);
    //ghost is in house
    if(ghostImgX[ghostNum] >= 302 && ghostImgX[ghostNum] <= 306
        && ghostY[ghostNum] >= 13 && ghostY[ghostNum] <= 15) {
        IOWR_VGA(VGA_BASE, 3 + 3 * ghostNum, 306);
        if(ghostMove[ghostNum] == 3)
            ghostImgX[ghostNum] = 302;
    }
    if(ghostImgX[ghostNum] >= 343 && ghostImgX[ghostNum] <= 347
        && ghostY[ghostNum] >= 13 && ghostY[ghostNum] <= 15) {
        IOWR_VGA(VGA_BASE, 3 + 3 * ghostNum, 343);
        if(ghostMove[ghostNum] == 1)
            ghostImgX[ghostNum] = 347;
    }
    if(ghostImgY[ghostNum] >= 236 && ghostImgY[ghostNum] <= 240
        && ghostX[ghostNum] >= 11 && ghostX[ghostNum] <= 16) {
        IOWR_VGA(VGA_BASE, 4 + 3 * ghostNum, 236);
        if(ghostMove[ghostNum] == 2)
            ghostImgY[ghostNum] = 240;
    }
    if(ghostImgY[ghostNum] >= 222 && ghostImgY[ghostNum] <= 227
        && (ghostX[ghostNum] == 11 || ghostX[ghostNum] == 12
            || ghostX[ghostNum] == 15 || ghostX[ghostNum] == 16)) {
        IOWR_VGA(VGA_BASE, 4 + 3 * ghostNum, 227);
        if(ghostMove[ghostNum] == 4)
            ghostImgY[ghostNum] = 222;
    }
}

if(ghostWeakMode[ghostNum] == 0) {
    if(ghostFloat[ghostNum] < GHOST_FLOAT_SPEED / 2)
        IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 7 + ghostMove[ghostNum] * 2);
    else
        IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 8 + ghostMove[ghostNum] * 2);
}
else {
    if(ghostWeakMode[ghostNum] < 3 * GHOST_WEAK_TIME / 4) {
        if(ghostFloat[ghostNum] < GHOST_FLOAT_SPEED / 2)
            IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 24);
        else
            IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 25);
    }
    else {
        if(ghostWeakMode[ghostNum] % GHOST_BLINK_TIME < GHOST_BLINK_TIME / 2) {
            if(ghostFloat[ghostNum] < GHOST_FLOAT_SPEED / 2)
                IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 26);
            else
                IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 27);
        }
        else {
            if(ghostFloat[ghostNum] < GHOST_FLOAT_SPEED / 2)
                IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 24);
            else
                IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 25);
        }
    }
}
ghostWeakMode[ghostNum] = (ghostWeakMode[ghostNum] + 1) % GHOST_WEAK_TIME;
}

if(ghostEaten[ghostNum] == 1) {
    IOWR_VGA(VGA_BASE, 5 + 3 * ghostNum, 19 + ghostMove[ghostNum]);
}
ghostFloat[ghostNum] = (ghostFloat[ghostNum] + 1) % GHOST_FLOAT_SPEED;
}
//-----
void movePac(int pacNum) {
    if(pacLife[pacNum] > 0 && pacDie[pacNum] == 0) {
        int nextPacX;
        int nextPacY;
        unsigned nextContent;
        if(pacNum == 0) {
            switch(keyBoardCode[pacNum])

```

```

{
case 116://right
    if(pacImgX[pacNum] < 446) {
        nextPacX = (pacImgX[pacNum] + PAC_R - 203) / 9;
        IOWR_VGA(VGA_BASE, 15, pacY[pacNum] * 28 + nextPacX);
        nextContent = IORD_VGA(VGA_BASE, 0);
        if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
            pacImgX[pacNum] += PAC_V;
            pacImgY[pacNum] = pacImgY[pacNum] - (pacImgY[pacNum] - 105) % 9;
            pacMove[pacNum] = 1;
        }
        else if(pacMove[pacNum] != 1) {
            switch(pacMove[pacNum]) {
            case 2:
                keyBoardCode[pacNum] = 114;
                break;
            case 3:
                keyBoardCode[pacNum] = 107;
                break;
            case 4:
                keyBoardCode[pacNum] = 117;
                break;
            }
        }
    }
    else {
        pacImgX[pacNum] = 203;
    }
    break;
case 114://down
    nextPacY = (pacImgY[pacNum] + PAC_R - 105) / 9;
    IOWR_VGA(VGA_BASE, 15, nextPacY * 28 + pacX[pacNum]);
    nextContent = IORD_VGA(VGA_BASE, 0);
    if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
        pacImgY[pacNum] += PAC_V;
        pacImgX[pacNum] = pacImgX[pacNum] - (pacImgX[pacNum] - 203) % 9;
        pacMove[pacNum] = 2;
    }
    else if(pacMove[pacNum] != 2) {
        switch(pacMove[pacNum]) {
        case 1:
            keyBoardCode[pacNum] = 116;
            break;
        case 3:
            keyBoardCode[pacNum] = 107;
            break;
        case 4:
            keyBoardCode[pacNum] = 117;
            break;
        }
    }
    break;
case 107://left
    if(pacImgX[pacNum] >= 203) {
        nextPacX = (pacImgX[pacNum] - PAC_V - 203) / 9;
        IOWR_VGA(VGA_BASE, 15, pacY[pacNum] * 28 + nextPacX);
        nextContent = IORD_VGA(VGA_BASE, 0);
        if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
            pacImgX[pacNum] -= PAC_V;
            pacImgY[pacNum] = pacImgY[pacNum] - (pacImgY[pacNum] - 105) % 9;
            pacMove[pacNum] = 3;
        }
        else if(pacMove[pacNum] != 3) {
            switch(pacMove[pacNum]) {
            case 1:
                keyBoardCode[pacNum] = 116;
                break;
            case 2:
                keyBoardCode[pacNum] = 114;
                break;
            case 4:
                keyBoardCode[pacNum] = 117;
                break;
            }
        }
    }
    else {
        pacImgX[pacNum] = 446;
    }
    break;
case 117://up
    nextPacY = (pacImgY[pacNum] - PAC_V - 105) / 9;
    IOWR_VGA(VGA_BASE, 15, nextPacY * 28 + pacX[pacNum]);

```



```

nextContent = IORD_VGA(VGA_BASE, 0);
if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
    pacImgY[pacNum] -= PAC_V;
    pacImgX[pacNum] = pacImgX[pacNum] - (pacImgX[pacNum] - 203) % 9;
    pacMove[pacNum] = 4;
}
else if(pacMove[pacNum] != 4) {
    switch(pacMove[pacNum]) {
        case 1:
            keyBoardCode[pacNum] = 116;
            break;
        case 2:
            keyBoardCode[pacNum] = 114;
            break;
        case 3:
            keyBoardCode[pacNum] = 107;
            break;
    }
}
break;
case 118: //pause
printf("[Game Paused] Press any key to continue...\n");
while(keyBoardCode[pacNum] == 118) {
    while(!IORD_8DIRECT(KEYBOARD_BASE, 0));
    keyBoardCode[pacNum] = IORD_8DIRECT(KEYBOARD_BASE, 1);
}
if(keyBoardCode[pacNum] != 0) {
    switch(pacMove[pacNum]) {
        case 1:
            keyBoardCode[pacNum] = 116;
            break;
        case 2:
            keyBoardCode[pacNum] = 114;
            break;
        case 3:
            keyBoardCode[pacNum] = 107;
            break;
        case 4:
            keyBoardCode[pacNum] = 117;
            break;
        default:
            break;
    }
}
break;
default:
    break;
}
}
else
{
    switch(keyBoardCode[pacNum])
    {
        case 35: //right
            if(pacImgX[pacNum] < 446) {
                nextPacX = (pacImgX[pacNum] + PAC_R - 203) / 9;
                IOWR_VGA(VGA_BASE, 15, pacY[pacNum] * 28 + nextPacX);
                nextContent = IORD_VGA(VGA_BASE, 0);
                if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
                    pacImgX[pacNum] += PAC_V;
                    pacImgY[pacNum] = pacImgY[pacNum] - (pacImgY[pacNum] - 105) % 9;
                    pacMove[pacNum] = 1;
                }
            }
            else if(pacMove[pacNum] != 1) {
                switch(pacMove[pacNum]) {
                    case 2:
                        keyBoardCode[pacNum] = 27;
                        break;
                    case 3:
                        keyBoardCode[pacNum] = 28;
                        break;
                    case 4:
                        keyBoardCode[pacNum] = 29;
                        break;
                }
            }
        }
    }
    else {
        pacImgX[pacNum] = 203;
    }
}
break;
case 27: //down
    nextPacY = (pacImgY[pacNum] + PAC_R - 105) / 9;

```

```

IOWR_VGA(VGA_BASE, 15, nextPacY * 28 + pacX[ pacNum]);
nextContent = IORD_VGA(VGA_BASE, 0);
if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
    pacImgY[ pacNum] += PAC_V;
    pacImgX[ pacNum] = pacImgX[ pacNum] - (pacImgX[ pacNum] - 203) % 9;
    pacMove[ pacNum] = 2;
}
else if(pacMove[ pacNum] != 2) {
    switch(pacMove[ pacNum]) {
        case 1:
            keyBoardCode[ pacNum] = 35;
            break;
        case 3:
            keyBoardCode[ pacNum] = 28;
            break;
        case 4:
            keyBoardCode[ pacNum] = 29;
            break;
    }
}
break;
case 28: //left
if(pacImgX[ pacNum] >= 203) {
    nextPacX = (pacImgX[ pacNum] - PAC_V - 203) / 9;
    IOWR_VGA(VGA_BASE, 15, pacY[ pacNum] * 28 + nextPacX);
    nextContent = IORD_VGA(VGA_BASE, 0);
    if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
        pacImgX[ pacNum] -= PAC_V;
        pacImgY[ pacNum] = pacImgY[ pacNum] - (pacImgY[ pacNum] - 105) % 9;
        pacMove[ pacNum] = 3;
    }
    else if(pacMove[ pacNum] != 3) {
        switch(pacMove[ pacNum]) {
            case 1:
                keyBoardCode[ pacNum] = 35;
                break;
            case 2:
                keyBoardCode[ pacNum] = 27;
                break;
            case 4:
                keyBoardCode[ pacNum] = 29;
                break;
        }
    }
}
else {
    pacImgX[ pacNum] = 446;
}
break;
case 29: //up
nextPacY = (pacImgY[ pacNum] - PAC_V - 105) / 9;
IOWR_VGA(VGA_BASE, 15, nextPacY * 28 + pacX[ pacNum]);
nextContent = IORD_VGA(VGA_BASE, 0);
if(nextContent == 26 || nextContent == 27 || nextContent == 28) {
    pacImgY[ pacNum] -= PAC_V;
    pacImgX[ pacNum] = pacImgX[ pacNum] - (pacImgX[ pacNum] - 203) % 9;
    pacMove[ pacNum] = 4;
}
else if(pacMove[ pacNum] != 4) {
    switch(pacMove[ pacNum]) {
        case 1:
            keyBoardCode[ pacNum] = 35;
            break;
        case 2:
            keyBoardCode[ pacNum] = 27;
            break;
        case 3:
            keyBoardCode[ pacNum] = 28;
            break;
    }
}
break;
case 118://pause
printf("[Game Paused] Press any key to continue...\n");
while(keyBoardCode[ pacNum] == 118) {
    while(!IORD_8DIRECT(KEYBOARD_BASE,0));
    keyBoardCode[ pacNum] = IORD_8DIRECT(KEYBOARD_BASE,1);
}
if(keyBoardCode[ pacNum] != 0) {
    switch(pacMove[ pacNum]) {
        case 1:
            keyBoardCode[ pacNum] = 35;
            break;

```

```

        case 2:
            keyBoardCode[pacNum] = 27;
            break;
        case 3:
            keyBoardCode[pacNum] = 28;
            break;
        case 4:
            keyBoardCode[pacNum] = 29;
            break;
        default:
            break;
    }
}
break;
default:
    break;
}
}

pacX[pacNum] = (pacImgX[pacNum] - 203) / 9;
pacY[pacNum] = (pacImgY[pacNum] - 105) / 9;

unsigned mazeContent;
IOWR_VGA(VGA_BASE, 15, pacY[pacNum] * 28 + pacX[pacNum]);
mazeContent = IORD_VGA(VGA_BASE, 0);

switch(mazeContent) {
case 26: // pacDot
    IOWR_VGA(VGA_BASE, 12, pacY[pacNum] * 28 + pacX[pacNum]);
    IOWR_VGA(VGA_BASE, 13, 28);
    pacDot--;
    score += 1;
    audioPlayROM(0);
    break;
case 27: // energizer
    IOWR_VGA(VGA_BASE, 12, pacY[pacNum] * 28 + pacX[pacNum]);
    IOWR_VGA(VGA_BASE, 13, 28);
    int i;
    for(i = 0; i < 3; i++) {
        if(ghostEaten[i] == 0)
            ghostWeakMode[i] = 1;
    }
    score += 10;
    audioPlayROM(1);
    break;
default:
    break;
}
}

paintPac(pacNum);
}
//-----
int isAvailable(int ghostNum, int direction) {
    int nextX;
    int nextY;
    unsigned nextContent;
    switch(direction) {
case 1: //right
        if(ghostImgX[ghostNum] < 446) {
            nextX = (ghostImgX[ghostNum] + GHOST_R - 203) / 9;
            if((ghostImgY[ghostNum] - 105) % 9 == 0) {
                IOWR_VGA(VGA_BASE, 15, ghostY[ghostNum] * 28 + nextX);
                nextContent = IORD_VGA(VGA_BASE, 0);
                if(nextContent == 26 || nextContent == 27 || nextContent == 28
                    || nextContent == 17 || nextContent == 18)
                    return 1;
            }
        }
    }
    else
        return 1;
    break;
case 2: //down
    nextY = (ghostImgY[ghostNum] + GHOST_R - 105) / 9;
    if((ghostImgX[ghostNum] - 203) % 9 == 0) {
        IOWR_VGA(VGA_BASE, 15, nextY * 28 + ghostX[ghostNum]);
        nextContent = IORD_VGA(VGA_BASE, 0);
        if(nextContent == 26 || nextContent == 27 || nextContent == 28
            || nextContent == 17 || nextContent == 18)
            return 1;
    }
    break;
case 3: //left

```

```

if(ghostImgX[ghostNum] >= 203) {
    nextX = (ghostImgX[ghostNum] - GHOST_V - 203) / 9;
    if((ghostImgY[ghostNum] - 105) % 9 == 0) {
        IOWR_VGA(VGA_BASE, 15, ghostY[ghostNum] * 28 + nextX);
        nextContent = IORD_VGA(VGA_BASE, 0);
        if(nextContent == 26 || nextContent == 27 || nextContent == 28
            || nextContent == 17 || nextContent == 18)
            return 1;
    }
}
else
    return 1;
break;
case 4: //up
    nextY = (ghostImgY[ghostNum] - GHOST_V - 105) / 9;
    if((ghostImgX[ghostNum] - 203) % 9 == 0) {
        IOWR_VGA(VGA_BASE, 15, nextY * 28 + ghostX[ghostNum]);
        nextContent = IORD_VGA(VGA_BASE, 0);
        if(nextContent == 26 || nextContent == 27 || nextContent == 28
            || nextContent == 17 || nextContent == 18)
            return 1;
    }
break;
default:
break;
}
return 0;
}
}
-----
int randomMode(int ghostNum) {
    int optionNum = 0;
    //compute all the possible directions at time
    int i;
    for(i = 0; i < 4; i++) {
        ghostOption[ghostNum][i] = isAvailable(ghostNum, i + 1);
        optionNum += ghostOption[ghostNum][i];
    }

    int choice = 0;
    switch(optionNum) {
        case 0: //no available direction
            return 0;
        case 1: //choose the only available direction
            for(i = 0; i < 4; i++) {
                if(ghostOption[ghostNum][i] == 1)
                    return i + 1;
            }
            break;
        //choose direction according to current moving direction & random choice
        case 2:
            switch(ghostMove[ghostNum]) {
                case 1:
                    if(ghostOption[ghostNum][0] == 1)
                        return 1;
                    else if(ghostOption[ghostNum][1] == 1)
                        return 2;
                    else
                        return 4;
                case 2:
                    if(ghostOption[ghostNum][0] == 1)
                        return 1;
                    else if(ghostOption[ghostNum][1] == 1)
                        return 2;
                    else
                        return 3;
                case 3:
                    if(ghostOption[ghostNum][1] == 1)
                        return 2;
                    else if(ghostOption[ghostNum][2] == 1)
                        return 3;
                    else
                        return 4;
                case 4:
                    if(ghostOption[ghostNum][0] == 1)
                        return 1;
                    else if(ghostOption[ghostNum][2] == 1)
                        return 3;
                    else
                        return 4;
            }
        default:
            break;
    }
break;
}

```

case 3:

```
choice = rand() % 2;
int badDirection = 0;
for(i = 0; i < 4; i++) {
    if(ghostOption[ghostNum][i] == 0)
        badDirection = i + 1;
}
switch(ghostMove[ghostNum]) {
case 1:
    if(badDirection == 1) {
        if(choice == 0)
            return 2;
        else
            return 4;
    }
    else if(badDirection == 2) {
        if(choice == 0)
            return 1;
        else
            return 4;
    }
    else {
        if(choice == 0)
            return 1;
        else
            return 2;
    }
case 2:
    if(badDirection == 1) {
        if(choice == 0)
            return 2;
        else
            return 3;
    }
    else if(badDirection == 2) {
        if(choice == 0)
            return 1;
        else
            return 3;
    }
    else {
        if(choice == 0)
            return 1;
        else
            return 2;
    }
case 3:
    if(badDirection == 2) {
        if(choice == 0)
            return 3;
        else
            return 4;
    }
    else if(badDirection == 3) {
        if(choice == 0)
            return 2;
        else
            return 4;
    }
    else {
        if(choice == 0)
            return 2;
        else
            return 3;
    }
case 4:
    if(badDirection == 1) {
        if(choice == 0)
            return 3;
        else
            return 4;
    }
    else if(badDirection == 3) {
        if(choice == 0)
            return 1;
        else
            return 4;
    }
    else {
        if(choice == 0)
            return 1;
        else
            return 3;
    }
}
```

```

    }
    default: break;
  }
  break;
case 4:
  choice = rand() % 3;
  switch(ghostMove[ghostNum]) {
  case 1:
    if(choice == 0)
      return 1;
    else if(choice == 1)
      return 2;
    else
      return 4;
  case 2:
    if(choice == 0)
      return 1;
    else if(choice == 1)
      return 2;
    else
      return 3;
  case 3:
    if(choice == 0)
      return 2;
    else if(choice == 1)
      return 3;
    else
      return 4;
  case 4:
    if(choice == 0)
      return 1;
    else if(choice == 1)
      return 3;
    else
      return 4;
  default: break;
  }
  break;
  default: break;
}
return 0;
}
//-----
int chaseMode(int ghostNum, int x, int y) {
  int i;
  for(i = 0; i < 4; i++) {
    ghostOption[ghostNum][i] = isAvailable(ghostNum, i + 1);
  }
  //make choice depending on target position
  if(ghostImgX[ghostNum] > x) {
    if(ghostImgY[ghostNum] > y) { //ghost is at right-bottom of the target
      if(ghostOption[ghostNum][2] == 1 && ghostOption[ghostNum][3] == 1) {
        if(ghostMove[ghostNum] == 1)
          return 4;
        else if(ghostMove[ghostNum] == 2)
          return 3;
        else {
          int choice = rand() % 2;
          if(choice == 0 && ghostMove[ghostNum] != 1)
            return 3;
          else if(choice == 1 && ghostMove[ghostNum] != 2)
            return 4;
        }
      }
      if(ghostOption[ghostNum][2] == 1 && ghostOption[ghostNum][3] == 0
        && ghostMove[ghostNum] != 1)
        return 3;
      if(ghostOption[ghostNum][2] == 0 && ghostOption[ghostNum][3] == 1
        && ghostMove[ghostNum] != 2)
        return 4;
    }
    else if(ghostImgY[ghostNum] < y) { //ghost is at right-top of the target
      if(ghostOption[ghostNum][1] == 1 && ghostOption[ghostNum][2] == 1) {
        if(ghostMove[ghostNum] == 1)
          return 2;
        else if(ghostMove[ghostNum] == 4)
          return 3;
        else {
          int choice = rand() % 2;
          if(choice == 0 && ghostMove[ghostNum] != 4)
            return 2;
          else if(choice == 1 && ghostMove[ghostNum] != 1)
            return 3;
        }
      }
    }
  }
}

```

```

    }
    if(ghostOption[ghostNum][1] == 1 && ghostOption[ghostNum][2] == 0
        && ghostMove[ghostNum] != 4)
        return 2;
    if(ghostOption[ghostNum][1] == 0 && ghostOption[ghostNum][2] == 1
        && ghostMove[ghostNum] != 1)
        return 3;
}
else { //ghost is at right of the target
    if(ghostOption[ghostNum][2] == 1 && ghostMove[ghostNum] != 1)
        return 3;
}
}
else if(ghostImgX[ghostNum] < x) {
    if(ghostImgY[ghostNum] > y) { //ghost is at left-bottom of the target
        if(ghostOption[ghostNum][0] == 1 && ghostOption[ghostNum][3] == 1) {
            if(ghostMove[ghostNum] == 3)
                return 4;
            else if(ghostMove[ghostNum] == 2)
                return 1;
            else {
                int choice = rand() % 2;
                if(choice == 0 && ghostMove[ghostNum] != 3)
                    return 1;
                else if(choice == 1 && ghostMove[ghostNum] != 2)
                    return 4;
            }
        }
        if(ghostOption[ghostNum][0] == 1 && ghostOption[ghostNum][3] == 0
            && ghostMove[ghostNum] != 3)
            return 1;
        if(ghostOption[ghostNum][0] == 0 && ghostOption[ghostNum][3] == 1
            && ghostMove[ghostNum] != 2)
            return 4;
    }
    else if(ghostImgY[ghostNum] < y) { //ghost is at left-top of the target
        if(ghostOption[ghostNum][0] == 1 && ghostOption[ghostNum][1] == 1) {
            if(ghostMove[ghostNum] == 4)
                return 1;
            else if(ghostMove[ghostNum] == 3)
                return 2;
            else {
                int choice = rand() % 2;
                if(choice == 0 && ghostMove[ghostNum] != 3)
                    return 1;
                else if(choice == 1 && ghostMove[ghostNum] != 4)
                    return 2;
            }
        }
        if(ghostOption[ghostNum][0] == 1 && ghostOption[ghostNum][1] == 0
            && ghostMove[ghostNum] != 3)
            return 1;
        if(ghostOption[ghostNum][0] == 0 && ghostOption[ghostNum][1] == 1
            && ghostMove[ghostNum] != 4)
            return 2;
    }
}
else { //ghost is at left of the target
    if(ghostOption[ghostNum][0] == 1 && ghostMove[ghostNum] != 3)
        return 1;
}
}
else
{
    if(ghostImgY[ghostNum] > y) { //ghost is at bottom of the target
        if(ghostOption[ghostNum][3] == 1 && ghostMove[ghostNum] != 2)
            return 4;
    }
    else if(ghostImgY[ghostNum] < y) { //ghost is at top of the target
        if(ghostOption[ghostNum][1] == 1 && ghostMove[ghostNum] != 4)
            return 2;
    }
}
else { //ghost reaches target
    return 0;
}
}
if(ghostOption[ghostNum][ghostMove[ghostNum] - 1] == 1)
    return ghostMove[ghostNum];

return randomMode(ghostNum);
}
//-----

```

```

void moveGhost(int ghostNum) {
    if(pacDie[0] == 0 && pacDie[1] == 0) {
        if(ghostEaten[ghostNum] == 0) {
            //random or chasing?
            if(ghostWeakMode[ghostNum] == 0) {
                if(gameMode == 0) {
                    if(ghostMode[ghostNum] < ghostModeSwitchTime[ghostNum] / 2)
                        ghostOperation[ghostNum] = randomMode(ghostNum);
                    else
                        ghostOperation[ghostNum] = chaseMode(ghostNum, pacImgX[0], pacImgY[0]);
                }
                else
                {
                    if(ghostMode[ghostNum] < ghostModeSwitchTime[ghostNum] / 3)
                        ghostOperation[ghostNum] = randomMode(ghostNum);
                    else if(ghostMode[ghostNum] < 2 * ghostModeSwitchTime[ghostNum] / 3)
                        ghostOperation[ghostNum] = chaseMode(ghostNum, pacImgX[0], pacImgY[0]);
                    else
                        ghostOperation[ghostNum] = chaseMode(ghostNum, pacImgX[1], pacImgY[1]);
                }
                ghostMode[ghostNum] = (ghostMode[ghostNum] + 1) % ghostModeSwitchTime[ghostNum];
            }
            else
                ghostOperation[ghostNum] = randomMode(ghostNum);
        }
        else {
            ghostOperation[ghostNum] = chaseMode(ghostNum, 203 + INITIAL_GHOST_X * 9, 105 + INITIAL_GHOST_Y * 9);
        }

        switch(ghostOperation[ghostNum]) {
            case 1: //right
                if(ghostImgX[ghostNum] < 446) {
                    if(ghostWeakMode[ghostNum] % 2 == 0) {
                        ghostImgX[ghostNum] += ghostV[ghostNum];
                        ghostMove[ghostNum] = 1;
                    }
                }
                else {
                    ghostImgX[ghostNum] = 203;
                    ghostMove[ghostNum] = 1;
                }
                break;
            case 2: //down
                if(ghostWeakMode[ghostNum] % 2 == 0) {
                    ghostImgY[ghostNum] += ghostV[ghostNum];
                    ghostMove[ghostNum] = 2;
                }
                break;
            case 3: //left
                if(ghostImgX[ghostNum] >= 203) {
                    if(ghostWeakMode[ghostNum] % 2 == 0) {
                        ghostImgX[ghostNum] -= ghostV[ghostNum];
                        ghostMove[ghostNum] = 3;
                    }
                }
                else {
                    ghostImgX[ghostNum] = 446;
                    ghostMove[ghostNum] = 3;
                }
                break;
            case 4: //up
                if(ghostWeakMode[ghostNum] % 2 == 0) {
                    ghostImgY[ghostNum] -= ghostV[ghostNum];
                    ghostMove[ghostNum] = 4;
                }
                break;
            default:
                break;
        }

        ghostX[ghostNum] = (ghostImgX[ghostNum] - 203) / 9;
        ghostY[ghostNum] = (ghostImgY[ghostNum] - 105) / 9;
        int i;
        for(i = 0; i <= gameMode; i++) {
            if(ghostX[ghostNum] == pacX[i] && ghostY[ghostNum] == pacY[i]) {
                if(ghostWeakMode[ghostNum] == 0 && ghostEaten[ghostNum] == 0) {
                    pacDie[i] = 1;
                    pacLife[i]--;
                    audioPlayROM(3);
                }
                else {
                    ghostEaten[ghostNum] = 1;
                    ghostWeakMode[ghostNum] = 0;
                }
            }
        }
    }
}

```



```

        audioPlayROM(1);
    }
    }
    if(ghostEaten[ghostNum] == 1) {
        if(ghostX[ghostNum] == INITIAL_GHOST_X && ghostY[ghostNum] == INITIAL_GHOST_Y)
            ghostEaten[ghostNum] = 0;
    }
}
}

paintGhost(ghostNum);
}
//-----
void startPac() {
    srand(time(NULL));
    printf("[New Game]\n");
    score = 0;
    pacLife[0] = INITIAL_PAC_LIFE;
    if(gameMode == 0) {
        pacLife[1] = 0;
        IOWR_VGA(VGA_BASE, 16, 0);
        IOWR_VGA(VGA_BASE, 17, 0);
        IOWR_VGA(VGA_BASE, 19, 28);
        paintLife(1);
    }
    else
        pacLife[1] = INITIAL_PAC_LIFE;
    level = 1;
    gameSpeed = INITIAL_GAME_SPEED;
    initializeStage();
    unsigned keyC = 0;
    while(pacLife[0] + pacLife[1] > 0 || pacDie[0] > 0 || pacDie[1] > 0) {
        while(!IORD_8DIRECT(KEYBOARD_BASE,0)){
            int i;
            for(i = 0; i < gameSpeed; i++){
                movePac(0);
                if(gameMode == 1)
                    movePac(1);
            }
            for(i = 0; i < 3; i++){
                moveGhost(i);
            }
            if(pacDot == 0)
                initializeStage();
            if(pacLife[0] + pacLife[1] == 0)
                break;
        }
        keyC = IORD_8DIRECT(KEYBOARD_BASE,1);
        if(keyC == 116 || keyC == 114 || keyC == 107 || keyC == 117 || keyC == 118)
            keyBoardCode[0] = keyC;
        movePac(0);
        if(gameMode == 1) {
            if(keyC == 35 || keyC == 27 || keyC == 28 || keyC == 29 || keyC == 118)
                keyBoardCode[1] = keyC;
            movePac(1);
        }
        int i;
        for(i = 0; i < 3; i++)
            moveGhost(i);
        if(pacDot == 0)
            initializeStage();
    }
    IOWR_VGA(VGA_BASE, 14, 2);
    paintScore2();
    int i;a
    audioPlaySDRAM(1);
}
//-----
int modeChoose() {
    IOWR_VGA(VGA_BASE, 14, 1);
    IOWR_VGA(VGA_BASE, 12, 0);
    IOWR_VGA(VGA_BASE, 18, 51);
    IOWR_VGA(VGA_BASE, 12, 6);
    IOWR_VGA(VGA_BASE, 18, 28);
    audioPlaySDRAM(0);
    int modeC = 0;
    unsigned modeSelection;
    for(;;) {
        while(!IORD_8DIRECT(KEYBOARD_BASE,0));
        modeSelection = IORD_8DIRECT(KEYBOARD_BASE,1);
        switch(modeSelection) {
            case 117:
                modeC = 0; //1P
                IOWR_VGA(VGA_BASE, 12, 0);
                IOWR_VGA(VGA_BASE, 18, 51);

```

```

        IOWR_VGA(VGA_BASE, 12, 6);
        IOWR_VGA(VGA_BASE, 18, 28);
        break;
    case 114:
        modeC = 1;          //2P
        IOWR_VGA(VGA_BASE, 12, 0);
        IOWR_VGA(VGA_BASE, 18, 28);
        IOWR_VGA(VGA_BASE, 12, 6);
        IOWR_VGA(VGA_BASE, 18, 51);
        break;
    case 90:
        return modeC;
        break;
    default:
        break;
    }
}
return 0;
}
}
//-----
void audioPlaySDRAM(int audioNum) {
    long unsigned length;
    int i;
    unsigned indicator;
    switch(audioNum) {
    case 0:
        length = sizeof(begin);
        i = 0;
        indicator = IORD_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0);
        while (i < length - 1) {
            indicator = IORD_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0);
            if (indicator == 0x00000000) {
                IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0, begin[i]);
                i++;
            }
        }
        break;
    case 1:
        length = sizeof(intermission);
        i = 0;
        indicator = IORD_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0);
        while(i < length - 1) {
            indicator = IORD_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0);
            if (indicator == 0x00000000) {
                IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 0, intermission[i]);
                i++;
            }
        }
        break;
    default:
        break;
    }
}
//-----
void audioPlayROM(int audioNum) {
    switch(audioNum) {
    case 0:
        if(audioFlag1 == 0 && audioFlag2 == 0 && audioFlag3 == 0) {
            IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x01);
            IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x02);
            audioFlag1 = 1;
        }
        break;
    case 1:
        if(audioFlag2 == 0 && audioFlag3 == 0) {
            IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x03);
            IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x04);
            audioFlag2 = 1;
        }
        break;
    case 2:
        if(audioFlag2 == 0 && audioFlag3 == 0) {
            IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x05);
            IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x06);
            audioFlag2 = 1;
        }
        break;
    case 3:
        IOWR_8DIRECT(AUDIO_PLAYER_BUFFER_BASE, 1, 0x07);
        audioFlag3 = 1;
        break;
    default:
        break;
    }
}

```

```

    }
}
//-----
int main() {
    printf("[Staring PacMan] ...\n");

    for(;;)
    {
        gameMode = modeChoose();
        startPac();
    }
    return 0;
}
//-----

```

## 4.2 Audio\_buffer.vhd

```

library ieee;
use ieee.std_logic_1164.all;
use ieee.numeric_std.all;

entity audio_buffer is
port (
    clk : in std_logic;
    reset_n : in std_logic;
    read : in std_logic;
    write : in std_logic;
    chipselect : in std_logic;
    address : in std_logic_vector(7 downto 0);
    readdata : out std_logic_vector(7 downto 0);
    writedata : in std_logic_vector(7 downto 0);
    audio_data : out std_logic_vector(7 downto 0);
    audio_request : in std_logic;
    audio_clk : in std_logic;
    rom_select : out std_logic_vector (2 downto 0)
);
end audio_buffer;

architecture rtl of audio_buffer is
    type ram_type is array(255 downto 0) of
        std_logic_vector(7 downto 0);
    signal RAM : ram_type;
    signal ram_address: unsigned(7 downto 0):="00000000";
    signal audio_address : unsigned(7 downto 0):="00000000";
    signal output : std_logic_vector (7 downto 0):="00000000";
    signal cpu_command : std_logic_vector (2 downto 0):="000";
begin
    process (clk)
    begin
        if rising_edge(clk) then
            if reset_n = '0' then
                ram_address <= "00000000";
                --audio_address <= "00000000";
                for I in 0 to 255 loop
                    RAM(I) <= "00000000";
                end loop;
            else
                if chipselect = '1' then

```

```

        if read = '1' then
        if ram_address = audio_address - 1 then
            readdata <= "11111111";
        else
            readdata <= "00000000";
        end if;
        elsif write = '1' then
        if address(0) = '1' then
            cpu_command <= writedata (2 downto 0);
        else
            cpu_command <= "000";
        if ram_address /= audio_address - 1 then
            ram_address <= ram_address + 1;
            RAM(to_integer(ram_address)) <= writedata;
        end if;
        end if;
        end if;
    end if;
end process;

```

```

audio_data <= output;
rom_select <= cpu_command;

```

```

process (audio_clk)
begin
    if rising_edge(audio_clk) then
        if ram_address = audio_address then
            output <= "00000000";
        else
            output <= RAM(to_integer(audio_address));
            if audio_request = '1' then
                audio_address <= audio_address + 1;
            end if;
        end if;
    end if;
end process;
end rtl;

```

#### 4.3 Audio\_module.vhd

```

library ieee;
use ieee.std_logic_1164.all;
use ieee.numeric_std.all;

```

```

entity audio_module is

```

```

port (
    reset_n : in std_logic;
    clk_18 : in std_logic;    -- Audio CODEC Chip Clock AUD_XCK (18.43 MHz)
    test_mode : in std_logic;    -- Audio CODEC controller test mode
    audio_request: out std_logic; -- Audio controller request new data
    data : in std_logic_vector(7 downto 0);

```

```

rom_select : in std_logic_vector (2 downto 0);
address_to_rom : out std_logic_vector (15 downto 0);
data_from_rom : in std_logic_vector (7 downto 0);

-- Audio interface signals
AUD_ADCLRCK : out std_logic; -- Audio CODEC ADC LR Clock
AUD_ADCDATA : in std_logic; -- Audio CODEC ADC Data
AUD_DACLCK : out std_logic; -- Audio CODEC DAC LR Clock
AUD_DACDATA : out std_logic; -- Audio CODEC DAC Data
AUD_BCLK : inout std_logic -- Audio CODEC Bit-Stream Clock
);
end audio_module;

architecture rtl of audio_module is
    signal audio_play : std_logic:= '0';
        signal rom_select_lat1 : std_logic_vector(2 downto 0):= "000";
        signal rom_select_lat2 : std_logic_vector(2 downto 0):= "000";
        signal audio_request_address : unsigned (15 downto 0) := "0000000000000000";

    signal lrck : std_logic;
    signal bclk : std_logic;
    signal xck : std_logic;

    signal lrck_divider : unsigned(11 downto 0);
    signal bclk_divider : unsigned(7 downto 0);

    signal set_bclk : std_logic;
    signal set_lrck : std_logic;
    signal clr_bclk : std_logic;
    signal lrck_lat : std_logic;

    signal shift_out : std_logic_vector(15 downto 0);

    signal sin_out : std_logic_vector(15 downto 0);
    signal sin_counter : unsigned(5 downto 0);

begin

    -- LRCK divider
    -- Audio chip main clock is 18.432MHz / Sample rate 48KHz
    -- Divider is 18.432 MHz / 48KHz = 192 (X"C0") 192/16=12 X"C"
    -- Left justify mode set by I2C controller
    -- 11.025KHz -- 1672/2 = 836 X"344" 836/16 = 53 X"35"

    process (clk_18)
    begin
        if rising_edge(clk_18) then
            rom_select_lat1 <= rom_select;
            rom_select_lat2 <= rom_select_lat1;
        end if;
    end process;
end architecture;

```

```

process (clk_18)
begin
  if rising_edge(clk_18) then
    if reset_n = '0' then
      lrck_divider <= (others => '0');
    elsif lrck_divider = X"343" then -- "344" minus 1
      lrck_divider <= X"000";
    else
      lrck_divider <= lrck_divider + 1;
    end if;
  end if;
end process;

```

```

process (clk_18)
begin
  if rising_edge(clk_18) then
    if reset_n = '0' then
      bclk_divider <= (others => '0');
    elsif bclk_divider = X"34" or set_lrck = '1' then -- "35" minus 1
      bclk_divider <= X"00";
    else
      bclk_divider <= bclk_divider + 1;
    end if;
  end if;
end process;

```

```

set_lrck <= '1' when lrck_divider = X"343" else '0';

```

```

process (clk_18)
begin
  if rising_edge(clk_18) then
    if reset_n = '0' then
      lrck <= '0';
    elsif set_lrck = '1' then
      lrck <= not lrck;
    end if;
  end if;
end process;

```

-- BCLK divider

```

set_bclk <= '1' when bclk_divider(7 downto 0) = "00011010" else '0';
clr_bclk <= '1' when bclk_divider(7 downto 0) = "00110100" else '0';

```

```

process (clk_18)
begin
  if rising_edge(clk_18) then
    if reset_n = '0' then
      bclk <= '0';
    elsif set_lrck = '1' or clr_bclk = '1' then
      bclk <= '0';
    elsif set_bclk = '1' then
      bclk <= '1';
    end if;
  end if;
end process;

```

```
end if;
end if;
end process;
```

```
-- Audio data shift output
```

```
process (clk_18)
```

```
begin
```

```
if rising_edge(clk_18) then
```

```
if reset_n = '0' then
```

```
shift_out <= (others => '0');
```

```
elsif set_lrck = '1' then
```

```
if test_mode = '1' then
```

```
shift_out <= sin_out;
```

```
else
```

```
if rom_select_lat1 = "000" then
```

```
shift_out <= data(7 downto 0) & "00000000";
```

```
else
```

```
shift_out <= data_from_rom(7 downto 0) & "00000000";
```

```
end if;
```

```
end if;
```

```
elsif clr_bclk = '1' then
```

```
shift_out <= shift_out (14 downto 0) & '0';
```

```
end if;
```

```
end if;
```

```
end process;
```

```
-- Audio outputs
```

```
AUD_ADCLRCK <= lrck;
```

```
AUD_DACLCK <= lrck;
```

```
AUD_DACDAT <= shift_out(15);
```

```
AUD_BCLK <= bclk;
```

```
address_to_rom <= std_logic_vector(audio_request_address);
```

```
-- Self test with Sin wave
```

```
process(clk_18)
```

```
begin
```

```
if rising_edge(clk_18) then
```

```
if reset_n = '0' then
```

```
sin_counter <= (others => '0');
```

```
elsif lrck_lat = '1' and lrck = '0' then
```

```
if sin_counter = "101111" then
```

```
sin_counter <= "000000";
```

```
else
```

```
sin_counter <= sin_counter + 1;
```

```
end if;
```

```
end if;
```

```
end if;
```

```
end process;
```

```
process(clk_18)
```

```

begin
  if rising_edge(clk_18) then
    lrck_lat <= lrck;
  end if;
end process;

  process (clk_18)
begin
  if rising_edge(clk_18) then
    if rom_select_lat1 = "000" then
      if lrck_lat = '1' and lrck = '0' then
        audio_request <= '1';
      else
        audio_request <= '0';
      end if;
    else
      audio_request <='0';
    end if;
  end if;
end process;

process (clk_18)
begin
  if rising_edge(clk_18) then
    if rom_select_lat1 /= "000" then
      if rom_select_lat2 /= rom_select_lat1 then
        audio_play <= '0';
      elsif lrck_lat = '1' and lrck = '0' then
        if rom_select_lat1 = "001" or rom_select_lat1 = "010" then
          if audio_play = '0' then
            audio_request_address <= "0000000000000000";
            audio_play <= '1';
          else
            if audio_request_address /= "0001111011011100" then
              audio_request_address <= audio_request_address + 1;
            end if;
          end if;
        elsif rom_select_lat1 = "011" or rom_select_lat1 = "100" then
          if audio_play = '0' then
            audio_request_address <= "0001111011011100";
            audio_play <= '1';
          else
            if audio_request_address /= "0011011110001111" then
              audio_request_address <= audio_request_address + 1;
            end if;
          end if;
        elsif rom_select_lat1 = "101" or rom_select_lat1 = "110" then
          if audio_play = '0' then
            audio_request_address <= "0011011110001111";
            audio_play <= '1';
          else
            if audio_request_address /= "0100101001111100" then

```



```

        audio_request_address <= audio_request_address + 1;
    end if;
end if;
elsif rom_select_lat1 = "111" then
    if audio_play = '0' then
        audio_request_address <= "0100101001111100";
        audio_play <= '1';
    else
        if audio_request_address /= "1000110010010000" then
            audio_request_address <= audio_request_address + 1;
        end if;
    end if;
end if;
end if;
end if;
end if;
end process;

```

```

with sin_counter select sin_out <=

```

```

X"0000" when "000000",
X"10b4" when "000001",
X"2120" when "000010",
X"30fb" when "000011",
X"3fff" when "000100",
X"4deb" when "000101",
X"5a81" when "000110",
X"658b" when "000111",
X"6ed9" when "001000",
X"7640" when "001001",
X"7ba2" when "001010",
X"7ee6" when "001011",
X"7fff" when "001100",
X"7ee6" when "001101",
X"7ba2" when "001110",
X"7640" when "001111",
X"6ed9" when "010000",
X"658b" when "010001",
X"5a81" when "010010",
X"4deb" when "010011",
X"3fff" when "010100",
X"30fb" when "010101",
X"2120" when "010110",
X"10b4" when "010111",
X"0000" when "011000",
X"ef4b" when "011001",
X"dee0" when "011010",
X"cf05" when "011011",
X"c001" when "011100",
X"b215" when "011101",
X"a57e" when "011110",
X"9a74" when "011111",
X"9127" when "100000",

```

```

X"89bf" when "100001",
X"845d" when "100010",
X"8119" when "100011",
X"8000" when "100100",
X"8119" when "100101",
X"845d" when "100110",
X"89bf" when "100111",
X"9127" when "101000",
X"9a74" when "101001",
X"a57e" when "101010",
X"b215" when "101011",
X"c000" when "101100",
X"cf05" when "101101",
X"dee0" when "101110",
X"ef4b" when "101111",
X"0000" when others;

```

```
end architecture;
```

#### 4.4 TOP\_LEVEL.vhd

```

--
-- DE2 top-level module that includes the simple VGA raster generator
--
-- Stephen A. Edwards, Columbia University, sedwards@cs.columbia.edu
--
-- From an original by Terasic Technology, Inc.
-- (DE2_TOP.v, part of the DE2 system board CD supplied by Altera)
--

```

```

library ieee;
use ieee.std_logic_1164.all;
use ieee.numeric_std.all;

```

```
entity lab3_vga is
```

```
port (
```

```
-- Clocks
```

```

CLOCK_27,           -- 27 MHz
CLOCK_50,           -- 50 MHz
EXT_CLOCK : in std_logic;    -- External Clock

```

```
-- Buttons and switches
```

```

KEY : in std_logic_vector(3 downto 0);    -- Push buttons
SW : in std_logic_vector(17 downto 0);    -- DPDT switches

```

```
-- LED displays
```

```

HEX0, HEX1, HEX2, HEX3, HEX4, HEX5, HEX6, HEX7 -- 7-segment displays
: out std_logic_vector(6 downto 0);
LEDG : out std_logic_vector(8 downto 0);    -- Green LEDs

```

LEDR : out std\_logic\_vector(17 downto 0); -- Red LEDs

-- RS-232 interface

UART\_TXD : out std\_logic; -- UART transmitter

UART\_RXD : in std\_logic; -- UART receiver

-- IRDA interface

-- IRDA\_TXD : out std\_logic; -- IRDA Transmitter

IRDA\_RXD : in std\_logic; -- IRDA Receiver

-- SDRAM

DRAM\_DQ : inout std\_logic\_vector(15 downto 0); -- Data Bus

DRAM\_ADDR : out std\_logic\_vector(11 downto 0); -- Address Bus

DRAM\_LDQM, -- Low-byte Data Mask

DRAM\_UDQM, -- High-byte Data Mask

DRAM\_WE\_N, -- Write Enable

DRAM\_CAS\_N, -- Column Address Strobe

DRAM\_RAS\_N, -- Row Address Strobe

DRAM\_CS\_N, -- Chip Select

DRAM\_BA\_0, -- Bank Address 0

DRAM\_BA\_1, -- Bank Address 0

DRAM\_CLK, -- Clock

DRAM\_CKE : out std\_logic; -- Clock Enable

-- FLASH

FL\_DQ : inout std\_logic\_vector(7 downto 0); -- Data bus

FL\_ADDR : out std\_logic\_vector(21 downto 0); -- Address bus

FL\_WE\_N, -- Write Enable

FL\_RST\_N, -- Reset

FL\_OE\_N, -- Output Enable

FL\_CE\_N : out std\_logic; -- Chip Enable

-- SRAM

SRAM\_DQ : inout std\_logic\_vector(15 downto 0); -- Data bus 16 Bits

SRAM\_ADDR : out std\_logic\_vector(17 downto 0); -- Address bus 18 Bits

SRAM\_UB\_N, -- High-byte Data Mask

SRAM\_LB\_N, -- Low-byte Data Mask

SRAM\_WE\_N, -- Write Enable

SRAM\_CE\_N, -- Chip Enable

SRAM\_OE\_N : out std\_logic; -- Output Enable

-- USB controller

OTG\_DATA : inout std\_logic\_vector(15 downto 0); -- Data bus

OTG\_ADDR : out std\_logic\_vector(1 downto 0); -- Address

OTG\_CS\_N, -- Chip Select

OTG\_RD\_N, -- Write

OTG\_WR\_N, -- Read  
OTG\_RST\_N, -- Reset  
OTG\_FSPEED, -- USB Full Speed, 0 = Enable, Z = Disable  
OTG\_LSPEED : out std\_logic; -- USB Low Speed, 0 = Enable, Z = Disable  
OTG\_INT0, -- Interrupt 0  
OTG\_INT1, -- Interrupt 1  
OTG\_DREQ0, -- DMA Request 0  
OTG\_DREQ1 : in std\_logic; -- DMA Request 1  
OTG\_DACK0\_N, -- DMA Acknowledge 0  
OTG\_DACK1\_N : out std\_logic; -- DMA Acknowledge 1

-- 16 X 2 LCD Module

LCD\_ON, -- Power ON/OFF  
LCD\_BLON, -- Back Light ON/OFF  
LCD\_RW, -- Read/Write Select, 0 = Write, 1 = Read  
LCD\_EN, -- Enable  
LCD\_RS : out std\_logic; -- Command/Data Select, 0 = Command, 1 = Data  
LCD\_DATA : inout std\_logic\_vector(7 downto 0); -- Data bus 8 bits

-- SD card interface

SD\_DAT, -- SD Card Data  
SD\_DAT3, -- SD Card Data 3  
SD\_CMD : inout std\_logic; -- SD Card Command Signal  
SD\_CLK : out std\_logic; -- SD Card Clock

-- USB JTAG link

TDI, -- CPLD -> FPGA (data in)  
TCK, -- CPLD -> FPGA (clk)  
TCS : in std\_logic; -- CPLD -> FPGA (CS)  
TDO : out std\_logic; -- FPGA -> CPLD (data out)

-- I2C bus

I2C\_SDAT : inout std\_logic; -- I2C Data  
I2C\_SCLK : out std\_logic; -- I2C Clock

-- PS/2 port

PS2\_DAT, -- Data  
PS2\_CLK : in std\_logic; -- Clock

-- VGA output

VGA\_CLK, -- Clock  
VGA\_HS, -- H\_SYNC  
VGA\_VS, -- V\_SYNC  
VGA\_BLANK, -- BLANK  
VGA\_SYNC : out std\_logic; -- SYNC  
VGA\_R, -- Red[9:0]

```

VGA_G,                -- Green[9:0]
VGA_B : out std_logic_vector(9 downto 0);    -- Blue[9:0]

-- Ethernet Interface

ENET_DATA : inout std_logic_vector(15 downto 0); -- DATA bus 16Bits
ENET_CMD,    -- Command/Data Select, 0 = Command, 1 = Data
ENET_CS_N,   -- Chip Select
ENET_WR_N,   -- Write
ENET_RD_N,   -- Read
ENET_RST_N,  -- Reset
ENET_CLK : out std_logic;        -- Clock 25 MHz
ENET_INT : in std_logic;        -- Interrupt

-- Audio CODEC

AUD_ADCLRCK : inout std_logic;    -- ADC LR Clock
AUD_ADCDAT : in std_logic;        -- ADC Data
AUD_DACLK : inout std_logic;     -- DAC LR Clock
AUD_DACDAT : out std_logic;      -- DAC Data
AUD_BCLK : inout std_logic;      -- Bit-Stream Clock
AUD_XCK : out std_logic;         -- Chip Clock

-- Video Decoder

TD_DATA : in std_logic_vector(7 downto 0); -- Data bus 8 bits
TD_HS,   -- H_SYNC
TD_VS : in std_logic;    -- V_SYNC
TD_RESET : out std_logic; -- Reset

-- General-purpose I/O

GPIO_0,                -- GPIO Connection 0
GPIO_1 : inout std_logic_vector(35 downto 0) -- GPIO Connection 1
);

```

```
end lab3_vga;
```

architecture datapath of lab3\_vga is

component de2\_i2c\_av\_config is

```

port (
  iCLK : in std_logic;
  iRST_N : in std_logic;
  I2C_SCLK : out std_logic;
  I2C_SDAT : inout std_logic
);
end component;
```

```

signal clk25 : std_logic := '0';
signal audio_clock_18 : std_logic;
signal request : std_logic;
```

```
signal data : std_logic_vector (7 downto 0);
signal rom_select: std_logic_vector (2 downto 0);
signal data_from_rom : std_logic_vector (7 downto 0);
signal address_to_rom : std_logic_vector (15 downto 0);
```

```
begin
```

```
process (CLOCK_50)
begin
  if rising_edge(CLOCK_50) then
    clk25 <= not clk25;
  end if;
end process;
```

```
AUD_XCK <= audio_clock_18;
```

```
i2c : de2_i2c_av_config port map (
  iCLK   => CLOCK_50,
  iRST_n => '1',
  I2C_SCLK => I2C_SCLK,
  I2C_SDAT => I2C_SDAT
);
```

```
PLL : entity work.audio_pll port map (
  inclk0 => CLOCK_50,
  c0      => audio_clock_18
);
```

```
ROM : entity work.ROM port map(
  address      => address_to_rom,
  clock        => CLOCK_50,
  q            => data_from_rom
);
```

```
nios: entity work.pac_key_test port map (
  reset_n => '1',
  clk_0 => clk25,
  VGA_CLK_from_the_vga => VGA_CLK,
  VGA_HS_from_the_vga => VGA_HS,
  VGA_VS_from_the_vga => VGA_VS,
  VGA_BLANK_from_the_vga => VGA_BLANK,
  VGA_SYNC_from_the_vga => VGA_SYNC,
  VGA_R_from_the_vga => VGA_R,
  VGA_G_from_the_vga => VGA_G,
  VGA_B_from_the_vga => VGA_B,

  ledsred_from_the_keyboard => LEDR(15 downto 0),
  ledsgreen_from_the_keyboard => LEDG(7 downto 0),
  PS2_Data_to_the_keyboard => PS2_Dat,
  PS2_Clk_to_the_keyboard => PS2_Clk,

  --leds_from_the_vga    => LEDR(15 downto 0),
```

```

SRAM_ADDR_from_the_sram    => SRAM_ADDR,
SRAM_CE_N_from_the_sram    => SRAM_CE_N,
SRAM_DQ_to_and_from_the_sram => SRAM_DQ,
SRAM_LB_N_from_the_sram    => SRAM_LB_N,
SRAM_OE_N_from_the_sram    => SRAM_OE_N,
SRAM_UB_N_from_the_sram    => SRAM_UB_N,
SRAM_WE_N_from_the_sram    => SRAM_WE_N,

    --audio buffer
    audio_clk_to_the_audio_player_buffer => audio_clock_18,
    audio_data_from_the_audio_player_buffer => data,
    audio_request_to_the_audio_player_buffer => request,
    rom_select_from_the_audio_player_buffer => rom_select

);

```

```

V1: entity work.audio_module port map (
    clk_18 => audio_clock_18,
    reset_n => '1',
    test_mode => '0',          -- Disable test_mode
    audio_request => request,
    data => data,
    data_from_rom => data_from_rom,
    address_to_rom => address_to_rom,
    rom_select => rom_select,

```

```

-- Audio interface signals
AUD_ADCLRCK => AUD_ADCLRCK,
AUD_ADCCDAT => AUD_ADCCDAT,
AUD_DACLCK => AUD_DACLCK,
AUD_DACDAT => AUD_DACDAT,
AUD_BCLK => AUD_BCLK
);

```

```

HEX7  <= "0001001"; -- Leftmost
HEX6  <= "0000110";
HEX5  <= "1000111";
HEX4  <= "1000111";
HEX3  <= "1000000";
HEX2  <= (others => '1');
HEX1  <= (others => '1');
HEX0  <= (others => '1');    -- Rightmost
--LEDG  <= (others => '1');
--LEDR  <= (others => '1');
LCD_ON  <= '1';
LCD_BLON <= '1';
LCD_RW  <= '1';
LCD_EN  <= '0';
LCD_RS  <= '0';

```

```

SD_DAT3 <= '1';
SD_CMD <= '1';

```

```
SD_CLK <= '1';
```

```
--SRAM_DQ <= (others => 'Z');  
--SRAM_ADDR <= (others => '0');  
--SRAM_UB_N <= '1';  
--SRAM_LB_N <= '1';  
--SRAM_CE_N <= '1';  
--SRAM_WE_N <= '1';  
--SRAM_OE_N <= '1';
```

```
UART_TXD <= '0';  
DRAM_ADDR <= (others => '0');  
DRAM_LDQM <= '0';  
DRAM_UDQM <= '0';  
DRAM_WE_N <= '1';  
DRAM_CAS_N <= '1';  
DRAM_RAS_N <= '1';  
DRAM_CS_N <= '1';  
DRAM_BA_0 <= '0';  
DRAM_BA_1 <= '0';  
DRAM_CLK <= '0';  
DRAM_CKE <= '0';  
FL_ADDR <= (others => '0');  
FL_WE_N <= '1';  
FL_RST_N <= '0';  
FL_OE_N <= '1';  
FL_CE_N <= '1';  
OTG_ADDR <= (others => '0');  
OTG_CS_N <= '1';  
OTG_RD_N <= '1';  
OTG_RD_N <= '1';  
OTG_WR_N <= '1';  
OTG_RST_N <= '1';  
OTG_FSPEED <= '1';  
OTG_LSPEED <= '1';  
OTG_DACK0_N <= '1';  
OTG_DACK1_N <= '1';
```

```
TDO <= '0';
```

```
ENET_CMD <= '0';  
ENET_CS_N <= '1';  
ENET_WR_N <= '1';  
ENET_RD_N <= '1';  
ENET_RST_N <= '1';  
ENET_CLK <= '0';
```

```
TD_RESET <= '0';
```

```
-- Set all bidirectional ports to tri-state  
DRAM_DQ <= (others => 'Z');  
FL_DQ <= (others => 'Z');
```



```

OTG_DATA  <= (others => 'Z');
LCD_DATA  <= (others => 'Z');
SD_DAT    <= 'Z';
ENET_DATA <= (others => 'Z');
GPIO_0    <= (others => 'Z');
GPIO_1    <= (others => 'Z');

```

```
end datapath;
```

#### 4.5 VGA\_color.vhd

```
library ieee;
```

```
use ieee.std_logic_1164.all;
```

```
use ieee.numeric_std.all;
```

```
entity VGA_colour is
```

```
port(
```

```
  VGA_R,          -- Red[9:0]
```

```
  VGA_G,          -- Green[9:0]
```

```
  VGA_B : out std_logic_vector(9 downto 0); -- Blue[9:0]
```

```
  clk,
```

```
  reset_n : in std_logic;
```

```
  rectangle : in std_logic_vector(3 downto 0);
```

```
  vga_hblank, vga_vblank :in std_logic;
```

```
  pac_fb1,
```

```
  pac_fb2,
```

```
  pac_fb3,
```

```
  map_fb      : in std_logic;
```

```
  ghost_state : in std_logic_vector(1 downto 0)
```

```
);
```

```
end VGA_colour;
```

```
architecture rtl of VGA_colour is
```

```
begin
```

```
VideoOut: process (clk, reset_n)
```

```
begin
```

```
  if reset_n = '0' then
```

```
    VGA_R <= "0000000000";
```

```
    VGA_G <= "0000000000";
```

```
    VGA_B <= "0000000000";
```

```
  elsif clk'event and clk = '1' then
```

```
    if vga_hblank = '0' and vga_vblank = '0' then
```

```
      case rectangle is
```

```
__*****pac_man*****
```

```
__*****
```

```
        when "0000" =>
```

```
          if pac_fb1 = '1' then
```

```
            VGA_R <= "1111111111";
```

```
            VGA_G <= "1111111111";
```

```

VGA_B <= "0000000000";
    else
        VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
    end if;
_*****pac_2_man*****
_*****
        when "1001" =>
            if pac_fb1 = '1' then
VGA_R <= "1111111111";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
                end if;
_*****ghost1*****
_*****
        when "0001" =>
            if ghost_state = "01" then
                if pac_fb1 = '1' then
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "1111111111";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
                end if;
            elsif ghost_state = "10" then
                if pac_fb1 = '1' then
                    VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
                end if;
            else
                if pac_fb1 = '1' then
                    VGA_R <= "0000000000";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
                elsif pac_fb2 = '1' then
                    VGA_R <= "0000000000";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
                elsif pac_fb3 = '1' then
                    VGA_R <= "1111111111";

```

```

VGA_G <= "1111111111";
VGA_B <= "1111111111";
    else
        VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
    end if;
end if;
--*****ghost2*****
--*****
when "0010" =>
    if ghost_state = "01" then
        if pac_fb1 = '1' then
            VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "1111111111";
            else
                VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
        elsif ghost_state = "10" then
            if pac_fb1 = '1' then
                VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
            else
                VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
        else
            if pac_fb1 = '1' then
                VGA_R <= "1111111111";
VGA_G <= "1010101011";
VGA_B <= "1010101011";
                elsif pac_fb2 = '1' then
                    VGA_R <= "0000000000";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
                elsif pac_fb3 = '1' then
                    VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
        end if;
--*****ghost3*****
--*****

```

```

when "0011" =>
    if ghost_state = "01" then
        if pac_fb1 = '1' then
            VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "1111111111";
        else
            VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
        end if;
    elsif ghost_state = "10" then
        if pac_fb1 = '1' then
            VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
        else
            VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
        end if;
    else
        if pac_fb1 = '1' then
            VGA_R <= "0000000000";
VGA_G <= "1111111111";
VGA_B <= "0000000000";
            elsif pac_fb2 = '1' then
                VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "1111111111";
            elsif pac_fb3 = '1' then
                VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
            else
                VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
        end if;
    end if;

```

```

_*****wall*****
_*****

```

```

    when "0101" =>
        if map_fb = '1' then
VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "1111111111";
        else
            VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
        end if;

```

```

__*****pea*****
__*****

        when "0100" =>
            if map_fb = '1' then
VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
__*****score*number*****
__*****

        when "0111" =>
            if map_fb = '1' then
VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "1111111111";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
__*****pac_lives_1*****
__*****

        when "1000" =>
            if map_fb = '1' then
VGA_R <= "1111111111";
VGA_G <= "1111111111";
VGA_B <= "0000000000";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
__*****pac_lives_2*****
__*****

        when "1010" =>
            if map_fb = '1' then
VGA_R <= "1111111111";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
                else
                    VGA_R <= "0000000000";
VGA_G <= "0000000000";
VGA_B <= "0000000000";
            end if;
__*****
__*****

        when others =>
VGA_R <= "0000000000";

```



```
"001111111111111100",  
"0001111111111111000",  
"00001111111111110000",  
"000000111111000000",  
"000000000000000000"
```

```
);
```

```
constant pac_man_right1 : ram_graph := (  
"000000000000000000",  
"000000111111000000",  
"000011111111110000",  
"00011111111111000",  
"00111111111111000",  
"00111111111111100",  
"011111111111110000",  
"011111111100000000",  
"011111110000000000",  
"01111111110000000",  
"0111111111110000",  
"0011111111111110",  
"0011111111111100",  
"00011111111111000",  
"000011111111110000",  
"000000111111000000",  
"000000000000000000"
```

```
);
```

```
constant pac_man_right2 : ram_graph := (  
"000000000000000000",  
"0000001111110000",  
"00001111111111100",  
"0001111111111110",  
"00111111111111000",  
"00111111111100000",  
"01111111110000000",  
"01111111000000000",  
"01111100000000000",  
"01111111000000000",  
"01111111110000000",  
"00111111111100000",  
"0011111111111000",  
"0001111111111110",  
"00001111111111100",  
"0000001111110000",  
"00000000000000000"
```

```
);
```

```
constant pac_man_down1 : ram_graph := (  
"000000000000000000",  
"0000001111100000",  
"0000111111110000",  
"0001111111111000",  
"0011111111111100",  
"0011111111111100",  
"0111111111111110",  
"0111111011111110",  
"0111111011111110",  
"0111111011111110",  
"0111111000111110",  
"0011111000111100",  
"0011111000111100",  
"0001110000011100",  
"0000110000011000",  
"0000010000010000",  
"0000000000000000")  
);
```

```
constant pac_man_down2 : ram_graph := (  
"0000000000000000",  
"0000001111100000",  
"0000111111110000",  
"0001111111111000",  
"0011111111111100",  
"0011111111111100",  
"0111111101111110",  
"0111111101111110",  
"0111111000111110",  
"0111111000111110",  
"0111110000011110",  
"0111110000011110",  
"0111100000001110",  
"0011100000001100",  
"0011000000000100",  
"0001000000000100",  
"0000000000000000")  
);
```

```
constant pac_man_left1 : ram_graph := (  
"0000000000000000",  
"0000001111100000",  
"0000111111110000",  
"0001111111111000",  
"0011111111111100",
```



```
"011111111111111100",
"000011111111111110",
"000000011111111110",
"000000000011111110",
"000000011111111110",
"000011111111111110",
"011111111111111100",
"001111111111111100",
"000111111111110000",
"000011111111110000",
"000000111110000000",
"000000000000000000"
```

```
);
```

```
constant pac_man_left2 : ram_graph := (
"000000000000000000",
"000011111110000000",
"001111111111000000",
"011111111111100000",
"000111111111110000",
"000001111111111000",
"000000011111111100",
"000000000111111110",
"000000000011111110",
"000000000001111110",
"000000000011111110",
"000000000011111110",
"000000000111111110",
"000000000111111110",
"000000001111111110",
"000111111111111000",
"011111111111100000",
"001111111111100000",
"000011111110000000",
"000000000000000000"
```

```
);
```

```
constant pac_man_up1 : ram_graph := (
"000000000000000000",
"000001000001000000",
"000011000001100000",
"000111000001110000",
"001111100011111000",
"001111100011111000",
"011111100011111100",
"011111101111111100",
"011111101111111100",
"011111101111111100",
"011111111111111100",
"001111111111111000"
```

```
"001111111111111100",  
"0001111111111111000",  
"00001111111111110000",  
"000000111111000000",  
"000000000000000000"
```

```
);
```

```
constant pac_man_up2 : ram_graph := (  
"000000000000000000",  
"00010000000001000",  
"00110000000001100",  
"00111000000011100",  
"01111000000011110",  
"01111100000111110",  
"01111100000111110",  
"01111110001111110",  
"01111110001111110",  
"01111111011111110",  
"01111111011111110",  
"00111111111111100",  
"00111111111111100",  
"00011111111111000",  
"000011111111110000",  
"000000111111000000",  
"000000000000000000"
```

```
);
```

```
constant pac_die1 : ram_graph := (  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"01000000000000010",  
"01110000000001110",  
"01111100000111110",  
"01111111011111110",  
"01111111111111110",  
"01111111111111110",  
"00111111111111100",  
"00111111111111100",  
"00011111111111000",  
"000011111111110000",  
"000000111111000000",  
"000000000000000000"
```

);

```
constant pac_die2 : ram_graph := (  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"00000011111000000",  
"0000111111110000",  
"0011111111111100",  
"0011111111111100",  
"0001111111111100",  
"0000111111111000",  
"0000001111100000",  
"0000000000000000")
```

);

```
constant pac_die3 : ram_graph := (  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"00000000100000000",  
"00000000100000000",  
"00000000100000000",  
"00000000100000000",  
"00000000100000000",  
"00000000100000000",  
"00000000100000000",  
"00000000000000000")
```

);

```
--  
*****ghost*****  
*****  
--  
*****  
*****
```



```
"00000011000001100",  
"00000011000001100",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000"
```

```
);
```

```
constant ghost_right4 : ram_graph := (
```

```
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000110000011000",  
"00001111000111100",  
"00001100000110000",  
"00001100000110000",  
"00000110000011000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000",  
"00000000000000000"
```

```
);
```

```
constant ghost_down1 : ram_graph := (
```

```
"00000000000000000",  
"00000111111100000",  
"00001111111100000",  
"00011111111100000",  
"00111111111100000",  
"01110011110011100",  
"01100001110000110",  
"01100001110000110",  
"01100001110000110",  
"01110011110011100",  
"01111111111100000",  
"01111111111100000",  
"01111111111100000",  
"01111111111100000",  
"01111011110111000"
```

```
"00110001100011000",  
"000000000000000000"
```

```
);
```

```
constant ghost_down2 : ram_graph := (  
"000000000000000000",  
"00000111111100000",  
"0000111111110000",  
"000111111111000",  
"001111111111100",  
"01110011111001110",  
"01100001110000110",  
"01100001110000110",  
"01100001110000110",  
"01110011111001110",  
"0111111111111110",  
"0111111111111110",  
"0111111111111110",  
"0111111111111110",  
"0111111111111110",  
"00111101111011110",  
"00011000110001100",  
"000000000000000000")
```

```
);
```

```
constant ghost_down3 : ram_graph := (  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"00001100000110000",  
"00001100000110000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000",  
"000000000000000000")
```

```
);
```

```
constant ghost_down4 : ram_graph := (  
"000000000000000000",  
"000000000000000000",
```

```
"000000000000000000",
"000000000000000000",
"000000000000000000",
"00001100000110000",
"00011110001111000",
"00011110001111000",
"00010010001001000",
"000000000000000000",
"000000000000000000",
"000000000000000000",
"000000000000000000",
"000000000000000000",
"000000000000000000",
"000000000000000000",
"000000000000000000",
"000000000000000000"
```

```
);
```

```
constant ghost_left1 : ram_graph := (
```

```
"000000000000000000",
"00000111111100000",
"00001111111100000",
"00011111111100000",
"00111111111110000",
"01100111110011110",
"01000011100001110",
"01000011100001110",
"01000011100001110",
"01100111110011110",
"0111111111111110",
"0111111111111110",
"0111111111111110",
"0111111111111110",
"01111011110111100",
"00110001100011000",
"000000000000000000"
```

```
);
```

```
constant ghost_left2 : ram_graph := (
```

```
"000000000000000000",
"00000111111100000",
"00001111111100000",
"00011111111100000",
"00111111111110000",
"01100111110011110",
"01000011100001110",
"01000011100001110",
"01000011100001110",
"01100111110011110",
```





);

```
    constant ghost_up1 : ram_graph := (  
"000000000000000000",  
"0000011111110000",  
"0000111111110000",  
"000111111111000",  
"001111111111100",  
"0111001111100110",  
"01100001110000110",  
"01100001110000110",  
"01100001110000110",  
"0111001111100110",  
"011111111111110",  
"011111111111110",  
"011111111111110",  
"0111101111011100",  
"0011000110001100",  
"0000000000000000")
```

);

```
    constant ghost_up2 : ram_graph := (  
"0000000000000000",  
"0000011111110000",  
"0000111111110000",  
"000111111111000",  
"001111111111100",  
"0111001111100110",  
"01100001110000110",  
"01100001110000110",  
"01100001110000110",  
"0111001111100110",  
"011111111111110",  
"011111111111110",  
"011111111111110",  
"011111111111110",  
"0011110111101110",  
"0001100011000110",  
"0000000000000000")
```

);

```
    constant ghost_up3 : ram_graph := (  
"0000000000000000",  
"0000000000000000",  
"0000000000000000",  
"0000000000000000",  
"0000000000000000",  
"0000000000000000")
```

```
"00001100000110000",
"00001100000110000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000"
```

```
);
```

```
constant ghost_up4 : ram_graph := (
```

```
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00010010001001000",
"00011110001111000",
"00011110001111000",
"00001100000110000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000"
```

```
);
```

```
constant ghost_vulnerable1 : ram_graph := (
```

```
"00000000000000000",
"00000111111100000",
"00001111111100000",
"00011111111100000",
"00111111111100000",
"011111111111110",
"01110011111001110",
"01110011111001110",
"011111111111110",
"011111111111110",
"0111011101101110",
"0110101010101010",
"01011101110111010",
"011111111111110"
```

```
"01111011110111100",
"00110001100011000",
"00000000000000000"
```

```
);
```

```
constant ghost_vulnerable2 : ram_graph := (
"00000000000000000",
"00000111111100000",
"00001111111100000",
"00011111111100000",
"00111111111100000",
"01111111111100000",
"01110011111001110",
"01110011111001110",
"01111111111100000",
"01111111111100000",
"01110111011101110",
"01101010101010101",
"01011101110111010",
"01111111111100000",
"00111101111011110",
"00011000110001100",
"00000000000000000"
```

```
);
```

```
constant zero : ram_graph := (
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000",
"00000000000000000"
```

```
);
```

```
begin
with pac_N_17 select
```

```

pac_fb1 <= pac_man_0(to_integer(pac_v_17))(to_integer(pac_h_17)) when "0000000000000000",
pac_man_right1(to_integer(pac_v_17))(to_integer(pac_h_17)) when "0000000000000001",
pac_man_right2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000000010",
pac_man_down1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000000011",
pac_man_down2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000000100",
pac_man_left1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000000101",
pac_man_left2(to_integer(pac_v_17))(to_integer(pac_h_17))when
"0000000000000110",
pac_man_up1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000000111",
pac_man_up2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001000",
pac_die1(to_integer(pac_v_17))(to_integer(pac_h_17))when
"0000000000001001",
pac_die2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001010",
pac_die3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001011",
zero(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001100",
ghost_right1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001001",
ghost_right2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001010",
ghost_down1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001011",
ghost_down2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001100",
ghost_left1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001101",
ghost_left2(to_integer(pac_v_17))(to_integer(pac_h_17))when
"0000000000001110",
ghost_up1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001111",
ghost_up2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001000",
ghost_vulnerable1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001100",
ghost_vulnerable2(to_integer(pac_v_17))(to_integer(pac_h_17))when
"0000000000001101",
ghost_vulnerable1(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000011010",
ghost_vulnerable2(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000011011",
'0' when others;

```

```

with pac_N_17 select
pac_fb2 <= ghost_right3(to_integer(pac_v_17))(to_integer(pac_h_17)) when "0000000000001001",
      ghost_right3(to_integer(pac_v_17))(to_integer(pac_h_17)) when "0000000000001010",
      ghost_right3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010100",
      ghost_down3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001011",
      ghost_down3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001100",
      ghost_down3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010101",
      ghost_left3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001101",
      ghost_left3(to_integer(pac_v_17))(to_integer(pac_h_17))when
"0000000000001110",
      ghost_left3(to_integer(pac_v_17))(to_integer(pac_h_17))when
"00000000000010110",
      ghost_up3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001111",
      ghost_up3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010000",
      ghost_up3(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010111",
      '0' when others;

with pac_N_17 select
pac_fb3 <= ghost_right4(to_integer(pac_v_17))(to_integer(pac_h_17)) when "0000000000001001",
      ghost_right4(to_integer(pac_v_17))(to_integer(pac_h_17)) when "0000000000001010",
      ghost_right4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010100",
      ghost_down4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001011",
      ghost_down4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001100",
      ghost_down4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010101",
      ghost_left4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001101",
      ghost_left4(to_integer(pac_v_17))(to_integer(pac_h_17))when
"0000000000001110",
      ghost_left4(to_integer(pac_v_17))(to_integer(pac_h_17))when
"00000000000010110",
      ghost_up4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"0000000000001111",
      ghost_up4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010000",
      ghost_up4(to_integer(pac_v_17))(to_integer(pac_h_17)) when
"00000000000010111",
      '0' when others;

with pac_N_17 select
ghost_state <= "01" when "00000000000011000",
      "01" when "00000000000011001",
      "10" when "00000000000011010",

```

"10" when "0000000000011011",  
"00" when others;

end rtl;

#### 4.7 map\_graph.vhd

```
library ieee;
use ieee.std_logic_1164.all;
use ieee.numeric_std.all;
use ieee.std_logic_unsigned.all;

entity map_graph is
port(
map_v_17,
map_h_17 : in unsigned(15 downto 0);
map_state_17 : in std_logic_vector(5 downto 0);
map_fb : out std_logic
);
end map_graph;

architecture rtl of map_graph is
type ram_map is array(0 to 8) of
    unsigned(0 to 8);

    constant map_graph_000000 : ram_map := (
"000111111",
"001111111",
"011000000",
"110000000",
"110000111",
"110001000",
"110010000",
"110010000",
"110010000"
);

    constant map_graph_000001 : ram_map := (
"111111111",
"111111111",
"000000000",
"000000000",
"111111111",
"000000000",
"000000000",
"000000000",
"000000000"
);

    constant map_graph_000010 : ram_map := (
"111111111",
```

```
"111111111",
"000000000",
"000000000",
"111000000",
"000100000",
"000010000",
"000010000",
"000010000"
);
```

```
constant map_graph_000011 : ram_map := (
"111111111",
"111111111",
"000000000",
"000000000",
"000000111",
"000001000",
"000010000",
"000010000",
"000010000"
);
```

```
constant map_graph_000100 : ram_map := (
"111111000",
"111111100",
"000000110",
"000000011",
"111000011",
"000100011",
"000010011",
"000010011",
"000010011"
);
```

```
constant map_graph_000101 : ram_map := (
"110010000",
"110010000",
"110010000",
"110010000",
"110010000",
"110010000",
"110010000",
"110010000",
"110010000"
);
```

```
constant map_graph_000110 : ram_map := (
"000010000",
"000010000",
"000010000",
"000010000",
"000010000",
```

```
"000010000",  
"000010000",  
"000010000",  
"000010000"  
);
```

```
constant map_graph_000111 : ram_map := (  
"000010011",  
"000010011",  
"000010011",  
"000010011",  
"000010011",  
"000010011",  
"000010011",  
"000010011",  
"000010011",  
"000010011"  
);
```

```
constant map_graph_001000 : ram_map := (  
"000000000",  
"000000000",  
"000000000",  
"000000000",  
"000000111",  
"000001000",  
"000010000",  
"000010000",  
"000010000"  
);
```

```
constant map_graph_001001 : ram_map := (  
"000000000",  
"000000000",  
"000000000",  
"000000000",  
"111111111",  
"000000000",  
"000000000",  
"000000000",  
"000000000"  
);
```

```
constant map_graph_001010 : ram_map := (  
"000000000",  
"000000000",  
"000000000",  
"000000000",  
"111000000",  
"000100000",  
"000010000",  
"000010000",  
"000010000"  
);
```



```
);
```

```
    constant map_graph_001011 : ram_map := (  
"000010000",  
"000010000",  
"000010000",  
"000001000",  
"000000111",  
"000000000",  
"000000000",  
"000000000",  
"000000000"  
);
```

```
    constant map_graph_001100 : ram_map := (  
"000010000",  
"000010000",  
"000010000",  
"000100000",  
"111000000",  
"000000000",  
"000000000",  
"000000000",  
"000000000"  
);
```

```
    constant map_graph_001101 : ram_map := (  
"110010000",  
"110010000",  
"110010000",  
"110001000",  
"110000111",  
"110000000",  
"010000000",  
"001111111",  
"000111111"  
);
```

```
    constant map_graph_001110 : ram_map := (  
"000000000",  
"000000000",  
"000000000",  
"000000000",  
"111111111",  
"000000000",  
"000000000",  
"111111111",  
"111111111"  
);
```

```
    constant map_graph_001111 : ram_map := (  

```



```
"111110000",  
"000010000",  
"000010000",  
"000010000",  
"100010000"  
);
```

```
constant map_graph_010100 : ram_map := (  
"000010001",  
"000010000",  
"000010000",  
"000010000",  
"000011111",  
"000000000",  
"000000000",  
"000000000",  
"000000000"  
);
```

```
constant map_graph_010101 : ram_map := (  
"100010000",  
"000010000",  
"000010000",  
"000010000",  
"111110000",  
"000000000",  
"000000000",  
"000000000",  
"000000000"  
);
```

```
constant map_graph_010110 : ram_map := (  
"110010000",  
"110010000",  
"110010000",  
"110001000",  
"110000111",  
"110000000",  
"110000000",  
"110000000",  
"110000000"  
);
```

```
constant map_graph_010111 : ram_map := (  
"000010011",  
"000010011",  
"000010011",  
"000100011",  
"111000011",  
"000000011",  
"000000011",  
"000000011",
```

```
"000000011"
```

```
);
```

```
constant map_graph_011000 : ram_map := (
```

```
"110000000",
```

```
"110000000",
```

```
"110000000",
```

```
"110000000",
```

```
"110000111",
```

```
"110001000",
```

```
"110010000",
```

```
"110010000",
```

```
"110010000"
```

```
);
```

```
constant map_graph_011001 : ram_map := (
```

```
"000000011",
```

```
"000000011",
```

```
"000000011",
```

```
"000000011",
```

```
"111000011",
```

```
"000100011",
```

```
"000010011",
```

```
"000010011",
```

```
"000010011"
```

```
);
```

```
constant map_graph_011101 : ram_map := (
```

```
"000000000",
```

```
"000000000",
```

```
"000000000",
```

```
"000000000",
```

```
"111000000",
```

```
"000100000",
```

```
"000010000",
```

```
"100010000",
```

```
"110010000"
```

```
);
```

```
constant map_graph_011110 : ram_map := (
```

```
"000000000",
```

```
"000000000",
```

```
"000000000",
```

```
"000000000",
```

```
"000000111",
```

```
"000001000",
```

```
"000010000",
```

```
"000010001",
```

```
"000010011"
```

```
);

constant map_graph_011111 : ram_map := (
"110010000",
"100010000",
"000010000",
"000100000",
"111000000",
"000000000",
"000000000",
"000000000",
"000000000"
);
```

```
constant map_graph_100000 : ram_map := (
"000010011",
"100010001",
"000010000",
"000001000",
"000000111",
"000000000",
"000000000",
"000000000",
"000000000"
);
```

```
);
--*****number
leter*****
--
*****
*****
```

```
constant map_graph_100001 : ram_map := (
"000000000",
"001111100",
"011000110",
"011000000",
"001111000",
"000000110",
"011000110",
"000111100",
"000000000"
);
```

```
constant map_graph_100010 : ram_map := (
"000000000",
"000111100",
"001100110",
);
```

```
"011000000",  
"011000000",  
"011000000",  
"001100110",  
"000111100",  
"000000000"
```

```
);
```

```
constant map_graph_100011 : ram_map := (  
"000000000",  
"001111100",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"001111100",  
"000000000"
```

```
);
```

```
constant map_graph_100100 : ram_map := (  
"000000000",  
"011111100",  
"011000110",  
"011000110",  
"011001110",  
"011111000",  
"011011100",  
"011001110",  
"000000000"
```

```
);
```

```
constant map_graph_100101 : ram_map := (  
"000000000",  
"011111110",  
"011000000",  
"011000000",  
"011111100",  
"011000000",  
"011000000",  
"011111110",  
"000000000"
```

```
);
```

```
constant map_graph_110000 : ram_map := (  
"000000000",  
"011110000",  
"001100000",  
"001100000",  
"001100000",  
"001100000",  
"001100000",  
"001100000",  
"011111110",  
"000000000"
```

```
);
```

```
constant map_graph_110001 : ram_map := (  
"000000000",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"001101100",  
"000111000",  
"000000000"
```

```
);
```

```
--  
*****number*****  
*****
```

```
--  
*****  
*****
```

```
constant map_graph_100110 : ram_map := (  
"000000000",  
"000111000",  
"001001100",  
"011000110",  
"011000110",  
"011000110",  
"001100100",  
"000111000",  
"000000000"
```

```
);
```

```
constant map_graph_100111 : ram_map := (  
"000000000",  
"000011000",  
"000111000",  
"000011000",
```





```
"00000000",  
"011111110",  
"011000000",  
"011000000",  
"011111110",  
"000001110",  
"000001110",  
"011111110",  
"000000000"
```

```
);
```

```
constant map_graph_101100 : ram_map := (  
"000000000",  
"001111110",  
"011000110",  
"011000000",  
"011111110",  
"011000110",  
"011000110",  
"011000110",  
"001111110",  
"000000000"
```

```
);
```

```
constant map_graph_101101 : ram_map := (  
"000000000",  
"011111110",  
"000000110",  
"000000110",  
"000001100",  
"000001100",  
"000001100",  
"000001100",  
"000001100",  
"000000000"
```

```
);
```

```
constant map_graph_101110 : ram_map := (  
"000000000",  
"001111110",  
"011000110",  
"011000110",  
"001111110",  
"011000110",  
"011000110",  
"001111110",  
"000000000"
```

```
);

constant map_graph_101111 : ram_map := (
"000000000",
"001111100",
"011000110",
"011000110",
"001111110",
"000000110",
"011000110",
"001111100",
"000000000"
);
```

```
);
--
*****pea*****
*****
--
*****
*****
```

```
constant map_graph_011010 : ram_map := (
"000000000",
"000000000",
"000000000",
"000111000",
"000111000",
"000111000",
"000000000",
"000000000",
"000000000"
);
```

```
constant map_graph_011011 : ram_map := (
"001111100",
"011111110",
"111111111",
"111111111",
"111111111",
"111111111",
"111111111",
"111111111",
"011111110",
"001111100"
);
```

```
constant map_graph_011100 : ram_map := (
"000000000",
"000000000",
"000000000",
"000000000",
"000000000",
"000000000",
"000000000"
);
```

```

"000000000",
"000000000",
"000000000"
);
--
*****pac*****
*****

--
*****
*****

type pac_graph is array(0 to 16) of
    unsigned(0 to 16);
    constant pac_man_lives : pac_graph := (
"00000000000000000",
"0000001111100000",
"0000111111110000",
"0001111111111000",
"0011111111111100",
"0111111111111110",
"0111111111111110",
"0000111111111110",
"0000000111111110",
"0000000000111110",
"0000000111111110",
"0000111111111110",
"0111111111111100",
"0011111111111100",
"0001111111111000",
"0000111111111000",
"0000001111100000",
"0000000000000000"

);
--
*****map_start_state*****
*****

--
*****
*****

type map_start_state is array(0 to 8) of
    unsigned(0 to 8);
    constant map_state_start_110011 : map_start_state := (
"000000000",
"001111000",
"001111100",
"001111110",
"001111111",
"001111110",
"001111100",
"001111000",
"001110000"

```

```
);  
    constant map_state_start_110100 : map_start_state := (  
"000000000",  
"011111000",  
"011000110",  
"011000110",  
"011111000",  
"011000000",  
"011000000",  
"011000000",  
"000000000"
```

```
);  
    constant map_state_start_110101 : map_start_state := (  
"000000000",  
"001111100",  
"011000110",  
"011000110",  
"011111110",  
"011000110",  
"011000110",  
"011000110",  
"000000000"
```

```
);  
    constant map_state_start_110110 : map_start_state := (  
"000000000",  
"000111100",  
"001100110",  
"011000000",  
"011001110",  
"011001110",  
"001100110",  
"000111100",  
"000000000"
```

```
);  
    constant map_state_start_110111 : map_start_state := (  
"000000000",  
"110000011",  
"111000111",  
"111000111",  
"111101111",  
"111101111",  
"110111011",  
"110111011",
```

```
"000000000"
```

```
);
```

```
    constant map_state_start_111000 : map_start_state := (  
"000000000",  
"011000110",  
"011000110",  
"001101100",  
"000111000",  
"000111000",  
"000111000",  
"000111000",  
"000111000",  
"000000000"
```

```
);
```

```
    constant map_state_start_111001 : map_start_state := (  
"000000000",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"011000110",  
"001111100",  
"000000000"
```

```
);
```

```
begin
```

```
with map_state_17 select
```

```
map_fb <= map_graph_000000(to_integer(map_v_17))(to_integer(map_h_17)) when "000000",  
    map_graph_000001(to_integer(map_v_17))(to_integer(map_h_17)) when "000001",  
    map_graph_000010(to_integer(map_v_17))(to_integer(map_h_17)) when "000010",  
    map_graph_000011(to_integer(map_v_17))(to_integer(map_h_17)) when "000011",  
    map_graph_000100(to_integer(map_v_17))(to_integer(map_h_17)) when "000100",  
    map_graph_000101(to_integer(map_v_17))(to_integer(map_h_17)) when  
"000101",  
    map_graph_000110(to_integer(map_v_17))(to_integer(map_h_17)) when  
"000110",  
    map_graph_000111(to_integer(map_v_17))(to_integer(map_h_17)) when  
"000111",  
    map_graph_001000(to_integer(map_v_17))(to_integer(map_h_17)) when  
"001000",  
    map_graph_001001(to_integer(map_v_17))(to_integer(map_h_17)) when  
"001001",  
    map_graph_001010(to_integer(map_v_17))(to_integer(map_h_17)) when  
"001010",
```

```
map_graph_001011(to_integer(map_v_17))(to_integer(map_h_17)) when
"001011",
map_graph_001100(to_integer(map_v_17))(to_integer(map_h_17)) when
"001100",
map_graph_001101(to_integer(map_v_17))(to_integer(map_h_17)) when
"001101",
map_graph_001110(to_integer(map_v_17))(to_integer(map_h_17)) when
"001110",
map_graph_001111(to_integer(map_v_17))(to_integer(map_h_17)) when
"001111",
map_graph_010000(to_integer(map_v_17))(to_integer(map_h_17)) when
"010000",
map_graph_010001(to_integer(map_v_17))(to_integer(map_h_17)) when
"010001",
map_graph_010010(to_integer(map_v_17))(to_integer(map_h_17)) when
"010010",
map_graph_010011(to_integer(map_v_17))(to_integer(map_h_17)) when
"010011",
map_graph_010100(to_integer(map_v_17))(to_integer(map_h_17)) when
"010100",
map_graph_010101(to_integer(map_v_17))(to_integer(map_h_17)) when
"010101",
map_graph_010110(to_integer(map_v_17))(to_integer(map_h_17)) when
"010110",
map_graph_010111(to_integer(map_v_17))(to_integer(map_h_17)) when
"010111",
map_graph_011000(to_integer(map_v_17))(to_integer(map_h_17)) when
"011000",
map_graph_011001(to_integer(map_v_17))(to_integer(map_h_17)) when
"011001",
map_graph_011101(to_integer(map_v_17))(to_integer(map_h_17)) when
"011101",
map_graph_011110(to_integer(map_v_17))(to_integer(map_h_17)) when
"011110",
map_graph_011111(to_integer(map_v_17))(to_integer(map_h_17)) when
"011111",
map_graph_100000(to_integer(map_v_17))(to_integer(map_h_17)) when
"100000",
--
*****score*****
*****
map_graph_100001(to_integer(map_v_17))(to_integer(map_h_17)) when
"100001",
map_graph_100010(to_integer(map_v_17))(to_integer(map_h_17)) when
"100010",
map_graph_100011(to_integer(map_v_17))(to_integer(map_h_17)) when
"100011",
map_graph_100100(to_integer(map_v_17))(to_integer(map_h_17)) when
"100100",
map_graph_100101(to_integer(map_v_17))(to_integer(map_h_17)) when
"100101",
```

```

map_graph_110000(to_integer(map_v_17))(to_integer(map_h_17)) when
"110000",
map_graph_110001(to_integer(map_v_17))(to_integer(map_h_17)) when
"110001",
--
*****number*****
*****
map_graph_100110(to_integer(map_v_17))(to_integer(map_h_17)) when
"100110",
map_graph_100111(to_integer(map_v_17))(to_integer(map_h_17)) when
"100111",
map_graph_101000(to_integer(map_v_17))(to_integer(map_h_17)) when
"101000",
map_graph_101001(to_integer(map_v_17))(to_integer(map_h_17)) when
"101001",
map_graph_101010(to_integer(map_v_17))(to_integer(map_h_17)) when
"101010",
map_graph_101011(to_integer(map_v_17))(to_integer(map_h_17)) when
"101011",
map_graph_101100(to_integer(map_v_17))(to_integer(map_h_17)) when
"101100",
map_graph_101101(to_integer(map_v_17))(to_integer(map_h_17)) when
"101101",
map_graph_101110(to_integer(map_v_17))(to_integer(map_h_17)) when
"101110",
map_graph_101111(to_integer(map_v_17))(to_integer(map_h_17)) when
"101111",
--
*****pac_lives*****
*****
pac_man_lives(to_integer(map_v_17))(to_integer(map_h_17)) when "110010",
--
*****
*****
map_graph_011010(to_integer(map_v_17))(to_integer(map_h_17)) when
"011010",
map_graph_011011(to_integer(map_v_17))(to_integer(map_h_17)) when
"011011",
map_graph_011100(to_integer(map_v_17))(to_integer(map_h_17)) when
"011100",
--
*****game_start_state*****
***
map_state_start_110011(to_integer(map_v_17))(to_integer(map_h_17)) when "110011",
map_state_start_110100(to_integer(map_v_17))(to_integer(map_h_17)) when
"110100",
map_state_start_110101(to_integer(map_v_17))(to_integer(map_h_17)) when
"110101",
--
*****game_over_state*****
***
map_state_start_110110(to_integer(map_v_17))(to_integer(map_h_17)) when "110110",

```

```

map_state_start_110111(to_integer(map_v_17))(to_integer(map_h_17)) when
"110111",
map_state_start_111000(to_integer(map_v_17))(to_integer(map_h_17)) when
"111000",
map_state_start_111001(to_integer(map_v_17))(to_integer(map_h_17)) when
"111001",
'0' when others;
end rtl;

```

#### 4.8 VGA\_raster.vhd

```

-----
--
-- Simple VGA raster display
--
-- Stephen A. Edwards
-- sedwards@cs.columbia.edu
--
-----
library ieee;
use ieee.std_logic_1164.all;
use ieee.numeric_std.all;
use ieee.std_logic_unsigned.all;

entity de2_vga_raster is

port (
  reset_n : in std_logic;
    reset_n_colour :out std_logic;
  clk : in std_logic;          -- Should be 25.125 MHz

  VGA_CLK,          -- Clock
  VGA_HS,           -- H_SYNC
  VGA_VS,           -- V_SYNC
  VGA_BLANK,        -- BLANK
  VGA_SYNC : out std_logic;    -- SYNC

  readd   : in std_logic;
  writee  : in std_logic;
  chipselect : in std_logic;
  address  : in std_logic_vector(4 downto 0);
  readdata : out std_logic_vector(15 downto 0);
  writedata : in std_logic_vector(15 downto 0);

  rectangle : out std_logic_vector(3 downto 0);  --VGA_colour
  vga_hblank, vga_vblank :out std_logic;

  pac_h_17,          --pac-graph
  pac_v_17,
  pac_N_17 : out unsigned (15 downto 0);

```



```
map_v_17,          --map_graph
map_h_17 :out unsigned(15 downto 0);
map_state_17 : out std_logic_vector(5 downto 0)
```

```
);
```

```
end de2_vga_raster;
```

```
architecture rtl of de2_vga_raster is
```

```
-- Video parameters
```

```
constant HTOTAL    : integer := 800;
constant HSYNC     : integer := 96;
constant HBACK_PORCH : integer := 48;
constant HACTIVE   : integer := 640;
constant HFRONT_PORCH : integer := 16;
```

```
constant VTOTAL    : integer := 525;
constant VSYNC     : integer := 2;
constant VBACK_PORCH : integer := 33;
constant VACTIVE   : integer := 480;
constant VFRONT_PORCH : integer := 10;
```

```
constant RECTANGLE_HSTART : integer := 100;
constant RECTANGLE_HEND   : integer := 540;
constant RECTANGLE_VSTART : integer := 100;
constant RECTANGLE_VEND   : integer := 380;
```

```
-- Signals for the video controller
```

```
signal Hcount : unsigned(15 downto 0) := "0000000000000000"; -- Horizontal position (0-800)
signal Vcount : unsigned(15 downto 0) := "0000000000000000"; -- Vertical position (0-524)
signal EndOfLine, EndOfField : std_logic;
```

```
signal vga_hsync, vga_vsync : std_logic; -- Sync. signals
```

```
-- type ram_type is array(15 downto 0) of
```

```
--   std_logic_vector(15 downto 0);
```

```
--signal RAM : ram_type;
```

```
signal ram_address : unsigned(4 downto 0);
```

```
signal pac_h_axis, pac_v_axis : unsigned(15 downto 0) := "0000000100100000";
```

```
signal pac_2_h_axis, pac_2_v_axis : unsigned(15 downto 0) := "0000000100110000";
```

```
signal ghost1_h_axis, ghost1_v_axis:unsigned(15 downto 0) := "0000000101100000";
```

```
signal ghost2_h_axis, ghost2_v_axis:unsigned(15 downto 0) := "0000000110000000";
```

```
signal ghost3_h_axis, ghost3_v_axis:unsigned(15 downto 0) := "0000000110100000";
```

```
signal ghost1_N,ghost2_N,ghost3_N : unsigned(15 downto 0) := "0000000000001001";
```

```
signal pac_N : unsigned(15 downto 0) := "0000000000000011";
```

```
signal pac_N_2 : unsigned(15 downto 0) := "0000000000000011";
```

```
signal state_address : unsigned(15 downto 0) := "0000000000000000";
```

```
signal over_state_address : unsigned(15 downto 0) := "0000000000000000";
signal game_state : std_logic_vector(5 downto 0) := "000000";
signal read_N : unsigned(15 downto 0);
```

```
type ram_type is array(0 to 886) of std_logic_vector(5 downto 0); --map buffer for game state
signal map_state : ram_type := (
```

```
--
105*****105*****
*****
--
****203*****212*****221*****230*****239*****248*****257*****266*****275*****2
84*****293*****302*****311*****320**

"000000","000001","000001","000001","000001","000001","000001","000001","000001","000001","0000
01","000001","000001","000010",
--
****329*****338*****347*****356*****365*****374*****383*****392*****401*****4
10*****419*****428*****437*****446*

"000011","000001","000001","000001","000001","000001","000001","000001","000001","000001","0000
01","000001","000001","000100",
--
114*****114*****
*****
--
****203*****212*****221*****230*****239*****248*****257*****266*****275*****2
84*****293*****302*****311*****320**

"000101","011010","011010","011010","011010","011010","011010","011010","011010","011010","0110
10","011010","011010","000110",
--
****329*****338*****347*****356*****365*****374*****383*****392*****401*****4
10*****419*****428*****437*****446*

"000110","011010","011010","011010","011010","011010","011010","011010","011010","011010","0110
10","011010","011010","000111",
--
123*****114*****
*****
--
****203*****212*****221*****230*****239*****248*****257*****266*****275*****2
84*****293*****302*****311*****320**

"000101","011010","001000","001001","001001","001010","011010","001000","001001","001001","0010
01","001010","011010","000110",
--
****329*****338*****347*****356*****365*****374*****383*****392*****401*****4
10*****419*****428*****437*****446*

"000110","011010","001000","001001","001001","001001","001010","011010","001000","001001","0010
01","001010","011010","000111",
```

--  
132\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*

--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"000101","011011","000110","011100","011100","000110","011010","000110","011100","011100","0111  
00","000110","011010","000110",

--  
\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
10\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

"000110","011010","000110","011100","011100","011100","000110","011010","000110","011100","0111  
00","000110","011011","000111",

--  
141\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*

--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"000101","011010","001011","001001","001001","001100","011010","001011","001001","001001","0010  
01","001100","011010","001011",

--  
\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
10\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

"001100","011010","001011","001001","001001","001001","001100","011010","001011","001001","0010  
01","001100","011010","000111",

--  
150\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*

--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"000101","011010","011010","011010","011010","011010","011010","011010","011010","011010","0110  
10","011010","011010","011010",

--  
\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
10\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

"011010","011010","011010","011010","011010","011010","011010","011010","011010","011010","0110  
10","011010","011010","000111",

--  
159\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*

--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"000101","011010","001000","001001","001001","001010","011010","001000","001010","011010","001000","001001","001001",

"001001","001001","001001","001010","011010","001000","001010","011010","001000","001001","001001","001010","011010","000111",

--

168\*\*\*\*\*114\*\*\*\*\*

--

\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*284\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"000101","011010","001011","001001","001001","001100","011010","000110","000110","011010","001011","001001","001001","001010",

--

\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

"001000","001001","001001","001100","011010","000110","000110","011010","001011","001001","001001","001010","011010","000111",

--

177\*\*\*\*\*114\*\*\*\*\*

--

\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*284\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"000101","011010","011010","011010","011010","011010","011010","000110","000110","011010","011010","011010","011010","000110",

--

\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

"000110","011010","011010","011010","011010","000110","000110","011010","011010","011010","011010","011010","011010","000111",

--

186\*\*\*\*\*114\*\*\*\*\*

--

\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*284\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"001101","001110","001110","001110","001110","011101","011010","000110","001011","001001","001001","001010","011100","000110",

--

\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

"000110","011100","001000","001001","001001","001100","000110","011010","011110","001110","001110","001110","001111",

--  
195\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*  
--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*  
  
"011100","011100","011100","011100","011100","000101","011010","000110","001000","001001","0010  
01","001100","011100","001011",  
--  
\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
10\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*  
  
"001100","011100","001011","001001","001001","001010","000110","011010","000111","011100","0111  
00","011100","011100","011100",  
--  
204\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*  
--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*  
  
"011100","011100","011100","011100","011100","000101","011010","000110","000110","011100","0111  
00","011100","011100","011100",  
--  
\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
10\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*  
  
"011100","011100","011100","011100","011100","000110","000110","011010","000111","011100","0111  
00","011100","011100","011100",  
--  
213\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*  
--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*  
  
"011100","011100","011100","011100","011100","000101","011010","000110","000110","011100","0100  
00","001110","001110","010001",  
--  
\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
10\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*  
  
"010010","001110","001110","010011","011100","000110","000110","011010","000111","011100","0111  
00","011100","011100","011100",  
--  
222\*\*\*\*\*114\*\*\*\*\*  
\*\*\*\*\*  
--  
\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

"000001","000001","000001","000001","000001","011111","011010","001011","001100","011100","000111","011100","011100","011100",

--

\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

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231\*\*\*\*\*114\*\*\*\*\*

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\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

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240\*\*\*\*\*114\*\*\*\*\*

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\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*284\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*

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\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

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249\*\*\*\*\*114\*\*\*\*\*

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\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

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258\*\*\*\*\*114\*\*\*\*\*  
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\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*410\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

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276\*\*\*\*\*114\*\*\*\*\*  
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321\*\*\*\*\*114\*\*\*\*\*  
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84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*  
  
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339\*\*\*\*\*114\*\*\*\*\*  
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348\*\*\*\*\*114\*\*\*\*\*  
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84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*







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159\*\*\*\*\*114\*\*\*\*\*  
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10\*\*\*\*\*419\*\*\*\*\*428\*\*\*\*\*437\*\*\*\*\*446\*

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195\*\*\*\*\*114\*\*\*\*\*

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204\*\*\*\*\*114\*\*\*\*\*

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213\*\*\*\*\*114\*\*\*\*\*

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222\*\*\*\*\*114\*\*\*\*\*  
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231\*\*\*\*\*114\*\*\*\*\*  
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84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*  
  
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240\*\*\*\*\*114\*\*\*\*\*  
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249\*\*\*\*\*114\*\*\*\*\*  
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267\*\*\*\*\*114\*\*\*\*\*

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276\*\*\*\*\*114\*\*\*\*\*

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285\*\*\*\*\*114\*\*\*\*\*  
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\*\*\*\*203\*\*\*\*\*212\*\*\*\*\*221\*\*\*\*\*230\*\*\*\*\*239\*\*\*\*\*248\*\*\*\*\*257\*\*\*\*\*266\*\*\*\*\*275\*\*\*\*\*2  
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\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
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294\*\*\*\*\*114\*\*\*\*\*  
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84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*  
  
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84\*\*\*\*\*293\*\*\*\*\*302\*\*\*\*\*311\*\*\*\*\*320\*\*  
  
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\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
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\*\*\*\*329\*\*\*\*\*338\*\*\*\*\*347\*\*\*\*\*356\*\*\*\*\*365\*\*\*\*\*374\*\*\*\*\*383\*\*\*\*\*392\*\*\*\*\*401\*\*\*\*\*4  
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375\*\*\*\*\*114\*\*\*\*\*  
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****329*****338*****347*****356*****365*****374*****383*****392*****401*****4
10*****419*****428*****437*****446*

"001110","001110","001110","001110","001110","001110","001110","001110","001110","001110","001110","001110","001110","001110",
"001110","001110","001111",

"100001","100010","100011","100100","100101",--score
"100110","100110","100110","100110", --number
"110000","100101","110001","100101","110000","100111", --level
"110010","110010", --lives
"110010","110010" --lives_2
);
type ram_type_1 is array(0 to 11) of std_logic_vector(5 downto 0); --map buffer for game start state
signal map_state_start :ram_type_1:=(
"110011","100111","011100","110100","110101","100010",
"011100","101000","011100","110100","110101","100010"
);

type ram_type_2 is array(0 to 23) of std_logic_vector(5 downto 0); --map buffer for game over state
signal map_state_over :ram_type_2:=(
"110110","110101","110111","100101","011100", --GAME_
"100011","110001","100101","100100", --OVER
"111000","100011","111001","100100","011100", --YOUR_
"100001","100010","100011","100100","100101","011100", --SCORE_
"100110","100110","100110","100110"
);

begin
--
*****
--
*****
ram_address <= unsigned(address);
reset_n_colour <= reset_n;

process(clk)
begin
if rising_edge(clk) then
if reset_n = '0' then
pac_h_axis <= (others => '0');
pac_v_axis <= (others => '0');
elsif chipselect = '1' then
if writee = '1' then
case ram_address is
when "00000" =>

```

```

        pac_h_axis <= unsigned(writedata);
    when "00001" =>
        pac_v_axis <= unsigned(writedata);
    when "00010" =>
        pac_N <= unsigned(writedata);
when "00011" =>
    ghost1_h_axis <= unsigned(writedata);
    when "00100" =>
        ghost1_v_axis <= unsigned(writedata);
    when "00101" =>
        ghost1_N <= unsigned(writedata);
    when "00110" =>
        ghost2_h_axis <= unsigned(writedata);
    when "00111" =>
        ghost2_v_axis <= unsigned(writedata);
    when "01000" =>
        ghost2_N <= unsigned(writedata);
when "01001" =>
    ghost3_h_axis <= unsigned(writedata);
    when "01010" =>
        ghost3_v_axis <= unsigned(writedata);
    when "01011" =>
        ghost3_N <= unsigned(writedata);
    when "01100" =>
        state_address <= unsigned(writedata);
    when "01101" =>
        map_state(to_integer(state_address)) <= writedata(5 downto 0);
    when "01110" =>
        game_state <= writedata(5 downto 0);
        map_state(0 to 867) <= map_initial_state(0 to 867);
    when "01111" =>
        read_N <= unsigned(writedata);
    when "10000" =>
        pac_2_h_axis <= unsigned(writedata);
    when "10001" =>
        pac_2_v_axis <= unsigned(writedata);
    when "10010" =>
        map_state_start(to_integer(state_address)) <= writedata(5 downto 0);
    when "10011" =>
        pac_N_2 <= unsigned(writedata);
    when "10100" =>
        over_state_address <= unsigned(writedata);
    when "10101" =>
        map_state_over(to_integer(over_state_address)) <= writedata(5 downto 0);
    when others =>
        read_N <= unsigned(writedata);
    end case;
    elsif readd = '1' then
readdata(5 downto 0) <= map_state(to_integer(read_N));
        end if;
    end if;
end if;

```

```
end process;
```

```
-- Horizontal and vertical counters
```

```
HCounter : process (clk)
```

```
begin
```

```
if rising_edge(clk) then
```

```
if reset_n = '0' then
```

```
    Hcount <= (others => '0');
```

```
elseif EndOfLine = '1' then
```

```
    Hcount <= (others => '0');
```

```
else
```

```
    Hcount <= Hcount + 1;
```

```
end if;
```

```
end if;
```

```
end process HCounter;
```

```
EndOfLine <= '1' when Hcount = HTOTAL - 1 else '0';
```

```
VCounter: process (clk)
```

```
begin
```

```
if rising_edge(clk) then
```

```
if reset_n = '0' then
```

```
    Vcount <= (others => '0');
```

```
elseif EndOfLine = '1' then
```

```
if EndOfField = '1' then
```

```
    Vcount <= (others => '0');
```

```
else
```

```
    Vcount <= Vcount + 1;
```

```
end if;
```

```
end if;
```

```
end if;
```

```
end process VCounter;
```

```
EndOfField <= '1' when Vcount = VTOTAL - 1 else '0';
```

```
-- State machines to generate HSYNC, VSYNC, HBLANK, and VBLANK
```

```
HSyncGen : process (clk)
```

```
begin
```

```
if rising_edge(clk) then
```

```
if reset_n = '0' or EndOfLine = '1' then
```

```
    vga_hsync <= '1';
```

```
elseif Hcount = HSYNC - 1 then
```

```
    vga_hsync <= '0';
```

```
end if;
```

```
end if;
```

```
end process HSyncGen;
```

```

HBlankGen : process (clk)
begin
  if rising_edge(clk) then
    if reset_n = '0' then
      vga_hblank <= '1';
    elsif Hcount = HSYNC + HBACK_PORCH then
      vga_hblank <= '0';
    elsif Hcount = HSYNC + HBACK_PORCH + HACTIVE then
      vga_hblank <= '1';
    end if;
  end if;
end process HBlankGen;

```

```

VSyncGen : process (clk)
begin
  if rising_edge(clk) then
    if reset_n = '0' then
      vga_vsync <= '1';
    elsif EndOfLine = '1' then
      if EndOfField = '1' then
        vga_vsync <= '1';
      elsif Vcount = VSYNC - 1 then
        vga_vsync <= '0';
      end if;
    end if;
  end if;
end process VSyncGen;

```

```

VBlankGen : process (clk)
begin
  if rising_edge(clk) then
    if reset_n = '0' then
      vga_vblank <= '1';
    elsif EndOfLine = '1' then
      if Vcount = VSYNC + VBACK_PORCH - 1 then
        vga_vblank <= '0';
      elsif Vcount = VSYNC + VBACK_PORCH + VACTIVE - 1 then
        vga_vblank <= '1';
      end if;
    end if;
  end if;
end process VBlankGen;

```

```

--
*****
*****

```

```

--
*****level_state*****
*****

```

```

RectangleHGen : process (clk)
begin

```

```

if rising_edge(clk) then
    if game_state = "000011" then
        if ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC + HBACK_PORCH + 4)
AND
            (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(877);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(878);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(879);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(880);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(881);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(882);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            end if;
        --
        *****game_over_state*****
        *****
        --
        *****
        *****
        elsif game_state = "000010" then

```



```

    if ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
        (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0111";map_state_17 <= map_state_over(0);
        map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
            (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(1);
            map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state_over(2);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
                elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                    (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                    rectangle <= "0111";map_state_17 <= map_state_over(3);
                    map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                    map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
                    elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                        (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                        rectangle <= "0111";map_state_17 <= map_state_over(4);
                        map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                        map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
                        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                            (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                            rectangle <= "0111";map_state_17 <= map_state_over(5);
                            map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                            map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );

                        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                            (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                            rectangle <= "0111";map_state_17 <= map_state_over(6);
                            map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                            map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );

```

```

        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
            (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(7);
            map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
            elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                    rectangle <= "0111";map_state_17 <= map_state_over(8);
                    map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                    map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
                    __*****
                    __*****
            elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                    rectangle <= "0111";map_state_17 <= map_state_over(9);
                    map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                    map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
                    elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                            rectangle <= "0111";map_state_17 <= map_state_over(10);
                            map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
                            elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                                    rectangle <= "0111";map_state_17 <= map_state_over(11);
                                    map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                                    map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
                                    elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                                        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                                            rectangle <= "0111";map_state_17 <= map_state_over(12);
                                            map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                                            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
                                            elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                                                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                                                    rectangle <= "0111";map_state_17 <= map_state_over(13);
                                                    map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                                                    map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );

```

```

        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(14);
            map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );

        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(15);
            map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(16);
            map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(17);
            map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );

        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(18);
            map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(19);
            map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(20);
            map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );

```

```

        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
            (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state_over(21);
            map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
            elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                    rectangle <= "0111";map_state_17 <= map_state_over(22);
                    map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                    map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
                    elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                            rectangle <= "0111";map_state_17 <= map_state_over(23);
                            map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                            map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
                            end if;
--
*****game_start_state*****
*****
--
*****
*****
        elsif game_state = "000001" then
            if ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
                Hcount <= (266 + HSYNC + HBACK_PORCH + 4) and
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
                    (249 + 4 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
                rectangle <= "0111";
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
                map_state_17 <= map_state_start(0);
            elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
                Hcount <= (275 + HSYNC + HBACK_PORCH + 4) and
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
                    (249 + 4 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
                rectangle <= "0111";
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
                map_state_17 <= map_state_start(1);
            elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
                Hcount <= (284 + HSYNC + HBACK_PORCH + 4) and
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and

```

(249 + 4 - 1 + VSYNC + VBACK\_PORCH) >=

Vcount) then

```
rectangle <= "0111";
  map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
  map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
  map_state_17 <= map_state_start(2);
elseif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (293 + HSYNC + HBACK_PORCH + 4) and
        (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (249 + 4 - 1 + VSYNC + VBACK_PORCH) >=
```

Vcount) then

```
rectangle <= "0111";
  map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
  map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
  map_state_17 <= map_state_start(3);
elseif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (302 + HSYNC + HBACK_PORCH + 4) and
        (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (249 + 4 - 1 + VSYNC + VBACK_PORCH) >=
```

Vcount) then

```
rectangle <= "0111";
  map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
  map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
  map_state_17 <= map_state_start(4);
elseif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (311 + HSYNC + HBACK_PORCH + 4) and
        (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (249 + 4 - 1 + VSYNC + VBACK_PORCH) >=
```

Vcount) then

```
rectangle <= "0111";
  map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
  map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
  map_state_17 <= map_state_start(5);
elseif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (266 + HSYNC + HBACK_PORCH + 4) and
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (258 + 4 - 1 + VSYNC + VBACK_PORCH) >=
```

Vcount) then

```
rectangle <= "0111";
  map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
  map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
  map_state_17 <= map_state_start(6);
elseif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (275 + HSYNC + HBACK_PORCH + 4) and
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (258 + 4 - 1 + VSYNC + VBACK_PORCH) >=
```

Vcount) then

```
rectangle <= "0111";
  map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
  map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
  map_state_17 <= map_state_start(7);
elseif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
```

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                Hcount <= (284 + HSYNC + HBACK_PORCH + 4) and
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
                (258 + 4 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
    rectangle <= "0111";
    map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
    map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
    map_state_17 <= map_state_start(8);
elseif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (293 + HSYNC + HBACK_PORCH + 4) and
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (258 + 4 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
    rectangle <= "0111";
    map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
    map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
    map_state_17 <= map_state_start(9);
elseif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (302 + HSYNC + HBACK_PORCH + 4) and
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (258 + 4 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
    rectangle <= "0111";
    map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
    map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
    map_state_17 <= map_state_start(10);
elseif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (311 + HSYNC + HBACK_PORCH + 4) and
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount and
        (258 + 4 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
    rectangle <= "0111";
    map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
    map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
    map_state_17 <= map_state_start(11);
end if;
--
*****normal_state*****
--
*****
*****
else

    if reset_n = '0' or ((pac_h_axis - 8 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (pac_h_axis + HSYNC + HBACK_PORCH + 8) and
        (pac_v_axis + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount and
        (pac_v_axis + 8 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0000";
        pac_h_17 <= Hcount + 1 - (pac_h_axis - 8 + HSYNC + HBACK_PORCH + 1);

```

```

    pac_v_17 <= Vcount + 1 - (pac_v_axis - 8 + VSYNC + VBACK_PORCH );
    pac_N_17 <= pac_N;
elseif ((pac_2_h_axis - 8 + HSYNC + HBACK_PORCH) <= Hcount and
        Hcount <= (pac_2_h_axis + HSYNC + HBACK_PORCH + 8) and
        (pac_2_v_axis + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount and
        (pac_2_v_axis + 8 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
    rectangle <= "1001";
    pac_h_17 <= Hcount + 1 - (pac_2_h_axis - 8 + HSYNC + HBACK_PORCH + 1);
    pac_v_17 <= Vcount + 1 - (pac_2_v_axis - 8 + VSYNC + VBACK_PORCH );
    pac_N_17 <= pac_N_2;
elseif ((ghost1_h_axis - 8 + HSYNC + HBACK_PORCH) <= Hcount AND
        Hcount <= (ghost1_h_axis + HSYNC + HBACK_PORCH + 8) AND
        (ghost1_v_axis + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount AND
        (ghost1_v_axis + 8 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
    rectangle <= "0001";
    pac_h_17 <= Hcount + 1 - (ghost1_h_axis - 8 + HSYNC + HBACK_PORCH + 1);
    pac_v_17 <= Vcount + 1 - (ghost1_v_axis - 8 + VSYNC + VBACK_PORCH );
    pac_N_17 <= ghost1_N;
elseif ((ghost2_h_axis - 8 + HSYNC + HBACK_PORCH) <= Hcount AND
        Hcount <= (ghost2_h_axis + HSYNC + HBACK_PORCH + 8) AND
        (ghost2_v_axis + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount AND
        (ghost2_v_axis + 8 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
    rectangle <= "0010";
    pac_h_17 <= Hcount + 1 - (ghost2_h_axis - 8 + HSYNC + HBACK_PORCH + 1);
    pac_v_17 <= Vcount + 1 - (ghost2_v_axis - 8 + VSYNC + VBACK_PORCH );
    pac_N_17 <= ghost2_N;
elseif ((ghost3_h_axis - 8 + HSYNC + HBACK_PORCH) <= Hcount AND
        Hcount <= (ghost3_h_axis + HSYNC + HBACK_PORCH + 8) AND
        (ghost3_v_axis + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount AND
        (ghost3_v_axis + 8 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
    rectangle <= "0011";
    pac_h_17 <= Hcount + 1 - (ghost3_h_axis - 8 + HSYNC + HBACK_PORCH + 1);
    pac_v_17 <= Vcount + 1 - (ghost3_v_axis - 8 + VSYNC + VBACK_PORCH );
    pac_N_17 <= ghost3_N;
--
*****
*****
    elseif Vcount <=278 AND Vcount >= 135 And Hcount >= 343 AND Hcount <= 594 then
--
*****
*****
    (203,105)0
        if ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
            (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0101";map_state_17 <= map_state(0);
            map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);

```

```

        map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,105)1 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(1);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,105)2 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(2);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,105)3 *****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(3);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,105)4 *****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(4);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,105)5 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(5);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );

```



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--
*****
***** (257,105)6 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(6);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (266,105)7 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(7);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (275,105)8 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(8);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (284,105)9 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(9);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (293,105)10 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(10);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);

```

```

--
*****
***** (302,105)11 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(11);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,105)12 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(12);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,105)13 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(13);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,105)14 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(14);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,105)15 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(15);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );

```



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--
*****
***** (392,105)21 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(21);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,105)22 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(22);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (410,105)23 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(23);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,105)24 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(24);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,105)25 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(25);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH);

```

```

--
*****
***** (437,105)26 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(26);
                map_h_17 <= Hcount + 1 - (437 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,105)27 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (105 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (105 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(27);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (105 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** end105 *****
--
*****
***** (203,114)28 *****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(28);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,114)29 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(29);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,114)30 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(30);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);

```

```

map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,114)31 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(31);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,114)32 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(32);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,114)33 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(33);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,114)34 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(34);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,114)35 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(35);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (275,114)36 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(36);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,114)37 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(37);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,114)38 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(38);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,114)39 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(39);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,114)40 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(40);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH );

```





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--
*****
***** (365,114)46 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(46);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,114)47 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(47);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,114)48 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(48);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (392,114)49 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(49);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,114)50 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(50);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (410,114)51 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(51);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,114)52 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(52);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,114)53 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(53);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (437,114)54 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(54);
                map_h_17 <= Hcount + 1 - (437 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (446,114)55 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (114 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (114 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(55);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (114 - 4 + VSYNC + VBACK_PORCH);

```

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--
*****
*****end114*****
--
*****
***** (203,123)56*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(56);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,123)57*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(57);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,123)58*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(58);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,123)59*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(59);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,123)60*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(60);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,123)61 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(61);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,123)62 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(62);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,123)63 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(63);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,123)64 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(64);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,123)65 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (123 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(123 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(65);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (123 - 4 + VSYNC + VBACK_PORCH );

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        map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,132)86 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(86);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,132)87 *****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(87);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,132)88 *****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(88);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,132)89 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(89);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,132)90 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(90);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (266,132)91 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(91);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,132)92 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(92);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,132)93 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(93);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,132)94 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(94);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,132)95 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(95);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (311,132)96 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(96);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,132)97 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(97);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,132)98 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(98);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,132)99 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(99);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,132)100 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(100);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (356,132)101*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(101);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,132)102*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(102);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (374,132)103*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(103);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,132)104*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(104);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,132)105*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(105);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (401,132)106*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(106);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,132)107*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(107);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,132)108*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(108);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,132)109*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(109);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,132)110*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(110);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (446,132)111 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (132 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (132 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(111);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (132 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** end132 *****
--
*****
***** (203,141)112 *****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(112);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,141)113 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(113);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,141)114 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(114);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,141)115 *****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(115);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);

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```

map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,141)116 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(116);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,141)117 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(117);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,141)118 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(118);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,141)119 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(119);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,141)120 *****
    elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
        (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(120);
        map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (284,141)121 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(121);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,141)122 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(122);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,141)123 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(123);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,141)124 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(124);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,141)125 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(125);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (374,141)131*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(131);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,141)132*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(132);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,141)133*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(133);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,141)134*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(134);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,141)135*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(135);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (419,141)136*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(136);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,141)137*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(137);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,141)138*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(138);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,141)139*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (141 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(141 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(139);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (141 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** end141*****
--
*****
***** (203,150)140*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(140);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,150)141 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(141);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,150)142 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(142);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,150)143 *****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(143);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,150)144 *****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(144);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,150)145 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(145);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (257,150)146 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(146);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,150)147 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(147);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,150)148 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(148);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,150)149 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(149);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,150)150 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(150);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (302,150)151 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(151);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,150)152 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(152);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,150)153 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(153);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,150)154 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(154);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,150)155 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(155);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );

```



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--
*****
***** (392,150)161 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(161);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,150)162 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(162);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (410,150)163 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(163);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,150)164 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(164);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,150)165 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(165);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH);

```



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--
*****
***** (437,150)166*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(166);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,150)167*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (150 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(150 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(167);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (150 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end150*****
--
*****
***** (203,159)168*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(168);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,159)169*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(169);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,159)170*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(170);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);

```

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        map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,159)171 *****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(171);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,159)172 *****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(172);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,159)173 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(173);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,159)174 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(174);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,159)175 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(175);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (275,159)176*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(176);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,159)177*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(177);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,159)178*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(178);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,159)179*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(179);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,159)180*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(180);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (365,159)186 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(186);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,159)187 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(187);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,159)188 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(188);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (392,159)189 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(189);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,159)190 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(190);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (410,159)191 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(191);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,159)192 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(192);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,159)193 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(193);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (437,159)194 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(194);
                map_h_17 <= Hcount + 1 - (437 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (446,159)195 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (159 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (159 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(195);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (159 - 4 + VSYNC + VBACK_PORCH);

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--
*****
*****end159*****
--
*****
***** (203,168)196*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(196);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,168)197*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(197);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,168)198*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(198);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,168)199*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(199);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,168)200*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(200);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,168)201 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(201);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,168)202 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(202);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,168)203 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(203);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,168)204 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(204);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,168)205 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(205);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (293,168)206*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(206);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,168)207*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(207);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,168)208*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(208);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,168)209*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(209);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,168)210*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(210);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (338,168)211 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(211);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,168)212 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(212);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,168)213 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(213);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,168)214 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(214);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,168)215 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(215);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (383,168)216*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(216);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,168)217*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(217);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,168)218*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(218);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,168)219*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(219);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,168)220*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(220);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (428,168)221*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(221);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,168)222*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(222);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,168)223*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (168 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(168 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(223);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (168 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end168*****
--
*****
***** (203,177)224*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(224);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,177)225*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(225);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,177)226*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(226);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,177)227*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(227);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,177)228*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(228);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,177)229*****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(229);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,177)230*****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(230);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (266,177)231*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(231);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,177)232*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(232);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,177)233*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(233);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,177)234*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(234);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,177)235*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(235);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (311,177)236 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(236);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (320,177)237 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(237);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (329,177)238 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(238);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (338,177)239 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(239);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,177)240 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(240);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (356,177)241 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(241);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,177)242 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(242);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,177)243 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(243);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,177)244 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(244);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (392,177)245 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(245);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);

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*****
***** (401,177)246 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(246);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (410,177)247 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(247);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,177)248 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(248);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,177)249 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(249);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (437,177)250 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(250);
                map_h_17 <= Hcount + 1 - (437 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH);

```

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--
*****
***** (446,177)251*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (177 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(177 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(251);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (177 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end177*****
--
*****
***** (203,186)252*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(252);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,186)253*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(253);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,186)254*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(254);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,186)255*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(255);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);

```

```

map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,186)256 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(256);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,186)257 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(257);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,186)258 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(258);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,186)259 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(259);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,186)260 *****
    elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
        (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(260);
        map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (284,186)261*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(261);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,186)262*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(262);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,186)263*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(263);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,186)264*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(264);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,186)265*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(265);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (329,186)266 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(266);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (338,186)267 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(267);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,186)268 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(268);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,186)269 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(269);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,186)270 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(270);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH);

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*****
***** (374,186)271*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(271);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,186)272*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(272);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,186)273*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(273);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,186)274*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(274);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,186)275*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(275);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (419,186)276*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(276);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,186)277*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(277);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,186)278*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(278);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,186)279*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (186 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(186 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(279);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (186 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** end186*****
--
*****
***** (203,195)280*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(280);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,195)281 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
        (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(281);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,195)282 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
        (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(282);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,195)283 *****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(283);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,195)284 *****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(284);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,195)285 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(285);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (257,195)286*****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(286);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,195)287*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(287);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,195)288*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(288);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,195)289*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(289);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,195)290*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(290);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (302,195)291*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(291);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,195)292*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(292);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,195)293*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(293);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,195)294*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(294);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,195)295*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(295);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (347,195)296 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(296);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,195)297 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(297);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,195)298 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(298);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,195)299 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(299);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,195)300 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(300);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (392,195)301 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(301);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,195)302 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(302);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (410,195)303 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(303);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,195)304 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(304);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,195)305 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(305);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);

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*****
***** (437,195)306 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(306);
                map_h_17 <= Hcount + 1 - (437 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (446,195)307 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (195 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (195 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(307);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (195 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** end195 *****
--
*****
***** (203,204)308 *****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(308);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (212,204)309 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(309);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (221,204)310 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(310);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,204)311 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(311);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,204)312 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(312);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,204)313 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(313);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,204)314 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(314);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,204)315 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(315);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (275,204)316*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(316);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,204)317*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(317);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,204)318*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(318);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,204)319*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(319);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,204)320*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(320);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (320,204)321 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(321);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (329,204)322 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(322);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (338,204)323 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(323);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,204)324 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(324);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,204)325 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(325);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH);

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*****
***** (410,204)331*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(331);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,204)332*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(332);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,204)333*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(333);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,204)334*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(334);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,204)335*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (204 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(204 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(335);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (204 - 4 + VSYNC + VBACK_PORCH );

```

```

--
*****
*****end204*****
--
*****
***** (203,213)336*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(336);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,213)337*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(337);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,213)338*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(338);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,213)339*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(339);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,213)340*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(340);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);

```

```

        map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,213)341 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(341);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,213)342 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(342);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,213)343 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(343);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,213)344 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(344);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,213)345 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(345);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (293,213)346*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(346);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,213)347*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(347);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,213)348*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(348);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,213)349*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(349);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,213)350*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(350);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (338,213)351 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(351);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,213)352 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(352);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,213)353 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(353);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,213)354 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(354);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,213)355 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(355);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (383,213)356*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(356);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,213)357*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(357);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,213)358*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(358);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,213)359*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(359);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,213)360*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(360);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (428,213)361 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(361);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,213)362 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(362);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,213)363 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (213 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (213 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(363);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (213 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end213*****
--
*****
***** (203,222)364 *****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(364);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,222)365 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(365);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,222)366 *****
      elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
      (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(366);
      map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,222)367 *****
      elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
      (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(367);
      map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,222)368 *****
      elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
      (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(368);
      map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,222)369 *****
      elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
      (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(369);
      map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,222)370 *****
      elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
      (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0100";map_state_17 <= map_state(370);
      map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (266,222)371*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(371);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,222)372*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(372);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,222)373*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(373);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,222)374*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(374);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,222)375*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(375);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (311,222)376 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(376);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,222)377 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(377);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,222)378 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(378);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,222)379 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(379);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,222)380 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(380);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (356,222)381*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(381);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,222)382*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(382);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (374,222)383*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(383);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,222)384*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(384);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,222)385*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(385);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (401,222)386*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(386);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,222)387*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(387);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,222)388*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(388);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,222)389*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(389);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,222)390*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(390);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (446,222)391*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (222 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(222 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(391);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (222 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end222*****
--
*****
***** (203,231)392*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(392);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,231)393*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(393);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,231)394*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(394);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,231)395*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(395);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,231)396*****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(396);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,231)397*****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(397);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,231)398*****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(398);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,231)399*****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(399);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,231)400*****
    elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
        (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(400);
        map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (284,231)401*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(401);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,231)402*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(402);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,231)403*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(403);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,231)404*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(404);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,231)405*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(405);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (329,231)406*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(406);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,231)407*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(407);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,231)408*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(408);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,231)409*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(409);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,231)410*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(410);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (374,231)411*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(411);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,231)412*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(412);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,231)413*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(413);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,231)414*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(414);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,231)415*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(415);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (419,231)416*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(416);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,231)417*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(417);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,231)418*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(418);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,231)419*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (231 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(231 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(419);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (231 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** end231*****
--
*****
***** (203,240)420*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(420);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);

```

```

map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,240)421 *****
    elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
        (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(421);
        map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,240)422 *****
    elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
        (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(422);
        map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,240)423 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(423);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,240)424 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(424);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,240)425 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(425);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (257,240)426*****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(426);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,240)427*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(427);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,240)428*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(428);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,240)429*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(429);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,240)430*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(430);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (302,240)431 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(431);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,240)432 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(432);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,240)433 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(433);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,240)434 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(434);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,240)435 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(435);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (347,240)436*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(436);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,240)437*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(437);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,240)438*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(438);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (374,240)439*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(439);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,240)440*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(440);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (392,240)441*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(441);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,240)442*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(442);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,240)443*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(443);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,240)444*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(444);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,240)445*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(445);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (437,240)446*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(446);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,240)447*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (240 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(240 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(447);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (240 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end240*****
        end if;
        elsif Vcount >= 279 AND Vcount <= 413 And Hcount >= 343 AND Hcount <= 594 then
--
*****
***** (203,249)448*****
        if ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(448);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,249)449*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(449);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,249)450*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then

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        map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,249)456*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(456);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,249)457*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(457);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,249)458*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(458);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,249)459*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(459);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,249)460*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(460);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (320,249)461 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(461);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (329,249)462 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(462);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (338,249)463 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(463);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,249)464 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(464);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,249)465 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(465);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);

```

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--
*****
***** (365,249)466 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(466);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,249)467 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(467);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,249)468 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(468);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (392,249)469 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(469);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,249)470 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(470);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH);

```

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--
*****
***** (410,249)471*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(471);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,249)472*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(472);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,249)473*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(473);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,249)474*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(474);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,249)475*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (249 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(249 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(475);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (249 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
*****end249*****
--
*****
***** (203,258)476*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(476);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,258)477*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(477);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,258)478*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(478);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,258)479*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(479);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,258)480*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(480);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);

```

```

map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,258)481 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(481);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,258)482 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(482);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,258)483 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(483);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,258)484 *****
    elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(484);
        map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,258)485 *****
    elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
        (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(485);
        map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (293,258)486*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(486);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,258)487*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(487);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,258)488*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(488);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,258)489*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(489);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,258)490*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(490);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (338,258)491 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(491);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,258)492 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(492);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,258)493 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(493);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,258)494 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(494);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,258)495 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(495);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (383,258)496*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(496);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,258)497*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(497);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,258)498*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(498);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,258)499*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(499);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,258)500*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(500);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (428,258)501*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(501);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,258)502*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(502);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,258)503*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (258 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(258 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(503);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (258 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end258*****
--
*****
***** (203,267)504*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(504);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,267)505*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(505);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,267)506*****
      elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
      (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(506);
      map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,267)507*****
      elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
      (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(507);
      map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,267)508*****
      elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
      (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(508);
      map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,267)509*****
      elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
      (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0101";map_state_17 <= map_state(509);
      map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,267)510*****
      elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
      (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
      rectangle <= "0100";map_state_17 <= map_state(510);
      map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
      map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (266,267)511*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(511);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,267)512*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(512);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,267)513*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(513);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,267)514*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(514);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,267)515*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(515);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (311,267)516 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(516);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (320,267)517 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(517);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (329,267)518 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(518);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (338,267)519 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(519);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,267)520 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(520);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (356,267)521*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(521);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,267)522*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(522);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (374,267)523*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(523);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,267)524*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(524);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,267)525*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(525);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );

```



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--
*****
***** (401,267)526*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(526);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,267)527*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(527);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,267)528*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(528);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,267)529*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(529);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,267)530*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(530);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (446,267)531*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (267 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(267 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(531);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (267 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end267*****
--
*****
***** (203,276)532*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(532);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,276)533*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(533);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,276)534*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(534);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,276)535*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(535);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,276)536*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(536);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,276)537*****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(537);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,276)538*****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(538);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,276)539*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(539);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,276)540*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(540);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (284,276)541*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(541);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,276)542*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(542);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,276)543*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(543);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,276)544*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(544);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,276)545*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(545);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (329,276)546*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(546);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,276)547*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(547);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,276)548*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(548);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,276)549*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(549);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,276)550*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(550);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (374,276)551*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(551);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,276)552*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(552);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,276)553*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(553);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,276)554*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(554);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,276)555*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(555);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH );

```

```

--
*****
***** (419,276)556 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(556);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,276)557 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(557);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (437,276)558 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(558);
                map_h_17 <= Hcount + 1 - (437 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (446,276)559 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (276 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (276 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(559);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (276 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** end276 *****
--
*****
***** (203,285)560 *****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(560);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);

```

```

map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,285)561 *****
    elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
        (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(561);
        map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,285)562 *****
    elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
        (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(562);
        map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,285)563 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(563);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,285)564 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(564);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,285)565 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(565);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (257,285)566 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(566);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,285)567 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(567);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,285)568 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(568);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,285)569 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(569);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,285)570 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(570);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (302,285)571*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(571);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,285)572*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(572);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,285)573*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(573);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,285)574*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(574);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,285)575*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(575);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (347,285)576*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(576);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,285)577*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(577);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,285)578*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(578);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (374,285)579*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(579);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,285)580*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(580);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (392,285)581*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(581);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,285)582*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(582);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,285)583*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(583);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,v)584*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(584);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,285)585*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(585);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );

```

```

--
*****
***** (437,285)586*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(586);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,285)587*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (285 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(285 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(587);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (285 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end285*****
--
*****
***** (203,294)588*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(588);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,294)589*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(589);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,294)590*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(590);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);

```

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map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,294)591 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(591);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,294)592 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(592);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,294)593 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(593);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,294)594 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(594);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,294)595 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(595);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (275,294)596*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(596);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,294)597*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(597);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,294)598*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(598);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,294)599*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(599);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,294)600*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(600);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (320,294)601*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(601);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,294)602*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(602);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,294)603*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(603);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,294)604*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(604);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,294)605*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(605);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );

```





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--
*****
***** (410,294)611*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(611);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,294)612*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(612);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,294)613*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(613);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,294)614*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(614);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,294)615*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (294 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(294 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(615);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (294 - 4 + VSYNC + VBACK_PORCH );

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--
*****
*****end294*****
--
*****
***** (203,303)616*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(616);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,303)617*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(617);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,303)618*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(618);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,303)619*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(619);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,303)620*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(620);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,303)621 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(621);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,303)622 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(622);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,303)623 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(623);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,303)624 *****
    elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
        (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(624);
        map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,303)625 *****
    elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
        (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(625);
        map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (293,303)626 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(626);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,303)627 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(627);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,303)628 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(628);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,303)629 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(629);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,303)630 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(630);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (338,303)631 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(631);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,303)632 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(632);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,303)633 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(633);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,303)634 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(634);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,303)635 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(635);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);

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*****
***** (383,303)636*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(636);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,303)637*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(637);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,303)638*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(638);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,303)639*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(639);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,303)640*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(640);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH );

```

```

--
*****
***** (428,303)641 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(641);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (437,303)642 *****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(642);
                map_h_17 <= Hcount + 1 - (437 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (446,303)643 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (303 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (303 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(643);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (303 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** end303 *****
--
*****
***** (203,312)644 *****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(644);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (212,312)645 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(645);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);

```



```

map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,312)646 *****
    elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
        (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(646);
        map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,312)647 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(647);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,312)648 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(648);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,312)649 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(649);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,312)650 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(650);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );

```

```

--
*****
***** (266,312)651*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(651);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,312)652*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(652);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,312)653*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(653);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,312)654*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(654);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,312)655*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(655);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (356,312)661 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(661);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,312)662 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(662);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,312)663 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(663);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,312)664 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(664);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (392,312)665 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(665);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (446,312)671*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (312 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(312 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(671);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (312 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end312*****
--
*****
***** (203,321)672*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(672);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,321)673*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(673);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,321)674*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(674);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,321)675*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(675);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,321)676*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(676);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,321)677*****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(677);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,321)678*****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(678);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,321)679*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(679);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,321)680*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(680);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (284,321)681*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(681);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,321)682*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(682);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,321)683*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(683);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,321)684*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(684);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,321)685*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(685);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );

```



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--
*****
***** (329,321)686*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(686);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,321)687*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(687);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,321)688*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(688);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,321)689*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(689);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,321)690*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(690);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (374,321)691*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(691);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,321)692*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(692);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,321)693*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(693);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,321)694*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(694);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,321)695*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(695);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (419,321)696*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(696);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,321)697*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(697);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,321)698*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(698);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,321)699*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (321 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(321 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(699);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (321 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** end321*****
--
*****
***** (203,330)700*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(700);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,330)701 *****
    elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
        (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(701);
        map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,330)702 *****
    elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
        (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(702);
        map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,330)703 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(703);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,330)704 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(704);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,330)705 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(705);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (257,330)706 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(706);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,330)707 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(707);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,330)708 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(708);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,330)709 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(709);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,330)710 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(710);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (302,330)711 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(711);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,330)712 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(712);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,330)713 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(713);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,330)714 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(714);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,330)715 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(715);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (347,330)716*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(716);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,330)717*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(717);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,330)718*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(718);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (374,330)719*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(719);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,330)720*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(720);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (392,330)721 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(721);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,330)722 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(722);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (410,330)723 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(723);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,330)724 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(724);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,330)725 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(725);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (437,330)726*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(726);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,330)727*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (330 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(330 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(727);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (330 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end330*****
--
*****
***** (203,339)728*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(728);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,339)729*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(729);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,339)730*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(730);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,339)731 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(731);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,339)732 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(732);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,339)733 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(733);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,339)734 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100"; map_state_17 <= map_state(734);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,339)735 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(735);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (275,339)736*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(736);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,339)737*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(737);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,339)738*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(738);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,339)739*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(739);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,339)740*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(740);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (320,339)741 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(741);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (329,339)742 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(742);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (338,339)743 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(743);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (347,339)744 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(744);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,339)745 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(745);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);

```

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--
*****
***** (365,339)746 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(746);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,339)747 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(747);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,339)748 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(748);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (392,339)749 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(749);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,339)750 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(750);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (410,339)751*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(751);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,339)752*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(752);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,339)753*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(753);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,339)754*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(754);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,339)755*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (339 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(339 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(755);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (339 - 4 + VSYNC + VBACK_PORCH );

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--
*****
*****end339*****
--
*****
***** (203,348)756*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(756);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,348)757*****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(757);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,348)758*****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(758);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,348)759*****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(759);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,348)760*****
        elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(760);
                map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);

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        map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,348)761 *****
        elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(761);
                map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,348)762 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(762);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,348)763 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(763);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,348)764 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
        (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(764);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,348)765 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
        (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(765);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (293,348)766*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(766);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,348)767*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(767);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,348)768*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(768);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,348)769*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(769);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,348)770*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(770);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (338,348)771*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(771);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,348)772*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(772);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,348)773*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(773);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,348)774*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(774);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (374,348)775*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(775);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (383,348)776*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(776);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,348)777*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(777);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,348)778*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(778);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,348)779*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(779);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,348)780*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (348 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(348 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(780);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (348 - 4 + VSYNC + VBACK_PORCH );

```



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map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,357)786 *****
    elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
        (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(786);
        map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,357)787 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(787);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,357)788 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(788);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,357)789 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(789);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,357)790 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101";map_state_17 <= map_state(790);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (266,357)791*****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(791);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,357)792*****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(792);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (284,357)793*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(793);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,357)794*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(794);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,357)795*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(795);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );

```

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--
*****
***** (311,357)796 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(796);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,357)797 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(797);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,357)798 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(798);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,357)799 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(799);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,357)800 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(800);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (356,357)801 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(801);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,357)802 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(802);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,357)803 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(803);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,357)804 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(804);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (392,357)805 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(805);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (401,357)806*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(806);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,357)807*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(807);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (419,357)808*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(808);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,357)809*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(809);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,357)810*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(810);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (446,357)811 *****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (357 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (357 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(811);
                map_h_17 <= Hcount + 1 - (446 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (357 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** end357 *****
--
*****
***** (203,366)812 *****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(812);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (212,366)813 *****
        elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(813);
                map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (221,366)814 *****
        elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(814);
                map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (230,815)787 *****
        elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100"; map_state_17 <= map_state(815);
                map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,366)816 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(816);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,366)817 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(817);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (257,366)818 *****
    elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
        (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(818);
        map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (266,366)819 *****
    elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
        (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(819);
        map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (275,366)820 *****
    elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
        (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0100";map_state_17 <= map_state(820);
        map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (284,366)821*****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(821);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (293,366)822*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(822);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (302,366)823*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(823);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,366)824*****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(824);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,366)825*****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(825);
                map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (329,366)826*****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(826);
                map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,366)827*****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(827);
                map_h_17 <= Hcount + 1 - (338- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (347,366)828*****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(828);
                map_h_17 <= Hcount + 1 - (347- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (356,366)829*****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(829);
                map_h_17 <= Hcount + 1 - (356- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (365,366)830*****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(830);
                map_h_17 <= Hcount + 1 - (365- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (374,366)831*****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(831);
                map_h_17 <= Hcount + 1 - (374- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (383,366)832*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(832);
                map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (392,366)833*****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(833);
                map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (401,366)834*****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(834);
                map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (410,366)835*****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(835);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );

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--
*****
***** (419,366)836*****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(836);
                map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (428,366)837*****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366+ 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(837);
                map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (437,366)838*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0100";map_state_17 <= map_state(838);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,366)839*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (366 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(366 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(839);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (366 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** end366*****
--
*****
***** (203,375)840*****
        elsif ((203 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (203 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(840);
                map_h_17 <= Hcount + 1 - (203 - 4 + HSYNC + HBACK_PORCH + 1);

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map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (212,375)841 *****
    elsif ((212 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (212 + HSYNC +
HBACK_PORCH + 4) AND
        (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(841);
        map_h_17 <= Hcount + 1 - (212 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (221,375)842 *****
    elsif ((221 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (221 + HSYNC +
HBACK_PORCH + 4) AND
        (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(842);
        map_h_17 <= Hcount + 1 - (221 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (230,375)843 *****
    elsif ((230 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (230 + HSYNC +
HBACK_PORCH + 4) AND
        (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(843);
        map_h_17 <= Hcount + 1 - (230 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (239,375)844 *****
    elsif ((239 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (239 + HSYNC +
HBACK_PORCH + 4) AND
        (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(844);
        map_h_17 <= Hcount + 1 - (239 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (248,375)845 *****
    elsif ((248 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (248 + HSYNC +
HBACK_PORCH + 4) AND
        (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0101"; map_state_17 <= map_state(845);
        map_h_17 <= Hcount + 1 - (248 - 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (257,375)846 *****
        elsif ((257 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (257 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(846);
                map_h_17 <= Hcount + 1 - (257 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (266,375)847 *****
        elsif ((266 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (266 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(847);
                map_h_17 <= Hcount + 1 - (266 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (275,375)848 *****
        elsif ((275 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (275 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(848);
                map_h_17 <= Hcount + 1 - (275 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (284,375)849 *****
        elsif ((284 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (284 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(849);
                map_h_17 <= Hcount + 1 - (284 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (293,375)850 *****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(850);
                map_h_17 <= Hcount + 1 - (293 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);

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*****
***** (302,375)851 *****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(851);
                map_h_17 <= Hcount + 1 - (302 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (311,375)852 *****
        elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(852);
                map_h_17 <= Hcount + 1 - (311 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (320,375)853 *****
        elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(853);
                map_h_17 <= Hcount + 1 - (320 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (329,375)854 *****
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(854);
                map_h_17 <= Hcount + 1 - (329 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (338,375)855 *****
        elsif ((338 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (338 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(855);
                map_h_17 <= Hcount + 1 - (338 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );

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*****
***** (347,375)856 *****
        elsif ((347 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (347 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(856);
                map_h_17 <= Hcount + 1 - (347 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (356,375)857 *****
        elsif ((356 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (356 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(857);
                map_h_17 <= Hcount + 1 - (356 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (365,375)858 *****
        elsif ((365 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (365 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(858);
                map_h_17 <= Hcount + 1 - (365 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (374,375)859 *****
        elsif ((374 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (374 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(859);
                map_h_17 <= Hcount + 1 - (374 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (383,375)860 *****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(860);
                map_h_17 <= Hcount + 1 - (383 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (392,375)861 *****
        elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(861);
                map_h_17 <= Hcount + 1 - (392 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (401,375)862 *****
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(862);
                map_h_17 <= Hcount + 1 - (401 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (410,375)863 *****
        elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(863);
                map_h_17 <= Hcount + 1 - (410 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (419,375)864 *****
        elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(864);
                map_h_17 <= Hcount + 1 - (419 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);
--
*****
***** (428,375)865 *****
        elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND (375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101"; map_state_17 <= map_state(865);
                map_h_17 <= Hcount + 1 - (428 - 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH);

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--
*****
***** (437,375)866*****
        elsif ((437 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (437 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(866);
                map_h_17 <= Hcount + 1 - (437- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
***** (446,375)867*****
        elsif ((446 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (446 + HSYNC +
HBACK_PORCH + 4) AND
                (375 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(375 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0101";map_state_17 <= map_state(867);
                map_h_17 <= Hcount + 1 - (446- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (375 - 4 + VSYNC + VBACK_PORCH );
--
*****
*****end366*****
        end if;
--
*****score*****
*****
        elsif ((293 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (293 + HSYNC + HBACK_PORCH +
4) AND
                (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(868);
                map_h_17 <= Hcount + 1 - (293- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC + HBACK_PORCH +
4) AND
                (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(869);
                map_h_17 <= Hcount + 1 - (302- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
                elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
                        (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                        rectangle <= "0111";map_state_17 <= map_state(870);
                        map_h_17 <= Hcount + 1 - (311- 4 + HSYNC + HBACK_PORCH + 1);
                        map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
                elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                        (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then

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        rectangle <= "0111";map_state_17 <= map_state(871);
        map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
        elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
        (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state(872);
            map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
--
*****number*****
*****
        elsif ((302 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (302 + HSYNC + HBACK_PORCH +
4) AND
        (87 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(87 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state(873);
            map_h_17 <= Hcount + 1 - (302- 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (87 - 4 + VSYNC + VBACK_PORCH );
            elsif ((311 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (311 + HSYNC +
HBACK_PORCH + 4) AND
            (87 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(87 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(874);
                map_h_17 <= Hcount + 1 - (311- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (87 - 4 + VSYNC + VBACK_PORCH );
                elsif ((320 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (320 + HSYNC +
HBACK_PORCH + 4) AND
                (87 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(87 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                    rectangle <= "0111";map_state_17 <= map_state(875);
                    map_h_17 <= Hcount + 1 - (320- 4 + HSYNC + HBACK_PORCH + 1);
                    map_v_17 <= Vcount + 1 - (87 - 4 + VSYNC + VBACK_PORCH );
                    elsif ((329 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (329 + HSYNC +
HBACK_PORCH + 4) AND
                    (87 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(87 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                        rectangle <= "0111";map_state_17 <= map_state(876);
                        map_h_17 <= Hcount + 1 - (329- 4 + HSYNC + HBACK_PORCH + 1);
                        map_v_17 <= Vcount + 1 - (87 - 4 + VSYNC + VBACK_PORCH );
--
*****level*****
*****
        elsif ((383 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (383 + HSYNC + HBACK_PORCH +
4) AND
        (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state(877);
            map_h_17 <= Hcount + 1 - (383- 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );

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    elsif ((392 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (392 + HSYNC + HBACK_PORCH +
4) AND
        (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
        rectangle <= "0111";map_state_17 <= map_state(878);
        map_h_17 <= Hcount + 1 - (392- 4 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
        elsif ((401 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (401 + HSYNC +
HBACK_PORCH + 4) AND
            (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
            rectangle <= "0111";map_state_17 <= map_state(879);
            map_h_17 <= Hcount + 1 - (401- 4 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
            elsif ((410 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (410 + HSYNC +
HBACK_PORCH + 4) AND
                (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                rectangle <= "0111";map_state_17 <= map_state(880);
                map_h_17 <= Hcount + 1 - (410- 4 + HSYNC + HBACK_PORCH + 1);
                map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
                elsif ((419 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (419 + HSYNC +
HBACK_PORCH + 4) AND
                    (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                    rectangle <= "0111";map_state_17 <= map_state(881);
                    map_h_17 <= Hcount + 1 - (419- 4 + HSYNC + HBACK_PORCH + 1);
                    map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
                    elsif ((428 - 4 + HSYNC + HBACK_PORCH) <= Hcount AND Hcount <= (428 + HSYNC +
HBACK_PORCH + 4) AND
                        (78 + VSYNC + VBACK_PORCH - 1 - 4) <= Vcount AND(78 + 4 - 1 + VSYNC +
VBACK_PORCH) >= Vcount) then
                            rectangle <= "0111";map_state_17 <= map_state(882);
                            map_h_17 <= Hcount + 1 - (428- 4 + HSYNC + HBACK_PORCH + 1);
                            map_v_17 <= Vcount + 1 - (78 - 4 + VSYNC + VBACK_PORCH );
--
*****|lives*****
*****
        elsif ((221 - 8 + HSYNC + HBACK_PORCH) <= Hcount and
            Hcount <= (221 + HSYNC + HBACK_PORCH + 8) and
            (395 + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount and
                (395 + 8 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
            rectangle <= "1000";
            map_h_17 <= Hcount + 1 - (221 - 8 + HSYNC + HBACK_PORCH + 1);
            map_v_17 <= Vcount + 1 - (395 - 8 + VSYNC + VBACK_PORCH );
            map_state_17 <= map_state(883);
        elsif ((239 - 8 + HSYNC + HBACK_PORCH) <= Hcount and
            Hcount <= (239 + HSYNC + HBACK_PORCH + 8) and
            (395 + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount and
                (395 + 8 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then

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        rectangle <= "1000";
        map_h_17 <= Hcount + 1 - (239 - 8 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (395 - 8 + VSYNC + VBACK_PORCH );
        map_state_17 <= map_state(884);
    elsif ((410 - 8 + HSYNC + HBACK_PORCH) <= Hcount and
           Hcount <= (410 + HSYNC + HBACK_PORCH + 8) and
           (395 + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount and
           (395 + 8 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
        rectangle <= "1010";
        map_h_17 <= Hcount + 1 - (410 - 8 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (395 - 8 + VSYNC + VBACK_PORCH );
        map_state_17 <= map_state(885);
    elsif ((428 - 8 + HSYNC + HBACK_PORCH) <= Hcount and
           Hcount <= (428 + HSYNC + HBACK_PORCH + 8) and
           (395 + VSYNC + VBACK_PORCH - 1 - 8) <= Vcount and
           (395 + 8 - 1 + VSYNC + VBACK_PORCH) >=
Vcount) then
        rectangle <= "1010";
        map_h_17 <= Hcount + 1 - (428 - 8 + HSYNC + HBACK_PORCH + 1);
        map_v_17 <= Vcount + 1 - (395 - 8 + VSYNC + VBACK_PORCH );
        map_state_17 <= map_state(886);
    --
    *****
    *****

    else
        rectangle <= "1111";
    end if;
    end if;
    end if;
end process RectangleHGen;
--
*****
*****

--
*****
*****

VGA_CLK <= clk;
VGA_HS <= not vga_hsync;
VGA_VS <= not vga_vsync;
VGA_SYNC <= '0';
VGA_BLANK <= not (vga_hsync or vga_vsync);

end rtl;

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-----END OF DOCUMENT-----