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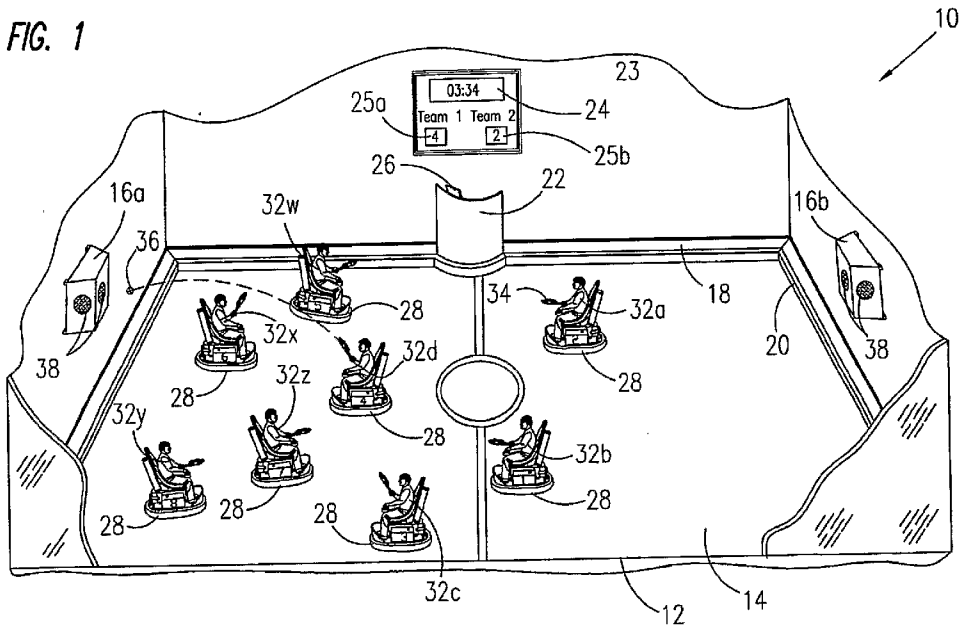
(54) **Title:** COURT-BASED GAME PLAYED BY PLAYERS RIDING VEHICLES

FIG. 1



(57) **Abstract:** A game having a floor, a plurality of walls rising up from said floor defining a play area, a game piece, at least one target positioned proximate the plurality of walls, including a plurality of multi-planar apertures operatively arranged to accept the game piece, and a vehicle, operatively arranged to be driven by a player, the vehicle having a bumper positioned circumferentially about a base of the vehicle.

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COURT-BASED GAME PLAYED BY PLAYERS RIDING VEHICLES

TECHNICAL FIELD

The invention relates generally to games played by players riding vehicles, specifically to games involving teams of players riding vehicles on a court, having an object of scoring by passing a projectile through a wall mounted, multi-planar goal.

BACKGROUND ART

Games played upon a hard surface with players riding personal vehicles are known in the art. Specifically, United States Patent No. 4,387,898 (*Mangum et al.*) describes a ball game played upon hard surface with players each riding their own vehicle. The players pass the ball with scoops held in one hand and drive the personal vehicle with the other hand. The game includes only a single, planar goal positioned at each end of the playing field. This design severely limits the amount of useable floor space for positioning the vehicles around the entire playing field and promotes "crowding" of players to a central area of the playing field. Furthermore, the personal vehicles described by *Mangum et al.* feature crank-like steering which is unwieldy with one hand and offers clumsy maneuverability. Other deficiencies of the game described by *Magnum et al.* include a perimeter wall that can operatively trap the ball, making it difficult to achieve continuous game play. The game taught by *Mangum et al.* also has a skirt around the perimeter of the floor that uses planks of wood or metal with large springs between the skirt and the wall. This bumper system creates a gap between the planks and the wall in which the ball could get stuck or a player could get injured. Finally, although these vehicles are self-propelled the vehicles are powered by current running through strips of metal embedded in the floor. Therefore every vehicle is either active or inactive at the same time.

Games are also known in the art which utilize multi-planar goals. Specifically, United States Patent No. 3,415,522 (*Bauer*) discloses a field game comprising two sets of three goals positioned on opposing ends of a playing field. The first goal has an opening positioned downfield towards the opposing first goal. The second and third goals are positioned at outward angles, to the left and right sides of the playing field, respectively. However, the goals in *Bauer* are located at ground level only, and the game itself is played in

an open field. It also does not utilize vehicles which the players use to maneuver around the field.

DISCLOSURE OF INVENTION

The present invention broadly comprises a game having a floor, a plurality of walls rising up from the floor defining a play area, a game piece, at least one target positioned proximate the plurality of walls, including a plurality of multi-planar apertures operatively arranged to accept the game piece, and a vehicle, operatively arranged to be driven by a player, the vehicle having a base, a seat, a movement control device positioned atop the base and in front of the seat, and a bumper positioned circumferentially about the base, and wherein the movement control device is operatively arranged to electronically control a turning means of the vehicle and electronically control a drive means of the vehicle. In a preferred embodiment the game is played on a court having a floor, four walls and a ceiling, with a pair of goals mounted on opposing walls proximate the ceiling.

The present invention further comprises a control terminal which is operated by a game referee. The control terminal can display and store game statistics such as the score, number of shots taken by each player, number of passes by each player, number of rebounds by each player, and so on. It can also play pre-recorded audio messages or music which correspond with the inputs the referee enters into the control terminal. Furthermore the control terminal may be used to control the speed of individual vehicles, disable or enable the drive mechanisms for the entire play area, turn on and off lights, and monitor power levels of onboard power supplies for individual vehicles.

The present invention also broadly comprises a control terminal including a computer-based method for controlling a plurality of independently propelled vehicles and at least one target. In a preferred embodiment, the method further includes a means for recording and displaying at least one characteristic of the game. In some aspects, the at least one characteristic of the game is selected from the group consisting of: scores, shots, penalties, player names, and time. In a further preferred embodiment, the at least one characteristic of the game is entered into the control terminal by means of a touch screen monitor. The control terminal may further include a means for operating an audiovisual output and a means for calculating at least one statistical characteristic of the game.

In a preferred embodiment, the control terminal includes a means for controlling the drive means of the vehicle and wherein the means for controlling the drive means of the vehicle is operatively arranged to control a rate of movement of the vehicle.

It is a general object of the present invention to provide a new and improved game for a plurality of players to participate in.

It is another object of the present invention to provide a safe bumper-car style vehicle to enhance game play.

It is a further object of the present invention to create a bumper system that protects players from being injured if a hand, foot, or other body part gets caught between two bumpers.

It is another object of the present invention to create a skirt around the perimeter of a play area for the aforementioned game which deflects a game piece back into the middle of the play area.

It is yet another object of the present invention to provide a multi-planar goal system to increase the strategy involved in playing the aforementioned game, and to spread players more evenly throughout the play area.

It is yet another object of the present invention to provide a vehicle for the aforementioned game which is variable in speed and turning to create a more intense game play experience.

It is yet a further object of the present invention to provide a control terminal to monitor and control all desired aspects of the aforementioned game from one location.

It is yet a further object of the present invention to provide a game where the game referee can interact with a control terminal to play audio messages corresponding with real time actions of the players in the game.

It is a general object of the present invention to provide a method and apparatus for controlling a plurality of independently propelled vehicles.

It is another object of the present invention to provide a method and apparatus for controlling at least one target.

These and other objects and advantages of the present invention will be readily appreciable from the following description of preferred embodiments of the invention and from the accompanying drawings and claims.

BRIEF DESCRIPTION OF DRAWINGS

The nature and mode of operation of the present invention will now be more fully described in the following detailed description of the invention taken with the accompanying drawing figures, in which:

Figure 1 is a perspective view of a game being played between two teams of four players each with part of a wall removed to reveal the game;

Figure 2a is a perspective view of a portion of the left side of the play area of the game;

Figure 2b is a section view of a wall skirt taken generally along line 2b-2b in Figure 2a;

Figure 2c is a section view of the wall skirt and the wall bumper as seen in Figure 2b with a bumper on a vehicle colliding with the wall bumper;

Figure 2d is a section view of the wall skirt seen in Figure 2b illustrating a ball rolling back into the play area off the wall skirt;

Figure 3 is a perspective view of a vehicle;

Figure 4 is a partial view of the area encircled in Figure 3 illustrating an embodiment utilizing a joystick as a movement control means;

Figure 5 is a section view taken generally along line 5-5 in Figure 4 illustrating a movement control means;

Figure 6 is a partial view of the joystick being operated by only the tips of a player's fingers;

Figure 7a is a perspective view of a scoop;

Figure 7b is a perspective view of the scoop in Figure 7a with a ball resting in the scoop's basket portion;

Figure 8 is a perspective view of a vehicle with a vehicle bumper membrane removed;

Figure 9 is a perspective view of vehicle bumper membrane which fits around a vehicle bumper cushion on the vehicle;

Figure 10 is a section view of a vehicle bumper taken generally along line 10-10 in Figure 3;

Figure 11 is a perspective view of a goal;

Figure 11a is a section view of a goal taken generally along line 11a-11a in Figure 11, showing the inside of the goal;

Figure 12 is a perspective view of the back of a vehicle showing a pair of motors and a battery pack;

Figure 13 is a bottom view of a vehicle revealing the components that the vehicle drives on;

Figure 14 is a partial view of a game utilizing a football as the game piece;

Figure 15 is a partial view of a game utilizing a backboard and hoop, and a beach ball as the game piece;

Figure 16 is a perspective view of an alternate embodiment of a goal, which has a rectangular cross-section;

Figure 17 is a perspective view of a further alternate embodiment of a goal, which has a semi-circular cross-section;

Figures 18A-18Y together are a schematic of the electronic circuit in a vehicle;

Figures 19A-19Y together are a schematic of the electronic circuit in a goal;

Figure 20 is a composite of Figures 18A-18Y;

Figure 21 is a composite of Figures 19A-19Y;

Figure 22 is a block diagram illustrating a present invention control terminal for controlling a game;

Figure 23 is a screen capture illustrating an operation mode selection prompt;

Figure 24 is a screen capture illustrating a game format selection prompt;

Figure 25 is a screen capture illustrating a player edit mode;

Figure 26 is a screen capture illustrating a player designation mode;

Figure 27 is a screen capture illustrating an active play mode; and,

Figure 28 is a screen capture illustrating an edit play mode.

BEST MODE FOR CARRYING OUT THE INVENTION

At the outset, it should be appreciated that like drawing numbers on different drawing views identify identical, or functionally similar, structural elements of the invention. While the present invention is described with respect to what is presently considered to be the preferred aspects, it is to be understood that the invention as claimed is not limited to the disclosed aspects. Also, the adjectives, "front," "back," "left," "right," "top," and "bottom"

and their derivatives, in the description herebelow, refer to the perspective of one facing the invention as it is shown in the Figure under discussion. Furthermore, "vehicle" may be used interchangeably with "car." Likewise, "control terminal" may be used interchangeably with "host."

Furthermore, it should be understood that this invention is not limited to the particular methodology, materials and modifications described and as such may, of course, vary. It should also be understood that the terminology used herein is for the purpose of describing particular aspects only, and is not intended to limit the scope of the present invention, which is limited only by the appended claims.

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this invention belongs. Although any methods, devices or materials similar or equivalent to those described herein can be used in the practice or testing of the invention, the preferred methods, devices, and materials are now described.

Adverting now to the drawings, Figures 1 and 2a illustrate game **10** being played. The game is played in play area **12** which includes floor **14** enclosed by walls **40**. Wall **40** should be of a sufficient height to keep the ball in play under normal circumstances, and to define boundaries for the movement of the vehicles. In a preferred embodiment, play area **12** is rectangular, and therefore so is floor **14**. However, it should be appreciated that the play area could be any size or shape, including but not limited to circular, triangular, or trapezoidal. The floor is preferably a flat and hard surface such as concrete. It is also preferred that the entire play area be enclosed to prevent the game piece from leaving the play area, and also to provide additional game play strategies which may involve purposefully playing the game piece off the wall. Therefore, walls **40** preferably include four sides in embodiments which have rectangular play areas, and as many sides as necessary to enclose play areas of other shapes. Around the perimeter of play area **12**, at the edge where floor **14** meets wall **40**, is wall skirt **18** which terminates in wall bumper **20**. In a preferred embodiment, the game is played on a court having a floor, four walls and a ceiling, where the walls form a rectangular play area.

In a preferred embodiment, the game is shown being played by two teams of four players each. The first team comprises players **32a**, **32b**, **32c**, and **32d**. The second team

comprises players **32w**, **32x**, **32y**, and **32z**. It should be appreciated that four players is only used to represent one embodiment of the game. Other embodiments could include more or fewer players, and furthermore, other embodiments could include more than two teams. The vehicles are preferably split into two colored groups (e.g., blue and red teams), and all players on the same team ride vehicles which are the same color. (In a preferred embodiment, the team colors are indicated by LED displays on each car, although team colors could be indicated by car color or by flags affixed to the cars, etc.) Goals **16a** and **16b** are at opposite sides of the play area. Target apertures **38** are located in each goal **16a** and **16b**. At the halfway point between the two goals on the play area, preferably against the wall, is shield **22**, behind which a referee stands to operate control terminal **26**. Scoreboard **23** should be located in an easily visible spot, such as above the control terminal. The scoreboard includes game clock **24** which displays the time remaining in the game, first team score **25a** which displays the number of points the first team has scored, and second team score **25b** which displays the number of points the second team has scored.

Each player is shown riding vehicle **28** and holding a scoop **34** which is operatively arranged for carrying, passing, and shooting ball **36**. Ball **36** is the preferred game piece used to play game **10**, but other game pieces of various sizes and shapes may be substituted as described *infra*. In some aspects, ball **36** is about the size of a baseball and made of a soft, spongy foam material.

Figure 2b shows a section view of wall skirt **18** and wall bumper **20**. The top of wall skirt **18** is sloped at angle **48** below the horizontal. Wall bumper **20** includes wall cushion **44** encased in wall bumper membrane **46**. Wall cushion **44** is preferably constructed of high impact, dense foam rubber. Wall bumper membrane **46** is preferably made from a smooth, flexible rubber, the advantages of which will be described *infra*. In Figure 2c the wall bumper is shown in contact with vehicle bumper **50** on vehicle **28**. Figure 2d shows ball **36** rolling off of wall skirt **18** over wall bumper **20** and ultimately onto floor **14**.

Figure 3 illustrates vehicle **28** which includes vehicle base **74** upon which seat **52** rests supported by seat support **54**. Seat **52** has seatbelt **53**. Leg guard **80** is located at the front of vehicle **28** to help ensure that each player's legs stay inside vehicle **28** so that they do not dangle out of the vehicle, where they could get injured. Base **74** of vehicle **28** is surrounded by bumper **50**. Motor **92L** and battery pack **56** are shown at the back of vehicle

28. Movement control support 58 is located in front of seat 52 located centrally along the width of vehicle 28 protruding out of base 74. Joystick shroud 60 surrounds joystick 62 at the top of joystick support 58. The advantages of the joystick shroud will be described *infra*.

Figure 4 shows an enlarged view of the joystick and corresponding shroud. Figure 5 shows a section view of the joystick, shroud, and support further illustrating wiring 63 which connects joystick 62 to the motors 92L and 92R and allows the joystick to communicate with the motors. Figure 6 shows how only fingers 68 of hand 66 can reach around shroud 60 to operate joystick 62.

It should be appreciated that although joystick 62 is the preferred method of vehicle movement control, other methods may also be acceptable. These other methods may include, but are not limited to a trackball, touch pad, computer style mouse, or electronic keypad. Movement control support 58 may also include a variable height mechanism so that a player can adjust the movement controls to a desired height.

Figures 7a and 7b show the scoop with and without the ball, respectively. Scoop 34 has a handle portion 70 for a player to grasp and a basket portion 72 in which the ball can be caught, and from which the ball can be passed or shot. The scoop can be used essentially to retrieve the ball off the ground, catch the ball in mid air, block the ball, pass the ball, or shoot the ball.

The vehicle and its bumper are illustrated in Figures 8-10. Figure 8 illustrates a similar view of the vehicle as was described with respect to Figure 3, however the vehicle does not have vehicle bumper membrane 78 secured around inner cushion 76. Vehicle bumper cushion 76 is built the same as wall cushion 44 in wall bumper 20 but sized and shaped to fit around the perimeter of vehicle 28. Vehicle bumper membrane 78 is built the same as membrane 46 but is sized and shaped to fit around vehicle bumper cushion 76.

Figure 9 shows vehicle bumper membrane 78 which typically is secured around inner cushion 76. The arrangement of the vehicle bumper membrane and the vehicle bumper cushion is further demonstrated in Figure 10, which shows a cross-section of the vehicle bumper, in which it can be seen that vehicle bumper cushion 76 is affixed to base 74 and encased in vehicle bumper membrane 78.

Figures 11 and 11a illustrate a preferred embodiment of goal 16 showing a perspective view and a cross-sectional view, respectively. Goals 16a and 16b are comparable

to goal **16**, and have different reference numerals only to illustrate the respective goals during game play. Therefore, anything said about goal **16** also holds true for both goals **16a** and **16b**. In these views, goal **16** is shown having three faces **84**, **86**, and **88**, each in its own unique plane generally in the shape of a box with a trapezoidal cross-section. Target apertures **38** are located in each face **84**, **86**, and **88**. Chute **82** is located in the bottom of goal **16** for depositing the game piece, such as ball **36** as shown, back into play. In some embodiments the bottom of the goals may be sloped inward to ensure the ball falls out of the chute.

Each of the faces also preferably has at least one goal indicator. Indicator light **90** can be triggered to illuminate during various events during game play, particularly when a goal is scored. Other events that may trigger indicator light **90** illuminating may include the start or end of a game. Indicator light **90** is preferably a LED or a group of LEDs. They may be any color, but are preferably colored to correspond with the color of the team that is trying to score in the goal that the indicator lights are located on. In some aspects, the teams are trying to score in goals that have indicator lights of the opposite team's color. In other aspects, the indicator lights are colors that do not correspond to either team.

Figure 12 is rear view of vehicle **28**. Motors **92L** and **92R** are shown positioned on the back left and back right sides of the vehicle, respectively. Emergency stop button **64** is located on the right side of the vehicle above motor **92R**. Battery pack **56** detachably fits between motors **92L** and **92R**. Battery pack **56** powers vehicle **28** when plug **94** is connected to socket **95** on vehicle **28**, however, any power source known in the art could be used. In a preferred embodiment, battery pack **56** is used because it is rechargeable, portable, and does not emit harmful gases or fumes. Emergency stop button **64** triggers the connection from the power source to the motors to physically disconnect so that power is no longer transmitted to the motors, thereby stopping the vehicle.

Figure 13 shows a bottom view of vehicle **28**. This reveals casters **27** located at the front and back of vehicle **28** substantially equidistant from the right and left sides of the vehicle. Casters **27** roll and swivel freely, and act only as rolling support for the vehicle, as they are not powered. On the left side of the vehicle is left motor **92L**, left wheel **96L**, and left drive regulator **98L**. On the right side of the vehicle is right motor **92R**, right wheel **96R**, and right drive regulator **98R**. In this embodiment, the motors are rotating about an axis that

is perpendicular to that of the axes of the wheels. Drive regulators **98L** and **98R** take the output from the motors and converts it so that it rotates in the same axes as the wheels so that the vehicle can move. This could be accomplished by the use of a set of bevel gears, but could also be accomplished by any other method known in the art. The drive means may also contain a further system for scaling the output of the motor. For example, the drive means could use a gearing system to take a high rpm output from the motors and convert it to a lower rpm output for the wheels.

Figure 14 illustrates another embodiment of game **10** wherein an ellipsoidal game piece, such as football **100**, is used instead of ball **36**. This embodiment does not require the players to use scoops **34**, since the ellipsoidal game piece is thrown and caught with the player's hands. Figure 15 shows a further embodiment in which goal **16** is replaced by backboard **114** and hoop **112** for a style of game play similar to basketball. In this embodiment, a preferably large spherical game piece is used, such as beach ball **110**.

Figure 16 illustrates another embodiment for the goal. Goal **130** is shaped essentially as an empty cube having three faces **132**, **136** (not shown), and **138**. Faces **136** and **138** are substantially orthogonal to face **132** and parallel to each other. Each has a target aperture **134** located in it for receiving the game piece. The faces each have at least one light indicator **142** thereon. Light indicator **142** is identical in construction and purpose to light indicator **90** on goal **16**. Chute **140** allows the game piece to return into play if it enters the goal through any of the target apertures.

Figure 17 is another embodiment for the goal in game **10**. In this embodiment, goal **150** has curved face **158** with three target apertures **154**. Light indicators **152** are located on the face of goal **150** and are constructed and used the same as light indicator **90** on goal **16**. Similar to other embodiments, chute **160** is located at the bottom of the goal and operatively arranged to return the ball back into play.

It should be appreciated that the target apertures do not have to be the same size, the same shape, centrally located on their respective goal faces, or limited to one aperture per face. To increase game play strategy and difficulty, different apertures may be different shapes or sizes, as such modifications are within the spirit and scope of the present invention.

Although not shown, the vehicles may have display panels which communicate with the control terminal to obtain, then display various game aspects such as the time remaining, the score, or how many shots or penalties the player riding that particular vehicle has accumulated during the game. Also, the vehicles may have a set of speakers added, preferably near the top of the seats so they are proximate the player's head thereby allowing the referee to trigger a command to play pre-recorded messages to individual players.

Operation and Game Play

A basic set of rules, strategies, and general operation of the preferred embodiment of the game will now be described to provide a better understanding of how the aspects of the game work together. Adverting back to Figures 1 and 2a, a depiction can be seen of game **10** in progress. The game is played between two teams and the object is to score more points than the opposing team. The game can be of varying lengths. For example, a game of thirty minutes could be separated into halves to give the players a short rest. Scoreboard **23** displays the time remaining and the scores of the two teams.

In this illustration the first team includes players **32a**, **32b**, **32c**, and **32d**, and the second team includes players **32w**, **32x**, **32y**, and **32z**. A player can score a point by shooting ball **36** through target aperture **38** in his respective goal. For example, the first team (players **32a – 32d**) is trying to score in goal **16a** and the second team (players **32w – 32z**) is trying to score in goal **16b**. Figures 1 and 2a illustrate player **32d** taking a shot at target aperture **38** in goal **16a**.

The vehicles driven by players in the first team preferably include an indicator which is a first color, and the vehicles driven by players in the second team preferably include an indicator which is a second color. This allows the players to easily distinguish which players are on which teams by looking at the color of the vehicle they are driving. In some embodiments the vehicles are actually painted a color or have their seats made from a colored fabric. In other embodiments the color of the car is determined by LEDs located about the vehicle so that each vehicle illuminates a color.

Although all of the first team is shown facing the same direction and all of the second team is shown facing the opposite direction, players are able to turn their vehicles in any direction and can go to any part of the play area. For safety reasons, players should not

exit their vehicles while the game is being played. In preferred embodiments players must wear their seatbelts at all times, or they may be penalized.

In some embodiments, players carry scoop **34** in one hand and maneuver their vehicles with the other hand via a movement control device. The movement control device is preferably located centrally between the left and right sides of the vehicle. If it is centrally located then a player can use either his left or right hand to operate the vehicle. This is preferred as it accommodates people with left or right hand dominance, and it also allows a player the option to quickly switch hands while driving, which may advantageously free up their other hand for more effectively or strategically playing the game.

Wall bumper **20** is also connected to skirt **18** which is shown cross-sectionally in Figure 2b. The wall skirt is sloped at angle **48** below the horizontal so that balls can not get stuck up against the walls. Instead, as shown in Figure 2d, any ball that otherwise would have landed at the edge between the floor and the wall will instead roll down wall skirt **18** over wall bumper **20** and back into the play area for easy retrieval by a player. Additionally, the wall bumper and skirt together provide a buffer between the players and the walls, so that a player cannot hit his head or some other body part against the hard wall.

Figure 3 shows the movement control device sitting atop movement control support **58**, which allows the movement control device to be at an appropriate level for a player seated in seat **52**. In these Figures the movement control device is joystick **62**. Players grip joystick **62** and press it forward to move the cart forward, to the right to turn the vehicle to the right, to the left to turn the vehicle to the left, and towards them to reverse the vehicle.

The movement control device is preferably variable in rate of movement and rate of turning. Joystick **62** is preferably programmed so that when the joystick is slightly pushed in a direction the motors operate slowly, and when the joystick is pressed all the way in a direction the motors operate at their highest allowable speed. This allows the players the greatest degree of maneuverability when playing game **10**. In a penalty mode, the referee can impose a penalty on one or more players, restricting the allowed speed of their car. For example, the referee can send a command which restricts voltage applied to the joystick to half-voltage, thereby restricting car speed to half-speed.

Shroud **60** is preferably included to protect joystick **62** from being pressed too hard in any direction, which may damage the joystick. Of particular concern is when vehicles

are about to make head-on contact with another vehicle or wall bumper, players instinctively brace themselves for impact. This generally involves a player exerting an excessive force on the joystick when the joystick is in a full forward position, which may cause the joystick to bend or snap. As seen in Figure 6, players are only able to grip joystick **62** with the tips of their fingers **68**, and the bulk of their hands **66** must remain outside the shroud. If a player was allowed to fully grip the joystick, that player may intentionally or unintentionally damage the joystick. Therefore, shroud **60** advantageously protects the joystick from being damaged, which potentially saves on the cost of maintenance and replacement parts.

Wall bumper **20** is also connected to skirt **18** which is shown cross-sectionally in Figure 2b. The wall skirt is sloped at angle **48** below the horizontal so that balls can not get stuck up against the wall. Instead, as shown in Figure 2d, any ball that otherwise would have landed at the edge between the floor and the wall will instead roll down wall skirt **18** over wall bumper **20** and back into the play area for easy retrieval by a player. Additionally it provides a buffer between the players and the walls, so that a player cannot hit his head or some other body part against the hard wall.

The following is described in light of Figures 2b-3, and 8-10. The bumpers are preferably constructed so that they are firm enough to provide a solid impact, but are pliable enough to ensure the safety of the players. Also, in the event that a player's hand or other body part gets caught between two bumpers, it is ideal for the player to suffer no injury or as minor an injury as possible. As previously discussed, Figure 10 illustrates a preferred configuration of the bumpers. It comprises a cushion made of high impact dense foam encased in a rubber membrane. This allows the bumpers to yield around a player's hand, leaving it virtually unharmed, should it happen to get caught between a vehicle bumper and another bumper. The rubber membrane is smooth so that it will not grip easily to skin, and therefore should not leave lacerations or brush burns if it roughly contacts a player. Also the rubber membrane allows the vehicles to easily slide off each other or the wall bumper during contact. Wall bumper **20** outlines the perimeter of the play area to eliminate any jarring contact with the hard walls. The wall bumper is constructed the same way and for the same advantages as the vehicle bumpers.

In a preferred embodiment, player moves joystick **62** which communicates with and activates motors **92L** and **92R**, seen in Figures 4, 5, and 13. The output from the

motors is taken by drive regulators **98L** and **98R** to rotate wheels **96L** and **96R**, respectively. To turn left, motor **92R** has a higher forward output than motor **92L**, which causes wheel **96R** to travel faster, thereby turning the vehicle. To turn right, motor **92L** has a higher forward output than motor **92R**, which causes wheel **96L** to travel faster, thereby turning the vehicle. For particularly sharp turns, such as when the joystick is in a full right or a full left position, the wheel on the inside of the turn may rotate in reverse so that the vehicle essentially rotates in place. To move forward, both motor **92L** and **92R** move at the same rate of speed so that the vehicle does not turn. To reverse, the motors both operate at substantially the same speed, but they do so in a reverse direction, causing the car to move backwards. Therefore, in this preferred embodiment, joystick **62**, motors **92L** and **92R**, drive regulators **98L** and **98R**, rotate wheels **96L** and **96R** collectively comprise both a drive means and a turning means for vehicle **28**. In other embodiments distinctly different systems could work independently to either move the vehicle or turn the vehicle. For example, both wheels could always rotate at the same speed, so that turning is achieved by a system such as a rack and pinion apparatus to physically change the orientation of the wheels with respect to the vehicle, instead of different rates of speed, as was just described above.

The goals have a plurality of multi-planar apertures to provide two main advantages. First, it allows players to take shots from the corners of the court, which spreads out the players on the court, and allows for more strategic and interesting game play. If the goal only had one target aperture, then the middle of the court would almost always be congested with players, because that would be the only location from which to score a goal. Secondly, it allows the game to be played on a much smaller play area, since the players will be spread out evenly throughout the play area, instead of congested in the middle. A smaller court significantly decreases the rental or real estate costs of operating a court to play game **10** by the same number of players as a larger court with only a forward facing target aperture.

Players use scoop **34** to pass the game piece to another player, or to retrieve the game piece if it is on the ground. In embodiments which use scoop **34**, players are only allowed to interact with the ball by use of their scoop. Not all embodiments use scoop **34** and players instead throw the ball, or shoot it similarly to basketball. It is preferred in all embodiments that a soft, lightweight ball be used, so that players are not injured if they are hit by an errant shot or pass.

A player is also able to maneuver his vehicle into another player's vehicle to push that player away from the game piece, jar the game piece loose from that player's possession, or disrupt a shot or pass that player is trying to perform. In some variations of the game, bumping other players may be encouraged, while in other variations, penalties may be issued for particularly hard or repeated bumping.

The referee operates the game by touching (or clicking, in those embodiments without a touch-screen) the buttons displayed on the control terminal. The referee generally enters into the control terminal all important actions that occur by players during the course of a round of playing the game. Such important actions may include, but are not limited to passes, shots on goal, goals scored, rebounds, retrievals off the ground, and penalties. The referee also controls when the game clock starts, stops or pauses. The referee can edit the time on the game clock and can also edit the scores of each team on the scoreboard.

The control terminal preferably communicates with the vehicles, speakers, lighting, goals, vehicles, and other components of the game by a plurality of wireless transmitters and receivers placed throughout the play area. Since some components, such as the goals and speakers, are stationary and may be located near the wall, they may instead be hard wired to the control terminal. In a preferred embodiment, each vehicle has a transmission and receiving means located on it for communicating with the control terminal. Various methods of wireless communication which may be used in other embodiments include, but are not limited to infrared, wireless Ethernet, radio, or Bluetooth technologies.

Circuit Operation

The control circuit for the game is shown in Figures 18A-19Y. It should be appreciated by those having ordinary skill in the art that variations and modifications in the circuit can be made without departing from the spirit and scope of the invention as claimed. The circuit is provided to illustrate a preferred embodiment of the invention, and the best mode of practicing the invention known to the inventors at the time of application for patent, and to enable those having ordinary skill in the art to make and use the invention. It should be appreciated, however, that there are different ways to implement the invention as claimed. For example, communications used in the game between the host and cars could be accomplished by infrared or RF communication without departing from the spirit and scope of the game as claimed.

Figures 18A-18Y illustrate the "car control circuit", so named because the circuit board containing this circuit is located in each car of the game, and because this circuit controls many car functions. The circuit comprises microprocessor S1D76, which is a model 68HC11 microprocessor (manufactured by Motorola) which operates in split-mode to enable multiplexing with interface adapter S1D75, a model 68HC24 adapter (manufactured by ASICS). (The 68HC24 is designed to replace the Port B and Port C functions of the 68HC11 MCU. These functions are lost when the MCU is operated in expanded mode.) The 68HC24 enables communication with three additional peripheral interface adapter ports.

Quartz crystal oscillator Y1 and its associated circuit components are arranged to accomplish a plurality of functions. The crystal oscillator is arranged to operate at a frequency of 14.64 MHz. The clock signals are used for communications by both microprocessor S1D76 and by peripheral interface adapter S1D75, and to provide reference clock signals for other game functions. In addition to providing a communications signal, the oscillator also provides a signal for an infrared (IR) baud clock for IR communication.

The crystal oscillator also provides a clock signal to a divide-by-three clock circuit comprising U30 (dual flip-flops), U22 (OR gate), and U14 (Schmitt trigger). This sub-circuit divides the 14.64 MHz by three for other applications within the game. U7 (comprising a plurality of flip-flops) further divides the 4.88 MHz signal from the divide-by-three module to a 38.5 KHz signal for infrared and to a 150 Hz signal for audio within the game. The infrared signal can be used for a "laser tag" aspect of the game where individuals cars can "tag" one another by "laser" IR devices, as in well-known laser tag games.

Code to run the microprocessor is stored in PROM S1D63, a model 29F010 1 MB PROM device. This code is included with a commercially available game from Cyber Sport Manufacturing of Amherst, New York.

Also connected to the peripheral interface adapter is display driver MAX7219, a standard seven-segment LED driver chip. The driver drives an LED display described *infra*.

The circuit also includes an MPU (microprocessor unit) support circuit, labeled on the drawing as a Powerup Reset sub-circuit comprising NPN transistor 2N3904 to ensure startup and reset of the main microprocessor and peripheral interface adapter.

Lines PD2 and PC6 communicate with a smaller MPU to perform other functions as described *infra*.

Also shown on the drawing are radio communication lines RFOUT and RFIN which transmit and receive radio communication signals between the car and host. Examples of information which may be communicated include, but are not limited to, car battery voltage and other car status information. This communication link can also be used to shut a car down in an emergency condition, or if a player in a game is "mis-behaving". The signals could also be used to cut battery voltage in the car to slow the car down, as in a penalty situation. In a preferred embodiment, the car, which of course is mobile about the playing surface, communicates with the host via a ceiling mounted transceiver. In a preferred embodiment, the transceiver communicates with each car through wireless RF, and the transceiver is hard-wired to the host PC. Of course, other communication schemes are possible. For example, the cars could communicate with the host via IR signals, and the transceiver could wirelessly communicate with the host PC.

Below the RFOUT and RFIN lines are HALF SPEED and EMERGENCY STOP control lines which, as described below, are used to control speed and to stop the car when desired in response to radio control signals. In a preferred embodiment, the EMERGENCY STOP circuit functions to actually operate a main battery contact. When activated, complete battery supply to the car drive motors is interrupted, which completely stops the car. Processor power is not affected by this control.

Below the EMERGENCY STOP control lines are a plurality of ATMEL SELECT lines operatively arranged to control other MPU controllers as additional game features are added.

The circuit also includes a GAME STOP control line which is operatively arranged to stop the game when instructed to do so by the host PC. Unlike the EMERGENCY STOP, the GAME STOP does not interrupt battery power, but simply stops the game in progress. Of course, if for any reason the GAME STOP function fails, the EMERGENCY STOP can be used as a failsafe.

The 38.5 KHz clock is used for a "phaser" function which will permit a "laser-tag" type game to be played. In this version of the game, players will be able to fire a "laser" and tag opposing cars, scoring points, etc.

The circuit also includes a voltage reference sub-circuit V_{REF} which is used as a reference voltage for monitoring car battery voltage. This reference voltage is

communicated to the MPU, which compares the reference voltage to the car battery voltage. When a sufficient battery drop is detected/measured, the MPU communicates this fact to the host PC. In this way, the host computer can notify the game operator when a car battery needs to be recharged.

The audio circuit shown in Figure 18F includes EPROM U18, model 27C160, which stores game sound files. The device has a 2Mb capacity. The device can hold a total of two minutes of audio files which may be selected as desired. Flip flops U11 start and stop the sounds. The software of the invention generates a byte which selects one of 128 segments of audio stored on the EPROM. The segments are concatenated to fill the length designated by the code. U11 is a counter that counts to the EPROM via lines A1-A13. Signals on lines A14-A20 are used to select specific quadrants of the EPROM. Audio data is transmitted from the EPROM via data lines D0-D7. In a preferred embodiment, the sound signals are amplified by AMP1, and the sounds play through a speaker (S2D71) in the car. Prior to game play, each car is assigned an identification number. The number is communicated via RF or IR signal to the car, and the car audio system will play a predetermined sound to indicate to the referee that the car I.D. has been assigned and acknowledged. The referee can also send a command code to trigger individual sounds to each car. For example, he can send a warning message to a player, or send a congratulatory message when a player scores, etc. Some sounds are manually triggered, while others are automatically triggered. For example, if one player rams his car into another car, a sensor detects the collision, fault is determined by means of the sensed signal, and the offending player's car can be automatically set to half speed for a predetermined amount of time. Another automatic sound, for example, may tell the driver that his battery needs to be recharged. A sound may tell the player "great shot" when he scores, for example.

In a preferred embodiment, the cars are each powered by a 24 VDC battery, rated at 130 amp-hours. This battery voltage is divided by divider circuits well known in the art to provide 15VDC, and 5VDC, to power electronics on each car. In some situations, it may be necessary to stop play, limit car speed, or to completely disable all cars. Shown in Figure 18U is emergency stop relay K2 which controls the aforementioned emergency stop contactor coils. Figures 18S and 18T show the half speed relay K1 and the game stop relay K3. As described previously, these relays are used to limit car speed to half speed when

desired, for example, when a player commits a penalty; or to stop game play, respectively. Emergency stop relay K2 can be used during an emergency, for example, if a player leaves his car and starts to walk across the play surface during a game. Emergency stop relay K2 breaks contact between the car's battery and motor, preventing motion. Half-speed relay K1 provides half-voltage to the player's joystick, preventing him from applying more than half voltage to the car motor controller. Game stop relays removes all voltage from the player's joystick, preventing application of a voltage to the motor controller, but does not break the main contacts to the motor.

Figure 18J shows peripheral interface processor S3D103 (Model AT90S2313 by Atmel or equivalent), which is used to control a plurality of multi-colored LED displays located within each car. In a preferred embodiment, each car includes red, blue and white LEDs. These LEDs can serve a number of functions. For example, a number of blue LEDs can be activated on a number of cars to designate a "blue" team; a number of red LEDs can be activated to designate a "red" team, etc. The LEDs can also be programmed to flash during certain game events, such as a score, for example, to add excitement, or even to dim/turn off when a player is penalized, for example. Also, in a "laser-tag" version of the car, a white LED may flash to indicate that a player successfully "tagged" an opposing player's car.

Figures 18W and 18X also show laser drive circuit LS1 which controls the laser on the phaser gun of the invention. This circuit controls the laser duration and limits it to .21 sec bursts in duration. Again, the phaser is used in a "laser-tag" version of the game of the present invention. Figure 18X also shows IR communication circuit IR1 which modulates the 38.5KHz IR communication signal. This signal is used for communication between cars. For example, it is used to indicate which car tagged another car during game play. Finally, Figures 18H-18K show LED displays DI0-DI7 which are mounted in each car and arranged to display various game parameters, such as team score, time left, shots on goal, etc.

Figures 18A-18Y illustrate a goal control circuit. In a preferred embodiment of the game, the host control circuit is mounted inside the goal unit, and hard-wired to the host PC. Of course, the goal control circuit could be connected wirelessly to the host PC. This control circuit processes commands sent from the host PC to control sounds from the main game speakers, and to control the scoreboard, etc. For example, the control circuit can send

both scores and time remaining information to the scoreboard when commanded to do so by the host PC.

As seen in the drawings, the goal control circuit is virtually identical to the car control circuit. The quartz crystal timing circuit and divide-by-three circuits, and audio clock signals are identical and perform the same function. The host control circuit includes a microprocessor S1D65 which is also a 68HC11 device, and a peripheral interface adapter S1D77 which is a 68HC24 device. The circuit also includes PROM S1D96, a 29F010 PROM, which stores the code to run the microprocessor.

Shown in Figures 19C and 19D is power supply PS1 which provides 9VDC for LEDs and 5VDC supplies to run the various electronic components.

The host circuit also includes audio circuit AMP2 comprising EPROM U19, model 27C160, which stores game sound files. The device has a 2Mb capacity. The device can hold a total of two minutes of audio files which may be selected as desired. Flip flops U12 start and stop the sounds. The software of the invention generates a byte which selects one of 128 segments of audio stored on the EPROM. The segments are concatenated to fill the length designated by the code. U12 is a counter that counts to the EPROM via pins A2-A13. Signals on lines A14-A20 are used to select specific quadrants of the EPROM. Audio data is transmitted from the EPROM via data lines D0-D7. In a preferred embodiment, the sound signals are amplified by circuit AMP2, and the sounds play through four speakers (S2D71) located in the corners of the playing area proximate the ceiling. Some sounds are manually triggered, while others may be automatically triggered. For example, the referee may manually trigger a sound to be played when a goal is scored, or sensors in the goal enclosure may sense a goal and play a sound.

The host computer communicates with the goal circuit via RS-485 ribbon cable or by RF communication depending on how the game is configured. If communicating by hard wire, then sub-circuit RS-485 on Figure 19T and 19U is used. If communicating by radio, then sub-circuit RADIO is used. The RS-485 sub-circuit uses a 75176 chip for TTL data communication with the processor. The RS-485 and radio circuits are arranged in parallel. If the radio is not connected, then communications occur via hard-wire over the RS-485 cable. If the radio is connected, then RS-485 communications are disabled. The goal circuit also includes a strobe light sub-circuit STROBE which may be configured to fire a

strobe light during game play. For example, the software can fire the strobe either automatically upon a score, or be fired manually by the referee.

The goal circuit also includes two microcontrollers U19 and U26 as shown on Figures 19G and 19K. In a preferred embodiment, each of these microcontrollers is an Atmel Model AT90S2313 8-bit microcontroller with 2K bytes of in-system programmable flash. As seen in the schematic, the controllers are arranged to fire a plurality of different colored LEDs. For example, the drawing shows a plurality of red, blue and green LEDs. The various LEDs are shown on the drawing using the conventional electronic symbol for an LED, and the control lines are labeled RED, GRN, BLU to designate red, green and blue; or RED1, GRN1 and BLU1 to designate red, green and blue, respectively. The individual LEDs are further labeled LS4-LS30. The multi-colored LEDs are physically located on each goal. They can serve a number of purposes. For example, the LEDs may light up on their respective goals corresponding to the team trying to score there. Also, the LEDs can be programmed to flash during certain game events, such as a score, to add excitement, or even to dim/turn off when game play is paused, for example.

The goal circuit also includes dipswitch DIPSWHEXV which identifies the goals to the host computer. This enables the host PC to know which goal has registered a goal/score. Figures 20 and 21 are composite diagrams of Figures 18A-18Y and 19A-19Y, respectively detailing the arrangement of the figures in viewing the electrical schematics.

Host PC Operation

In the drawings and written description of the invention, we utilize screen captures taken while operating the software to illustrate the best mode of the invention known to the inventors at the time of application for patent and to enable those having ordinary skill in the art to use the invention. The software of the present invention was written in C and is operatively arranged to operate in MS-DOS. It should be understood that the present invention is not limited to any particular operating system and may for example, be compatible with any DOS based system, Windows XP, Windows Vista, Unix, Mac OS, or any other operating system. Likewise, the software does not have to be written in C, but could be written instead in Visual Basic, Java, or any other programming language known in the art.

Figure 22 is a block diagram illustrating a present invention control terminal **26** for controlling game **10**. Control terminal **26** includes host pc **200**, which is operatively arranged to receive inputs from optical drive **202**, music control unit **204**, keyboard **206**, and touch screen monitor **102**. Typically, host PC **200** is a general-purpose computer, however it should be understood that host PC **200** can be any computer or computing system known in the art, and that such modifications are within the spirit and scope of the claims. Host PC **200** is also operatively arranged to output signals to speakers **208**, goal **16**, and touch screen monitor **102**. It should be understood that touch screen monitor **102** could be replaced with a standard non-touch monitor and the use of a mouse or voice command system could be used in place of a touch screen operation as these modifications are within the spirit and scope of the claims.

Optical Drive **202** is an optical unit which is primarily used to play music during game play, however optical drive **202** could be used for software updates and recording of player or game statistics. In a preferred embodiment, optical drive **202** is a compact disk drive. In the alternative, optical drive **202** could be a Digital Video Disk drive, Blue-Ray disk drive, or a re-writable compact disk drive. Music control unit **204** includes volume control, a microphone input, and track selection controls. Keyboard **206** is a standard keyboard, however any control unit known in the art could be used to select the appropriate commands as required by the computer. Touch screen **102** further allows the referee to control host pc **200** by pressing various control buttons on touch screen **102** as will be described *infra*.

Control terminal **26** also includes outputs to speakers **208**, touch screen monitor **102**, and goal **16**. Speakers **208** are located within play area **12** and arranged to reproduce music from optical drive **202**, voice commands from music control unit **204**, and sounds stored on a storage unit of host pc **200**, such as a hard drive or universal serial bus flash drive. Touch screen monitor **102** is operatively arranged to receive and display commands from host PC **200**, therefore touch screen monitor **102** maintains two-way communication with host pc **200**. Goal **16**, which may include lights in the form of LEDs or speakers, is operatively arranged to be controlled by host PC **200**. Such that when the referee depresses a certain button on touch screen monitor **102**, lights in goal **16** may light up or flash, or a sound may be reproduced through speakers on goal **16**. In addition, goal **16** may

be operatively arranged to send information to host PC **200**, which may also then be displayed on touch screen monitor **102**. Information sent to host PC **200** may include scoring a goal.

The operation of control terminal **26** will now be described adverting to Figures 23-28. Figure 23 is a screen capture illustrating operation mode selection menu **201**. The referee can select from various operation modes including play **210**, edit **212**, new **214**, print **216**, load names **218**, and configuration **220**. The operation mode selection can be made by pressing the appropriate button on keyboard **206** or touch screen monitor **102**. Host PC **200** is operatively linked to a wireless or wired network where players input their real name and code name. When setting up a game, host PC **200** receives the current list of real names and code names from the network. New **214** erases the current list of real names and codes names within memory of host PC **200** and communicates with the network to receive a replacement set of real names and code names when the referee selects load names **218**. Print **216** is arranged to allow the referee to print past game statistics, whereby the referee can print the player and game statistics of any game played which is still in host PC **200** memory.

Figure 24 is a screen capture illustrating a game format selection prompt which is accessible by selecting configuration **220** from the operation mode selection prompt. In configuration mode, the referee selects the appropriate game format by game name **222** and game type **224**. Maximum time **226** and maximum score **228** are displayed for each game format. For example, when game type **224** is practice, maximum time **226** may be seven minutes and maximum score **228** may be one goal. The referee may use keyboard **206** to scroll to the proper game name or touch screen monitor **102** to select the proper game name. If using keyboard **206**, the referee may press the F9 key to cancel the game change or press the F10 key to accept the highlighted game and exit the configuration mode. However, it is within the spirit and scope of the present invention to operatively change game name **222**, game type **224**, maximum time **226**, and maximum score **228** from the configuration mode by pressing the appropriate game name and modifying the desired parameters with the keyboard or the touch screen monitor.

Figure 25 is a screen capture illustrating player edit mode **212**. Player edit mode **212** allows the referee to operatively change user information such as car number **230**, code name **232**, team color **234**, team goal **236**, driver name **238**, and user identification number **240**. Player edit mode **212** loads player information within host PC **200** so that the

referee can move the cursor to the appropriate player to change each individual player's car number **230**, team color **234**, and team goal **236**. In a preferred embodiment, there are two team colors, red and blue, as well as two team goals. However, it is within the spirit and scope of the invention to provide more than two team colors and more than two goals, thereby requiring selection of the appropriate team color **234** and team goal **236**. The referee can change any of the user information as mentioned *supra* with keyboard **206** or touch screen monitor **102**.

Figure 26 is a screen capture illustrating player designation mode accessed through operation mode selection menu **201** via load names **218**. Player designation mode also includes navigation buttons delete **252**, down **254**, up **256**, to main **258**, and to game **260**. In addition, player names are represented by player name buttons **250** loaded into memory of host pc **200** are displayed on touch screen monitor **102**. In some aspects, the referee may double-click a player name button and edit the player name with a keyboard or touch screen monitor **102** to load players into the appropriate corresponding car, by load we mean placing the player name with the appropriate car. Down **254** and up **256** control cursor **251** which is represented as a star in play list **253**. The referee presses down **254** until the appropriate car is selected. For example, to place a player in car two, the referee will press down **254** or up **256** until cursor **251** is located on the same line as car two. If a player is already loaded in car two, the referee can press delete **252** to remove the player from car two. Once car two is empty, the referee will press a player name button **250**, which will place the player code name and real name on the car two line. The above process is repeated until the correct players are located in the correct cars and any non-players are removed from play list **253**. Once play list **253** is correct, the referee may select to main **258**, which will return the referee to operation mode selection menu **201**. If to game **260** is selected, the referee will be taken to active play mode as described *infra*.

Figure 27 is a screen capture illustrating an active play mode accessed through operation mode selection menu **201** via play **210** or to game **260**. Active play mode is the main game play mode and the mode in which the referee controls the aspects of play. Current player buttons **302** include car number **304**, player initials **306**, and player points **308**. The number of current player buttons **302** corresponds to the number of players currently playing game **10**. Current player buttons **302** are touch sensitive so that each player can be identified,

statistics kept, and penalties assessed. The active play mode further includes timer **310** which is operatively arranged to countdown from a predetermined time limit. Timer **310** corresponds to game clock **24** so that any changes made to timer **310** are also made to game clock **24**. Each team has a score box **312** and **314**, as well as a penalty box **316** and **318**. Score boxes **312** and **314** correspond to scoreboard scores **25a** and **25b**.

The referee can press penalty buttons **320** to assess penalties for a variety of infractions, including: ramming, pinning, slashing, hand on the ball, hand or feet outside of the vehicle, hiding the ball, goaltending, throwing the scoop, unsportsmanlike conduct, delay of game, or harassing the referee. However, it should be noted that any other penalties are within the spirit and scope of the present invention. In addition, time in **322** is operatively arranged to activate timer count down **310** as well as rename button **322** to display "time out." By this we mean that when play is active, button **322** reads "time out" and upon depressing "time out," the power to the vehicles is turned off and timer **310** stops. When play is inactive, either before the game begins or due to a "time out," button **322** reads "time in" and pressing the button will activate timer **310** and the vehicles for play.

The active play screen also includes ground **324**, goal **326**, and shot **328**. When the referee presses ground **324**, the next player to posses the ball will receive a "pick-up" statistic, meaning that the player picked the ball up from the ground. When the referee presses goal **326**, the player who currently posses the ball will be awarded a goal and the team score box **312** or **314** will increase by the appropriate number of points. When the referee presses shot **328**, the player who currently possesses the ball will be awarded a shot. Passes and steals between players are also kept in the statistics. To record a pass, the referee presses current player button **302** of the player who has the ball and then presses the player number of the player who received the pass or intercepted the pass. If the players are on the same team, the catch will be considered a pass. If the players are on opposing teams, the catch will be considered a steal. Advantageously, this arrangement allows the referee to press only one button to both statistically note the pass or steal and to note who currently possesses the ball.

In a preferred embodiment, when the referee presses ground **324**, goal **326**, shot **328**, passes between players, or assessing penalties activates speakers through host PC **200** to announce appropriate messages such as "nice pass" or "goal."

If a penalty occurs during game play, the referee will press the appropriate penalty button **320** followed by the current player button **302** of the offending player. After pressing current player button **302**, all vehicles are stopped for a predetermined time, preferably seven seconds, and both a point and possession of the ball are awarded to the non-offending team. In alternative embodiments, the vehicles remain active and only the offending player is penalized by a reduction of speed. By this, we mean that the speed of the offending player is set to a maximum of one-half or one-third of full speed for a given period of time. Once penalty time has elapsed, the offending player will again travel at normal speed.

In a preferred embodiment, when a penalty occurs and the referee presses the appropriate penalty button **320** followed by the corresponding current player button **302**, a personal message may be sent to the individual who committed the penalty through speakers which are on-board the player's vehicle. The message may detail what penalty the player committed, as well as informing the player that he or she is now at one-half speed or that a point has been awarded to the other team.

The active play screen also includes emergency **330** and edit mode **332**. If an emergency occurs during game play, the referee will press emergency **330** which will deactivate all the vehicles by removing power and will require a manual reset of each vehicle before operation can continue. If the referee presses edit mode **332**, active play continues in play area **12** and timer **310** continues to countdown, while touch screen monitor **102** displays the edit mode as described *infra*.

Figure 28 is a screen capture illustrating edit play mode which is accessible from active play mode by pressing edit mode **332**. Edit play mode includes the same current player buttons **302**, timer **310**, score boxes **312** and **314**, and penalty boxes **316** and **318**. In addition, the edit play mode also includes the ground, the goal, the shot, and the emergency buttons of the active play mode. Edit play mode is operatively arranged to allow normal play to continue while changes can be made to the score, time remaining, or statistics.

Edit play mode also includes new scorer **333**, change to x player score **334**, change receiver **336**, add ground first **338**, delete score **340**, change to point score **342**, and delete pass **344**. In order to change which player is credited with points, the referee presses new scorer **333** followed by the corresponding current player button **302** of the correct player.

When the referee presses change to x player score **334**, the referee then presses the corresponding current player button **302** and increases the player's score with buttons **346**, **350**, or **354** depending upon the point increase desired. Add one point **346**, add two points **350**, and add four points **354** increase individual and team scores respectively. However, one of ordinary skill in the art should immediately recognize that any combination of point increases or decreases could replace buttons **346**, **350**, and **345**. When the referee presses change receiver **336**, the last pass is deleted from the player statistics and replaced with a new pass directed to the player whose current player button **302** is pressed. For example, if player one passed to player two, but the referee inadvertently pressed player three as the receiver, by pressing change receiver **336** then player two current player button **306**, the incorrect pass will be removed and the correct pass included.

When the referee presses add ground first **338**, the last pass will be removed and a "pick up" will be included for the player who had received the incorrect pass. When the referee presses delete score **340**, the last goal issued by the referee is removed from the player statistics and the respective score box **312** or **314**. When the referee presses change to point score **342**, the team score and statistics of the player are increased after the referee presses the corresponding current player button **302** and the appropriate point increase button **346**, **350**, and **354**. When the referee presses delete pass **344**, the last pass is removed from the player statistics.

Edit play mode also includes timer increase buttons **348**, **352**, and **356**, which add one second, ten seconds, and one minute to timer **310**, respectively. Finally, game mode **358** is operatively arranged to place the referee in active play mode and exit from edit play mode.

Thus, although in a preferred embodiment the referee inputs actions such as goals, shots, passes, penalties, etc., by pressing buttons, it is within the spirit and scope of the present invention to provide functions that the referee normally controls, such as scoring goals, by means of sensors. The sensors could be lasers or push buttons. If lasers are used, once a ball breaks the laser's beam path, a point is automatically awarded to the proper team as opposed to the referee pressing goal **326**.

Thus, it is seen that the objects of the present invention are efficiently obtained, although modifications and changes to the invention should be readily apparent to

those having ordinary skill in the art, which modifications are intended to be within the spirit and scope of the invention as claimed. It also is understood that the foregoing description is illustrative of the present invention and should not be considered as limiting. Therefore, other embodiments of the present invention are possible without departing from the spirit and scope of the present invention.

What We Claim Is:

1. A game, comprising:

a court having a plurality of walls extending upwardly from a floor defining a play area;

a game piece;

at least one target positioned on a wall of said plurality walls, said target comprising a plurality of multi-planar apertures operatively arranged to receive said game piece; and,

a vehicle, operatively arranged to be driven by a player.

2. The game recited in Claim 1, wherein said game further comprises a padded skirt engaged to at least one wall of said plurality of walls and said floor, so that said padded skirt is located along a portion of a perimeter of said floor.

3. The game recited in Claim 2, wherein said vehicle further includes a bumper, and said bumper of said vehicle slidably engages with said padded skirt.

4. The game recited in Claim 2, wherein said padded skirt is operatively arranged to deflect said game piece away from said plurality of walls into said play area.

5. The game recited in Claim 2, wherein said padded skirt further comprises:

a sloped portion positioned proximate said plurality of walls;

a bumper, positioned at an end of said sloped portion including an inner cushioning potion and a smooth, flexible outer portion.

6. The game recited in Claim 5, wherein said inner cushioning portion is a dense foam rubber.

7. The game recited in Claim 5, wherein said smooth, flexible outer portion is a resilient smooth rubber membrane operatively arranged to encase said inner cushioning portion.

8. The game recited in Claim 3, wherein said bumper further comprises an inner cushioning portion and a smooth, flexible outer portion.

9. The game recited in Claim 8, where said inner cushioning portion is a dense foam rubber.

10. The game recited in Claim 8, wherein said smooth flexible outer portion is a resilient smooth rubber operatively arranged to encase said inner cushioning portion.

11. The game recited in Claim 1, wherein said vehicle comprises:

a base;

a seat positioned atop said base;

a movement control device positioned atop said base and in front of said seat; and,

a bumper positioned circumferentially about said base, and wherein said movement control device is operatively arranged to control a turning means of said vehicle and a drive means of said vehicle.

12. The game recited in Claim 1, wherein said game further comprises a control terminal.

13. The game recited in Claim 12, wherein said vehicle further comprises a means for wirelessly communicating with said control terminal, and wherein said control terminal further comprises a means for wirelessly communicating with said vehicle.

14. The game recited in Claim 12, wherein said control terminal comprises means for recording and displaying at least one characteristic of said game.

15. The game recited in Claim 14, wherein said at least one characteristic of said game is selected from the group consisting of: scores, shots on goal, rebounds, assists, penalties, player names, and time.

16. The game recited in Claim 14, wherein said at least one characteristic of said game is entered into said control terminal by means of a touch-screen monitor.

17. The game recited in Claim 12, wherein said control terminal comprises means for operating an audiovisual output.

18. The game recited in Claim 17, wherein said audiovisual output of said game comprises a pre-recorded message.

19. The game recited in Claim 12, where said control terminal comprises a means for calculating at least one statistical characteristic of said game.

20. The game recited in Claim 12, wherein said control terminal comprises a means for controlling a drive means of said vehicle.

21. The game recited in Claim 20, wherein said means for controlling said drive means of said vehicle is operatively arranged to control a rate of movement of said vehicle.

22. The game recited in Claim 20, wherein said vehicle is a plurality of vehicles, and said control terminal means for controlling said drive means of said vehicle can individually control each of said vehicles.

23. The game recited in Claim 1, wherein said game piece is spherical.

24. The game recited in Claim 1, wherein said game piece is ellipsoidal.

25. The game recited in Claim 1, wherein said game piece is a disk.

26. The game recited in Claim 1, further comprising a scoop operatively arranged to be held by said player for catching, throwing, and retrieving said game piece, wherein said scoop includes a handle portion and a basket portion.

27. The game recited in Claim 1, wherein said at least one target comprises three multi-planar apertures operatively arranged to accept said game piece.

28. The game recited in Claim 1, wherein said at least one target has a semi-circular perimeter.

29. The game recited in Claim 11, wherein said movement control device is located substantially equidistant from a left side and a right side of said vehicle.

30. The game recited in Claim 1, wherein said at least one target has a rectangular perimeter.

31. The game recited in Claim 1, wherein said at least one target has a trapezoidal perimeter.

32. The game recited in Claim 1, wherein said at least one target comprises a first aperture of a circular shape having a first diameter and positioned about a first plane, and a second aperture having a circular shape having a second diameter and positioned about a second plane, wherein said second diameter is greater than said first diameter.

33. The game recited in Claim 11, wherein said vehicle further comprises a turning means.

34. The game recited in Claim 11, wherein said movement control device of said vehicle is capable of varying a rate of speed and a rate of turning of said vehicle.

35. The game recited in Claim 11, wherein said movement control device is a joystick.

36. The game recited in Claim 11, wherein said movement control device is a trackball.

37. The game recited in Claim 1, wherein said vehicle is self-propelled and said vehicle further comprises an on-board power supply.

38. The game recited in Claim 37, wherein said on-board power supply comprises a battery.

39. The game recited in Claim 38, wherein said vehicle further comprises a means for monitoring said battery's charge level.

40. The game recited in Claim 11, wherein said vehicle further comprises a protective shroud around said movement control device.

41. A game, comprising:

a floor;

a plurality of walls rising up from said floor, wherein said plurality of walls comprises a first pair of parallel walls and a second pair of parallel walls, where said first set and said second set of parallel walls engage to generally define a rectangular play area, and wherein said play area has a first end and a second end, where said first end is opposite from said second end;

a padded skirt engaged to said plurality of walls and said floor along a substantial portion of a perimeter of said floor;

a game piece;

a first target positioned proximate said plurality of walls at said first end, comprising a plurality of multi-planar apertures operatively arranged to accept said game piece, wherein an aperture of said plurality of apertures is facing said second end;

a second target positioned proximate said plurality of walls at said second end, comprising a plurality of multi-planar apertures operatively arranged to accept said game piece, wherein an aperture of said plurality of apertures is facing said first end;

a vehicle, comprising a base, a seat, a movement control device positioned atop said base and in front of said seat and located substantially equidistant from a left and a right side of said vehicle, a shroud positioned about said movement control device, a power supply, and a bumper, wherein said movement control device is operatively arranged to electronically control a drive means of said vehicle; and,

a control terminal, wherein said control terminal comprises means for recording and displaying at least one characteristic of said game, means for remotely controlling said drive means of said vehicle, and means for operating an audiovisual output related to said game.

42. A vehicle comprising:

a base;

a seat located atop said base;

a bumper affixed around at least a portion of said base; and,

a movement control device positioned atop said base and in front of said seat and located substantially equidistant from a left and a right side of said vehicle, and wherein said movement control device is operatively arranged to electronically control a drive means and a turning means of said vehicle.

43. A joystick system comprising:

a joystick; and,

a shroud encircling said joystick, wherein said joystick has a first height, and said shroud has a second height, said first height is less than or equal to said second height.

44. The joystick system recited in Claim 43 wherein said joystick system is mounted on a vehicle and operatively arranged to control the movement of said vehicle.

45. A bumper skirt system comprising:

a court having a floor and a plurality of walls encasing at least a portion of said floor;

a skirt engaged to said floor and said plurality of walls around at least a portion of a perimeter of said floor, wherein said skirt is sloped downwardly away from said plurality of walls for deflecting an object which lands on said skirt away from said plurality of walls, and wherein said skirt terminates in a bumper;

wherein said bumper comprises an inner cushion and an outer membrane, and wherein said outer membrane is operatively arranged to encase said inner cushion.

46. The bumper skirt system recited in Claim 45 wherein said inner cushion is a dense foam rubber, and said outer membrane is a smooth, flexible, and resilient rubber.

47. The bumper skirt system recited in Claim 45 further comprising a vehicle operatively arranged to maneuver around said court, wherein said vehicle has a vehicle bumper, where said vehicle bumper includes a vehicle bumper cushion and a vehicle bumper membrane, and wherein said vehicle bumper membrane on said vehicle bumper slidably engages with said bumper on said skirt upon impact between said vehicle and said bumper skirt system.

48. A vehicle bumper system comprising:

a vehicle having a base;

a bumper secured around at least a portion of said base, wherein said bumper comprises an inner cushion and an outer membrane, and wherein said outer membrane is operatively arranged to encase said inner cushion.

49. The vehicle bumper system recited in Claim 48, wherein said inner cushion is a dense foam rubber, and said outer membrane is a smooth, flexible, and resilient rubber.

50. A game, comprising:

a floor;

a plurality of walls rising up from said floor defining a play area;

a game piece;

at least one target positioned proximate said plurality of walls, comprising a hoop and a backboard, wherein said hoop is arranged in a substantially horizontal orientation and said backboard is arranged in a substantially vertical orientation;

a vehicle operatively arranged to be driven by a player;

a control terminal operatively arranged to remotely control a drive means of said vehicle.

51. The game recited in Claim 50, wherein said control terminal remotely controls a rate of speed of said drive means of said vehicle.

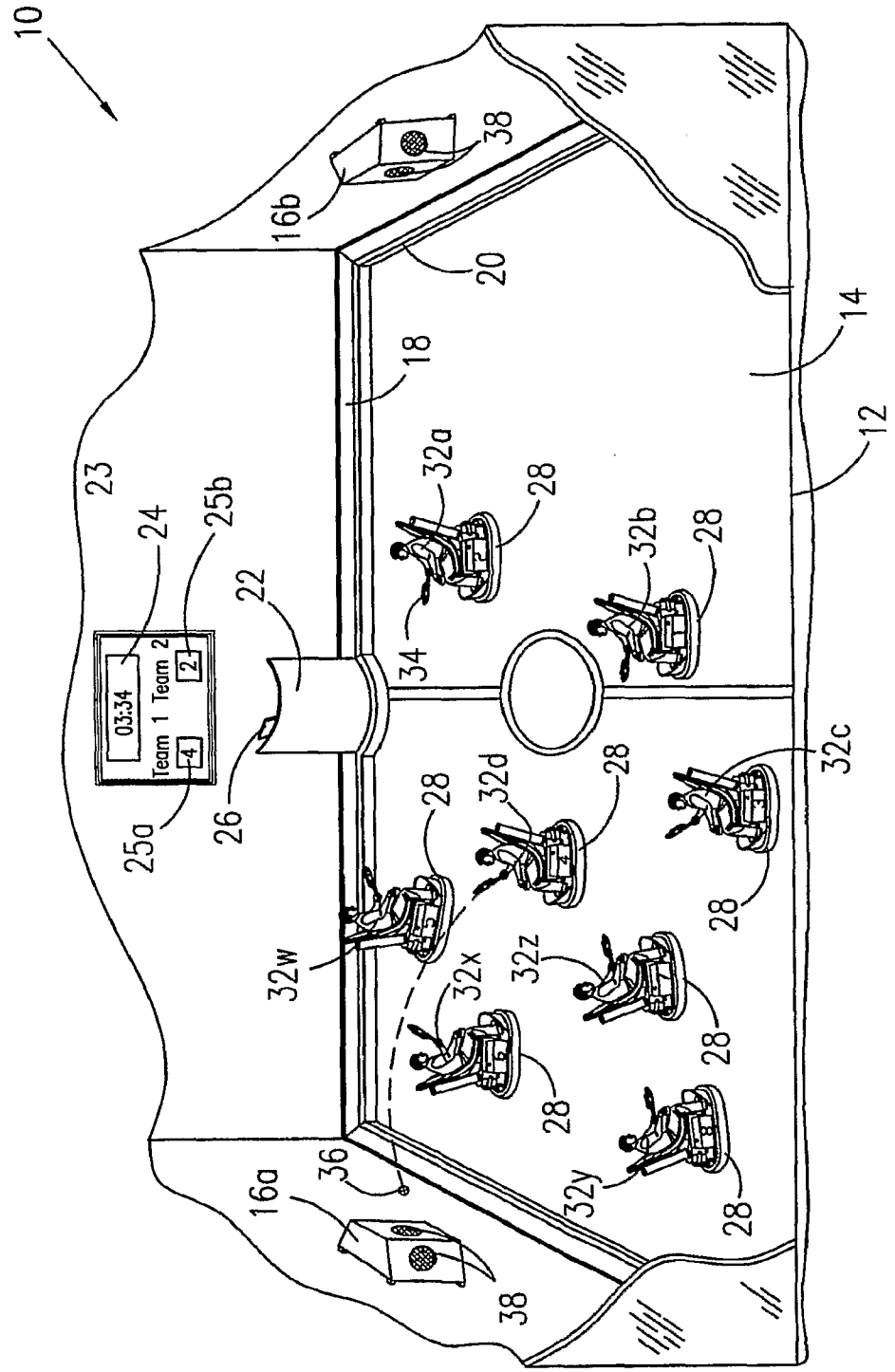

10
16b
38
20
14
18
12
23
24
25b
32a
28
22
03:34
Team 1 Team 2
4
2
34
32b
28
25a
26
28
32d
28
32c
28
32w
32x
32z
28
28
32y
28
36
16a
38

FIG. 1

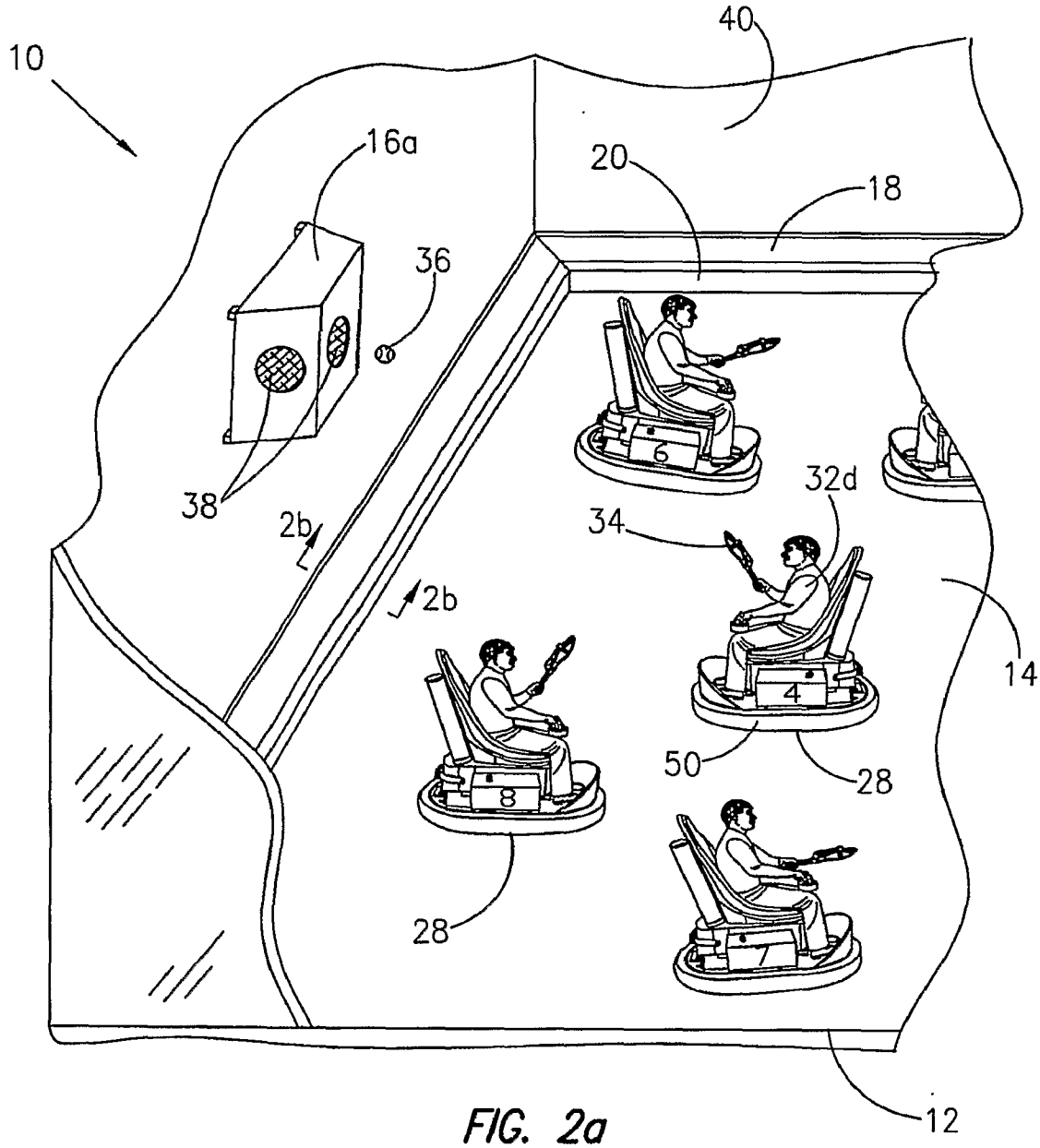


FIG. 2a

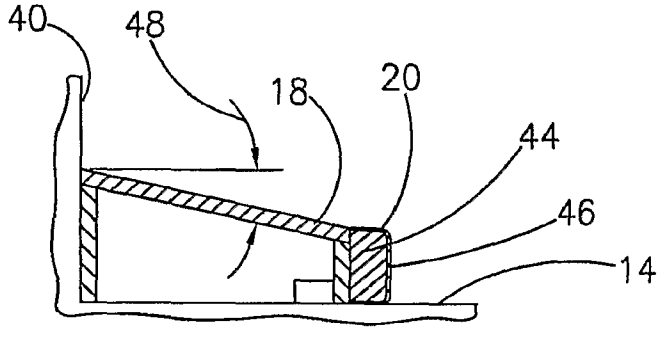


FIG. 2b

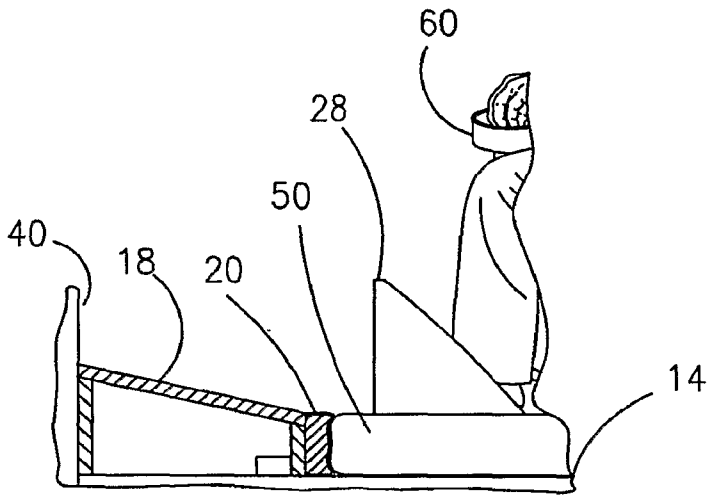


FIG. 2c

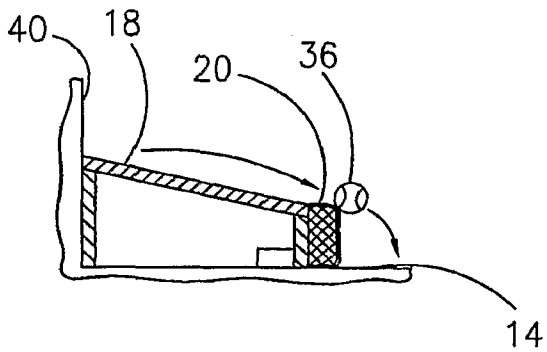


FIG. 2d

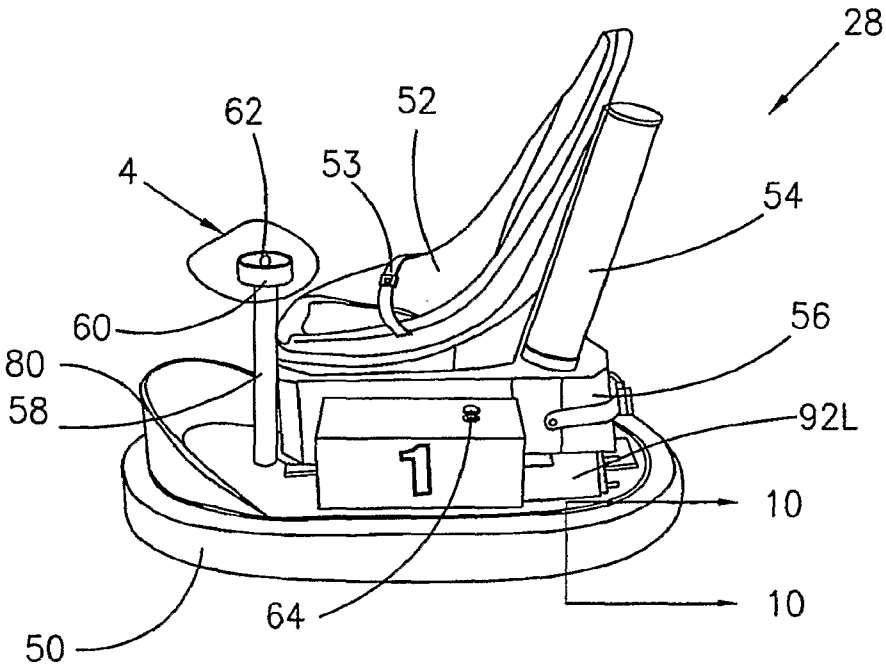


FIG. 3

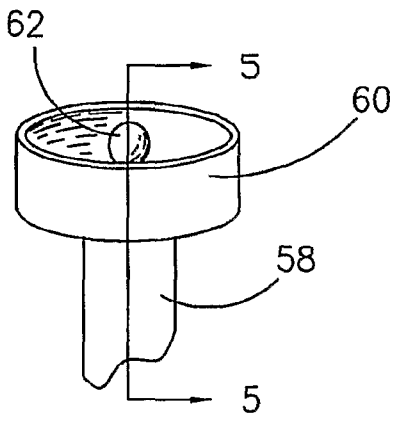


FIG. 4

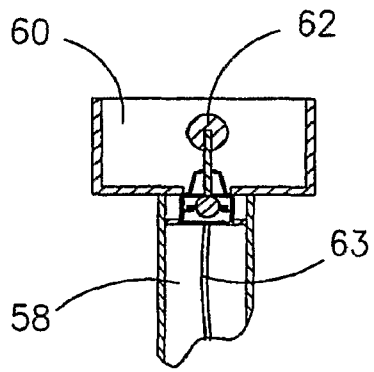


FIG. 5

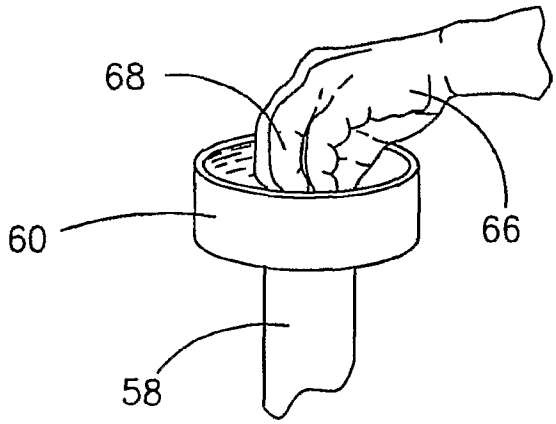


FIG. 6

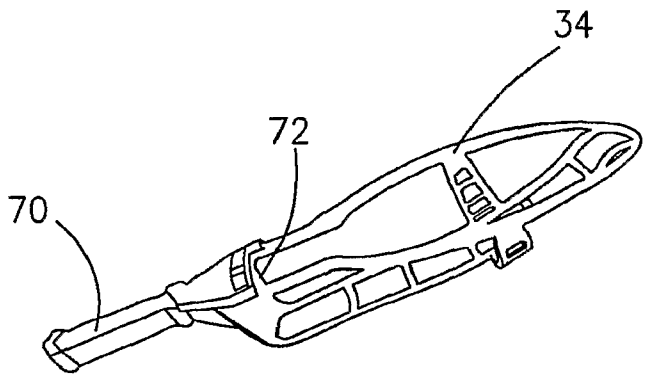


FIG. 7a

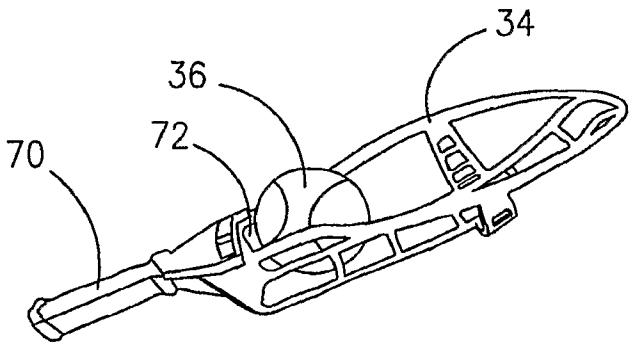


FIG. 7b

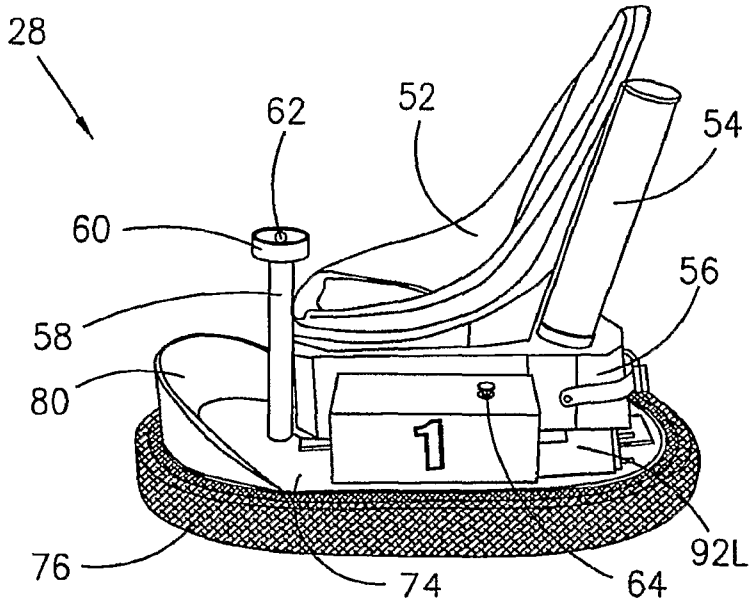


FIG. 8

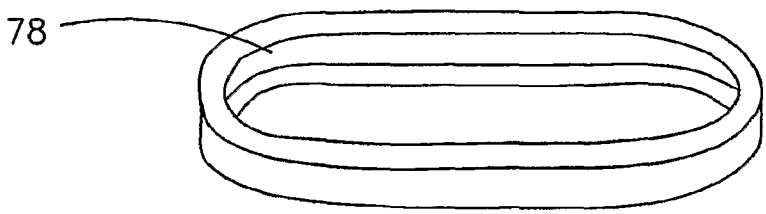


FIG. 9

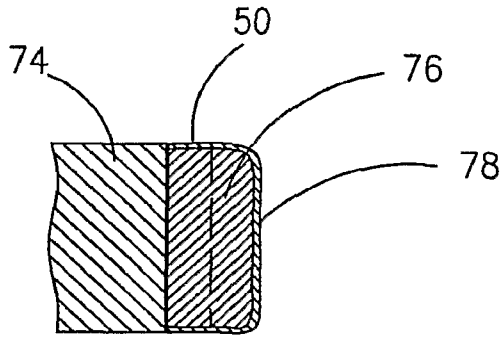


FIG. 10

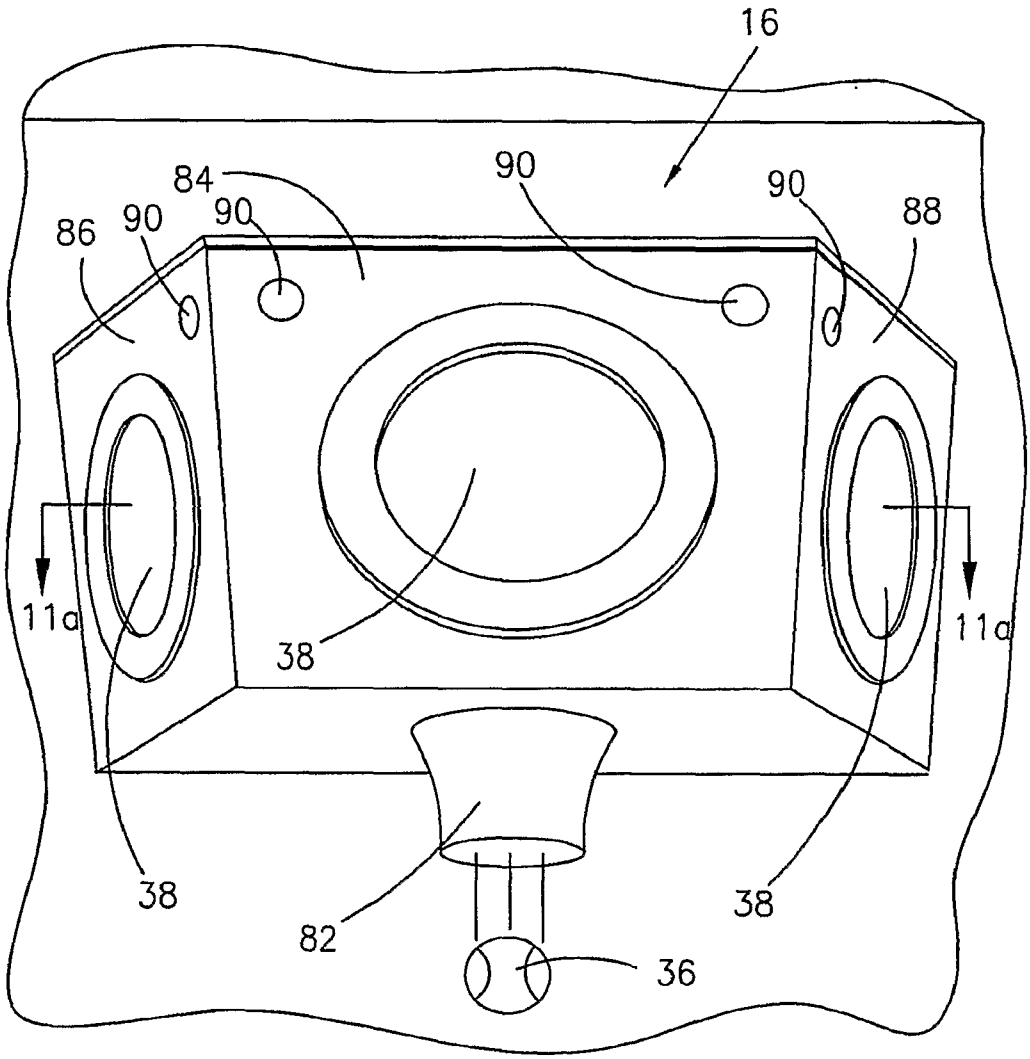


FIG. 11

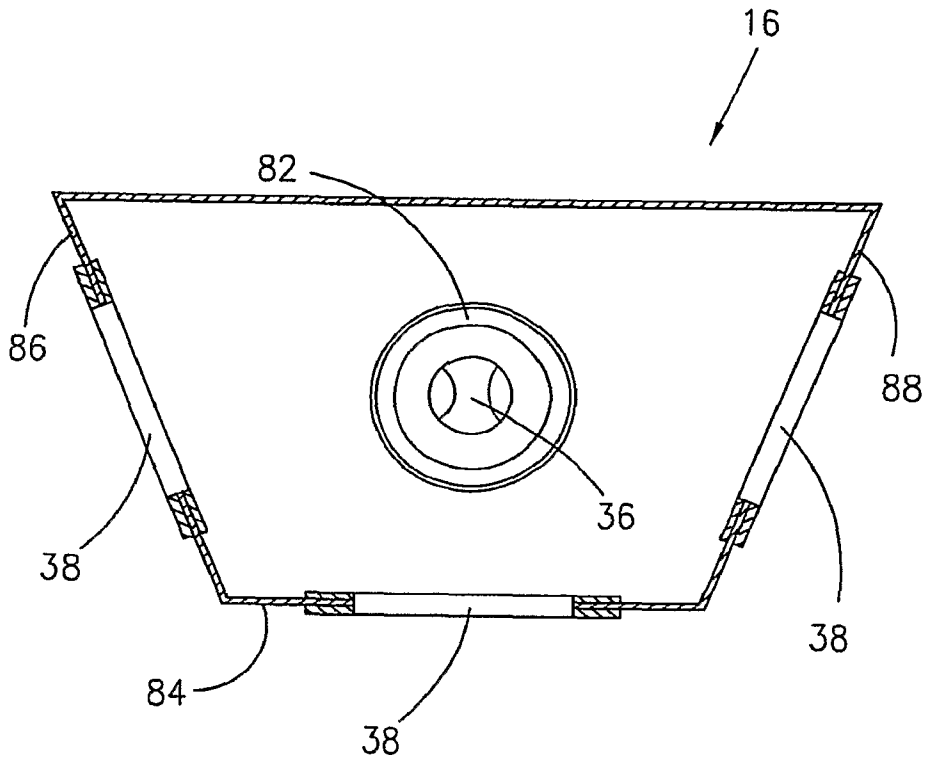


FIG. 11a

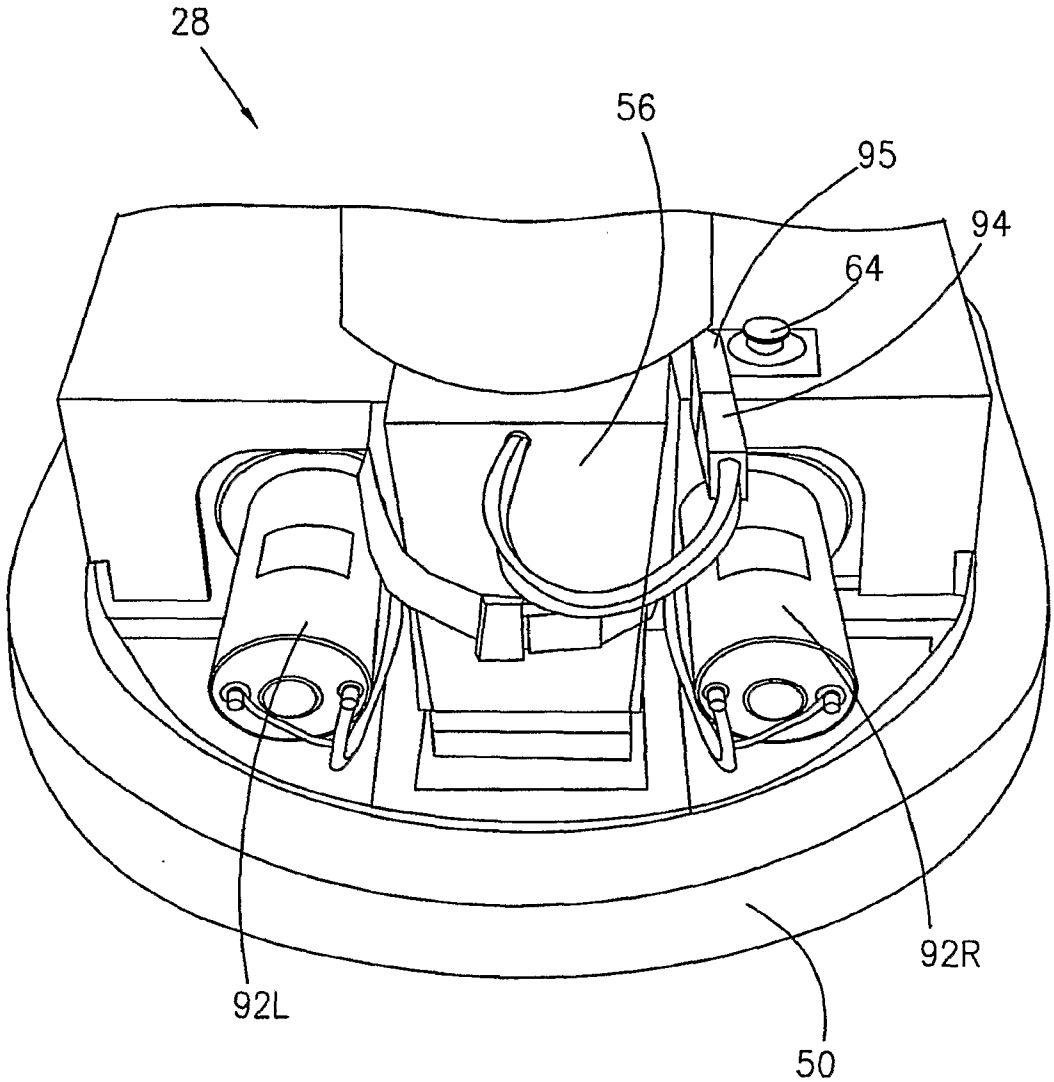


FIG. 12

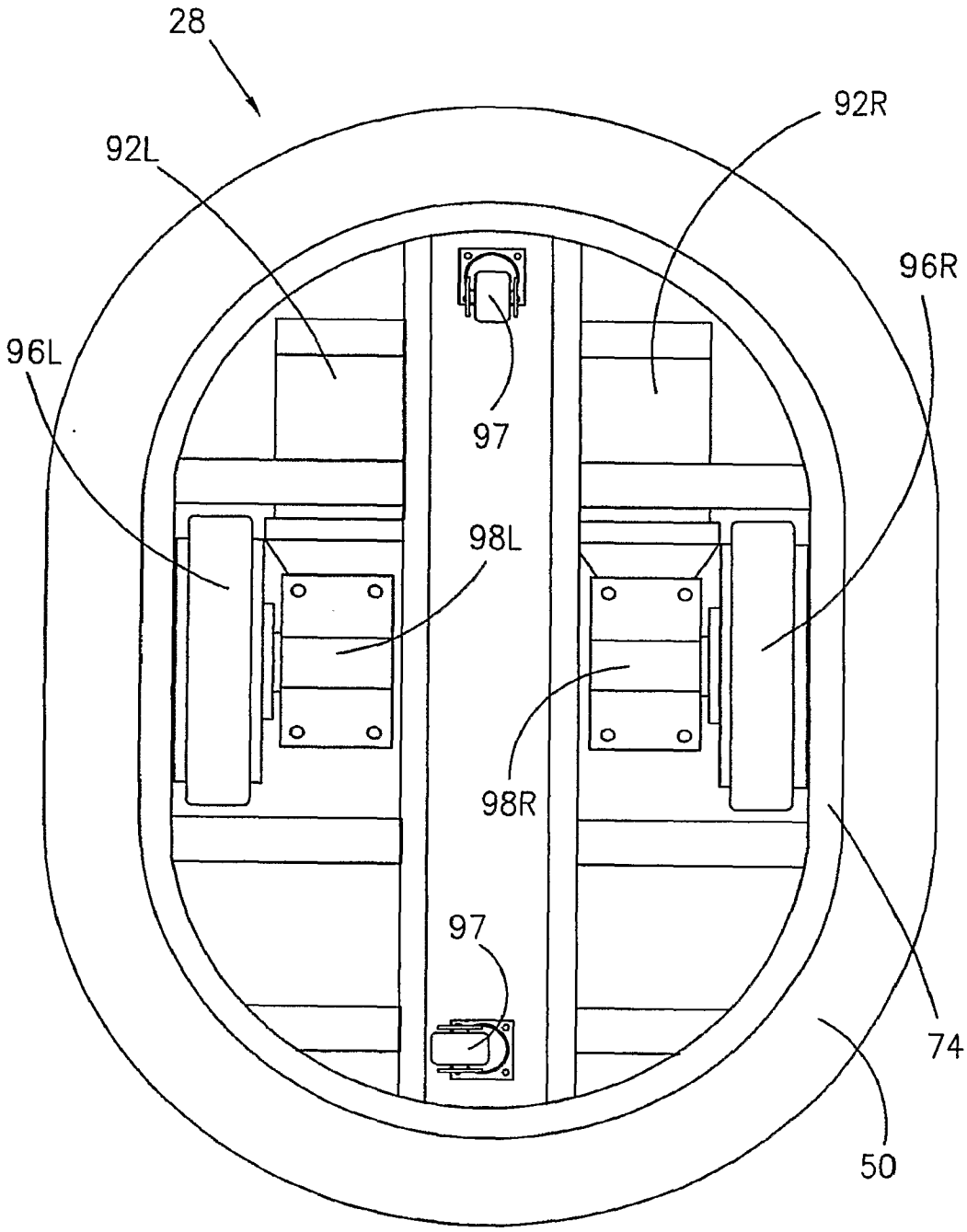


FIG. 13

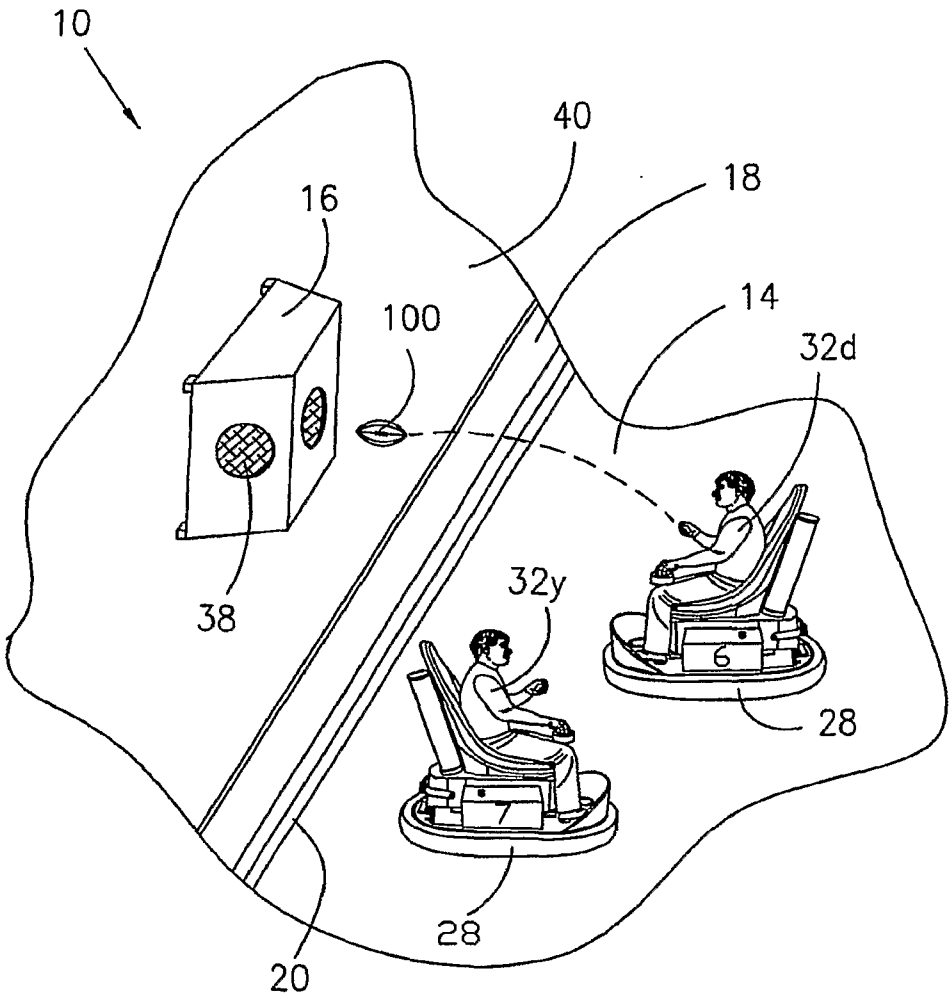


FIG. 14

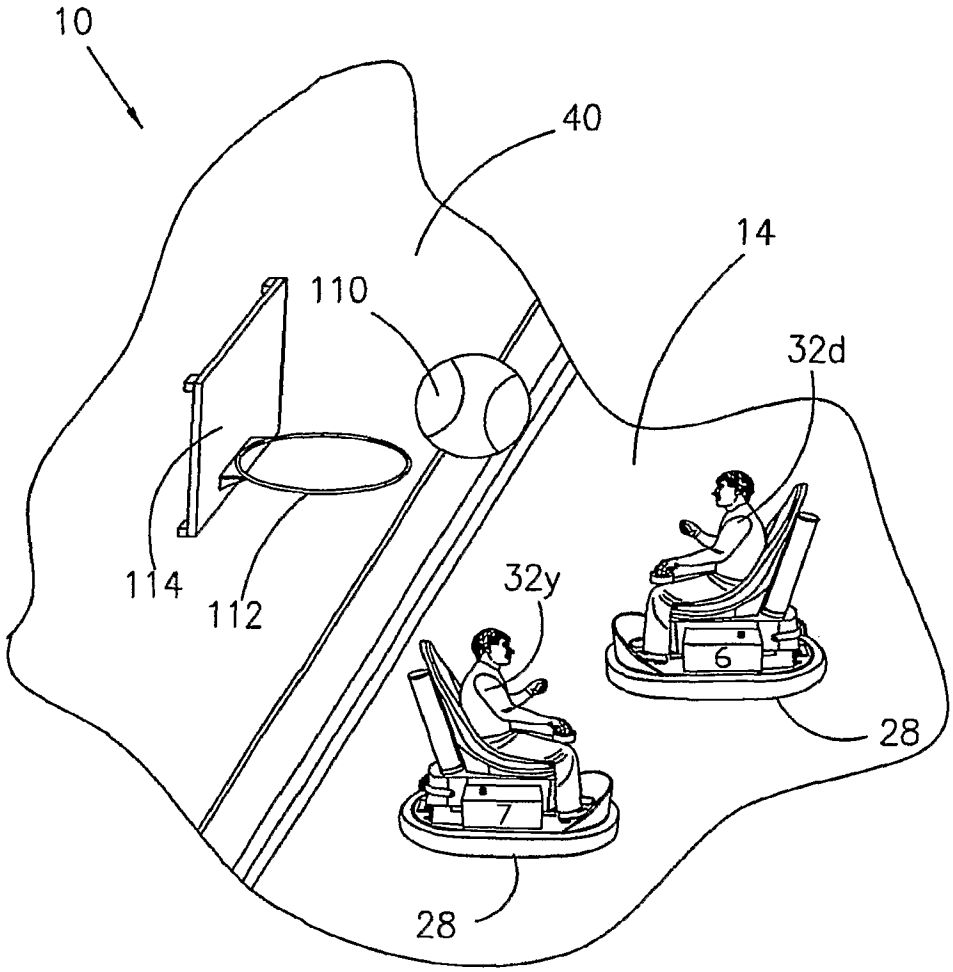


FIG. 15

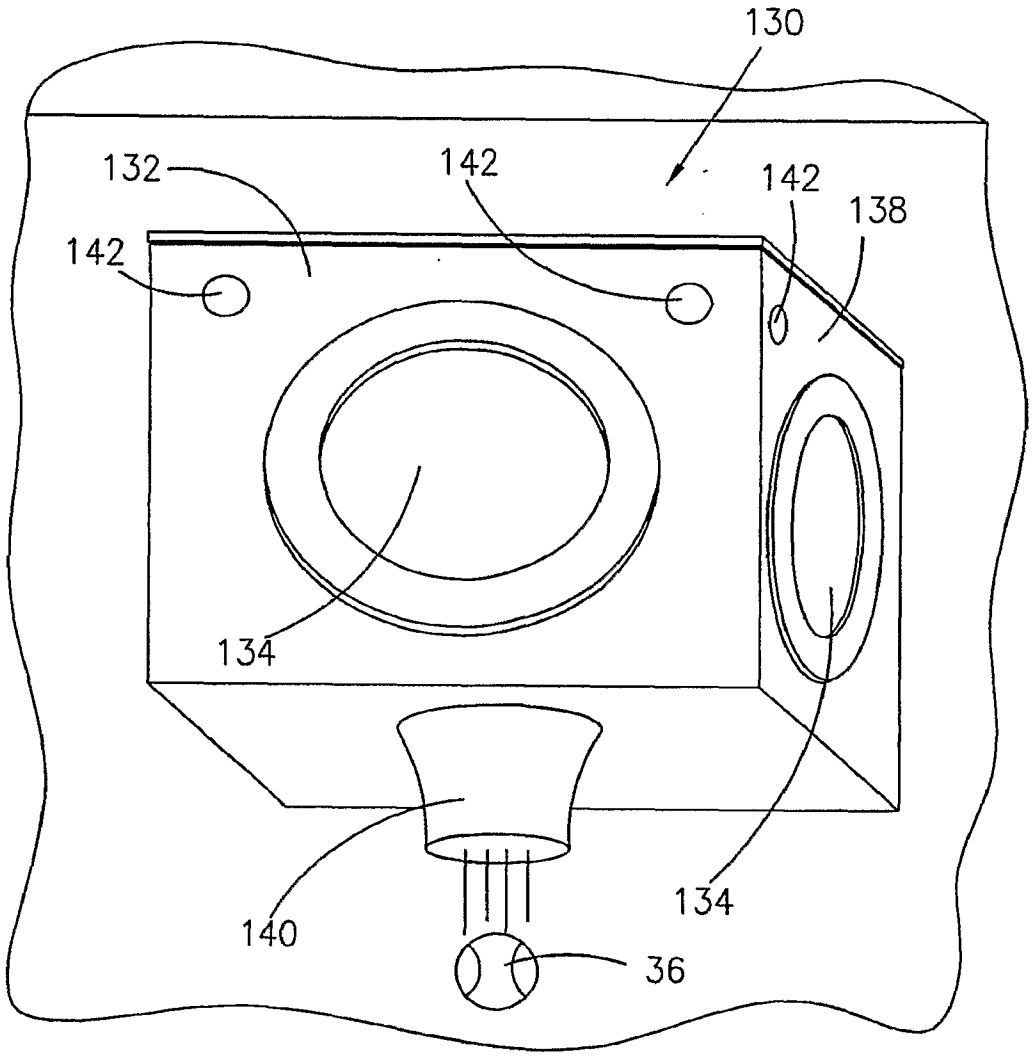


FIG. 16

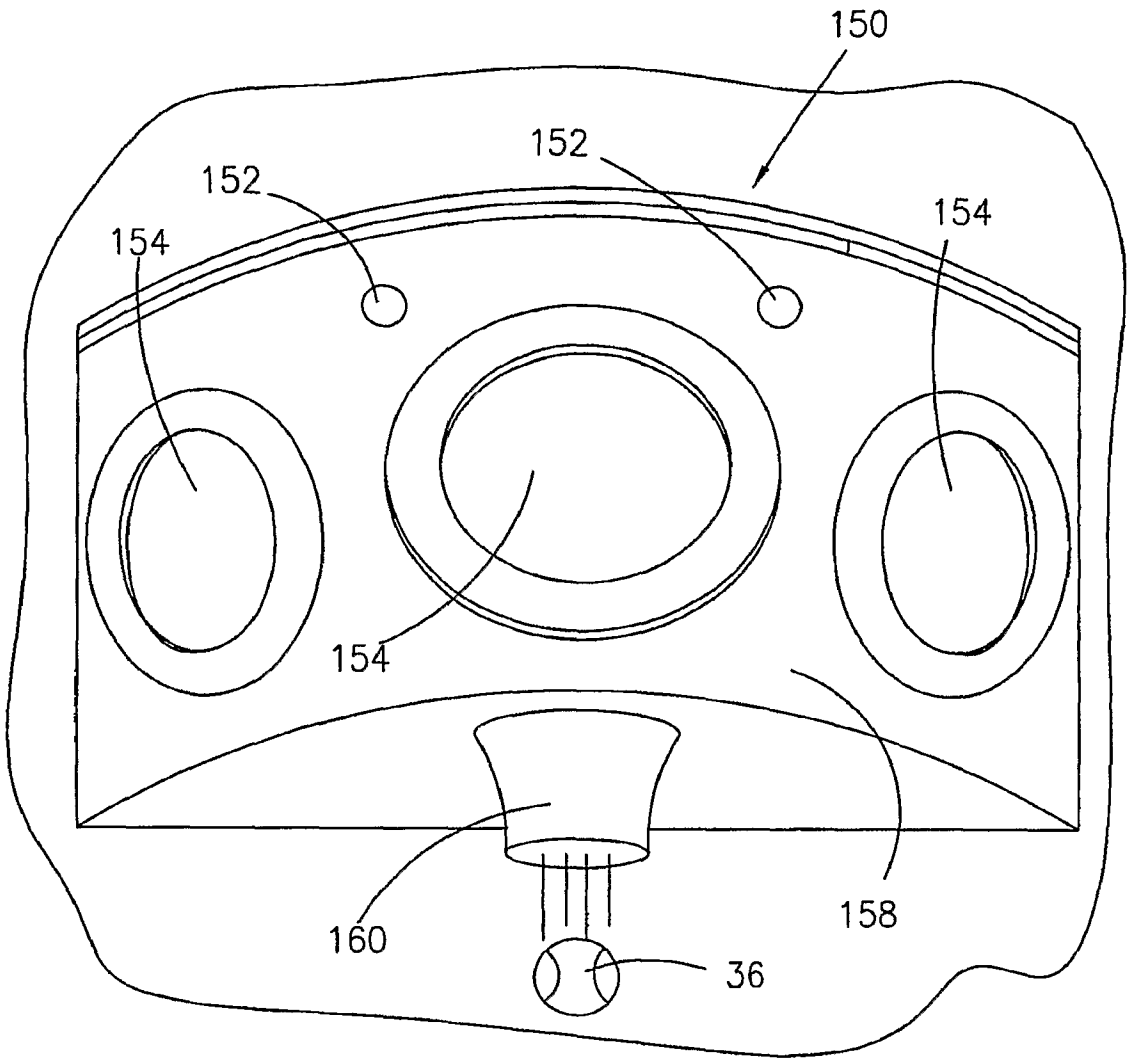


FIG. 17

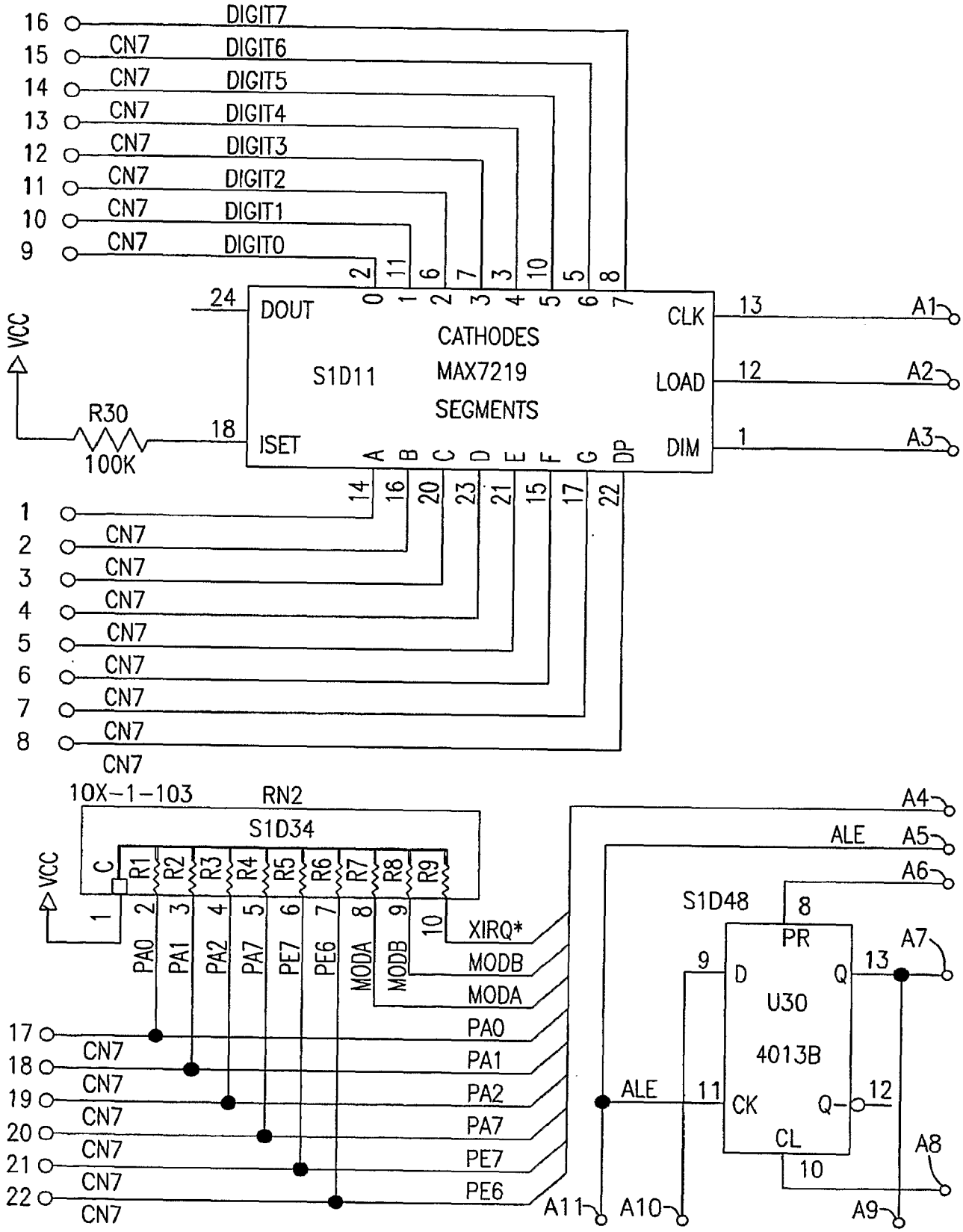

DIGIT7
DIGIT6
DIGIT5
DIGIT4
DIGIT3
DIGIT2
DIGIT1
DIGIT0
CN7
S1D11
MAX7219
CATHODES
SEGMENTS
DOUT
ISET
CLK
LOAD
DIM
VCC
R30
100K
A1
A2
A3
10X-1-103
RN2
S1D34
XIRQ*
MODB
MODA
PA0
PA1
PA2
PA7
PE7
PE6
A4
ALE
A5
A6
A7
A8
A9
A10
A11
S1D48
U30
4013B
PR
D
Q
CK
CL

FIG. 18A

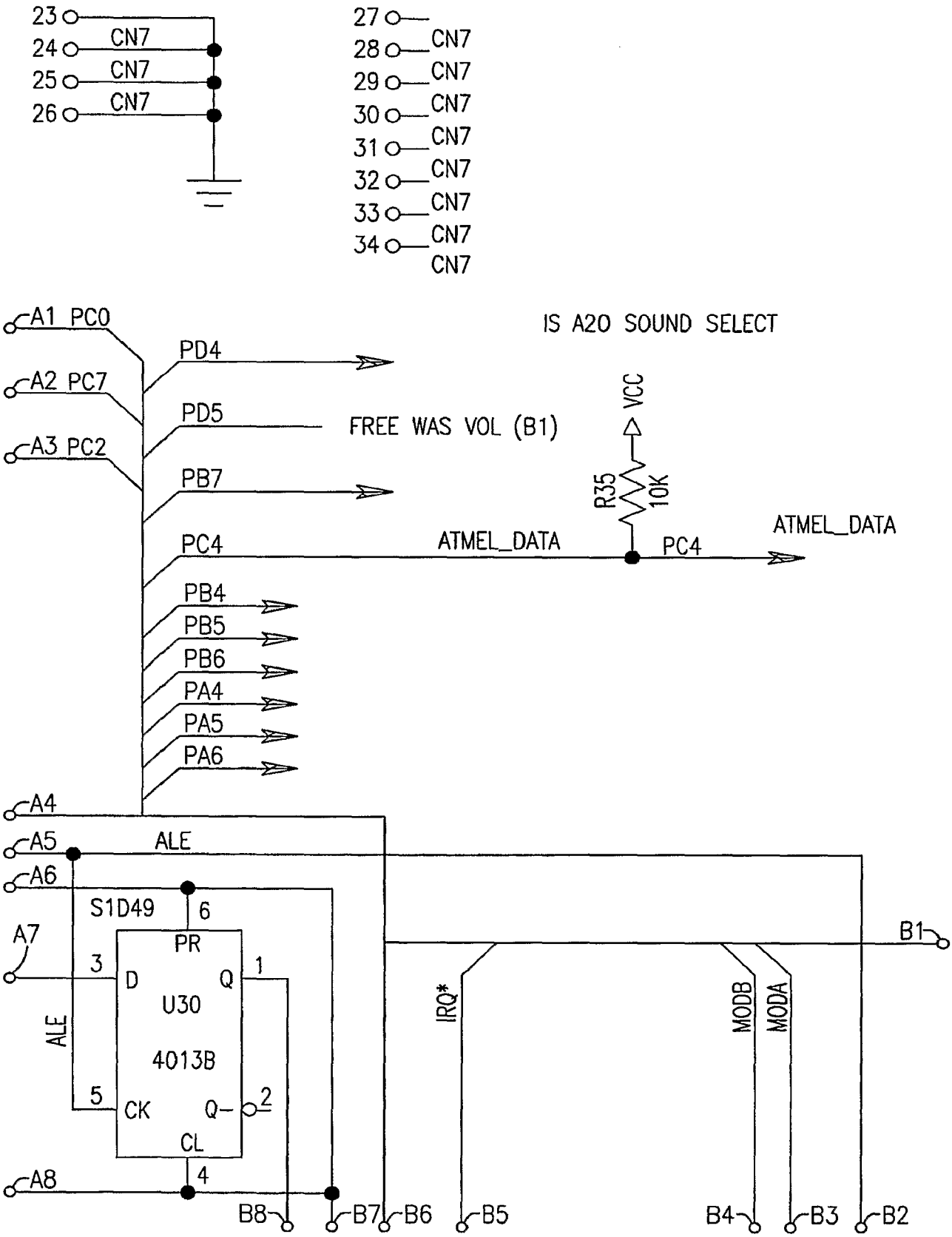
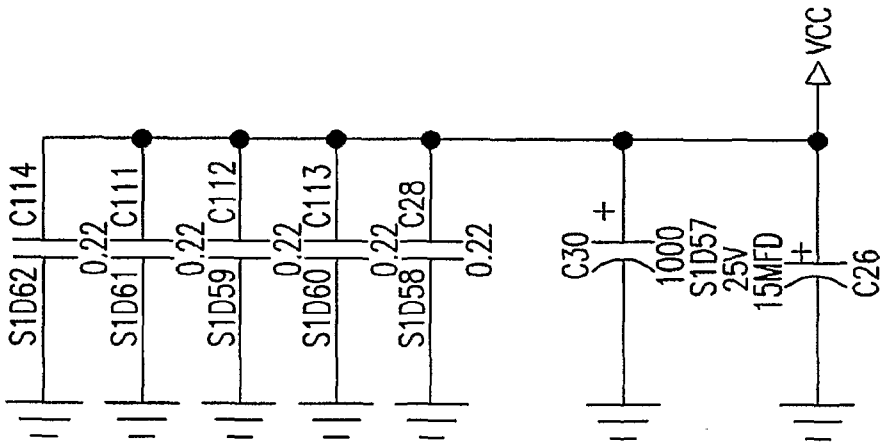

23
24 CN7
25 CN7
26 CN7
27
28 CN7
29 CN7
30 CN7
31 CN7
32 CN7
33 CN7
34 CN7
CN7
A1 PC0
A2 PC7
A3 PC2
PD4
PD5
PB7
PC4
PB4
PB5
PB6
PA4
PA5
PA6
A4
A5
A6
A7
A8
ALE
S1D49
6
PR
3
D
Q
1
U30
4013B
5
CK
Q-
2
CL
4
IS A20 SOUND SELECT
FREE WAS VOL (B1)
VCC
R35
10K
ATMEL_DATA
ATMEL_DATA
PC4
IRQ*
MODB
MODA
B1
B8
B7
B6
B5
B4
B3
B2

FIG. 18B


VCC
C114
0.22
S1D62
C111
0.22
S1D61
C112
0.22
S1D59
C113
0.22
S1D60
C28
0.22
S1D58
0.22
C30
+
1000
S1D57
25V
15MFD
+
C26

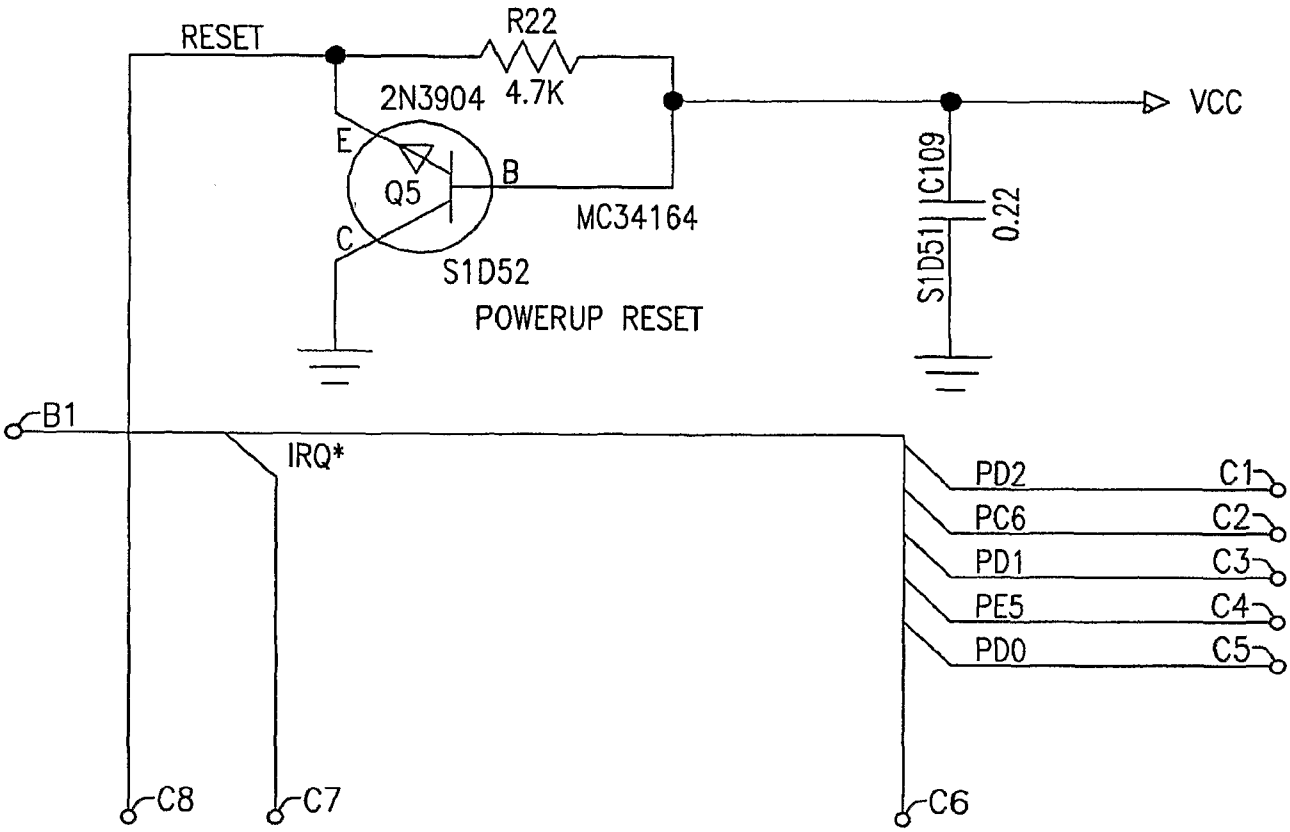
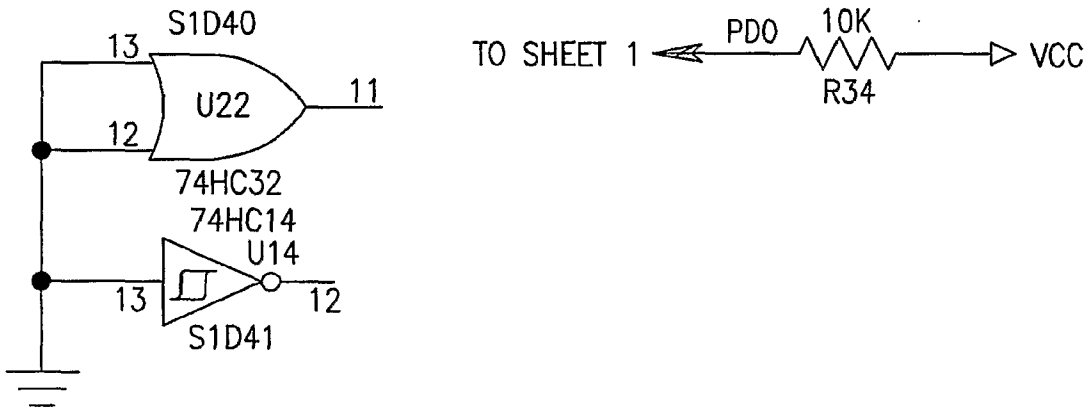

RESET
R22
4.7K
2N3904
E
B
Q5
C
MC34164
S1D52
POWERUP RESET
VCC
C109
0.22
S1D51
B1
IRQ*
PD2
C1
PC6
C2
PD1
C3
PE5
C4
PD0
C5
C8
C7
C6

FIG. 18C


S1D40
13
12
U22
11
74HC32
74HC14
U14
13
12
S1D41
TO SHEET 1
PD0
10K
R34
VCC

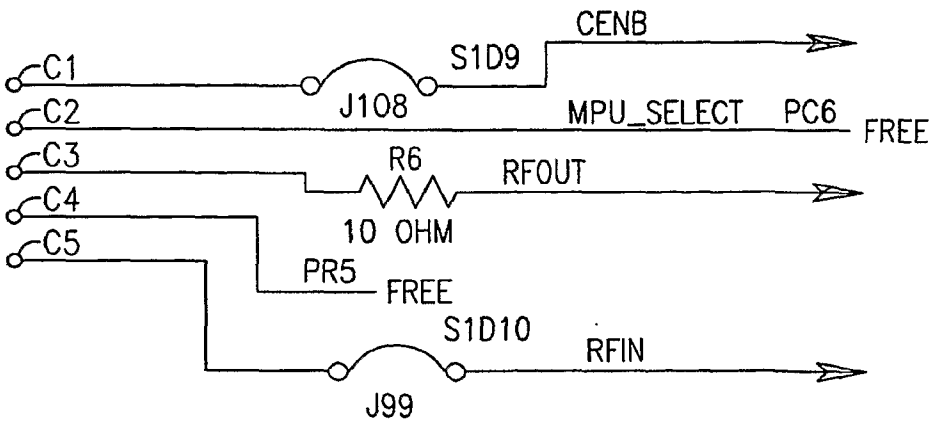

C1
C2
C3
C4
C5
S1D9
CENB
J108
MPU_SELECT
PC6
FREE
R6
RFOUT
10 OHM
PR5
FREE
S1D10
RFIN
J99

FIG. 18D

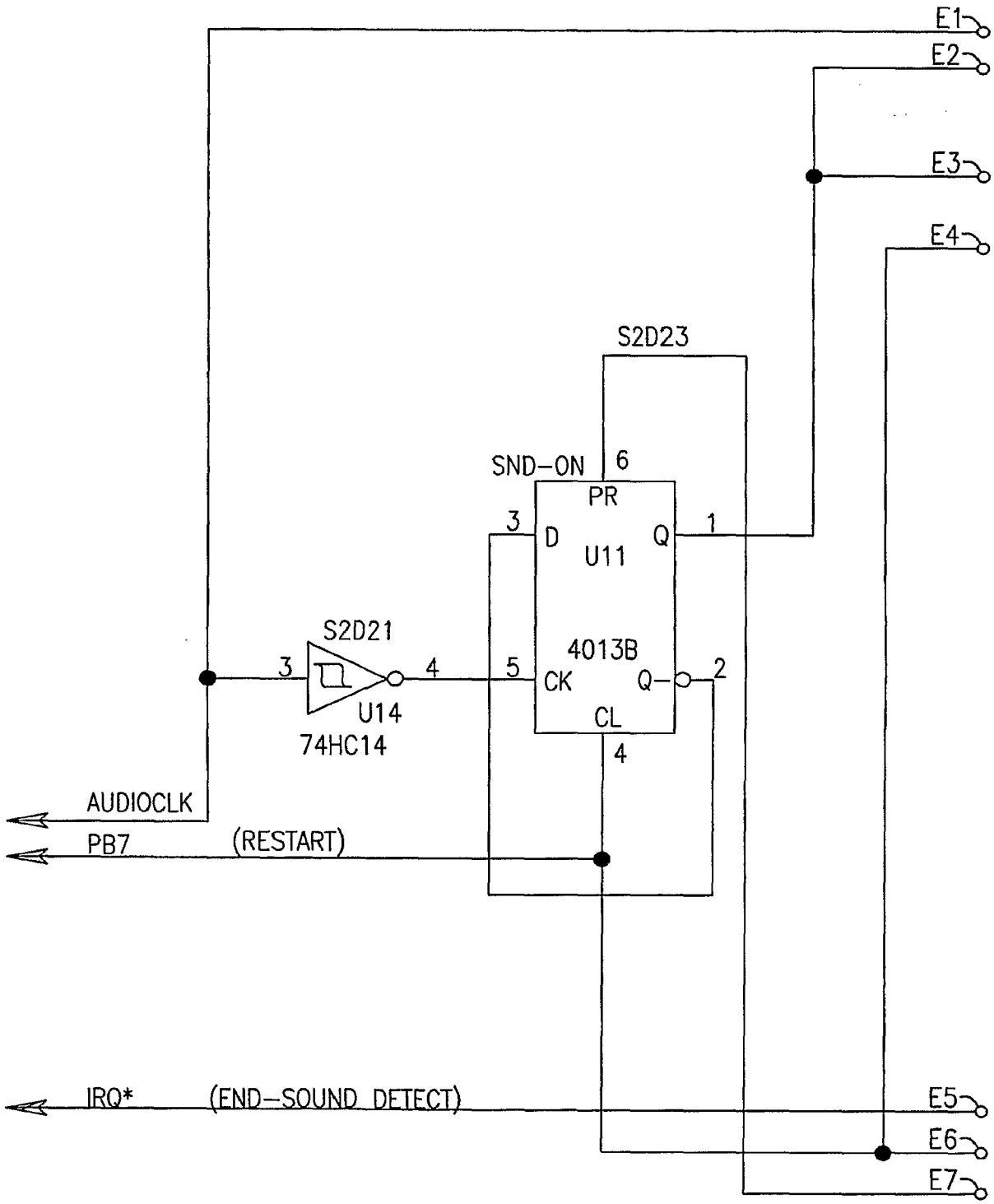

E1
E2
E3
E4
S2D23
SND-ON
6
PR
3
D
Q
1
U11
S2D21
4013B
3
4
5
CK
Q
2
U14
74HC14
CL
4
AUDIOCLK
PB7
(RESTART)
IRQ*
(END-SOUND DETECT)
E5
E6
E7

FIG. 18E

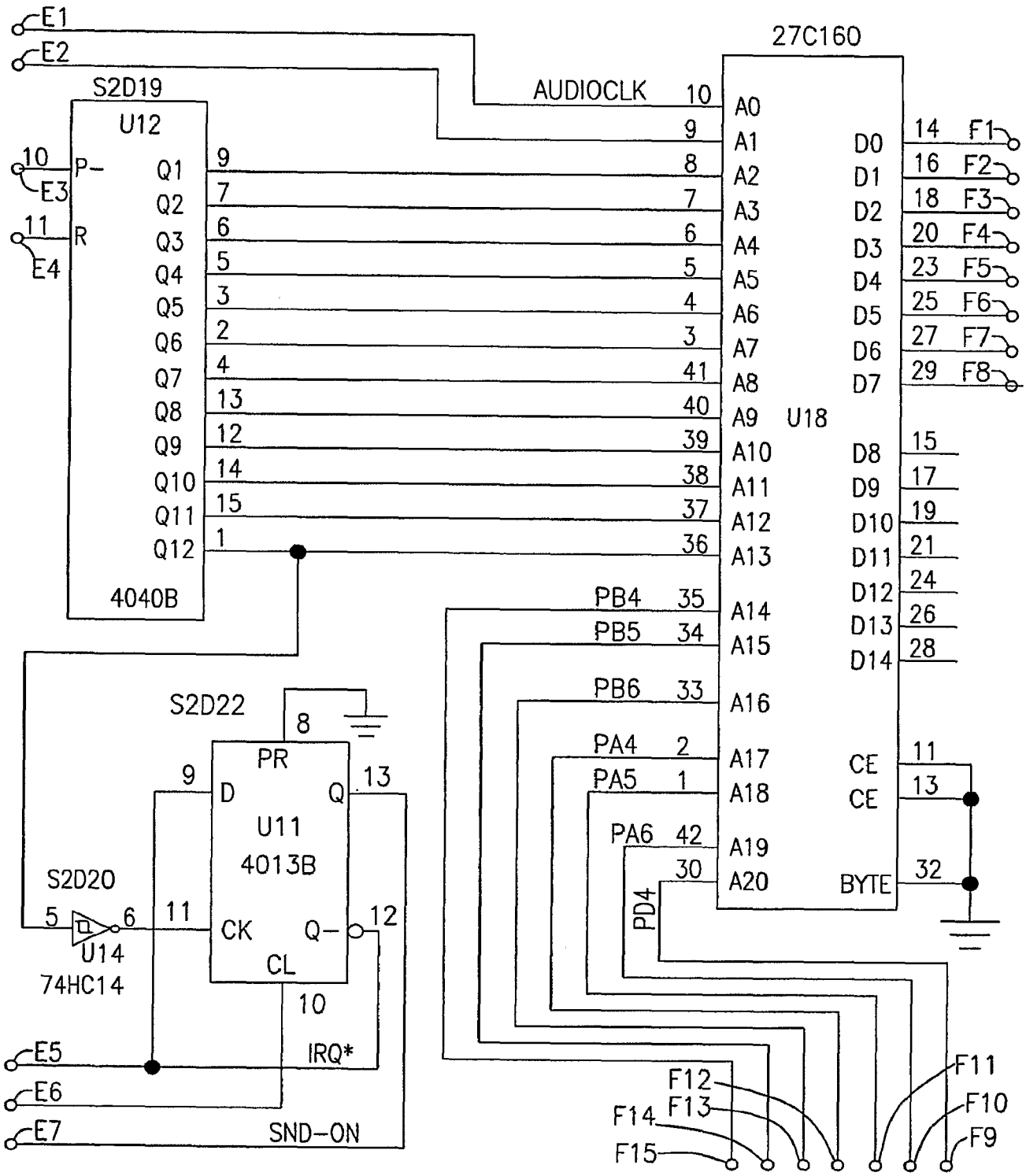

E1
E2
S2D19
U12
10
P-
E3
11
R
E4
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
9
7
6
5
3
2
4
13
12
14
15
1
4040B
AUDIOCLK
10
9
8
7
6
5
4
3
41
40
39
38
37
36
27C160
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
A20
U18
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
CE
CE
BYTE
14 F1
16 F2
18 F3
20 F4
23 F5
25 F6
27 F7
29 F8
15
17
19
21
24
26
28
11
13
32
PB4 35
PB5 34
PB6 33
PA4 2
PA5 1
PA6 42
30
PD4
S2D22
8
PR
9
D
Q
13
U11
4013B
CK
Q-
12
CL
10
IRQ*
S2D20
5
6
U14
74HC14
11
E5
E6
E7
SND-ON
F12
F13
F14
F15
F11
F10
F9

FIG. 18F

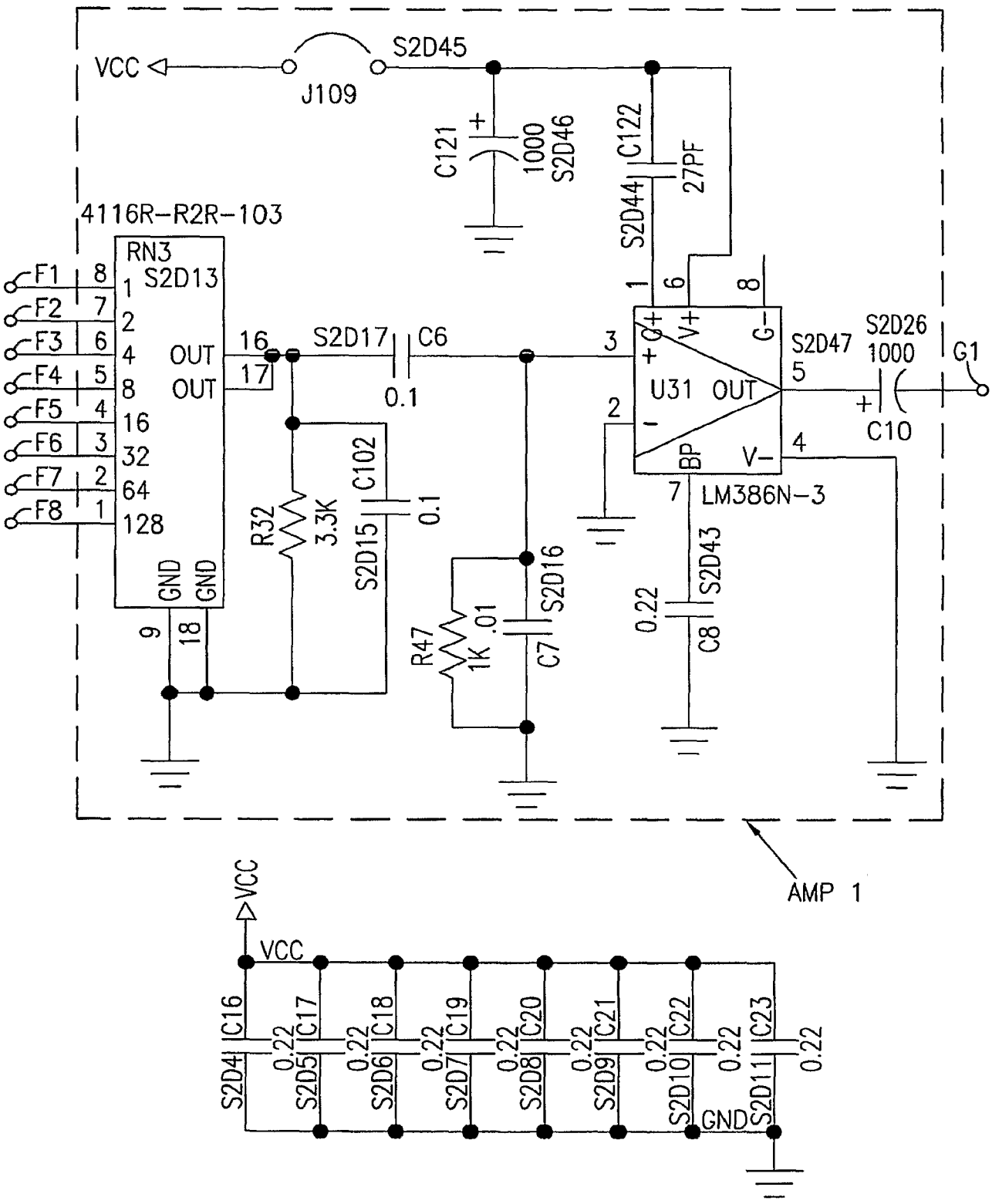

VCC
S2D45
J109
C121
1000
S2D46
C122
27PF
S2D44
4116R-R2R-103
RN3
S2D13
F1
F2
F3
F4
F5
F6
F7
F8
OUT
OUT
S2D17
C6
0.1
R32
3.3K
C102
S2D15
0.1
R47
1K
.01
S2D16
C7
U31
OUT
BP
V-
V+
S2D47
S2D26
1000
G1
C10
LM386N-3
0.22
S2D43
C8
GND
GND
AMP 1
VCC
C16
C17
C18
C19
C20
C21
C22
C23
S2D4
S2D5
S2D6
S2D7
S2D8
S2D9
S2D10
S2D11
GND

FIG. 18G

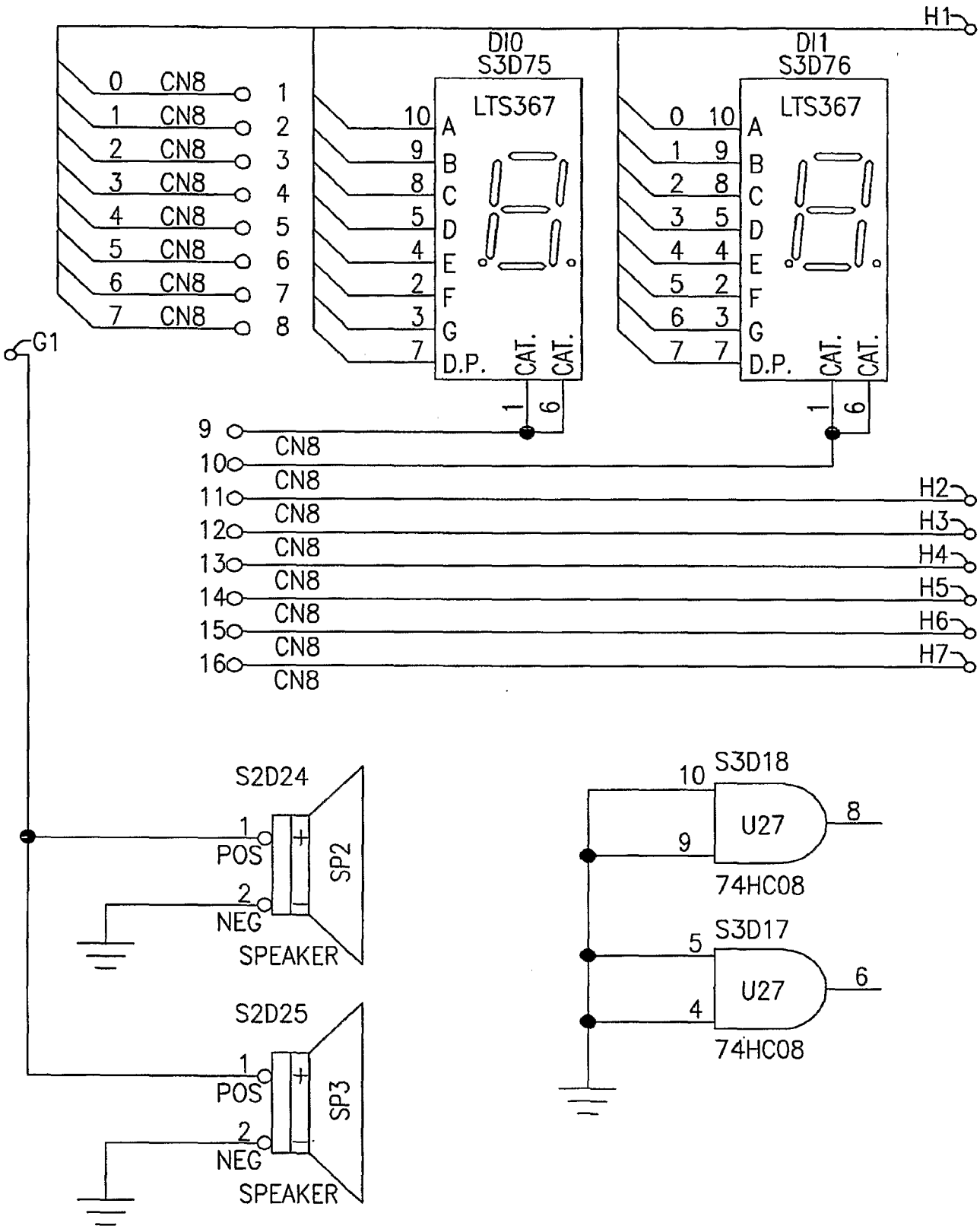

H1
DI0
S3D75
LTS367
DI1
S3D76
LTS367
0 CN8 1
1 CN8 2
2 CN8 3
3 CN8 4
4 CN8 5
5 CN8 6
6 CN8 7
7 CN8 8
10 A
9 B
8 C
5 D
4 E
2 F
3 G
7 D.P.
CAT.
CAT.
G1
9 CN8
10 CN8
11 CN8
12 CN8
13 CN8
14 CN8
15 CN8
16 CN8
H2
H3
H4
H5
H6
H7
S2D24
1 POS
2 NEG
SP2
SPEAKER
S2D25
1 POS
2 NEG
SP3
SPEAKER
S3D18
10
9
U27
8
74HC08
S3D17
5
4
U27
6
74HC08

FIG. 18H

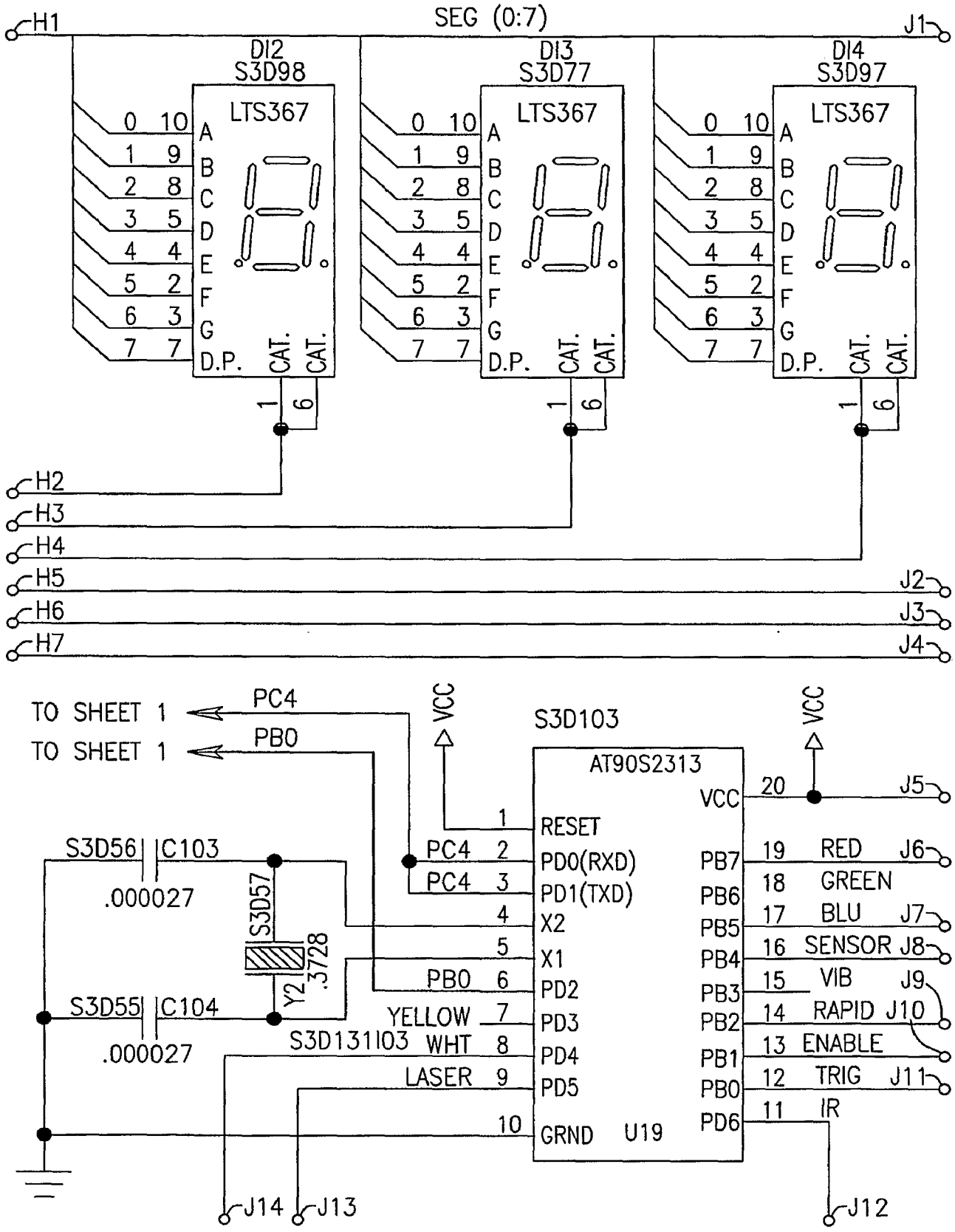

H1
SEG (0:7)
J1
DI2
S3D98
DI3
S3D77
DI4
S3D97
LTS367
A
B
C
D
E
F
G
D.P.
CAT.
CAT.
H2
H3
H4
H5
H6
H7
J2
J3
J4
TO SHEET 1
PC4
TO SHEET 1
PB0
VCC
S3D103
AT90S2313
VCC
20
J5
RESET
PD0(RXD)
PD1(TXD)
X2
X1
PD2
PD3
PD4
PD5
GRND
U19
PB7
PB6
PB5
PB4
PB3
PB2
PB1
PB0
PD6
19 RED J6
18 GREEN
17 BLU J7
16 SENSOR J8
15 VIB J9
14 RAPID J10
13 ENABLE
12 TRIG J11
11 IR
S3D56
C103
.000027
S3D57
.3728
Y2
S3D55
C104
.000027
YELLOW
S3D131103 WHT
LASER
J14
J13
J12

FIG. 18J

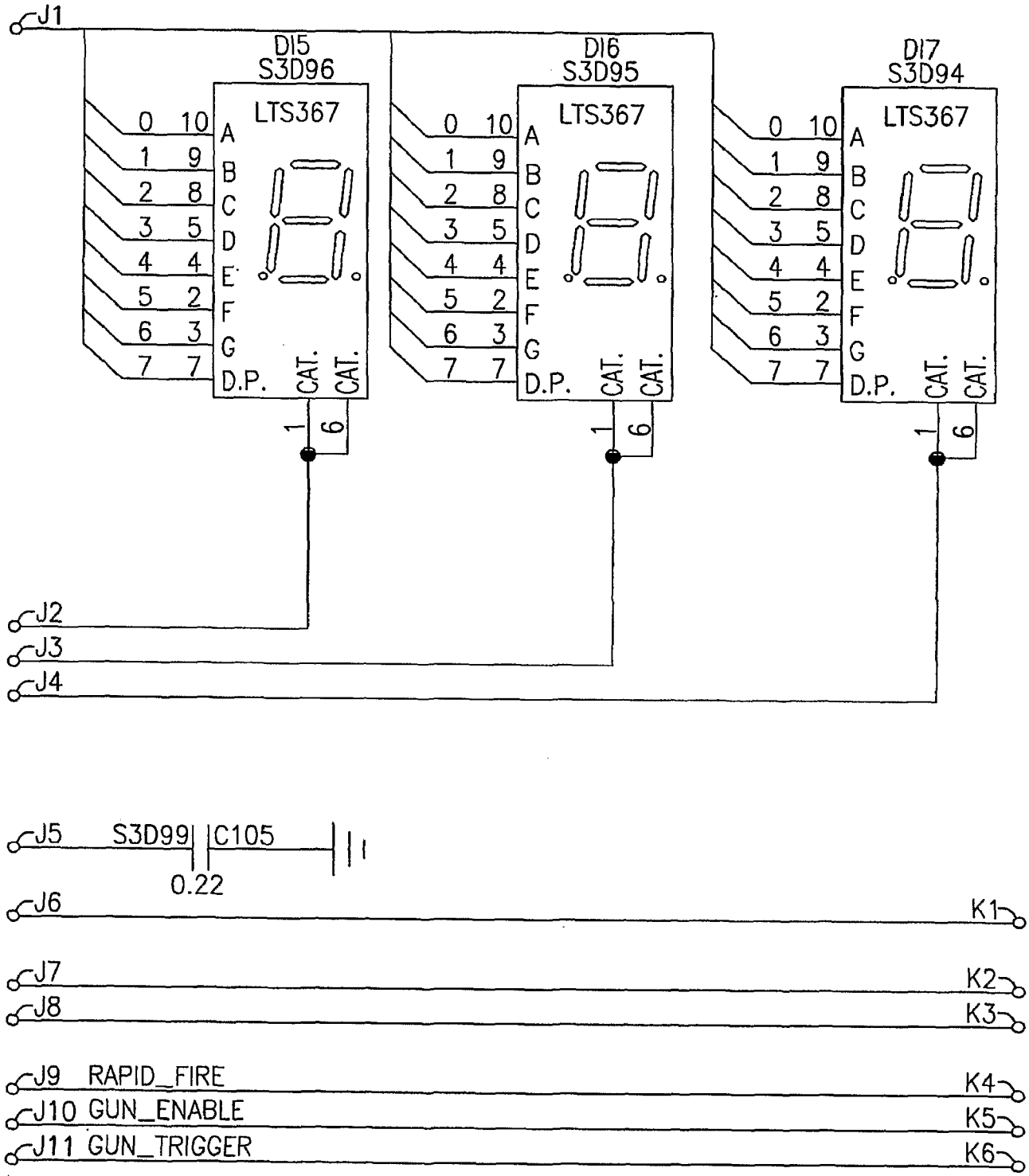

J1
D15
S3D96
LTS367
D16
S3D95
LTS367
D17
S3D94
LTS367
0 10
1 9
2 8
3 5
4 4
5 2
6 3
7 7
A
B
C
D
E
F
G
D.P.
CAT.
CAT.
1
6
J2
J3
J4
J5
S3D99
C105
0.22
J6
J7
J8
J9 RAPID_FIRE
J10 GUN_ENABLE
J11 GUN_TRIGGER
K1
K2
K3
K4
K5
K6

FIG. 18K

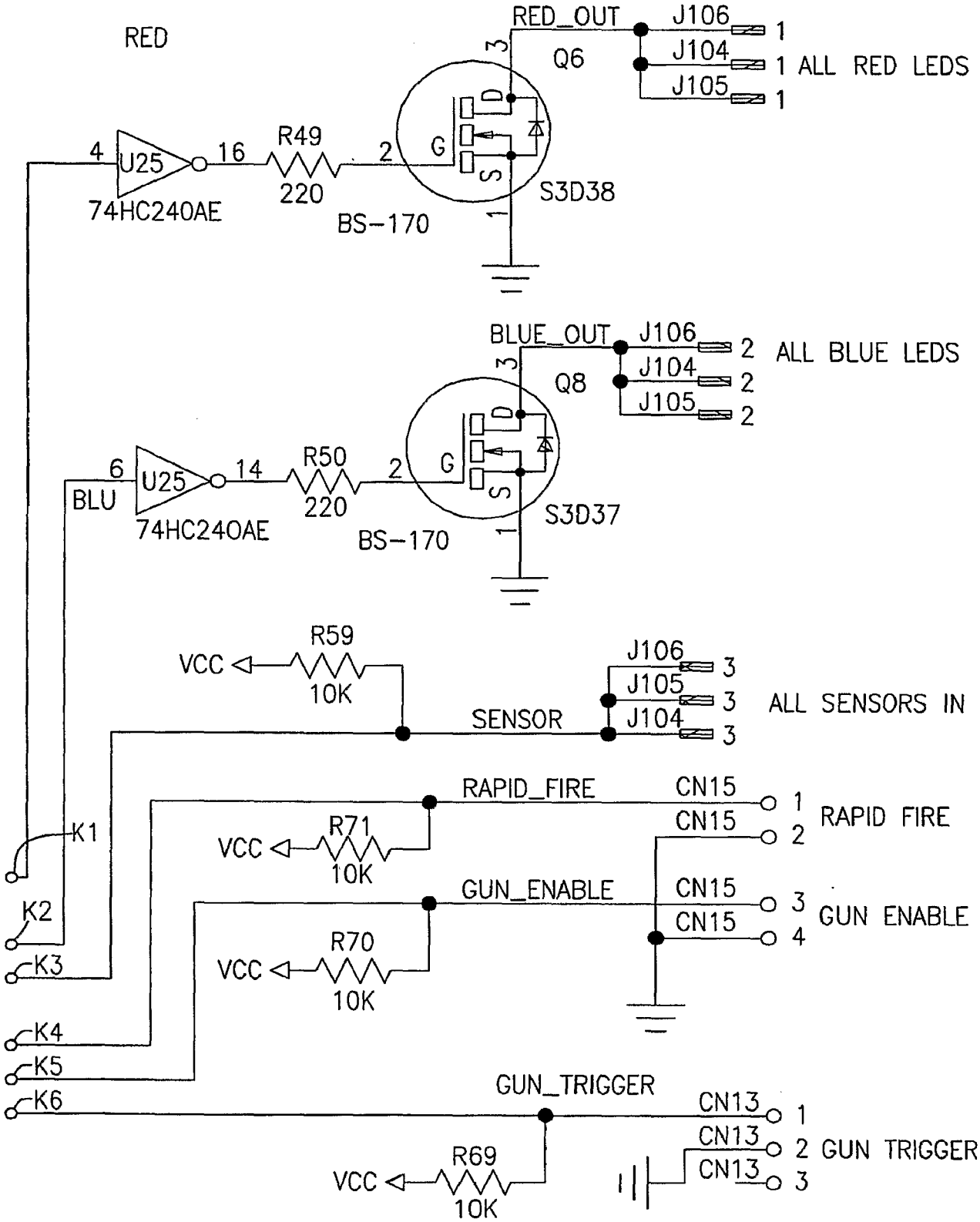

RED
RED_OUT
J106
J104
J105
ALL RED LEDS
Q6
R49
220
U25
74HC240AE
BS-170
S3D38
BLUE_OUT
ALL BLUE LEDS
Q8
R50
BLU
S3D37
R59
VCC
10K
SENSOR
ALL SENSORS IN
RAPID_FIRE
CN15
R71
RAPID FIRE
GUN_ENABLE
R70
GUN ENABLE
K1
K2
K3
K4
K5
K6
GUN_TRIGGER
CN13
R69
GUN TRIGGER

FIG. 18M

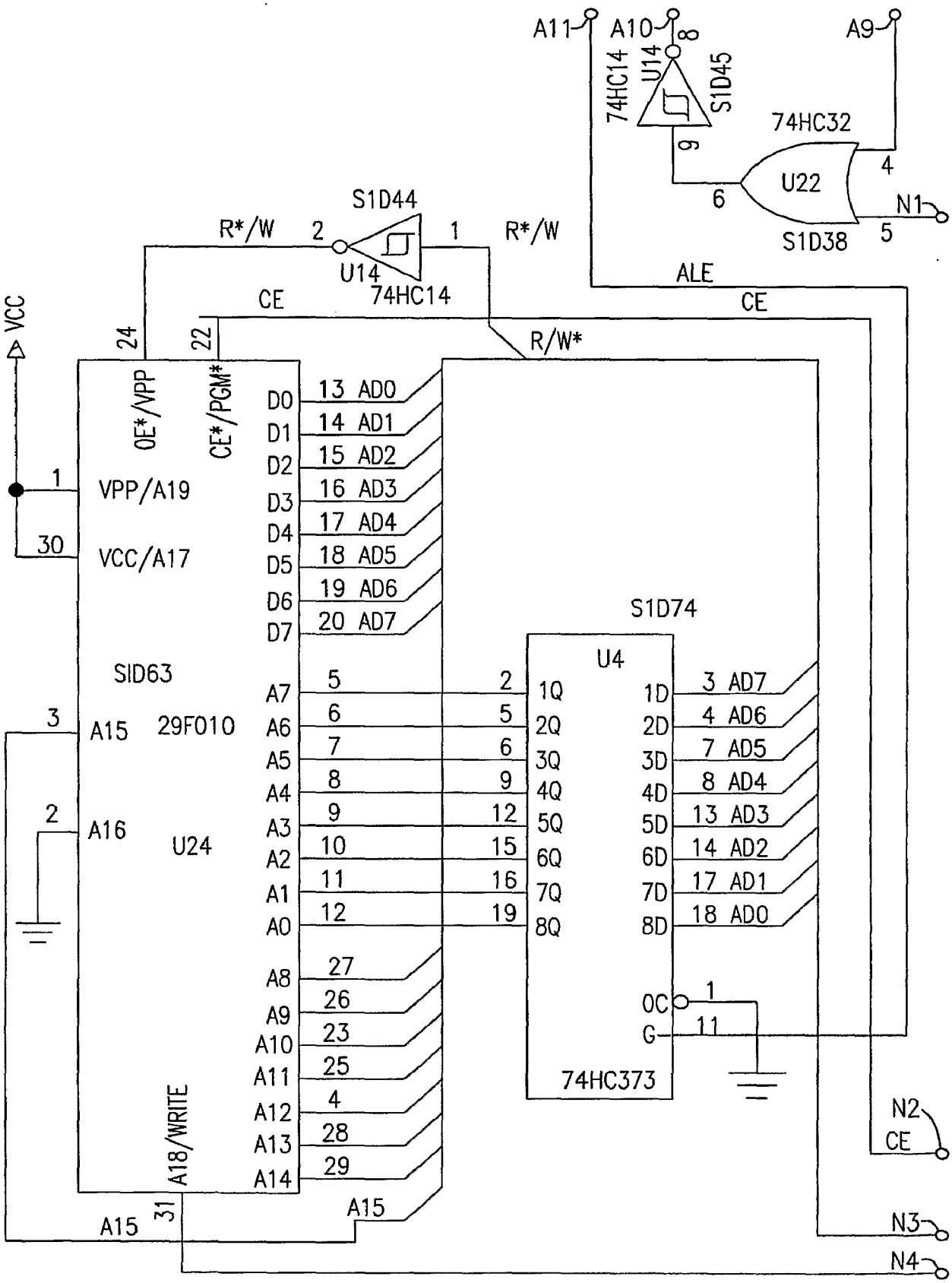

A11
A10
A9
74HC14
U14
S1D45
74HC32
U22
S1D38
N1
S1D44
R*/W
U14
74HC14
ALE
CE
R/W*
VCC
OE*/VPP
CE*/PGM*
VPP/A19
VCC/A17
SID63
A15
29F010
A16
U24
A18/WRITE
D0
D1
D2
D3
D4
D5
D6
D7
A7
A6
A5
A4
A3
A2
A1
A0
A8
A9
A10
A11
A12
A13
A14
13 AD0
14 AD1
15 AD2
16 AD3
17 AD4
18 AD5
19 AD6
20 AD7
S1D74
U4
74HC373
1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q
1D
2D
3D
4D
5D
6D
7D
8D
OC
G
3 AD7
4 AD6
7 AD5
8 AD4
13 AD3
14 AD2
17 AD1
18 AD0
N2
CE
N3
N4

FIG. 18N

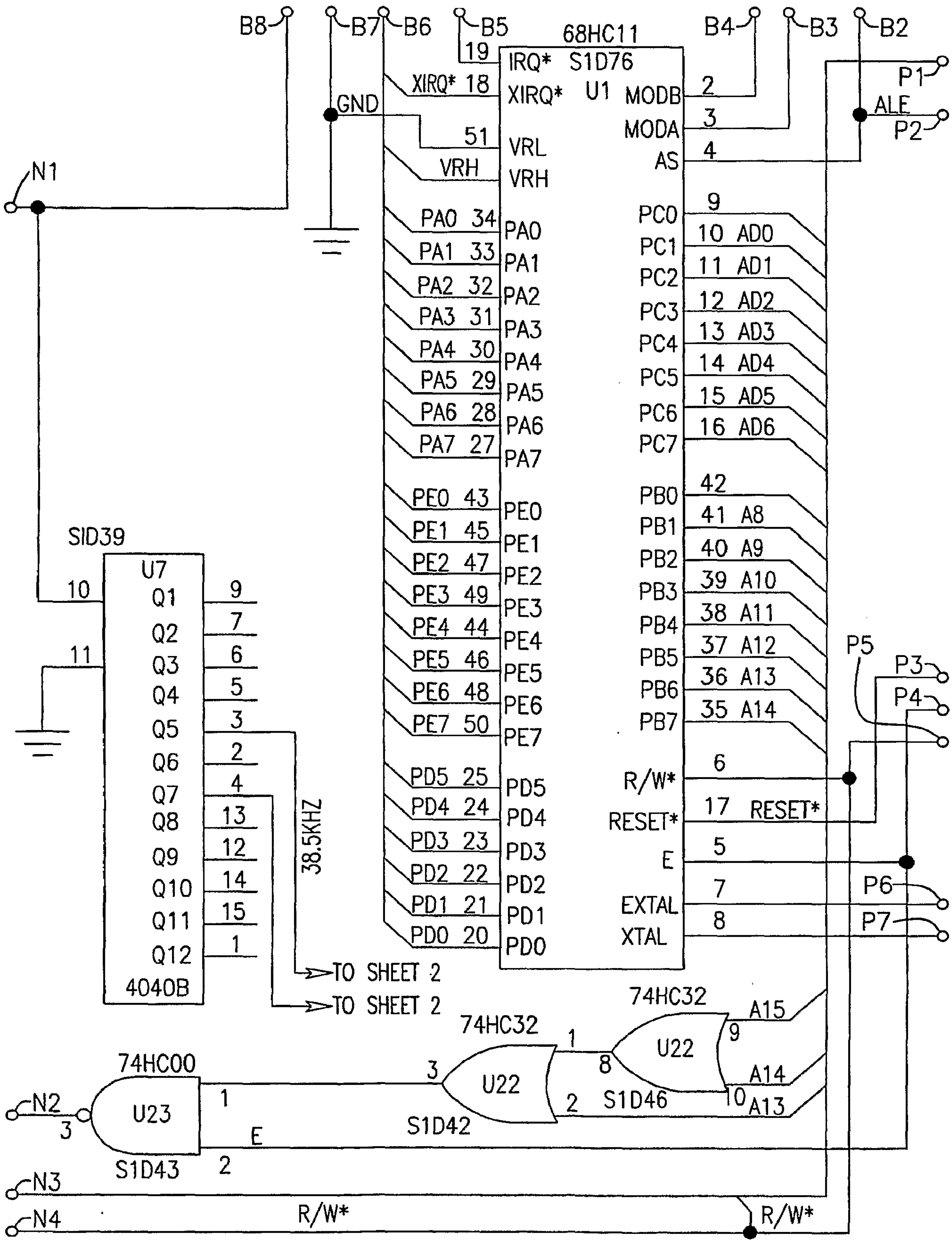

B8
B7
B6
B5
68HC11
B4
B3
B2
19 IRQ* S1D76
XIRQ* 18 XIRQ* U1 MODB 2
GND
51 VRL
VRH VRH
MODA 3
AS 4
P1
ALE
P2
N1
PA0 34 PA0
PA1 33 PA1
PA2 32 PA2
PA3 31 PA3
PA4 30 PA4
PA5 29 PA5
PA6 28 PA6
PA7 27 PA7
PC0 9
PC1 10 AD0
PC2 11 AD1
PC3 12 AD2
PC4 13 AD3
PC5 14 AD4
PC6 15 AD5
PC7 16 AD6
PE0 43 PE0
PE1 45 PE1
PE2 47 PE2
PE3 49 PE3
PE4 44 PE4
PE5 46 PE5
PE6 48 PE6
PE7 50 PE7
PB0 42
PB1 41 A8
PB2 40 A9
PB3 39 A10
PB4 38 A11
PB5 37 A12
PB6 36 A13
PB7 35 A14
SID39
U7
10 Q1 9
Q2 7
11 Q3 6
Q4 5
Q5 3
Q6 2
Q7 4
Q8 13
Q9 12
Q10 14
Q11 15
Q12 1
4040B
38.5KHZ
P5
P3
P4
PD5 25 PD5
PD4 24 PD4
PD3 23 PD3
PD2 22 PD2
PD1 21 PD1
PD0 20 PD0
R/W* 6
RESET* 17 RESET*
E 5
EXTAL 7
XTAL 8
P6
P7
TO SHEET 2
TO SHEET 2
74HC32
74HC32
U22
U22
A15
9
1
8
3
A14
10
A13
2
S1D46
S1D42
74HC00
N2
U23
3
1
E
2
S1D43
N3
N4
R/W*
R/W*

FIG. 18P

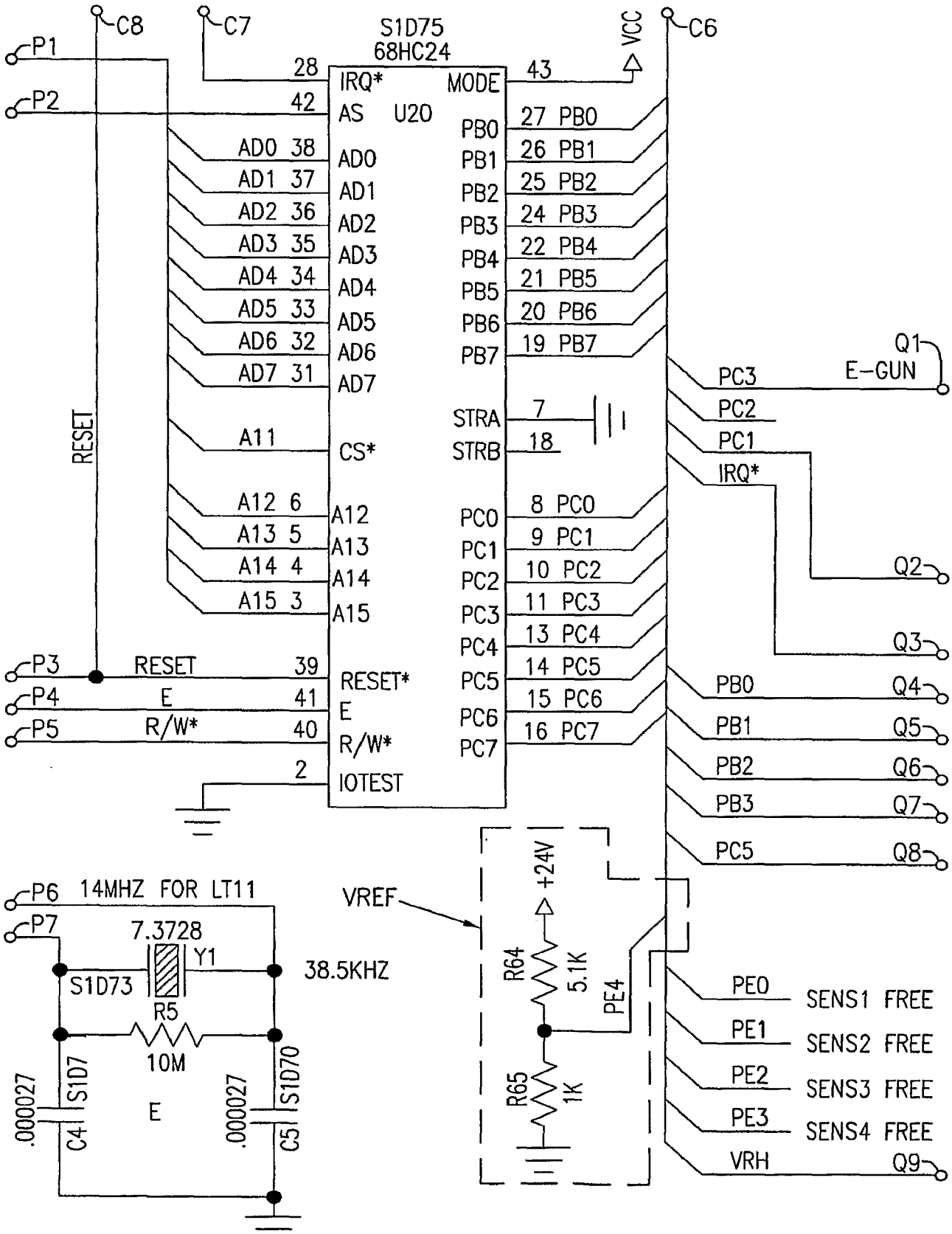

C8
C7
S1D75
68HC24
C6
VCC
P1
P2
28 IRQ*
42 AS
MODE 43
U20
AD0 38 AD0
AD1 37 AD1
AD2 36 AD2
AD3 35 AD3
AD4 34 AD4
AD5 33 AD5
AD6 32 AD6
AD7 31 AD7
PB0 27 PB0
PB1 26 PB1
PB2 25 PB2
PB3 24 PB3
PB4 22 PB4
PB5 21 PB5
PB6 20 PB6
PB7 19 PB7
Q1
E-GUN
PC3
PC2
PC1
IRQ*
Q2
Q3
RESET
A11 CS*
STRA 7
STRB 18
A12 6 A12
A13 5 A13
A14 4 A14
A15 3 A15
PC0 8 PC0
PC1 9 PC1
PC2 10 PC2
PC3 11 PC3
PC4 13 PC4
PC5 14 PC5
PC6 15 PC6
PC7 16 PC7
P3 RESET 39 RESET*
P4 E 41 E
P5 R/W* 40 R/W*
2 IOTEST
PB0 Q4
PB1 Q5
PB2 Q6
PB3 Q7
PC5 Q8
P6 14MHZ FOR LT11
P7
7.3728
Y1
S1D73
38.5KHZ
R5
10M
.000027
C4
S1D7
E
.000027
C5
S1D70
VREF
+24V
R64
5.1K
PE4
R65
1K
PE0 SENS1 FREE
PE1 SENS2 FREE
PE2 SENS3 FREE
PE3 SENS4 FREE
VRH Q9

FIG. 18Q

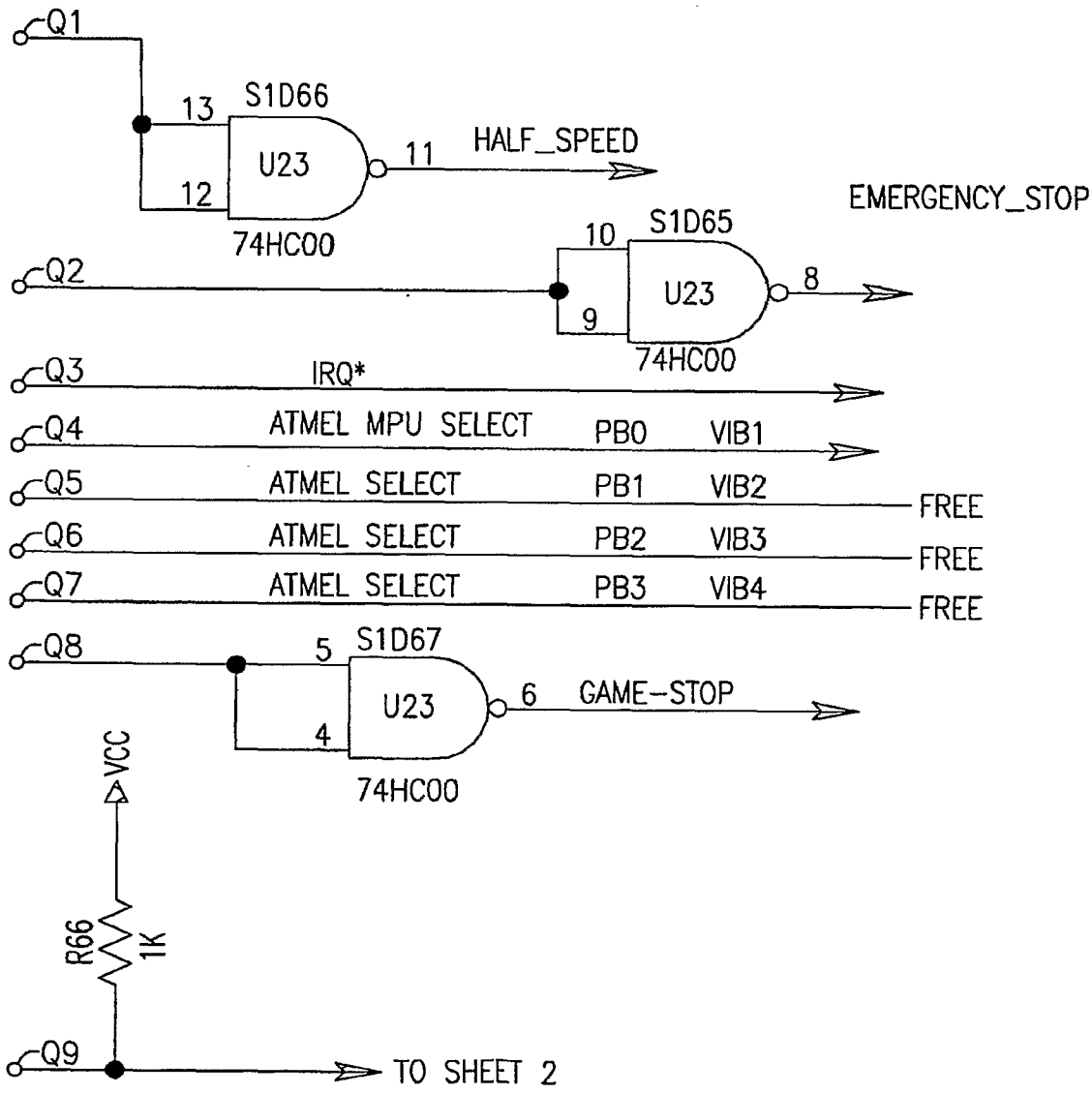

Q1
13
S1D66
U23
12
11
HALF_SPEED
74HC00
EMERGENCY_STOP
Q2
10
S1D65
U23
9
8
74HC00
Q3
IRQ*
Q4
ATMEL MPU SELECT
PB0
VIB1
Q5
ATMEL SELECT
PB1
VIB2
FREE
Q6
ATMEL SELECT
PB2
VIB3
FREE
Q7
ATMEL SELECT
PB3
VIB4
FREE
Q8
5
S1D67
U23
4
6
GAME-STOP
74HC00
VCC
R66
1K
Q9
TO SHEET 2

FIG. 18R

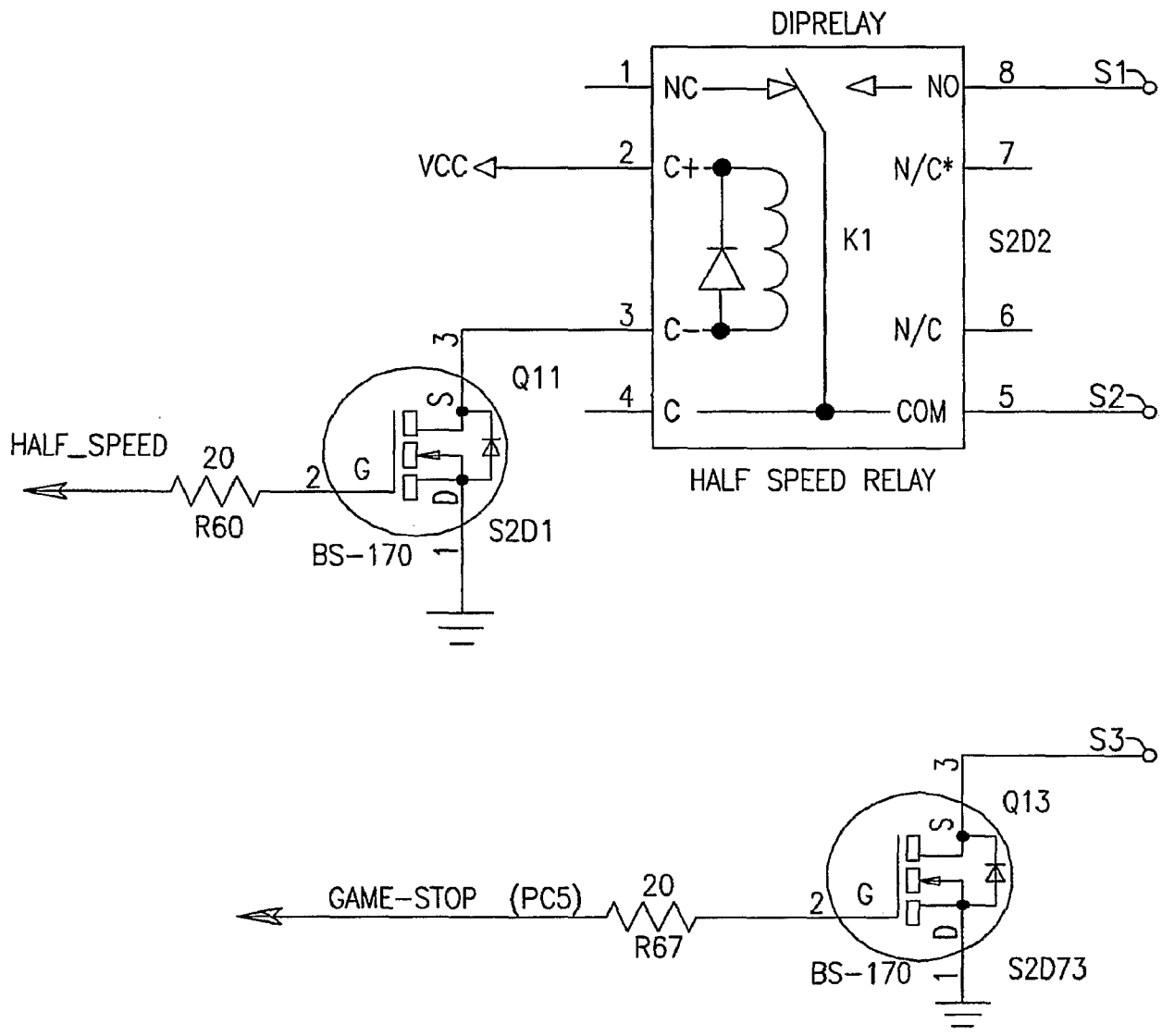

DIPRELAY
1
NC
NO
8
S1
VCC
2
C+
N/C*
7
K1
S2D2
3
C-
N/C
6
Q11
4
C
COM
5
S2
HALF_SPEED
20
R60
2
G
S
D
3
1
BS-170
S2D1
HALF SPEED RELAY
S3
Q13
GAME-STOP (PC5)
20
R67
BS-170
S2D73

FIG. 18S

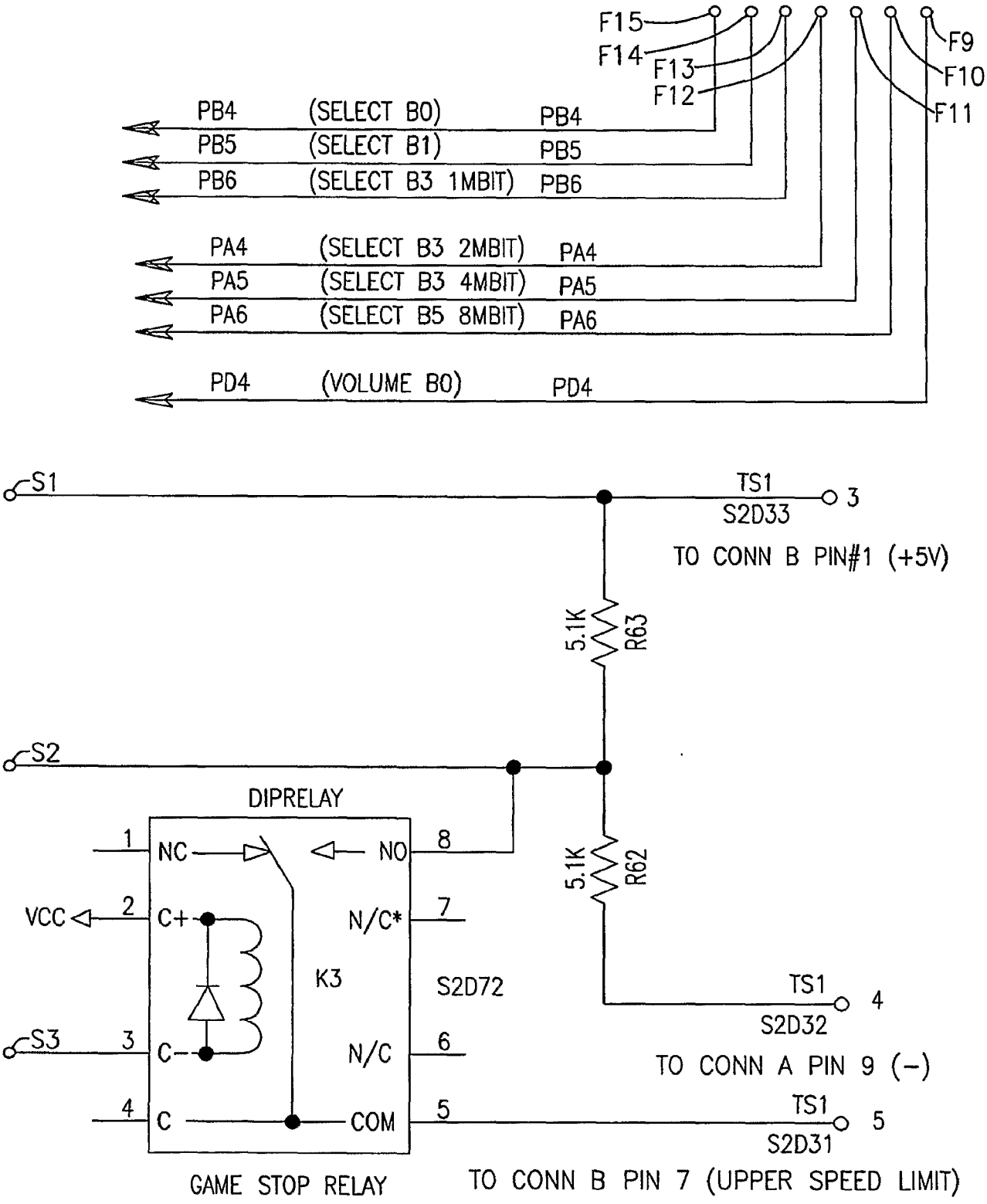
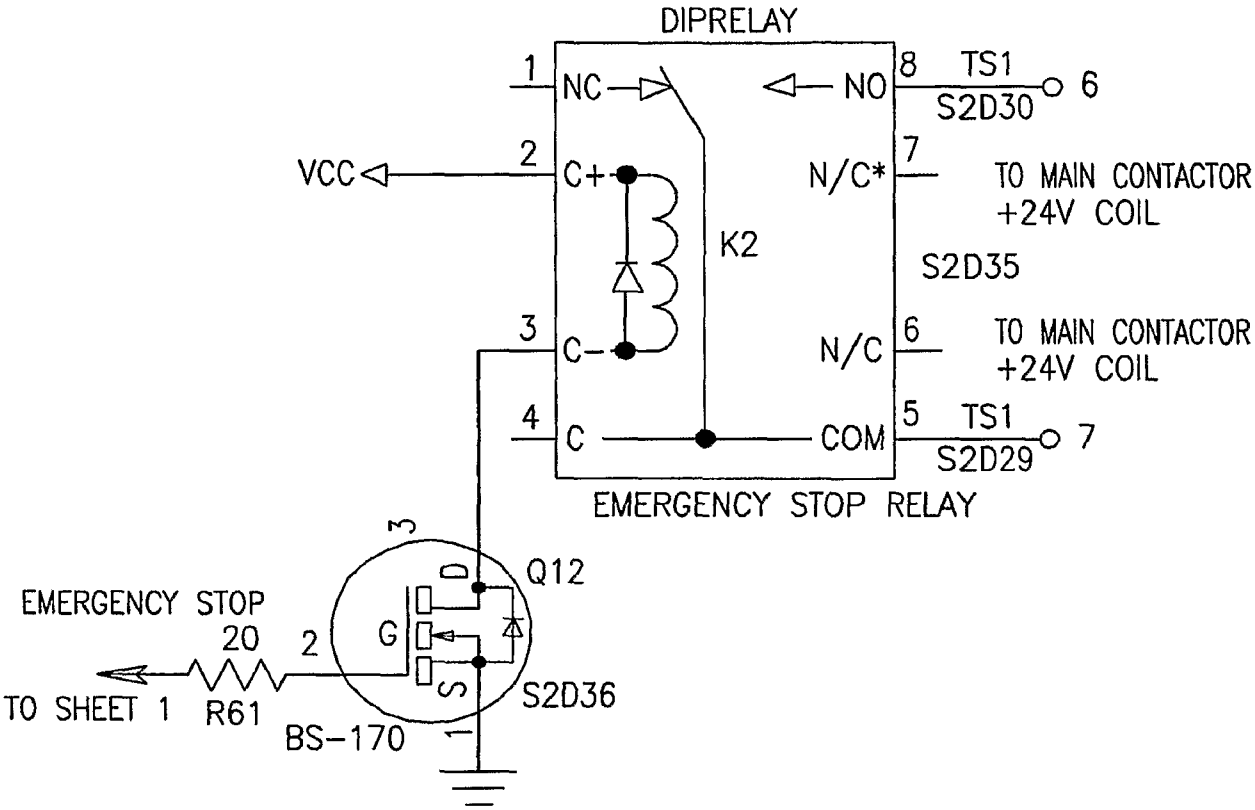

F15
F14
F13
F12
F9
F10
F11
PB4 (SELECT B0) PB4
PB5 (SELECT B1) PB5
PB6 (SELECT B3 1MBIT) PB6
PA4 (SELECT B3 2MBIT) PA4
PA5 (SELECT B3 4MBIT) PA5
PA6 (SELECT B5 8MBIT) PA6
PD4 (VOLUME B0) PD4
S1
TS1
S2D33
3
TO CONN B PIN#1 (+5V)
5.1K
R63
S2
DIPRELAY
1
NC
NO
8
5.1K
R62
VCC
2
C+
N/C*
7
K3
S2D72
TS1
4
S2D32
S3
3
C-
N/C
6
TO CONN A PIN 9 (-)
4
C
COM
5
TS1
5
S2D31
GAME STOP RELAY
TO CONN B PIN 7 (UPPER SPEED LIMIT)

FIG. 18T


DIPRELAY
1
NC
NO
8
TS1
S2D30
6
VCC
2
C+
N/C*
7
TO MAIN CONTACTOR
+24V COIL
K2
S2D35
3
C-
N/C
6
TO MAIN CONTACTOR
+24V COIL
4
C
COM
5
TS1
S2D29
7
EMERGENCY STOP RELAY
3
D
Q12
EMERGENCY STOP
20
2
G
S
S2D36
TO SHEET 1
R61
BS-170
1

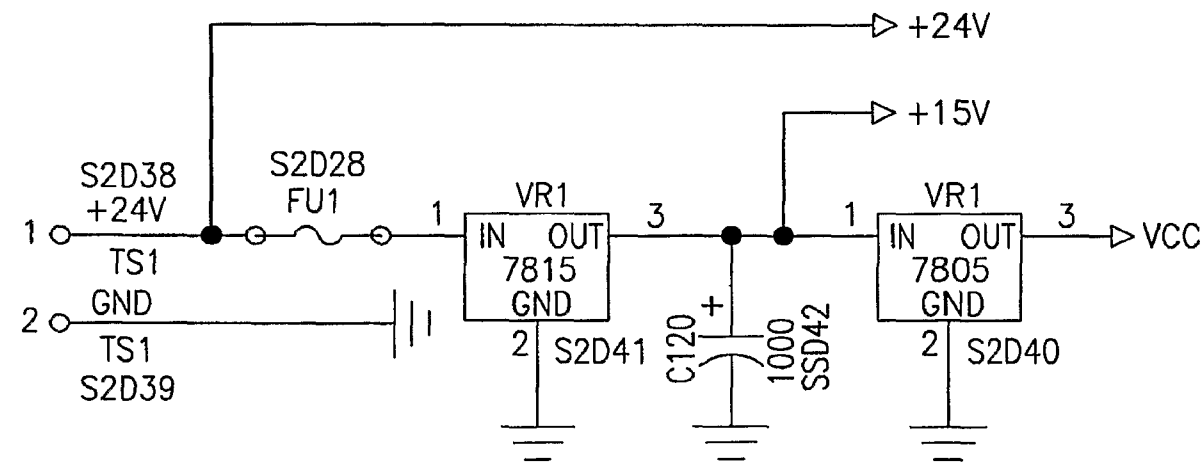

+24V
+15V
S2D38
+24V
S2D28
FU1
VR1
VR1
1
TS1
GND
2
TS1
S2D39
IN OUT
7815
GND
IN OUT
7805
GND
3
VCC
2
S2D41
2
S2D40
C120
1000
SSD42

FIG. 18U

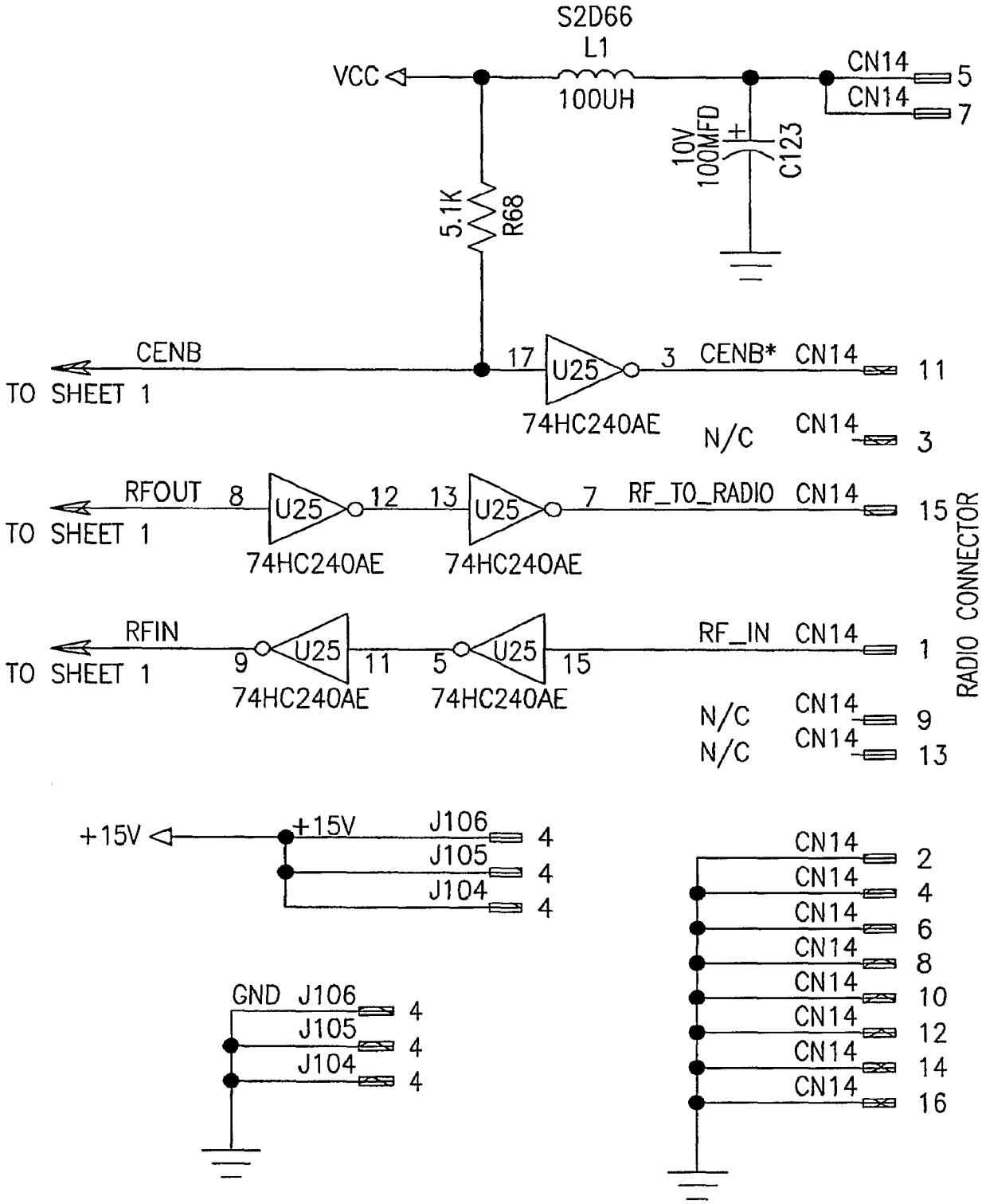

S2D66
L1
100UH
VCC
CN14 5
CN14 7
10V
100MFD
C123
5.1K
R68
CENB
TO SHEET 1
17
U25
3 CENB*
CN14 11
74HC240AE
N/C
CN14 3
RFOUT
8
U25
12
13
U25
7 RF_TO_RADIO
CN14 15
TO SHEET 1
74HC240AE
74HC240AE
RFIN
TO SHEET 1
9
U25
11
5
U25
15
RF_IN
CN14 1
74HC240AE
74HC240AE
N/C
CN14 9
N/C
CN14 13
RADIO CONNECTOR
+15V
+15V
J106 4
J105 4
J104 4
GND J106 4
J105 4
J104 4
CN14 2
CN14 4
CN14 6
CN14 8
CN14 10
CN14 12
CN14 14
CN14 16

FIG. 18V

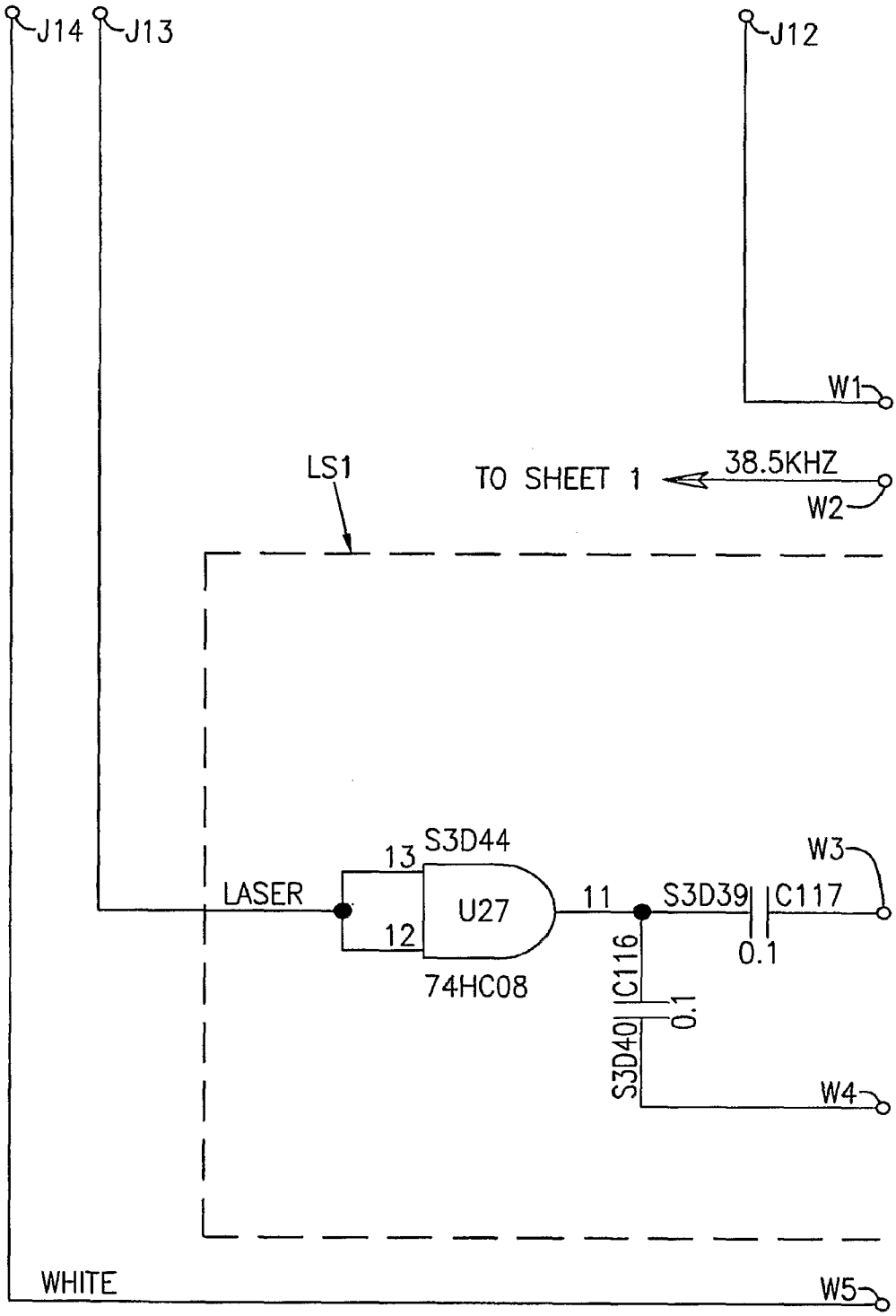

J14
J13
J12
W1
LS1
TO SHEET 1
38.5KHZ
W2
13
S3D44
W3
LASER
U27
11
S3D39
C117
12
0.1
74HC08
C116
0.1
S3D40
W4
WHITE
W5

FIG. 18W

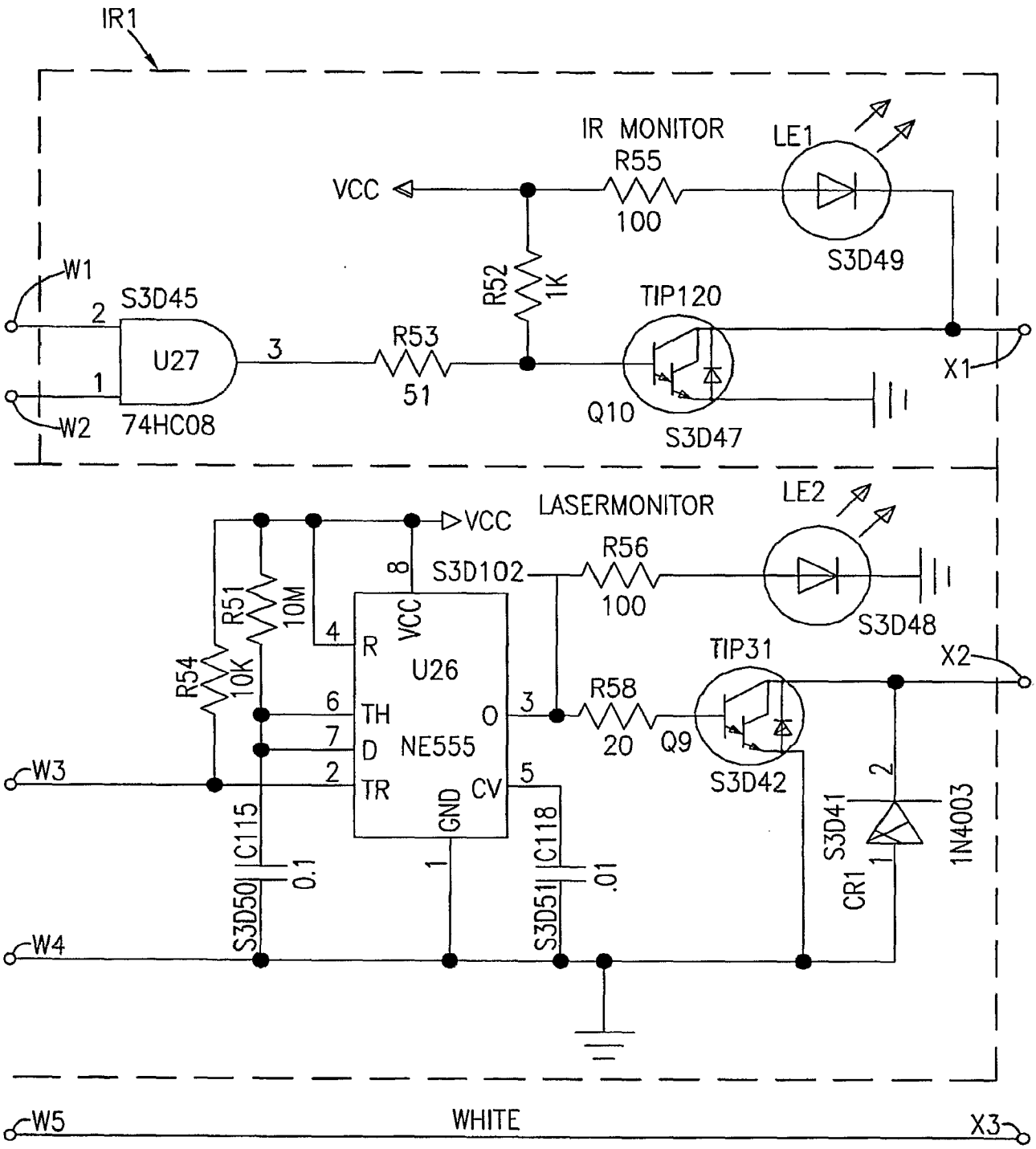

IR1
IR MONITOR
LE1
R55
VCC
100
S3D49
R52
1K
W1
S3D45
2
TIP120
R53
3
U27
51
X1
1
W2
74HC08
Q10
S3D47
LASERMONITOR
LE2
VCC
R56
S3D102
8
100
S3D48
R51
10M
TIP31
X2
4
R
VCC
U26
R54
10K
6
TH
O
3
R58
7
D
NE555
20
Q9
W3
2
TR
5
CV
S3D42
C115
GND
C118
S3D41
2
1N4003
0.1
1
.01
S3D50
S3D51
CR1
1
W4
W5
WHITE
X3

FIG. 18X

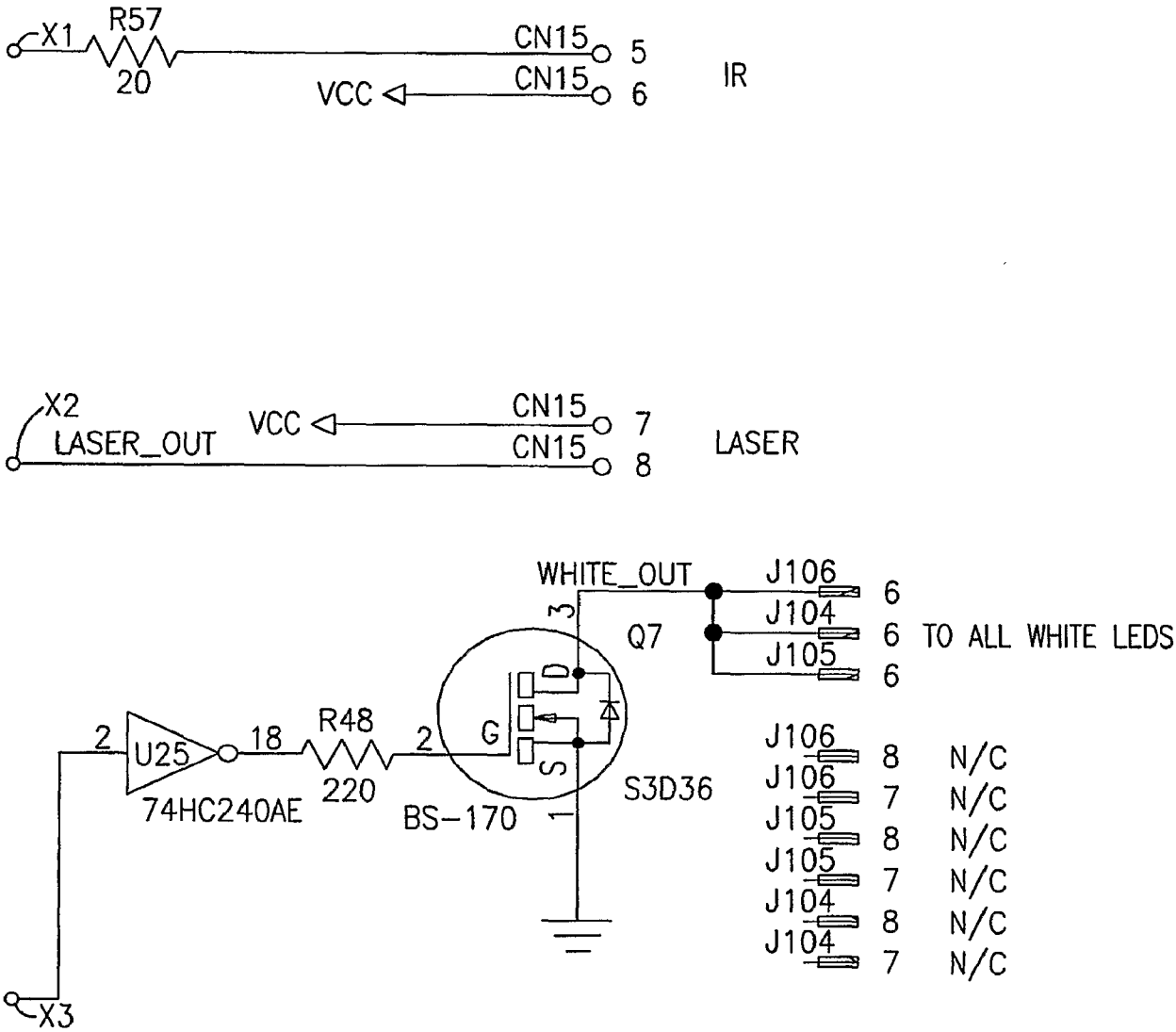

X1
R57
20
CN15
5
VCC
CN15
6
IR
X2
LASER_OUT
VCC
CN15
7
CN15
8
LASER
WHITE_OUT
J106
6
J104
6
TO ALL WHITE LEDS
Q7
J105
6
3
D
G
S
1
S3D36
2
U25
74HC240AE
18
R48
220
2
BS-170
J106
8
N/C
J106
7
N/C
J105
8
N/C
J105
7
N/C
J104
8
N/C
J104
7
N/C
X3

FIG. 18Y

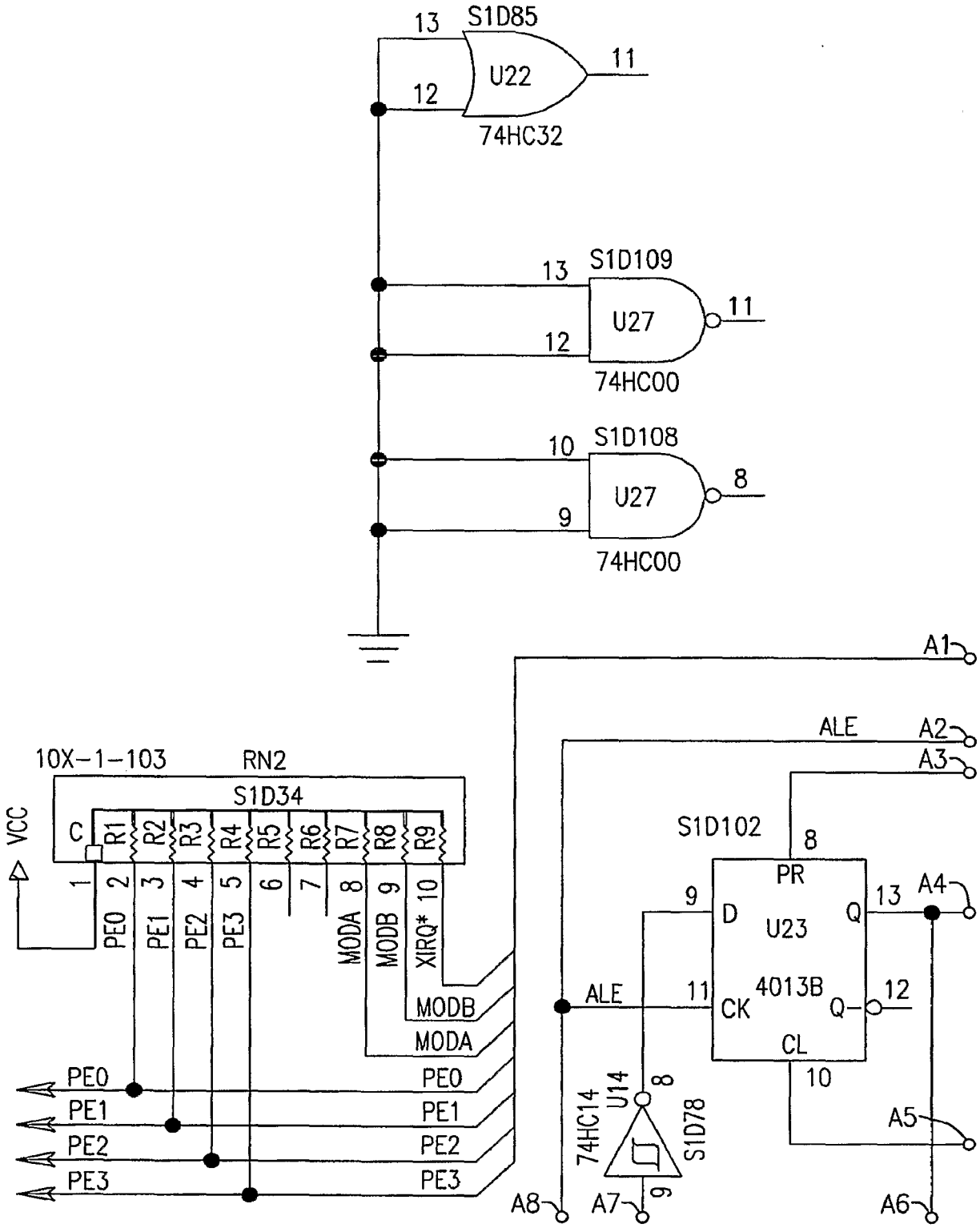

13
S1D85
U22
11
12
74HC32
13
S1D109
U27
11
12
74HC00
10
S1D108
U27
8
9
74HC00
A1
ALE
A2
A3
10X-1-103
RN2
S1D34
VCC
C
R1
R2
R3
R4
R5
R6
R7
R8
R9
1
2
3
4
5
6
7
8
9
10
PE0
PE1
PE2
PE3
MODA
MODB
XIRQ*
MODB
MODA
PE0
PE1
PE2
PE3
S1D102
8
PR
9
D
U23
Q
13
A4
ALE
11
CK
4013B
Q
12
CL
10
A5
74HC14
U14
8
S1D78
9
A8
A7
A6

FIG. 19A

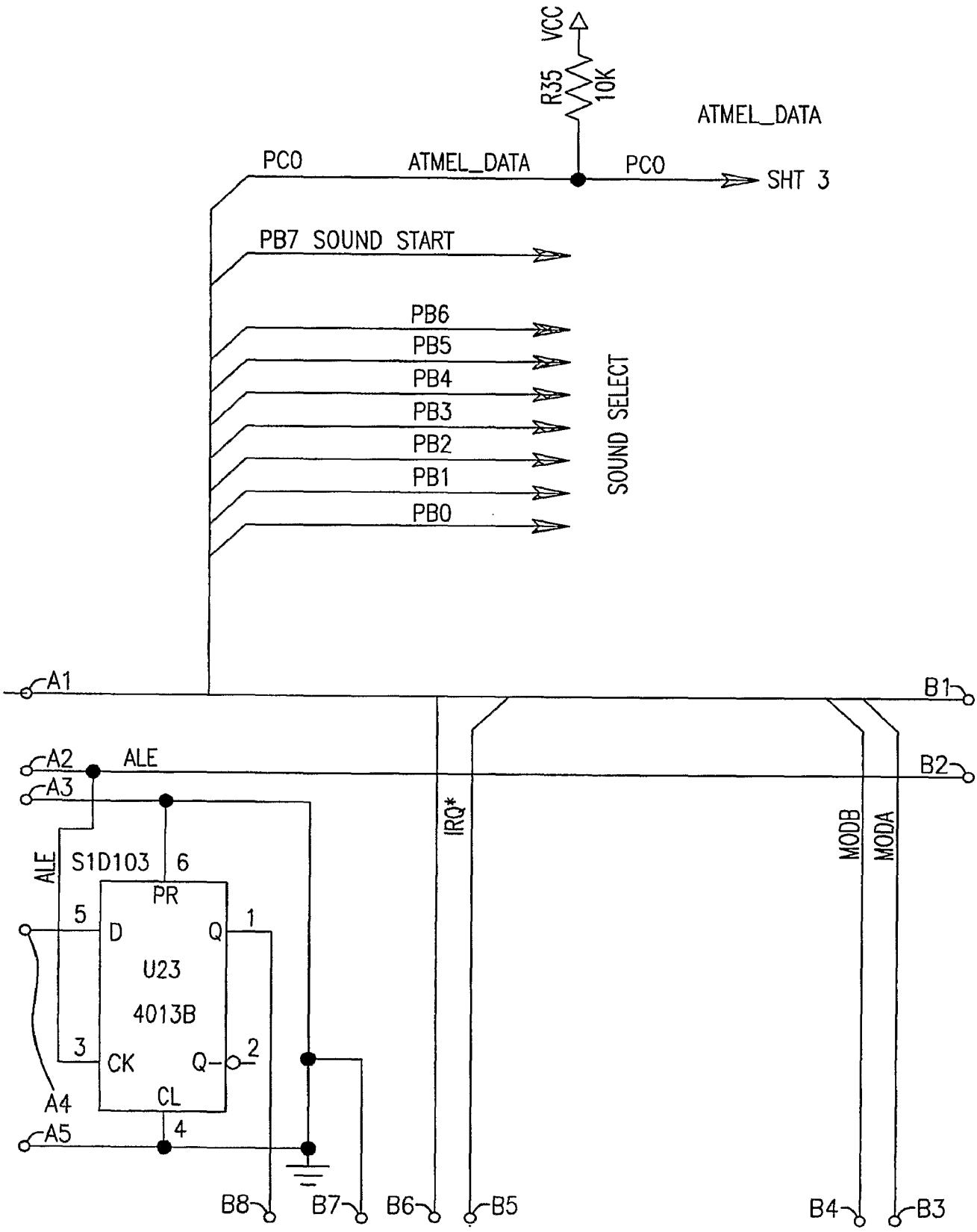

VCC
R35
10K
ATMEL_DATA
PC0
ATMEL_DATA
PC0
SHT 3
PB7 SOUND START
PB6
PB5
PB4
PB3
PB2
PB1
PB0
SOUND SELECT
A1
B1
A2
ALE
B2
A3
IRQ*
MODB
MODA
ALE
S1D103
6
PR
5
D
Q
1
U23
4013B
3
CK
Q
2
CL
A4
A5
4
B8
B7
B6
B5
B4
B3

FIG. 19B

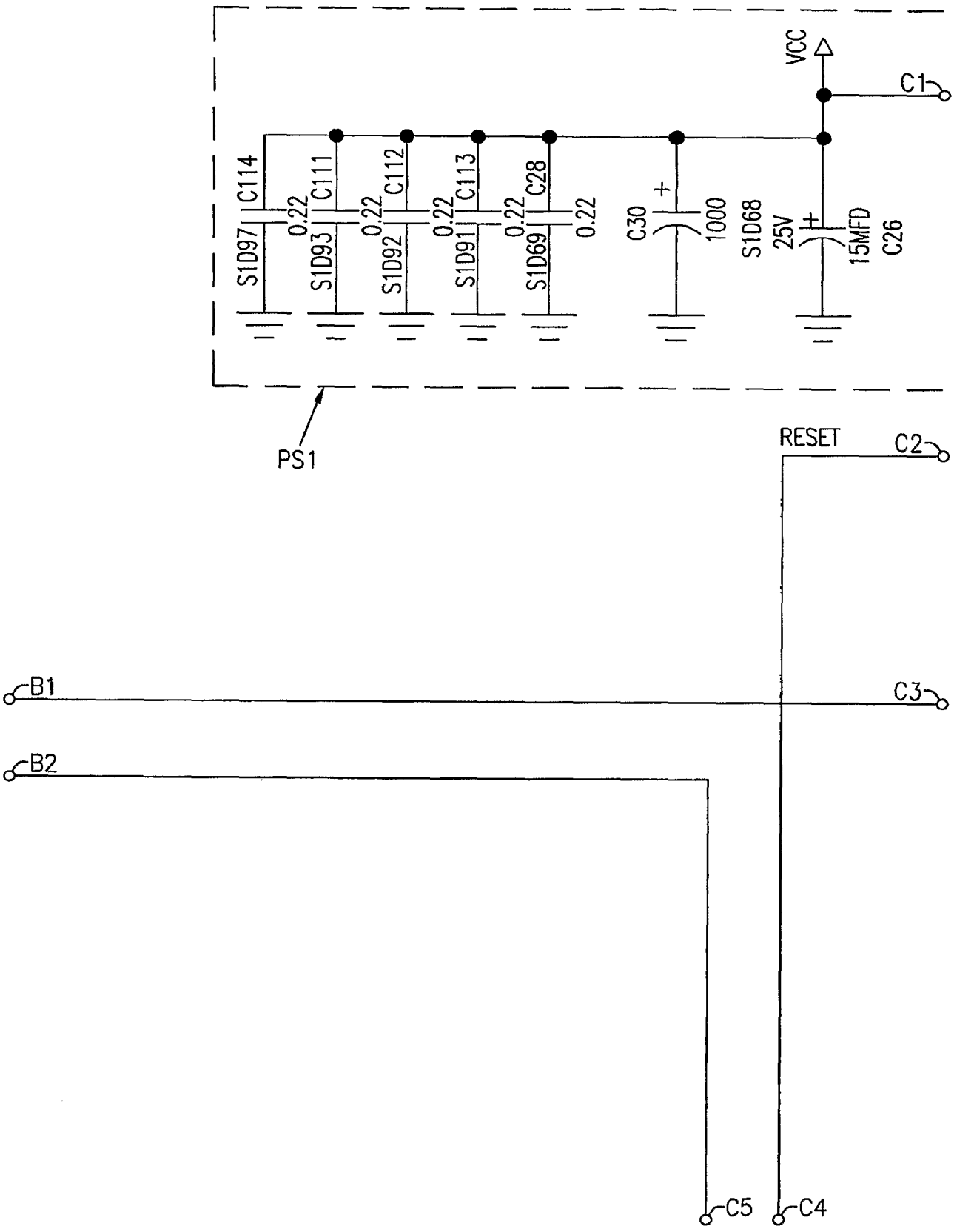

VCC
C1
C114
0.22
S1D97
C111
0.22
S1D93
C112
0.22
S1D92
C113
0.22
S1D91
C28
0.22
S1D69
C30
1000
S1D68
25V
15MFD
C26
PS1
RESET
C2
B1
C3
B2
C5
C4

FIG. 19C

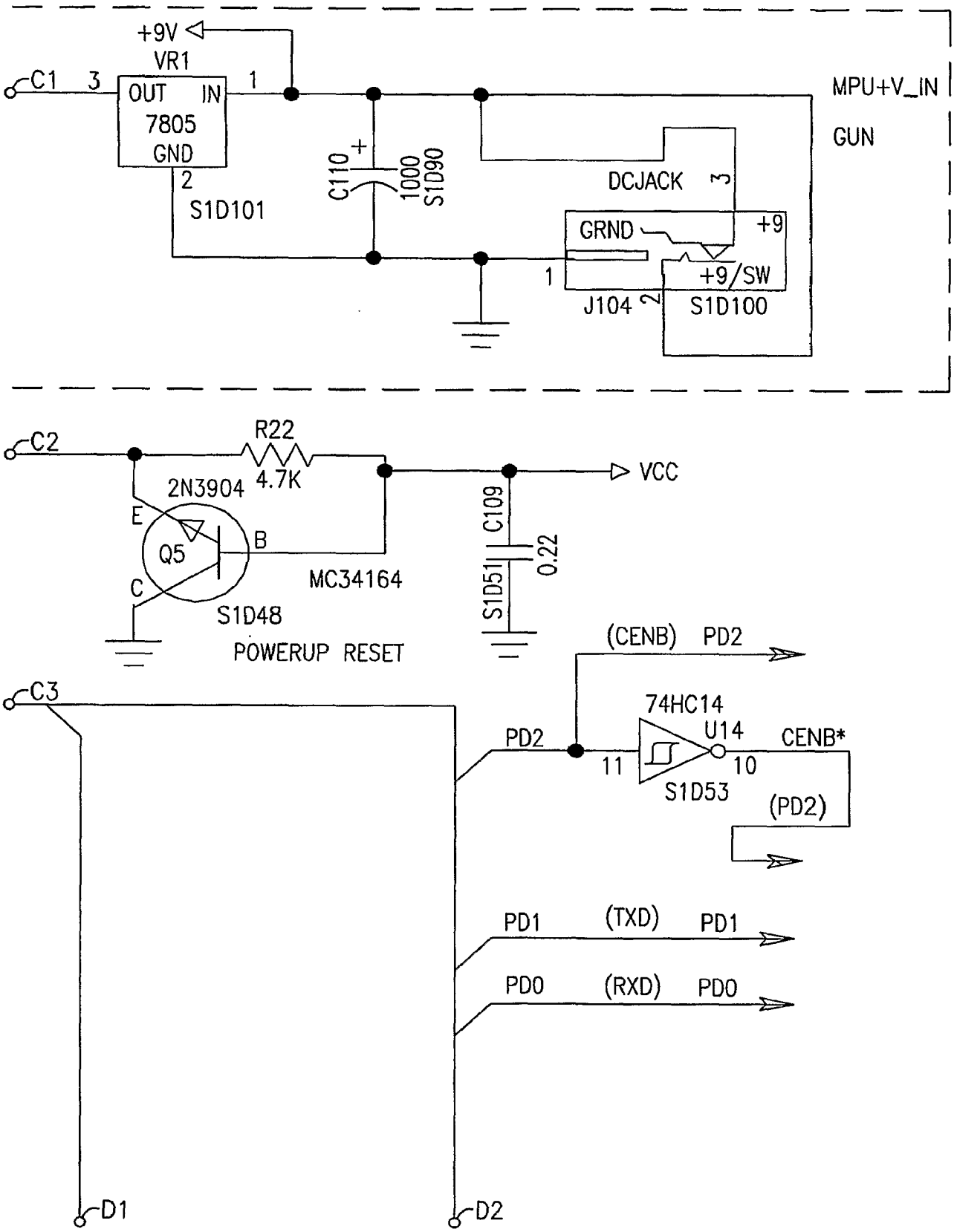

+9V
VR1
C1
3
OUT
IN
1
7805
GND
2
S1D101
C110
+
1000
S1D90
MPU+V_IN
GUN
DCJACK
3
GRND
+9
1
+9/SW
J104
2
S1D100
C2
R22
4.7K
2N3904
E
B
Q5
C
S1D48
MC34164
POWERUP RESET
VCC
C109
S1D51
0.22
(CENB)
PD2
C3
74HC14
U14
PD2
11
10
CENB*
S1D53
(PD2)
PD1
(TXD)
PD1
PD0
(RXD)
PD0
D1
D2

FIG. 19D

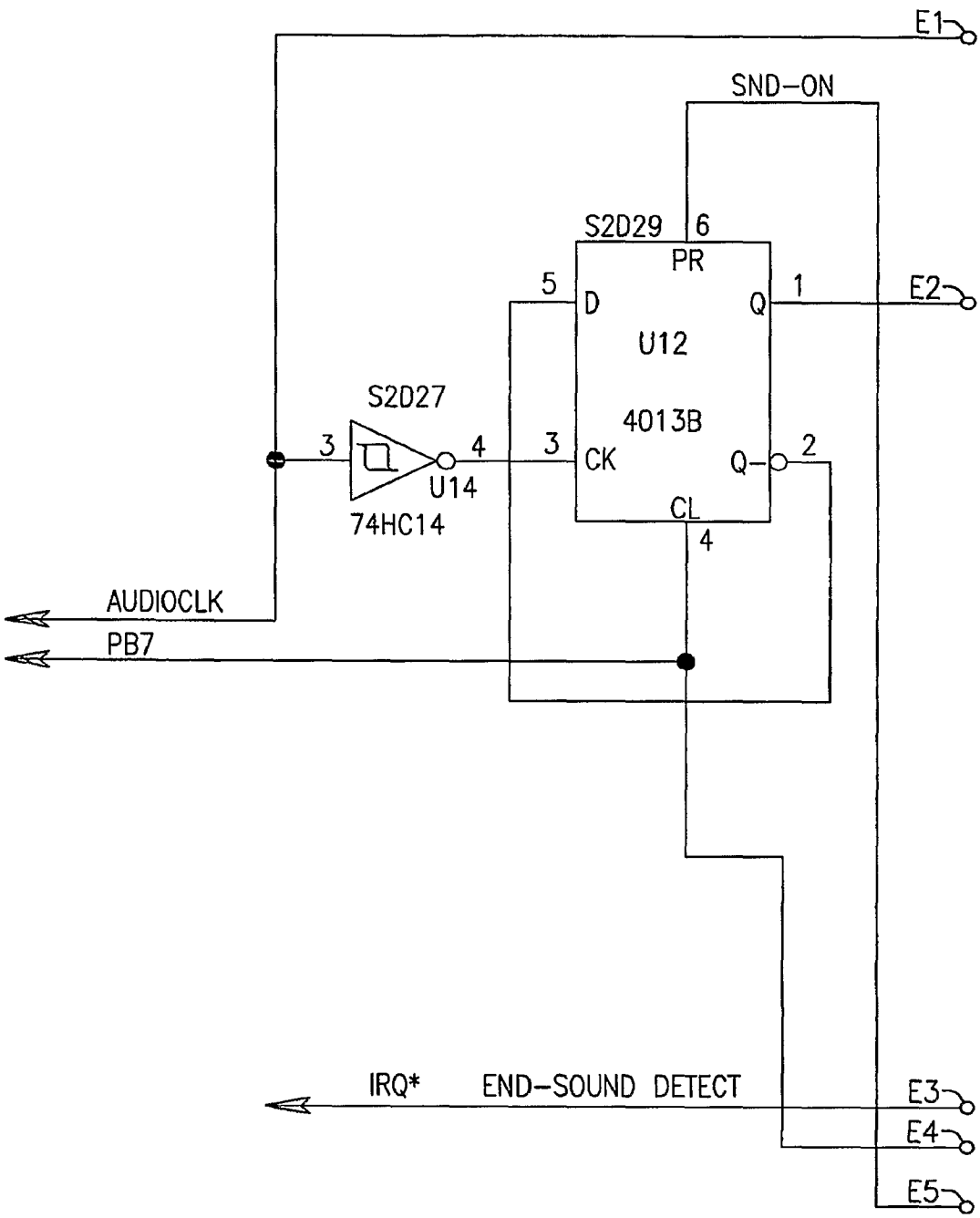

E1
SND-ON
S2D29
6
PR
5
D
Q
1
E2
U12
4013B
S2D27
3
4
3
CK
Q
2
U14
74HC14
CL
4
AUDIOCLK
PB7
IRQ*
END-SOUND DETECT
E3
E4
E5

FIG. 19E

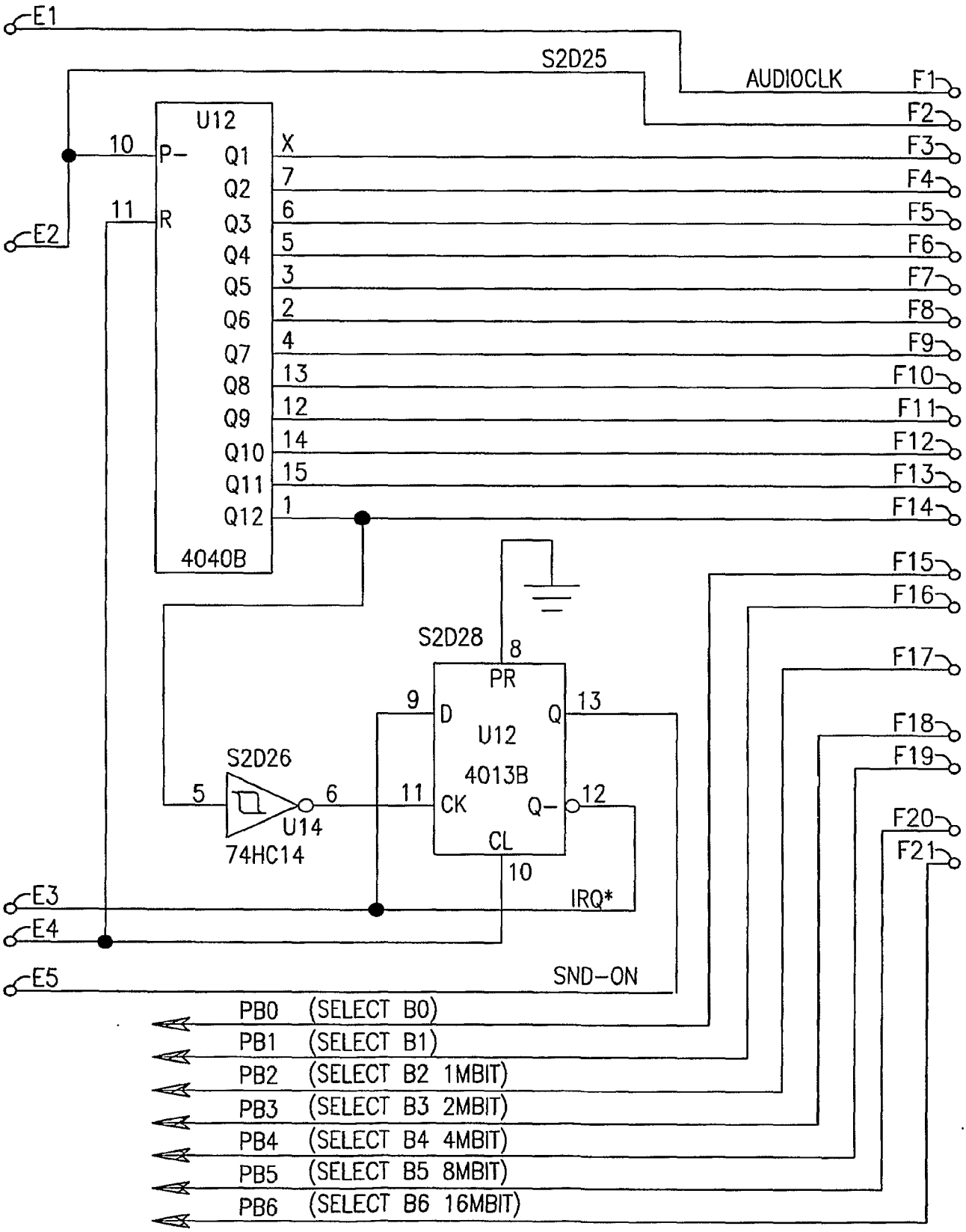

E1
S2D25
AUDIOCLK
F1
F2
U12
10
P-
Q1
X
F3
Q2
7
F4
11
R
Q3
6
F5
E2
Q4
5
F6
Q5
3
F7
Q6
2
F8
Q7
4
F9
Q8
13
F10
Q9
12
F11
Q10
14
F12
Q11
15
F13
Q12
1
F14
4040B
F15
F16
S2D28
8
PR
9
D
Q
13
U12
4013B
F17
S2D26
5
6
11
CK
Q-
12
F18
F19
U14
74HC14
CL
10
F20
F21
E3
IRQ*
E4
E5
SND-ON
PB0 (SELECT B0)
PB1 (SELECT B1)
PB2 (SELECT B2 1MBIT)
PB3 (SELECT B3 2MBIT)
PB4 (SELECT B4 4MBIT)
PB5 (SELECT B5 8MBIT)
PB6 (SELECT B6 16MBIT)

FIG. 19F

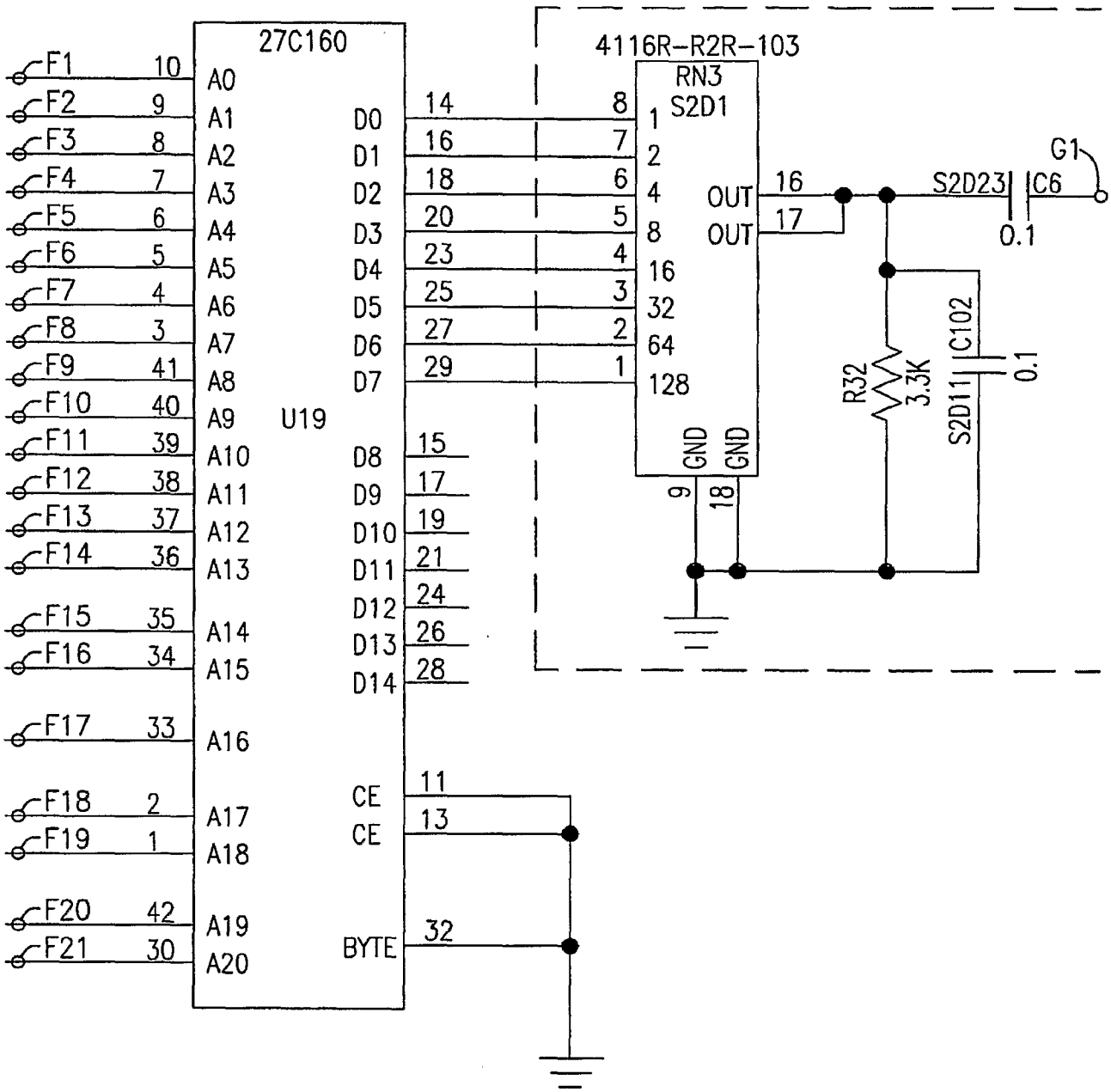

27C160
U19
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
A20
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
CE
CE
BYTE
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
F13
F14
F15
F16
F17
F18
F19
F20
F21
4116R-R2R-103
RN3
S2D1
OUT
OUT
GND
GND
R32
3.3K
C102
0.1
S2D11
S2D23
C6
0.1
G1

FIG. 19G

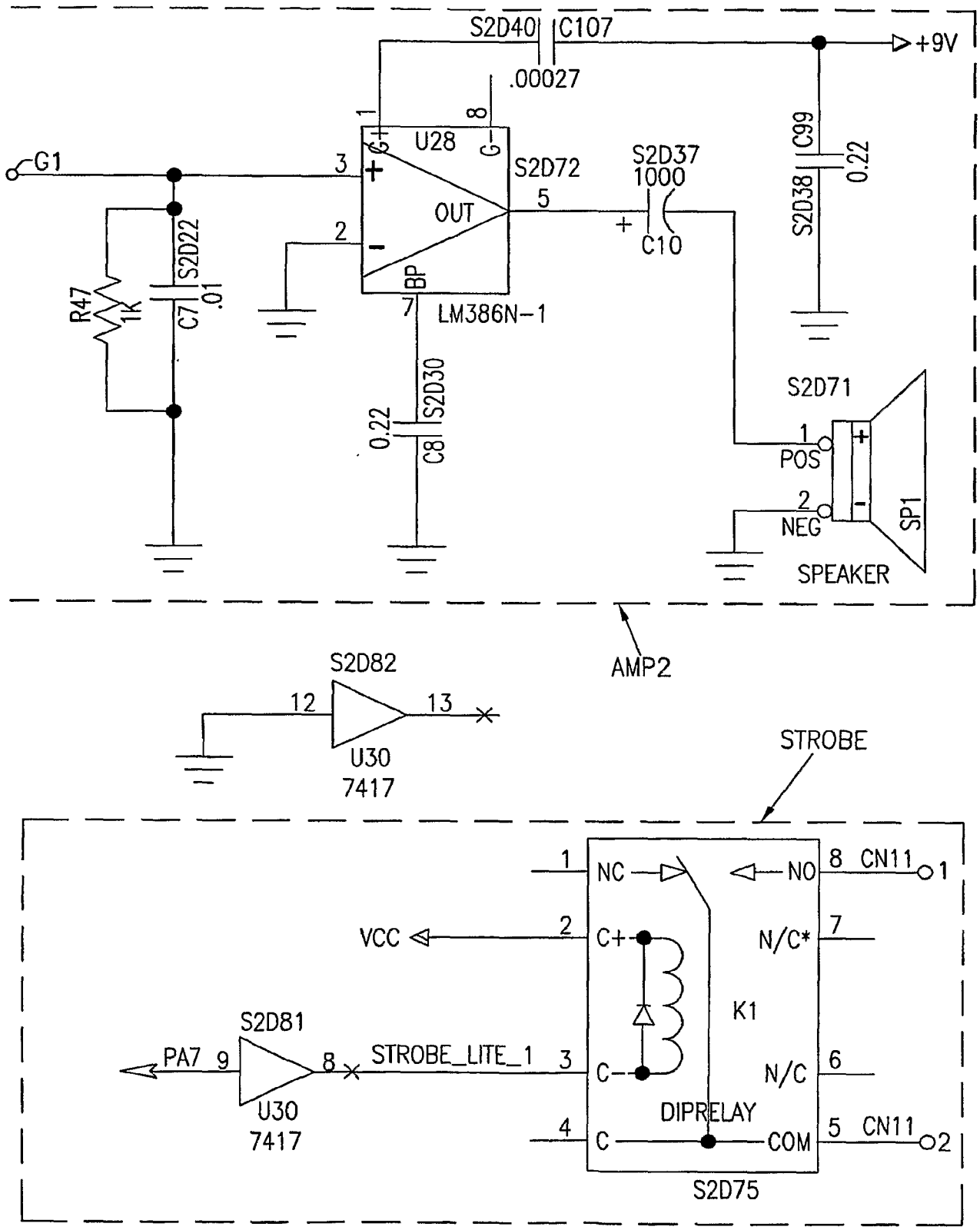

S2D40
C107
.00027
+9V
C99
0.22
S2D38
U28
S2D72
S2D37
1000
C10
G1
R47
1K
S2D22
C7
.01
OUT
BP
LM386N-1
S2D30
0.22
C8
S2D71
POS
NEG
SP1
SPEAKER
AMP2
S2D82
U30
7417
STROBE
NC
NO
CN11
VCC
C+
N/C*
K1
S2D81
PA7
STROBE_LITE_1
C-
N/C
DIPRELAY
COM
S2D75

FIG. 19H

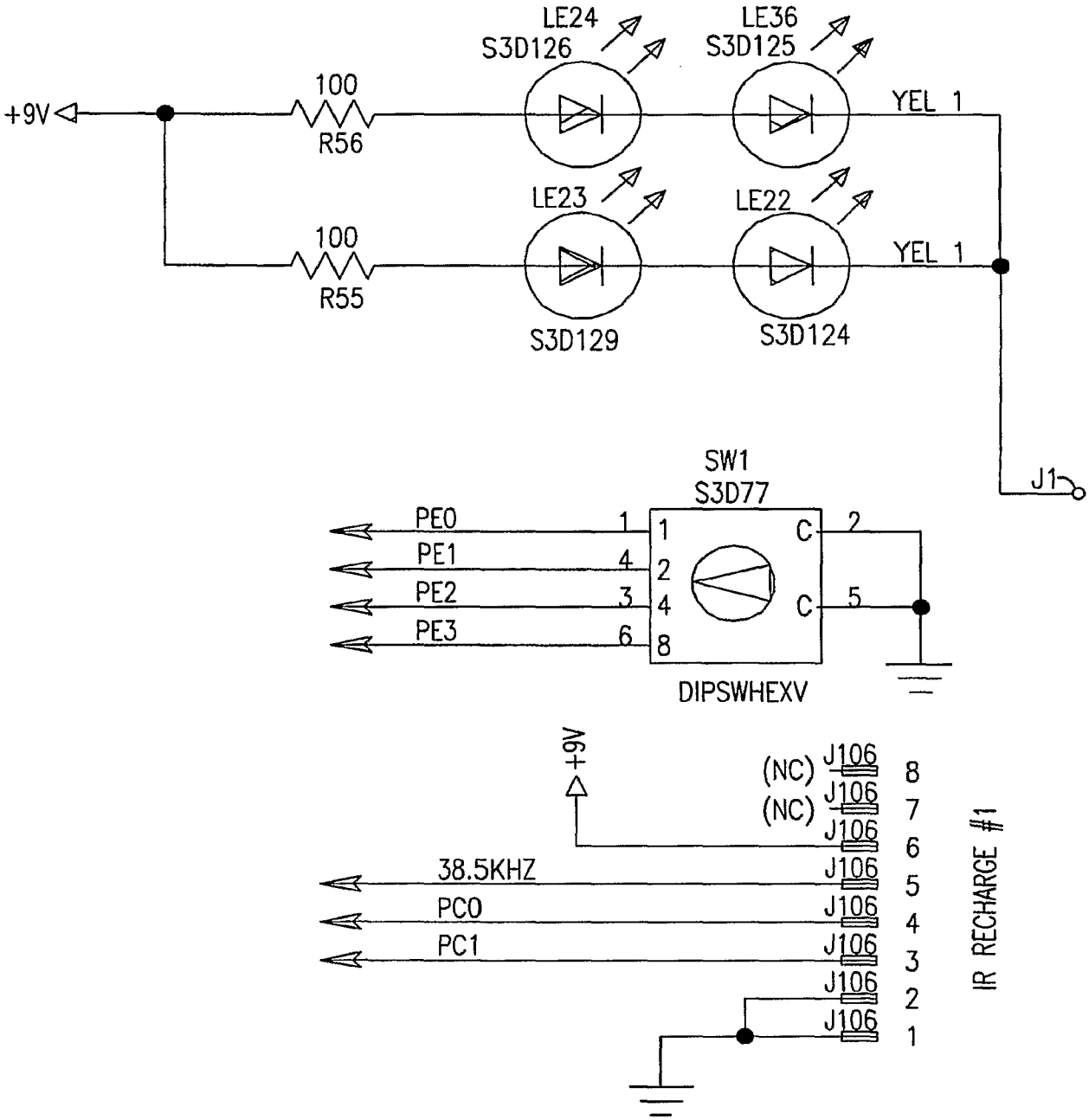

LE24
S3D126
LE36
S3D125
+9V
100
R56
YEL 1
LE23
LE22
100
R55
YEL 1
S3D129
S3D124
J1
SW1
S3D77
PE0
PE1
PE2
PE3
1
4
3
6
1
2
4
8
C
C
2
5
DIPSWHEXV
+9V
(NC) J106 8
(NC) J106 7
J106 6
38.5KHZ
J106 5
PC0
J106 4
PC1
J106 3
J106 2
J106 1
IR RECHARGE #1

FIG. 19J

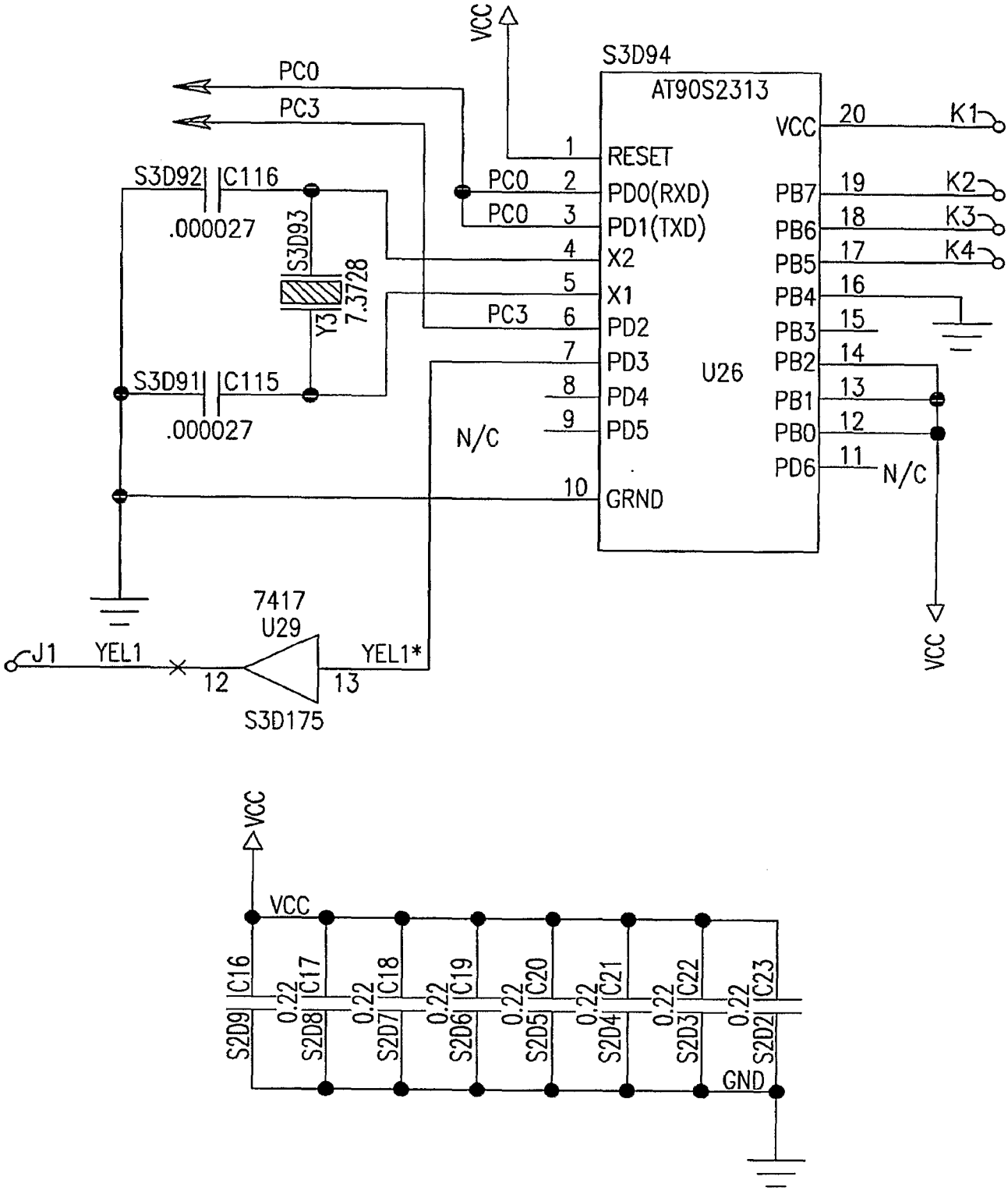

VCC
S3D94
AT90S2313
PC0
PC3
S3D92
C116
.000027
S3D93
Y3
7.3728
S3D91
C115
.000027
N/C
U26
RESET
PD0(RXD)
PD1(TXD)
X2
X1
PD2
PD3
PD4
PD5
GRND
VCC
PB7
PB6
PB5
PB4
PB3
PB2
PB1
PB0
PD6
K1
K2
K3
K4
N/C
7417
U29
J1
YEL1
YEL1*
S3D175
VCC
C16
C17
C18
C19
C20
C21
C22
C23
0.22
S2D9
S2D8
S2D7
S2D6
S2D5
S2D4
S2D3
S2D2
GND

FIG. 19K

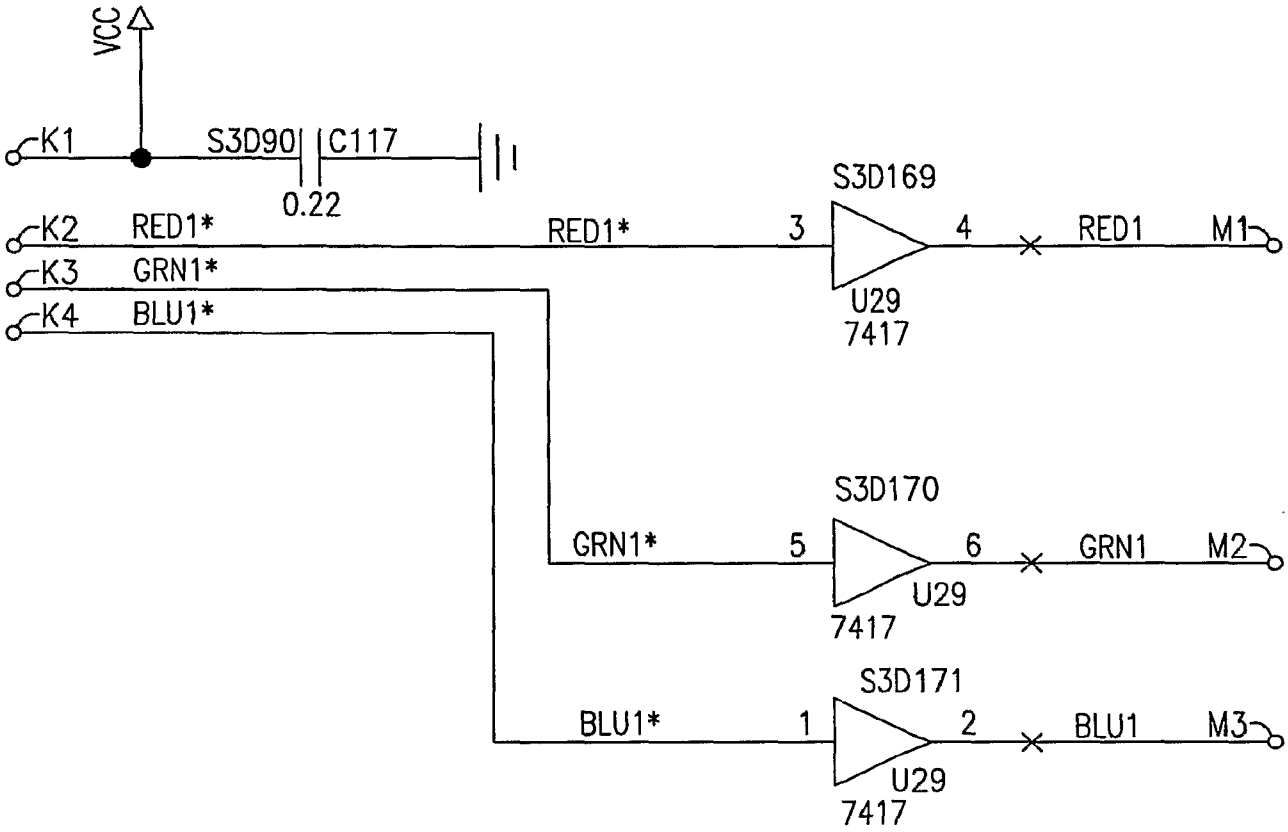

VCC
K1
S3D90
C117
0.22
K2
RED1*
K3
GRN1*
K4
BLU1*
RED1*
3
S3D169
4
RED1
M1
U29
7417
GRN1*
5
S3D170
6
GRN1
M2
U29
7417
BLU1*
1
S3D171
2
BLU1
M3
U29
7417

FIG. 19M

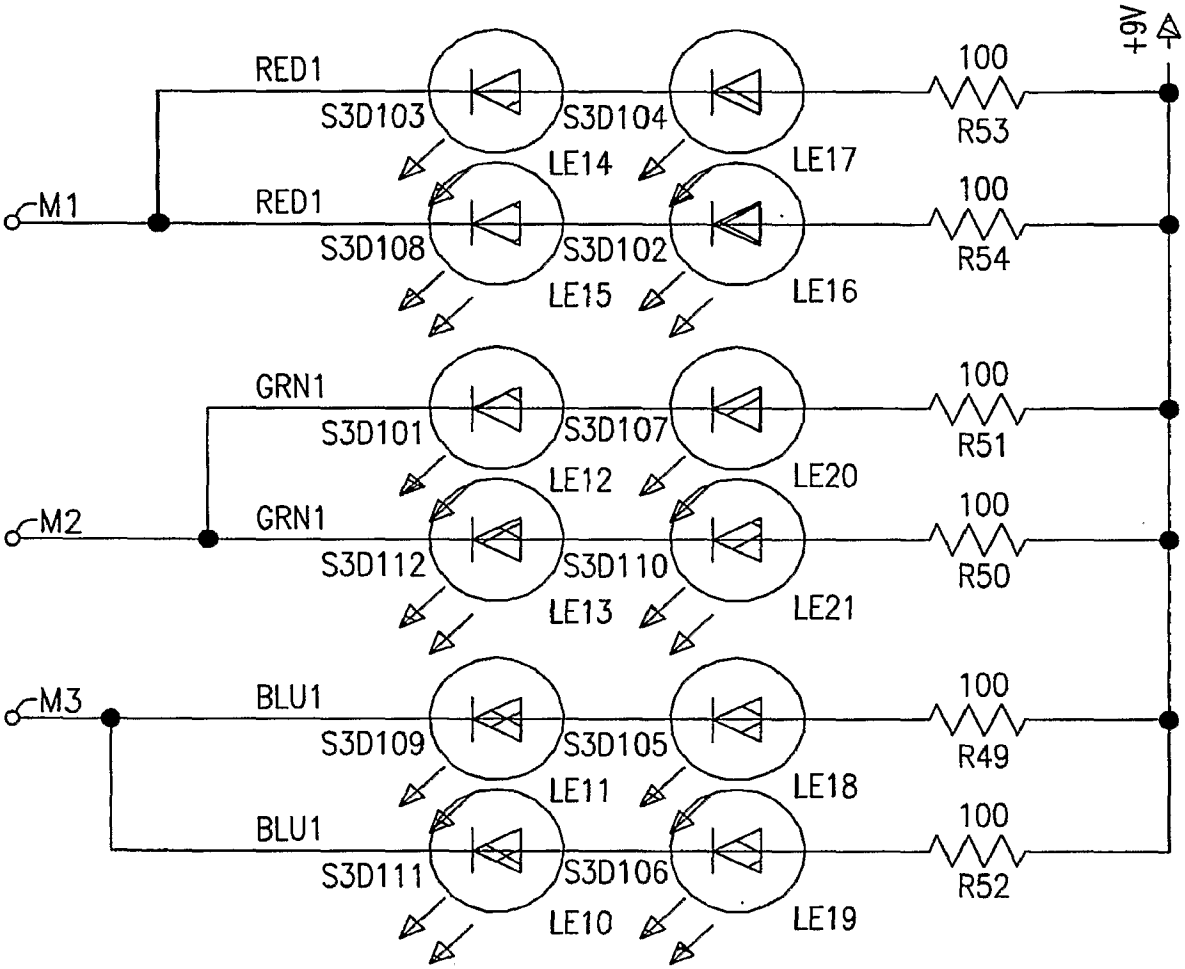

+9V
RED1
S3D103
S3D104
LE14
LE17
M1
RED1
S3D108
S3D102
LE15
LE16
100
R53
100
R54
GRN1
S3D101
S3D107
LE12
LE20
M2
GRN1
S3D112
S3D110
LE13
LE21
100
R51
100
R50
M3
BLU1
S3D109
S3D105
LE11
LE18
BLU1
S3D111
S3D106
LE10
LE19
100
R49
100
R52

FIG. 19N

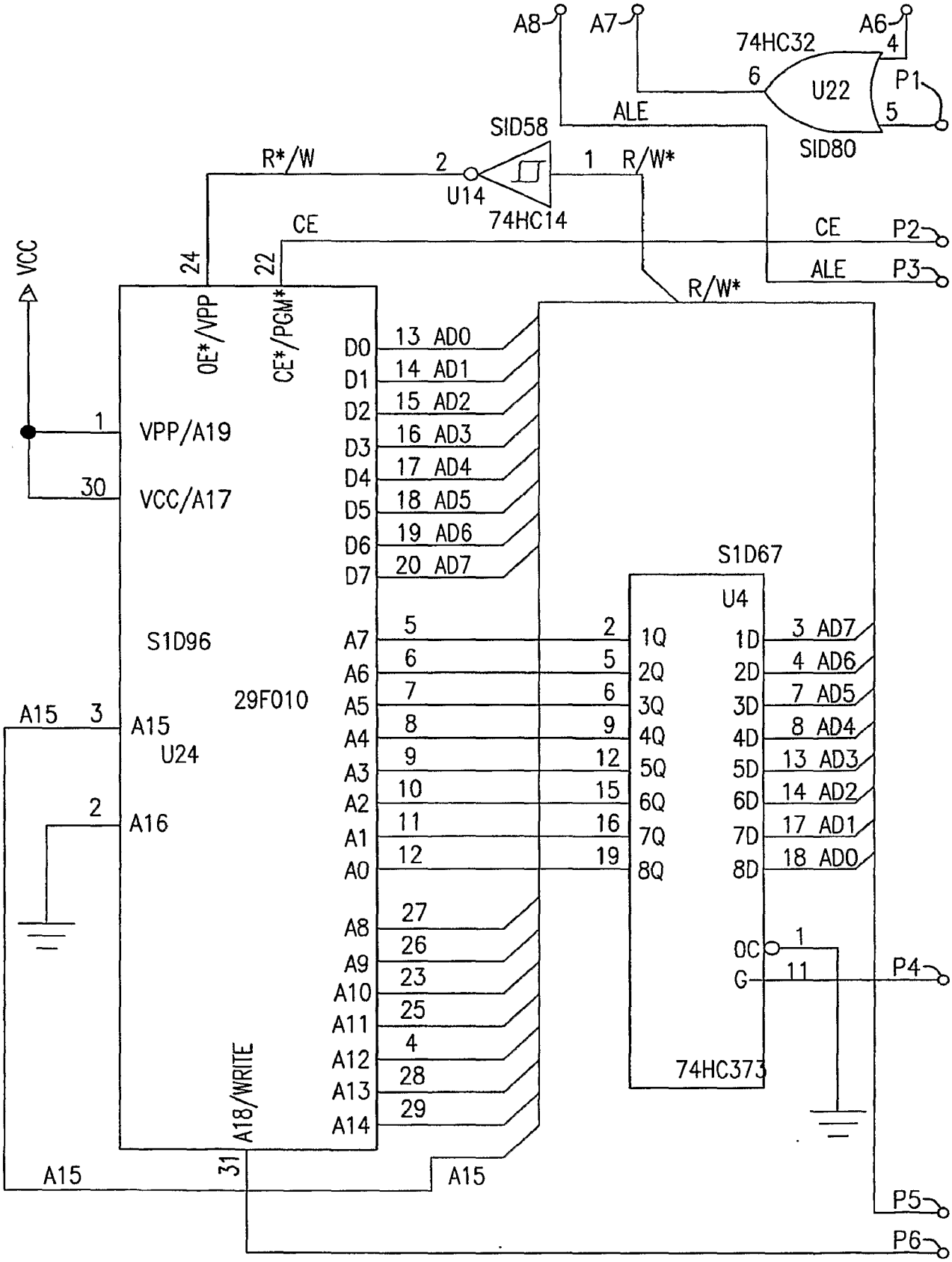

A8
A7
A6
74HC32
U22
P1
ALE
SID58
SID80
R*/W
U14
74HC14
R/W*
CE
P2
VCC
24
22
ALE
P3
OE*/VPP
CE*/PGM*
R/W*
D0
D1
D2
D3
D4
D5
D6
D7
13 AD0
14 AD1
15 AD2
16 AD3
17 AD4
18 AD5
19 AD6
20 AD7
1
VPP/A19
30
VCC/A17
S1D67
U4
S1D96
29F010
A7
A6
A5
A4
A3
A2
A1
A0
1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q
1D
2D
3D
4D
5D
6D
7D
8D
3 AD7
4 AD6
7 AD5
8 AD4
13 AD3
14 AD2
17 AD1
18 AD0
A15
3
A15
U24
2
A16
A8
A9
A10
A11
A12
A13
A14
OC
G
P4
74HC373
A18/WRITE
31
A15
A15
P5
P6

FIG. 19P

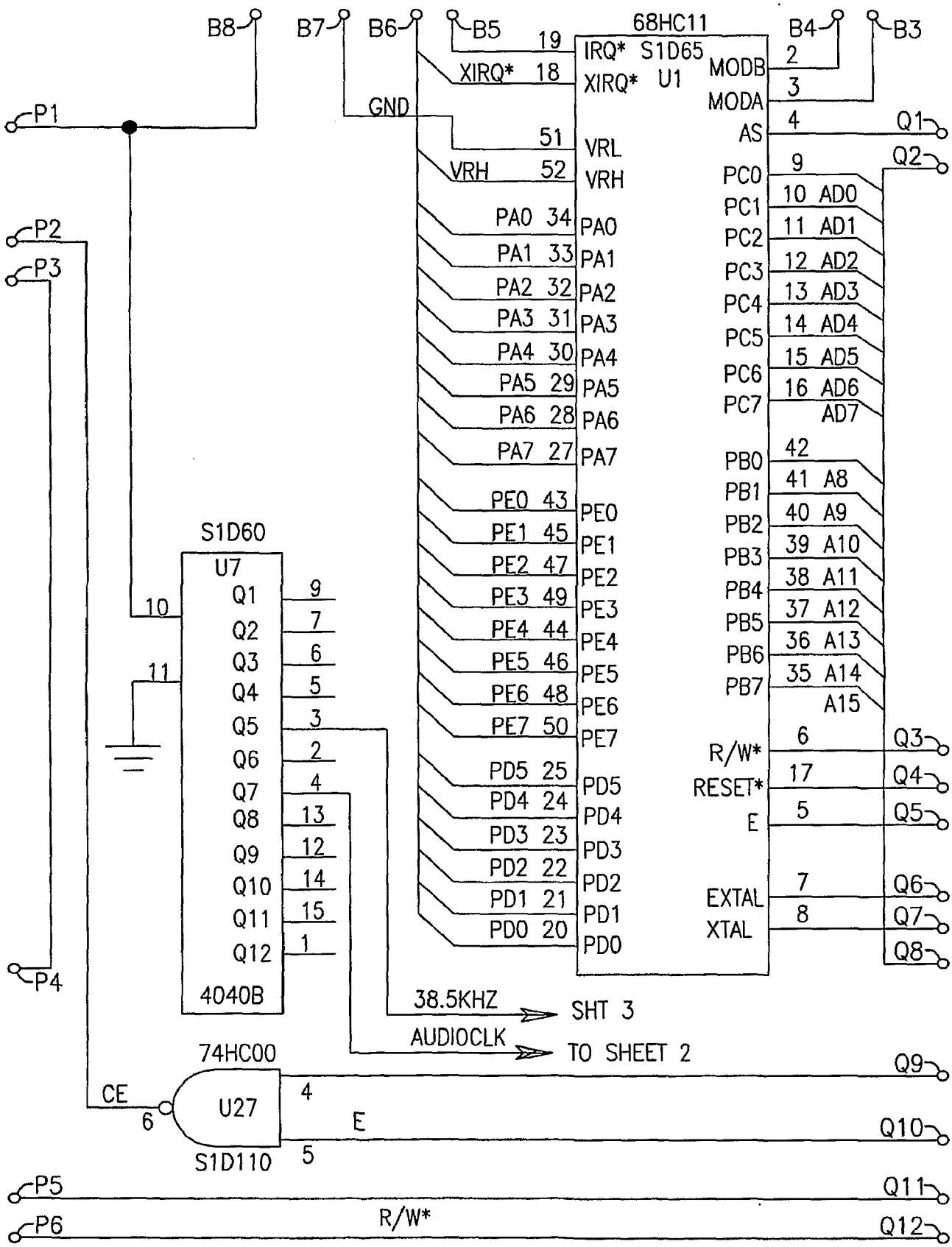

B8
B7
B6
B5
B4
B3
68HC11
P1
P2
P3
P4
P5
P6
GND
IRQ* S1D65
XIRQ* U1
XIRQ*
VRL
VRH
MODB
MODA
AS
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
A8
A9
A10
A11
A12
A13
A14
A15
PE0
PE1
PE2
PE3
PE4
PE5
PE6
PE7
PD5
PD4
PD3
PD2
PD1
PD0
R/W*
RESET*
E
EXTAL
XTAL
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
S1D60
U7
4040B
74HC00
U27
S1D110
CE
38.5KHZ
SHT 3
AUDIOCLK
TO SHEET 2

FIG. 19Q

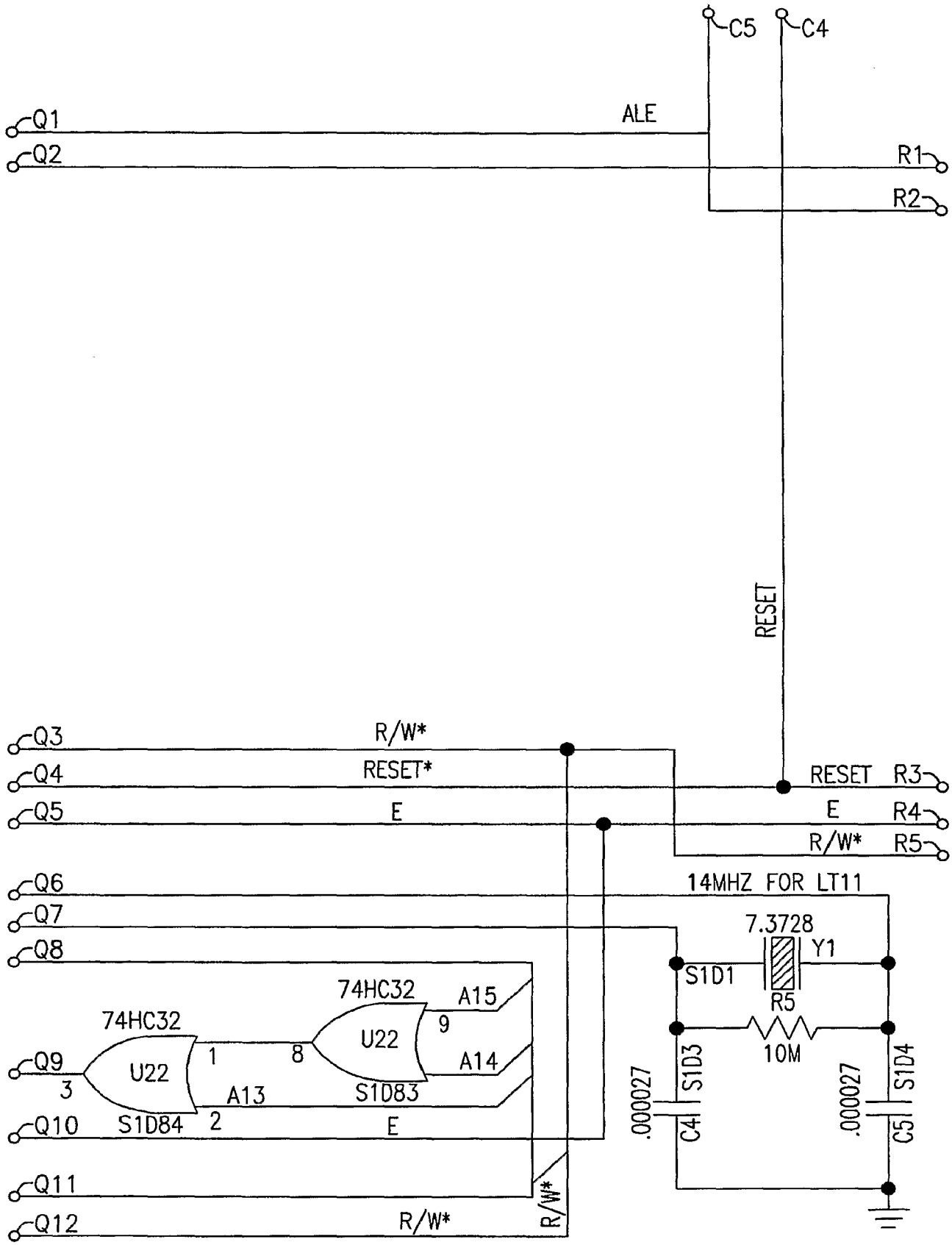

C5
C4
Q1
ALE
Q2
R1
R2
RESET
Q3
R/W*
Q4
RESET*
RESET R3
Q5
E
E R4
R/W* R5
Q6
14MHZ FOR LT11
Q7
7.3728
Y1
Q8
S1D1
R5
74HC32
A15
74HC32
U22
9
U22
10M
Q9
1
8
A14
3
A13
S1D83
S1D3
S1D4
.000027
.000027
C4
C5
Q10
S1D84
2
E
Q11
R/W*
Q12
R/W*
R/W*

FIG. 19R

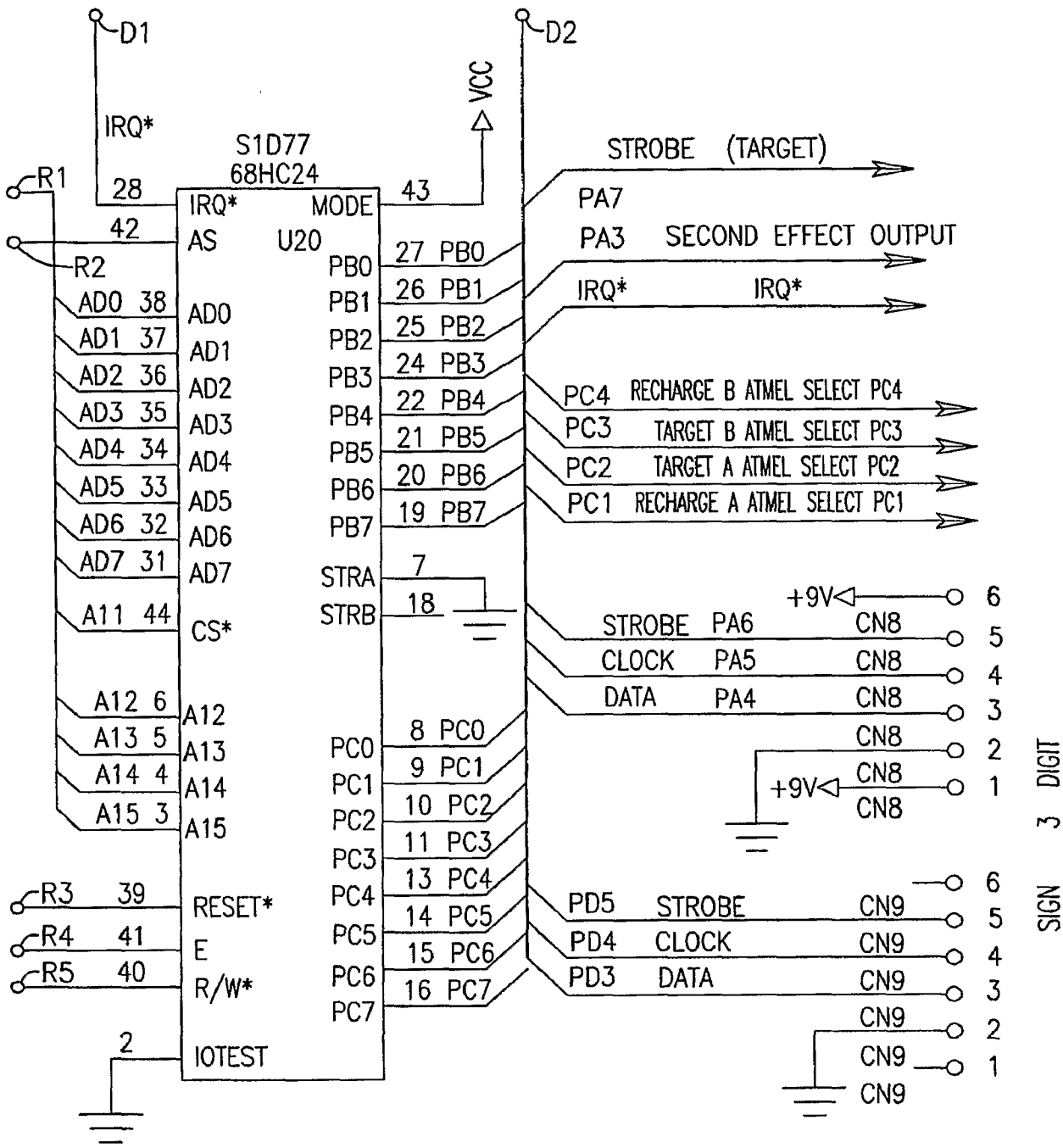

D1
IRQ*
S1D77
68HC24
R1
28
IRQ*
MODE
43
VCC
42
AS
U20
R2
AD0 38
AD1 37
AD2 36
AD3 35
AD4 34
AD5 33
AD6 32
AD7 31
A11 44
A12 6
A13 5
A14 4
A15 3
R3 39
R4 41
R5 40
2
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
CS*
A12
A13
A14
A15
RESET*
E
R/W*
IOTEST
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
STRA
STRB
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
27 PB0
26 PB1
25 PB2
24 PB3
22 PB4
21 PB5
20 PB6
19 PB7
7
18
8 PC0
9 PC1
10 PC2
11 PC3
13 PC4
14 PC5
15 PC6
16 PC7
D2
STROBE (TARGET)
PA7
PA3 SECOND EFFECT OUTPUT
IRQ* IRQ*
PC4 RECHARGE B ATMEL SELECT PC4
PC3 TARGET B ATMEL SELECT PC3
PC2 TARGET A ATMEL SELECT PC2
PC1 RECHARGE A ATMEL SELECT PC1
+9V
STROBE PA6 CN8
CLOCK PA5 CN8
DATA PA4 CN8
CN8
+9V
CN8
CN8
6
5
4
3
2
1
PD5 STROBE CN9
PD4 CLOCK CN9
PD3 DATA CN9
CN9
CN9
CN9
6
5
4
3
2
1
SIGN 3 DIGIT

FIG. 19S

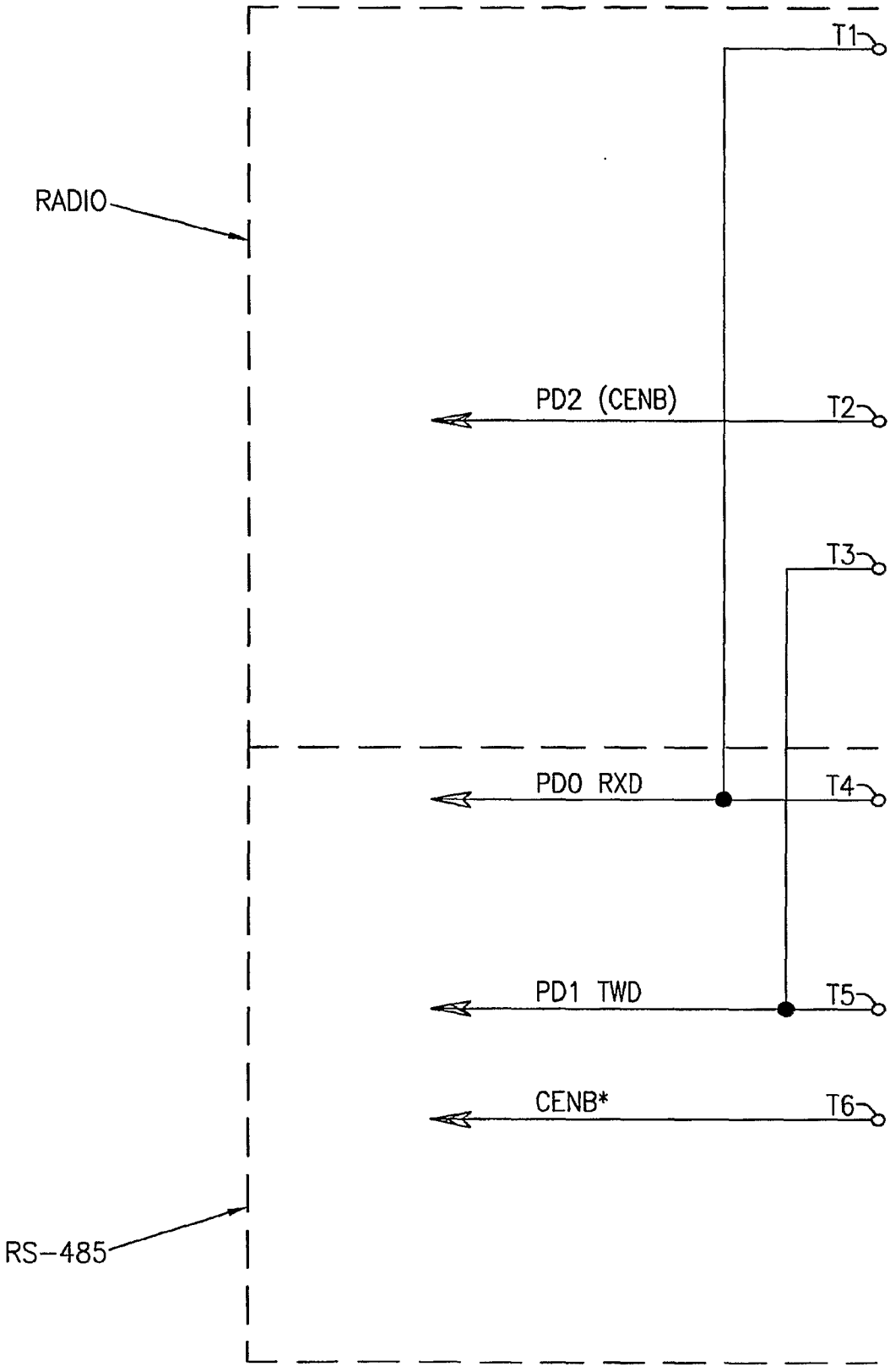


FIG. 19T

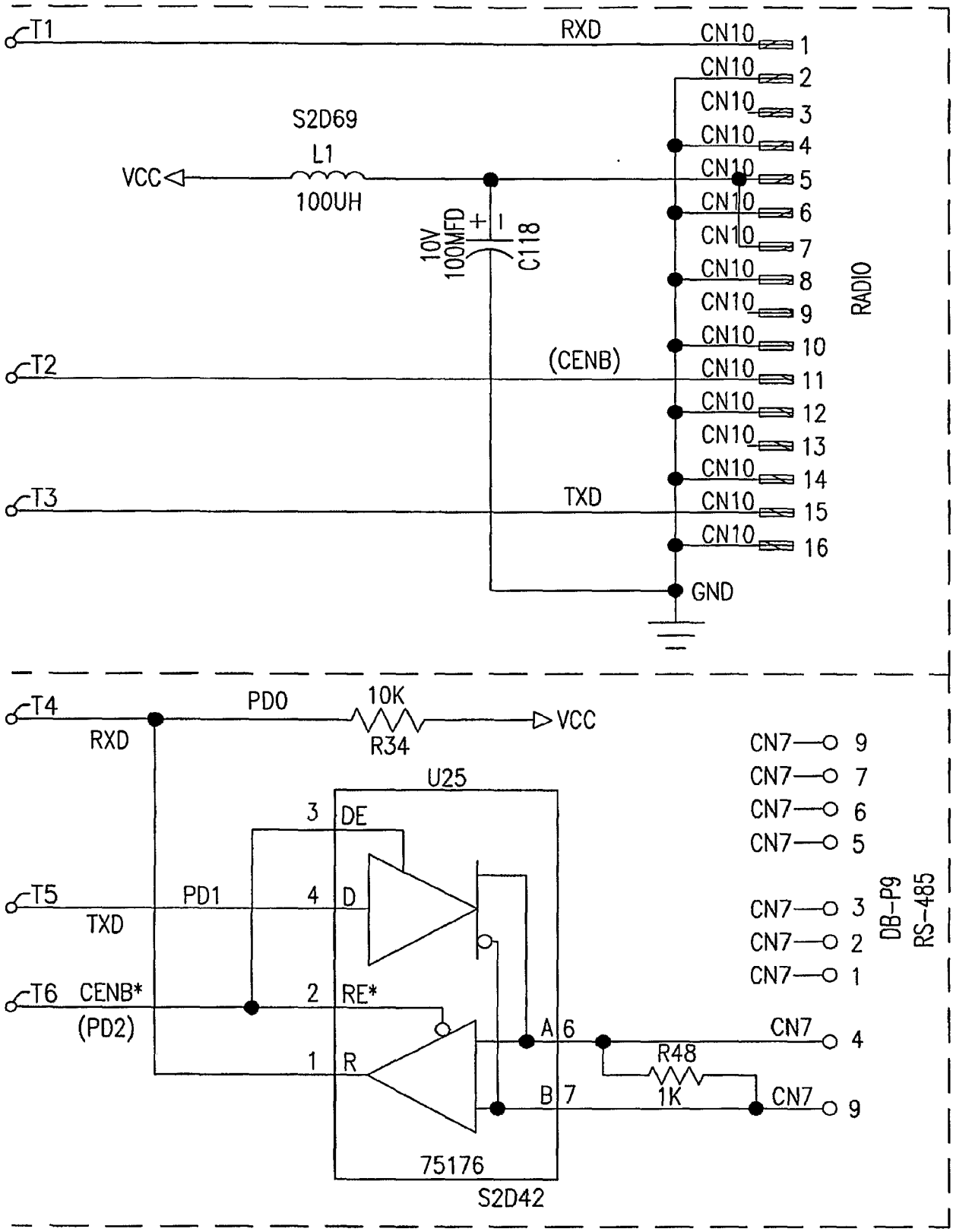

T1
RXD
CN10 1
CN10 2
CN10 3
CN10 4
CN10 5
CN10 6
CN10 7
CN10 8
CN10 9
CN10 10
CN10 11
CN10 12
CN10 13
CN10 14
CN10 15
CN10 16
RADIO
S2D69
L1
VCC
100UH
10V
100MFD
C118
T2
(CENB)
T3
TXD
GND
T4
RXD
PD0
10K
R34
VCC
U25
3 DE
T5
TXD
PD1
4 D
T6 CENB*
(PD2)
2 RE*
1 R
A 6
B 7
R48
1K
75176
S2D42
CN7 9
CN7 7
CN7 6
CN7 5
CN7 3
CN7 2
CN7 1
CN7 4
CN7 9
DB-P9
RS-485

FIG. 19U

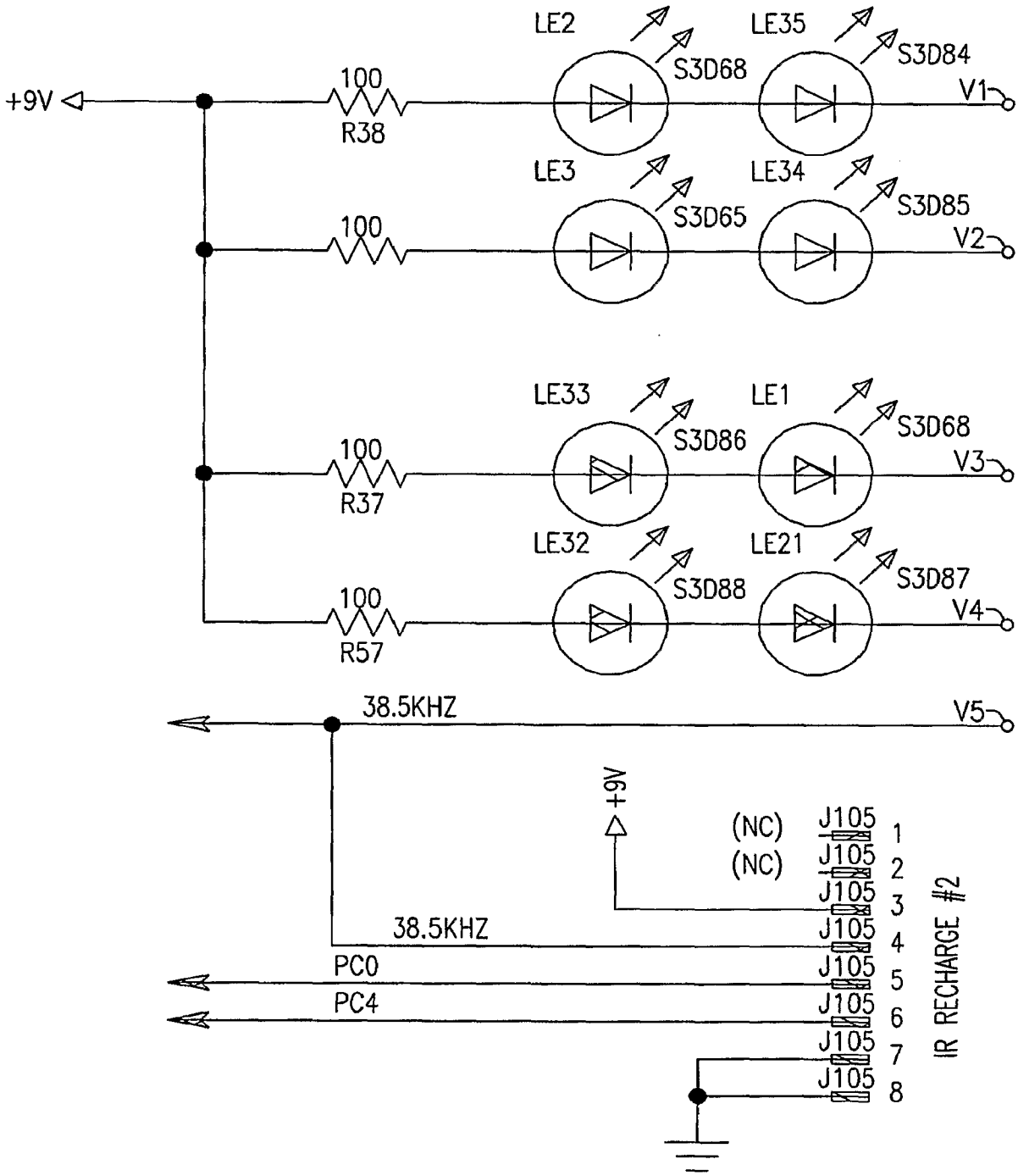

+9V
100
R38
LE2
S3D68
LE35
S3D84
V1
100
LE3
S3D65
LE34
S3D85
V2
100
R37
LE33
S3D86
LE1
S3D68
V3
100
R57
LE32
S3D88
LE21
S3D87
V4
38.5KHZ
V5
+9V
(NC)
(NC)
J105 1
J105 2
J105 3
J105 4
J105 5
J105 6
J105 7
J105 8
38.5KHZ
PC0
PC4
IR RECHARGE #2

FIG. 19V

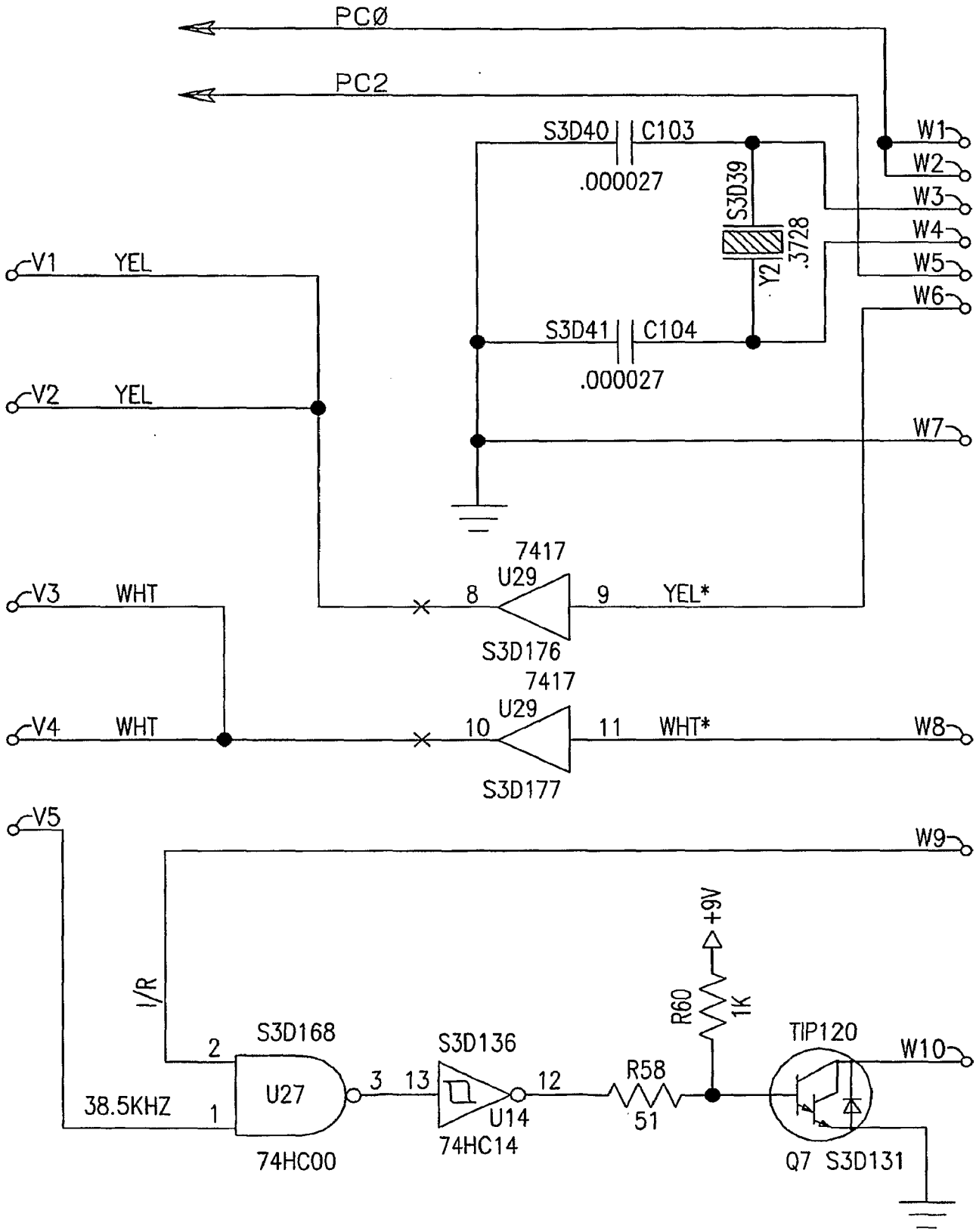

PCØ
PC2
S3D40
C103
.000027
S3D39
.3728
Y2
S3D41
C104
.000027
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
V1 YEL
V2 YEL
V3 WHT
V4 WHT
V5
7417
U29
8
9
YEL*
S3D176
10
11
WHT*
S3D177
I/R
S3D168
2
38.5KHZ
1
U27
74HC00
3
13
S3D136
U14
74HC14
12
R58
51
R60
1K
+9V
TIP120
Q7 S3D131

FIG. 19W

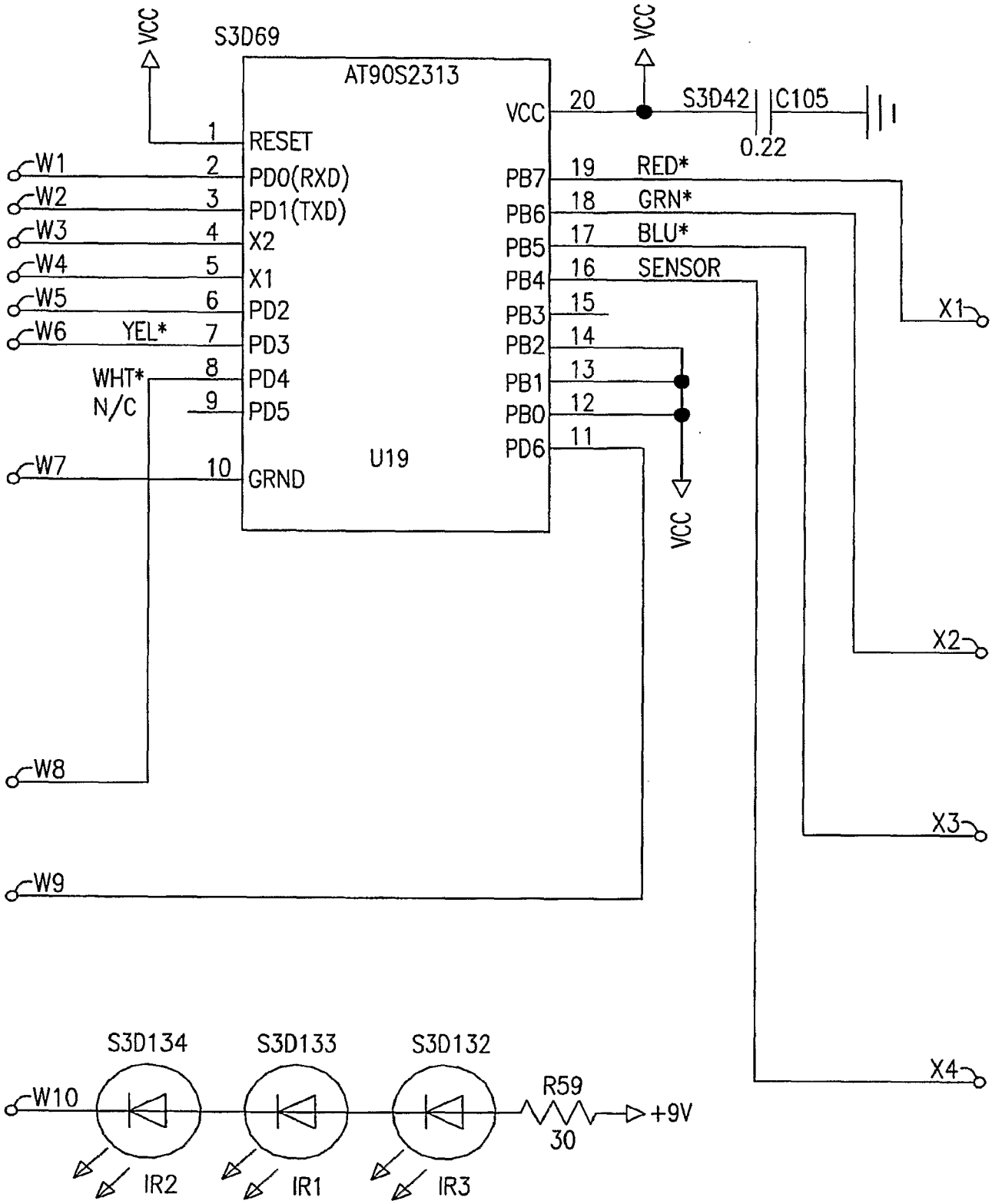

VCC
S3D69
AT90S2313
VCC
20
S3D42
C105
0.22
1
RESET
W1
2
PD0(RXD)
W2
3
PD1(TXD)
W3
4
X2
W4
5
X1
W5
6
PD2
W6
YEL*
7
PD3
WHT*
8
PD4
N/C
9
PD5
W7
10
GRND
U19
PB7
19
RED*
PB6
18
GRN*
PB5
17
BLU*
PB4
16
SENSOR
PB3
15
PB2
14
PB1
13
PB0
12
PD6
11
VCC
X1
X2
X3
X4
W8
W9
S3D134
S3D133
S3D132
W10
R59
30
+9V
IR2
IR1
IR3

FIG. 19X

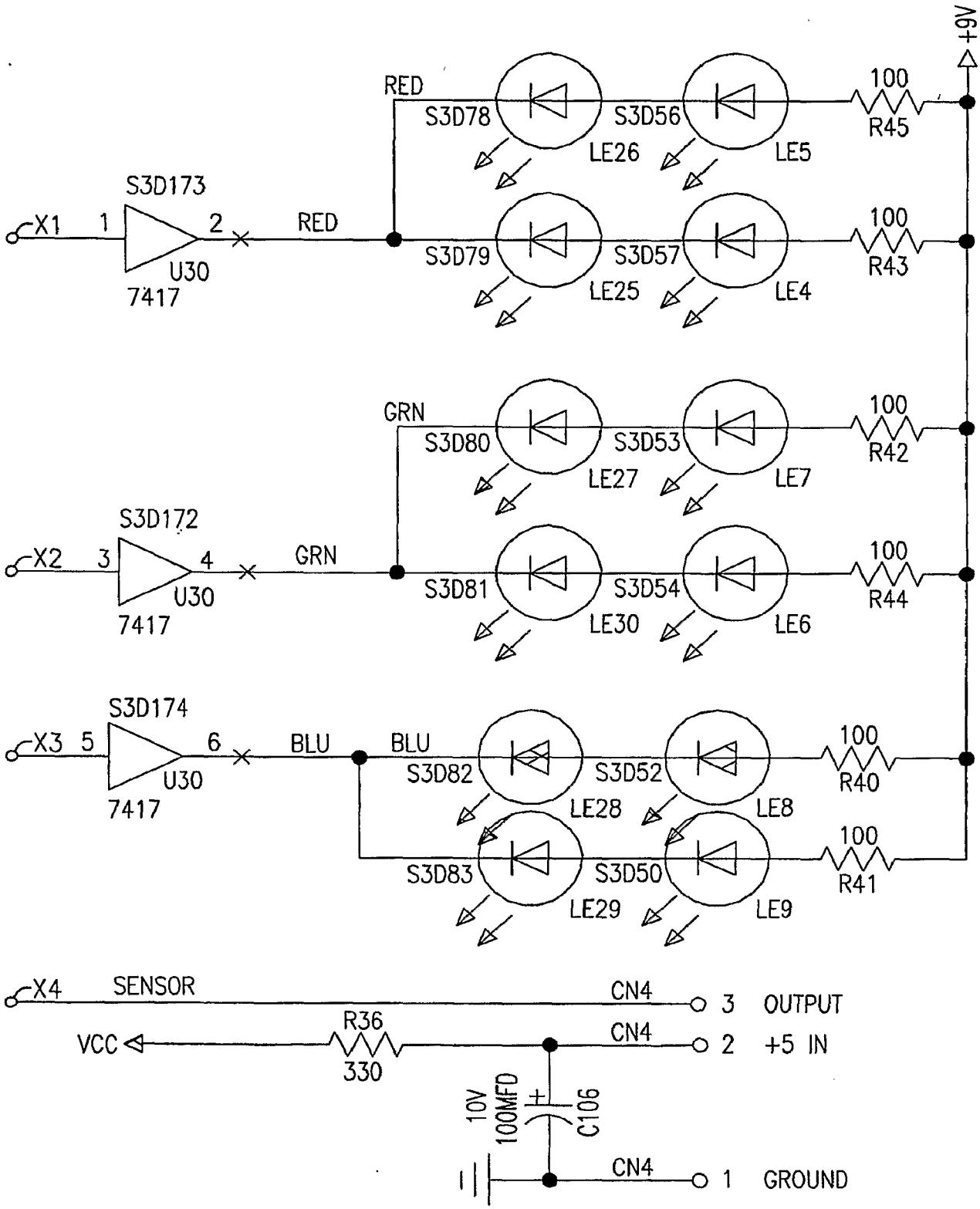

+9V
RED
S3D78
S3D56
LE26
LE5
100
R45
S3D173
X1
1
2
RED
U30
7417
S3D79
S3D57
LE25
LE4
100
R43
GRN
S3D80
S3D53
LE27
LE7
100
R42
S3D172
X2
3
4
GRN
U30
7417
S3D81
S3D54
LE30
LE6
100
R44
S3D174
X3
5
6
BLU
BLU
U30
7417
S3D82
S3D52
LE28
LE8
100
R40
S3D83
S3D50
LE29
LE9
100
R41
X4
SENSOR
CN4
3
OUTPUT
VCC
R36
330
CN4
2
+5 IN
10V
100MFD
C106
CN4
1
GROUND

FIG. 19Y

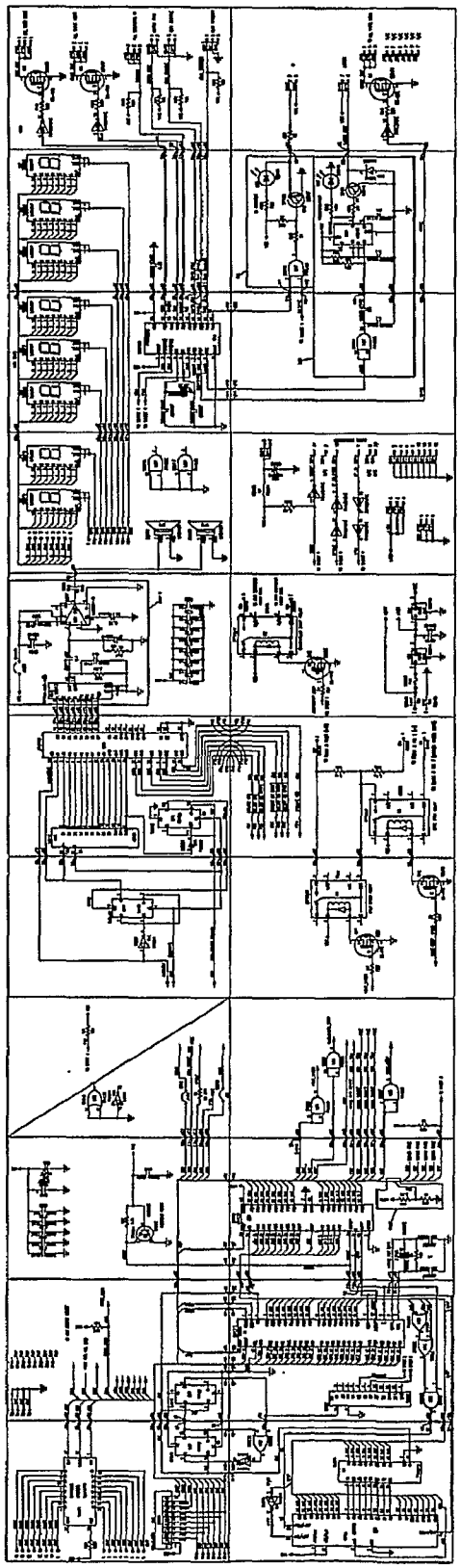


FIG. 20

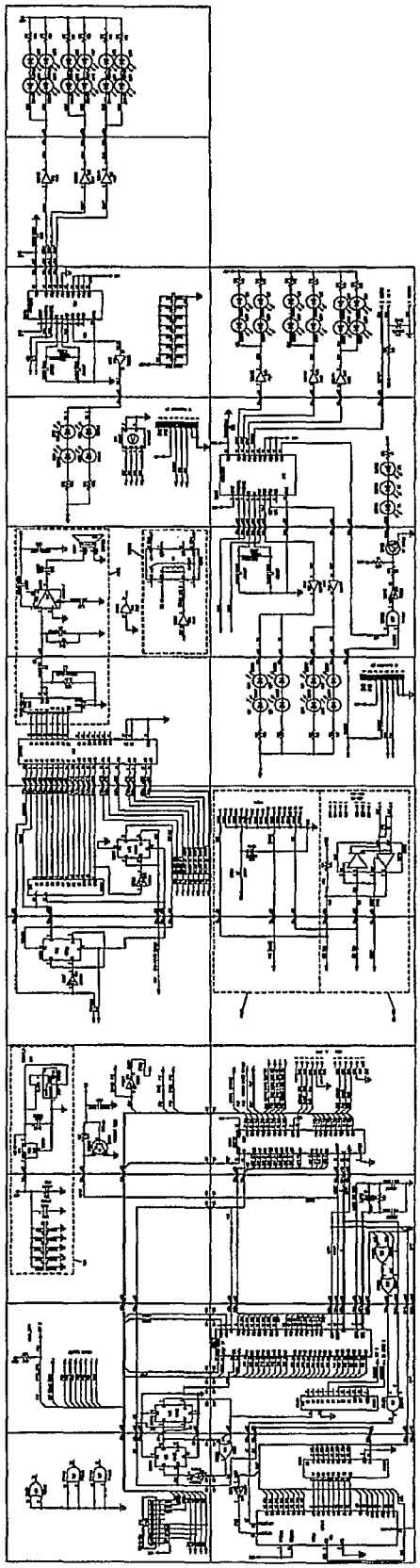


FIG. 21

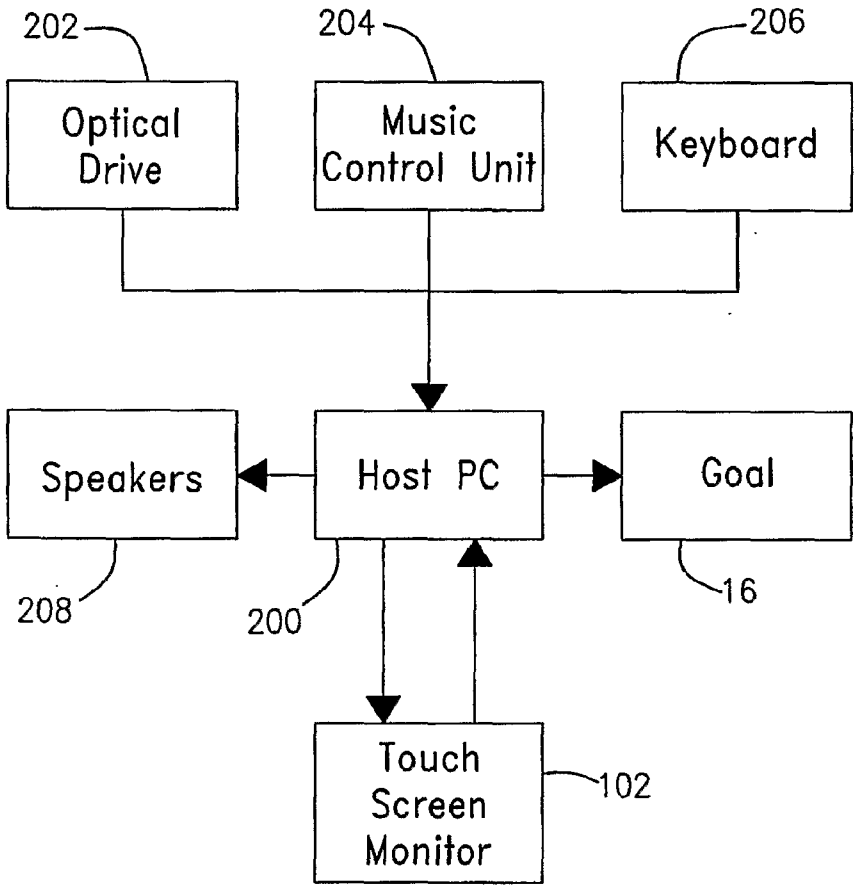

202
204
206
Optical Drive
Music Control Unit
Keyboard
Speakers
Host PC
Goal
208
200
16
Touch Screen Monitor
102

FIG. 22

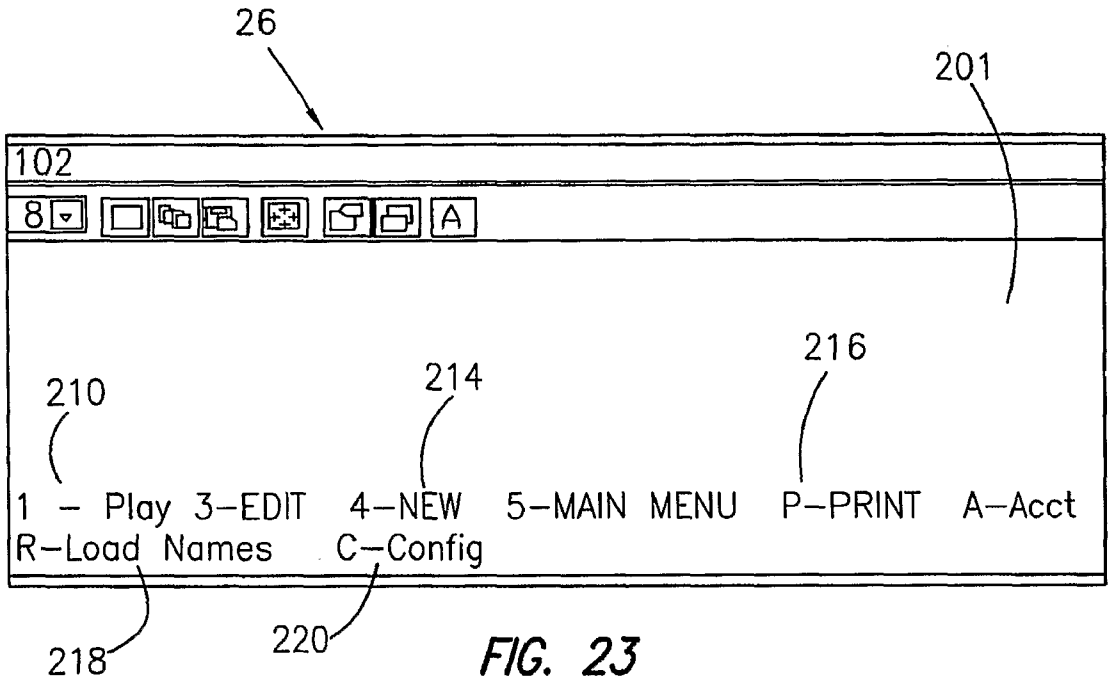

26
201
102
8
A
216
214
210
1 – Play 3–EDIT 4–NEW 5–MAIN MENU P–PRINT A–Acct
R–Load Names C–Config
218
220

FIG. 23

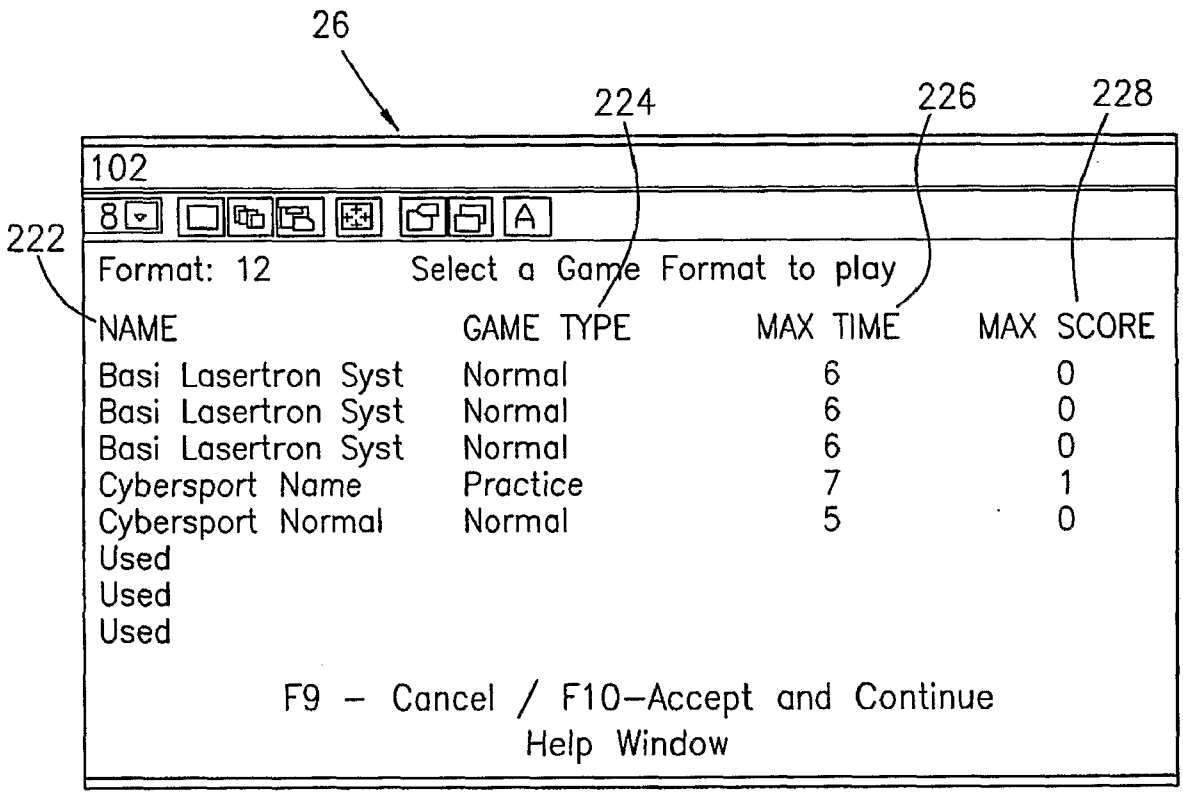

26
224
226
228
102
8
A
222
Format: 12 Select a Game Format to play
NAME GAME TYPE MAX TIME MAX SCORE
Basi Lasertron Syst Normal 6 0
Basi Lasertron Syst Normal 6 0
Basi Lasertron Syst Normal 6 0
Cybersport Name Practice 7 1
Cybersport Normal Normal 5 0
Used
Used
Used
F9 – Cancel / F10–Accept and Continue
Help Window

FIG. 24

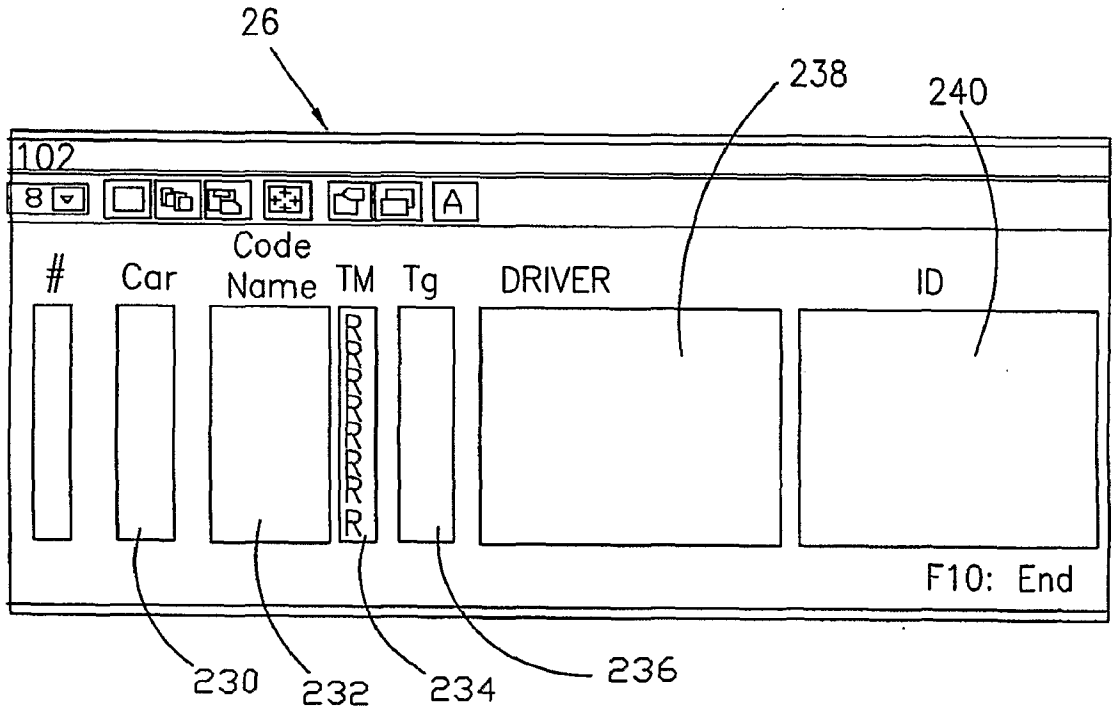

26
238
240
102
A
#
Car
Code Name
TM
Tg
DRIVER
ID
F10: End
230
232
234
236

FIG. 25

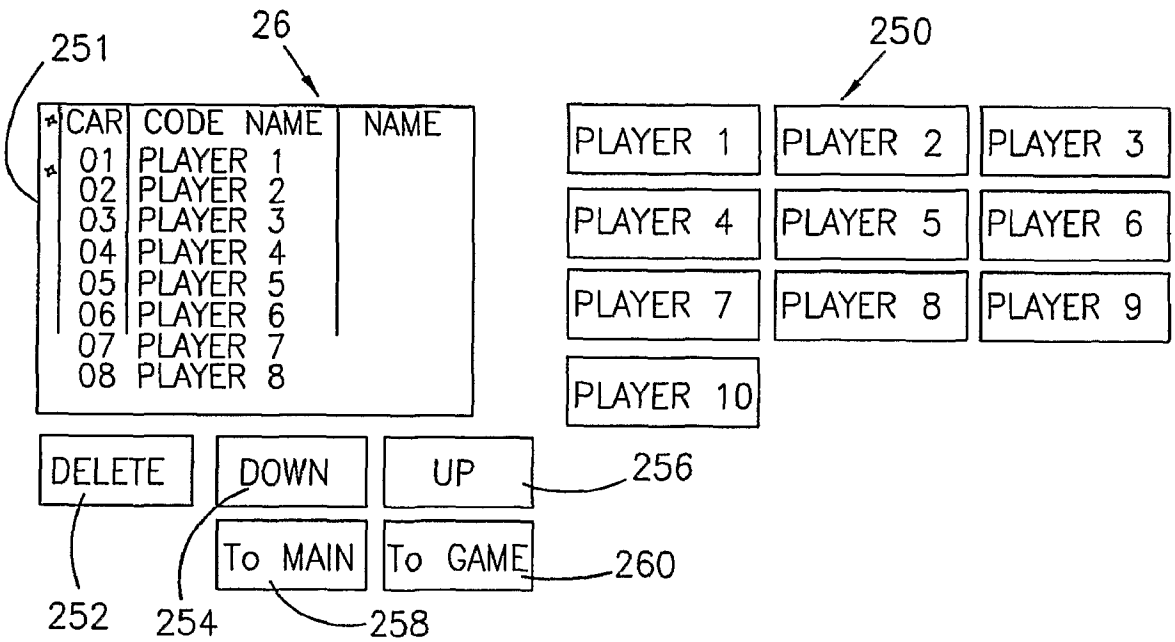

251
26
250
CAR
CODE NAME
NAME
01 PLAYER 1
02 PLAYER 2
03 PLAYER 3
04 PLAYER 4
05 PLAYER 5
06 PLAYER 6
07 PLAYER 7
08 PLAYER 8
PLAYER 1
PLAYER 2
PLAYER 3
PLAYER 4
PLAYER 5
PLAYER 6
PLAYER 7
PLAYER 8
PLAYER 9
PLAYER 10
DELETE
DOWN
UP
256
To MAIN
To GAME
260
252
254
258

FIG. 26

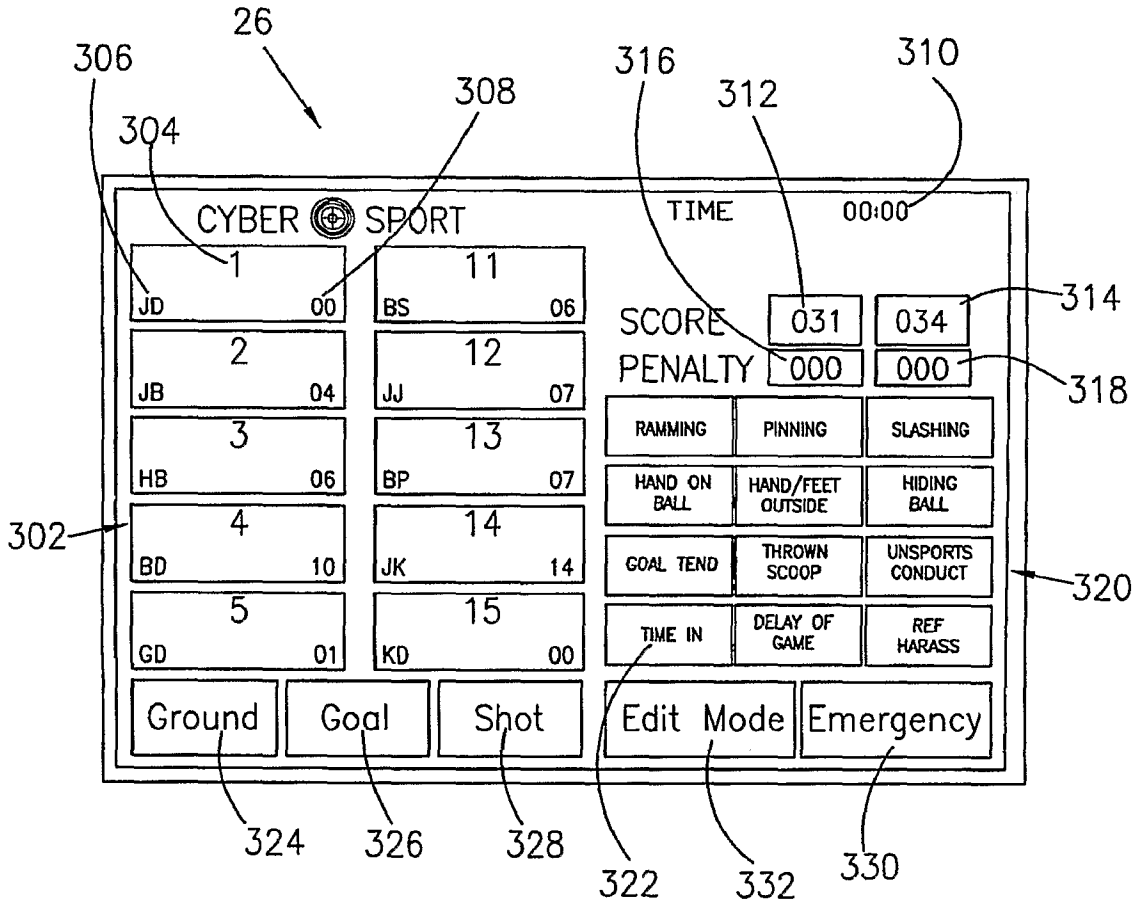

26
306
304
308
316
312
310
CYBER SPORT
TIME
00:00
1
JD
00
11
BS
06
SCORE
031
034
314
2
JB
04
12
JJ
07
PENALTY
000
000
318
3
HB
06
13
BP
07
RAMMING
PINNING
SLASHING
302
4
BD
10
14
JK
14
HAND ON BALL
HAND/FEET OUTSIDE
HIDING BALL
320
5
GD
01
15
KD
00
GOAL TEND
THROWN SCOOP
UNSPORTS CONDUCT
TIME IN
DELAY OF GAME
REF HARASS
Ground
Goal
Shot
Edit Mode
Emergency
324
326
328
322
332
330

FIG. 27

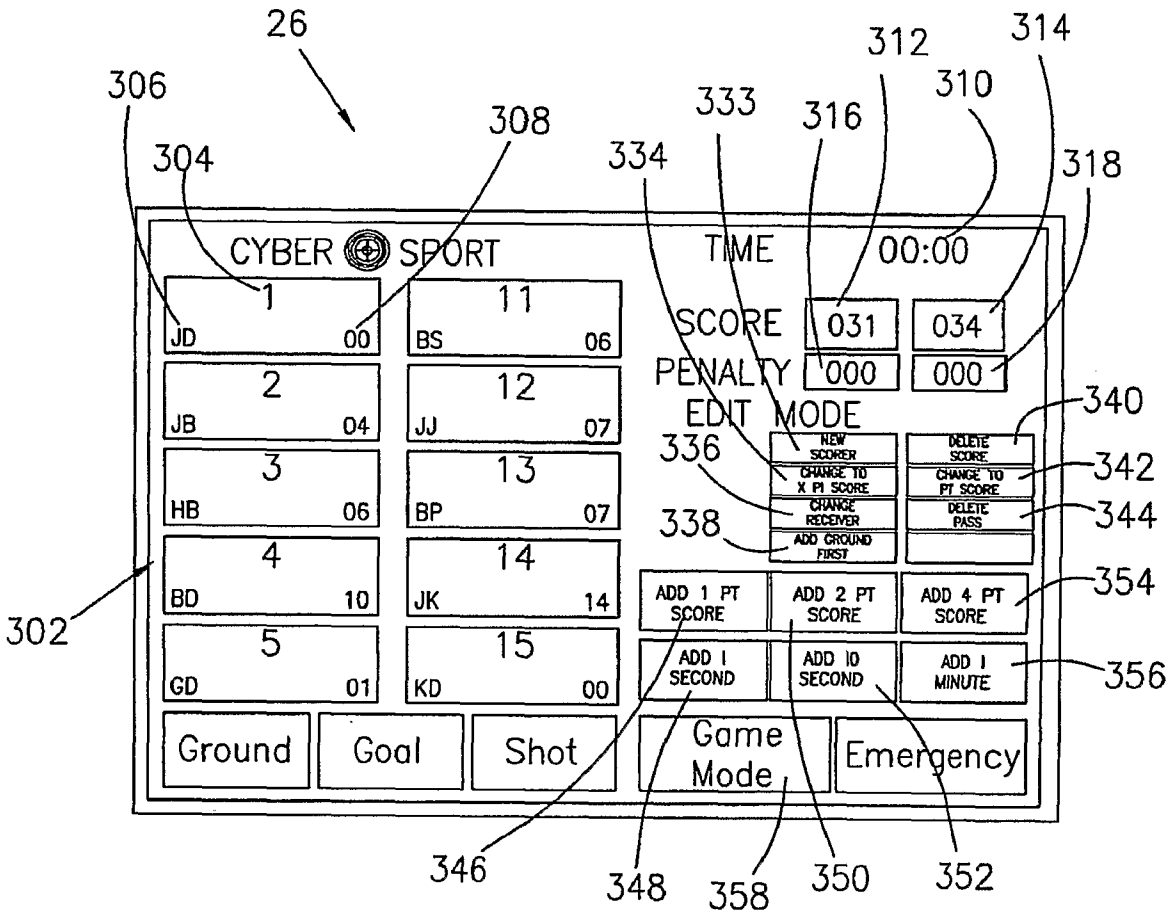

26
306
308
304
334
333
316
312
310
314
318
CYBER SPORT
TIME
00:00
1
JD
00
11
BS
06
SCORE
031
034
2
JB
04
12
JJ
07
PENALTY
000
000
EDIT MODE
340
3
HB
06
13
BP
07
336
NEW SCORER
DELETE SCORE
342
CHANGE TO X PT SCORE
CHANGE TO PT SCORE
CHANGE RECEIVER
DELETE PASS
344
338
ADD GROUND FIRST
4
BD
10
14
JK
14
ADD 1 PT SCORE
ADD 2 PT SCORE
ADD 4 PT SCORE
354
302
5
GD
01
15
KD
00
ADD 1 SECOND
ADD 10 SECOND
ADD 1 MINUTE
356
Ground
Goal
Shot
Game Mode
Emergency
346
348
358
350
352

FIG. 28

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US07/14995

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **A63H 33/26**(2006.01)

USPC: 273/442
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 273/442

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,484,030 A (GLENN) 16 June 1996 (16.06.1996), column 1, lines 48-67 and column 3, line 43-column 5, line 27.	1-51

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibitionor other means

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 June 2008 (17.06.2008)	17 SEP 2008
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Robert Pezzuto Telephone No. (571) 272-3700

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