

REGISTER NUMBER RECOGNITION SYSTEM.

1 The present invention relates to a register
number recognition system for automatically recognizing
the register number of a car which is running on a lane.

5 In a conventional register number recognition
system of this kind, different kinds of characters
described on a licence plate are recognized independently
of each other. Further, in order to recognize each kind
of character, an access signal is sent to the corresponding
one from plural recognition means through bus lines.

10 It is to be noted that the term "character" used herein
includes not only a character but also a numeral.

 The access signal is supplied to the bus through
an arbitration device for arbitrating the right of use of
the bus. The arbitration device determines the order of
15 priority among signal lines in accordance with the connect-
ing state of each signal line. Thus, a signal line with a
lower priority cannot use the bus while any signal line
higher in priority than the above signal line uses the
bus or requires to use the bus.

20 That is, the signal line with the lower priority
can use the bus, only when the bus is not used, and each
of the signal lines higher in priority than the above
signal line does not require to use the bus. In the
conventional arbitration device, however, the order of
25 priority is fixed, and thus there may arise a problem that

- 1 a signal line with a lower priority must have a long wait to acquire the right of use of the bus.

In a case where a register number is recognized, the result of recognition is of no use, unless all of
5 constituent characters of the register number such as an area code, a car code and a purpose code are recognized. That is, it is unnecessary to give the order of priority to each of the character recognition devices for recognizing the constituent characters.

- 10 Thus, a method of recognizing all characters on a licence plate has been proposed, in which processors each for recognizing one code character are made correspond to the characters on the licence plate, and all the processors perform character recognition in parallel.

- 15 In this case, since the arbitration device should determine the order of priority, there arises a problem that the access of some one of the processors to a bus is delayed, and thus the recognition of the register number is delayed.

- 20 While, a register number recognition system is required to process the register numbers of all cars which successively pass through a predetermined position on a lane. Accordingly, plate extraction and character recognition are carried out by a pipeline processing system.
25 Further, the plate extraction itself is carried out by pipeline processing, to obtain address information indicating the location of the image of an extracted licence plate. The result of plate extraction is sent to

1 character recognition devices.

In this case, the address information indicating the correct location of the image of the licence plate may usually be obtained by carrying out the plate extraction
5 only once. When the plate extraction is repeated a plurality of times after one image input operation has been performed, and address information is sent to the character recognition devices each time an image of the licence plate is extracted, the location of the image of the licence plate
10 is accurately determined.

Accordingly, it is preferable that the arbitration device changes the order of priority in the following manner. That is, when an image input operation is performed for a car reaching a predetermined position,
15 the plate extraction means are given a higher priority for access to the bus. When the address information indicating the location of the image of a licence plate is determined, the access of character recognition means to the bus is given a higher priority. Further, when the car has passed
20 through the predetermined position and the image input operation is performed for the next car reaching the predetermined position, the access of the plate extraction means to the bus is given the higher priority.

The conventional arbitration device, however,
25 cannot realize such a change in the order of priority.

Further, in the conventional arbitration device, it is checked whether the bus is used or not, to control the right of use of the bus, but it is not checked whether

1 an object to be accessed is busy or not. Accordingly,
even in a case where a plurality of buses are used for
shortening a waiting time, when a memory which is to be
accessed by using a bus, is now being used for other
5 purpose, it is obliged for a permitted device to abandon
the right of use of the bus. Thus, there arises a problem
that the efficiency of use of the bus is reduced.

It is accordingly an object of the present
invention to provide a register number recognition system
10 which can solve the above problems of prior art, and in
which processing means having the right of use of a bus
can surely access a desired memory, the priority of the
processing means now used is reduced to the lowest level,
to prevent the right of use of the bus from concentrating
15 on the processing means, and the priority of plate
extraction can be made higher or lower than the priority
of character recognition in accordance with the state of
processing, to recognize a register number in an optimum
manner.

20 In order to attain the above object, according to
the present invention, there is provided a register
number recognition system for recognizing a register
number made up of various characters on a licence plate
of a car running on one of a plurality of lanes of a
25 road, using a camera for each lane, the system
comprising:

a plurality of image memory cards, each
corresponding to a respective camera, for storing digital

data of still pictures, the still pictures being obtained by the camera, each of the still pictures being able to contain an image of the licence plate of the car running on the lane;

5 a plurality of plate extraction cards, each corresponding to a respective image memory card, for accessing the image memory cards to refer to image information stored in the image memory cards and for processing the image information to determine an address
10 indicating the location of the image of a licence plate in an image memory card when the image of the licence plate is detected in the image information;

 character recognition cards provided so as to correspond to different kinds of characters, for
15 extracting character information on the licence plate from the image memory card by using the address indicating the location of the image of the licence plate, to recognize the extracted characters;

 at least two image buses for enabling each plate
20 extraction card and each character recognition card to access a desired image memory card and for reading out information from and writing information in the image memory card; and

 a control card including a high-speed bus control
25 circuit for managing and controlling the overall processing of the system, the bus control circuit being supplied with information indicative of the requirement

for use of the image buses made by a plate extraction card or character recognition card and information whether an image memory card is accessible or not, and when the plate extraction card or character recognition card makes a request to access the image memory card

1 through the image buses, delivering a signal indicative
of permission for use of the image buses to the plate
extraction card or character recognition card having made
the request for use of the image buses, in accordance
5 with a predetermined order of priority, when it is judged
by the bus control circuit from the supplied information
that the image memory card to be accessed is accessible
and one of the image buses is usable.

Thus, according to the present invention, when an
10 image memory card to be accessed is usable and one of
the image buses is not used, the high-speed bus control
circuit can issue permission for use of the image bus in
accordance with algorithm based upon a priority pattern,
and thus the arbitration of use of the image buses for
15 carrying out plate extraction and character recognition
in an optimum manner can be made at high speed. Further,
the order of priority of the use of the image buses can be
changed in the course of recognition processing, and at
least two image buses can be efficiently used when a large
20 number of cards require the use of the image buses.
Additionally, when a plate extraction card or character
recognition card is given the right of use of an image
bus, it is unnecessary to check whether or not an image
memory card which is to be accessed by the above card is
25 now being used.

The above and other objects, features and
advantages of the present invention will be apparent from
the following detailed description of the preferred

1 embodiment of the invention taken in conjunction with the
accompanying drawings, in which:

Fig. 1 is a block diagram showing the outline of
an embodiment of a register number recognition system
5 according to the present invention; and

Fig. 2 is a circuit diagram showing the circuit
construction of a high-speed bus control circuit included
in the embodiment of Fig. 1.

Referring to Fig. 1, reference numeral 1
10 designates a control card for controlling a plurality of
buses at high speed so as to satisfy a predetermined
condition, and for controlling the whole of the embodiment
of Fig. 1. The control card 1 includes a high-speed
bus control circuit which will be explained later in detail,
15 with reference to Fig. 2.

Further, in Fig. 1, reference numeral 2
designates a camera for imaging the licence plate of a car
running on a first lane, 3 a camera for imaging the licence
palte of a car running on a second lane, and 4 a camera for
20 imaging the licence plate of a car running on a third lane.
When a car passes through a predetermined position on one
of the first to third lanes, an area code, a car code,
a purpose code and an identification number which are all
described on the licence plate of the car, are imaged by a
25 corresponding one of the cameras 2 to 4, and the image
information thus obtained is outputted from the camera.

Reference numeral 5 designates an image memory
card for storing the image of a licence plate obtained by

1 the camera 2 and the images of characters described on the
licence plate, 6 an image memory card for storing the image
of a licence plate obtained by the camera 3 and the images
of characters described on the licence plate, 7 an image
5 memory card for storing the image of a licence plate
obtained by the camera 4 and the images of characters
described on the licence plate, 8 a plate extraction card
for referring to and processing image information on a
licence plate and characters thereon which information is
10 stored in the image memory card 5, by searching the image
memory card 5, to check whether or not an image of a licence
plate is present in the image memory card 5, and for
determining an address indicating the location of an
image of a licence plate when the image of the licence
15 plate is detected in the card 5, 9 a plate extraction card
for referring to and processing image information on a
licence plate and characters thereon which information is
stored in the image memory card 6, by searching the image
memory card 6, to check whether or not an image of a licence
20 plate is present in the image memory card 6, and for
determining an address indicating the location of an image
of a licence plate when the image of the licence plate is
detected in the card 6, and 10 a plate extraction card for
referring to and processing image information on a licence
25 plate and characters thereon which information is stored
in the image memory card 7, by searching the image memory
card 7, to check whether or not an image of a licence plate
is present in the image memory card 7, and for determining

- 1 an address indicating the location of an image of a
licence plate when the image of the licence plate is
detected in the card 7.

As is apparent from Fig. 1, the plate extraction
5 cards 8, 9 and 10 correspond to the image memory cards
5, 6 and 7, respectively. That is, the number of plate
extraction cards is equal to the number of image memory
cards.

- Reference numeral 11 designates an area code
- 10 character recognition card arranged so as to be common to
the image memory cards 5 to 7 for recognizing that one of
characters on a licence plate image stored in one of the
image memory cards 5 to 7 which indicates a register office,
12 a car code character recognition card arranged so as to
15 be common to the image memory cards 5 to 7 for recognizing
that one of characters on a licence plate image stored in
one of the image memory cards 5 to 7 which indicates the
kind of a car, 13 a purpose code character recognition
card arranged so as to be common to the image memory cards
20 5 to 7 for recognizing that one of characters on a licence
plate image stored in one of the image memory cards 5 to 7
which indicates the purpose of a car, 14 an identification
number recognition card arranged so as to be common to the
image memory cards 5 to 7 for recognizing those ones of
25 characters on a licence plate image stored in one of the
image memory cards 5 to 7 which indicate a serial number,
and 15 a bus control line connected among the control card
1, the plate extraction cards 8 to 10, the area code

1 character recognition code 11, the car code character
recognition card 12, the purpose code character recogni-
tion card 13, and the identification number recognition
card 14.

5 Control data indicative of permission for use
of a bus at a time when one of the plate extraction cards
8 to 10 reads out information such as an address indicating
the location of the image of a licence plate, from a
corresponding one of the image memory cards 5 to 7, is sent
10 from the control card 1 to the plate extraction card
through the bus control line 15.

Each of an image bus-A 15 and an image bus-B 16
is connected among the control card 1, the image memory
cards 5 to 7, the plate extraction cards 8 to 10, the
15 area code character recognition card 11, the car code
character recognition card 12, the purpose code character
recognition card 13, and the identification number
recognition card 14.

Thus, one of the image bus-A 15 and the image
20 bus-B 16 selects one of the image memory cards 5 to 7 on the
basis of control data which is sent from the control card 1
through the bus control line 15 and indicates permission
for use of the image bus.

Next, the high-speed bus control circuit included
25 in the control card 1 of Fig. 1 will be explained, with
reference to Fig. 2.

In Fig. 2, reference numerals 21 and 22
designate latch circuits for latching information

1 indicative of the requirement for use of an image bus
made by each of the plate extraction cards 8 to 10 or
character recognition cards 11 to 14, and indicative of
that one of the image memory cards 5 to 7 which is to be
5 accessed. Each of the latch circuits 21 and 22 will
hereinafter be referred to as "bus requirement input latch
circuit".

The requirement for use of an image memory card
made by the plate extraction cards 8 to 10 and the character
10 recognition cards 11 to 14 is expressed by two-bit,
four-state information using two signal lines.

In more detail, the first state indicates that no
bus is required, the second state indicates that the use
of the image memory card 5 is required, the third state
15 indicates that the use of the image memory card 6 is
required, and the fourth state indicates that the use of
the image memory card 7 is required.

Input data of the bus requirement input latch
circuits 21 and 22 are supplied thereto through 16
20 signal lines corresponding to eight cards. Additionally,
a signal line for sending a priority mode signal PCORCR
is included in the high-speed bus control circuit.

The bus requirement input latch circuit 21 is
applied with outputs HWRQ11 and HWRQ12 of the control
25 card 11, outputs HWRQ21 and HWRQ22 of the plate extraction
card 8, outputs HWRQ31 and HWRQ32 of the plate extraction
card 9, and outputs HWRQ41 and HWRQ42 of the plate
extraction card 10. These outputs, as shown in Fig. 2,

1 are called "plate extraction cards", as a whole.

The bus requirement input latch circuit 22 is applied with outputs HWRQ51 and HWRQ52 of the area code character recognition card 11, outputs HWRQ61 and
5 HWRQ62 of the car code character recognition card 12, outputs HWRQ71 and HWRQ72 of the purpose code character recognition card 13, and outputs HWRQ81 and HWRQ82 of the serial number recognition card 14. These outputs, as shown in Fig. 2, are called "character recognition cards",
10 as a whole.

Reference numeral 24 in Fig. 2 designates a permission latch circuit for latching a code indicative of permission for use of the image bus-A 16 or image bus-B 17.

The priority mode signal PCORCR includes
15 information with respect to the use of the image memory cards 5 to 7.

Reference numeral 23 designates a bus requirement code output circuit applied with new bus requiring information which is included in the plate extraction
20 group and latched by the latch circuit 21, a code indicating permission for use of the image bus-A 16 or image bus-B 17 which is latched by the latch circuit 24, and the priority mode signal PCORCR, for outputting a new bus requiring code in accordance with algorithm based upon
25 a priority pattern stored in the output circuit 23.

Reference numeral 25 designates a bus requirement code output circuit applied with new bus requiring information which is included in the character recognition group

1 and latched by the latch circuit 22, a code indicating
permission for use of the image bus-A 16 or image bus-B 17
which is latched by the latch circuit 24, and the priority
mode signal PCORCR, for outputting a new bus requiring
5 code in accordance with algorithm based upon a priority
pattern stored in the output circuit 25.

Reference numeral 26 designates a bus require-
ment code latch circuit for latching a new bus requiring
code which is supplied from the bus requirement code
10 output circuit 23 and included in the plate extraction
group.

Reference numeral 27 designates a bus requirement
code latch circuit for latching a new bus requiring code
which is supplied from the bus requirement code output
15 circuit 25 and included in the character recognition group.

Reference numeral 28 designates a permission
output circuit for determining a new permission code for
use of bus on the basis of the new bus requirement code
from the latch circuit 26, the new bus requirement from
20 the latch circuit 27, and the priority mode signal
PCORCR, to deliver the new permission code to the
permission latch circuit 24.

In other words, the high-speed bus control
circuit selects one code from all the bus requiring
25 codes in accordance with algorithm based upon a priority
pattern stored in the bus control part, to deliver a
new permission code for use of bus.

Reference numeral 29 designates a permission

1 decoding circuit of bus A for decoding a code indicative of permission for use of the image bus-A 16 which is latched by the latch circuit 24, to deliver a permission signal of bus A by using eight signal lines.

5 In more detail, a permission signal of bus A HWAAV1 delivered from the decoding circuit 29 is sent to the control card 1, permission signals HWAAV2, HWAAV3 and HWAAV4 are sent to the plate extraction cards 8, 9 and 10, respectively, and permission signals
10 HWAAV5, HWAAV6, HWAAV7 and HWAAV8 are sent to the area code character recognition card 11, the car code character recognition card 12, the purpose code character recognition card 13 and the serial number recognition card 14, respectively.

15 Reference numeral 30 designates a permission decoding circuit of bus B for decoding a code indicative of permission for use of the image bus-B 17 which is latched by the latch circuit 24, to deliver a permission signal of bus B by using eight signal lines.

20 In more detail, a permission signal of bus B HWBAV1 delivered from the decoding circuit 30 is sent to the control card 1, permission signals of bus B HWBAV2, HWBAV3 and HWBAV4 are sent to the plate extraction cards 8, 9 and 10, respectively, and permission signals HWBAV5,
25 HWBAV6, HWBAV7 and HWBAV8 are sent to the area code character recognition card 11, the car code character recognition card 12, the purpose code character recognition card 13 and the serial number recognition

1 card 14, respectively.

Further, a clock signal is applied to the T-terminal of each of bus requirement input latch circuits 21 and 22, the bus requirement-code latch circuits 26 and 5 27, and the permission latch circuit 24, and a reset signal is applied to the $\overline{Rn}$ -terminal of each of the latch circuits 21, 22, 26, 27 and 24.

When the priority mode signal PCORCR has a level "0", the plate extraction group is higher in priority 10 than the character recognition group. When the priority mode signal PCORCR has a level "1", the character recognition group is higher in priority than the plate extraction group.

Next, the operation of the present embodiment 15 will be explained. Each time a car passes through a predetermined position on one of the first to third lanes, the licence plate of the car is imaged by a corresponding one of the cameras 2 to 4.

A register number which includes an area code 20 character, a car code character, a purpose code character and an identification number, is described on the licence plate. The characters on the licence plate, that is, the register number is imaged by the camera, together with the licence plate, and image information on the licence 25 plate and the above characters are stored in one of the image memory cards 5 to 7.

When an extraction command is sent from the control card 1 to the plate extraction cards 8 to 10

1 through the bus control line 15, the plate extraction
cards 8 to 10 search the image memory cards 5 to 7 to
check whether or not the image of a licence plate is
present in the image memory cards 5 to 7.

5 When it is found that the image of the licence
plate is stored in one of the image memory cards 5 to 7,
an address indicating the location of the image of the
licence plate is determined by a corresponding one of the
plate extraction cards 8 to 10, and the address is sent
10 to the control card 1 through the bus control line 15.

Then, by using the bus control line 15, the
control card 1 instructs the area code character recogni-
tion card 11, the car code character recognition card 12,
the purpose code character recognition card 13 and the
15 identification number recognition cards 14 to recognize
various characters on the licence plate in accordance with
address information indicative of the location of the
image of the licence plate.

In more detail, the area code character recogni-
20 tion card 11 recognizes an area code specified by the above
address information, the car code character recognition
card 12 recognizes a car code indicating the kind of the
car, the purpose code character recognition card 13
recognizes a purpose code, and the identification number
25 recognition card 14 recognizes an identification number.
The licence plate and a register number thereon are
recognized by combining the above codes and serial
number.

1 The above operation will be explained below in
more detail. When a control signal indicative of
permission for use of a bus is sent from the control card
1 to one of the plate extraction cards 8 to 10 through the
5 bus control line 15, this plate extraction card acquires
the right of use of one of the image bus-A 16 and the
image bus-B 17, and extracts data from a corresponding
image memory card.

A preliminary operation for extracting data is
10 performed by the high-speed control part of Fig. 2.

That is, 2-bit, 4-state information which is
supplied from each of the plate extraction cards 8 to 10
through the image bus-A 16 and the image bus-B 17 to
require access to one of the image memory cards 5 to 7,
15 is latched by the bus requirement input latch circuit 21,
and 2-bit, 4-state information which is supplied from
each of the character recognition cards 11 to 14 through
the image bus-A 16 and the image bus-B 17 to require access
to one of the image memory cards 5 to 7, is latched by
20 the bus requirement input latch circuit 22. The bus
requirement code output circuits 23 and 25 and the
permission output circuit 28 change the order of priority
in accordance with a change in inputs of the latch circuits
21 and 22. The order of priority is decided in accordance
25 with the following priority decision policy.

(1) The plate extraction group (that is, the group of
bus requiring inputs from the plate extraction cards 8 to
10) is made higher or lower in priority than the character

1 recognition group (that is, the group of bus requiring
inputs from the character recognition cards 11 to 14) in
accordance with the level of the priority mode signal
PCORCR.

5 (2) The bus requiring input HWRQ11 and HWRQ 12
from the control card 1 is included in the plate extraction
group, but has the lowest priority in this group.

(3) In each of the plate extraction group and the
character recognition group, a bus requiring input which
10 is now given permission for the use of a bus, has the
lowest priority in the next processing.

Now, an operation according to the item (1) will
be explained. As has been already mentioned, when the
priority mode signal PCORCR has the level "0", the
15 requirement for use of a bus from the plate extraction
cards 8 to 11 is higher in priority than the requirement
from the character recognition cards 11 to 14. When the
priority mode signal PCORCR has the level "1", the
requirement from the plate extraction cards 8 to 10 is
20 lower in priority than that from the character recognition
cards 11 to 14.

Explanation will be made of a case where the
priority mode signal PCORCR has the level "0". A new
bus requiring input latched by the latch circuit 21 and
25 a code indicating permission for use of the image bus-A 16
or the image bus-B 17 which is latched by the latch
circuit 24, are both applied to the bus requirement code
output circuit 23.

1 In the bus requirement code output circuit 23,
it is checked whether that one of the image memory cards
5 to 7 which is required, can be used or not. In a case
where the required image memory card is now being used,
5 this image memory card is omitted from the object of
permission.

Thus, it becomes unnecessary to check whether an
image memory card can be used or not, after a processing
card (namely, plate extraction card or character recogni-
10 tion card) requiring the use of the image memory card has
been connected to an image bus.

Further, a new bus requiring input latched by
the latch circuit 22 and a code indicating permission
for the use of the image bus-A 16 or the image bus-B 17
15 which is latched by the latch circuit 24, are both applied
to the bus requirement code output circuit 25.

The bus requirement code output circuits 23 and
25 are also applied with the priority mode signal PCORCR.
In a case where the priority mode signal has the level "0",
20 the output of the bus requirement code output circuit 23
is higher in priority than the output of the bus require-
ment code output circuit 25.

Thus, the bus requirement code output circuit 23
delivers a new bus requiring code which is latched by the
25 bus requirement input latch circuit 23, to the bus require-
ment code latch circuit 26 in accordance with algorithm
based upon a priority pattern stored in the output
circuit 23.

1 The new bus requiring code latched by the latch
 circuit 26 is supplied to the permission output circuit 28,
 which is also applied with the priority mode signal
 PCORCR. In a case where the priority mode signal has the
 5 level "0". The new bus requiring code from the bus
 requirement code latch circuit 26 is selected by the
 output circuit 28, and sent to the permission decoding
 circuit of bus A 29 through the permission latch circuit
 24.

10 The decoding circuit 29 decodes the new bus
 requiring code from the latch circuit 24, and sends out
 a permission signal of bus A. In more detail, a permission
 signal of bus A AWAAV1 is sent to the control card 1,
 permission signals of bus A HWAAV2, HWAAV3 and HWAAV4 are
 15 sent to the plate extraction cards 8, 9 and 10, respec-
 tively, and permission signals of bus A HWAAV5, HWAAV6,
 HWAAV7 and HWAAV8 are sent to the character recognition
 cards 11 12, 13 and 14, respectively.

 In a case where the priority mode signal PCORCR
 20 has the level "1", the bus requirement code output circuit
 25 applied with a new bus requiring code from the bus
 requirement input latch circuit 22 is selected.

 In the bus requirement code output circuit 25,
 it is checked whether that one of the image memory cards
 25 5 to 7 which is required, can be used or not. In a case
 where the required image memory card is now being used,
 this image memory card is omitted from the object of
 permission.

1 Thus, it become unnecessary to check whether
or not a processing card (namely, plate extraction card or
character recognition card) given the right of use of an
image bus can use a corresponding image memory card.

5 A new bus requiring code which is delivered
from the bus requirement code output circuit 25 and
belongs to the character recognition group, is latched by
the bus requirement code latch circuit 27. In a case
where the priority mode signal PCORCR has the level "1",
10 the new bus requiring code delivered from the latch
circuit 27 is selected by the permission output circuit
28, and sent to the permission decoding circuit of bus B 30
through the permission latch circuit 24.

 The decoding circuit 30 decodes the new bus
15 requiring code from the latch circuit 24, and sends out a
permission signal of bus B. In more detail, a permission
signal of bus B HWBAV1 is sent to the control card 1,
permission signals of bus B HWBAV2, HWBAV3 and HWBAV4 are
sent to the plate extraction cards 8, 9 and 10,
20 respectively, and permission signals of bus B HWBAV5,
HWBAV6, HWBAV7 and HWBAV8 are sent to the character
recognition cards 11, 12, 13 and 14, respectively.

 As is evident from the above, requirement for
use of the image bus-A 16 and the image bus-B 17 are
25 arbitrated by the bus requirement code output circuits 23
and 25 and the permission output circuit 28. Each of the
circuits 23, 25 and 28 serves as storage, in which a
permission pattern in arbitrating the right of use of the

1 image buses is expanded in accordance with predetermined
algorithm, and data is stored. Thus, a time necessary for
bus control is shortened by a time to access to a memory
for input data.

5 As regards the items (2) and (3) of the priority
decision policy, ordinary processing is carried out as
described in the items (2) and (3).

In a case where it is required to change the
order of priority for use of the buses, a new algorithm
10 pattern is stored in each of the bus requirement code
output circuits 23 and 25 and the permission output circuit
28. That is, the order of priority for use of the buses can
readily correspond to the recognition system used.

As is evident from the present embodiment, an
15 inventive licence plate recognition system for recognizing
a register number from the still picture of the licence
plate of a car running on a road, is provided with the
bus control part, which issues permission for use of image
buses in accordance with an alterable priority decision
20 policy, after it has been confirmed that an image memory
card to be accessed is accessible. Accordingly, optimum
arbitration for use of image buses can be made when a
register number is recognized. Further, in the course
of the register number recognition, the order of priority
25 for use of image buses is changed so as to be suited to a
processing step. Accordingly, in a case where a
multiplicity of requirements for use of image buses are
generated, the image buses can be efficiently used.

- 1 Further, according to the present invention, it is possible to omit a step of and means for checking whether an image memory card to be connected to a processing card can be used or not, after the processing card has obtained
- 5 the right of use of an image bus.

**CLAIMS:**

1. A register number recognition system for recognizing a register number made up of various characters on a licence plate of a car running on one of a plurality of lanes of a road, using a camera for each lane, the system comprising:

5 a plurality of image memory cards, each corresponding to a respective camera, for storing digital data of still pictures, the still pictures being obtained by the camera, each of the still pictures being able to contain an image of the licence plate of the car running on the lane;

10 a plurality of plate extraction cards, each corresponding to a respective image memory card, for accessing the image memory cards to refer to image information stored in the image memory cards and for processing the image information to determine an address indicating the location of the image of a licence plate in an image memory card when the image of the licence plate is detected in the image information;

20 character recognition cards provided so as to correspond to different kinds of characters, for extracting character information on the licence plate from the image memory card by using the address indicating the location of the image of the licence plate, to recognize the extracted characters;

25 at least two image buses for enabling each plate extraction card and each character recognition card to access a desired image memory card and for reading out information from and writing information in the image memory card; and



a control card including a high-speed bus control circuit for managing and controlling the overall processing of the system, the bus control circuit being supplied with information indicative of the requirement for use of the image buses made by a plate extraction card or character recognition card and information whether an image memory card is accessible or not, and when the plate extraction card or character recognition card makes a request to access the image memory card through the image buses, delivering a signal indicative of permission for use of the image buses to the plate extraction card or character recognition card having made the request for use of the image buses, in accordance with a predetermined order of priority, when it is judged by the bus control circuit from the supplied information that the image memory card to be accessed is accessible and one of the image buses is usable.

2. A register number recognition system according to Claim 1, wherein the bus control circuit includes a requirement input section for use of image bus for latching image bus requiring information capable of specifying an image memory card to be accessed which is supplied by the plate extraction card or the character recognition card; a permission output section for use of image bus applied with the bus requiring information latched by the requirement input section and information whether the



image memory card is accessible or not, for outputting a code indicative of permission for use of an image bus, in accordance with a predetermined order of priority when it is judged from the applied information that the image memory card to be accessed is accessible, and one of the image buses is usable; and a permission decoding section for use of image bus for decoding the code indicative of permission for use of an image bus to supply a signal indicative of permission for use of an image bus to the plate extraction card or character recognition card having sent out the image bus requiring information.

3. A register number recognition system according to Claim 2, wherein the permission output section includes storage means for storing the predetermined order of priority previously.

4. A register number recognition system substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
