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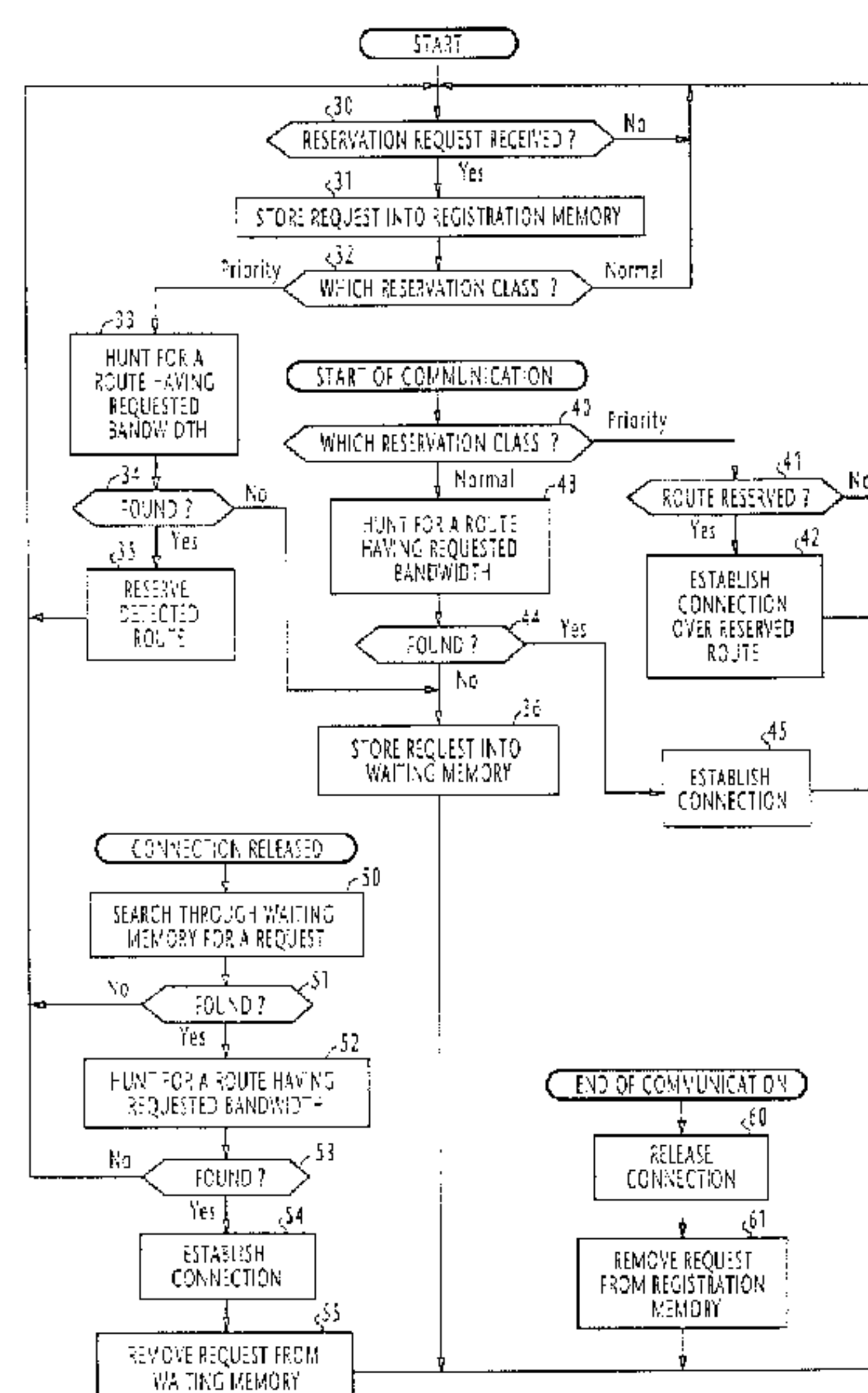
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(54) Titre : RESEAU MTA CONTROLE EXTERIEUREMENT POUR LA RESERVATION DE RESSOURCES A
CONNEXIONS VIRTUELLES COMMUTEES DE BOUT EN BOUT

(54) Title: ATM NETWORK EXTERNALLY CONTROLLED FOR NETWORK RESOURCE RESERVATION OF END-TO-END SWITCHED VIRTUAL CONNECTION



(57) Abrégé/Abstract:

In an ATM network, a database is provided in a network controller for holding data pertaining to network topology and remaining network resource. The controller has a supervisory circuit that constantly monitors communication links between ATM switches. Route decision and resource reservation logic circuitry updates the database if a network failure condition is detected by the supervisory circuit. The logic circuitry also receives, from a source terminal, a reservation request indicating a reservation of an end-to-end network resource between a scheduled start time and a scheduled end time, and makes a search through the database to reserve the network resource in the database if the network resource is available. The logic circuit causes the ATM switches to establish an end-to-end connection using the reserved network resource at the scheduled start time, informs the source terminal of a VCI/VPI of the established connection for subsequent transmission of messages, releases the established connection when the request in the registration memory indicates the scheduled end time, and removes the request from the registration memory. The logic circuit also accommodates class of service requests; for a first class, the database is searched, and requested resources are reserved at the time the request is received. For a second class, the search is not performed until the scheduled start time.



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ABSTRACT OF THE DISCLOSURE

In an ATM network, a database is provided in a network controller for holding data pertaining to network topology and remaining network resource. The controller has a supervisory circuit that constantly monitors communication links between ATM switches. Route decision and resource reservation logic circuitry updates the database if a network failure condition is detected by the supervisory circuit. The logic circuitry also receives, from a source terminal, a reservation request indicating a reservation of an end-to-end network resource between a scheduled start time and a scheduled end time, and makes a search through the database to reserve the network resource in the database if the network resource is available. The logic circuit causes the ATM switches to establish an end-to-end connection using the reserved network resource at the scheduled start time, informs the source terminal of a VCI/VPI of the established connection for subsequent transmission of messages, releases the established connection when the request in the registration memory indicates the scheduled end time, and removes the request from the registration memory. The logic circuit also accommodates class of service requests; for a first class, the database is searched, and requested resources are reserved at the time the request is received. For a second class, the search is not performed until the scheduled start time.

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1 TITLE OF THE INVENTION

2 "ATM Network Externally Controlled for Network Resource Reservation
3 of End-to-End Switched Virtual Connection"

4 BACKGROUND OF THE INVENTION

5 Field of the Invention

6 The present invention relates generally to asynchronous transfer
7 mode (ATM) networks, and more specifically to the reservation of network
8 resources in an ATM network in response to users' requests.

9 Description of the Related Art

10 Japanese Laid-Open Patent Specification Hei-6-30021 discloses
11 time-scheduled communications in a switched network in which ATM
12 switching nodes individually perform reservation of a bandwidth according
13 to user's reservation requests by storing reservation requests in memory and
14 monitoring the stored requests in order to establish a connection at
15 requested time of day if network resource is available. After the connection
16 is established, the ATM switches monitor the stored request in order to
17 release it at the expiry of the reservation.

18 Since the prior art resource reservation is implemented individually
19 on a per-node basis and no facility is available to link the reservation data
20 between ATM switches, network reservation cannot be performed on an
21 end-to-end basis. In addition, network resource reservation is attempted at
22 the very instant at which the scheduled communication begins. Although
23 the prior art is provided with means for rejecting some calls if they occur
24 during a predetermined interval prior to the scheduled communication,
25 there is some degree of uncertainty to satisfy the reservation request at the
26 beginning of the scheduled communication. Furthermore, if the ATM
27 switches fail to satisfy a reservation request at the beginning of the
28 scheduled communication, there is no fallback procedure for continuing the
29 search for the requested network resource.

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SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a solution to the problems associated with ATM switches for making a reservation of network resource.

5 According to a first aspect of the present invention, there is provided a network controller for making a resource reservation in a network formed by a plurality of ATM switches interconnected by communication links. The network controller comprises a database for holding data
10 pertaining to network topology and remaining network resource, a supervisory circuit for constantly monitoring the communication links, a registration memory, and route decision and resource reservation logic circuitry. The logic circuitry updates the database if a fault condition is
15 detected by the supervisory circuit and receives, from a source terminal, a reservation request indicating a reservation of an end-to-end network resource between a scheduled start time and a scheduled end time, making a search through the database to reserve the network resource
20 in the database if the network resource is available. The logic circuit causes the ATM switches to establish an end-to-end connection using the reserved network resource at the scheduled start time, informs the source terminal of a virtual channel identifier/virtual path identifier of the
25 established connection to be used for subsequent transmission of messages, releases the established connection when the request stored in the registration memory indicates the scheduled end time and removes the request from the registration memory.

30 According to a second aspect of the present invention, the reservation request further indicates one of first and second reservation classes, and the logic

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circuitry is arranged to make a search through the database, if the request is indicating the first class, to determine whether the network resource is available immediately following the receipt of the request, reserve the network resource and cause the ATM switches to establish the connection using the reserved network resource at the scheduled start time if the network resource is available, and is further arranged to make a search through the database, if the request is indicating the second class, to determine whether the network resource is available at the scheduled start time, and cause the ATM switches to establish the connection using the network resource if the network resource is available.

According to a third aspect of the present invention, the logic circuitry is arranged to store the request in a waiting memory if the network resource is determined to be unavailable, make a search through the database to determine, when an existing connection is released, whether the network resource is available, and cause the ATM switches to establish the connection using the network resource and remove the request from the waiting memory if the network resource is available.

In summary this invention seeks to provide a network controller for handling end-to-end network resource reservations for subscribers in an ATM communication network including a plurality of ATM switches interconnected by communication links, comprising: a first memory device for storing resource reservations requests; and logic circuitry responsive to a reservation request from a subscriber terminal for storing the request in the first memory device, operating the ATM switches to establish an end-to-end connection for the requesting subscriber terminal at a

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scheduled start time if the requested resource is available, informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for transmission of
5 messages, releasing the connection at a scheduled end time, and removing the record of the request from the first memory device when the connection is released.

This invention also seeks to provide a network controller for making resource reservations in an ATM
10 communication network formed of a plurality of subscriber terminals, and a plurality of ATM switches interconnected by communication links, the controller comprising: a database for storing data pertaining to the topology of the network and available network resources; a supervisory circuit for
15 constantly monitoring the communication links; a registration memory for storing received reservation requests; and route decision and resource reservation logic circuitry responsive to detection of a fault condition by the supervisory circuit to update the database, the logic
20 circuitry being further responsive to a reservation request from a subscriber terminal for an end-to-end network resource to be available between a scheduled start time and a scheduled end time, for making a search through the database and updating the database to reflect establishment
25 of the requested reservation if the requested resource is available, the logic circuitry being further responsive to an existing reservation in the database for operating the ATM switches to establish an end-to-end connection using the reserved network resource at the scheduled start time, and
30 informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for transmission of

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messages and releasing the connection at the scheduled end time, and removing the request from the registration memory.

This invention also seeks to provide an ATM communication network comprising: a plurality of subscriber terminals; a plurality of communication links; a plurality of ATM switches which interconnect the communication links; and a network controller comprising: a database for storing data pertaining to the topology of the network and available network resources; a registration memory; and a route decision and resource reservation logic circuitry, the subscriber terminals being operative to transmit reservation requests to the controller for end-to-end network resources to be allocated to the requesting terminal between a scheduled start time and a scheduled end time, the request including a reservation priority designation; the route decision and resource reservation logic circuitry being responsive to a reservation request to store the request in the registration memory, responsive to a first priority designation to search the database to determine whether the requested resource is available immediately upon receipt of the reservation request, or responsive to a second different priority designation to search the database to determine whether the requested resource is available at the scheduled start time specified in the reservation request; and responsive to an existing reservation to operate the ATM switches to establish an end-to-end connection using the reserved network resource at the scheduled start time, to inform the requesting subscriber source terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for subsequent transmission of messages, to release the connection at the scheduled end time, and to remove the request from the registration memory when the connection is released.

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This invention also seeks to provide a method of making resource reservations in an ATM communication network formed of a plurality of subscriber terminals, a plurality of ATM switches interconnected by communication links and a controller including a database for storing data pertaining to the topology of the network and available network resources, the method comprising the steps of: receiving a reservation request from a subscriber terminal for an end-to-end network resource between a start time and an end time; storing the reservation request in a memory device; searching the database, and updating the database to reflect establishment of the requested reservation if the requested resource is available; establishing an end-to-end connection through the ATM switches at the scheduled start time based on the reserved network resource; informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for transmission of messages; releasing the connection at the scheduled end time; and removing the request from the memory device when the connection is released.

This invention also seeks to provide a method of making resource reservations in an ATM communication network formed of a plurality of subscriber terminals, a plurality of ATM switches interconnected by communication links, the method comprising the steps of: receiving a reservation request for an end-to-end network resource between a scheduled start time and a scheduled end time from a subscriber terminal, the request including a reservation priority designation; storing the reservation request in a first memory; identifying the priority designation included in the reservation request; if the request includes a first priority designation, searching the database immediately upon receipt of the reservation request, and, if the

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requested resource is available, updating the database to reserve the requested resource, and establishing an end-to-end connection through the ATM switches at the scheduled start time based on the reserved network resource; or if the request includes a second priority destination, searching the database at the scheduled start time, and if the network resource is available, establishing an end-to-end connection through the ATM switches at the scheduled start time based on the reserved network resource; informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for transmission of messages; releasing the connection at the scheduled end time; and removing the request from the first memory when the connection is released.

15

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described in further detail with reference to the accompanying drawings, in which:

Fig. 1 is a block diagram of an ATM switched network according to the present invention;

Fig. 2 is a block diagram of the network management apparatus of Fig. 1;

Fig. 3 is a flowchart illustrating the operation of the route decision and bandwidth reservation (RDBR) logic circuit;

Fig. 4 is a block diagram of a modified embodiment in which a mapping table is located in the network controller for translating a user-transmitted code name to a corresponding set of reservation data items; and

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Fig. 5 is a block diagram of the ATM network in which the mapping table is located in the user's premises.

DETAILED DESCRIPTION

Referring to Fig. 1, an ATM (asynchronous transfer
5 mode) switched network of the present invention is
illustrated as a simplified example for the purpose of
disclosure. Two ATM switches 3 and 4, interconnected by a

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1 communication link 7, are illustrated as switching nodes of the network for
2 serving many end user terminals. Only two user terminals 1 and 5 are
3 illustrated for simplicity, these terminals being connected to the switching
4 nodes 3 and 4 via subscriber lines 6 and 8, respectively. All ATM nodes and
5 user terminals are connected to a network controller 2 via logical (virtual)
6 links 9, 10, 11 and 12. Logical links 9 and 12 of the user terminals are
7 established via ATM nodes 3 and 4.

8 As shown in Fig. 2, the network controller 2 comprises a line receiver
9 20 to which the logical links 9 and 12 are terminated for receiving
10 reservation requests from the user terminals. A supervisory circuit 21 is
11 connected to the logical links 10 and 11 to monitor lines and switching
12 equipment. A route decision and bandwidth reservation (RDBR) logic
13 circuit 22 is provided to receive reservation requests from line receiver 20
14 and a monitor report from the supervisory circuit 21. The RDBR logic
15 circuit 22 is associated with a network topology memory 23, a remaining
16 resource memory 24, a connection status memory 25, a registration
17 memory 26, and a waiting memory 27. A monitor circuit 28 is connected
18 to the registration memory 26 to monitor reservation requests stored in
19 memory 26 and supplies an interrupt command to the logic circuit 22 when
20 one of the start and end times of a reservation matches the time of day.
21 Monitor circuit 28 is further connected to the connection status memory 25
22 to monitor the status of established connections and supplies an interrupt
23 command to the logic circuit 22 when any of the established connections is
24 released.

25 A signaling circuit 29 is provided for transmitting signaling packets
26 to the ATM switches via logical links 10 and 11 to establish switched virtual
27 connections along routes determined by the RDBR logic circuit 22 using
28 the Simple Network Management Protocol (SNMP) which is currently in
29 use for establishing permanent virtual connections (PVC). According to a
30 first aspect of the present invention, each ATM node responds to the

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1 signaling packet for establishing a switched virtual connection to the
2 destination terminal and informing the source terminal of a virtual channel
3 identifier/virtual path identifier (VCI/VPI) to be used during the
4 subsequent transmission of ATM message cells. After a switched virtual
5 connection is established by the ATM switches under control of the network
6 controller 2, each ATM switch examines the header of user-transmitted
7 ATM message cells for routing them along the established connection.

8 According to a second aspect of the present invention, reservation
9 requests are classified into a high-cost, priority reservation class and a low-
10 cost, normal reservation class, for making a reservation of an end-to-end
11 communication through the ATM network. The priority reservation class
12 ensures a high degree of certainty for obtaining the requested bandwidth. If
13 this class is requested, the RDBR logic circuit 22 immediately begins
14 hunting for a route having the requested bandwidth. The normal
15 reservation class, on the other hand, provides a low degree of certainty for
16 obtaining the requested bandwidth. On receiving this request, the RDBR
17 logic circuit 22 waits until the start of the requested communication before
18 hunting for a route having the requested bandwidth.

19 The operation of the RDBR logic circuit 22 will be explained with
20 the aid of a flowchart shown in Fig. 3. When a reservation request is
21 received (step 30), flow proceeds to step 31 to store the request in the
22 registration memory 26. The reservation request indicates the identity of
23 the source user terminal (source address), the identity of a destination user
24 terminal (destination address), a network resource, such as bandwidth, to be
25 reserved, times of day respectively indicating the beginning and expiry of a
26 communication to be reserved over a route between the source and the
27 destination terminals, and a priority/normal reservation class.

28 At step 32, the stored request is examined to determine whether it
29 demands the priority class or the normal class. If the request is demanding
30 the normal class, flow returns to the starting point of the routine to wait

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1 until the logic circuit 22 is triggered by the monitor circuit 28 in order to
2 serve reservation requests from other user terminals.

3 If the request is demanding the priority class, flow proceeds from
4 step 32 to step 33 to hunt for a route having the requested bandwidth using
5 network topology data stored in the network topology memory 23 and
6 currently available network resource data stored in the remaining resource
7 memory 24. If there is one (step 34), flow proceeds to step 35 to reserve the
8 bandwidth of the detected route in the remaining resource memory 24. If
9 the decision at step 34 is negative, the reservation request is stored in a
10 queue in the waiting memory 27 (step 36), and flow returns to the starting
11 point of the routine.

12 When the beginning of a communication requested by either class
13 of a request stored in the registration memory is detected by monitor
14 circuit 28, the logic circuit 22 is triggered and starts its operation at step 40
15 by determining which reservation class the request is demanding. If the
16 priority class is requested, flow proceeds from step 40 to step 41 to check to
17 see if the requested route is reserved. If so, flow proceeds from step 41 to
18 step 42 where the logic circuit 22 commands the signaling circuit 29 to
19 operate the ATM switches to establish a connection over the reserved route.
20 In addition, the logic circuit 22 stores the connection status of the request
21 into connection status memory 25, and returns to the starting point of the
22 routine. If the decision at step 41 is negative, flow returns to the starting
23 point of the routine.

24 If the request stored in the registration memory is demanding the
25 normal class, flow branches at step 40 to step 43 to hunt for a route having
26 the requested bandwidth. If such a route is found (step 44), a connection is
27 established over the detected route and the remaining resource memory 24
28 and connection status memory 25 are updated accordingly (step 45).
29 Otherwise, the request is placed into a queue in the waiting memory 27
30 (step 36).

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1 The reservation requests stored in the waiting memory 27 are served
2 by the logic circuit 22 whenever any of the already established connections
3 is released. When this occurs, the logic circuit 22 is triggered by the
4 monitor circuit 28 and starts its operation at step 50 by making a search
5 through the waiting memory 27 for a stored request. If a request is found
6 in the waiting memory (step 51), flow proceeds to step 52 to hunt for a
7 route having the bandwidth requested by the request stored in the waiting
8 memory. If such a route is detected (step 53), a connection is established
9 over the detected route and the remaining resource memory 24 and
10 connection status memory 25 are updated accordingly (step 54) and the
11 request is removed from the waiting memory (step 55). If the decision at
12 steps 51 and 53 are negative, flow returns to the starting point of the
13 routine.

14 When the expiry of a communication of a request of either normal
15 or priority class is detected in the registration memory 26 by the monitor
16 circuit 28, the logic circuit 22 is triggered to start its operation at step 60 by
17 releasing the connection established for the request and removing the
18 request from the registration memory 26 (step 61), and flow returns to the
19 starting point of the routine.

20 Since the reservation request contains a number of reservation data
21 items, it is of time-consuming and tedious affair to manually enter
22 reservation data if calls are frequently set up using different patterns of
23 reservations. Therefore, from the customer service viewpoint, it is important
24 to simplify the reservation procedure. Fig. 4 illustrates an embodiment that
25 simplifies the reservation procedure.

26 According to the embodiment of Fig. 4, the network controller,
27 indicated at 70, additionally includes a mapping table 71 connected
28 between line receiver 20 and the RDBR logic circuit 22. In the table 71, a
29 plurality of code names are mapped to corresponding reservation data items
30 each including a source address, a destination address, times of day for the

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1 beginning and expiry of a scheduled communication, a desired bandwidth
2 and a reservation class. When transmitting a reservation request, the user
3 terminal only needs to enter a desired code name, instead of entering
4 reservation data. The code name is transmitted to the network controller
5 70, where it is translated by the mapping table 71 to corresponding
6 reservation data and applied to the logic circuit 22.

7 The mapping table may be located at the customer's premises. As
8 illustrated in Fig. 5, each of the user terminals 1 and 5 includes a mapping
9 table 81 connected to the data terminal equipment 80. When transmitting
10 a reservation request, each user terminal enters a desired code name which is
11 translated by the mapping table 81 to corresponding reservation data, which
12 is then transmitted to the network controller 2.

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CLAIMS:

1. A network controller for handling end-to-end network resource reservations for subscribers in an ATM communication network including a plurality of ATM switches interconnected by communication links, comprising:
- 5 a first memory device for storing resource reservations requests; and
- logic circuitry responsive to a reservation request from a subscriber terminal for storing the request in the first memory device, operating the ATM switches to establish an end-to-end connection for the requesting subscriber terminal at a scheduled start time if the requested resource is available, informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for transmission of messages, releasing the connection at a scheduled end time, and removing the record of the request from the first memory device when the connection is released.
- 10 2. The network controller of claim 1, further comprising:
- a database for storing data pertaining to the topology of the network and available network resources, and wherein:
- 25 the logic circuitry is further responsive to a reservation request for making a search through the database to determine if the requested resource is available, and if so, to reserve the requested resource, and to update the database to reflect establishment of the requested reservation.
- 30

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3. The network controller of claim 2, further comprising a second memory device, and wherein:

the logic circuitry is operative to store a reservation request in the second memory device if a search
5 of the database in response to the reservation request indicates that the requested resource is not available, and wherein

the logic circuitry is responsive to an existing connection being released to perform a further search of the
10 database, and if the further search indicates that the requested resource is available, to operate the ATM switches to establish the requested connection and to remove the request from the second memory device.

4. The network controller of claim 3, wherein the
15 reservation request includes a reservation priority designation; and

wherein the logic circuitry is further responsive to a first priority designation to determine whether the requested resource is available immediately upon receipt of
20 the reservation request and to reserve the requested resource at the time the reservation request is received if the requested resource is available, and

responsive to a second different priority designation to determine whether the requested resource is
25 available at the scheduled start time specified in the reservation request.

5. A network controller for making resource reservations in an ATM communication network formed of a plurality of subscriber terminals, and a plurality of ATM

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switches interconnected by communication links, the controller comprising:

a database for storing data pertaining to the topology of the network and available network resources;

5 a supervisory circuit for constantly monitoring the communication links;

a registration memory for storing received reservation requests; and

route decision and resource reservation logic
10 circuitry responsive to detection of a fault condition by the supervisory circuit to update the database,

the logic circuitry being further responsive to a reservation request from a subscriber terminal for an end-to-end network resource to be available between a scheduled
15 start time and a scheduled end time, for making a search through the database and updating the database to reflect establishment of the requested reservation if the requested resource is available,

the logic circuitry being further responsive to an
20 existing reservation in the database for operating the ATM switches to establish an end-to-end connection using the reserved network resource at the scheduled start time, and informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the
25 established connection to be used for transmission of messages and releasing the connection at the scheduled end time, and removing the request from the registration memory.

6. The network controller of claim 5, wherein the reservation request further includes a reservation priority
30 designation; and

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wherein the logic circuitry is further responsive to a first priority designation for determining whether the requested resource is available immediately upon receipt of the reservation request and reserving the requested resource at the time the reservation request is received if the requested resource is available, and further responsive to a second different priority designation to determine whether the requested resource is available at the scheduled start time specified in the reservation request.

7. The network controller of claim 5, wherein the logic circuitry further operative to store a reservation request in a waiting memory if the search of the database in response to the reservation request indicates that the requested resource is not available,

responsive to an existing connection being released for performing a further search of the database, and

responsive to the further search indicating that the requested resource is available to operate the ATM switches to establish the requested connection and to remove the request from the waiting memory.

8. The network controller of claim 5, wherein the reservation request is generated in the form of a code name, and wherein the controller further includes a circuit which converts the code name to a plurality of resource reservation data items.

9. The network controller of claim 5, wherein the reservation request is generated in the form of a code name, and wherein the subscriber terminal includes a circuit which converts the code name to a plurality of resource

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reservation data items and transmits the data items to the network controller.

10. An ATM communication network comprising:

a plurality of subscriber terminals;

5 a plurality of communication links;

a plurality of ATM switches which interconnect the communication links; and

a network controller comprising:

10 a database for storing data pertaining to the topology of the network and available network resources;

a registration memory; and

a route decision and resource reservation logic circuitry,

15 the subscriber terminals being operative to transmit reservation requests to the controller for end-to-end network resources to be allocated to the requesting terminal between a scheduled start time and a scheduled end time, the request including a reservation priority designation;

20 the route decision and resource reservation logic circuitry being responsive to a reservation request to store the request in the registration memory,

responsive to a first priority designation to search the database to determine whether the requested
25 resource is available immediately upon receipt of the reservation request, or

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responsive to a second different priority designation to search the database to determine whether the requested resource is available at the scheduled start time specified in the reservation request; and

5 responsive to an existing reservation to operate the ATM switches to establish an end-to-end connection using the reserved network resource at the scheduled start time, to inform the requesting subscriber source terminal of a virtual channel identifier/virtual path identifier of the
10 established connection to be used for subsequent transmission of messages, to release the connection at the scheduled end time, and to remove the request from the registration memory when the connection is released.

11. The ATM communication network of claim 10, wherein
15 the reservation request is in the form of a code name, and wherein the controller further includes a circuit which converts the code name to a plurality of resource reservation data items.

12. A method of making resource reservations in an ATM
20 communication network formed of a plurality of subscriber terminals, a plurality of ATM switches interconnected by communication links and a controller including a database for storing data pertaining to the topology of the network and available network resources, the method comprising the
25 steps of:

receiving a reservation request from a subscriber terminal for an end-to-end network resource between a start time and an end time;

storing the reservation request in a memory
30 device;

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searching the database, and updating the database to reflect establishment of the requested reservation if the requested resource is available;

establishing an end-to-end connection through the
5 ATM switches at the scheduled start time based on the reserved network resource;

informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for transmission of
10 messages;

releasing the connection at the scheduled end time; and

removing the request from the memory device when the connection is released.

15 13. The method of claim 12, further comprising the steps of:

receiving the reservation request in the form of a code name; and

converting the received code name to a plurality
20 of resource reservation data items.

14. A method of making resource reservations in an ATM communication network formed of a plurality of subscriber terminals, a plurality of ATM switches interconnected by communication links, the method comprising the steps of:

25 receiving a reservation request for an end-to-end network resource between a scheduled start time and a scheduled end time from a subscriber terminal, the request including a reservation priority designation;

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storing the reservation request in a first memory;

identifying the priority designation included in the reservation request;

if the request includes a first priority designation, searching the database immediately upon receipt of the reservation request, and, if the requested resource is available, updating the database to reserve the requested resource, and establishing an end-to-end connection through the ATM switches at the scheduled start time based on the reserved network resource; or

if the request includes a second priority destination, searching the database at the scheduled start time, and if the network resource is available, establishing an end-to-end connection through the ATM switches at the scheduled start time based on the reserved network resource;

informing the requesting subscriber terminal of a virtual channel identifier/virtual path identifier of the established connection to be used for transmission of messages;

releasing the connection at the scheduled end time; and

removing the request from the first memory when the connection is released.

15. The method of claim 14, further comprising the steps of:

storing the request in a second memory if the requested network resource is not available at the time the database is searched;

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performing a further search of the database when an existing connection is released to determine if the requested resource has become available, and if so, establishing the end-to-end connection through the ATM switches based on the reserved network resource at the time the further search is performed, and removing the request from the second memory.

16. The method of claim 14, wherein the step of receiving a reservation request from a subscriber terminal further comprises the steps of:

receiving the reservation request in the form of a code name; and

converting the received code name into a plurality of resource reservation data items.

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FIG. 1

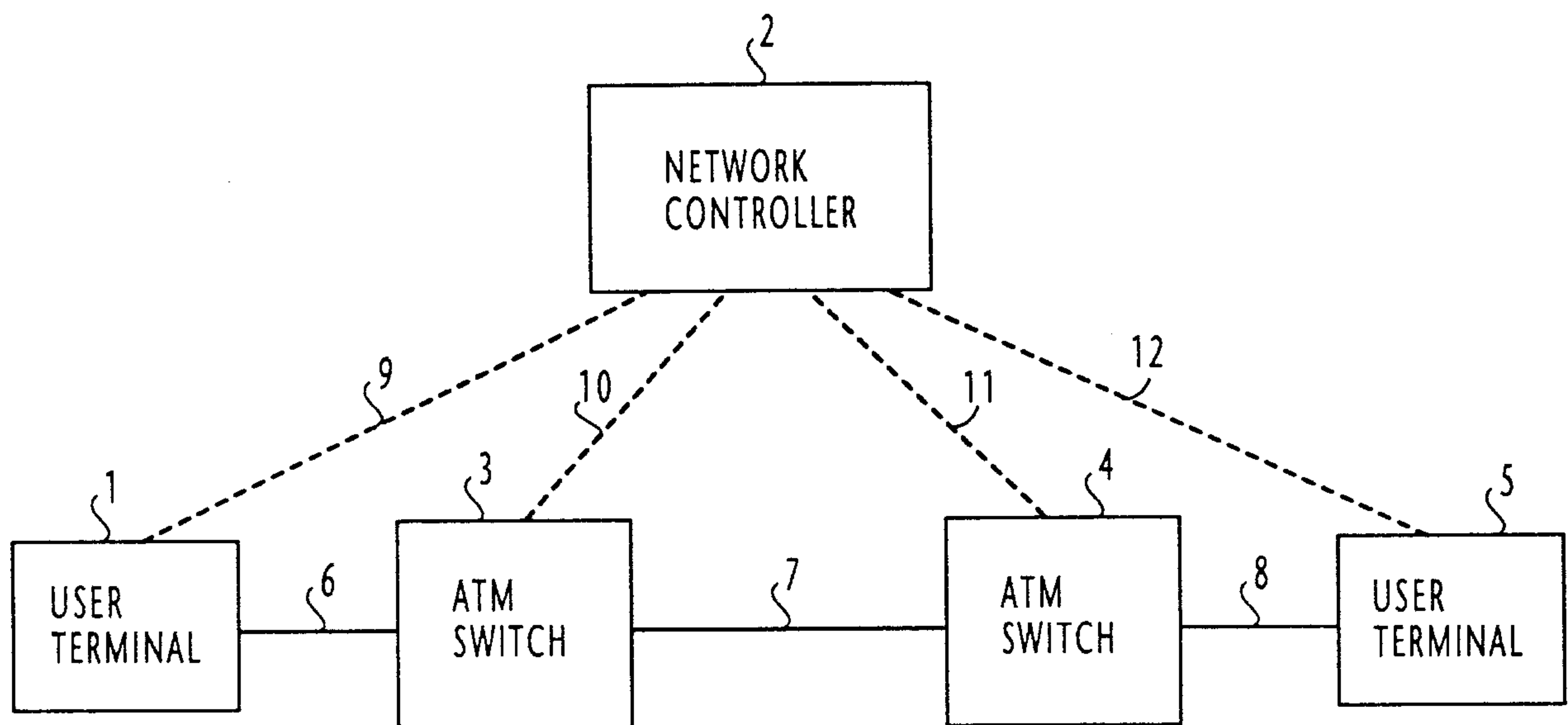


FIG. 2

NETWORK CONTROLLER 2

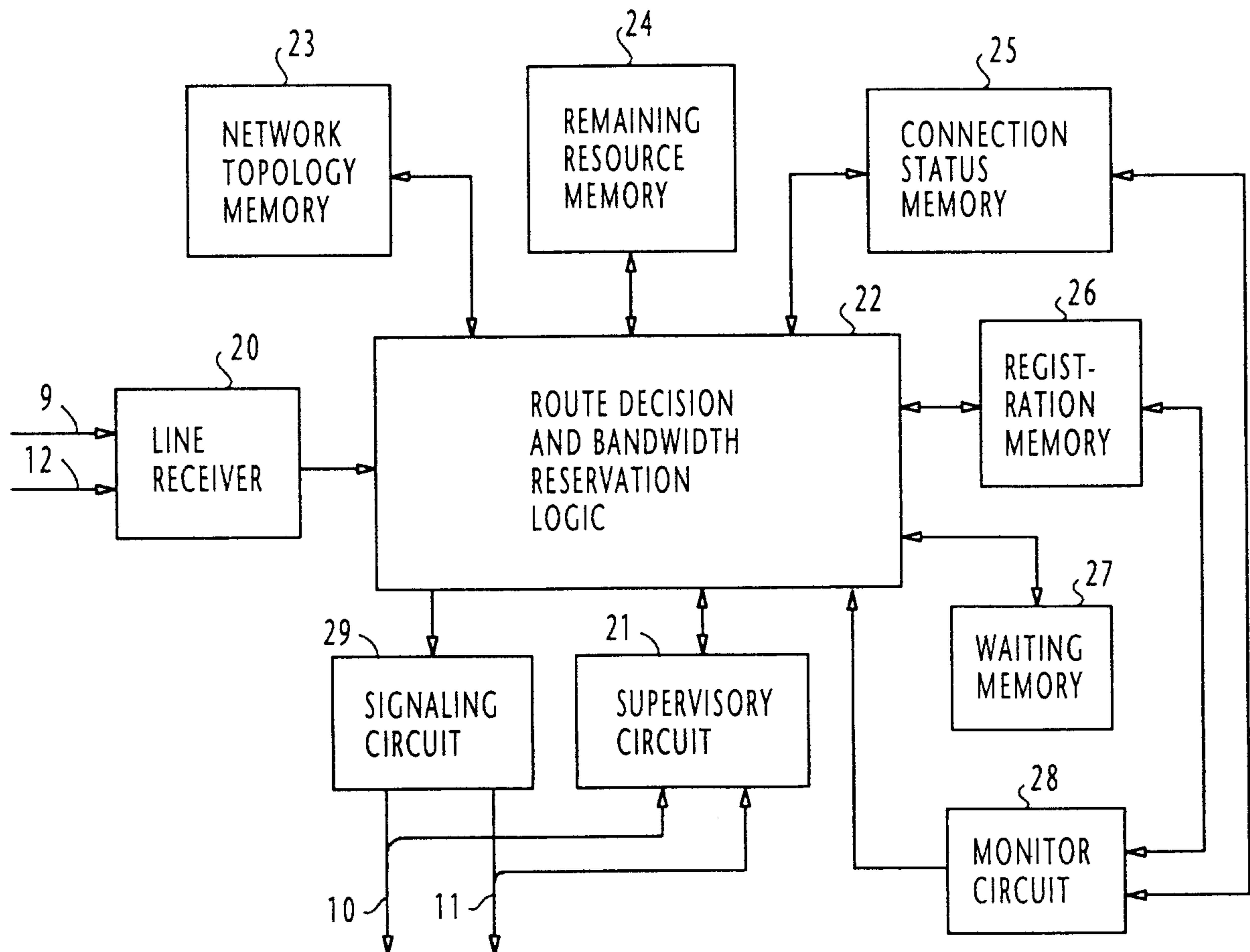


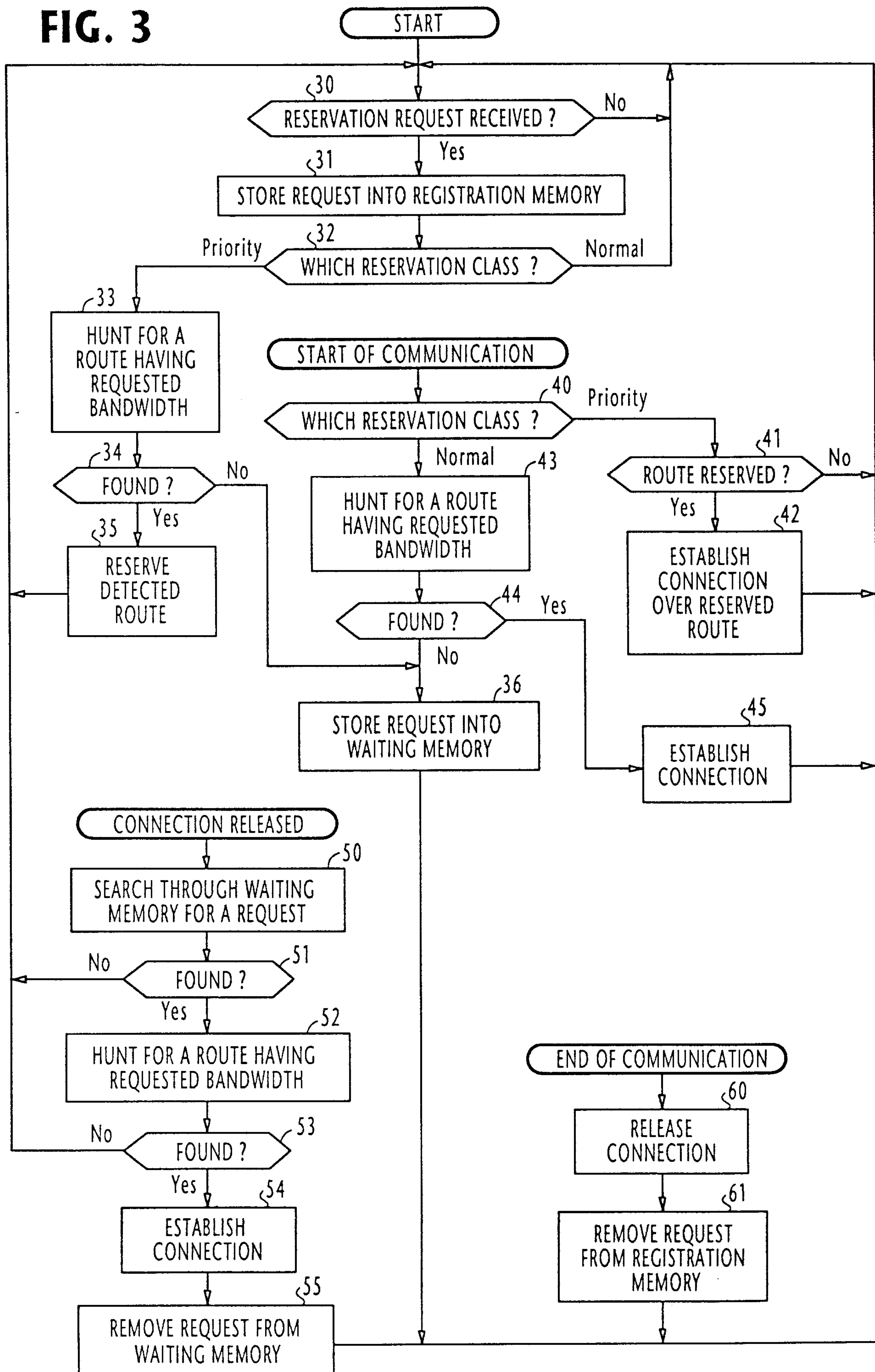
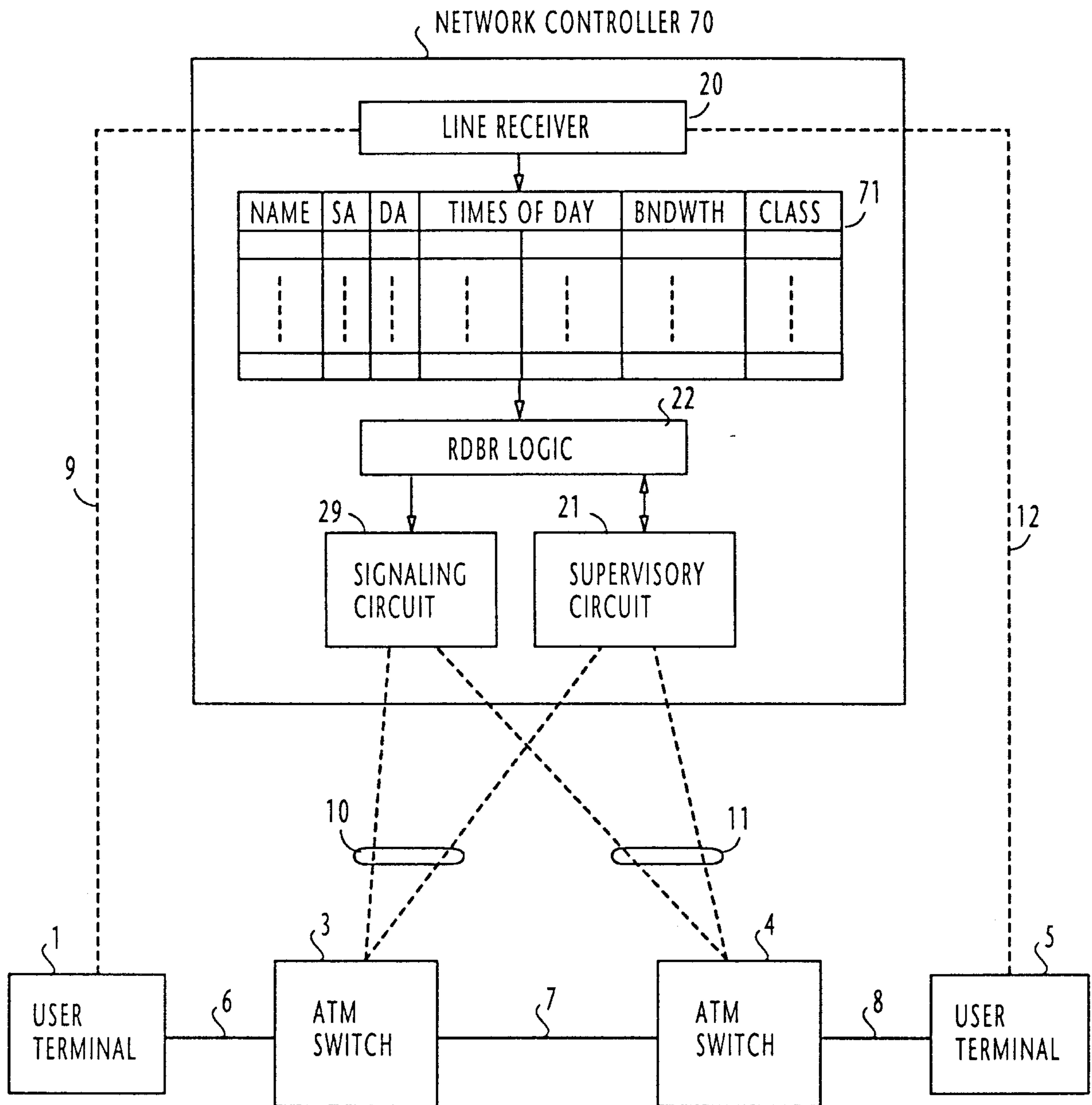
FIG. 3

FIG. 4**FIG. 5**