

# Interception service

DESCRIPTION



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**Abstract**

# 1

## GENERAL

Servicing incoming external calls is a most important activity in a company today. An order may be lost if a call is lost.

Most calls which do not receive a reply at the sought number are, at present, diverted to a Private Branch Exchange (PBX) operator who is often unable to provide any information other than there is no one answering at the number in question (which the caller already knows).

A system which provides assistance in keeping track of where people are, in diverting calls so that they are not lost, and in keeping track of messages to those sought is the key to increased efficiency in the office.

The Telecommunications administrations in most countries in the world have standardized an interface between the exchange and the interception computer, where the systems can exchange information and orders. The MX-ONE Service Node's interception computer facilities follow this standard. Consequently, all makes of interception computers which follow this standard can be connected to the exchange. The interface is described in the interworking description for INTERCEPTION SERVICE.

### 1.1

## GLOSSARY

For a complete list of abbreviations and glossary, refer to the *ACRONYMS, ABBREVIATIONS AND GLOSSARY*.

## 2 FACILITIES

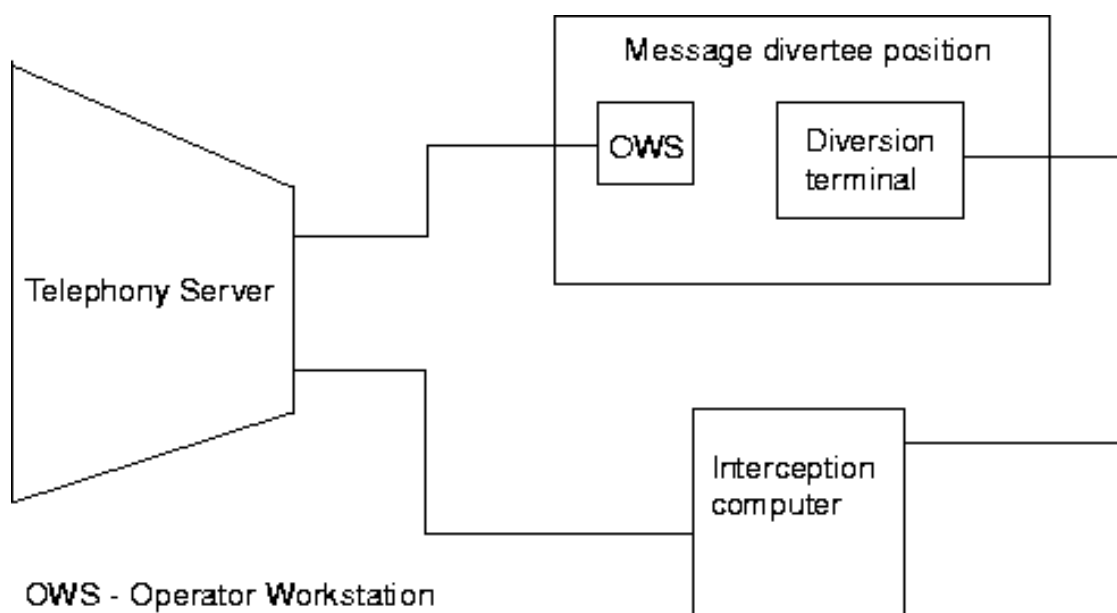
### 2.1 MESSAGE DIVERSION

The most important concept in this facility is message diversion, sometimes called interception diversion. This is a specialized form of diversion which means that the exchange, as far as possible, attempts to reach a divertee position which can provide information on the person sought.

### 2.2 DIVERTEE POSITION FOR MESSAGE DIVERSION

The divertee position which the system attempts to reach when diverting a message is, of course, a divertee position for message diversion or a message divertee position, as it is also sometimes called.

The message divertee position can consist of, for example, a PBX operator equipped with a Visual Display Unit (VDU) (terminal) connected to the interception computer. See on page 4.



**Figure 1: Divertee Position for Message Diversion**

As has been mentioned above, the divertee position can be a PBX operator, but it can also be a secretary or someone else in the company. The main point is that there is a diversion terminal from which:

- a) A search can be made in the telephone directory with a number of search keys.
- b) Message diversions can be updated (activated or deactivated).
- c) Messages to the sought person, and so on, can be entered.

## 2.3

## MESSAGE WAITING

Message waiting is an optional function that indicates it on the telephone when an extension receives a message in its mailbox in an information system.

There are numerous information systems available on the market, but they all have the same weakness: There is no efficient means of indicating to the mailbox owner that unread messages are waiting in the mailbox. The user must go through an enormous procedure to discover, perhaps, that the mailbox does not contain any unread messages. After a couple of attempts, the user gets fed up and the information system begins to cost more than it is worth.

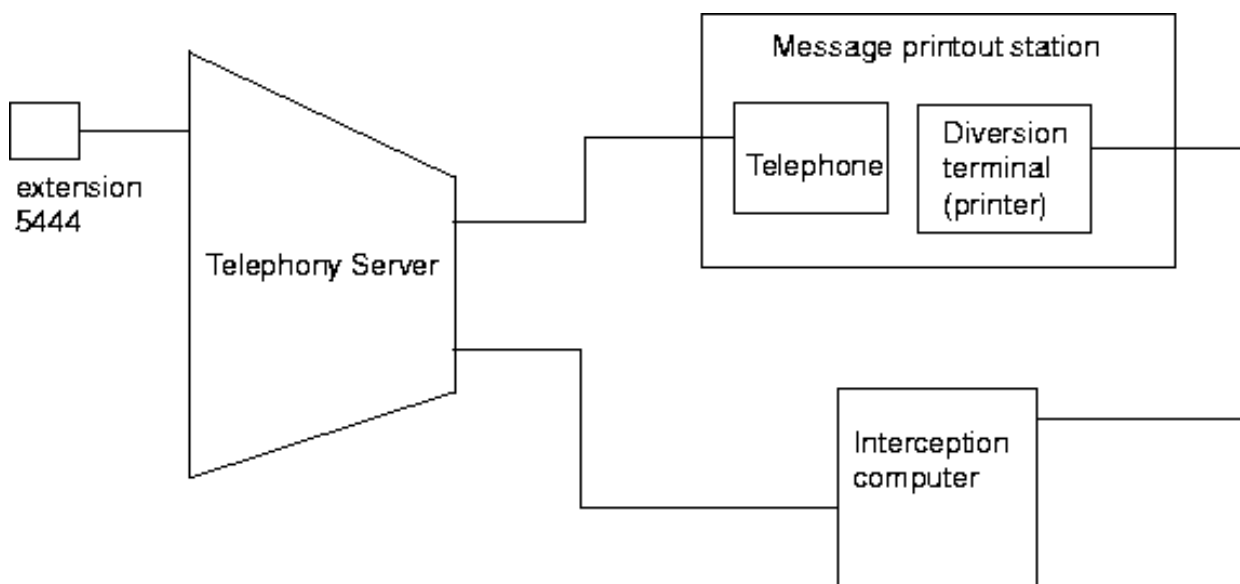
The message waiting function enables an indication to be given that the user has message(s) in an information system. Some examples of message waiting indications to announce the presence of messages are the following:

- a) The telephone bell produces plings at regular time intervals.
- b) A special dial tone is heard when using the telephone.
- c) A message waiting function key indicator flashes. This is applicable for IP telephones.
- d) A text message appears on the instrument display. This is applicable for digital telephones with an LCD display.

## 2.4

## MESSAGE PRINTOUT STATION

Not everyone in a company can have access to its own terminal which is connected to the interception computer merely to have its messages printed. Consequently, a service function which is called the message printout station is provided. This can consist of, for example, a mail-room from which mail is distributed. A printer connected to the interception computer can be installed in this mail-room. The mail-room also has, of course, a telephone set. With the aid of a special procedure on the telephone, a printout of all messages to a certain extension (specified in the procedure) can be requested on the printer in this message printout station. See on page 5.



**Figure 2: Message Printout Station**

If procedure \*FC\*5444# is selected at the message printout station, the exchange will order the interception computer to print all messages to extension 5444. FC is the feature code for printout of interception messages.

The message printout station cannot be a message diverttee position at the same time.

The extension procedure above can only be keyed from a message printout station.

## 2.5

### TERMINAL - TERMINAL NUMBER

A terminal can be either of the following:

- a) A VDU with a keyboard which is connected to the interception computer
- b) A printer which is connected to the interception computer

The terminal is addressed with the aid of a terminal number.

The terminal number is used from the exchange for a number of different functions, such as:

- c Addressing the correct terminal in the interception computer when ordering a presentation of the diversion information
- d A terminal number can be specified in the procedure for deactivating the message diversion function. If the user has received any messages during the time while the user was absent, these will be printed on the printer which has this terminal number.

## 2.6

### UPDATING

All active message diversions are stored both in the exchange and in the interception computer (in the exchange, so as to be able to divert the calls to the correct diverttee position and in the interception computer, so as to be able to present the correct information, and so on).

This means that there are two systems which store the same information, thus giving rise to a risk of differences between the systems. To deal with this problem, a facility for updating has been introduced. In this facility one of the systems (the interception computer) updates the other (the exchange). Thus, the interception computer is the controlling unit to decide which information is valid.

Message waiting status update can be done also. On updating, the information to be updated is first erased from the PBX. Updating can be initiated either from the PBX or the interception computer.

## 3

## EXTENSION PROCEDURES

### 3.1

### GENERAL

The following designations are used in this section:

<b>D</b>	Directory number for an extension (2-10 digits)
<b>X</b>	Terminal number, see 2.5 Terminal - Terminal Number on page 6, (2-10 digits)
<b>T</b>	Diversion cause (1 digit). This code receives its significance when the interception computer is programmed. Diversion cause 3 can, for example, mean that the user has gone to a conference.
<b>Y</b>	Expected return time (4 digits). This time can be in month, day (MMDD) or hour, minute (HHMM) format depending on which diversion cause has been specified in the procedure. In certain markets DDMM is used instead of MMDD. It is possible to set the format of this date, sent to the interception computer, by using an application system parameter.
<b>FC1</b>	Feature code for ordering/canceling message diversion from primary extension
<b>FC2</b>	Feature code for ordering/canceling message diversion from secondary extension
<b>FC3</b>	Feature code for follow-me
<b>FC4</b>	Feature code for printout of interception messages
<b>FC5</b>	Feature code for canceling message waiting
<b>FC6</b>	Feature code for general cancellation

### 3.2

### ORDERING MESSAGE DIVERSION

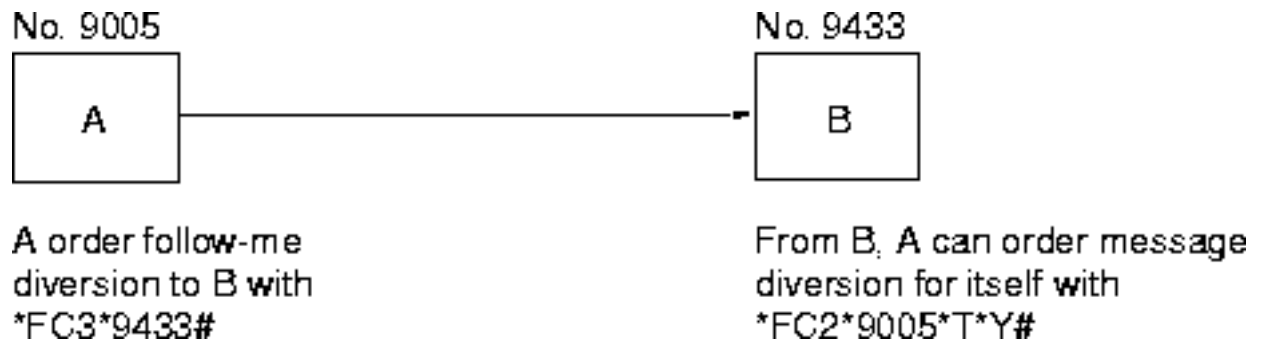
The user can choose two procedures for ordering the message diversion function, depending on whether a directory number must be specified for the activation to reply or not.

- a) **\*FC1\*T(\*Y)#**: ordering message diversion for the extension from which the procedure is dialed, with diversion cause T and possible return time Y
- b) **\*FC2\*D\*T(\*Y)#**: ordering message diversion for the extension whose number is specified in the procedure, with diversion cause T and possible return time Y

Extension number D can be specified in two cases:

- When the order refers to a secondary extension.

- When the order is made from the point to which the user has moved its telephone, see on page 8.



**Figure 3: Ordering Message Diversion**

Ordering the message diversion function does not cancel the follow-me function for A. If it has been decided to assign follow-me/direct diversion higher priority than message diversion, follow-me must be canceled with #FC3\*9005# for message diversion to be valid.

**Note:** The feature codes in the examples above are for illustration purpose only and can be different (market dependent parameters).

### 3.3

## CANCELING MESSAGE DIVERSION

The user can also choose the following two procedures for canceling the message diversion function, for the same reason as when ordering it:

- a) #FC1(\*X)#: canceling message diversion for the extension from which the procedure is dialed
- b) #FC2\*D(\*X)#: canceling message diversion for the extension whose number is specified in the procedure

These procedures include a facility for routing a printout of any messages which were written in the interception computer while the user was away to a certain terminal (printer). This is done by specifying the terminal number which is the identity of the printer/terminal. The terminal number must be initiated in the exchange.

If the terminal number is omitted, any messages which occur will be printed on a predetermined terminal (this is initiated at the same time as the interception computer function).

### 3.4

## PRINTING MESSAGES

An extension which is defined as a message printout station (see 2.4 Message Printout Station on page 5) has a facility for ordering, by means of a special procedure, a printout of the messages from the interception computer for an extension whose number is specified in the procedure.

The procedure is

\*FC4\*D#.

**Note:** D is the extension number for which the messages are to be printed.



### 3.5

## CANCELING THE MESSAGE WAITING INDICATION

If users find the message waiting indication disturbing or want to shut off the indication temporarily, they can do it by the following procedure:

#FC5#

This procedure terminates the indication for the primary extension and any secondary extensions which exist.

**Note:** No signaling is made to the information system or the interception computer which has requested the indication. This means that the next time the interception computer/information system executes updating, the indication will return until all the messages have been read.

### 3.6

## GENERAL CANCELLATION

The usual procedure for a general cancellation (#FC6#) also cancels the message diversion function. On the other hand, the message waiting indication is not canceled.

**Note:** Canceling the message diversion function entails a printout of any messages in the interception computer. That is, the interception computer can inform the exchange that the message waiting indication is to be removed for the extension - the messages are printed.

## 4

## MESSAGE DIVERSION

### 4.1

### GENERAL

Message diversion means that calls will be diverted to a message diversion position. If a call arrives at an extension with the message diversion function initiated, in the first instance, the call will be diverted to the extension's individual diverttee position.

However, a prerequisite for this is that the diverttee position must also be defined as a message diversion position, that is, it must have a diversion terminal.

If the diverttee position is impossible to reach (it is busy, diverted, or blocked in some way, and so on) or is not defined as a message diversion position, the call is reported to the common diverttee position for the exchange.

Three different common answer positions can be defined depending on the origin of the call: an internal call, a call from a private network, or a call from a public network. In this case, too, the prerequisite exists that it must be a message diversion position, free, not diverted, and so on.

If the conditions are still not met, the level of ambition is lowered, that is, an attempt is made to implement a direct diversion instead. That is, the busy signal may be received in this position.

The only exception is the case when any of the diverttee positions is a PBX operator group. In this case, it is impossible to refer to the call further on.

#### **Example:**

Mr. Brown has to attend a conference which will last until 16:00 o'clock. He then keys in procedure \*FC1\*3\*1600# on his telephone. Diversion cause 3 is defined as conference in the interception computer. Mr. Brown's individual message diversion position is the departmental secretariat. All day all the calls are diverted to the secretariat, which can provide information directly on when Mr. Brown is expected to return, can read messages sent to him and so on.

Now, it so happens that the secretary must go home at 15:00 o'clock. So, she also diverts her telephone (procedure \*FC1\*4#).

That is, everyone who tries to reach Mr. Brown from now on is diverted to the exchange's common message diversion position, in this case, the PBX operator group.

### 4.2

### MESSAGE DIVERSION COMBINED WITH OTHER DIVERSION FACILITIES

#### 4.2.1

#### GENERAL

Using a command, message diversion can be assigned to a higher or lower priority than the direct diversion and follow-me diversion. If lower priority applies, the user can choose if the calls are to be diverted to a message diversion position or to a diverttee position indicated by the user.

The diverttee position can be a follow-me position or the individual diverttee position if this does not have a diversion terminal.

If higher priority is applicable and message diversion has been ordered, direct diversion or follow-me (if any) will be ignored at the user position.

If the user wants to select an extension which does not have a diversion terminal as the diverttee position when lower priority applies for message diversion, the user can achieve it by ordering the activation of the message diversion function and the direct diversion/follow-me function at the same time. The diverttee position must, if for some reason it can no longer receive diverted calls, cancel the follow-me/diverted calls which arrive there. After this, the calls are routed to the message diversion position as usual.

#### 4.2.2

#### DIVERTED MESSAGE DIVERSION POSITIONS

If the message diversion position is diverted (that is, it has follow-me, direct diversion or message diversion functions active), the exchange attempts to continue to search for a message diversion position or diverttee position without a terminal according to the rules presented in 3 Extension Procedures on page 7.

## 5

# PRESENTATION OF MESSAGE DIVERSION INFORMATION

### 5.1

## GENERAL

Message diversion information consists of the following:

- a) Directory information, such as name, extension number, department, room number, and so on
- b) Message diversion, that is, the reason for the absence and return time which have been specified when ordering the message diversion function (\*FC1\*...#)
- c) Secondary diversion information, that is, the messages which are intended for the sought extension

If an extension rings directly to a message diversion position, the exchange orders the presentation of diversion information for this extension, that is, the message diversion position is informed of who is ringing.

On the other hand, if the call is diverted or rerouted to a message diversion position, the exchange orders the presentation of diversion information for the originally sought extension.

An additional information for message diverted extensions is the estimated date of return of the user. The person who is calling the diverted extension receives the reason for diversion and the date when the called extension will be able to answer the telephone.

The format of the date of return can be set to inform the caller correctly.

### 5.2

## PBX OPERATOR AS MESSAGE DIVERSION POSITION

Individual PBX operators and common PBX operator groups can be message diversion positions. In both cases, the individual PBX operators are defined as message diversion positions. If the PBX operator group is to handle message-diverted calls, it can be defined as a divertee position with commands *diversion* or *diversion\_common*, and the correct origin profile must be defined with commands.

At the same time as a call to the PBX operator is presented on the PBX operator console, the interception computer is ordered to present diversion information on the PBX operator's terminal.

When the call is disconnected or extended, the interception computer is ordered to delete the diversion information on the terminal.

There are a few cases in which it is not possible to present any diversion information. These are the following:

- a) Direct in-dialing from an external line (since a presentation of diversion information for the external line cannot be carried out)
- b) Recall to the PBX operator
- c) Recall pick-up of the parked party

## 5.3

### EXTENSION FOR MESSAGE DIVERSION POSITION

Unlike the PBX operator, the extension must first answer the call before the exchange can order the interception computer to present the diversion information on the extension's terminal.

When the extension concludes the call (by replacing the handset or transfer), the interception computer is ordered to delete the diversion information on the extension's terminal.

Here, too, there are a couple of cases in which the diversion information cannot be presented (compare to the list in 5.2 PBX Operator as Message Diversion Position on page 12):

- a) Direct in-dialing from external line
- b) When a recall, which has been ordered at the message diversion position, is executed.

## 5.4

### GROUP AS MESSAGE DIVERSION POSITION

Groups of extensions (internal group, hunting group or PBX, or line pick-up group) can be defined as message diversion positions. A prerequisite for this is that all members in the groups be also defined as message diversion positions.

That is, the group number can be used as an individual diversion number. The member who takes or receives the call also has diversion information presented on his diversion terminal.

## 6 MESSAGE WAITING

### 6.1 GENERAL

Message waiting is a function that indicates on the telephone when an extension receives a message in its mailbox in an information system.

An information system can be connected through the interception computer, if the interception computer can administer this, to provide the indication of message waiting.

This function can be selected for all extensions.

### 6.2 MESSAGE WAITING INDICATIONS

As mentioned in 2.3 Message Waiting on page 5, various message waiting indications can be used to announce that a user has received messages in the information system.

Full details on which telephones can receive which message waiting indications are described in the operational directions for *INFORMATION SYSTEMS*.

**Note:** If the procedure for canceling the message diversion function is used, the interception computer will interpret this as an order to print any messages which occur in the interception computer. These will be regarded as read and the message waiting indication can be removed (depending on how the interception computer is designed). That is, if the user removes the message diversion function by means of a procedure, messages in the interception computer may never be indicated (this also applies to the procedure for general cancellation).

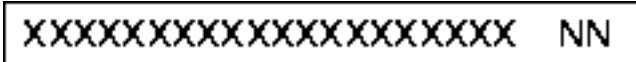
### 6.3 MESSAGE WAITING FUNCTION KEY

A telephone set with function key/indicator for message waiting will have access to several facilities, other than message waiting indication, as described below.

#### 6.3.1 TRAFFIC MODE

If the button is pressed when the digital system telephone is in the traffic mode (that is, not in the programming mode), the following functions can be obtained:

- (1) Presentation of text only on the display (see the figure below). This is the function which is obtained when nothing else is selected.



XXXXXXXXXXXXXXXXXXXX NN

DISPLAY

**Figure 4:**

XXXXX...X is selectable and is set per information system (so as to permit the use of some sort of code, making it possible to indicate which information system has requested notification).

NN states from how many message systems the extension has queue indications (notifications). NN is displayed for the first indication in the queue.

(2)

Calls to a number which is linked to the information system identities. For example, this can be a message printout station for the interception computer. In this case, the indication is removed from the queue.

(3)

Signal transmission to the interception computer which, for example, can entail a printout of all the messages for the extension in the information system. The indication is presented on the display in the same way as in (1) on page 14Case 1, above.

If the user presses the button again, the next notification in the queue will be processed. If the user presses the disconnection button, the display is deleted.

### 6.3.2

### PROGRAMMING MODE

If the telephone is in the programming mode when the message waiting button is pressed, the following happens:

The same text as in traffic mode (1) on page 14Case 1, (1) on page 14, appears on the display.

If the user presses the message waiting button again, the next indication in the queue is presented. NN is presented, however, only for the first indication.

The queue can be rotated as many times as the button is pressed. NN is presented each time the first notification is shown, indicating that the queue has been rotated one revolution.

The notification can be deleted by pressing the disconnection button and then pressing the message waiting button once again.

When programming is concluded by pressing the programming mode button or some other function button, the queue is updated so that the last displayed notification is placed first.

## 7

# UPDATING FROM INTERCEPTION COMPUTER

### 7.1

## GENERAL

Since two different systems (the interception computer and the exchange) store the same information, namely, message waiting information and message diversion information, there is a need to update one of the systems with information from the other so that no differences remain after, for example, a reloading or a temporary transmission error.

The interception computer updates the exchange and, thus, be the controlling unit to decide which information is valid.

When updating is carried out, both the message waiting information and the message diversion information are updated.

There are two types of updating:

- Periodic updating
- Updating with command

### 7.2

## PERIODIC UPDATING

Periodic updating means that the exchange requests updating at virtual midnight once per a 24-hour period. This time is set automatically, on PBX-start, at 01:30 o'clock.

### 7.3

## UPDATING WITH COMMAND

Updating can also be ordered by means of a command in the exchange, refer to the operational directions for *INFORMATION SYSTEMS*.

In some interception computers updating can also be ordered by means of a command.

In the following situations it may be justified to request updating by means of a command:

- a) After reloading of software for extension or message waiting function

**Note:** The reason for this is that these software units store information on message diversion and message waiting.

- b) After reloading the Line Interface Module (LIM)

- c) After reloading the entire exchange

- d) If the signal interface between the exchange and the interception computer has been faulty (alarm codes 281, 282, 298, 345 or 346)



## 8

# SIMULATED DIALING

A PBX operator who is defined as a message diversion position can, if the interception computer is equipped for this, request to have an extension number sent to the exchange for simulated dialing.

The MX-ONE Service Node will then process the digits exactly as if they had been dialed directly on the PBX operator's instrument set.

**Example:**

The PBX operator receives a diverted call to Brown in group Z. This, together with the information indicating that Mr. Brown is absent on a business trip, is presented on the diversion terminal. When the calling party receives this information from the PBX operator, the caller asks to speak to someone else in the same group. The PBX operator then searches through the interception computer's directory and finds that Mr. Green also works in this group. If the PBX operator requests simulated dialing on the diversion terminal in this position, the interception computer sends the number to the exchange and it appears on the PBX operator's instrument set as if the digits had been dialed manually. The call can, then, proceed as usual.

## 9 ADMINISTRATION

### 9.1 MESSAGE DIVERSION

There are no special categories for the message diversion facility. If the exchange is connected to an interception computer and the facility is initiated, the facility is permitted for all extensions which have diversion numbers. If there is a common diversion number, the facility is available for all extensions.

### 9.2 MESSAGE WAITING

If the message waiting facility is initiated, it is available for all extensions.

### 9.3 APPLICATION SYSTEM PARAMETERS

The type of notification of message waiting can be selected by an application system parameter.

The time interval between message waiting ring signals can be set with an application system parameter.

Whether extensions are allowed to dial interception service feature codes is determined by an application system parameter.

If the extension is message diverted and the user wants to show a date of return on the telephone display, the format of the date is determined by means of an application system parameter.

When an extension is message diverted, showing a date of return, it is possible to change the format of the date sent to the interception computer. Using an application system parameter (*PARNUM=231*), a date can be sent to the interception computer in European format (Day/Month) or in American format (Month/Day).

## 10 CONFIGURATION

### 10.1 MARKET DEPENDENT PARAMETERS

The following items are market dependent parameters (MDPs), for interception service facility:

- Message diversion suffix key
- Message diversion feature codes

## **11 CAPACITY**

### **11.1 INTERCEPTION COMPUTER**

A maximum of one interception computer can be connected to the MX-ONE Service Node, with one signal interface.

### **11.2 MESSAGE DIVERSION**

If there is a common message diversion position for the exchange, this facility is available for all extensions. Otherwise, it is available only for those who have an individual message diversion position. However, the function is reduced so much that unless there is a common message diversion position, it is not recommended.

### **11.3 MESSAGE DIVERSION POSITIONS**

A maximum of 100 message diversion positions, message printout stations, and groups (multiline and internal group hunting group that are message diversion positions) can be initiated.

## **12 HARDWARE**

The Interception Computer is connected to the MX-ONE Service Node with a LAN network cable.