

Call Diversion

DESCRIPTION



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GENERAL

This document describes the various types of **Diversion services** supported by the MX-ONE. Also described is administration of the diversion data, the user procedures, and the service capacity and limitations, and performance with respect to system faults.

See also Personal Number/Call List, which is an enhanced Diversion on no reply or Diversion on busy feature.

Diversion services make it possible for the user to have calls forwarded for various reasons, to an answering position. The Diversion services specified in this document are:

- direct diversion
- diversion on busy
- diversion on no reply
- follow me
- external follow me diversion
- message diversion

The network features direct diversion, diversion on busy, diversion on no reply, follow me and external follow me diversion are supported for:

- Homogeneous SIP tie-line networks supporting the RFC5806 for Diversion. Note that chaining counter information is not conveyed on the SIP tie-line.
- Homogeneous H.323 networks using user-to-user signaling for Diversion.
- Homogeneous H.323 networks using the Generic Functional Protocol for Call Diversion.
- Homogeneous ISDN QSIG networks using user-to-user signaling for Diversion.
- Homogeneous ISDN ISO QSIG networks using the Generic Functional Protocol for Call Diversion.
- Homogeneous DPNSS networks.
- Gateway scenarios H.323-trunk-ISDN if both use the same signaling option.
- Some gateway scenarios SIP-trunk-CCS-tie-line.

Direct diversion, diversion on busy and diversion on no reply can be executed depending on call origin if class-of-service category specifies so.

1.1

GLOSSARY

For a complete list of abbreviations and glossary, see the description for *ACRONYMS, ABBREVIATIONS AND GLOSSARY*.

2 FACILITIES

2.1 GENERAL OVERVIEW

2.1.1 DIVERSION TYPES

Four main types of diversion exist:

- Diversion
- Follow me
- External follow me diversion
- Message diversion

Diversion can be subdivided into

- direct diversion
- diversion on busy
- diversion on no reply

2.1.2 DIVERTEE POSITIONS

For voice calls the divertee position, i.e. the destination for diversion, can be as follows:

Internal diversion	The divertee position can be an extension, a hunt group, an ACD group, an individual PBX-operator or a PBX-operator group.
Network diversion	The divertee position can be an extension, a hunt group, an ACD group, an individual PBX-operator or a PBX-operator group in own PBX or in another PBX.
External follow me diversion	The divertee position can be an external public destination defined by procedure.

For some type of diversions there can be exceptions from the possible diverteas above. See respective diversion type for more information.

When initiating (I/O command) a diversion number, a check is made on the divertee position number to ensure that it is one of the numbers mentioned above.

Common PBX-operator number for direct in dialing calls is not allowed as divertee in a network, since the originator is seemed as internal in a network.

In order for the network service to work, a license check for Private Network Routing (PNR) must be approved.

2.1.3 ACTIVATION/DEACTIVATION

Diversion can be activated/deactivated for any type of extension either from the extension itself, from a PBX-operator or in some cases from another party. For generic extensions, diversion can also be activated/ cancelled using an I/O command.

A PBX-operator can request that recalls to an absent marked console shall be follow me diverted to another PBX-operator.

Interrogation, request to check which diversion destinations a particular user has activated, is not supported.

If the controlling party is an extension (except ISDN S0 terminal), the following diversion types are applicable:

- Diversion (direct diversion, diversion on no reply, diversion on busy)
- Follow me
- External follow me diversion
- Message diversion

Extensions can be the diverted-to position for these types of diversion:

- Diversion (direct diversion, diversion on no reply, diversion on busy)
- Follow me
- Message diversion

An ISDN S0 terminal can be the controlling party for these types of diversion:

- Diversion (direct diversion)
- Follow me
- External follow me diversion
- Message diversion

More details on the prerequisites and limitations are found under respective diversion type.

2.1.4

CATEGORY CHECKS OF DIVERTED CALLS

The traffic group classes of service can be checked for the calling and the diverttee position (I/O command controlled) for all diversions. Note that diversion on no reply has a separate category, changeable by I/O command, for this check.

At direct in dialing call and when the traffic group classes of service is checked (see above), there is, for all types of diversion, except diversion on no reply, a check at the diverttee position that direct in dialing is permitted (changeable by I/O command).

A clearing signal check is carried out for all diversions when the diverttee position is an extension, or hunt group.

2.1.5

DIVERSION TONE MESSAGES

A special dial tone is received as an acknowledgement for an activated diversion, follow me, message diversion or external follow me diversion. This tone is also received in the case of renewed calls from the diverted number as long as the diversion remains activated, if direct diversion, follow me/external follow me diversion or message diversion has been activated.

Note: Certain types or models of terminals may not be able to provide the special dial tone.

If the activation/deactivation is not successfully completed a rejection message is sent.

2.1.6 REPEATED DIVERSIONS

Repeated diversion is possible but limited by the traffic case and type of diversion encountered.

For Direct Diversion and Follow me internally, in a single system, the repeated diversion can allow more hops, but is limited by a counter.

For voice calls in a network, the repeated diversion can be limited by a counter (I/O command controlled), 2.12 Repeated diversion on page 24.

2.2 ADMINISTRATION

There are I/O commands to initiate, erase and print an extension, hunt group, or ACD group. These commands handle categories for all types of diversion except message diversion.

There are I/O commands to initiate, change and print the three common and customer diverttee positions.

There are I/O commands to initiate, change and print the individual diverttee position.

2.3 DIVERSION

2.3.1 GENERAL

The diverttee positions which can be used in connection with diversion are predetermined and constitute an individual diverttee position and up to three common/customer diverttee positions (common to the customer group or to the exchange).

There is a table which shows to which common/customer diverttee position a call is diverted with regard to the origin of the call and which of the common/customer diverttee positions are initiated in the exchange, see 14 Common/customer diversion on page 23

Direct diversion can be carried out to the individual diverttee position or, if no such position exists, to one of the common/customer diverttee positions. Diversion on busy or on no reply can only take place to the individual diverttee position.

The diverttee position for diversion is programmed by means of a command from an I/O unit.

2.3.2 DIRECT DIVERSION

Direct diversion, CFU version 1, can be used by all extension types, hunt group or ACD group.

2.3.2.1 *Activation/Deactivation*

Direct diversion to an individual diverttee position is permitted for extensions.

If the diverttee position is a common or customer diverttee position, activation is permitted, if there is a predetermined diverttee position and the controlling extension has a class of service for direct diversion. If the controlling position is a hunt group or an ACD group, no class of service check is performed.

The activation or deactivation of **internal** direct diversion is carried out with a procedure and can be executed from the controlling extension, the diverttee position or a PBX-operator. The diverttee position is not verified.

The activation or deactivation of **network** direct diversion is carried out with a procedure and can be executed from the controlling extension or from a PBX-operator. The diverttee position is not verified.

When activation/deactivation of direct diversion is initiated from one of the three common or customer diverttee positions the common or customer diverttee position for internal calls is used. If this is not initiated, the procedure can be performed at the common or customer diverttee position for calls within private networks. If this is not initiated either the procedure can be performed at the common or customer diverttee position for calls from the public network.

Activation of an **internal** direct diversion for a hunt group can be executed through a procedure from a PBX-operator or a member of the group.

Activation of an **internal** direct diversion for an ACD group can be executed through a procedure from a PBX-operator.

Deactivation of an **internal** direct diversion for a hunt group can be executed through a procedure from the diverttee position, a PBX-operator or a member of the group.

Deactivation of an **internal** direct diversion for an ACD group can be executed through a procedure from the diverttee position or a PBX-operator.

Activation/deactivation of a **network** direct diversion for a hunt group can be executed through a procedure from a PBX-operator or a member of the group.

Activation/deactivation of a **network** direct diversion for an ACD group can be executed through a procedure from a PBX-operator.

If the procedure cannot be executed due to class of service barred, a rejection message is sent.

Table 1 Direct Diversion

The user procedures are as follows	
Activation from controlling position	*FC#
Activation from a PBX-operator	*FC*D1#
Activation from diverttee position	*FC*D1*D2#
Deactivation from controlling position	#FC#
Deactivation from diverttee position or PBX-operator	#FC*D1#

where FC is the service code for direct diversion, D1 is the directory number of the extension, hunt group, ACD group and D2 is the diverttee position.

2.3.2.2

Execution of direct diversion

All new calls to an extension, hunt group and ACD group which has the direct diversion function activated are diverted to the diverttee position. Standard call origin message is sent to the calling party.

For network calls to a party with the diverttee in the same PBX the call is treated as above, and the identity of the diverttee is returned to the originating party, to be displayed.

In the case where the diverttee position is in another PBX, the diversion case and the identity of the diverttee are sent back to the originating PBX. From the originating PBX the original connection is released and the diverted call is set up. As above, the origi-

minating party is informed of the diverttee's identity. In the terminating (first called) PBX a time out (10 sec.) is started to supervise the release message from the originating PBX. On expiry of time out the connection will be released from terminating PBX.

If the originating PBX doesn't support the network diversion feature (e.g. ISDN in a PBX not supporting network diversion), no diversion information is sent back to the originating PBX and if the diverttee position is in another PBX, a new call is set up from the first PBX, seen from the originating PBX, supporting network diversion.

If direct diversion cannot be executed due to internal barring, nominated position is "vacant" or class of service barred, a rejection message is sent. The calling party will not keep any diversion information on a display.

If the diverttee position is a generic extension and direct diversion has been successfully executed, if the terminal becomes not available' while ringing then the calling party receives 'NOT AVAILABLE'. The actual message is dependent on the originator type.

For more information on where the diverted call is routed with respect to the different states of the diverttee position, 15 Internal Diversion followed by internal Diversion on page 25.

2.3.3

DIVERSION ON NO REPLY

Diversion on no reply, CFNR, can be used by all voice extensions, except ISDN S0 terminal. To be able to use diversion on no reply, the extension must have been assigned a unique class of service.

See also the description for Personal Number/Call List, which provides a similar but more advanced and flexible function, which can be an alternative to diversion on no reply.

2.3.3.1

Activation/Deactivation

Activation/deactivation of **internal** diversion on no reply can be carried out from the controlling extension or from a PBX-operator.

Activation/deactivation of **network** diversion on no reply can be carried out from the controlling extension or from a PBX-operator in the same PBX as the controlling extension.

Activation is permitted if there is a predetermined individual diverttee position and if the controlling extension has a class of service for diversion on no reply.

If the procedure cannot be executed due to class of service barred, a NO PROGRESS message is sent.

Table 2 Diversion on no reply

The user procedures are as follows	
Activation from controlling position	*FC#
Activation from a PBX-operator	*FC*D1#
Deactivation from controlling position	#FC#
Deactivation from PBX-operator	#FC*D1#

where FC is the service code for diversion on no reply and D1 is the directory number of the extension.

When programming an individual divertee position, activation automatically takes place if the extension has a class of service for diversion on no reply (I/O command controlled).

When programming the class of service of the extension for diversion on no reply, activation automatically takes place if there is a predetermined individual divertee position (the same I/O parameter as above).

2.3.3.2

Execution of diversion on no reply

Incoming new calls to an extension are diverted on no reply if the sought party has the facility activated and does not answer within a predetermined time and if the divertee position is free (or if it is a hunt group, if queuing is possible). This predetermined time is initially **long time** for the first unanswered call and **short time** for all calls thereafter. When the extension has been used the time is reset to **long time**. The times can be changed by I/O-command.

For internal diversion, where the controlling extension is a non-generic one, a specific time, 2 sec. (I/O command controlled), before the call is forwarded to the diversion position a **connection click** can be sent to the calling party (I/O command controlled).

For network diversion a **connection click** can only be sent to the calling party if the called (diverted) party is a non-generic extension, located in the same PBX as calling party.

Standard call origin message is sent to the calling party.

For internal diversion, where controlling extension is a non-generic one, the call can also be signaled at the origin position when calling the diverted-to position (I/O command controlled) except when the diverted-to party is a remote extension. If both the positions are signaled, whichever position answers first receives the speech connection.

In case of diversion on no reply to an ACD group with no free members then, diversion will be rejected. Diversion on no reply to an ACD group should have at least one member free.

If diversion on no reply cannot be executed due to barring, the diversion is ignored.

If the divertee position is a generic extension and diversion on no reply has been successfully executed, if the terminal becomes **not available** while ringing, there are two possible situations:

- When only the divertee party is ringing, the calling party receives a **not available** message. The actual message is dependent on the originator type.
- When both the diverted and divertee party are ringing, then the diverted party keeps on ringing.

For more information on where the call is diverted with respect to the different states of the divertee position, 15 Internal Diversion followed by internal Diversion on page 25.

In the case where the divertee position is in another PBX, the diverted call is set up from the originating PBX. The originating party is informed of the divertee's identity.

For network the called party is not released until ringing has started at the divertee. If the new attempt to set up a call is rejected, the original connection (called party) is not released (it is kept in ringing state). It will never ring at both parties at the same time if the diverted party and the divertee are in different PBX. If the first called party answers the call before the ringing has started at the new nominated position, the call set up to this new nominated party is released and the first call is put into speech state.

For network calls to a party with the diverttee in the same PBX the call is treated as internal diversion, and the identity of the diverttee is returned to the originating party, to be displayed.

If the originating PBX doesn't support the network diversion feature (e.g. ISDN in a PBX not supporting network diversion), no diversion information is sent back to the originating PBX and if the diverttee position is in another PBX, a new call is set up from the first PBX, seen from the originating PBX, supporting network diversion.

2.3.3.3

Supervision of ringing at the diverted party

If diversion on no reply is executed in a situation where the diverttee position is an extension or a hunt group number, then the function for time supervision of call state will remain activated. If no answer is received from the first called party or the diverttee position within 2 minutes (I/O command controlled), the call will be disconnected and a rejection message will be sent to the calling party.

In case of diversion on no reply to a PBX group or ACD group with free members then, ringing is provided at the diverttee position and releases the path with the diverted party.

If diversion on no reply is executed in a situation where the diverttee position is a PBX-operator, then the function for time supervision of queue state will start from zero. If no answer is received from the first called party or the diverttee position, within 30 minutes (I/O command controlled), the call will be disconnected and a rejection message will be sent to the calling party.

2.3.4

DIVERSION ON BUSY

Diversion on busy, CFB, can be used by all extensions, except ISDN S0 terminals. To be able to use diversion on busy the extension must have been assigned a unique class of service.

See also the description for Personal Number/Call List, which (with busy option) provides a similar but more advanced and flexible function, which can be an alternative to diversion on busy.

2.3.4.1

Activation/Deactivation

Activation/deactivation of **internal** diversion on busy can be executed from the controlling extension or from a PBX-operator.

Activation/deactivation of **network** diversion on busy can be executed from the controlling extension or from a PBX-operator in the same PBX as the controlling extension.

Activation is permitted if there is a predetermined individual diverttee position and the controlling extension has a class of service for diversion on busy.

If the procedure cannot be executed due to class of service barred, a rejection message is sent.

Table 3 Diversion on no busy

The user procedures are as follows	
Activation from controlling position	*FC#
Activation from a PBX-operator	*FC*D#
Deactivation from controlling position	#FC#

Deactivation from PBX-operator	#FC*D#
--------------------------------	--------

where FC is the service code for diversion on busy and D is the directory number of the extension.

When programming an individual diverttee position, activation automatically takes place if the extension has a class of service for diversion on busy (I/O command controlled).

When programming the class of service of the extension for diversion on busy, activation automatically takes place if there is a predetermined individual diverttee position (the same I/O parameter as above).

2.3.4.2

Execution of diversion on busy

Incoming calls to a sought busy extension are diverted if the facility is activated and if the diverttee position is free.

For network calls to a party with the diverttee in the same PBX the call is treated as if it is an internal diversion, and the identity of the diverttee is returned to the originating party, to be displayed.

In the case where the diverttee position is in another PBX, the diversion case and the identity of the diverttee is sent back to the originating PBX.

When set up from the originating PBX the original connection is released and the diverted call is set up. As above, the originating party is informed of the diverttee's identity. In the terminating (first called) PBX a timer (10s) is started to supervise the release message from the originating PBX. On expiry of the timer the connection will be released from terminating PBX.

If the originating PBX doesn't support the network diversion feature (e.g. ISDN in a PBX not supporting network diversion), no diversion information is sent back to the originating PBX and if the diverttee position is in another PBX, a new call is set up from the first PBX, seen from the originating PBX, supporting network diversion.

If the diverttee position is a generic extension and diversion on busy has been successfully executed, if the terminal becomes not available while ringing, calling party receives a **not available** message. The actual message is dependent on the originator type.

For more information on where the call is diverted with respect to the different states of the diverttee position, 15 Internal Diversion followed by internal Diversion on page 25

2.3.5

CONDITIONAL FOLLOW ME FOR HUNT GROUP

In addition to direct diversion and follow me there are cases when calls to a hunt group are diverted to a specified answering position:

- the call cannot be queued
- there are no members available to answer the call

The hunt group must be categorized for one or both of the diversion cases. Diversion is activated by assigning the hunt group an individual diversion number, and deactivated by removing the individual diversion number. The diversion can only be done to an internal number.

In addition a second diversion number can be set by procedure, in which case it overrides the diversion number set by command. This diversion number can be removed by procedure, the one set by command then becomes active.

An extension with a unique class of service, a PBX-operator and a member of the group can order this second diversion number.

If the procedure cannot be executed due to class of service barred, a rejection message is sent.

The divertee position can only be an internal number (not any number in a private network).

Table 4 Follow-me for hunt group

Setting the diversion number	*FC*D1*D2##
Removing the diversion number	#FC*D1#

where FC is the service code for setting/removing the diversion number, D1 is the hunt group number and D2 is the diversion number.

2.4 FOLLOW ME

2.4.1 GENERAL

Follow me, CFU version 2, can be used by extensions, hunt group or ACD group. The user must have been assigned a unique class of service to be able to use follow me. The follow me feature can be used **internally** and in **network**.

2.4.2 ACTIVATION/DEACTIVATION

For all voice extensions the follow me feature can be activated by procedure from the origin position or from a PBX-operator.

Furthermore, a follow me, which has already been initiated, can by means of a procedure from the nominated answer position be moved to a new specified follow me position, and a procedure can be used from an arbitrary position to move the follow me to this arbitrary position. The new nominated answer position is verified.

If the follow me is activated from an arbitrary position and if this position is, at the same time, a diversion position for the diverted position, the requested follow me is activated and direct diversion is also activated. In this case the follow me is regarded as the last one to have been ordered and therefore has priority above an activated direct diversion.

A follow me can be deactivated from the controlling extension, from the divertee position or from a PBX-operator. A follow me for a hunt group can be deactivated from the divertee position, a PBX-operator or a member of the group.

For hunt group the follow me function can be activated from a PBX-operator or a member of the group. The nominated answer position is verified.

Activation of follow me is permitted if the controlling extension has a class of service for follow me and if the specified divertee position is valid.

If the procedure cannot be executed due to class of service barred, a rejection message is sent.

Table 5 Follow-me

The user procedures are as follows	
Activation from controlling position	*FC*D2#
Activation from divertee position or PBX-operator	*FC*D1*D2#
Deactivation from controlling position	#FC#

Deactivation from divertee position or PBX-operator	#FC*D1#
---	---------

where FC is the service code for follow me and D1 is the directory number of the controlling position and D2 is the directory number of the divertee.

2.4.3

EXECUTION OF FOLLOW ME

All incoming new calls to the diverted/controlling position are diverted to the divertee position. A call origin message is sent to the calling party.

For network calls to a party with the divertee in the same PBX as the diverted party the call is treated as above, and the identity of the divertee is returned to the originating party, to be displayed.

In the case where the divertee position is in another PBX than the diverted party, the diversion case and the identity of the divertee are sent back to the originating PBX.

When set up from the originating PBX the original connection is released and the diverted call is set up. As above the originating party is informed of the divertee's identity. In the terminating (first called) PBX a time supervision (10s) is started to supervise the release message from the originating PBX. On expiry of the timer the connection will be released from terminating PBX.

If the originating PBX doesn't support the network diversion feature (e.g. ISDN in a PBX not supporting network diversion), no diversion information is sent back to the originating PBX and if the divertee position is in another PBX, a new call is set up from the first PBX, seen from the originating PBX, supporting network diversion.

If follow me cannot be executed due to internal barring, nominated position is **vacant** or class of service barred, a NO PROGRESS message is sent.

If the divertee position is a generic extension and follow me has been successfully executed, if the terminal becomes 'not available' while ringing, the calling party receives 'NOT AVAILABLE'. The actual message is dependent on the originator type.

For more information on where the diverted call is routed with respect to the different states of the divertee position, 15 Internal Diversion followed by internal Diversion on page 25.

2.5

DIVERSION OF RECALLS TO PBX-OPERATOR

A PBX-operator can request that recalls to an absent marked console shall be diverted to another PBX-operator.

Table 6 Diversion for PBX Operator

The user procedure is	*FC*D2#
-----------------------	---------

where FC is the service code for follow me and

D2 is the directory number of another PBX-operator.

A check is done that D2 is a directory number for an individual PBX-operator.

The following types of recall are forwarded:

- no reply at extending to busy/free
- no reply at call announcing to busy
- terminated serial call.

2.6

EXTERNAL FOLLOW ME DIVERSION

2.6.1

GENERAL

External follow me, CFU version 3, enables a voice extension, a hunt group or an ACD group to have incoming calls diverted to an answering position outside the system. External follow me to a destination within a private network with net service available, is not allowed.

External follow me is a subset of follow me, and therefore, both cannot be active simultaneously. The last activated will cancel the previous.

2.6.2

ACTIVATION/DEACTIVATION

External follow me can be activated or deactivated from the user's own telephone, or from a PBX-operator in the same PBX.

External follow me for a hunt group number can also be activated or deactivated from a member of the group.

A specific COS controls the user's possibility to invoke external follow me. The procedures for common and individual authorization codes are allowed to be used before the procedure for ECF to get another COS. A PBX-operator is always allowed to invoke external follow me for an extension independent of the COS of the extension.

Activation of external follow me is done in two parts:

The first step is to activate external follow me using a procedure. The procedure is acknowledged by a register message.

The external destination is then given by dialing the complete external number. There is no restriction on how the external number is dialed, i.e. using IADs, account code etc. The # character is dialed to signify the end of the external number.

Table 7 External Follow-me activation

External follow me is activated using:	*FC(*D1)#
	---D2*#

where FC is the service code for external follow me and D1 is the directory number for the external follow me user, used when external follow me is programmed from PBX-operator and D2* is a complete external, public, number. The destination for the external follow-me. --- indicates dial tone.

The activation is acknowledged with a specific progress message, which is different for extension and PBX operator.

If the number is not within the number plan of the private network, the validation will fail and the activation will be rejected.

Note: It is possible to activate external follow me to a vacant number.

Table 8 External Follow-me deactivation

External follow me is deactivated using:	#FC(*D1)#
--	-----------

where FC is the service code for external follow me and D1 is the directory number for the external follow me diverted user, used when programmed from PBX-operator.

This is acknowledged with a progress message when the deactivating party is an extension (register message), or when it is a PBX-operator (noprogess message).

2.6.3

EXECUTION OF EXTERNAL FOLLOW ME

All calls to an extension that has external follow me activated will be forwarded to the external destination. At seizure of the external line a special tone message is given.

If an extension already has an external follow me diverted call in progress, the incoming call will not be external follow me diverted. A DID call is for example rerouted if the route COS so specifies. If rerouting takes place to a PBX-operator, then the PBX-operator is informed about the external follow me diverted extension's state.

2.6.3.1

Tones and messages sent to the calling party

A number of messages are sent to the calling party to indicate the progress of the call.

- As soon as it has been discovered that this is an external follow me diverted call, a register message is sent.
- If the call cannot be diverted as there is already an external follow me diverted call in progress, a rejection message is sent.
- When an outgoing trunk has been seized, the above register message is changed to an external line connected message.
- If there are no free trunks a rejection message is sent.
- Calling party will receive display information, also in network, that external follow me has been executed.

2.6.3.2

Tones and messages sent to the called party

For ECF (and for Repeated Individual Distribution), the A-number and type of number (TON) sent to the public destination, can be selected in the additional destination category.

The A-number is a selection of:

- Send the diverted extension number as A-number
- Send received A-number

The type of number is a selection of:

- Send the TON programmed for the destination
- Send received TON (Only allowed if send received A-number is selected)

If no public number and TON is received for the originating party, in the ECF node, the A-number and TON for the served user is sent to the public destination, independent on selection made in the additional destination category.

2.6.3.3

Call set-up

As all checks with respect to CAD, LCR, etc., have been done at activation of external follow me, all checks are bypassed at call set-up.

If an attempt is made to set up an external follow me diverted call between two trunks, the clear down characteristics of the involved routes are checked. If none of the routes have any clear signal, a rejection message is sent to the calling party and the call is released down.

2.7

MESSAGE DIVERSION

The divertee positions which can be used for message diversion are predetermined and consist of up to four divertee positions (common to the exchange or to the customer) and/or an individual divertee position.

The divertee position for message diversion is programmed from an I/O unit. Hereinafter this divertee position is called the message diversion position.

The following can be selected as message diversion position for the interception computer: hunt group, common bell group, individual PBX-operator or PBX-operator group.

The following can be selected as voice message system diversion position: analog extension, hunt group, common bell group, or ACD group.

Message diversion can be used by voice extensions only.

2.7.1

ACTIVATION/DEACTIVATION

Message diversion can be activated/deactivated from any voice extension for itself, but also from the divertee position, and from a PBX operator in the same PBX as the controlling extension.

The following is applicable for the interception computer:

- The message diversion function is activated either from the exchange itself with a procedure or from the connected interception computer.
- The function can be deactivated from the exchange or from the connected interception computer.

Deactivation and activation of message diversion cannot be done by the connected voice message system.

Table 9 Message diversion

The user procedures are as follows	
Activation from controlling position	*FC*H*Y# or *FC*H#
Activation from controlling position (for secondary number)	*FC*D1*H*Y# or *FC*D1*H#
Activation from divertee position or PBX-operator	#FC# or *FC*D1*H#
Deactivation from controlling position	#FC*X# or #FC*D1#
Deactivation from divertee position or PBX-operator	#FC*D1*X or *FC*D1#

where FC is the service code for message diversion and D1 is the directory number of the controlling position and H is reason for diversion X is a terminal identity Y is the date or time, 4 digits.

2.7.2

EXECUTION OF MESSAGE DIVERSION

All new calls to an extension which has ordered the message diversion function are forwarded to the message diversion position of the extension.

When the message diversion function is activated for an extension and a call arrives at the extension, a check is first made to see if the common/customer diversion position of that extension is a message diversion position. If so, and if the message diversion position is free, and if it has not activated by any type of diversion or do-not-disturb, or is logged-off, the call is diverted with regard to the **origin** of the call to the relevant **common/customer diversion position**.

If the common/customer diversion position is not available for the same reasons as those mentioned above, or if common/customer diversion position is not defined, a direct diversion is made to the individual diversion position (if defined).

If the individual diversion position is not a message diversion position, e.g. a number outside the own exchange or an analog extension, is not free or has any kind of diversion or do-not-disturb activated, or is logged off, the diversion cannot be executed, and the call will be disconnected with a rejection message.

If the individual diversion position is a PBX-operator group and not a message diversion position, the call cannot proceed, and will be disconnected with a rejection message.

If message diversion cannot be executed due to internal barring or class of service barred, a rejection message is sent.

2.8

MULTI DIRECTORY DIVERSION

2.8.1

GENERAL

Multi Directory Diversion/DND facility enables DTS users to activate/deactivate diversion (or DND) easily without doing the procedure for each ADN on the instrument. A class of service, affiliated to the ODN, controls if the DTS has 'Multi Directory Diversion' facility or not.

Multi Directory Diversion/DND facility enables SIP extension users to activate/deactivate diversion (or DND) easily without doing the procedure for each EDN on the instrument. A class of service, affiliated to the ODN, controls if the SIP extension (Mitel 6700 models) has 'Multi Directory Diversion' facility or not.

When follow me, direct diversion or message diversion is activated/deactivated for an ODN which has Multi Directory Diversion/DND class of service, the diversion is also activated/deactivated for the ADNs affiliated to the DTS. For all EDNs affiliated to the SIP extension, DND is activated.

2.8.2

ACTIVATION/DEACTIVATION

The activation/cancellation of diversion (or DND) for an ODN can be ordered from the extension itself, from a PABX-operator or in some cases from another party. Details about these procedures are found in the chapters 'Diversion', 'Follow me', 'External follow me diversion' and 'Message diversion'.

The ADNs of digital extensions are not affected when the ODN activates/deactivates diversion on busy, diversion on no reply, external follow me or diversion to paging.

The EDNs of SIP extensions are not affected when the ODN activates/deactivates Personal Number/Call List or diversion to paging.

2.8.3 EXECUTION OF MULTI DIRECTORY DIVERSION

2.8.3.1 *Follow me*

When internal or network follow me is activated for the ODN, the ADNs belonging to that DTS are diverted to the same answering position. After that, if the follow me of the ODN is moved to a new specified answer position, the follow me of the ADNs are also moved to the same new answering position.

When internal or network follow me is activated for the ODN of a SIP extension (Mitel 6700), the EDNs belonging to that SIP extension will get DND activated, and can be re-directed to the same answering position if Personal Number list (with DND option) is initiated. After that, if the re-direction of the ODN is changed to a new specified answer position, the re-directions of the EDNs are also changed to the same new answering position.

When an ODN activates follow me to itself, the ADNs/EDNs will be diverted to the ODN number.

Alternatively, if an MDP is set so, the re-directions could address the individual ADN's/EDN's answering positions, instead of the ODN's answering position.

2.8.3.2 *Message Diversion*

When message diversion is activated/deactivated for the ODN of a SIP extension (Mitel 6900/6800/6700), DND is activated/deactivated for the EDNs belonging to that SIP extension.

When message diversion is activated/deactivated for the ODN, message diversion is activated/deactivated for the ADNs belonging to that DTS.

When a new call comes to a user with MDD, the call is diverted to the individual diverttee position of the ODN/ADN/EDN, if it exists. Otherwise it is diverted to the common diverttee position for DTS, or according to the Personal Number/Call list for the SIP extension.

2.8.3.3 *Direct Diversion*

When internal or network direct diversion is activated/deactivated for the SIP extension's ODN, direct diversion is activated/deactivated for the EDNs belonging to that SIP extension.

When internal or network direct diversion is activated/deactivated for the DTS's ODN, direct diversion is activated/deactivated for the ADNs belonging to that DTS.

2.9 DIVERSION ON ORIGIN

2.9.1 GENERAL

This Diversion on origin feature enables voice extensions to have their calls diverted to different answering positions depending on the call origin, i.e. calling party's type, by setting appropriate class-of-service categories. Three different types of call origin, and four different diversion options for each extension, are used to select diverttee number, or to avoid diversion.

Follow me, external follow me and message diversion are not affected by this feature.

User procedures and diversion priorities are not affected.

2.9.2 DIVERSION CHOICES

Each voice extension can be allowed or denied this feature by a class-of-service category.

Three types of call origin are defined: internal party (PBX-operators and extensions), public trunks and private lines (tie lines). For each calling party's type, a class-of-service category specifies the diversion option to be selected.

Options of diversion on origin are defined as follows:

- 0 The default option is when selecting divertee position depending to the normal rules in this document without diversion on origin.
- 1 The first option is to divert calls to a divertee number defined by **individual divertee position**.
- 2 The second option is to divert calls to **common/customer diversion positions**, which will in addition choose the proper answering position for the calls from internal party (PBX-operator and extension), public trunk or private line.
- 3 The third option is that **no diversion** shall take place, i.e. calls will bypass diversion and terminate at called party.

2.9.3 DISPLAY CONSIDERATIONS

2.9.3.1 *At the diverted party*

DTS and H.323 telephones in idle state display the diversion information and diversion destination for **internal** diversion on origin.

Note: SIP, DECT and Mobile extensions do not display diversion destination number for diversion on origin.

2.9.3.2 *At the calling party or at the divertee*

The display on IP (both SIP and H.323) extension and PBX-operator as calling or called (divertee) party is not affected by diversion on origin.

2.9.4 DIVERSION ON ORIGIN MATRIX

The following matrix describes the call status of different traffic cases when diversion on origin is active, with or without answering point assigned:

Table 10 Diversion on origin

Call status	Indivi./Common	No indiv./Common	Indiv./ No common	No indiv./ No common
Direct diversion	O1 = Indiv.	O1 = Common	O1 = Indiv.	O1 = No Div.
	O2 = Common	O2 = Common	O2 = No Div.	O2 = No Div.
	O3 = No Div.	O3 = No Div.	O3 = No Div.	O3 = No Div.
Diversion busy *)	O1 = Indiv.	O1 = No Div.	O1 = Indiv.	O1 = No Div.
	O2 = Common	O2 = No Div.	O2 = No Div.	O2 = No Div.
	O3 = No Div.	O3 = No Div.	O3 = No Div.	O3 = No Div.
Diversion on no reply **)	O1 = Indiv.	O1 = No Div.	O1 = Indiv.	O1 = No Div.
	O2 = Common	O2 = No Div.	O2 = No Div.	O2 = No Div.
	O3 = No Div.	O3 = No Div.	O3 = No Div.	O3 = No Div.

O1, O2 & O3 Diversion on origin options
Common Common Diversion points for the exchange or for the customer
No common No Common Diversion points assigned
Indiv. Individual Diversion point
No indiv. No Individual Diversion point assigned

*) No Div. means that A -party receives busy tone.

***) No Div. means keep on ringing on B-party

2.10

BYPASS OF DIVERSION

It is not possible to initiate bypass of diversion over an ISDN ISO QSIG/H.323 network using the Generic Functional Protocol for Call Diversion.

2.10.1

BYPASS BY PROCEDURE

Diversion bypass, both internally and in network, is done with a procedure from the calling user. If the extension is not generic, then two options are possible:

- The extension is always allowed to initiate diversion bypass.
- When the extension tries to initiate diversion bypass, its intrusion class of service is checked. If this class of service permits intrusion, then the bypass is also allowed. If not, the attempt to initiate bypass will be rejected.

If the extension is a generic extension, then the two options are:

- The extension is always allowed to initiate diversion bypass.
- When the extension tries to initiate diversion bypass, a dedicated class of service is checked to see if it is allowed to be executed from that extension or not.

The value of a specific parameter determines whether bypass is always allowed or a certain class of service (as shown above), shall be checked before permitting it.

PBX-operators are always permitted to bypass diversion.

If the same number as that of the connected party in left side of operator is dialed from the right side of the operator, all diversions are bypassed.

If a diversion cannot be bypassed due to internal barring or class of service barred, a NO PROGRESS message is sent to calling party. The call is released.

The same bypass procedure is also valid for bypass of Personal Number.

Table 11 Bypass

The user procedure for bypassing diversion is:	*FC*D1#
--	---------

where FC is the service code for diversion bypass and D1 the directory number of the sought user.

2.10.2

AUTOMATIC BYPASS

Diversion bypass, both internally and in network, is automatically carried out for the following traffic cases:

- for voice extension when the diverted directory number is called from the diverttee position, provided that this position is an extension directory number
- when called from a member of the diverttee position that is a hunt group, except when the hunt group is classified as a voice mail position.
- when a diverted call encounters traffic category check rejection.

2.10.3

BYPASS BY KEY

Bypass by key, both internally and in network, is carried out for the following traffic cases:

- for voice calls when a PBX-operator calls a party that is diverted to the calling PBX-operator or to a common PBX-operator group where the calling PBX-operator is member of the common PBX-operator group.

At bypass by key the PBX-operator display shows the diversion information of the extension.

2.11

ORDER OF PRIORITY

2.11.1

ACTIVATION/DEACTIVATION

Several diversions can be activated at the same time for a user. However, in some cases an activation/ deactivation will deactivate another diversion, 12 Order of priority at activation, effects at activation on page 22 and 13 Order of priority at deactivation, effects at deactivation on page 22.

Note: This section does not consider other services, like Do Not Disturb, Personal Number, CSTA Deflect or other re-direction services, which may affect the priority order if activated. The priority order is, somewhat simplified, (with highest priority first): Diversion services without line status dependency, Personal Number, Individual DND, Group DND, Multiple Terminal Services, Diversion on busy/no-reply. See the descriptions of those services for details.

Table 12 Order of priority at activation, effects at activation

	Activated diversion that will be deactivated when activating some type of diversion in the left most column						
Activation of	Dir. div.	Div. no rep.	Div. FM hunt	Cond. FM hunt	FM	ECF	Mes. div
Direct diversion	React.	-	-	-	-	-	-
Diversion on no reply	-	React.	-	-	-	-	-
Diversion on busy	-	-	React.	-	-	-	-
Conditional follow me of hunt group	-	-	-	React.	Deact.	-	-
Follow me	-	-	-	Deact.	React.	Deact.	-
External follow me	-	-	-	-	Deact.	React.	-
Message diversion	-	-	-	-	-	-	React.

Deact. The diversion will be deactivated

React. The diversion will be reactivated.

- The activated diversion will not be affected.

Table 13 Order of priority at deactivation, effects at deactivation

	Activated diversion that will be deactivated when deactivating some type of diversion in the left most column						
Activation of	Dir. div.	Div. no rep.	Div. FM hunt	Cond. FM hunt	FM	ECF	Mes. div
Direct diversion	Deact.	-	-	Deact.	Deact.	-	-
Diversion on no reply	-	Deact.	-	-	-	-	-
Diversion on busy	-	-	Deact.	-	-	-	-
Conditional follow me of hunt group	-	-	-	Deact.	-	-	-
Follow me	Deact. *)	-	-	Deact.	Deact.	-	-
External follow me	-	-	-	-	-	Deact.	-
Message diversion	-	-	-	-	-	-	Deact.

2.11.2

EXECUTION

At execution of a call, message diversion can be selected (I/O command controlled) to have higher or lower priority than direct diversion and follow me/external follow me diversion.

The last ordered direct diversion or follow me/external follow me diversion applies.

If message diversion has the lowest priority, activated direct diversion or follow me/external follow me diversion has the highest priority and precedence over other diversion but does not deactivate the latter.

Diversion to common/customer position

If the diverted position belongs to customer group and this customer has already initiated at least one of its customer diversion numbers (for internal and/or private and/or

public and/or operator originated calls), the table below applies to these customer diversion position, that is, the diversion position will be looked for among the initiated customer diversion numbers.

Table 14 Common/customer diversion

	CALL ORIGIN			
Initiated common diverttee positions	internal call	calls within private network	calls from public networks	calls from operator
internal ¹⁾	diverted to internal	diverted to internal	diverted to internal	not diverted
private ²⁾	not diverted	diverted to private	diverted to private	not diverted
public ³⁾	not diverted	not diverted	diverted to public	not diverted
operator ⁴⁾	diverted to opediv group if originating is operator for message diversion case only else not diverted	diverted to opediv group if originating is operator for message diversion case only else not diverted	not diverted	diverted to operator
both internal and private	diverted to internal	diverted to private	diverted to private	not diverted
both internal and public	diverted to internal	diverted to internal	diverted to public	not diverted
both internal and operator diverttee	if originator is operator diversion to opediv group and message diversion is activate else diverted to internal	if originator is operator diversion to opediv group else diverted to internal	diverted to internal	diverted to operator
both private and public	not diverted	diverted to private	diverted to public	not diverted
both private and operator diverttee	if originator is operator diversion to opediv group and message diversion is activate else not diverted	if originator is operator diversion to opediv group and message diversion is activated else diverted to private	diverted to private	diverted to operator
internal, private and public	diverted to internal	diverted to private	diverted to public	not diverted
Internal, private, public and operator diverttee	if originator is operator diversion to opediv group and message diversion is activated else diverted to internal	if originator is operator diversion to opediv group and message diversion is activated else diverted to private	diverted to public	diverted to operator

- 1) Common/Customer diverttee position for internal calls.
- 2) Common/Customer diverttee position for calls within a private network.
- 3) Common/Customer diverttee position for calls from a public network.
- 4) Customer diverttee position for calls originating from operators internally, or in a private network, if message diversion is activated.

2.12

REPEATED DIVERSION

The term repeated diversion describes the situation where a call is diverted two or more times before reaching the final destination.

Note: There is another feature called Individual Repeated Distribution (Personal Number) that in some sense is similar to repeated diversion.

MX-ONE Service Node allows repeated diversions according to the following rules:

- 1) A divertee position for **“diversion on busy”** may be diverted with “follow me or external follow me”.
- 2) A divertee position for **“diversion on no reply”** may be diverted with “follow me”.
- 3) A divertee position for **“direct diversion”** may be diverted with “direct diversion”, “follow me” or “external follow me”. A counter limits the number of repeated diversions.
- 4) A divertee position for **network “follow me”** may be diverted with “follow me or external follow me”.
- 5) A divertee position for **“follow me”** may be diverted with “follow me”, “direct diversion” or “diversion on no reply”. A counter limits the number of repeated diversions.
- 6) A divertee position for **“message diversion”** may be diverted with “diversion on no reply”.
- 7) All other combinations are blocked.

“Diversion on busy”, “diversion on no reply”, “direct diversion” or “follow me” can be internal or in the private network, except for rule 4, where the first follow me cannot be internal.

Limitations to these rules are:

Diversion on no reply

Diversion on no reply is not executed if there has been a previous “diversion on no reply” or “diversion on busy” in the diversion chain. In this case, the last diversion on no reply is not executed and the party that did not reply (the last one) keeps on ringing. E.g. if B is diverted on busy to C, C has a follow me to D and D does not answer, a diversion on no reply from D to E is not executed.

Internal Diversion counter

There is a counter for Direct Diversion and Follow me internally, within a single system, which allows a limited number of diversion hops with those diversion types. It can be chained Follow me, chained Direct Diversions or a chained mix of the types. If the repeatedly diverted call (where the counter does not prohibit more diversions) encounters a user with External Follow me, Diversion on no reply or Diversion on busy active, the chain ends, i.e. the counter will only allow this one additional diversion.

Private network Diversion counter

There is a counter which indicates the maximum number of network diversions (chainings) that are allowed for one call (changeable by I/O command) in ISDN QSIG/H.323 networks using user-to-user signaling for diversion. This counter is placed in the originating/gateway PBX and will be increased when an outgoing trunk is being seized.

In ISDN ISO QSIG/H.323 networks, using the Generic Functional Protocol for Call Diversion, the counter is passed on in the call setup and diversion messages. The counter is increased in the controlling extension's PBX when diversion is encountered.

If the diversion that exceeds the maximum value is a network diversion on no reply, then this diversion on no reply is not executed, and the party that did not reply keeps on ringing.

If the diversion that exceeds the maximum value is a network follow me, then:

- When direct diversion or follow me is the first diversion type, a rejection tone is sent to A-party.
- When diversion on busy is the first diversion type, busy tone will be sent to the A party.
- When diversion on no reply is the first diversion type it will keep on ringing on first called party.

The tables below present a survey of where a call is to be routed when the sought B-party is diverted to a C-party with different states. It is assumed that a common/customer diversion position, which is also programmed as a message diversion position, is available. This is symbolized with COM in the table. D- party is the answering position of C-party's redirection, and E- party is public answering position, where C-party has ECF activated.

For repeated **internal** diversion, 15 Internal Diversion followed by internal Diversion on page 25.

For **network** diversion followed by an **internal** diversion, 16 Network Diversion followed by Internal Diversion on page 26.

For **network** diversion followed by a **network** diversion, 17 Network Diversion followed by Network Diversion on page 26.

Table 15 Internal Diversion followed by internal Diversion

Facility available to B-party	State of C-party								
	Free	**)Busy	Line lockout	Direct diverted to D-part	Follow me to D	External follow me (to E)	Message diverted to D	Div. on no reply to D	Not reg./ Not avail.
Diversion to C on no reply	C	B	B	B	D*	B	B	C	B
Diversion to C on busy	C	B	B	B	D*	E	B	C	B
Directly diverted to C	C	C	C	D	D	E	C	D ***	C
Follow me to C	C	C	C	D	D	E	C	D ***	C
Message diverted to C	C	COM	COM	COM	COM	COM	COM	D ***	COM

*) When D-party is busy, follow me diverted, directly diverted, in line lockout or vacant, B-party applies.

**) A hunt group is considered as busy if all the members are busy, regardless of queuing possibilities.

***) When the free C-party does not answer within a predetermined time and D-party is free. If D-party is not free, then C-party applies.

Note: According to the repeated diversion rules, several direct diversions or follow-me can be chained in a call (up to a certain limit), so e.g. a follow me to D-party could also be followed with another follow me from D-party to an E-party, etcetera.

Table 16 Network Diversion followed by Internal Diversion

Facility available to B-party who is another PBX than the C-party.	State of C-party who is in the same PBX as D-party							
	Free	**)Busy	Line lockout	Direct diverted to D-part	Follow me to D	External follow me	Div. on no reply to D	Not reg./ Not avail.
Diversion to C on no reply	C	B	B	B	D ^{*)}	B	C	B
Diversion to C on busy	C	B	B	B	D ^{*)}	E	C	B
Directly diverted to C	C	C	C	C	D	E	D ^{***)}	C
Follow me to C	C	C	C	C	D	E	D ^{***)}	C

Table 17 Network Diversion followed by Network Diversion

Facility available to B-party who is in another PBX than the C-party.	State of C-party who is in another PBX than D-party							
	Free	**)Busy	Line lockout	Direct diverted to D-part	Follow me to D	External follow me	Div. on no reply to D	Not reg./ Not avail.
Diversion to C on no reply	C	B	B	B	D ^{*)}	B	C	B
Diversion to C on busy	C	B	B	B	D ^{*)}	E	C	B
Directly diverted to C	C	C	C	C	D	E	D ^{***)}	C

^{*)} When D-party is busy, follow me diverted, directly diverted, in line lockout or vacant, B-party applies

^{**)} A hunt group is considered as busy if all the members are busy, regardless of queuing possibilities.

^{***)} When the free C-party does not answer within a predetermined time and D-party is free. If D-party is not free, then C-party applies.

Note: According to the repeated diversion rules, more than two diversions can be chained in a call, so e.g. a network follow me to D-party could also be followed with another network follow me from D-party to an E-party.

2.12.1

LOOPS, SPECIAL CONSIDERATIONS

If a repeated diversion ends up back at the first party, or at any other of the destinations of the earlier hops, so the call diversions would be in a loop, the diversions will be allowed/executed up to the internal diversion counter limit.

2.13 CAPACITIES AND LIMITATIONS

2.13.1 DIVERSION AND FOLLOW ME

The number length is the same as for the maximum number length used in the private network.

All extensions are allowed to use follow me and diversion, except that ISDN S0 only supports direct diversion.

Extensions with an individual answer position can have diversion on busy or diversion on no reply.

There can only be one individual answer position for each extension.

There are three common answer position in the system, and three per customer.

Diversion and Follow me for Rotary dialing analog extensions is not supported.

2.13.2 EXTERNAL FOLLOW ME DIVERSION

External numbers with a length up to 20 digits is available. These 20 digits include destination code or LCR destination code.

External follow me is available only for voice extensions and extension groups.

Extension has access to this feature depending on COS.

The calling party can be any type of voice user.

Only one call at a time is allowed to an external follow me diverted extension. For hunt groups this limit can be changed (I/O command controlled).

2.13.3 REPEATED DIVERSIONS

There is a counter for internal follow me and direct diversion, which allows a maximum of 5 such redirections.

There is another counter which limits repeated private network diversions.

2.13.4 DIVERSION ON ORIGIN FEATURE

Diversion on origin is available only for voice extensions.

All extensions can have access to this feature if class-of-service permits.

2.13.5 DIVERSION BYPASS

All extensions can have access to the bypass feature if class-of-service permits. An attendant is always allowed to use the bypass feature.

It is not possible to initiate bypass of diversion over an ISDN ISO QSIG/H.323 network using the Generic Functional Protocol for Call Diversion. Proprietary Bypass signaling will be sent instead.

3 HARDWARE

The Diversion services do not require any special hardware.

4 SUMMARY

Diversion services make it possible for the user to have calls forwarded for various reasons, to an answering position. The Diversion services specified in this document are:

- direct diversion
- diversion on busy
- diversion on no reply
- follow me
- external follow me diversion
- message diversion

See also the description for Personal Number/Call List, which provides alternative services similar to diversion on busy or on no reply.