
Meridian 1

Emergency Services Access

Product description and administration

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Emergency Services Access

Purpose of this document

The purpose of this document is to explain how the Emergency Services Access (ESA) feature works, and how to successfully implement it on the Meridian 1. ESA is a totally new feature that places a customer in compliance with new federal legislation that requires the Private 911 type of functionality provided by ESA.

However, the feature is also generally useful for users who are not subject to legislation, and is broad enough to be used in different countries. It will be appreciated by any customer who wants to route emergency calls in a special way, or who wants to be notified when a telephone user makes an emergency call. The section “Different applications of ESA” on page 15 talks about some of the possible variations of ESA that might appeal to a customer.

ESA introduces new implementation issues to be addressed by system administrators and craftspeople. For example, when making service changes to individual telephone sets and DNs, changes to the ESA database (such as setting up the CLID tables) have to be done at the same time. And when setting up the ESA database, ESA customer requirements have to be considered, such as basic all-DID cases, cases of mixed DID and non-DID, how and when to set up 7-digit and 10-digit Automatic Number Identification, when to use multiple area and office codes (NPAs and NXXs), and networking-specific requirements (since ESA applies to non-networking and networking environments).

The information in this document is geared to address these, and other, issues, as well as providing functional information on ESA.

Background information pertaining to ESA

In October 1994, the Federal Communications Commission (FCC) issued a Notice of Proposed Rulemaking (NPRM), on the subject of PBX compatibility with Enhanced 911 Emergency Services. The intent is to give 911 callers located on a PBX the same level of 911 service that is currently given to the majority of residences in North America.

Note 1: Some states already have existing legislation in place.

Note 2: Throughout this document, 911 is used, since this number is most commonly used and most easily recognized as an emergency services number. However, any other valid digit sequence may be used, as explained later in this document.

The thrust of the legislation is to ensure the following:

- The Public Safety Answering Point (PSAP) receives a number that accurately gives details of the exact location of the caller sufficient for service providers to find the scene of the emergency. The PSAP is the physical answering location where a 911 call is first answered. From here, the call is directed to the most appropriate emergency response agency, such as ambulance, firefighting, or police.
- The PSAP can call back to the calling party (or close thereto), in the event that the caller disconnects.
- Any telephone on the PBX can be used to call 911 without ambiguity on the part of an unfamiliar user.
- Security personnel located at the PBX premises are notified that an emergency call is in progress, and can identify the source in order to assist the emergency response agency when it arrives.
- Fully Restricted phones must be able to make an outgoing 911 call.
- No access codes have to be dialed before dialing 911 (i.e. just dial 911, rather than AC+911).
- Designated trunks must be reserved for 911 calls, to ensure that they are not busy when an emergency occurs. Typically at least two trunks in the 911 route is recommended, with overflow to a regular outgoing CO trunk route.

- The PSAP has access to a database which associates numbers with telephone locations. This is known as the Automatic Location Identification (ALI) database. The PBX administrators may have to begin providing timely updates for it. For residential phones, for instance, the location information is usually the subscriber's name and the street address of the residence, and possibly some ancillary information such as access directions, special hazards, medical/disability information, etc. The ALI database is usually maintained by the local Telco or other public agency, and updated as telephone numbers and addresses change. When a 911 call is received, this database is accessed to provide the information to the PSAP agent. For obvious reasons, it is imperative that this database be kept current, so that it is ready to be referenced in an emergency.

- With these rule changes, it may now be necessary for PBX administrators to ensure that similar information be provided to the ALI database for all of the telephones connected to the PBX. This will mean that an agreement must be made with the agency maintaining the ALI database about the content and format of the location information, as well as updating procedures. Typically the content will include:
 - street address of the building, and location information and access methods if necessary
 - the floor number
 - location on the floor, e.g. NW corner, room number, pillar number, or something similar
 - name of the principal user of the telephone, if appropriate

This information will have to be provided when the PBX is first installed or configured for Private 911 service, and also on an ongoing basis as service activity for Adds, Moves & Changes are carried out.

Residential vs. PBX services

The existing Enhanced 911 residential service provides the following capabilities:

- The calling party's number (ANI) is passed along with the call, and is received at the point where the call is answered, the PSAP. The number is unique, and is used by the PSAP to automatically make a reference to the ALI database. The information in this database tells the PSAP operator the exact name, address and location of the telephone line, so that in the event that the caller cannot speak or the call is disconnected, appropriate help can still be dispatched. The ALI database is kept up to date by the local telephone service provider as service orders are executed.
- The ANI also allows the telephone network to automatically route the call to the PSAP that serves the caller in their geographic location, and so avoids calls being received in a different municipality or jurisdiction.

When a call is made from a telephone located on a PBX, the issue is more complex. Many PBXs only send the main Listed Directory Number (LDN) for the business. If the caller cannot speak coherently, the PSAP operator can only dispatch assistance to the main entrance. Once there, the guard or receptionist may be unaware that a 911 call has been made, and unaware of the exact site of the emergency.

Even for cases where the caller's full seven or 10-digit DID number can be sent with the call by the PBX, there is generally no entry in the ALI database information corresponding to the exact location of the caller, only the main business address. To date, there has not been a requirement for PBX owners to provide ALI database updates every time an internal telephone move is made.

The solution is provided by a Private 911 service (such as Nortel's Emergency Services Access feature). A Private 911 service sends out a unique number (ANI) with every call, which will identify the calling station by means of an ALI lookup. Generally this is done by prefixing the Directory Number (DN) of the phone by the specified three-digit office code (NXX). For DID numbers, this gives a unique seven-digit telephone number that the PSAP can use to determine location. In addition, ALI database updates must be made corresponding to PBX service changes, so that all of the possible ANI combinations have valid and current ALI information available to the PSAP.

Non-DID DNs and number translation

However, non-DID numbers pose a problem, since they cannot form an outgoing number in the same way: It is not valid to make a seven-digit number by prefixing the DN with the NXX (it is required that any Private 911 system send out only ANI numbers that are Part of the North American Numbering Plan (NANP), and that are valid DID numbers assigned to the customer by the serving Telco.)

For example, A PBX has an office code (NXX) of 962, and a DID range of 5000–5999. A telephone within this DID range, for example, 5500, will form a Calling Number of 962-5500, which is valid and unique.

A non-DID telephone, for example, DN 3000, would form a Calling Number of 962-3000. Because this is outside the DID range of 5000-5999, this number will most likely have been allocated by the telephone company to a different subscriber, that could be many miles away from the PBX location.

Thus special arrangements need to be made for non-DID telephones within the customer site. Non-DID numbers will usually have to be mapped to nearby DID numbers for the purposes of 911 calls. This will involve some form of translation at the PBX before sending out the ANI.

As an example of non-DID number translation, consider extension 3000, which is a non-DID number, placing a 911 call. ESA recognizes that the extension is a non-DID station and checks its translation table for the valid DID number to assign to the call. In this case extension 3000 will be replaced with a pre-determined station number of, say, 962-5500, which is a valid DID number (this station is located within the same physical area as extension 3000). The translated number, in this case 962-5500, can be used as a call-back number by the PSAP to provide location identification as close as possible to the caller who placed the call.

Note: DID numbers undergo a similar translation process, because they usually have to have their NXX office code prefixed. So, using the same example as above, if extension 5500 (a DID number) makes a 911 call, ESA will ‘translate’ this into 962-5500, thus providing a unique North American Numbering Plan number to be used by the PSAP to determine accurate location information.

The capabilities originally provided by the ISDN CLID Enhancements feature are now enhanced to allow a great flexibility in setting up the required translations. (The section “Digit translation examples” on page 30 provides samples of common types of translations that are likely to be required, and how the customer can set up and use translation tables.)

Note: Although the ESA uses the translation capabilities provided by the ISDN CLID database, the ISDN package is not a prerequisite for ESA functionality. Refer to “A note on packaging” on page 19 for more information on packaging and digit translation.

Note that a Private 911 environment requires that the customer deploy sufficient DID numbers so that all locations within the enterprise are close enough to a DID telephone to be quickly found by the emergency response team. In the event that the caller was not able to be coherent about his exact location, the emergency services will arrive at the location of the telephone with the DID number used as ANI. The location of any non-DID telephones which have been mapped to the DID number must be close enough that the emergency response team can quickly locate the caller. This requirement might mean that additional DID numbers will have to be obtained, or those that are in use may have to be redistributed. This need is not specific to Meridian 1, but is of consequence to the concept of Private 911.

Summary of capabilities provided by ESA

The Emergency Services Access (ESA) feature has been developed primarily to respond to the previously-described legislation, but can also meet the needs of users who wish to manage emergency calls from their business (as explained in the section “Different applications of ESA” which follows).

The focus of the ESA feature is to provide the following:

- A special ESA Directory Number access (such as 911) can be defined to access emergency services. This number can be dialed without having to first dial an ESN access code.
- The Meridian 1 recognizes that the dialed ESA DN is an emergency call, and provides special treatment.
- Route the call to special trunks designated to handle ESA calls (either dedicated to handle only ESA calls, or shared to handle other types of calls as well.)
- Provide flexible ANI number translation for non-DID numbers (and for DID numbers, if desired by the customer.)
- Send out the ANI of the station with the call, so that the PSAP can use it to determine the caller’s location.
- Support a networking environment, that is, where the ESA call is originated on one node, and then routed across the network to another node for onward routing into the Public Network and the PSAP.
- Provide On-site Notification, so that the customer’s staff know that an ESA call is in progress.

Different applications of ESA

The ESA feature, although designed primarily to respond to legislation, as previously described, can also meet the needs of other users who wish to manage emergency calls from their business. These needs will depend on a number of factors, such as:

- current legislation which is in effect
- availability of access to the ALI database
- amount of administration
- the necessary response level for the type and location of the business

Emergency Services Access is flexible enough to be set up in different ways, depending on the requirements. Some examples follow:

- 1 The customer wishes to uniquely identify every telephone to the PSAP, either because the legislation requires it or he wishes to do so for other reasons. This will require a relatively large number of DID numbers to be deployed, and they will need to be well distributed: this is so that all non-DID numbers will be able to map to a DID which is very close, such that an emergency response team arriving at the DID location will be able to immediately see the non-DID user who made the call.

This is the principle which is behind the early State legislation (Illinois, Washington, etc.). It requires that all DID telephones have an entry in the ALI database, and that the customer makes ongoing changes to the ALI database every time that a Meridian 1 telephone change is made. Thus it makes heavy demands on the customer's administration staff, and puts the responsibility on them for ensuring that all databases are properly synchronized. It also requires that the ALI database owner permits, and provides facilities for, PBX administrators to access the ALI to make changes.

The FCC's Notice of Proposed Rulemaking (NPRM) also took this approach.

- 2 The customer wishes to simply do Local Notification, so that the security or reception staff can be warned about any outgoing emergency calls from the location. There is no need to send any ALI other than the main listed number to the PSAP along with the call. This will happen in places where there is no legislation, and where the ALI database owner does not allow access for PBX administrators. There is obviously no non-DID mapping required, and the customer does not need to be sensitive about the quantity or distribution of his DID numbers.

This relieves the customer of a lot of administrative work, as the initial set-up is simple and Meridian 1 moves and changes can be made without major concern for ANI translation.

However, the customer still needs to ensure that locations encoded in the 'DES' fields¹ are correct when moves are made. Initial set-up simply requires the administrator to define the same ANI for all telephones (the LDN), and to route calls to the appropriate dedicated or shared route. Appropriate OSN options then need to be configured.

- 3 Several levels of intermediate approach can also be taken. A typical one would be to assign a single DID number (of an actual telephone, or one which is unused) to a specific area on the business premises, such as a building, a floor, a wing, a group of offices, etc. An example would be 'B2F1T5', for 'Building number two, Floor number 1, Tower number 5'. This information would comprise the DES field for all telephones in that particular area (see the footnote below, pertaining to the DES field.) This relatively small number of DIDs would be registered in the ALI database, and would not normally change (barring major reorganizations or building alterations). All telephones within the specified area would be mapped to the corresponding DID number; thus calls from such telephones would send the ANI of the DID number, and provide respective location information in the form of DES fields. Local Notification would still provide details about the individual caller.

The PSAP, and hence the responding emergency team would be able to identify the appropriate building, etc., and would be able to obtain more details from the customer via the Local Notification arrangements.

- 4 The customer wishes to answer all emergency calls, either on a per-site or a network basis. This involves routing all emergency calls to an internal telephone, generally in conjunction with OSN. This configuration is covered later in the document, in the section "Provisioning an ESA On Site Notification set" on page 50.

References to "adjacent DID telephones" can mean any of the above, as required.

1. The DES (telephone designator) field contains the type of information described in item 3 above. This DES field is part of the caller information which is printed on the OSN output device, and displayed on the OSN set as part of the caller information. Refer to the sections "ESA On Site Notification output device print" on page 44, and "OSN set displays" on page 52. The DES data is configured in the telephone sets administration Overlays (10, 11, 27) when configuring OSN. Refer to page 98.

ESA feature overview

Prior to the introduction of the Emergency Services Access (ESA) feature, the Meridian 1 provided limited emergency 911 services to its users through the existing Automatic Number Identification (ANI) feature, where the ANI was output for callers dialing the public emergency services telephone number (typically 911).

The use of ANI was limited to Meridian 1 systems that used exclusively Direct Inward Dial (DID) numbers. Also, when a Meridian 1 caller tried to access a Public Safety Answering Point (PSAP), an ESN Access Code would have to be dialed prior to dialing 911. This functionality applied to a non-networking environment only, and did not function within a networking environment.

With the introduction of ESA, the Meridian 1 has the capability of providing private 911 emergency services to all its users in both a non-networking and networking environment, on Meridian systems using DID and/or non-DID numbers, and without the need to dial an Access Code. Also, a calling terminal identification number may now be delivered to the PSAP with the outgoing call.

Generally, the ESA feature functions as follows. A user makes an emergency call by dialing the designated ESA DN (typically, 911) from a station on the Meridian 1. The Meridian 1 recognizes that this is an emergency call and prepares for special treatment. This involves creating a suitable ANI or Calling Line Identification, and routing the call to a trunk that has been designated to handle ESA calls (this trunk may be dedicated or shared).

An on-site alert of the ESA is then given to a designated OSN set or terminal. The OSN set emits a buzzing when an ESA call is detected. This set is also equipped with an OSN key lamp that flashes in case of an ESA call. By pressing this OSN key, the caller information is displayed on the set. Also, the caller and calling number information is created and printed on a designated display terminal as soon as the ESA call terminates onto an outgoing trunk. The ESA call is then routed to a PSAP, or routed back to the Meridian 1 to be handled internally.

There are four major components of ESA that provide the functionality described above. These are discussed in greater detail in the sections that follow.

With ‘ESA Call Recognition’ an Emergency Services Access DN (such as 911) can be configured on the Meridian 1. When a caller dials the ESA DN (there is no need to first dial an Access Code), the Meridian 1 automatically recognizes the call as an Emergency Services Access call and sets up special treatment.

With ‘ESA Call Routing’ outgoing trunk routes may be designated to handle ESA calls.

With ‘ESA Calling Terminal Identification’ the Meridian 1 composes an ESA calling number for outgoing ESA calls.

With ‘On Site Notification’ a Meridian 1 output device (such as a terminal or a set) may be configured to provide an on-site alerting capability for ESA calls. The last two capabilities allow emergency and security personnel to respond more promptly in the event of an ESA call.

These four components are described in detail beginning on page 21.

A note on packaging

ESA is comprised of three different packages, which must be implemented separately (as defined in the section “Feature implementation” on page 91), depending on the functionality that a customer desires.

The ESA package 329 provides ESA Call Recognition and ESA Call Routing. It also provides basic number translation, such as the addition of NXX and NPA (area and office) codes, but not non-DID to DID translation (this is provided by the ESA_CLMP package.) The ESA_SUPP package provides supplementary capabilities, such as networking capabilities (for example, incoming ISDN to CAMA number conversions), and On Site Notification. The ESA_CLMP package provides translation of non-DID to DID numbers. Refer to the section “Feature packaging” on page 89 for more information.

A note on the Flexible Numbering Plan and ESA

Throughout this document, when examples are provided pertaining to Automatic Number Identification (ANI) which is being generated for ESA calls, the composed numbers are given to be either 7 or 10 digits in length. This assumes that the Flexible Numbering Plan (FNP) is not equipped on the Meridian 1 along with ESA. However, if FNP is equipped, then the ANI can be any length, up to a maximum of 16 digits. Refer to Table 2, “Valid ESA calling number lengths,” on page 27 for an explanation of valid lengths for ESA calling number composition.

This also applies in cases where ISDN trunks are involved. However, since CAMA trunks are North-American specific, the ANI can only be 7 or 10 digits long.

Standards compliance

This feature is designed in accordance with the following standards:

- 1 ANSI/T1.411-1995. “Interface between carriers and customer installations - analog voice-grade Enhanced 911 switched access using network-provided reverse-battery signaling.” This standard describes CAMA signaling on analog CAMA trunks, but the same signaling is also used by this feature for digital CAMA trunks.

ISDN signaling uses standard ISDN CLID protocols.

- 2 ANSI TIA/EIA 689. “PBX and KTS Support of Enhanced 911 Emergency Service Calling.” This standard has been approved, but not yet printed and published, and is a supplement to ANSI EIA/TIA 464B-1995, the standard for PBX switching equipment.

ESA Call Recognition

The ESA Call Recognition function allows the Meridian 1 system administrator to configure an Emergency Services Directory Number (ESDN) in Overlay 24 (also used for Direct Inward System Access administration), on a customer basis. When a Meridian 1 user dials the ESDN, the Meridian 1 recognizes the call as a public emergency services request, and immediately routes it to the public emergency services over trunks designated to handle ESA calls.

The ESDN can be up to four digits long, and can be the same number that a caller would use to request emergency services from home (in North America, this number is 911), unless the number conflicts with any other number in the Meridian 1 dialing plan.

The configuration of a customer's ESDN is independent of the customer's ESN database, so that ESA calls can be routed to the PSAP as soon as the ESDN is dialed. There is no need to dial a BARS/NARS Access Code prior to dialing the ESDN. ESA calls also override any access restrictions placed on sets or trunks. Refer to "Access Restrictions" on page 80 of the feature interactions section for more details.

Guidelines for configuring the ESDN

The Meridian 1 does not check for conflicts between the digits used for the ESDN and digits used for internal DNs, Coordinated Dialing Plan steering codes, or a BARS/NARS dialing plan. Therefore, the following guidelines should be followed when configuring the ESDN on the Meridian 1:

- Do not configure internal DNs and CDP steering codes, that are the same length or longer than the ESDN, to have the same leading digits as the ESDN.

If there is any internal DN or steering code that is equal to or longer than the ESDN, and all the leading digits of that internal DN match the ESDN digits, then calls will not terminate on that internal DN or steering code, since ESA calls receive priority. For example, if the ESDN is 911, and there is a station DN or a steering code of 9112, then whenever someone dials the 9112 extension, or steering code, they are automatically routed to the PSAP as an ESA call.

- Do not configure internal DNs or CDP steering codes, that are shorter than the ESDN, to have the same leading digits as the ESDN.

If there is any internal DN or steering code that is shorter than the ESDN, and all the leading digits of the ESDN match those of that internal DN or steering, the callers may be prevented from making an ESA call. For example, if the ESDN is 911, and there is a station DN or steering code of 91, then whenever someone attempts to dial the 911 ESDN, they are presented as a call to that station, or routed out as a CDP steering code, rather than being routed to the PSAP as an ESA call.

- Do not configure a BARS/NARS dialing plan, i.e., Access Code (AC) + Location Code (LOC)/North American Planning Area Code (NPA)/Central Office Code (NXX)/Special Number (SPN), that is the same length or longer than the ESDN, to have the same leading digits as the ESDN.

If there is BARS/NARS dialing plan, equal to or longer than the ESDN, and all the leading digits of that internal DN match the ESDN digits, then calls will not terminate on that dialing plan, since ESA calls receive priority. For example, if the ESDN is 911, and there is a BARS/NARS dialing plan having an access Code of 9 and a Special Number of 114, then whenever someone tries to dial 9114, they are automatically routed to the PSAP as an ESA call.

- Do not configure a BARS/NARS dialing plan, i.e., Access Code (AC) + Location Code (LOC)/North American Planning Area Code (NPA)/Central Office Code (NXX)/Special Number (SPN), that is shorter than the ESDN, to have the same leading digits as the ESDN.

If there is BARS/NARS dialing plan, shorter in length than the ESDN, and all the leading digits of that internal DN match the ESDN digits, then callers may be prevented from making ESA calls. For example, if the ESDN is 911, and there is a BARS/NARS dialing plan having an access Code of 9 and a Special Number of 1, then whenever someone tries to dial 911, they are automatically routed out as a BARS/NARS Special Number.

- For customers using a BARS/NARS dialing plan, it is possible to configure their database such that the PSAP may be reached by either dialing only the ESDN, or an Access Code and then the ESDN. In order for the latter to be recognized as an ESA call by the Meridian 1, the ESDN must be configured as a BARS/NARS Special Number in Overlay 87 (by entering the ESDN in response to the SPN prompt), and the Special Number be configured to use a local terminating route list index (by responding to the LTER prompt with YES in Overlay 86).

Originating an ESA call from a set or attendant

Originating an ESA call from a set

An ESA call may be made from an analog (500/2500 type) set by simply going off-hook, waiting for dial tone, and dialing the ESDN. If there is another call already established on the set, the caller may do a consultation, or invoke standard conference or call transfer by performing an off-hook flash, waiting for special dial tone, and then dialing the ESDN.

An ESA call may be made from a Meridian 1 proprietary set by simply going off-hook, waiting for dial tone after pressing either the Single Call Ringing, Single Call Non-ringing, Multiple Call Ringing, Multiple Call Non-ringing, or Hotline (HOT) key, and then dialing the ESDN. If there is another call already established on the set, the caller may do a consultation, or invoke standard conference or call transfer by pressing either the Transfer, Conference, No-hold Conference, or No-hold Conference Hotline key, waiting for dial tone, and then dialing the ESDN.

Originating an ESA call from an attendant console

An ESA call may be made from an attendant console by pressing an idle LOOP key, waiting for dial tone, and dialing the ESDN. If the attendant already has an established call on the source (SRC) side of an active LOOP key, an ESA call may be initiated on the destination (DEST) side of the active LOOP key.

ESA Calling Terminal Identification

The ESA Calling Terminal Identification function allows the Meridian 1 to compose an ESA calling number for outgoing ESA calls. The ESA feature modifies the functionality of the ISDN CLID Enhancements feature, introduced in Release 22, to compose the ESA calling number.

Note: The ESA Calling Terminal Identification function composes the calling number for ESA calls only. For non-ESA calls, the existing CLID composition remains in effect.

The ISDN CLID Enhancements feature allows up to 4000 CLID entries to be configured for a customer on a Meridian 1 system equipped with the ISDN package 145. Each DN key for customer sets (analog (500/2500 type sets, Meridian 1 proprietary sets, and ISDN BRI sets) may be assigned with a desired CLID entry (as stated, up to a maximum of 4000 CLID entries may be assigned for a customer). When an outgoing ISDN call is made, the appropriate CLID is composed for the originating DN based on the its CLID configuration (using Overlay 15, and, as required, Overlays 10, 11, and 27).

ESA does not require the ISDN package to define a CLID entry for a station DN. When an emergency services call is initiated, the Calling Terminal Identification function is automatically invoked by the Meridian 1. This generates an Emergency Services Access calling number to identify the calling party requesting emergency services.

The calling number content is specified by the system administrator in Overlay 15, using the Calling Line Identification (CLID) entry prompt. This prompt has been modified to accept the following new responses for ESA. These new responses allow a customer to define how calling number digits are to be translated.

Refer to the section “Digit translation examples” on page 30 for examples of how the prompts (as defined below) may be applied to perform DID DN digit translation, and the type of translation required for non-DID digits.

- `ESA_HLCL` (ESA Home Local Code). This is the basic ANI that is generated. It is used as follows:
 - as a 3-digit home local office code for ESA DID calls that is being translated or
 - for non-DID calls, the full 7-digit translated number

- **ESA_INHN** (Insert Home National Code yes/no flag). If **ESA_INHN** is set to **YES**, then the ESA Home Local Code is translated to be prefixed by the Home National Code (area code). This is done when a 10-digit ANI is required. If **ESA_INHN** is set to **NO**, the ESA Home Local Code is not prefixed by the area code. This is done when a 7-digit ANI is required.
- **ESA_APDN** (Append DN yes/no flag). If **ESA_APDN** is set to **YES**, then the originating DN is translated to be appended to the ESA Home Local Code (**ESA_HLCL**). If **ESA_APDN** is set to **NO**, then the originating DN is not appended. The appending of the DN in this manner will be the typical treatment for DID numbers.

Note: **ESA_APDN** defaults to **YES**, and can only be changed to **NO** if the Meridian 1 is equipped with the Calling Number Mapping package (**ESA_CLMP**) 331.

On a Meridian 1 system equipped with ESA, a CLID entry may be defined for trunk routes, on a per-route basis.

Calling number composition

The following sections provide tables that explain how a calling number is composed for DID digits, based on the digit translation done according to how the **ESA_HLCL**, **ESA_INHN**, and **ESA_APDN** prompts are defined. This is done for ESA calls initiated from a station set, for ESA calls initiated from an attendant console, and for incoming trunk-initiated tandem ESA calls. Also, the section “Digit translation examples” on page 30 provides examples of how a customer might set up some digit translation configurations.

Note: In the tables that follow, for the sections pertaining to calling number composition, the composed numbers for ESA calls are said to be either 7 or 10 digits in length. As mentioned previously, if the Flexible Numbering Plan (FNP) is equipped, then the calling numbers can be any length, up to a maximum of 16 digits.

Please also note that not all combinations of prompts shown in the tables are useful in an ESA environment. They have been included for completeness.

Calling number for station set-initiated ESA calls

For ESA calls initiated from a station set, the ESA calling number is composed based on the CLID entry for the DN key on which the call originates. Table 1 illustrates how the ESA calling number may be composed for station set-initiated ESA calls, according to the CLID database.

Table 1
ESA calling number composition for station set-initiated ESA calls

CLID entry configuration				ESA Calling Number composition (Typical use)
HNTN	ESA_HLCL	ESA_INHN	ESA_APDN	
Does not matter	Defined	NO	YES	ESA_HLCL+originating DN (7-digit ANI for a DID number)
Defined	Defined	YES	YES	HNTN+ESA_HLCL+originatingDN (10-digit ANI for a DID number)
Undefined	Defined	YES	YES	ESA_HLCL+originating DN (7-digit ANI for a DID number)
Does not matter	Undefined	NO	YES	originating DN (7-digit ANI for a DID number, if a 7-digit DID dialing plan is used.)
Defined	Undefined	YES	YES	HNTN+originating DN (10-digit ANI for a DID number, if a 7-digit DID dialing plan is used.)
Undefined	Undefined	YES	YES	Originating DN
Does not matter	Defined	NO	NO	ESA_HLCL (7-digit ANI for a non-DID number)
Defined	Defined	YES	NO	HNTN+ESA_HLCL (10-digit ANI for a non-DID number)
Undefined	Defined	YES	NO	ESA_HLCL
Does not matter	Undefined	NO	NO	Nothing
Defined	Undefined	YES	NO	HNTN
Undefined	Undefined	YES	NO	Nothing

Note: If the length of the resulting ESA calling number is invalid (refer to Table 2 for valid lengths), then the ESA calling number is set to be the customer's Default ESA Calling Number (as defined in response to the DFCL prompt in Overlay 24). The DFCL is a number that is sent out if ANI is not used.

This also applies to the other cases of calling number composition in the sections that follow.

Table 2
Valid ESA calling number lengths

ESA Calling Number Length	ESA Calling Number Status	
	FNP Package Equipped	FNP Package Not Equipped
0	Invalid	Invalid
1-6	Valid	Invalid
7	Valid	Valid
8-9	Valid	Invalid
10	Valid	Valid
11-16	Valid	Invalid
More than 16	Invalid	Invalid

Calling number for attendant-initiated ESA calls

For ESA calls initiated from an attendant console, the ESA calling number is composed based on the CLID entry 0 (as per the ISDN CLID Enhancements feature functionality, when an attendant initiates a public numbering plan call, LDN0, as defined for the customer, is used as the originating DN).

Table 3 illustrates how the ESA calling number may be composed for attendant-initiated ESA calls, according to the CLID database.

Table 3
ESA calling number composition for attendant-initiated ESA calls

CLID entry configuration				ESA Calling Number composition (Typical use)
HNTN	ESA_HLCL	ESA_INHN	ESA_APDN	
Does not matter.	Defined	NO	YES	ESA_HLCL+LDN0 (7-digit ANI for a DID number)
Defined	Defined	YES	YES	HNTN+ESA_HLCL+LDN0 (10-digit ANI for a DID number)
Undefined	Defined	YES	YES	ESA_HLCL+LDN0 (7-digit ANI for a DID number)
Does not matter.	Undefined	NO	YES	LDN0
Defined	Undefined	YES	YES	HNTN+LDN0
Undefined	Undefined	YES	YES	LDN0
Does not matter.	Defined	NO	NO	ESA_HLCL (7-digit ANI if LDN0 is not to be used)
Defined	Defined	YES	NO	HNTN+ESA_HLCL (10-digit ANI if LDN0 is not to be used)
Undefined	Defined	YES	NO	ESA_HLCL
Does not matter.	Undefined	NO	NO	Nothing
Defined	Undefined	YES	NO	HNTN
Undefined	Undefined	YES	NO	Nothing

Calling number for incoming non-ISDN trunk-initiated tandem ESA calls

For incoming non-ISDN trunk-initiated tandem ESA calls, the ESA calling number is composed based on the CLID entry used by the incoming trunk route. Table 4 illustrates how the ESA calling number may be composed for non-ISDN trunk-initiated tandem ESA calls, according to the various combinations of the CLID ESA configuration.

Table 4
ESA calling number for incoming trunk-initiated tandem ESA calls

CLID entry configuration				ESA Calling Number composition
HNTN	ESA_HLCL	ESA_INHN	ESA_APDN	
Does not matter	Defined	NO	YES	ESA_HLCL+ACOD ^a
Defined	Defined	YES	YES	HNTN+ESA_HLCL+ACOD
Undefined	Defined	YES	YES	ESA_HLCL_ACOD
Does not matter	Undefined	NO	YES	ACOD
Defined	Undefined	YES	YES	HNTN+ACOD
Undefined	Undefined	YES	YES	ACOD
Does not matter	Defined	NO	NO	ESA_HLCL (7-digit ANI indicating the trunk route. This would allow the person who is receiving the DID call to at least know on what trunk the call originated.)
Defined	Defined	YES	NO	HNTN+ESA_HLCL (10-digit ANI indicating the trunk route)
Undefined	Defined	YES	NO	ESA_HLCL
Does not matter	Undefined	NO	NO	Nothing
Defined	Undefined	YES	NO	HNTN
Undefined	Undefined	YES	NO	Nothing

a. ACOD = Route access code of the incoming trunk.

Calling number for incoming ISDN trunk-initiated tandem ESA calls

For incoming trunk-initiated tandem ESA calls, the CLID that is tandemed in is tandemed out as the calling number. In rare cases, such as when no valid CLID is received, a CLID entry should be set up, in which case Table 4 would apply.

Digit translation examples

This section provides examples on how a customer may set up digit translation for DID numbers, non-DID numbers, trunk routes, and attendants.

DID numbers

The only translation normally required by DID numbers is to add the NXX (office code), and possibly the NPA (area code). All DID numbers in the same NPA-NXX can share a single CLID table entry, unless there is a need for multiple entries for ISDN purposes.

Example 1

A customer has DID numbers in the ranges 5000–5999 and 8000–8499. The Office Code is 768 and the Area Code is 404.

Set up a CLID table entry number 7, and assign this CLID table number to all DID keys and telephones.

The ESA data for entry 7 in Overlay 15 will be:

HNTN	404	Area code (NPA)
ESA_HLCL	768	Office code (NXX)
ESA_INHN	yes	Include NPA, if 10-digit ANI required
	no	No NPA if 7-digit ANI required
ESA_APDN	yes	Append the DN after ESA_HLCL

This will form the ANI in the following way:

- ANI will be set to 768.
- The DN will be appended at the end, e.g., DN 5123 will form 7685123.
- If ESA_INHN is 'yes', the area code will be added on to the beginning, giving 4047685123.

Other DID numbers will be similarly formulated.

Example 2

A customer has DID numbers in the ranges 5000–5999 with Office Code 768, and 8000–8499 with Office Code 770. The Area Code is 404, but only 7-digit ANI is required.

Set up a CLID table entry number **7**, and assign this CLID table number to all DID keys and telephones in the 5000–5999 range.

The ESA data for entry 7 in overlay 15 will be:

HNTN		Could be any valid value (may be needed for ISDN)
ESA_HLCL	768	Office code (NXX)
ESA_INHN	no	No NPA is required for a 7-digit ANI
ESA_APDN	yes	Append the DN after ESA_HLCL

This will form the ANI in the following way:

- ANI will be set to 768.
- The DN will be appended at the end, e.g. DN 5123 will form 7685123.

Set up a second CLID table entry number **8**, and assign this CLID table number to all DID keys and telephones in the 8000–8499 range.

The ESA data for entry 8 in Overlay 15 will be:

HNTN		Could be any valid value (may be needed for ISDN)
ESA_HLCL	770	Office code (NXX)
ESA_INHN	no	No NPA is required for a 7-digit ANI
ESA_APDN	yes	Append the DN after ESA_HLCL

This will form the ANI in the following way:

- ANI will be set to 770.
- The DN will be appended at the end, e.g. DN 8765 will form 7708765.

Example 3

A customer has DID numbers in the ranges 5000–5999 with NPA-NXX 404-768, and 8000–8499 with NPA-NXX 339-770. A 10-digit ANI is required to distinguish between the overlay area codes.

Set up a CLID table entry number **7**, and assign this CLID table number to all DID keys and telephones in the 5000–5999 range.

The ESA data for entry 7 in Overlay 15 will be:

HNTN	404	Area code (NPA)
ESA_HLCL	768	Office code (NXX)
ESA_INHN	yes	Include NPA, required by a 10-digit ANI
ESA_APDN	yes	Append the DN after ESA_HLCL

This will form the ANI in the following way:

- ANI will be set to 768.
- The DN will be appended at the end, e.g. DN 5123 will form 7685123.
- The area code will be added at the beginning, giving 4047685123.

Set up a second CLID table entry number **8**, and assign this CLID table number to all DID keys and telephones in the 8000–8499 range.

The ESA data for entry 8 in Overlay 15 will be:

HNTN	339	Area code (NPA)
ESA_HLCL	770	Office code (NXX)
ESA_INHN	yes	Include NPA, required by a 10-digit ANI
ESA_APDN	yes	Append the DN after ESA_HLCL

This will form the ANI in the following way:

- ANI will be set to 770.
- The DN will be appended at the end, e.g. DN 8765 will form 7708765.
- The area code will be added at the beginning, giving 3397708765.

7-digit DID numbers

This would be typical of a residential application, where the Meridian 1 is being used to deliver dialtone to apartment dwellers.

Example 4

An apartment complex has 7-digit dialing, and because of overlay area codes, requires to use 10-digit ANI. The 7-digit DNs encompass several NXXs.

A single CLID table entry will suffice to handle all such subscribers on a customer, unless there are multiple area codes involved, when there will need to be one entry per NPA.

Set up a CLID table entry number **6**, and assign this CLID table number to all DID keys and telephones.

The ESA data for entry 6 in overlay 15 will be:

HNTN	404	Area code (NPA)
ESA_HLCL		leave blank
ESA_INHN	yes	Include NPA, if a 10-digit ANI required
ESA_APDN	yes	Append the DN after ESA_HLCL

This will form the ANI in the following way:

- ANI will be set to blank.
- The DN will be added onto the end, e.g. DN 7685123 will form 7685123.
- The area code will be added at the beginning, giving 4047685123.

Non-DID numbers

Non-DID numbers have to be mapped to individual DID numbers in most cases. Since this mapping is not systematic, there will have to be at least as many CLID table entries as there are DID numbers that have non-DIDs mapped to them. If some DID numbers have no non-DIDs mapped, they will not need a unique entry, but can use a common one as in examples 1 & 2 above.

Example 5

A customer has DID numbers in the range 5000–5999, and has non-DID numbers in the range 3000-3999. The Office Code is 768, and NPA is not required. Table 5 illustrates part of the CLID table configuration that would be required:

Table 5
CLID table configuration for non-DID numbers

DN	3008	3009	3010	5704 (DID)
Mapped to DID	5199	5704	5704	5704
CLID table entry number	84	85	85	7
HNTN	-	-		-
ESA_HLCL	768 5199	768 5704		768
ESA_INHN	no	no		no
ESA_APDN	no	no		yes
ANI formed	768 5199	768 5704		768 5704

The non-DID keys and telephones will have the corresponding table entries programmed in Overlays 10 & 11.

The DID number 5704 could equally well be mapped to itself (table entry 85), but it is easier for administration to map all DIDs to a common entry number (7 in this example).

Trunk Routes

Non-ISDN private network TIE trunk routes need to have an identifying DID number assigned. When a 911 call comes in over such a route, this number will be sent as the ANI to identify the originating location.

Example 6

The remote location is located in area code 339, and is within the Selective Routing capabilities from the hub node. The receptionist's DID DN at the remote node is 770-8700, and it is decided to use this number to identify the remote location.

Set up a CLID table number entry 5, and assign this CLID table number to the trunk route data block for the route.

The ESA data for entry 5 in Overlay 15 will be:

HNTN	339	Area code (NPA)
ESA_HLCL	7708700	Office area code (NXX)
ESA_INHN	yes	Include NPA, if a 10-digit ANI is used
ESA_APDN	no	Do not append the DN after ESA_HLCL

This will form the ANI in the following way:

- ANI will be set to 7708700.
- The area code will be added at the beginning, giving 3397708700.

ISDN trunk routes

Although the incoming CLID will be used as ANI on calls from an incoming ISDN TIE trunk route, a CLID entry should still be set up. This will be used as the ANI if no valid CLID is received. The data entry shown in Example 6 will apply for this case also.

Attendants

An entry is required to define the ANI to be sent when attendants originate a 911 call. Attendants default to CLID table entry 0, which uses the LDN0 as the DN to be used.

Example 7

Set up CLID table number entry **0**, which will be used for all attendant consoles in the customer. The Office Code is 768, the Area Code is 404, and the LDN0 is 0100.

The ESA data for entry 0 in Overlay 15 will be:

HNTN	404	Area code (NPA)
ESA_HLCL	768	Office code (NXX)
ESA_INHN	yes	Include NPA, if a 10-digit ANI required
ESA_APDN	yes	Append the LDN0

This will form the ANI in the following way:

- ANI will be set to 768.
- The LDN0 will be appended at the end, giving 7680100.
- The area code will be added at the beginning, giving 4047680100.

If the Console Presentation Groups feature is being used, a different LDN0 can be programmed for each CPG. This will allow different ANIs to be constructed for each CPG, which will allow a distinct ALI record. Thus a different CPG Tenant with LDN0 of 4300 will generate an ANI of 4047684300.

If all attendants are to be mapped to the same LDN0 (single tenant and co-located) the LDN0, or any other desired DID DN, could be built into ESA_HLCL, and ESA_APDN set to 'NO.'

Emergency Services Access Call Routing

The ESA Call Routing function allows the system administrator to configure an outgoing route to only handle ESA calls (using the ESRT prompt in Overlay 24).

Note: Although it is recommend that dedicated trunks be configured to handle only ESA calls, and generally a minimum of two, the designated trunk routes may be shared with other types of calls.

As soon as an ESA call is made, the Meridian 1 identifies the call as being an ESA call (based on the ESA Call Recognition function.) The Meridian 1 then seizes the first available trunk designated as an ESA emergency services trunk, and routes the call over that trunk. If no ESA emergency services trunk is available, then the call will overflow to the alternate route (as configured in Overlay 16 in response to the STEP prompt).

The following trunk route types can be designated to handle ESA emergency calls only:

- Centralized Automatic Message Accounting (CAMA)
- Central Office (COT)
- Direct Inward Dial (DID)
- Foreign Exchange (FEX)
- TIE
- Wide Area Telephone Service (WATS)

Note: An NI-2 Call By Call or Integrated Services Access (ISA) service route may be configured as an ESA emergency call route, as long as it is one of the above types.

Since it is important for ESA calls to be able to terminate on the outgoing trunk designated to handle ESA emergency calls, ESA calls override any access restrictions placed on outgoing trunks (refer to “Access Restrictions” on page 80 of the feature interactions section for more details.)

Calling and called number information for ESA calls routed to a CAMA trunk

This section describes the called number information for ESA calls routed to a Centralized Automatic Message Accounting (CAMA) trunk. A CAMA trunk is a trunk type that is mostly used to provide Private 911 services by the Meridian 1.

For a Meridian 1 to PSAP connection, or in a Meridian 1 to Central Office to PSAP connection, the use of CAMA trunks between the Meridian 1 and the PSAP, or between Meridian 1 and the CO, is recommended by the FCC.

Whenever an ESA call is routed to an outgoing CAMA trunk, a called number and calling number information are sent using Multifrequency (MF) signaling.

Called number information

The called number information for outgoing ESA calls over CAMA trunks consists of, in order, a Key Pulse (KP) signal, the called number signals, and a Start (ST) signal.

As per the existing Enhanced 911 (E911)¹ Switch Access requirements, the called number to access emergency services in North America is expected to be either 911, 11, or 1. It is up to the E911 provider to specify the digits that the Meridian 1 is to output as the called number. This outputted number may be different than the ESDN. Using prompt DDGT in Overlay 24 (previously only used for Direct Inward System Access administration), the system administrator may configure “ESA Directing Digits.” For ESA calls terminating on CAMA trunks, these DDGT digits are outputted as the called number rather than the ESDN.

Calling number information

The calling number information for outgoing ESA calls over CAMA trunks consists of, in order, a Key Pulse (KP) signal, an information digit signal, the calling number signals, and a Start (ST) signal.

1. Enhanced 911 refers to the delivery of calling party numbers to the PSAP with 911 calls.

As per the existing E911 requirements, the information digit for ESA calls must be either '0' if the calling number is transmitted by the Meridian 1, or '2' if the Meridian 1 does not know and cannot transmit the calling number.

The ESA feature sets the outgoing calling number to be one of the following:

- For a station set to CAMA trunk ESA call, the outgoing calling number is the ESA calling number that has been composed for the station set (refer to Table 1, “ESA calling number composition for station set-initiated ESA calls,” on page 26.)
- For an attendant console to CAMA ESA call, the outgoing calling number is the ESA calling number that has been composed for the attendant console (refer to Table 3, “ESA calling number composition for attendant-initiated ESA calls,” on page 28.)
- For a trunk to CAMA tandem ESA call, the outgoing calling number is as follows:
 - On a Meridian 1 system not equipped with the ESA_SUPP package, the outgoing calling number is the ESA calling number composed for the incoming trunk route (refer to Table 4, “ESA calling number for incoming trunk-initiated tandem ESA calls,” on page 29), regardless of whether an ANI/CLID is passed in by the incoming trunk.
 - On a Meridian 1 system equipped with the ESA_SUPP package, if a valid ANI/CLID¹ is passed in by the incoming trunk (such as an ISDN trunk, M911 trunk, or Feature Group D trunk), the outgoing calling number is set by the ESA feature to be the incoming ANI/CLID. If the incoming trunk does not pass on an ANI/CLID, or if the ANI/CLID is invalid, then the ESA feature sets the outgoing calling number to be the ESA calling number that has been composed for the incoming trunk route. Refer to Table 4, “ESA calling number for incoming trunk-initiated tandem ESA calls,” on page 29 Table 6 describes the resulting calling number that is sent.

Please bear in mind the information contained in “A note on the Flexible Numbering Plan and ESA” on page 20 when viewing these tables.

1. As per E911 requirements, the calling number for North America is expected to be 7 or 10 digits.

Table 6
Calling number for incoming trunk-initiated tandem ESA call

Length of incoming ANI/CLID	Length of ESA calling number for the incoming trunk	Resulting calling number
7 or 10	Does not matter	Incoming ANI/CLID
Other than 7 or 10	7 or 10	ESA calling number for the incoming trunk
Other than 7 or 10	Other than 7 or 10	Null

Once the outgoing calling number is identified, the resulting calling number information that is outputted is described in Table 7.

Table 7
CAMA Multifrequency Compelled format of the calling number information

Calling number length	Calling number information
0	KP_2_ST
7	KP_0_7 digit calling number_ST
10	KP_0_10 digit calling number_ST

Calling and called number information for ESA calls routed to an ISDN trunk

This section describes the called number information for ESA calls routed to an ISDN trunk. For a Meridian 1 to Meridian 1 to Central Office (optional) to PSAP tandem scenario, the use of ISDN trunks (either PRI or ISL) between the Meridian 1 and the Meridian 1 is recommended. This is to allow the appropriate ESA calling number to be composed by the originating node and to be passed on by the Meridian 1 tandem node(s).

Called number information

When an ESA call is routed to an outgoing ISDN trunk, the ESDN is sent as the called number in the SETUP message using the existing ISDN protocol. The values for Numbering Plan Identification (NPI) and the Type of Number (TON) are defined in the called number Information Element as shown in Table 8.

Table 8
TON and NPI for the ESA called number

Outgoing ISDN trunk type	Numbering Plan	Type of Number
TIE	Private	Unknown
Others	E163 for a Lucent ESS4/ESS5 interface	Local
	E.164 for all other interfaces	

Calling number information

When an ESA call is routed to an outgoing ISDN trunk, the outgoing CLID is set to be one of the following:

- For a station set/attendant console to non-ISDN trunk ESA call, the outgoing calling number is the ESA calling number that has been composed for the station set (refer to Table 1, “ESA calling number composition for station set-initiated ESA calls,” on page 26) or attendant console (refer to Table 3, “ESA calling number composition for attendant-initiated ESA calls,” on page 28.)

- For a trunk to ISDN tandem ESA call, the outgoing calling number is as follows:
 - If no ANI/CLID is passed in by the incoming trunk, then the outgoing calling number is set to be the ESA calling number composed for the incoming trunk route (refer to Table 4, “ESA calling number for incoming trunk-initiated tandem ESA calls,” on page 29.)
 - If ANI/CLID is passed in by the incoming trunk, then the outgoing calling number is set to be the incoming ANI/CLID.

Once the ESA outgoing calling number is identified, it is sent as the CLID in the SETUP message using the existing ISDN protocol. The values for Numbering Plan Identification (NPI) and the Type of Number (TON) are defined in the calling number Information Element as shown in Table 9.

Table 9
TON and NPI for the ESA calling number

Calling number length	Numbering Plan	Type of Number
1-9	E163 for a Lucent ESS4/ESS5 interface	Local
	E.164 for all other interfaces	
10 or more	E163 for a Lucent ESS4/ESS5 interface	National
	E.164 for all other interfaces	

Calling and called number information for ESA calls routed to all other outgoing trunks

This section describes the called number information for ESA calls routed to all other types of outgoing trunks.

Called number information

When an ESA call is routed to any other outgoing trunk, the ESDN is sent as the called number. It is up to the far end to recognize the called number and to process it accordingly.

Calling number information

When an ESA call is routed to any other outgoing trunk, the ESA feature does not transmit a calling number, since these trunks cannot carry calling number information.

ESA On Site Notification

The ESA On Site Notification (OSN) function notifies local security personnel that an emergency call has occurred. This notification can be provided by a maintenance device or a Meridian 1 proprietary set with display. The maintenance device and OSN set are independent of one another, and can be configured together, or one without the other (MTC is entered in response to the USER prompt in Overlay 17).

When an emergency call is placed, the On-Site Notification function automatically broadcasts an On-Site Notification call record to the output devices. If the History File (ADAN = HST in Overlay 17) is configured as a maintenance device, then the OSN call record will be saved in the History File.

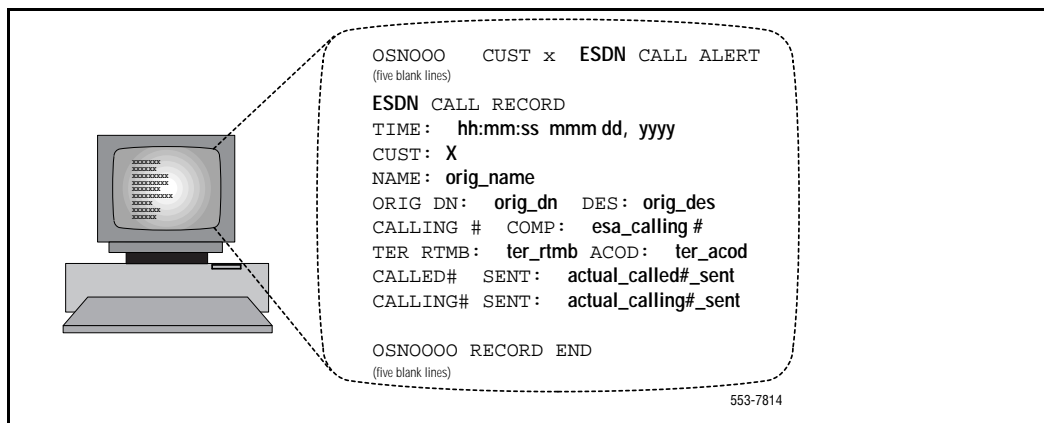
ESA On Site Notification output device print

Call record for a station set-initiated ESA call

Figure 1 illustrates the call record printed on the OSN output device for a station set-initiated ESA call.

Note that this output can be used by third-party vendors to create a PC application that would filter out any data not pertaining to ESA. In turn, this application could then be run on a Meridian 1 equipped with the ESA feature.

Figure 1
OSN call record print for a station set-initiated ESA call



Description of call record fields

Field	Description
x	The customer number, as defined using the CUST prompt in Overlay 10, 11, or 27.
ESDN	The customer Emergency Services Access DN, as defined using the ESDN prompt in Overlay 24.
hh:mm:ss	The 24-hour time stamp of when the call was made (hour, minute, and second).
mmm dd yyyy	The date stamp of when the call was made (month, day, and year).
orig_name	The name associated with the originating DN ^a , as defined using the NAME prompt in Overlay 95.
orig_dn	The DN associated with the originating set.
esa_calling#	The calling number composed by the ESA Call Termination Identification function, for the originating station set.
orig_des	The telephone designator ^b of the originating station set.
ter_rtmb	The route and member number of the outgoing trunk on which the ESA call terminated, as defined using the RTMB prompt in Overlay 14.
ter_acod	The route access code of the outgoing trunk on which the ESA call terminated.
actual_called#_sent	The called number that was sent.
actual_calling#_sent	The calling number that was sent.

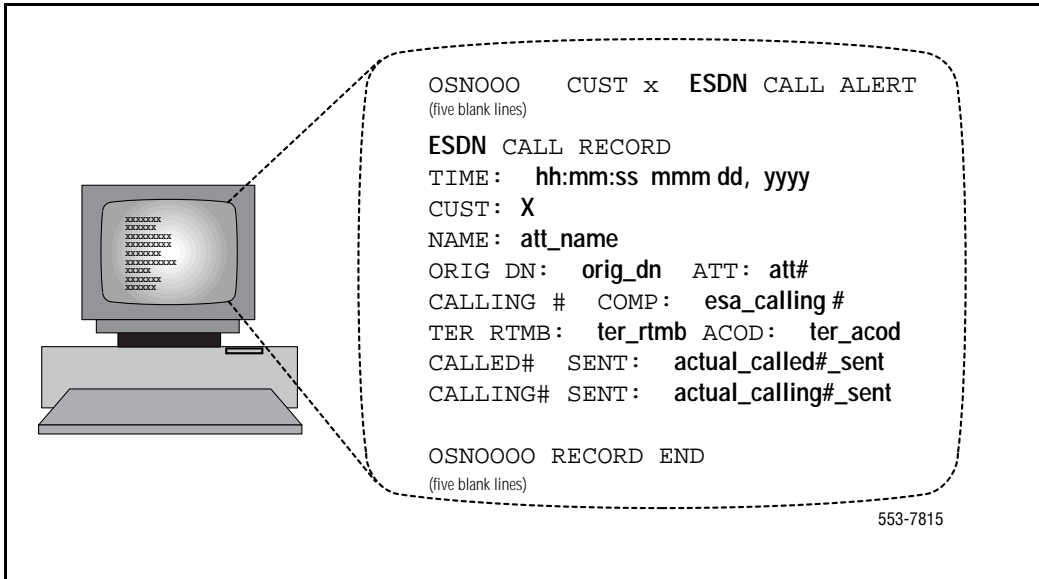
a. The Meridian 1 must be equipped with the Calling Party Name Display (CPND) package 95 in order to print the originating name.

b. The Meridian 1 must be equipped with the Office Data Administration System (ODAS) package 20 in order to print the telephone designator.

Call record for an attendant console-initiated ESA call

Figure 2 illustrates the call record printed on the OSN output device for an attendant console-initiated ESA call.

Figure 2
OSN call record print for an attendant console-initiated ESA call



Description of call record fields

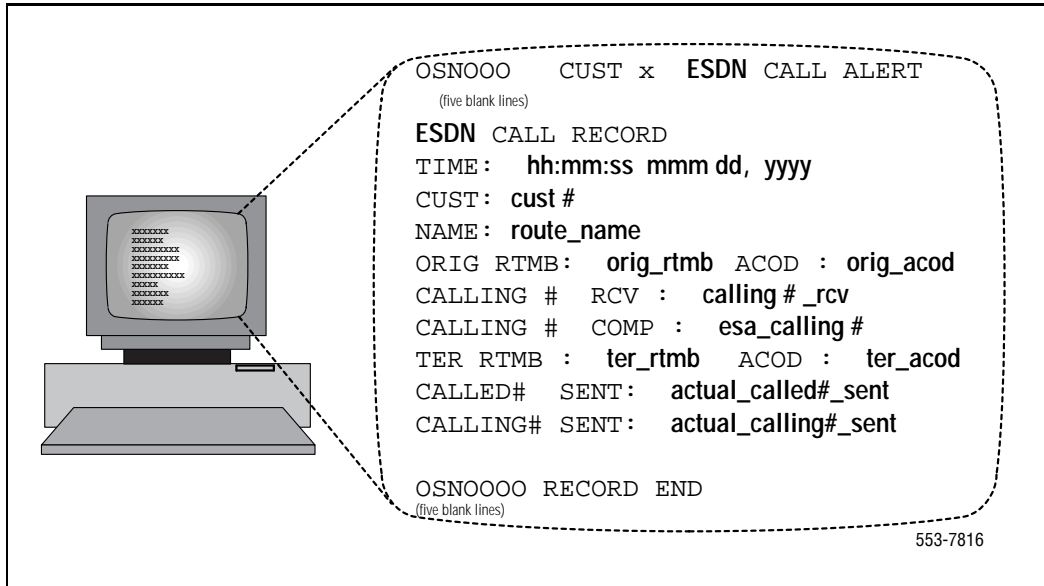
Field	Description
x	The customer number, as defined using the CUST prompt in Overlay 12.
ESDN	The customer Emergency Services Access DN, as defined using the ESDN prompt in Overlay 24.
hh:mm:ss	The 24-hour time stamp of when the call was made (hour, minute, and second).
mmm dd yyyy	The date stamp of when the call was made (month, day, and year).
att_name	The name associated with the attendant DN ^a , as defined using the NAME prompt in Overlay 95.
orig_dn	The attendant DN, as defined using the ATDN prompt in Overlay 15.
attn#	The attendant number, as defined using the ANUM prompt in Overlay 12.
esa_calling#	The calling number composed by the ESA Call Termination Identification function, for the originating attendant console.
ter_rtmb	The route and member number of the outgoing trunk on which the ESA call terminated, as defined using the RTMB prompt in Overlay 14.
ter_acod	The route access code of the outgoing trunk on which the ESA call terminated.
actual_called#_sent	The called number that was sent.
actual_calling#_sent	The calling number that was sent.

a. The Meridian 1 must be equipped with the Calling Party Name Display (CPND) package 95 in order to print the originating name.

Call record for an incoming trunk-initiated tandem ESA call

Figure 3 illustrates the call record printed on the OSN output device for an incoming trunk-initiated tandem ESA call.

Figure 3
OSN call record print for an incoming trunk-initiated tandem ESA call



Description of call record fields

Field	Description
x	The customer number, as defined using the CUST prompt in Overlay 12.
ESDN	The customer Emergency Services Access DN, as defined using the ESDN prompt in Overlay 24.
hh:mm:ss	The 24-hour time stamp of when the call was made (hour, minute, and second).
mmm dd yyyy	The date stamp of when the call was made (month, day, and year).
route_name	The name associated with the incoming trunk route ^a , as defined using the NAME prompt in Overlay 95.
orig_rtmb	The route and member number of the incoming trunk, as defined using the RTMB prompt in Overlay 14.
orig_acod	The route access code of the incoming trunk on which the ESA call was initiated, as defined using the ACOD prompt in Overlay 16.
calling#_rcv	The calling number that was received from the incoming trunk.
esa_calling#	The calling number composed by the ESA Call Termination Identification function, for the incoming trunk route.
ter_rtmb	The route and member number of the outgoing trunk on which the ESA call terminated, as defined using the RTMB prompt in Overlay 14.
ter_acod	The route access code of the outgoing trunk on which the ESA call terminated, as defined using the ACOD prompt in Overlay 16.
actual_called#_sent	The called number that was sent.
actual_calling#_sent	The calling number that was sent.

a. The Meridian 1 must be equipped with the Calling Party Name Display (CPND) package 95 in order to print the originating name.

Provisioning an ESA On Site Notification set

A Meridian 1 proprietary display set may be designated as an On Site Notification set (only one OSN set may be configured per customer). The set is provisioned with an On Site Notification (OSN) key, using the KEY prompt in Overlay 11. The OSN key can only be used to display ESA caller information. It cannot be used to make or receive a call.

A single appearance station DN on the OSN set is designated as the customer's On Site DN using the OSDN prompt on Overlay 14. This OSDN is used by the On Site Notification function to locate and alert the OSDN set that an ESA call has taken place.

The following events also take place when an ESA call is detected:

- The caller information is copied into a separate memory block (call register).
- The OSN key lamp begins to flash.
- The OSN buzzing is activated for 10 seconds.

OSN set considerations

The OSN set display feature is intended for small installations, where cost is a major factor, and 911 calls are likely to be infrequent. Accordingly, the following limitations should be noted:

- Only one OSN Set can be defined per customer.
- Only one ESA call can be handled at a time. Calls cannot be queued for the OSN Set. The second and subsequent simultaneous calls will not be notified, even if the first call information is cleared while the second call is in progress.
- ESA information must be cleared off the OSN set manually, before another ESA call information can be presented. This is to prevent successive (often related) emergency calls from “rippling” across the set before the operator has a chance to properly process them.

ESA Call Answering

The OSN function does not answer the ESA call; the call continues to the ESA trunk and the PSAP quite normally. Similarly, the OSN set operator cannot monitor the call directly.

If call monitoring is required, and allowed, the OSN set can dial the originating 911 caller's number and perform an override. This will form a conference between the caller, the PSAP, the OSN set, and a warning tone. Note that some jurisdictions do not allow this kind of conference, and many public safety officials disapprove of it, so check carefully before implementation.

It is also possible to route the outgoing trunks back into the Meridian 1 and answer them internally, rather than routing to the PSAP. Refer to the section "Standalone configuration (on-site call answering)" on page 67 for details. It is also conceivably possible to combine the answering set with the OSN function. This will, however, require the OSN set user to be very careful in his operating procedures in order to avoid losing the ESA information. It is definitely not recommended in large installations; in these, the SDI Port output would form the basis of OSN display.

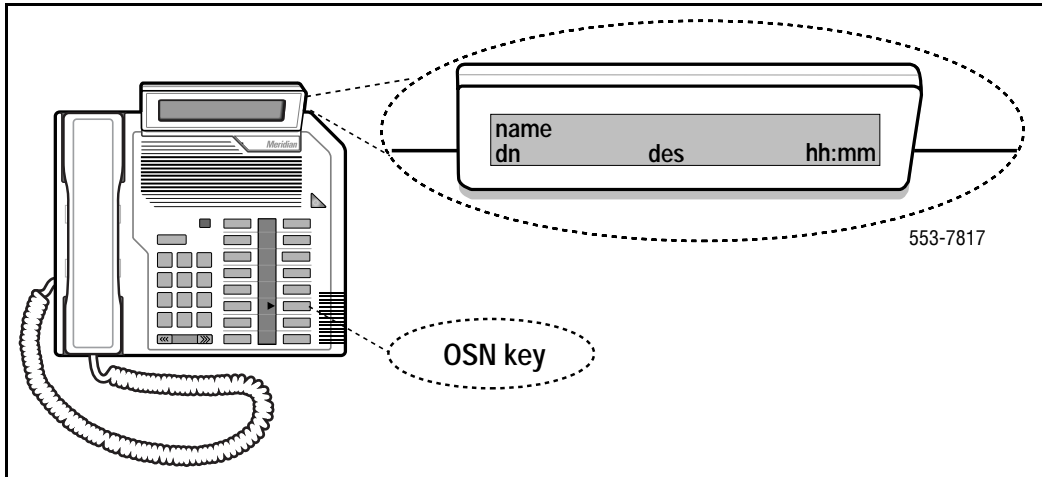
The following sections contain information pertaining to the OSN set displays. For details on OSN set operation (how to view and discard the caller information) and key lamp states, please refer to the section "Feature operation" on page 105.

OSN set displays

OSN set display for a station set-initiated ESA call

Figure 4 illustrates the OSN set display for a station set-initiated ESA call. A description of the fields follows.

Figure 4
OSN set display for a station set-initiated ESA call



Field	Description
name	The name (as defined using the NAME prompt in Overlay 95) associated with the originating DN ^a .
dn	The originating DN.
des	The telephone designator ^b of the originating set (as defined using the DES prompt in Overlay 10, 11, or 27).
hh:mm	The 24-hour time stamp of when the ESA call was made.

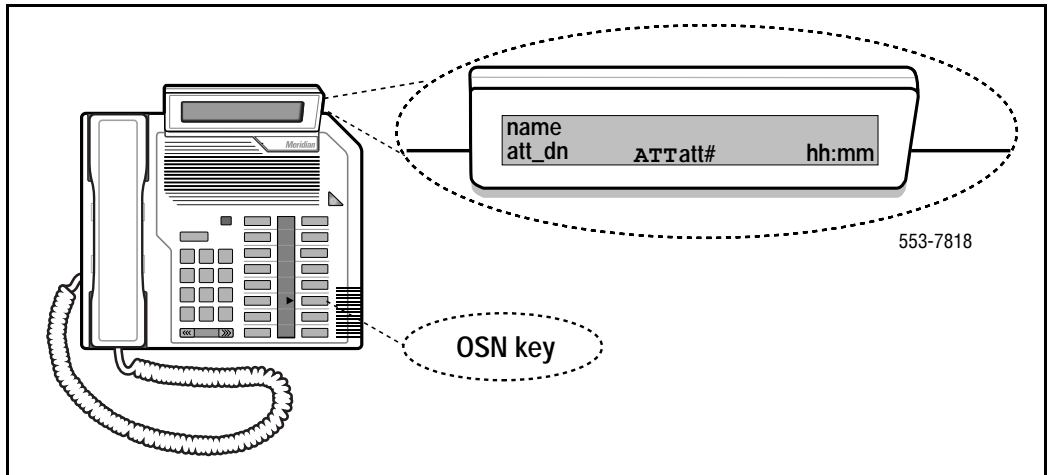
a. The Meridian 1 must be equipped with the Calling Party Name Display (CPND) package 95 in order to display the originating name.

b. The Meridian 1 must be equipped with the Office Data Administration System (ODAS) package 20 in order to display the telephone designator.

OSN set display for an attendant-initiated ESA call

Figure 5 illustrates the OSN set display for an attendant-initiated ESA call. A description of the fields follows.

Figure 5
OSN set display for an attendant console-initiated ESA call



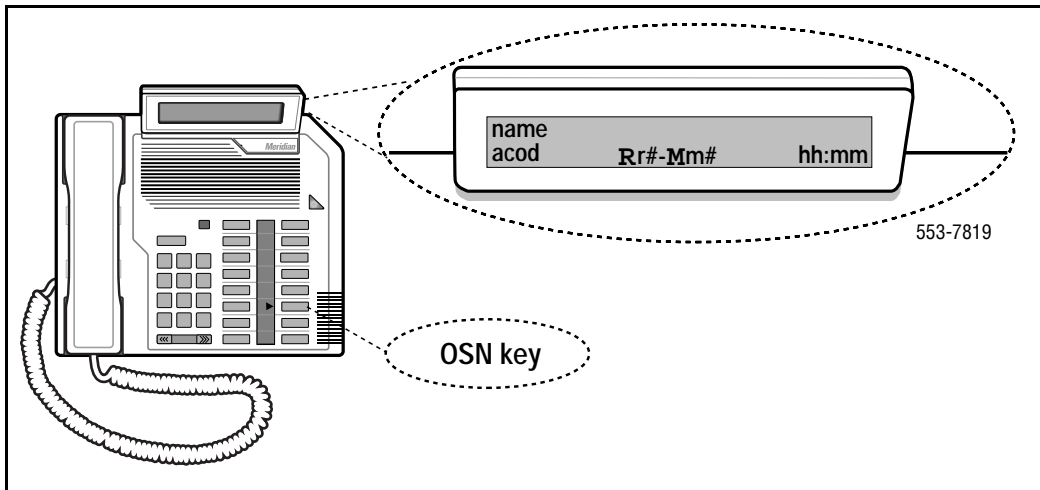
Field	Description
name	The name (as defined using the NAME prompt in Overlay 95) associated with the attendant DN ^a .
attn_dn	The attendant DN (as defined using the ATDN prompt in Overlay 15).
ATTatt#	The attendant number of the originating attendant console (as defined using the ANUM prompt in Overlay 12).
hh:mm	The 24-hour time stamp of when the ESA call was made.

a. The Meridian 1 must be equipped with the Calling Party Name Display (CPND) package 95 in order to display the originating name.

OSN set display for an incoming trunk-initiated tandem ESA call

Figure 6 illustrates the OSN set display for an incoming trunk-initiated tandem ESA call. A description of the fields follows.

Figure 6
OSN set display for an incoming non-ISDN trunk-initiated tandem ESA call



Field	Description
name	The name (as defined using the NAME prompt in Overlay 95) associated with the attendant DN ^a .
acod	The route access code of the incoming trunk (as defined using the ACOD prompt in Overlay 16).
Rr#-Mm#	The route and member number of the incoming trunk (as defined using the RTMB prompt in Overlay 14).
hh:mm	The 24-hour time stamp of when the ESA call was made.

a. The Meridian 1 must be equipped with the Calling Party Name Display (CPND) package 95 in order to display the originating name.

System configurations

The following sections describe the most common Meridian 1 system configurations that are possible with ESA.¹ Samples are provided to show typical non-networking and networking configurations. Also, a standalone configuration, where ESA calls are answered on the business premises, rather than being forwarded to the PSAP, is presented at the end of the section.

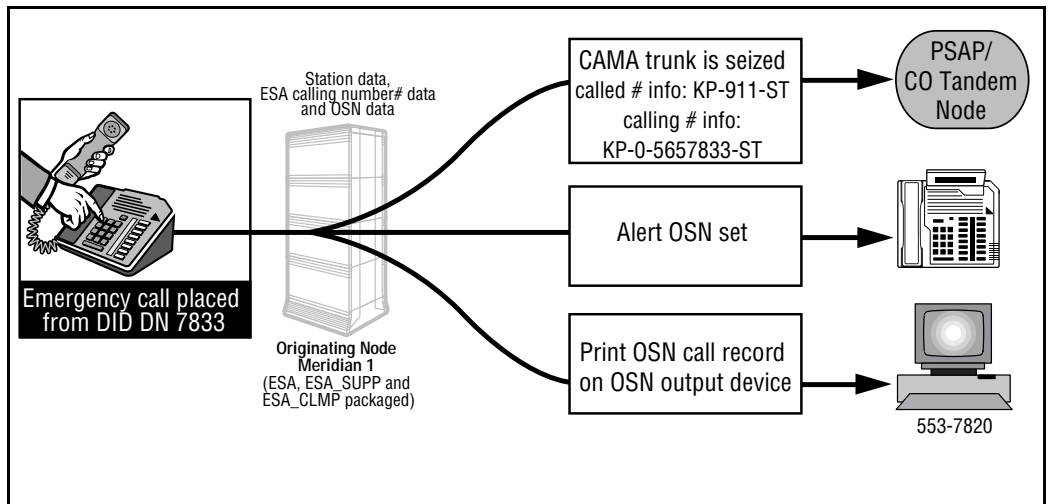
Note: In the diagrams, CAMA trunks are depicted as handling ESA calls. However, ISDN trunks are equally applicable.

Non-networking ESA configurations

Sample configuration for a DID DN ESA call

Figure 7 illustrates a Meridian 1 system with the ESA feature handling a DID DN ESA call.

Figure 7
Meridian 1 non-networking ESA application for a DID DN call



1. Please note that, as discussed in the section "Different applications of ESA" on page 15, there are variations to how ESA may be configured.

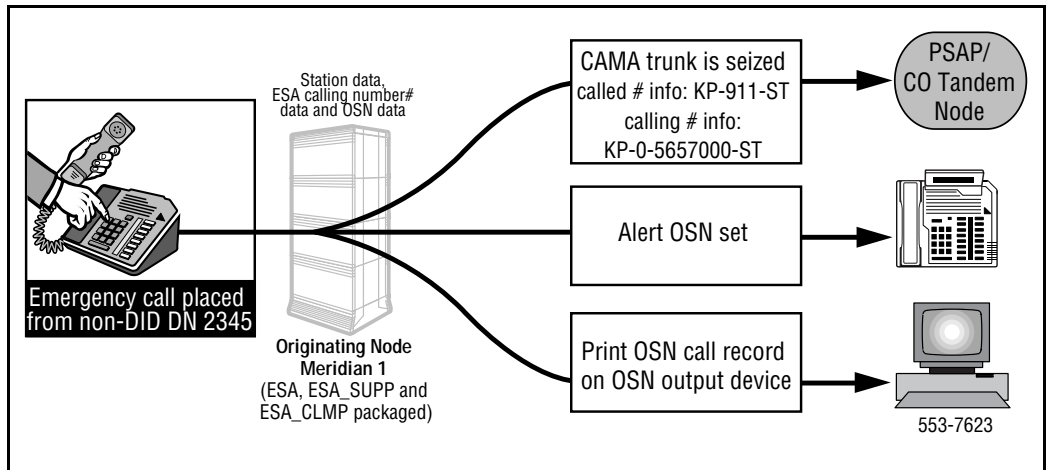
In Figure 7, an emergency call is placed at the originating node from DID DN 7833 (by dialing the ESDN 911). The following call processing takes place:

- An outgoing CAMA trunk is seized at the originating node.
- 911 is outpulsed as the CAMA trunk directing digits (911 is entered against the DDGT prompt in Overlay 24) via MF signaling.
- The appropriate calling number information for the DID DN is composed and outpulsed via MF signaling. Refer to the section “Calling number for station set-initiated ESA calls” on page 26.
- The OSN set is alerted by ESA.
- The OSN call record is printed on the output device. Refer to Figure 1 “OSN call record print for a station set-initiated ESA call” on page 44.

Figure 8 illustrates a Meridian 1 system with the ESA feature handling a non-DID DN ESA call.

Sample configuration for a non-DID DN ESA call

Figure 8
Meridian 1 non-networking ESA application for a non-DID DN call



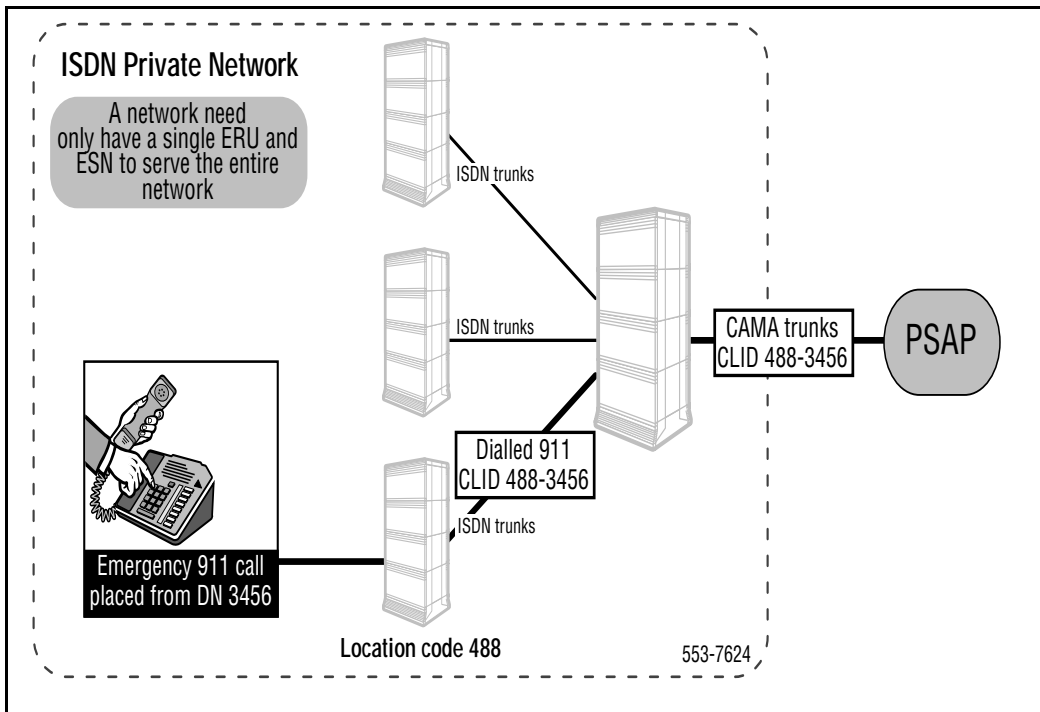
In Figure 8, an emergency call is placed at the originating node from non-DID DN 2345 (by dialing the ESDN 911.) The following call processing takes place:

- An outgoing CAMA trunk is seized at the originating node.
- 911 is outpulsed as part of the called number via MF signaling.
- The appropriate calling number information for the non-DID DN is composed and outpulsed via MF signaling. Refer to the section “Calling number for station set-initiated ESA calls” on page 26.
- The OSN set is alerted by ESA.
- The OSN call record is printed on the output device. Refer to Figure 1 “OSN call record print for a station set-initiated ESA call” on page 44.

Networking ESA configuration

This configuration, as shown in Figure 9, will appeal to users who normally route all of their outgoing calls through a single hub location, as well as those with a more complex configuration. Callers can still dial 911 at remote locations, and have their calls routed automatically across the private network to the hop-off point. At that point, they are routed to the PSAP. All locations would typically be running ESA, with the same ESDN at each node.

Figure 9
Meridian 1 networking configuration



Configuration guidelines

Note, however, that this arrangement is not satisfactory if such network calls can be overflowed to the public network or to non-ISDN links. In these cases, the overflow mechanism should be a direct local CO connection, which would still allow 911 calls to be completed, albeit without the benefits of the ANI.

Thought should also be given to the engineering of the ISDN links if this arrangement is adopted. It is important to ensure that a trunk is always available, and it would be prudent to allow a dedicated route of one or two channels in the PRI link for 911 purposes.

If the network links are not ISDN, it will only be possible to identify the location, and not the individual station. The trunk route can be programmed to provide a single unique number that is sent as the ANI.

Before planning this configuration, care should also be taken that calls will route to the correct PSAPs. The public 911 tandem network usually provides a feature known as Selective Routing, which will route a 911 call to the correct PSAP based on the ANI. However, this generally only works within a limited area, and it might not be possible for the hub's 911 connection to correctly route calls from some distant locations. The customer should always check with the Telco or Public Safety agency before committing to this arrangement, and plan additional 911 access at locations where routing might be a problem.

How to set up the ESA networking requirements

At the remote nodes, the following configuration is required:

- Set the outgoing trunk routes to be dedicated or shared.
- Ensure that the outgoing ESDN is the same as the ESDN outputted at the hub.
- Set up OSN.

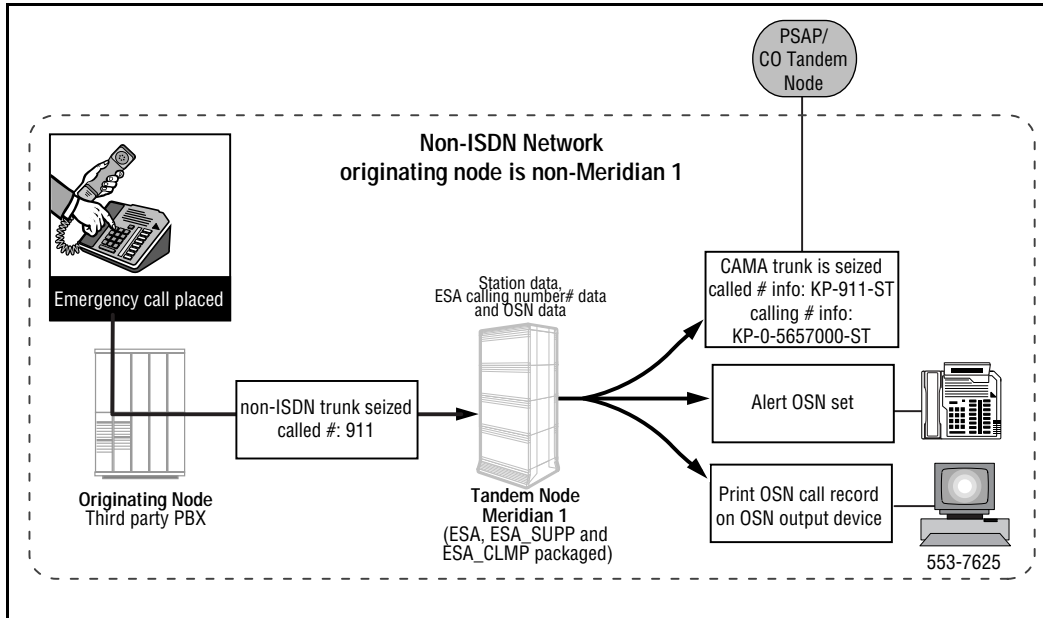
At the hub, no special set up is required, since the CLID delivered by the ISDN link is used (the ANI from the hub is ignored).

Sample ESA networking configurations

Non-ISDN network, originating node is non-Meridian 1

Figure 10 illustrates a Meridian 1 non-ISDN network ESA configuration, where the originating node is a non-Meridian PBX, or possibly a Meridian 1 running pre-Release 23 software.

Figure 10
Non-ISDN networking ESA configuration, originating node is non-Meridian 1



In Figure 10, an emergency call is placed from the originating node over a non-ISDN trunk to a tandem Meridian. At the tandem Meridian 1, the following call processing takes place:

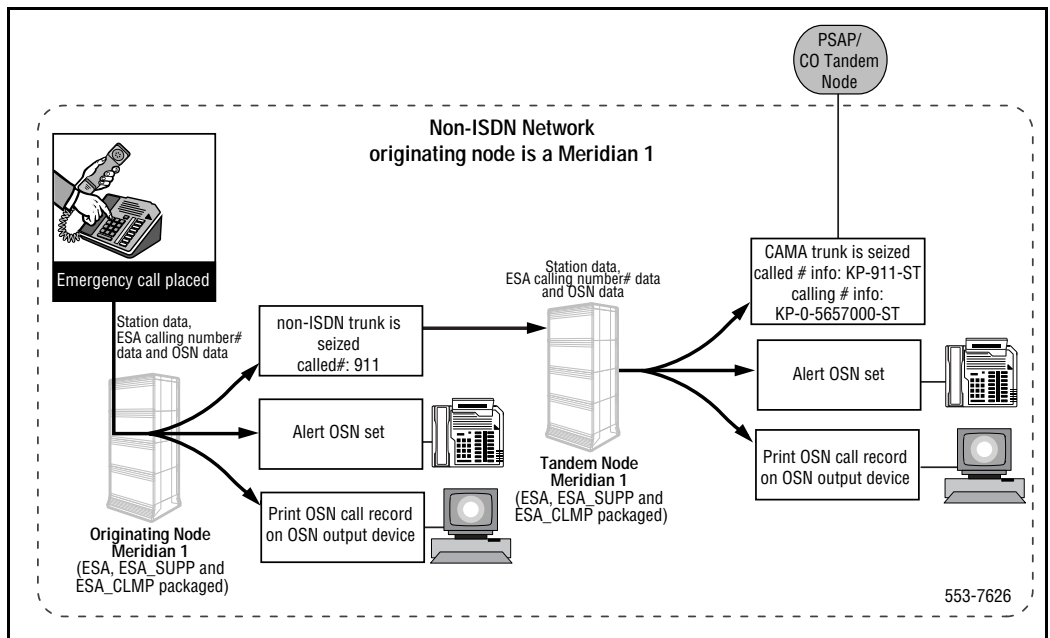
- An outgoing CAMA trunk is seized.
- 911 is outpulsed as part of the called number via MF signaling.
- The appropriate calling number information for the incoming non-ISDN trunk is composed and outpulsed via MF signaling. Refer to the section “Calling number for incoming non-ISDN trunk-initiated tandem ESA calls” on page 29.

- The OSN set is alerted by ESA.
- The OSN call record is printed on the output device. Refer to Figure 3 “OSN call record print for an incoming trunk-initiated tandem ESA call” on page 48.

Non-ISDN network, originating node is a Meridian 1

Figure 11 illustrates a Meridian 1 private non-ISDN network ESA configuration. In this case, the originating node is a Meridian 1, which can output display information (the Meridian 1 is running Release 23 software and equipped with ESA).

Figure 11
Non-ISDN networking ESA configuration, originating node is a Meridian 1



In Figure 11, an emergency call is placed from the originating node, where the following call processing occurs:

- An outgoing Meridian 1 non-ISDN trunk is seized.

- 911 (which has been defined as the ESDN in Overlay 24) is outpulsed as part of the called number.
- The OSN set is alerted by ESA.
- The OSN call record is printed on the output device. Refer to Figure 3 “OSN call record print for an incoming trunk-initiated tandem ESA call” on page 48.

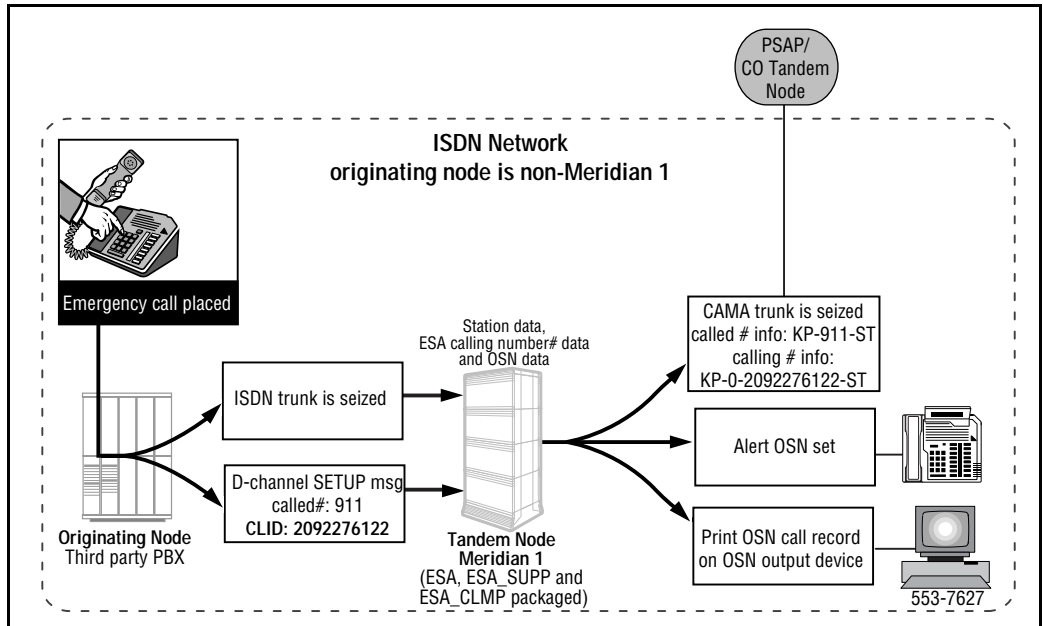
At the tandem node, the following call processing takes place:

- An outgoing CAMA trunk is seized.
- 911 is outpulsed as part of the called number via MF signaling.
- The appropriate calling number information for the incoming non-ISDN trunk is composed and outpulsed via MF signaling. Refer to the section “Calling number for incoming non-ISDN trunk-initiated tandem ESA calls” on page 29.
- The OSN set is alerted by ESA.
- The OSN call record is printed on the output device. Refer to Figure 3 “OSN call record print for an incoming trunk-initiated tandem ESA call” on page 48.

ISDN network, originating node is non-Meridian 1

Figure 12 illustrates a Meridian 1 non-private ISDN network ESA configuration. In this example, the originating node is a non-Meridian PBX, or possibly a Meridian 1 running pre-Release 23 software and one of the Meridian supported inter-vendor protocols (such as QSIG).

Figure 12
ISDN networking ESA configuration, originating node is non-Meridian 1



In Figure 12, an emergency call is placed from the originating node, where the following call processing occurs:

- An outgoing Meridian 1 ISDN trunk is seized.
- 911 (which has been defined as the ESDN in Overlay 24) is outpulsed as part of the called number via ISDN messaging.

- The appropriate calling number is composed for the ISDN trunk (refer to the section “Calling and called number information for ESA calls routed to an ISDN trunk” on page 41), and passed on to the tandem node via CLID messaging.

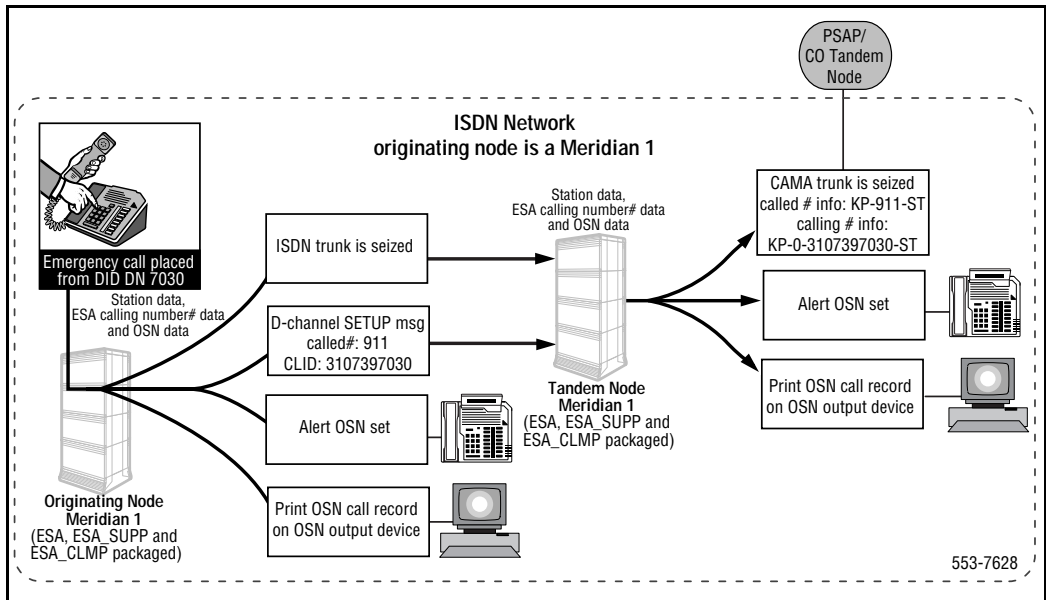
At the tandem node, the following call processing takes place:

- An outgoing CAMA trunk is seized.
- 911 is outpulsed as the called number via MF signaling.
- The CLID received from the incoming trunk is retrieved and outpulsed as the calling number, via MF signaling.
- The OSN set is alerted by ESA.
- The OSN call record is printed on the output device. Refer to Figure 3 “OSN call record print for an incoming trunk-initiated tandem ESA call” on page 48.

ISDN network, originating node is a Meridian 1

Figure 13 illustrates a Meridian 1 private ISDN network ESA configuration, where the originating node is a Meridian 1 running Release 23 software and equipped with ESA.

Figure 13
ISDN networking ESA configuration, originating node is a Meridian 1



In Figure 13, an emergency call is placed from the originating node, where the following call processing occurs:

- An outgoing Meridian 1 ISDN trunk is seized.
- 911 (which has been defined as the ESDN in Overlay 24) is outpulsed as the called number via ISDN messaging.
- The appropriate calling number is composed for the ISDN trunk (refer to the section “Calling and called number information for ESA calls routed to an ISDN trunk” on page 41), and passed on to the tandem node via CLID messaging.

At the tandem node, the following call processing takes place:

- An outgoing CAMA trunk is seized.
- 911 (which has been defined as the using the DDGT in Overlay 24) is outpulsed as the called number via MF signaling.
- The CLID received from the incoming trunk is retrieved and outpulsed as the calling number, via MF signaling.
- The OSN set is alerted by ESA.
- The OSN call record is printed on the output device. Refer to Figure 3 “OSN call record print for an incoming trunk-initiated tandem ESA call” on page 48.

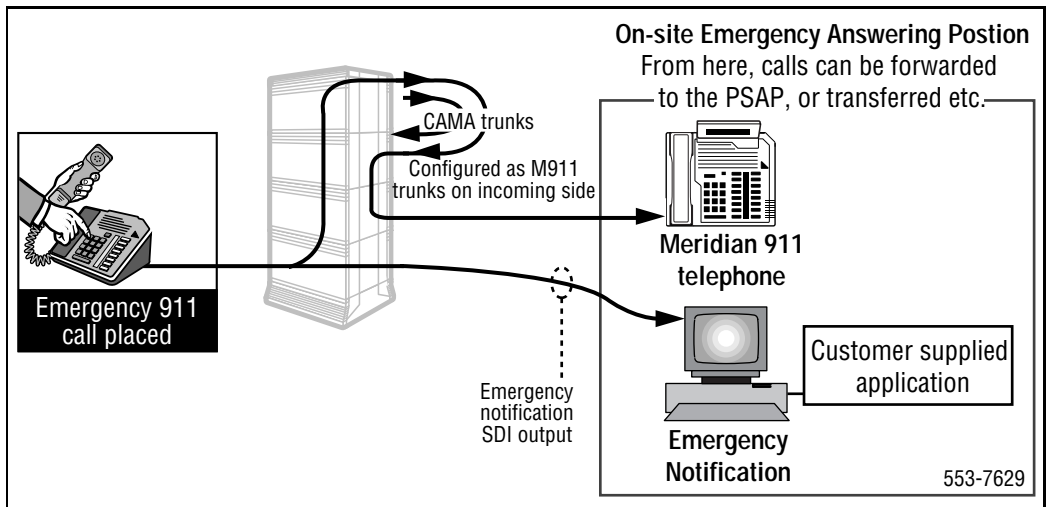
Standalone configuration (on-site call answering)

A standalone configuration is one where ESA calls are answered on the business premises, rather than being forwarded to the PSAP. The calls, however, may then be redirected to the PSAP, if required.

The configuration is illustrated by Figure 14 (using CAMA trunks) and by Figure 15 (using ISDN trunks).

Note: This configuration does not provide what the legislation requires. However, in jurisdictions where no legislation yet exists, there are requirements for it. If it is used, you should be aware that later legislation may require you to reconfigure.

Figure 14
Meridian 1 ESA stand-alone configuration using CAMA trunks



The two CAMA trunks which normally go to the PSAP or 911 tandem are fed back into the Meridian 1. They must be configured as “Meridian 911” trunks at the Meridian 1, and invoke the Meridian 911 feature. Meridian 911 is an X11 feature which is designed to be used when a Meridian 1 is being used as a PSAP, and is used here to simulate a customer-owned PSAP.

Meridian 911 allows E911 CAMA trunks to bring incoming 911 calls into Meridian 1, and route them to either an ACD operation, or to single or multiple appearance telephones. Refer to Nortel Networks technical publication (NTP) 553-3001-305 for a more detailed description of Meridian 911.

Configuration guidelines

If the use of single or multiple appearance telephones is preferred over ACD, it will still be necessary to set up an ACD operation, and use the default ACD number for the Control DN (CDN) required by Meridian 911. The ACD queue should then be Night Call Forwarded to the desired single or multiple appearance DN. Note that this is the only way that emergency calls will be able to be automatically forwarded out of the system to the Public Safety Answering Point if internal answering is not being used at any time.

The Emergency Notification computer (if one is used) will be co-located with the Meridian 911 telephone, so that the call can be answered and the screen information made available at the same time.¹

To transfer calls to the public 911 service, use the No-Hold Conference (or Transfer) capabilities, to ensure that the caller is not disconnected while waiting for the connection. Note, however, that if the same customer is used to both originate and answer a call, the ESDN cannot be used, since the call would simply loop around another CAMA trunk back to the same telephone. It is recommended that ESN translation be used to ensure that the transferred call correctly exits the Meridian 1 on a trunk route to the Central Office and the PSAP. Similar consideration apply for Call Forward No Answer and Call Forward All Calls. You might want to consider putting the public 911 number into a No-Hold Conference Hotline key, to simplify such transfers.

It is not recommended that this configuration be used if the answering position is likely to be unattended. However, if the Meridian 911 customer is set up as indicated above for non-ACD operation, the telephone can be forwarded (Call Forward All Calls (preferred) or Call Forward No Answer) to the public network via ESN.

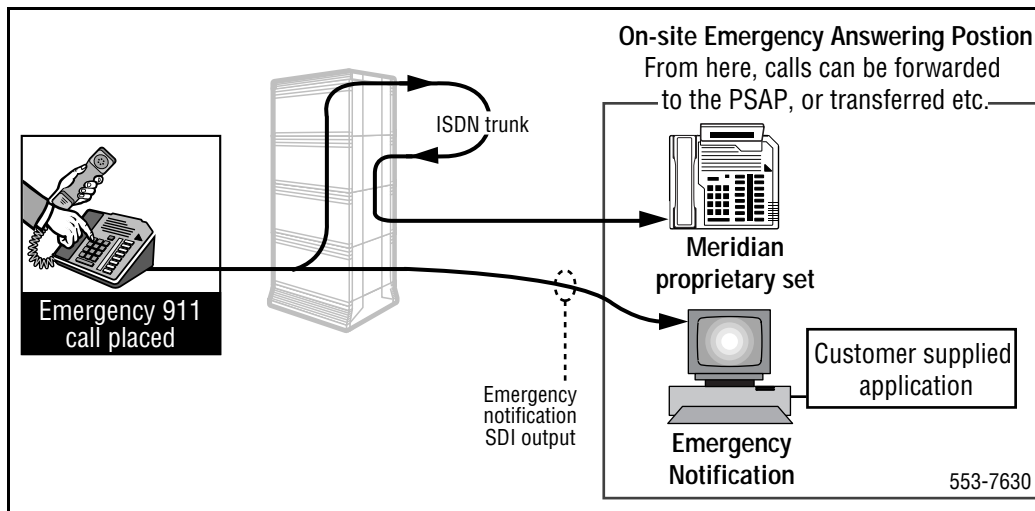
1. As mentioned in the section "ESA On Site Notification output device print" on page 44, a third-party application may be used to view the screen information.

The answering telephone should be set to 'Forward-No-Answer' to the public 911 service, in case the attendant inadvertently omits to set call forward when away. However, relying on CFNA like this will put a delay into the call answer, and is to be avoided. The phone should always be forwarded when unattended, even if momentarily.

Any configuration that allows unattended operation must be thoroughly tested before being put into service. If there is any doubt that all 911 calls will get properly routed, the position should be continuously staffed.

Note: If ISDN trunks are being used, they are not configured as Meridian 911 trunks. They are fed out and routed back in as ISDN trunks, as shown in Figure 15.

Figure 15
Meridian 1 ESA stand-alone configuration using ISDN trunks



Since the ESDN is always sent out as the directing number on ISDN ESA calls, care must be taken to ensure that the incoming loop call does not loop straight back out again. This may happen if the same customer is used, unless Autotermination or Incoming Digit Conversion is used on the incoming portion of the ISDN trunk loop.

Implementation and engineering considerations

The following items are required in order to implement ESA between the Meridian 1 and the Public Safety Answering Point (PSAP). You should get in touch with your service provider at an early date, to establish if there are any other requirements.

Note: These requirements have been largely based on U.S. practice, but broadly similar conditions will apply to other jurisdictions. A number of steps may not apply, or apply to a lesser extent if the ESA feature is being used for other than full functionality (as described in the section “Different applications of ESA” on page 15).

General considerations

- All buildings are required to have an address approved by the 911 emergency services provider, as these are the only ones that can be entered in the ALI database. You should verify with your 911 service provider or Telco that the addresses you propose to use are acceptable. Addresses may vary from building to building, especially in a campus environment.
- Each telephone station user's location will require a designation, such as a floor and room number, or pillar number. These designations should be consistent in design and clearly visible, as this information will be entered in the ALI database, as well as ENS. The proposed designations should be discussed and agreed with your 911 service provider or Telco. The database typically has a field for 20 alphanumeric characters.
- Telephones should be clearly marked with the digits that have to be dialed to initiate a 911 call.
- The primary routing for 911 calls will be via CAMA or ISDN trunks, in order to deliver telephone station user information (usually ANI) to the emergency services dispatcher. Alternate 911 routing should be established via regular central office trunk lines, in order to provide backup and overflow capabilities, even though ANI isn't available on these routes.

- Determine the number of trunks needed to handle the 911 traffic volume. The Telco or service provider's 911 contact should be able to assist in determining the number of CAMA or ISDN trunks required: two would be the recommended minimum. You then need to order these trunks and arrange an installation date.
- Analyze your Meridian 1 to determine your additional hardware and software requirements, if any. Generic X11 release 23 is required as a minimum.
- Analyze your DID numbers to see if you have a sufficient number, and if they are distributed appropriately. Order additional numbers if necessary.
- Determine how close you want to map DNs to actual locations on your premises (adjacent DID telephones). For example, one small group of desks or workstations may share one DID number, or one DID number may be designated per floor. This DID number may be real or fictitious. This DID number will be used to track down the point of origin in the case of an emergency call.
- Map all non-DID numbers to appropriately adjacent DIDs. Refer to "Digit translation examples" on page 30. Collect all location information for all telephones on the Meridian 1, along with other pertinent details.
- Program the required changes to the Meridian 1.
- A personal computer for operation of the ALI database software (if provided by your Telco or service provider) may be required, but it does not need to be a dedicated computer for this function. This PC is used for maintaining the addresses and telephone user database information, and to download it to the ALI database. A POTS line is also required for the PC's modem.

DID numbers

ESA deals effectively with non-DID numbers, by mapping them to nearby DID numbers. (Refer to “Digit translation examples” on page 30 for information). This means that large numbers of non-DID numbers can be used, but it also means that there needs to be a reasonable number of DID numbers to map them to. These DID numbers need to be strategically scattered throughout the organization, so that all non-DID numbers are reasonable close to a DID number.

Thought, therefore, needs to be given to whether there are enough DID numbers, and whether the distribution is satisfactory.

Trunk service (CAMA, ISDN) from Telco

It will be necessary to contact your local telephone service provider to obtain CAMA or ISDN trunk service, and a service agreement will have to be drawn up, based on applicable tariffs. CAMA trunks would typically be new service, while ISDN trunks would normally already be in use.

Meridian 1 hardware considerations

NTAG26AA is a MF Receiver card that is required to support the Meridian 911 feature in the standalone configuration. XUT trunk appearances are also required to be configured as incoming Meridian 911 trunks.

Database considerations

Data Management - general

When Private 911 is first implemented, a great deal of information may need to be gathered, concerning the locations and DNs of telephones, and the names of the users. Once the information is gathered, careful record-keeping will be required, and all changes must be properly recorded and made in all databases (including Meridian 1) at more or less the same time. This additional effort needs to be planned for.

Also, an agreement must be made with the agency maintaining the ALI database about the content and format of the location information, as well as updating procedures. Typically the content will include:

- street address of the building, and location information and access methods, if necessary

- the floor number
- location on the floor, e.g. NW corner, room number, pillar number, or something similar
- name of the principal user of the telephone, if appropriate

This information will have to be provided when the PBX is first installed or configured for Private 911 service, and also on an ongoing basis as service activity for Adds, Moves & Changes are carried out.

ALI database updating

When Private 911 is in use, it is required that all changes to station sets be registered in the external ALI database. This will be required not only at initial service time, but every time that a change is made to a station's location, DN, or user name. The Telco will have procedures in place to allow this to be done, and should be consulted at an early stage.

ALI database maintenance will be performed as a separate activity from the Meridian 1 service change, and strict procedures will be necessary to ensure consistency of the external ALI database with the Meridian 1. The Telco may offer one or more of the following methods to do this updating:

- a PC utility to post ALI updates via modem
- mailing in changes
- faxing changes
- other arrangements

As changes are made to the DNs and locations of the telephones in the switch, changes should be made to the ANI translation tables needed to provide the correct ANI (not always necessary, but should be checked), as well as the 'DES' and the external ALI.

The above issues pertaining to the ALI database updating are not part of the ESA feature, but an essential part of what the user has to do.

Special database considerations

Activities that can possibly cause inconsistencies are:

- Automatic Set Relocation and Modular Telephone Relocation. These are features where the user can move his/her own telephone simply by dialing appropriate codes, and then picking up the telephone and moving to another location. It is recommended that the 'CSC' USER type be enabled in Overlay 17, so that messages can be printed and history file records generated for such moves. This will allow procedures to be put into place to make appropriate ALI, etc., updates.
- Attendant and Set-based Administration. Sets can be configured, changed, and removed, and DNs can be changed by persons other than the official administration staff. Again, CSC messages should be enabled, to allow ALI, etc., updates to be made.
- It is also important to note that undocumented moving of telephones by means of building wiring changes (such as would perhaps happen in a departmental move) must not occur. Any activity that causes the physical location of a DN to change must be reflected in an ALI, etc., update.

ESA equipment engineering

Many jurisdictions recommend dedicated trunks to handle 911 calls, and generally a minimum of two. It is important to determine how many channels will be needed to handle the maximum number of 911 calls that will be in progress simultaneously, and provide as many trunks as needed to handle the traffic. As each business is different, it is not possible to provide definitive guidelines for how many channels will be needed, but an average figure for a normal business might be two dedicated trunks serving up to 5000 lines. The 911 calls should overflow onto Central Office (CO) trunks, thus ensuring that no calls get blocked. However, such overflowed calls will not be able to provide the ANI to the PSAP, so Enhanced 911 service would not be given.

Operating parameters

ESA Call Recognition

As per existing system operation, when a TN is service changed via overlay administration or attendant administration, or disabled via maintenance overlays, then all calls on the TN, including ESA calls, are force disconnected.

Up to four digits (0-9) can be defined as the customer's ESDN. The symbols '#', '*' will be rejected as invalid.

The system administrator must define the customer's ESDN as a BARS/NARS Special Number (defined by responding with SPN to the TYPE prompt in Overlay 90) in order for an Access Code+ESDN call to be recognized as an ESA call.

Similarly, the system administrator must define a local terminating route list index for the SPN (defined by responding with YES to the LTER prompt in Overlay 86) in order for an Access Code+ESDN call to be recognized as an ESA call.

If an ESA route is accessed by dialing the Access Code of the ESA route, the call will not be recognized as an ESA call. It is recommended that, to prevent non-911 calls from direct access to ESA routes, some means of access control be implemented (such as Trunk Group Access Restriction).

ESA Calling Terminal Identification

Once a CLID entry has been assigned to a station set or to a route, it is up to the system administrator to maintain the database so that the CLID entry remains valid.

If an undefined CLID entry is being referenced when the system is trying to compose the ESA calling number, then the ESA calling number is set to the Customer's Default Calling Number (DFCL). The following error message is provided as an indication:

```
ERR9009 cust# dn clid_ent#
```

After the ESA calling number has been composed for an ESA or tandem ESA call, the number of digits in the ESA calling number is validated by the system. If the ESA calling number is found to contain an unexpected number of digits, then the ESA calling number is set to the Customer's Default Calling Number (DFCL). The following error message is provided as an indication:

ERR9012 *cust# clid_ent# calling#*

ESA Call Routing

Only the following routes can be used as an ESA route:

- Centralized Automatic Message Accounting (CAMA)
- Central Office (COT)
- Direct Inward Dial (DID)
- Foreign Exchange (FEX)
- TIE
- Wide Area Telephone Service (WATS)

Note: An NI-2 Call By Call or Integrated Services Access (ISA) service route may be configured as an ESA emergency call route, as long as it is one of the above types.

Once a route is designated as an ESA route, it is up to the system administrator to maintain the database so that the ESA route remains valid.

As per existing operation, when a call terminates onto an outgoing CAMA trunk, the call may be dropped if the far-end is unable to respond to the CAMA MF signaling.

If all trunks in the Emergency Service Route (ESRT) and the alternate route defined for the ESRT (using the STEP prompt in Overlay 16) are unavailable, then the Access Denied intercept treatment (defined using the ACCD prompt in Overlay 15) is given.

After the ESRT has been configured in Overlay 24, there is no cross checking by the system for subsequent route database administration in Overlay 16 to ensure that the route that is designated as the ESRT remains valid. Therefore, during call processing, if the ESRT is found to be configured with an invalid route (e.g. undefined), then the customer's ACCD treatment is give. The following error message is provided as an indication:

ERR9006 CUST: *cust#* ESA RT: *esrt#*

When ESA Call Routing tries to route an ESA call to the step route configured for the ESRT, if the step route is not valid for ESA calls, then the customer's ACCD treatment is give. The following error message is provided as an indication:

ERR9006 CUST: *cust#* ESA RT: *esrt#* STEP: *step_rt#*

For a CAMA outgoing trunk, in the event that a customer's DFCL is to be used as the ESA calling number and the DFCL is not configured, then KP-2-ST is outpulsed as the calling number.

For a CAMA outgoing trunk, if the composed number is not a 7 or 10 digit number, the DFCL is not sent. KP-2-ST is outpulsed as the calling number instead. There is no error message provided.

For an ISDN-to-ISDN tandem ESA call, if no CLID is passed in by the incoming ISDN trunk, then the Customer's Default Calling Number (DFCL) is sent as the CLID. If the DFCL is not configured, then no CLID is sent over the outgoing trunk.

ESA On Site Notification

Only a Meridian proprietary display set can be an OSN set.

Only one OSN set may be configured for a customer.

Only a single appearance station DN on the OSN set can be used as the customer's On Site Notification DN (defined using the OSDN prompt in Overlay 24).

Once an ESA caller information is linked onto the OSN key, no other ESA caller information can be linked onto the OSN key until the current one is discarded.

Once a DN has been designated as the OSDN, it is up to the system administrator to maintain the database so that the OSDN remains valid.

As soon as an ESA call terminates onto an outgoing trunk, an OSN call record is printed, and an alert is initiated to the OSN set. If an ESA call terminates onto an outgoing trunk that is configured with wink start arrangement (defined by setting the STRO prompt to WNK in Overlay 14), in the abnormal event that wink is not returned, the ESA call will step to the next available trunk, as per the existing trunk termination operation. When this occurs, the ESA OSN function will treat the call as a new call, and print a separate OSN record and will attempt to notify the OSN set again.

Whenever an ESA call receives the customer's ACCD intercept treatment, it will be indicated in the OSN call record with the following line:

911 CALL INTERCEPTED

As per existing operation, whenever ringing is removed from a Meridian proprietary set, buzzing (including the OSN buzzing) ends.

If the DN that is designated as the customer's On Site Notification DN (OSDN) is invalid (e.g. vacant, or multiple appearance), the caller information will not be linked. The following error message is provided as an indication:

ERR9007 *cust#*

If the station set specified by the OSDN is not configured with an OSN key, then the caller information will not be linked. The following error message is provided as an indication:

ERR9008 *cust#*

The caller information will not be linked onto the OSN key if it already has a caller information linked to it. The following warning message is provided as an indication:

OSN001 *cust#* OSN SET IS NOT NOTIFIED - OSN KEY IS BUSY

The caller information will not be linked onto the OSN key if the set is found to be in the disable state. The following warning message is provided as an indication:

OSN002 *cust#* OSN SET IS NOT NOTIFIED - OSN SET IS UNAVAILABLE

If a customer has more than one set configured with an OSN key, then only the OSN set that has a DN key that matches the customer's OSDN will be linked with the ESA caller information.

If more than one OSN key is defined on a set, then the ESA caller information is linked to the first OSN key on the set.

When an OSN set is service changed via overlay administration or attendant administration, or disabled via maintenance overlays, then all call registers linked to the set, including that on the OSN key, are discarded.

Non-networking Feature Interactions

Access Restrictions

Class of Service Restriction

ESA calls will override any system Class of Service restrictions, such as: Unrestricted Service (UNR), Conditionally Restricted (CUN), Conditionally Toll Restricted (CTD), Toll Restricted (TLD), Semi-restricted (SRE), and Fully Restricted (FRE).

Code Restriction

The ESA feature allows outgoing ESA calls to override code restrictions.

Trunk Group Access Restriction

The ESA feature allows outgoing ESA calls to override Trunk Group Access Restriction (TGAR).

Attendant Administration

Attendant Administration is not supported by the ESA feature.

As per existing operation, when an analog (500/2500 type) set is service changed via Attendant Administration, all calls on that set, including ESA calls, are force disconnected.

As per existing operation, when a Meridian 1 proprietary set is service changed via Attendant Administration, all call registers linked to that set, including those on the On-Site Notification (OSN) key, are discarded.

Attendant Barge-In

The ESA feature does not restrict Attendant Barge-In on ESA calls.

Attendant Break-In

The ESA feature does not restrict an attendant from breaking into ESA calls.

Automatic Call Distribution

When an ESA call is initiated by an ACD agent using Call Transfer or Conference and the transfer/conference is against the ACD key on the agent set, the CLID entry associated with the ACD key is used for composing the ESA Calling Number.

When an ESA call is initiated by an ACD agent using Call Transfer or Conference and the transfer/conference is against an Individual DN (IDN) key on the agent's set, the CLID entry associated with the IDN key is used for composing the ESA Calling Number.

There is no CLID entry for a PBX ACD DN. The CLID entry associated with the PBX DN is used for the PBX ACD DN when a Call Transfer/Conference is initiated by an ACD agent on an analog (500/2500 type) set.

Conference

No Hold Conference

The ESA feature does not restrict an Attendant Console or a set from initiating an ESA call via Conference. The ESA feature does not restrict conference completion of an ESA call that is initiated via Conference/No Hold Conference.

When a Meridian 1 proprietary set initiates an ESA Call via Conference/No Hold Conference, the ESA Calling Terminal Identification function composes the ESA Calling Number based on the key against which the conference is activated. If this key is not a DN key, the ESA Calling Number is set to the Customer's Default Calling Number (DFCL). The DFCL is a number that will be sent out if ANI is not used. In rare cases, that number that will be sent is the customer's Listed Directory Number.

Call Forward All Calls

Call Forward No Answer

Call Hunt

For all three cases of redirection above, the ANI of the originating set overrides the ANI of the redirecting set. This means that it is the ANI of the originating set that is sent out with the call, and that appears on the OSN set-type or terminal-type display, and not that of the redirecting set.

Call Transfer

The ESA feature does not restrict an Attendant Console or a set from initiating an ESA call via Call Transfer. The ESA feature does not restrict transfer completion of an ESA call that is initiated via Call Transfer.

When a Meridian 1 proprietary set initiates an ESA call via Call Transfer, the ESA Calling Terminal Identification function composes the ESA Calling number based on the key against which the transfer is activated. If this key is not a DN key, the ESA Calling Number is set to the Customer's default ESA Calling Number (DFCL).

Flexible Incoming Tone

The Flexible Incoming Tone (FIT) feature does not apply to the OSN buzz. The OSN buzz is a 10-second continuous buzz, regardless of whether or not the OSN set has FIT configured.

When the OSN set receives the OSN buzz at the same time the FIT buzz is being given for another key, the FIT buzz resumes after the OSN buzz times out.

Group Call

ESA calls cannot be made using the Group Call feature.

History Files

All ESA records are saved into the History File if USER = MTC in Overlay 17.

Hotline

If the terminating/target DN of a Hotline set/key is programmed with the ESDN, an ESA call is originated whenever the Hotline set goes off-hook or whenever the Hotline key is pressed to initiate a new call.

Intercept Treatment

When an ESA call cannot be completed because of invalid route configuration or unavailable trunk, it receives the Customer's access denied (ACCD) intercept treatment. As per existing operation, the ACCD intercept treatment can be defined to route the intercepted call to a Recorded Announcement (RAN), route the intercepted call to the attendant, provide the caller with overflow tone, or provide the caller with busy tone.

Internal Call Forward

The ESA feature allows calls to be forwarded to the ESDN.

Meridian 1 Attendant Console Enhancements

The ESA feature is dependent on the ISDN CLID Enhancements feature. As per existing ISDN CLID Enhancements functionality, for attendant initiated calls, Attendant Consoles use CLID entry 0 and LDN 0 as the originating DN.

Due to the ESA feature's dependency on the ISDN CLID Enhancement, the MACE feature determines whether LDN 0 should be replaced with an appropriate value.

One Plus Dialing

When One Plus Dialing is defined in the CLID entries, the calling number for North America can be 8 or 11 digits. However, E911 standard requires that ESA calls sent over CAMA trunks must have a 7 or 10 digit calling number. Therefore, whenever the calling number is 8 or 11 digits and the leading digit is a "1," the leading digit "1" is truncated and the KP-0-7/10 digit calling number-ST is outputted. If the calling number is anything other than 7 or 10 digits, the KP-2-ST is outputted.

Pretranslation

Pretranslation, when configured, occurs before the dialed digits are verified to determine whether or not the call is an ESA call.

Privacy Override

The ESA feature allows ESA calls to be overridden by the Privacy Override feature.

Private Line

The ESA feature does not support calls that are initiated by a Private Line set or key.

Trunk Barring

Trunk Barring provides the option of allowing or denying a direct or modified connection between customer defined routes. For direct connection, the ESA feature allows outgoing ESA calls to override Trunk Barring. For modified connection, the ESA feature does not allow outgoing ESA calls to override Trunk Barring.

Networking Feature Interactions

Attendant Break-In

When an ESA call and an attendant are on different nodes, if Network Attendant Service (NAS) is provisioned, the ESA feature does not restrict the attendant from breaking into the ESA call.

Basic Alternate Route Selection (BARS)/Network Alternate Route Selection (NARS)

A BARS/NARS dialing plan that is the same length or longer than the ESDN, should not have the same leading digits as the ESDN. If there is BARS/NARS dialing plan equal to or longer than the ESDN, and all the leading digits of that internal DN match the ESDN digits, then calls will not terminate on that dialing plan, since ESA calls receive priority.

Similarly, a BARS/NARS dialing plan that is shorter than the ESDN, should not have the same leading digits as the ESDN. If there is BARS/NARS dialing plan, shorter in length than the ESDN, and all the leading digits of that internal DN match the ESDN digits, then callers may be prevented from making ESA calls.

The system administrator must define ESDN as a BARS/NARS SPN, to ensure that AC+ESDN calls are recognized as ESA calls.

The system administrator must define a local terminating route list index for the SPN that is configured with the ESDN, to ensure that AC+ESDN calls are recognized as ESA calls. For example, no ESA Calling Number or On-Site Notification is composed.

Basic Rate Interface Set Calling Line Identification Restriction

CLIR Set to ISDN trunks

When a CLIR set initiates an ESA call, the ESA feature overrides the BRI Set CLIR feature. Therefore, the calling number and Calling Party Name Display (CPND) presentation indicators are set to display allowed.

CLIR Set to CAMA or other trunks

As per existing operation, the Basic Rate Interface (BRI) Set Calling Line Identification Restriction (CLIR) feature applies to CLIR Set to ISDN trunk calls only.

Calling Party Privacy Display of Calling Party Denied

Both Calling Party Privacy and Display of Calling Party Denied have the potential to mark a call as 'Private', and set the Presentation Restriction indicators or output a Privacy code (e.g. *67). The ESA feature overrides all such privacy indications, except in the case of an incoming ISDN Tandem trunk (the assumption is that the originating Meridian 1 will have already set the indicator to 'Presentation Allowed' since it is an emergency call).

If the source of the call, be it set, console, or trunk, has a privacy indicator set, the following table indicates the status of the privacy indication on the outgoing trunk for ESA calls.

TO FROM	CAMA trunk	ISDN trunk	Other trunk
Set or console	No privacy indication possible	No privacy indicator sent	No privacy indicator sent
ISDN trunk	No privacy indication possible	Incoming privacy indicators are tandemed	Privacy indicator (DTPI/DPPI in Overlay 16) sent
Non-ISDN trunk	No privacy indication possible	No privacy indicator sent	No privacy indicator sent

Coordinated Dialing Plan

When a Meridian 1 Internal DN or Coordinated Dialing Plan (CDP) steering code is equal to or longer than the ESDN and all of the leading digits of such an Internal DN match with those of the ESDN, then calls do not terminate onto these Internal DNs or CDP steering codes, as ESA calls are given priority. Conversely, if there is any Internal DN that is shorter than the ESDN and all of the leading digits match those of the Internal DN, then it may prevent callers from placing ESA calls.

Direct Inward System Access

An incoming trunk that has obtained system access via a DISA DN can initiate a tandem ESA call. When a tandem ESA call is initiated via DISA, it is treated in the same manner as any other tandem ESA call.

Feature Group D

The Feature Group D (FGD) route cannot be defined as the Customer's outgoing Emergency Services Route (ESRT).

For an FGD-to-CAMA tandem ESA call:

- If no FGD Automatic Number Identification (ANI) is passed in, then as FGD is a non-ISDN trunk, the ESA Calling Number, composed for the incoming FGD trunk, is outputted as the calling number via CAMA MF signaling over the outgoing CAMA trunk.
- If FGD ANI is passed in and the system does not have the ESA_SUPP package equipped, the FGD ANI is ignored and the ESA Calling Number, composed for the incoming trunk, is outputted as the calling number via CAMA MF Signaling over the outgoing CAMA trunk.
- If FGD ANI is passed in and the system has the ESA_SUPP package equipped, the FGD ANI is outputted as the calling number via CAMA MF Signaling over the outgoing CAMA trunk.

For an FGD-to-ISDN tandem ESA call:

- If no FGD ANI is passed in, then as FGD is a non-ISDN trunk, the ESA Calling Number, composed for the incoming FGD trunk, is sent as the CLID over the outgoing ISDN trunk.

- If FGD ANI is passed in and the system does not have the ESA_SUPP package equipped, the FGD ANI is ignored and the ESA Calling Number is sent as the CLID over the outgoing ISDN trunk.
- If FGD ANI is passed in and the system has the ESA_SUPP package equipped, the FGD ANI is sent as the CLID over the outgoing ISDN trunk.

The ESA feature overrides the FGD ANI display suppression functionality if it is configured for the incoming FGD trunk (SHAN = NO in Overlay 19).

In-Band ANI

For a non-ISDN-to-CAMA tandem ESA call:

- If no In-Band ANI is passed in, then as the incoming trunk is a non-ISDN trunk, the ESA Calling Number, composed for the incoming trunk, is outpulsed as the calling number via CAMA MF signaling over the outgoing CAMA trunk.
- If In-Band ANI is passed in and the system does not have the ESA_SUPP package equipped, then the In-Band ANI is ignored, and the ESA Calling Number is outpulsed as the calling number via CAMA MF signaling over the outgoing CAMA trunk.
- If In-Band ANI is passed and the system has the ESA_SUPP package equipped, then the In-Band ANI is outpulsed as the calling number via CAMA MF signaling over the outgoing CAMA trunk.

For a non-ISDN-to-ISDN tandem ESA call:

- If no In-band ANI is passed in, then as the incoming trunk is a non-ISDN trunk, the ESA Calling Number composed for the incoming trunk is sent as the CLID over the outgoing ISDN trunk.
- If In-Band ANI is passed in and the system does not have the ESA_SUPP package equipped, then the In-Band ANI is ignored and the ESA Calling Number is sent as the CLID over the outgoing ISDN trunk.
- If In-Band ANI is passed in and the system has the ESA_SUPP package equipped, then the In-Band ANI is sent as the CLID over the outgoing ISDN trunk.

Incoming Trunk Programmable CLID

The Incoming Trunk Programmable CLID feature allows incoming non-ISDN trunk routes to be provisioned for a programmable billing number when the incoming non-ISDN trunk is tandemed onto an outgoing ISDN trunk. For a non-ISDN trunk initiated ESA call, the ESA feature takes precedence over the Incoming Trunk Programmable CLID feature. Therefore, the ESA Calling Number, composed for the incoming non-ISDN trunk, is sent as the CLID over the outgoing ISDN trunk.

ISDN CLID Enhancements

With the ESA feature, the ISDN package 145 restriction is removed for the ISDN CLID Enhancements feature. Also, ISDN CLID Enhancements is modified to allow the configuration of ESA data within each CLID entry. If the call is identified as an ESA call, the CLID ESA configuration is referenced for ESA Calling Number composition.

ISDN BRI Call Forward All Calls

The ESA feature allows calls to be forwarded to the ESDN.

ISDN Enbloc Dialing

ESA Call Processing takes precedence over the ISDN Enbloc Dialing feature. As soon as the ESDN is dialed, if the outgoing trunk for the ESA call is an ISDN trunk, the call is initiated for call termination.

ISDN Network Attendant Service

When an ESA call is intercepted to the local attendant, CLID/ANI is unavailable. If the ESA call is routed to a network attendant through NAS routing, this call is not treated as an ESA call by the NAS feature, and the existing NAS feature constructs the appropriate CLID.

Meridian 911

An incoming Meridian 911 (M911) call cannot tandem out of the Meridian 1 system. Therefore, there is no interaction between the M911 and ESA features.

Network Call Redirection

As per existing Network Call Redirection (NCRD) operation, when a call is redirected, a NOTIFY message is sent to the originating and/or terminating node to request the connected party number. Upon receiving the NOTIFY message, the connected party number is composed and then sent by the existing ISDN CLID Enhancements feature. The ESA Calling Terminal Identification function is not invoked to compose the connected party number.

Virtual Network Services

Virtual Network Services (VNS) trunks are treated in the same manner as ISDN trunks.

Feature packaging

The following software option packages apply to the ESA feature, according to the type of functionality defined.

Total functionality

Emergency Services Access (ESA) is package 329 and provides the following functions:

- Emergency Services Access Call Recognition
- Emergency Services Access Call Routing to CAMA, Primary Rate Interface (PRI) or other trunks
- Basic Number translations such as NXX and NPA but excluding non-Direct Inward Dialing (DID) translations
- ESA Call Termination Identification
- Dependencies:
 - Automatic Number Identification (ANI) package 12
 - Office Data Administration System (ODAS) package 20
 - Calling Party Name Display (CPND) package 95
 - Integrated Services Digital Network (ISDN) package 145

Emergency Services Access Supplementary (ESA_SUPP) is package 330 and provides the following functions:

- Networking conversions such as incoming ISDN to CAMA conversions
- On-Site Notification

Emergency Service Access Calling Number Mapping (ESA_CLMP) is package 331 and provides the following function:

- Translation of non-Direct Inward Dialing (non-DID) numbers

Partial functionality

ESA Call Recognition:

- Access (ESA) is package 329

ESA Call Termination Identification:

- Emergency Services Access (ESA) package 329
- Emergency Service Access Calling Number Mapping (ESA_CLMP) package 331 (required if the customer desires translation of non-DID) numbers to DID numbers)

ESA Call Routing:

- Emergency Services Access (ESA) package 329
- Emergency Services Access Supplementary (ESA_SUPP) package 330 (required if the customer is to offer ISDN-to-CAMA tandem ESA calls, and wants to allow the CLID passed in by the incoming ISDN trunk to be converted to be outpulsed as the CAMA calling number)
- Automatic Number Identification (ANI) package 12 (required for CAMA MF outpulsing, if CAMA trunks are used for outgoing ESA calls)
- Integrated Services Digital Network (ISDN) package 145 (required if the ESA calls are transported over outgoing ISDN trunks)

ESA On Site Notification:

- Emergency Services Access (ESA) package 329
- Emergency Services Access Supplementary (ESA_SUPP) package 330

- Calling Party Name Display (CPND) package 95 (required to provide the originator's name on the call record, and originator's name to be displayed on the OSN set)
- Office Data Administration System (ODAS) package 20 (required to provide the originator's DES information on the call record, and the originator's DES information to be displayed on the OSN set)

Feature implementation

The following steps are required to implement ESA:

- 1 Modify the customer CLID database to allow ESA calling number composition, using Overlay 15.
- 2 Configure CLID entries for non-ISDN routes, so that when an incoming non-ISDN trunk initiates a tandem ESA call, the ESA Calling Terminal Identification function will compose an ESA calling number to identify the incoming trunk. This is done using Overlay 16.
- 3 Configure the ESA trunk type using Overlay 14. Only the following trunk types may be used to handle ESA calls:
 - Centralized Automatic Message Accounting (CAMA)
 - Central Office (COT)
 - Direct Inward Dial (DID)
 - Foreign Exchange (FEX)
 - TIE
 - Wide Area Telephone Service (WATS)
- 4 Configure a CLID entry for analog (500/2500 type) sets, Meridian proprietary sets, and BRI sets, using Overlay 10, 11, and 27 respectively.
- 5 Configure OSN Notification data:
 - Configure an OSN output device using Overlay 17.
 - Configure an OSN set using Overlay 11.
 - Configure terminal designator (DES) data for (500/2500 type) sets, Meridian proprietary sets, and BRI sets, using Overlay 10, 11, and 27 respectively.

6 Configure ESA:

- Configure ESA data using Overlay 24.
- Configure ESA route data using Overlay 16.
- If BARS/NARS is used, configure ESA digit manipulation and call routing using Overlay 86, and ESA call recognition using Overlay 90. This is to allow Access Code+ESDN dialing to be recognized and treated as an ESA call.

LD 15 – Modify the customer CLID database to allow ESA calling number composition.

Prompt	Response	Description
REQ:	CHG	Change existing data.
TYPE:	NET	Networking data.
CUST	xx	Customer number.
...		
CLID	YES	Configure Calling Line Identification (CLID) options.
- SIZE	0-4000	Specify the maximum number of CLID entries required.
- INTL	1-4	Country code (1 to 4 digits).
- ENTRY	0-(1)-3999	CLID entry to be configured. CLID entries must be between 0 and (the value entered at the size prompt - 1). ENTRY is repeated until a <cr> is entered.
- HNTN	x...x	National code for home national number (1 - 6 digits). Precede with 'X' to delete digits.
- ESA_HLCL	x...x	Home local code for Emergency Service Access call. Up to 12 digits are accepted. Precede with 'X' to delete entry.
- ESA_INHN	(NO) YES	Do not insert HNTN in front of ESA_HLCL. Insert HNTN in front of ESA_HLCL.
- ESA_APDN	(YES) NO	Append the originating DN after ESA_HLCL. Do not append the originating DN after ESA_HLCL.
...		
- ENTRY	xx	Configure another CLID entry. ENTRY is repeated until a <cr> is entered.

LD 16 – Configure CLID entries for a non-ISDN route.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	RDB	Route Data Block.
CUST	xx	Customer number.
ROUT	0-511 0-127	Route number. For Option 11C.
...		
TKTP	aaa	Trunk type where: aaa = CAM, COT, DID, FEX, TIE, WAT
...		
ISDN	NO	Route is not an ISDN route.
...		
- ISAR	NO	Route is not an ISA service route.
...		
ACOD	x...x	Route Access Code. It must not conflict with numbering plan. Up to 4 digits (7 digits if the DN Expansion package equipped.)
CLEN	0-(1)-3999	Calling Line Identification entry number. Configured in LD 15. CLEN will not be prompted for NI-2 CBC or ISA master routes.
...		

LD 14 – Configure the ESA trunk type.

Prompt	Response	Description
REQ	NEW	New.
TYPE	aaa	Trunk type, where aaa can be one of the following: CAM = Centralized Automatic Message Accounting COT = Central Office DID = Direct Inward Dial FEX = Foreign Exchange TIE = TIE WAT = Wide Area Telephone Service
TN	l s c u c u	Terminal Number For Option 11C.
RTMB	0 - 511 1- 254	Route number, Member number.

LD 10 – Configure a CLID entry for Analog (500/2500 type) sets.

Note: While Overlay 10 is loaded, you may want to configure the terminal designator data required for On Site Notification configuration for Analog (500/2500 type) sets. Refer to page 99.

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	500	500/2500 type set data block.
TN	l s c u c u	Terminal Number For Option 11C.
...
DN	xxxx (0)-N	DN and CLID entry. N = CLID SIZE-1 (where SIZE is defined in LD 15).
...		

LD 11 – Configure Calling Line Identification for Meridian 1 proprietary sets.

Note: While Overlay 11 is loaded, you may want to configure the OSN set (refer to page 98) and terminal designator data required for On Site Notification configuration for Meridian 1 proprietary sets (refer to page 100).

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	xxxx	Telephone type, where: xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616 or 3000.
TN	l s c u c u	Terminal Number For Option 11C.
...		
KEY	aa bbb yyyy (0)-N	Directory Number, where: aa = key number. bbb = key type or function; one of the following: SCR, SCN, MCR, MCN, or HOT. yyyy = DN. (0)-N = CLID entry, where N = SIZE-1 (SIZE is defined in LD 15).
...		

LD 27 – Configure Calling Line Identification for Basic Rate Interface sets.

Note: While Overlay 27 is loaded, you may want to configure the terminal designator data required for On Site Notification configuration for BRI sets. Refer to page 100.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
TYPE	TSP	Administer the Terminal Service Profile on the Digital Subscriber Loop.
DSL	l s c dsl	Digital Subscriber Loop address.
...		
DN	xxxx (0)-N	DN and CLID entry. N = CLID SIZE-1 (where SIZE is defined in LD 15).
...		

On Site Notification Configuration

LD 17 – Configure an OSN output device.

Prompt	Response	Description
REQ	CHG	Change data.
TYPE	ADAN	Action Device and Number
- ADAN	CHG bbb x	Change Action Device and Number where: bbb = TTY, or PRT x = Port number
...		
USER	MTC	Maintenance output device.
...		

LD 11 – Configure the On-Site Notification set.

Note 1: Only one OSN set can be configured for a customer.

Note 2: After the OSN set has been defined, an Equipment Datadump (EDD command in LD 43) must be performed so that the On-Site Notification Directory Number (OSDN) can be programmed in LD 24, as defined on page 101.

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	xxxx	Telephone type, where: xxxx = 2006, 2008, 2016, 2216, or 2616.
TN	l s c u c u	Terminal Number For Option 11C.
...		
CUST	xx	Customer number.
...		

KEY	aa bbb yyyy (0)-N	Directory Number, where: aa = key number. bbb = key type or function; one of the following: SCR, SCN, MCR, MCN, or HOT. yyyy = DN. (0)-N = CLID entry, where N = SIZE-1 (SIZE is defined in LD 15).
KEY	xx OSN	Key number and the On-Site Notification key mnemonic.
...		

LD 10 – Configure terminal designator (DES) data for Analog (500/2500 type) sets.

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	500	500/2500 type set data block.
TN	l s c u c u	Terminal Number For Option 11C.
...
DES	d...d	Office Data Administration System Station Designator.
...		

LD 11 – Configure terminal designator (DES) data for Meridian 1 proprietary sets.

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	xxxx	Telephone type, where: xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616 or 3000.
TN	l s c u c u	Terminal Number For Option 11C.
...		
DES	d...d	Office Data Administration System Station Designator.
...		

LD 27 – Configure terminal designator (DES) data for Basic Rate Interface sets.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
TYPE	TSP	Administer the Terminal Service Profile on the Digital Subscriber Loop.
DSL	l s c dsl	Digital Subscriber Loop address.
...		
DES	d...d	Office Data Administration System Station Designator.
...		

Emergency Services Access Configuration

LD 24 – Configure Emergency Services Access Data.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
TYPE	ESA	Emergency Services Access.
CUST	xx	Customer number.
ESDN	x...x	Emergency Services Directory Number (e.g. 911). Up to 4 digits are accepted.
ESRT	0-511 0-127	ESA route number. For Option 11C. The trunk type can be CAM, COT, DID, FEX, TIE, or WAT
DDGT	xxxx	Emergency Services Directing Digits (e.g. 1, 11, 911, etc.). Up to 4 digits are accepted. The DDGT digits are output as the called number if the ESA call terminates onto an outgoing CAMA trunk. Otherwise, the ESDN is output.
DFCL	x....x	Default Calling Line Identification. The input must be of the following length: — On a system that is not FNP packaged, the input must be nothing, or 7 or 10 digit. If nothing is entered, KP-911-ST is output. — On a system that is FNP packaged, any number of digits, up to 16, are allowed to be entered.
OSDN	x....x	On-Site Notification Directory Number. The input must be a valid single appearance internal DN that belongs to a Meridian 1 proprietary telephone configured with an OSN key. This DN must be the same as the OSDN configured for the OSN set in LD 11. Refer to page 98.

LD 16 – Configure Emergency Services Access Route Data.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
TYPE	RDB	Route Data Block.
CUST	xx	Customer number.
ROUT	0-511 0-127	Route number. For Option 11C.
...		
TKTP	aaa	Trunk type where: aaa = CAM, COT, DID, FEX, TIE, WAT
...		
STEP	0-511 0-127	ESA alternate route number. For Option 11C.
...		

For customers using Basic Alternate Routing (BARS) or Network Alternate Routing (NARS), the following configuration is recommended to allow Access Code (AC) + Emergency Services Directory Number (ESDN) Dialing to be recognized and treated as an emergency call.

LD 86 – Configure Emergency Service Access Digit Manipulation for AC + ESDN dialing.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
CUST	xx	Customer number.
FEAT	DDGT	Digit Manipulation.
...		

DMI	1 - 999	Digit Manipulation Table numbers. Note: Do not use digit manipulation Table 0, as it results in the incorrect call termination treatment.
...		

LD 86 – Configure Emergency Service Access call routing for AC + ESDN dialing.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
CUST	xx	Customer number associated with function.
FEAT	RLB	Route List Block.
...		
RLI	xxx	Route List Index to be accessed.
ENTR	xxx	Entry number for NARS/BARS Route list.
LTER	YES	Local Termination entry. This allows the AC+ESDN call to be recognized as an Emergency Services Access call.
...		
DMI	1 - 999	Digit Manipulation Table. Use the table configured in LD 86. This allows the digits after the AC to remain in the call register as a called number. Note: Do not use digit manipulation Table 0, as it results in the incorrect call termination treatment.
...		

LD 90 – Configure Emergency Service Access call recognition for AC + ESDN dialing.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
CUST	xx	Customer number associated with function.
FEAT	NET	Network translation tables.
TRAN	aaa	Access code type where aaa: AC1 = Access Code 1 (BARS/NARS) AC2 = Access Code 2 (NARS)
TYPE	SPN	Special code translation data block.
- SPN	911	AC+ESDN is recognized as an Emergency Services Access call.
- RLI	xxx	Route List Index. Use Route List Index configured in LD 86.
...		

Feature operation

This section explains how to view and discard caller information on an OSN set. Also, Table 10 summarizes the various events on the OSN set that may affect the operation of the OSN key.

OSN Set Operation

The purpose of the OSN Set is to provide basic information about a 911 caller at the time of the call. It does this by linking certain information into the digit display of an Aries-type telephone. This set will have a single key-lamp pair for the OSN function, as well as other standard keys. For greatest flexibility, it should also be equipped with a DISP (display) key.

Key-lamp states

- If the OSN lamp is dark, there is no ESA information waiting to be displayed.
- If the OSN lamp is flashing, there is information waiting to be displayed.
- If the OSN lamp is steadily lit, there is ESA information being displayed, or in some circumstances can be redisplayed.

To display OSN data

The user can display the ESA information in one of two ways:

- 1 Press DISP key, followed by the OSN key. This leaves the ESA information in a waiting state, which has the advantage of allowing it to be repeatedly re-displayed interspersed with other set operations. The OSN lamp remains flashing to indicate this.

This operation can be carried out with another call active on the set, and new calls can be initiated or answered without permanently losing the ESA information. If some of these other operations change the display, the ESA information can be restored by either of the methods described here. You can repeatedly toggle between ESA information and display information for other calls by using this method.

- 2 Press the OSN key only. The OSN lamp changes to steadily lit to indicate that the ESA information is now active on the set.

Note: Be aware that whenever the OSN lamp is steadily lit, any set operation to go on-hook or Release, or initiate or answer another call, or take a call off hold, or any other action that makes the set active on a non-OSN function, will permanently discard the ESA information. If it is still important, ensure that the ESA information is written down before carrying out one of these operations.

An incoming call can be presented to the set, but will not overwrite the ESA information. The DISP key, followed by the incoming DN key, will allow the incoming call information to be seen, without losing the ESA information. To restore the ESA information, use DISP + OSN.

Operating the OSN key in this fashion will not work if there is another call active on the set. Release or put on hold all such active calls first. Note that any call taken off hold at this point will lose the ESA information.

The ESA information cannot be put “On Hold.”

Clearing OSN display

ESA information must be cleared from the OSN set manually, before another ESA call information can be presented. This is to prevent successive (often related) emergency calls from “rippling” across the set before the operator has a chance to properly process them.

To remove the ESA information from the set, and thus permit the information for another ESA call to come in, make the ESA information active (OSN lamp steadily lit) and then perform one of the following:

- 1 going on-hook or
- 2 pressing the release (RLS) key or
- 3 answering an incoming call, making a new call, or returning to a previously established call by going off-hook or pressing an appropriate key

OSN key operation and lamp state

Table 10 describes the various events on the OSN set that may affect the operation of the OSN key.

Table 10
OSN key operation and lamp state

Event	Current OSN Key Lamp State		
	Dark There is no ESA caller information to be displayed	Flashing An ESA caller information is waiting to be displayed	Lit An ESA caller information is being displayed
A new ESA call is presented to the OSN set.	OSN buzzing is given to the OSN set. The OSN key lamp changes to flashing, and the caller information is linked to the OSN key.	The new caller information is not linked as there is a caller information already linked to the OSN key. The OSN key lamp remains flashing, and the previous caller information remains linked to the OSN key.	The new caller information is not linked as there is a caller information already linked to the OSN key. The OSN key lamp remains lit, and the previous caller information remains linked to the OSN key.
The Display (DISP) key is pressed, and then the OSN key.	No ESA caller information is displayed. The DISP key lamp changes to dark. The OSN key lamp remains dark.	The caller information that is linked to the OSN key is displayed. The DISP key lamp changes to dark. The OSN key lamp remains flashing, and the caller information remains linked to the OSN key.	The caller information that is linked to the OSN key is redisplayed. The DISP key lamp changes to dark. The OSN key lamp remains lit, and the caller information remains linked to the OSN key.
The OSN key is pressed when the OSN set is not in idle state.	The operation is ignored. The OSN key lamp remains dark.	The operation is ignored. The OSN key lamp remains flashing, and the caller information remains linked to the OSN key.	The operation is ignored. The OSN key lamp remains lit, and the caller information remains linked to the OSN key.

Table 10
OSN key operation and lamp state

Event	Current OSN Key Lamp State		
	Dark There is no ESA caller information to be displayed	Flashing An ESA caller information is waiting to be displayed	Lit An ESA caller information is being displayed
The OSN key is pressed when the OSN set is in idle state.	The operation is ignored. The OSN key lamp remains dark.	The caller information linked to the OSN key is displayed. The operation is ignored. The OSN key lamp changes to lit, and the caller information remains linked to the OSN key. The OSN buzzing ends, if it has not already timed out. While the OSN key lamp remains lit, the OSN set is in active state, with the OSN key being the active key.	The operation is ignored. The OSN key lamp remains lit, and the caller information remains linked to the OSN key.
A new ESA call is presented to the OSN set.	The new call is presented as per normal operation. The OSN key lamp remains dark.	The new call is presented as per normal operation. The OSN key lamp remains flashing, and the caller information remains linked to the OSN key.	The new call is presented to the OSN set. The set display continues to show the existing ESA caller information; it is not replaced by the new caller information. The OSN key lamp remains lit, and the caller information remains linked to the OSN key.

Table 10
OSN key operation and lamp state

Event	Current OSN Key Lamp State		
	Dark There is no ESA caller information to be displayed	Flashing An ESA caller information is waiting to be displayed	Lit An ESA caller information is being displayed
A new ESA call is presented to the OSN set. The Display (DISP) key is pressed, and then the DN key on which the new call has been presented.	The caller information associated with the new call is displayed. The OSN key lamp remains dark.	The caller information associated with the new call is displayed. The OSN key lamp remains flashing, and the caller information remains linked to the OSN key.	The ESA caller information that was being displayed is replaced by the new caller information. The OSN key lamp remains lit, and the caller information remains linked to the OSN key. <i>Note: To redisplay the previous caller information, press the DISP key and then the OSN key.</i>
The OSN set user goes on-hook, or presses the RLS key.	The OSN key lamp remains dark.	The OSN key lamp remains flashing, and the caller information remains linked to the OSN key.	The OSN set is returned to the idle state. The OSN key lamp changes to dark, and the caller information is erased.
The OSN set user makes a new call, returns to a previously established call, or answers an incoming call.	The OSN key lamp remains dark.	The OSN key lamp remains flashing, and the caller information remains linked to the OSN key.	The OSN key lamp changes to dark, and the caller information is erased.

Meridian 1
Emergency Services Access
Product description and
administration

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