Meridian 1

Meridian 1 telephones

Description and specifications

Document Number: 553-3001-108
Document Release: Standard 8.00
Date: June 1999

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Printed in the United States of America

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Revision history

June 1999

Standard, release 8.00. Reissued to include technical updates.

October 1997

Standard, release 7.00. Reissued to include technical updates.

August 1996

Standard, release 6.00.

April 1996

Standard, release 5.00.

December 1995

Standard, release 4.00. Reissued to include Hands Free.

July 1995

Standard, release 3.00. Reissued to include technical updates for release 21.

December 1994

Standard, release 2.00. Reissued to include technical updates.

August 1993

Standard, release 1.00. This is a new document that merges documents 2001-110, 2201-110, 2201-113, 2201-115, and 2201-116, and incorporates X11 release 19 changes.

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— M2317 telephones

— M2000 telephones

— SL-1 telephones

— MCA, MCU and ATA

Other documentation

For more information, refer to the following documentation:

— *Analog Terminal Adapter Quick Reference Card and Installing an Analog Terminal Adapter*

— *Digital telephone line engineering*

— *Meridian Communications Unit and Meridian Communications Adapter description, installation, administration, operation*

— *Spares planning*

— *Meridian 1 equipment identification*

— *Meridian 1 line cards description*

— *Telephone and attendant console installation*

— *X11 features and services*

— *X11 input/output guide*

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- *Asynchronous Data user guide*
- *M2317 user quide*
- *Meridian Modular Telephone user guide—North America*
- *M2216 user guide*
- *Meridian Programmable Data Adaptor user guide*
- *Meridian Communications Adaptor user guide*
- *M3000 Touchphone user guide*
- *Standard 500/2500 Telephone user guide*
- *Meridian Modular Telephone Display quick reference card*
- *M2216 quick reference card*

Meridian Digital (Modular) telephones

The Meridian Digital Telephones were introduced in 1989 as Meridian Modular Telephones. The term modular usually immediately brings to mind that the telephones use modular connections for the handset and the line cords. The intent was to signify that the Meridian 1 line of telephones included versatile functionality by providing accessories that could be added and changed in the field as well as equipped at the factory. Evergreen is a philosophy at Nortel and the modular design will continue which provides most versatility.

Meridian Digital Telephones are used to promote awareness that the Meridian 1 proprietary telephones are true digital telephones with all the advantages of digital transmission.

This chapter provides feature, add-on module, relocation, and specification information for the M2006, M2008, M2008HF, M2616, M2016S, and M2216ACD Modular telephones.

Functional description

This section provides feature and software requirement information for the M2006, M2008, M2008HF, M2616, M2016S, and M2216ACD Digital (Modular) telephones.

> ***Note:*** There are two distinct versions of Digital (Modular) telephone sets—both are supported. The versions can be clearly distinguished by the first four letters in the upper left-hand corner of the model identification label on the bottom of the set. The two types are the "NTZK" models and the "NT2K" models. In addition, the two jacks face in the same direction on NT2K sets, and in opposite directions on NTZK sets. When appropriate, differences between the models are noted in this document.

Digital (Modular) telephones are designed to provide cost-effective integrated voice and data communication. These telephones communicate with the Meridian 1 using digital transmission over standard twisted-pair wiring. They interface with the Meridian 1 using the Integrated Services Digital Line Card (ISDLC), QPC578 or the Digital Line Card (DLC), (NTAD02.). No additional hardware is required at the line circuit to provide data communication.

Digital (Modular) telephones are connected to the system through a two-wire loop carrying two independent 64 kbs PCM channels with associated signaling channels. One of the two PCM channels is dedicated to voice while the other is dedicated to data traffic. Line cords and handset cords on all Meridian Digital Telephones are equipped with standard modular connectors for easy and quick connecting procedures.

The telephone interfaces with the Digital Line Card (DLC) or ISDLC in the Peripheral Equipment shelf of the system. The DLC supports 16 voice and 16 data ports. The ISDLC supports eight voice and eight data ports. A TN is assigned to each port in the system software.

General features

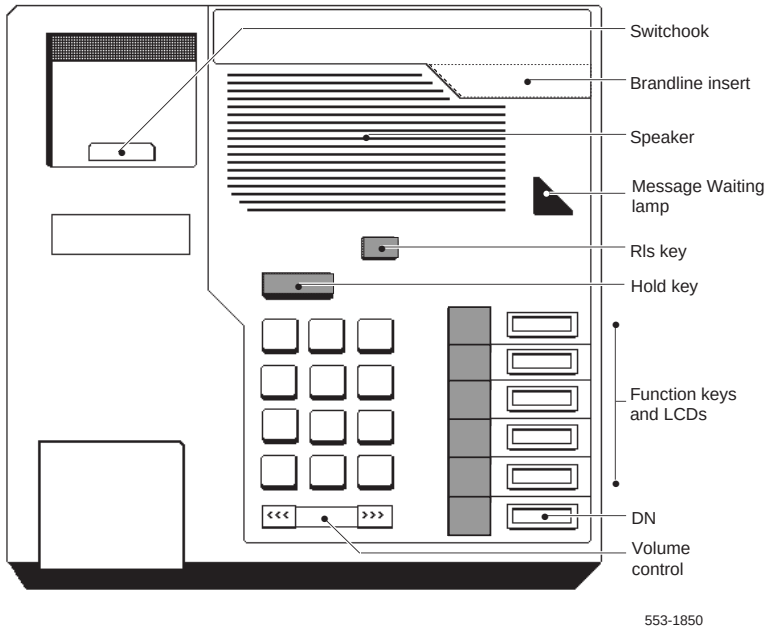
Digital (Modular) telephones have the following general features:

M2006—a single-line telephone with six programmable function keys. See Figure 1.

M2008/M2008HF—a multi-line telephone with eight programmable function keys. The M2008HF contains an integrated Handsfree unit. See Figure 2.

M2616—a high-performance multi-line telephone with 16 programmable function keys and integrated Handsfree unit. See Figure 3.

Figure 1
M2006 telephone



Dimensions:

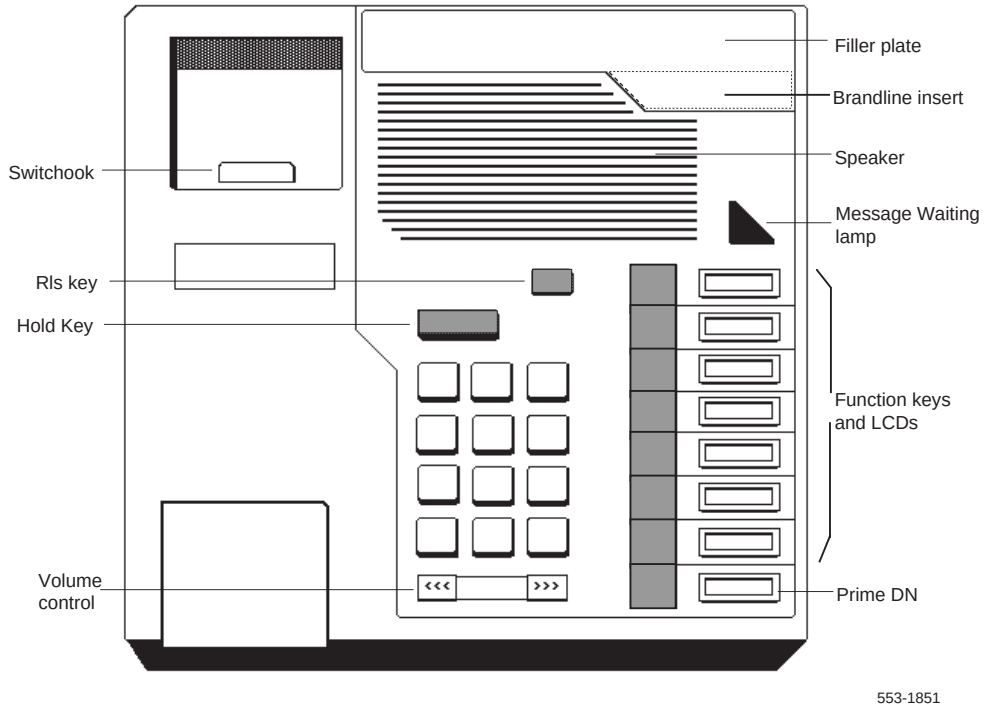
Length: 8.42 in (216 mm)

Width: 8.42 in (216 mm)

Height: 3.61 in (92.6 mm)

Weight: approximately 2.65 lbs (1.1 kg)

Figure 2
M2008/M2008HF telephone



Dimensions:

Length: 8.42 in (216 mm)

Width: 8.42 in (216 mm)

Height: 3.61 in (92.6 mm)

Weight: approximately 2.65 lbs (1.1 kg)

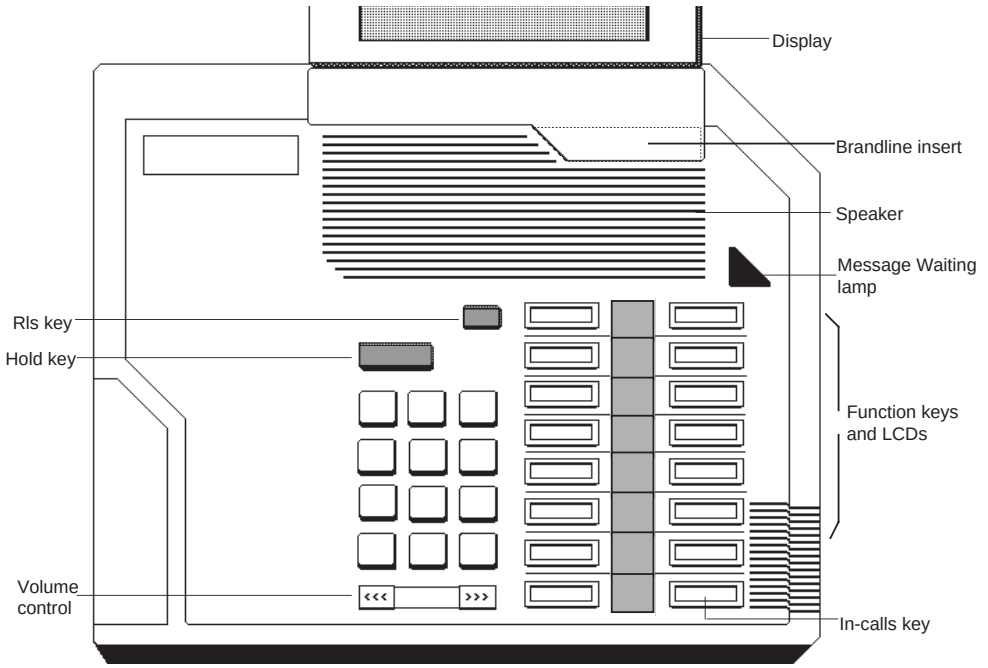
M2016S—a secure telephone (Security Group Class II approved TSG-210291030), designed to provide on-hook security. It is similar to the M2616, with 16 programmable function keys, but has no Handsfree capability.The M2016S uses relay circuitry that physically disconnects the handset from the telephone circuit when the switchhook is depressed. The red LED triangle lights steadily when the phone is not secure. (The phone is not secure when the handset is off the hook, when the phone is ringing, or whenever the handset/piezo relays are connected.) The red LED triangle blinks when a message is waiting. See Figure 3.

M2216ACD-1—a multi-line telephone for ACD operations See Figure 4. It has 15 programmable function keys, the Special Applications Display module, and two RJ-32 jacks for modular electret headsets. See Figure 5.

M2216ACD-2 (retired)— a multi-line telephone for ACD operations. It has 15 programmable function keys and the Display module. It is similar to model 1, but with one PJ-327 jack for a carbon agent headset and one RJ-32 jack for an electret supervisor headset. See Figure 5.

If headset is desired, the amplified type is strongly recommended.

Figure 3
M2616 and M2016S telephones



Dimensions:

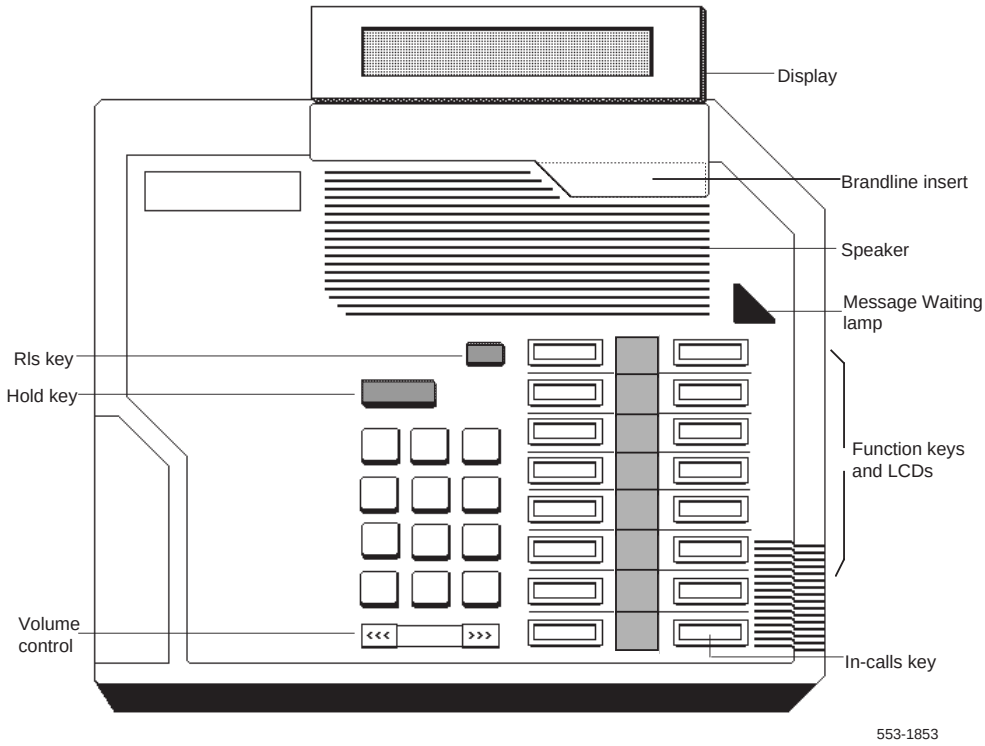
Length: 9.75 in (251 mm)

Width: 9.45 in (237 mm)

Height: 3.64 in (92.6 mm)

Weight: approximately 2.65 lbs (1.1 kg)

Figure 4
M2216ACD-1 and -2 telephones



Dimensions:

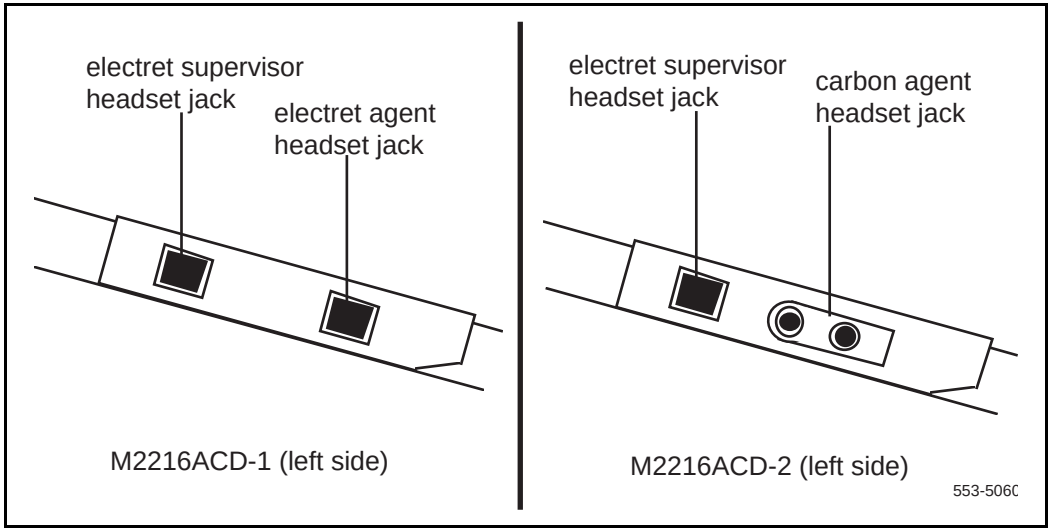
Length: 9.75 in (251 mm)

Width: 9.45 in (237 mm)

Height: 3.64 in (92.6 mm)

Weight: approximately 2.65 lbs (1.1 kg)

Figure 5
M2216ACD-1 and -2 left side showing headset jacks



M2216ACD Headset interface

Using the Program key, you can adjust the headset/handset interface of the M2216ACD-1 to optimize performance.

The M2216ACD-1 is compatible with most headsets. Amplified headsets are strongly recommended. Three settings are provided:

— Interface 1 (i.e. Plantronics type)

— Interface 2 (Liberation)

— Interface 3 (Handset)

Note: It is recommended that the headset user try using their headset with each of the three settings to determine which works best for them. Trial with both internal and external calls is also recommended in each setting to determine optimum performance.

Note: When the amplified headset is used, there are two choices of volume control: the rocker control on the telephone and the switch on the headset. The settings which provide for the clearest communication with the least amount of distortion are when the amplifier has a higher setting than the telephone volume control.

The supervisor and agent jacks are not interchangeable. A headset must be plugged into the agent jack if the telephone is to receive ACD calls.

Note: Any recording device connected to the receive path of a Modular telephone must meet these requirements:

- isolate power source from the headset/handset jack
- connect in parallel across pins 3 and 4 of the handset/headset jack
- load impedance at least 8K ohms across the audio band

Physical characteristics

Fixed keys

All of the Modular telephones are equipped with the following fixed keys:

— Hold key

— Release key

— Volume control key

Volume control key Pressing the right “volume up”***** or left “volume down” side of the key incrementally increases or decreases the volume for the tone or sound that is currently active.

*****All Meridian Digital telephones, with the exception of the M2016S manufactured after June 1996 are compliant with the HAC volume level requirements issued by the FCC for handset volume control for the hearing impaired. The highest volume level setting provides 13.5 dB over nominal.

The volume settings are retained for subsequent calls until new volume adjustments are made. If the telephone is equipped with a Display module, volume can be adjusted at any time with the setting displayed on the screen (in Program mode).

You can adjust the volume of the following tones while they are audible:

— ringing

— Handsfree (M2008HF/M2616)

— handset/headset

— buzz

— on-hook dialing

Note: When the telephone is disconnected, all volume levels will return to default values upon reconnection.

Message Waiting lamp key Each Modular telephone has a red triangle in the upper right-hand corner that lights brightly to indicate a message is waiting. This LED is the primary message waiting indicator and lets you know a message is waiting regardless of whether the telephone has a message waiting key/lamp pair. You must have Message Waiting allowed Class of Service. See LD 11, *X11 input/output guide*.

If you do assign a message waiting key/lamp pair, there will be two indications of a message waiting:

— the red Message Waiting triangle lights

— the LCD associated with the Message Waiting key flashes

You may assign an Autodial key that dials the message center (or voice mail system) to avoid the double indication or have no key/lamp pair assigned to the message center.

The Message Waiting lamp is also used to indicate security of the M2016S. The red LED triangle lights steadily when the phone is not secure. (The phone is not secure when the handset is off the hook, when the phone is ringing, or whenever the handset/piezo relays are connected.) The red LED triangle blinks when a message is waiting.

Handsfree/Mute key (M2008HF & M2616 only) Handsfree is software assignable on the M2008HF/M2616. This allows you to talk to another party without lifting the handset. Activate Handsfree by depressing the Handsfree/Mute key (key 15, top left for M2616; key 6, below Program for M2008HF) or by selecting a DN without lifting the handset. Once Handsfree is activated, it can be deactivated by picking up the handset or by ending the call using the Release (Rls) key. If Handsfree is not software assigned, you can assign any other feature to the “Handsfree” key.

Note: Software Control - CLS Class of Service for M2008HF

The Class of Service feature consistent with M2616 Handsfree control allows system administrators to enable/disable the Handsfree option on the M2008HF (Handsfree) telephone via software. M2008HF telephones ship from the factory with a hardware jumper enabled to allow the Handsfree option for existing software releases.

Release 21.41 and later software will now override the hardware setting and default to Handsfree denied (HFD.) If the handsfree option is desired, the system administrator simply enables Handsfree via a Class of Service prompt (HFA) included on Overlay 11 programming for the M2008 telephones (consistent with M2616).

Service Change Parameters

LD 11 - Allow/Deny Handsfree for M2008HF

Prompt	Response	Description
Req:	New/Chg	
Type	M2008	Aries
CLS	(HFD)	Digital Telephone Handsfree Denied
	HFA	Digital Telephone Handsfree Allowed

MAT

X11 Release 21.41 introduces support for the Meridian M2008HF set by providing a “Class of Service” change for Overlay 11 that allows handsfree operation on set type M2008. If MAT is equipped, a patch is required for MAT Release 4.02 to support this feature. Sites running MAT Release 3 cannot be patched to support this operation. Sites with MAT Release 3 must upgrade to MAT Release 4 and obtain a patch to support M2008 handsfree operation. The patch is available from ETAS.

Handsfree operates as if an off-hook operation had been performed. For example, when the telephone is idle, pressing the Handsfree/Mute key turns on the integrated Handsfree and selects a DN (depending on line selection as assigned through COS), allowing the user to make a call. When a call comes in to an M2008HF/M2616 and the set is ringing, pressing the Handsfree/Mute key turns on the Handsfree and allows the user to answer the incoming (ringing) call (depending on COS-assigned line selection) without picking up the handset.

Features keys

Each modular telephone has a number of programmable keys with LCD indicators that can be assigned to any combination of directory numbers and features (only one DN for the M2006). The lower right-hand key (key 0) is reserved for the Primary DN.

Note 1: When equipped with a Display module, Meridian Communications Adapter (MCA), or Meridian Programmable Data Adapter (MPDA), key 07 is automatically assigned as the Program key and cannot be changed. Key 05 becomes the Program key on the M2006 if equipped with the MCA or MPDA.

See "Data options" on page 113 for more information on the MCA and MPDA.

Note 2: The M2006 is a single-line telephone and accepts only one DN. The remaining five key/lamp pairs can be assigned any feature that is not considered a DN, such as Transfer, Call Forward, or Conference. Features that cannot be assigned are those that are considered DNs: Voice Call and two-way Hot Line, for example. Attempting to assign more than one DN to the M2006 causes the telephone to disable itself and all LCDs light steadily. It will return to its normal operating state when service change removes all secondary DNs.

LCD indicators support four key/LCD states:

Function	**LCD state**
idle	off
active	on (steady)
ringing	flash (60 Hz)
hold	fast flash (120 Hz)

* An indicator fast flashes when you have pressed a feature key but have not completed the procedure necessary to activate the feature.

Data Options

See "Data options" on page 113 for more information on the MPDA and MCA.

Software requirements

Modular telephones are supported by X11 release 14 and later software. The option number for the Modular telephones is 170. The mnemonic is ARIE. The DSET package (88) and the TSET package (89) are required.

Modular options

This section describes the modular options available for Modular telephones. Table 1 lists the features and optional hardware available for each telephone.

Table 1
Hardware features and options

	M2006	M2008/ M2008HF	M2616	M2016S	M2216 ACD-1	M2216 ACD-2
Programmable keys	6	8	16	16	15	15
Handsfree microphone		standard on the HF	standard			
Optional hardware available:						
Display		x	x		standard	standard
Key Expansion Module			x		x	x
Meridian Communications Adapter (MCA)	x	x	x		x	x
Meridian Programmable Data Adapter (MPDA)	x	x	x		x	x
External alerter interface	x	x	x		x	x

Note: In this table, x indicates available features for the telephone type listed in the top row.

Table 1
Hardware features and options

	M2006	M2008/ M2008HF	M2616	M2016S	M2216 ACD-1	M2216 ACD-2
Analog Terminal Adapter (ATA)	x	x	x		x	x
Brandline insert	x	x	x	x	x	x

Note: In this table, x indicates available features for the telephone type listed in the top row.

Note: If the telephone is equipped with a Display, Meridian Programmable Data Adapter, or Meridian Communications Adapter, the number of programmable keys is reduced by one, as key 07 (key 05 on M2006) automatically assumes the Program function.

For installation information, see *Telephone and attendant console installation* (553-3001-215). See “Data options” on page 113 for more information on the MPDA and MCA.

Display module

A two-line (24 characters per line) Display module provides system prompts, feedback on active features, and valuable calling party information. In addition, you can modify various telephone features such as volume and screen contrast using the Program key (top right function key). You can enable a Call Timer, which times calls made or received on the prime DN.

Note: The display module is not supported on the M2006.

The displays previously available (NT2K24WA, NT2K25YL, and others) have been replaced by display NT2K28xx which eliminates a daughter board. Two new screens have also been added to support ACD applications:

— Logged Out

— Not Ready

Note: It is possible to adjust the Display screen contrast so that it is too light or too dark to read. If you cannot read the Display, disconnect and then reconnect the line cord to return to the default settings.

Program key

The Program key is automatically assigned to Modular telephones with Display, Meridian Communications Adapter (MCA), or Meridian Programmable Data Adapter (MPDA) added. You can change a variety of display features such as screen format, contrast, and language. It also lets you change data parameters, such as transmission speed and parity, on the MPDA and MCA (if equipped).

The upper right-hand key (key 05 on the M2006 and key 07 on all others) automatically becomes the Program key when Display, MCA, or MPDA is configured with the telephone. The Program key is local to the telephone and shows blank when you print key assignments in LD 20.

See “Data options” on page 113 for descriptions of the MCA, MPDA and ATA and their requirements.

External Alerter interface

The External Alerter Board provides an interface to standard remote ringing devices, such as a ringing unit installed in a location separate from the telephone. The External Alerter interface is not the remote ringer itself, but provides access to standard, off-the-shelf remote ringing devices. The Alerter Board requires additional power. See “Power requirements” on page 24.

You can program the External Alerter interface to activate a ringer (or light) when the telephone rings or when the telephone is in use (off-hook).

For information on installing and setting up the External Alerter, see “Add-on modules” in *Telephone and attendant console installation* (553-3001-215).

Key Expansion Module

A modular 22-key unit can be attached to any 16-key Modular telephone except M2016S. See Figure 6. The extra keys can be assigned to any combination of lines and features. You can add up to two expansion modules to 16-key telephones, providing a total of 60 line/feature keys. You will need a separate footstand for the module(s), one for a single module, one for a double. See “Ordering information” on page 31. The expansion module may require additional power. See “Power requirements” on page 24.

The Key Expansion Module connects to the telephone through a cable running from the base of the telephone. It is physically connected to the telephone by the footstand. NT2K22VH or later vintage key lamp modules are required for CISPR22, Class B compliance.

Brandline insert

The filler plate on the telephone or Display module contains a removable insert designed to accommodate custom labeling. You can order blank Brandline Inserts and have a printer silk screen your company logo on them. Brandline Inserts snap easily into and out of the filler plate.

M2006/M2008/M2008HF/M2216ACD/M2616 telephones

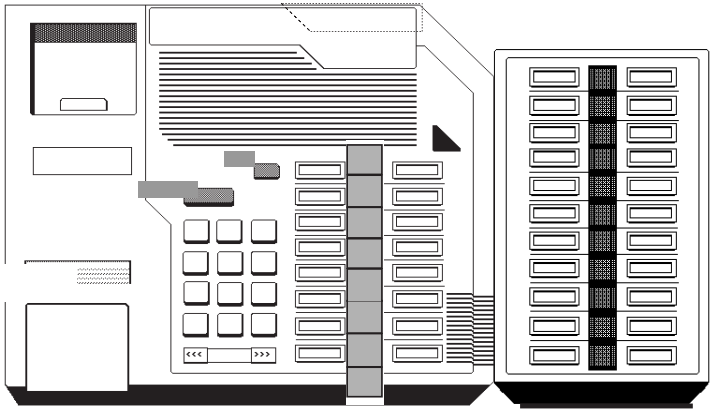
You can use an electret headset in the handset port of the M2006, M2008, M2008HF, M2616, and M2216ACD telephones. The amplifier must draw less than 400 micro amps from the telephone jack.

The headset should be designed to work with a telephone jack with these characteristics:

Transmit interface: +5 V through 10K DC bias resistance with maximum current of 500 micro amps. The differential input impedance is 10K ohms. Connects to pins 2 and 5 of the handset jack.

Receive interface: single ended output with output impedance of 180 ohms. Connects to pins 3 and 4 of the handset jack.

Figure 6
M2616 with Display module and Key Expansion module



Modular telephone relocation

This section describes how to relocate a Modular telephone and its associated dataport Terminal Number (TN) without the intervention of a craftsperson.

Modular Telephone Relocation is designed specifically for the Modular terminals and is an enhancement to Automatic Set Relocation. If dataport TN information exists for the terminal, it is automatically relocated when the telephone is relocated.

When a telephone is relocated-out, a relocation block is built to store the relocation information in the protected data area. The relocation block includes the old TN, the terminal ID information, the serial number of the telephone, and other information.

This feature uses the unique serial number and terminal ID of the Modular terminal sets to identify the terminal being relocated and to reduce the number of manual steps needed for relocation.

See Automatic Set Relocation in *X11 features and services* (553-3001-305) for complete details.

How to relocate a Modular telephone

1 Go off-hook, receive dial tone, and enter Relocation Code (either SPRE +81 or Flexible Feature Code).

2 Enter optional security code as defined in OVL 15 (a burst of tone confirms that the telephone is relocated-out).

3 Take it to the new location and plug it in (a confirmation buzz from the speaker indicates the telephone is in service).

Specifications

This section lists the specifications required for Modular telephones.

Environmental and safety considerations

All digital telephones and their associated options meet the requirements of the Electronic Industries Association (EIA) specification PN-1361.

Temperature and humidity

Operating state:

Temperature range	0° to 50°C (32° to 104°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 53 mbar of water vapor pressure.

Storage:

Temperature range	–50° to 70°C (–58° to 158°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 53 mbar of water vapor pressure.

Electromagnetic interference

The radiated and conducted electromagnetic interference meets the requirements of Subpart J of Part 15 of the FCC rules for class A computing devices.

NT2K model sets with all options meet CISPR22, Class B requirements.

Local alerting tones

Each telephone provides four alerting tones and a buzz sound. The system controls the ringing cadence by sending tone-ON and tone-OFF messages to the telephone. The alerting tone cadences cannot be changed from the telephone but can be altered for individual Modular telephones by software controlled adjustments in the system. See *X11 input/output guide*. All other telephony tones, such as dial tone or overflow, are provided by the Meridian 1 from a Tone and Digit Switch.

Alerting tone characteristics

The tone frequency combinations are as follows:

Tone	Frequencies	Warble Rate (Hz)
1	667 Hz, 500 Hz	5.2
2	667 Hz, 500 Hz	2.6
M2006/M2008/M2008HF:		
3	1600 Hz, 2000 Hz	5.2
4	1600 Hz, 2000 Hz	2.6
M2016S/M2616/M2216ACD:		
3	333 Hz, 250 Hz	5.2
4	333 Hz, 250 Hz	2.6

A 500 Hz buzz signal is provided for incoming call notification while the receiver is off-hook.

Line engineering

Modular telephones use twisted pair wiring on transmission lines selected by the rules given in *Digital telephone line engineering* (553-2201-180). The maximum permissible loop length is 3500 ft. (1067 m), assuming 24 AWG (0.5 mm) standard twisted wire with no bridge taps. A 15.5 dB loss at 256 kHz defines the loop length limit. (Longer lengths are possible, depending on the wire's gauge and insulation.) Table 2 gives detailed information on loop lengths.

Table 2
Loop lengths for digital telephones

	QPC578 A and B	QPC578 C +	NT8D02
PVC insulated cable (polyvinyl chloride)			
22 or 24 AWG	100–3000 ft. (30.5–915 m)	0–3500 ft. (0–1067 m)	0–3500 ft. (0–1067 m)
26 AWG	100–2100 ft. (30.5–640 m)	0–2600 ft. (0–945 m)	0–2600 ft. (0–793 m)

Note 1: No bridge taps or loading coils are allowed.

Note 2: Effect of line protector at MDF reduces loop length by 500 ft.

Note: Use only the line cord provided with the Modular telephone. Using a cord designed for other digital telephones could result in damage to the cord/loss of set functionality.

Power requirements

The M2006, M2008, M2008HF, M2616 (basic configuration and with Display module), and M2216ACD-1 are loop powered. Loop power, originating in the ISDLC or the DLC, consists of a 30 V dc power source and assumes a 3500 ft. (1219 m) maximum loop length of 24 AWG (0.5 mm) wire and a minimum 15.5 V dc at the telephone terminals.

Note: The loop length limit is defined by a 15.5 dB loss at 256 KHz. Longer lengths can be determined using the wire's gauge and insulation.

The Handsfree feature, which is integrated into the M2008HF/M2616, requires no additional power.

Some configurations of telephones and options need more than basic loop power to operate. Table 3 lists the types of Modular telephones for NTZK telephones (Table 4 for NT2K telephones) and shows when additional power is needed to operate the telephone or its optional hardware. Power Supply Boards come installed in factory-assembled configurations that require additional power.

Note 1: If a power failure occurs, configurations that require loop power will continue to work only if the system has battery backup. Only those options that require additional power will cease to function.

Note 2: During a power failure, the carbon agent headset on the M2216ACD-2 will fail and the electret supervisor's jack can be used as an agent jack. If no headset is plugged in to the electret jack during power failure, the call is dropped, and the agent is logged off and must log in again once the electret headset is plugged in. When power is restored, the carbon jack returns automatically. Power supply board

The power supply option consists of a power supply board that mounts inside the telephone, coupled with an external wall-mount transformer or closet power supply that provides power to the power supply board. The power supply board receives its power through pins 1 and 6 of the line cord.

Table 3
NTZK model Power requirements, Meridian Digital (Modular) Telephone sets

Telephone type	Loop power	Additional power (Power Supply Board)
M2006	Basic configuration	MPDA, External Alerter Interface, MCA (optional),
M2008	Basic configuration	Any option(s)
M2616	Basic configuration (with Handsfree) and Display.	MPDA, Key Expansion Module, External Alerter Interface, MCA (optional)
M2016S	N/A	Basic Configuration
M2216ACD-1	Basic configuration (with Display)	MPDA, Key Expansion Module, External Alerter Interface, MCA (optional)
M2216ACD-2	N/A	Any configuration

Table 4
NT2K model Power requirements, Meridian Digital (Modular) Telephone sets

Telephone type	Loop power	Additional power (Power Supply Board and Transformer)
M2006	Basic configuration	Any option(s)* (MPDA, External Alerter Interface, MCA)
M2008/M2008HF	Basic and Display configurations	MPDA, External Alerter Interface
M2616	Basic, Display, and Handsfree configurations and Key Expansion Module(s)	MCA, MPDA, External Alerter Interface, MCA
M2016S	N/A	Basic configuration
M2216ACD	Basic configurations (with Display) Key Expansion Module(s).	MPDA, Key Expansion Module, External Alerter Interface, MCA

*No display can be added to the M2006 set.

When installing an MCA or MPDA to NTZK or NT2K phone sets with a date code prior to January 1998 a Power Option board is required, along with an additional power source.

When installing an MCA in an NT9K phone set or an NT2K with date code of January 1998 you will only install the MCA (an additional Power Option board and Jumper board is not required).

The power supply board connects to the telephone through a 14-pin bottom entry connector.

Refer to Table 3 and Table 3 for power supply board requirements.

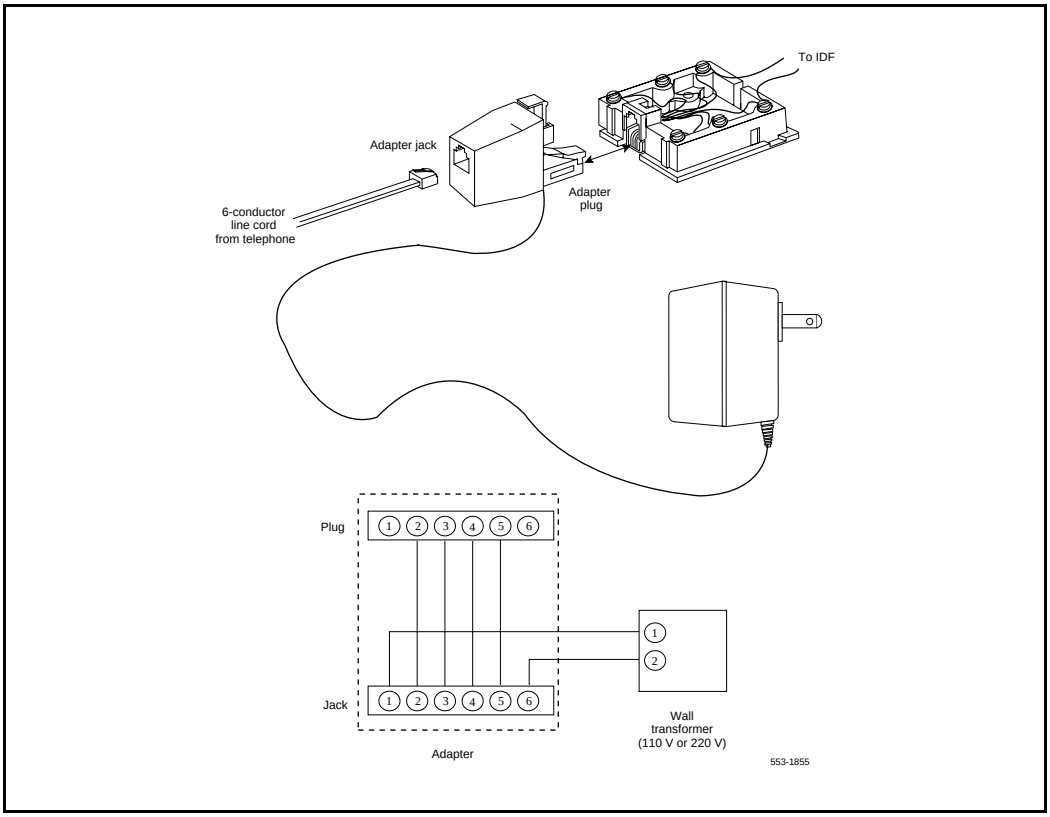
Local plug-in transformer (A0367335)

A single winding transformer equipped with a 10 ft. (3 m) cord of 22 AWG two-conductor stranded and twisted wire with a modular RJ-11 duplex adapter can provide the additional power needed to operate the telephone and its options. (See Figure 7)**.**

CAUTION

Do not plug any equipment (computer, modem, or LAN card) other than the Modular telephone into the RJ-11 transformer adapter, as damage to equipment may result.

Figure 7
Configuration of local plug-in transformer



120 V transformer (AO367335 or equivalent) The following minimum specifications must be met by this transformer:

Input voltage	120 V ac/60 Hz
No load output voltage	29 V ac maximum
Voltage at rated current	26.7 V ac minimum
Rated load current	700 mA

240 V transformer (AO367914 or equivalent) The following minimum specifications have to be met by this transformer:

Input voltage	240 V ac/50 Hz
No load output voltage	29 V ac maximum
Voltage at rated current	26.7 V ac minimum
Rated load current	700 mA

Note 1: You cannot wall mount the telephone over the wall jack when using a transformer because of the size of the RJ-11 adapter. Hang it above or to the side of the jack and run the line and power cords to it.

Note 2: The above-mentioned transformers can also used with outlets identified as 110V or 220V.

Closet Power Supply

Closet power can be obtained from an AC transformer for loops of 100 ft. (30 m) or less, or a DC transformer for loop lengths of 650 ft. (198 m) or less. An equivalent power source can be used but must be UL listed to provide isolation of outputs to the terminal. See Figure 8.

CAUTION

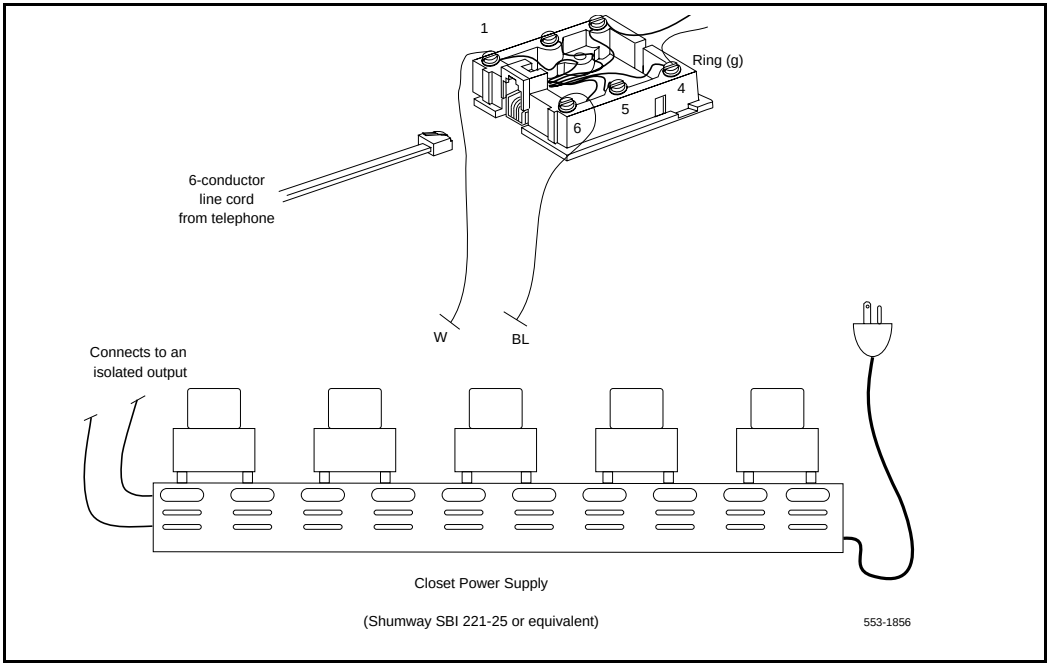
When using closet power, do not plug the modular connector into any equipment (computer, modem, or LAN card) other than the Digital (Modular) telephone, as damage to equipment may result.

Note 1: All terminals must be isolated from the input winding and each terminal must be isolated from all other terminal windings. A separate winding is required for each terminal, and grounds should not be connected.

Note 2: The QUT1 closet power supply source is not compatible with Modular telephones.

The AC source should be rated at 29 V ac, 700 mA isolated. The DC source should be rated at 42 V dc, 300 mA isolated, with current limiting output of 1 amp.

Figure 8
Closet Power Supply configuration



Handsets

This section provides ordering information for Digital (Modular) telephone handsets.

Table 5
Order codes for new handsets for Meridian Digital (Modular) Telephone sets, model NTZK

Description	Order Code
Legacy handset, Black	NT0C09EA03
Legacy handset, Ash	NT0C09EA35
Legacy handset, Gray	NT0C09EA93
Note: Handsets designed for NT2K sets (Global handset) will not meet product transmission/reception specifications if used with NTZK sets.	

Table 6
Order codes for new handsets for Meridian Modular Telephone sets, model NT2K

Description	Order Code
Global handset, Black	NT0C09EK03 / A0400786
Global handset, Ash	NT0C09EK35 / A0400787
Global handset, Gray	NT0C09EK93 / A0400790
Note 1: Handsets designed for NTZK sets (Legacy handset) will not meet product transmission/reception specifications if used with NT2K sets. ***Note 2:*** Noisy Location, Push-to-Talk, Push-to-Mute, and Mercury Switch handsets will not meet product transmission/reception specifications if used with NT2K sets. ***Note 3:*** Global handsets are not compatible with M1250 or M2250 (AE or current AF versions) telephones.	

Ordering information

Refer to the Northern Telecom price book, or contact your Northern Telecom representative for specific ordering codes.

Table 1, “Hardware features and options,” on page 16 lists the hardware options that you can purchase separately.

For ordering configurations for Meridian Modular telephones and accessories, see the current price book.

See *Meridian 1 equipment identification* (553-3001-154) for more information.

M3000 Touchphone

This chapter provides feature and specification information for the M3000 Touchphone which is now retired.

Functional description

This section provides feature and software requirement information for the M3000 Touchphone.

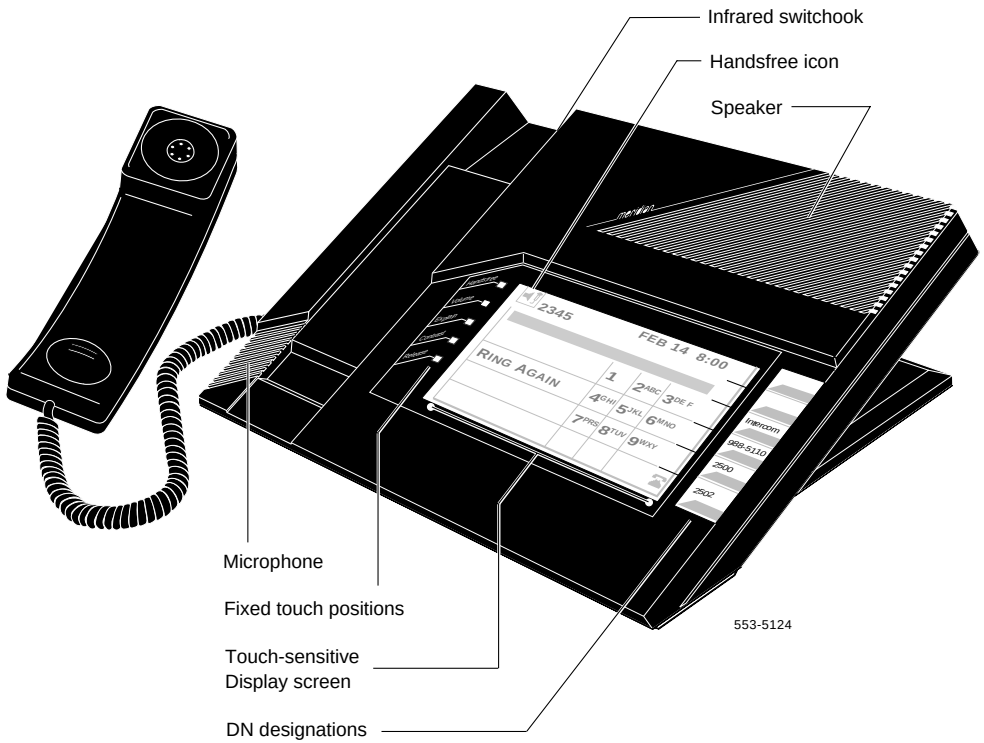
The M3000 Touchphone (see Figure 9) is a digital, integrated voice and data telephone with a touch-sensitive Liquid Crystal Display (LCD) screen, designed to meet the demanding requirements of business decision makers. All features are displayed on the screen and are accessed by touching the appropriate name on the screen. In the idle state, the touch-sensitive screen displays time and date. The Touchphone can display a number of on-line feature descriptions and operating instructions in user-friendly language.

A microphone and a speaker are built into the set to permit Handsfree operation.

The telephone interfaces with the QPC578 or the NT8D02 line card in the Intelligent Peripheral Equipment shelf or the Peripheral Equipment shelf of the Meridian 1. The QPC578 supports 16 Integrated Voice and Data ports, and the NT8D02 supports 32 Integrated Voice and Data ports. Each port supports one voice or data channel. A voice TN and a data TN are assigned in the system software.

> ***Note:*** The minimum vintage M3000 firmware that can connect to the NT8D02 Digital Line Card is 4.15.

Figure 9
M3000 Touchphone



Dimensions:

Length: 11.8 in. (302 mm.)

Width: 8.4 in. (214 mm.)

Height: adjustable

Weight: approximately 3.3 lbs. (1.5 kg.)

The M3000 is connected to the system through a two-wire loop carrying two independent 64 kbps PCM channels with associated signaling channels. One of the two PCM channels is dedicated to voice, while the other is dedicated to data traffic.

General features

The M3000 Touchphone has the following general features:

— No moving mechanical parts associated with the Touchphone.

— No dial pad, no keys, no switchhook. The keys are replaced by touch-sensitive positions on the screen, and an infrared sensor replaces the conventional mechanical switchhook.

— No additional keypads or other external add-on units for future expansion required; consequently, no change in setup or increase in desk space requirements are necessary.

— Supports multi-line access up to a maximum of six lines that can be any combination of Directory Numbers (DN), private lines, and dial intercom appearances.

— Message waiting alert (a short tone every 5 to 60 minutes) using the Touch Profile Timer Control.

— Built-in microprocessor lets you generate a local private directory where you can store frequently used names and Directory Numbers in the telephone, recall any stored information, and originate a call by touching the name on the touch screen. (The Directory feature is described later in this section.)

— Also supports a predial function and feature requests to the SL-1 system, and indicates the current telephone state to the user by means of touch-positions, icons, and textual information displayed in the Information Area. The microprocessor also maintains call duration timers, provides a time/date display, provides visible and audible feedback for user input, mutes the Handsfree microphone, controls alerting tone cadence, generates sounds, monitors the infrared switchhook, and performs diagnostics.

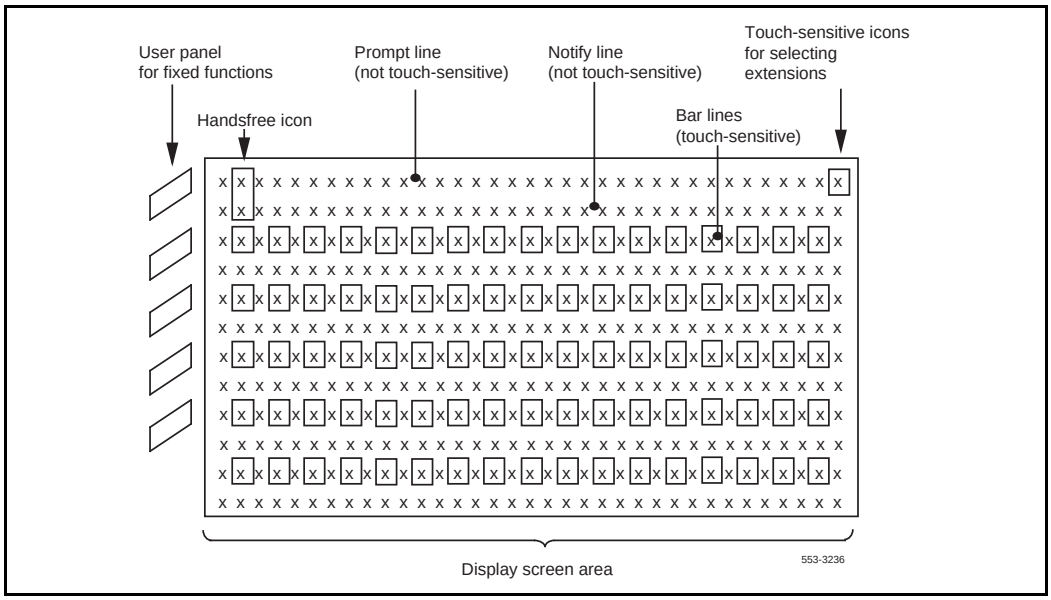
Physical characteristics

The M3000 Touchphone has the following physical characteristics.

Touch-Sensitive LCD screen

The touch-sensitive LCD screen provides access to any of the features on the Touchphone. The display screen consists of a total of 12 rows of display elements, each row with a 29-character display capacity, and is divided into specific display areas. (See Figure 10.)

Figure 10
M3000 Touchphone basic screen layout



The numerous touch-positions and icons appearing with different screen states are described in the *M3000 Touchphone user guide* (P0800569). A summary of all icon symbols used by the Touchphone is shown in Table 7.

Table 7
Icons used by the M3000

Icon	Icon state	Meaning
	On	Call active / Call Log, outgoing calls
	Flashing	Call held
	Flashing	Incoming call
	On	Call Log, answered incoming calls
	On	Call Log, unanswered incoming calls
	On	Identifies the DN associated with the call timer display
	On	Message waiting
	On	Backspace
	On	Voice call forwarded, or set made busy, or auto answer is on
	On	Data calls are forwarded
	On	Scroll down
	On	Scroll up
	On	Handsfree speaker and microphone are on
	On	Handsfree speaker on (microphone is muted)

Display screen partition

Figure 10 illustrates the display screen partitioning that is described in Table 8. The Idle screen (Figure 11) and the dial tone screen (see Figure 12) are shown as general layout examples. The actual touch positions displayed on the dial tone screen and other screens depend on the features assigned to the telephone.

There are 12 display lines per screen. Line numbers given in Table 8 are counted from the top and proceed toward the bottom of the display screen.

Table 8
M3000 display screen partition

Line number	Line type	Function of Display line	Touch sensitive	
			yes	no
1	Prompt line	Prompts user for action and/or displays call status, ringing call identification, call duration, or time and date when no other messages are shown.		x
2	Notify line (Information area)	Displays status information not requiring immediate user response (dialed digits, identification of connected call). Truncates information that goes beyond 32 alphanumeric characters (does not scroll).		x
3	Bar line	Displays screen-dependent information and touch functions (allows user to scroll directory entries, exit from local functions, move to the next step in a sequential activity by touching the OK icon, connect a waiting call).	x	
4–12	Screen	Contains the dial pad and touch locations (array of 5 x 16 touch sensitive positions), which alter with screen states. The number of touch positions used for a function is directly proportional to the size of the displayed function (a dial pad digit occupies two touch positions).	x	
1–12	Programmable touch positions	The screen touch positions located at the extreme right (farthest away from the handset) remain outside the 29-character wide lines and are reserved for icons and labels identifying telephone extensions.	x	
1–12	User Panel	The touch positions located at the extreme left (closest to the handset) of the screen are outside the display screen area and are used to access fixed functions, which are identified in print on slanted lines between the touch-sensitive positions and the handset.	x	

Figure 11
M3000 idle state screen

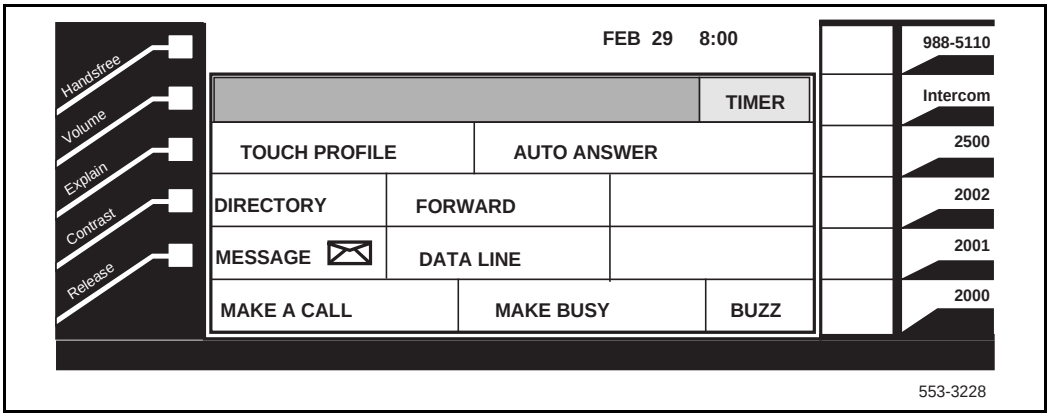
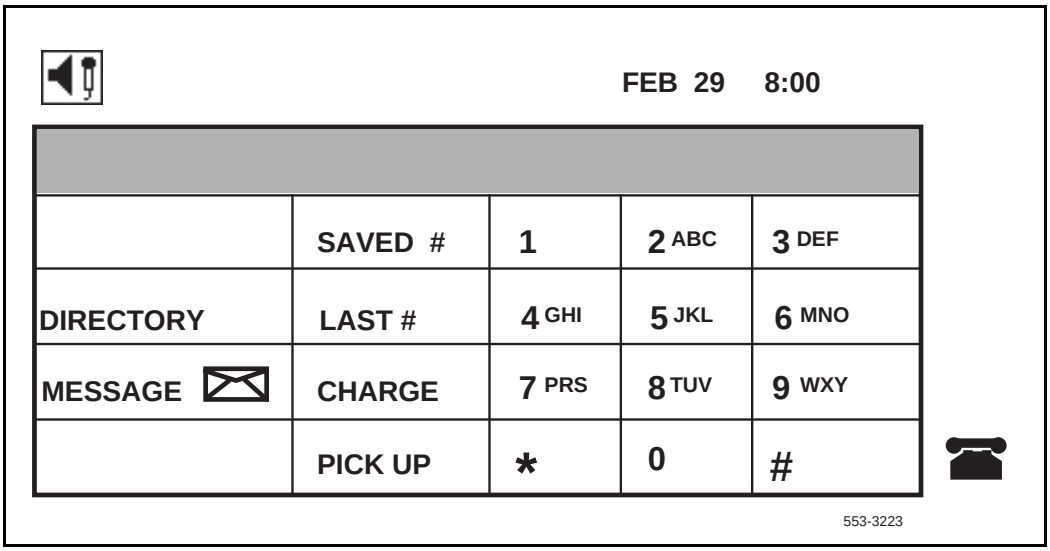


Figure 12
M3000 dial tone screen



User panel

The left-most area of the screen contains the user panel. The user panel consists of five fixed-touch positions:

— Handsfree

— Volume

— Explain

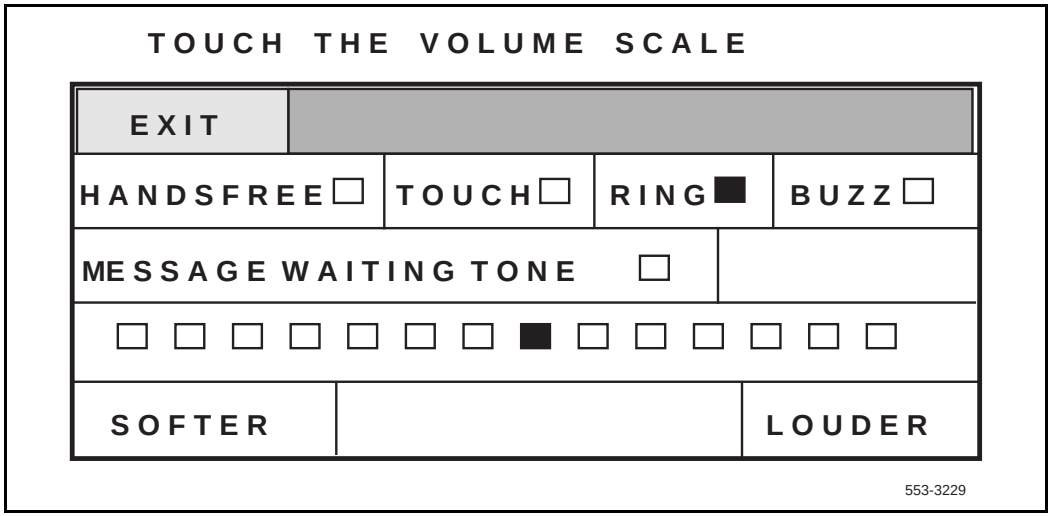
— Contrast

— Release

Handsfree key You can make a Handsfree call on your prime DN by pressing this position or on any free extension by touching the extension area without lifting the handset. If Handsfree is active, touching this position mutes the microphone, so the party at the far-end cannot hear you. Touch Handsfree to activate the muted microphone.

Volume key You can adjust the volume during any voice call or from the Idle screen by pressing this position. Figure 13 shows the volume screen.

Figure 13
M3000 volume state screen

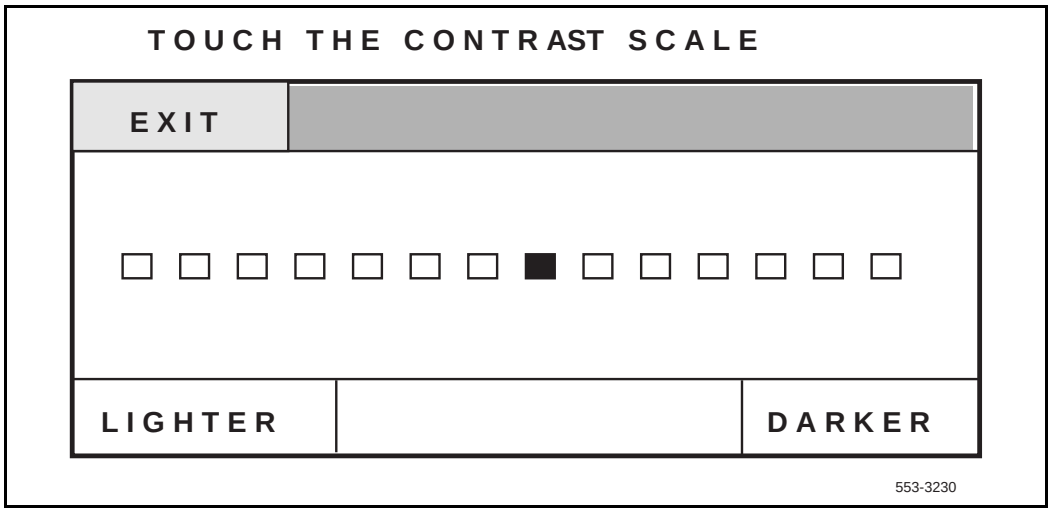


Adjust volume up or down by touching the select-scale. You can also make incremental volume adjustments by pressing the “Softer” or “Louder” touch-sensitive areas displayed on the screen. Touch the “Exit” position on the volume screen to save the changes and return to the previous screen state.

Explain You can receive up to eight lines of help text on the screen using this fixed-touch position. First touch Explain, then touch the item on the screen that needs to be explained.

Contrast You can adjust the contrast from any screen state by pressing this position. When you touch the contrast position, the screen displays a row of 14 touch positions, with the current setting selected. Figure 14 shows the contrast screen.

Figure 14
M3000 contrast state screen



Touching the contrast level scale changes the LCD viewing angle to the position touched to improve visibility while sitting or standing. Touching the “Lighter” or “Darker” touch positions adjusts the LCD viewing angle one step at a time. Touch the “Exit” position to save the change and return to the previous screen state.

Release You can disconnect any active call by simply touching this fixed touch position. The Touchphone returns to the idle state, with Handsfree turned off.

Touch profile soft key

The Touch Profile is a soft key available when the Touchphone is idle. It lets you check on local Touchphone features and make adjustments, where applicable. Below is a summary of the local Touchphone features you can access using the Touch Profile:

— List Features presents a list of common features with a check box beside each to indicate whether your Touchphone has access to it. You can display help information by touching the feature name.

— Select Ring lets you choose one of four ring sounds or make one of your own using a piano-style keyboard displayed on the screen.

— Lock Directory allows you to prevent unauthorized use of the Directory by locking it so that a password is needed to access its contents. The same password applies to the Call Log.

— Lock Call Log allows you to prevent unauthorized use of the Call Log by locking it so that a password is needed to access its contents. The same password applies to the Directory.

— Timer Control lets you toggle the Call Timer and Message Waiting Timer ON or OFF. You can also choose the time lapse between Message Waiting alerting beeps.

— Call Log control lets you choose what type of calls to log: incoming unanswered, incoming answered, or outgoing.

— Clean Surface turns off the display screen for cleaning. Lift the handset to turn on the touch surface.

Call Log

The Call Log lets you review the last 28 calls the M3000 Touchphone placed or received. You can check the time and date of any call in the Call Log by pressing the icon (telephone or bell) at the left of the screen. You can also call back an entry in the Call Log by pressing the entry and selecting an idle extension.

Each page of the Call Log shows four calls, starting with the most recent. If the Call Log is empty, the Call Log key will not appear on the set, since there is nothing to view.

You can select which types of calls are logged (incoming answered, incoming unanswered, outgoing) in the Touch Profile.

You can lock the Call Log to prevent unauthorized access. Use the Touch Profile to lock the Call Log so a password must be entered to access it. The same password is used for both the Directory and Call Log. You can lock and unlock your Call Log without affecting the Directory. If you have forgotten the password, use LD 32 ("CPWD" followed by the TN) to unlock the Touchphone. The Call Log will remain unlocked until a new password is entered.

Call Log entries that contain dialable numbers can be copied to the Directory. (See the following sections for a description of the Directory and the Directory Archiver.) While using the Paste command, you can also choose to edit the name and number.

If there is a system power failure, the contents of the Call Log are lost.

> ***Note:*** To log incoming calls, your M3000 Touchphone must have TDD (Touchphone display option) class of service set in LD 11.

Directory

The M3000 Touchphone offers a private Directory that you can access by touching the display screen. You can search for an entry in the Directory, scroll the Directory display up or down, and dial the desired DN by touching the corresponding name on the screen. You can add, change, or delete names and numbers quickly and easily.

The Directory allows 15-character names. The Directory is organized alphabetically; eight names are displayed per page. The Directory can store from 150 to 450 names, depending on the length of each entry. Multiple entries with the same phone number are allowed. The Rotate key allows the entries to be placed in the desired orientation.

You can lock the Directory to prevent unauthorized access. Use the Touch Profile to lock the Directory so a password must be entered to access it. The same password is used for both the Directory and Call Log. You can lock and unlock your Directory without affecting the Call Log. If the password is forgotten, use LD 32 (“CPWD” followed by the TN) to unlock the Touchphone. The Directory will remain unlocked until a new password is entered.

You can use more than one letter to define the search parameters. For example, if your Directory has more than one page of names that begin with the letter “S,” the Find command will allow you to enter a second letter, such as “O” to go directly to the page with names beginning with “SO.”

Version 4.15 firmware and earlier The Directory allows nine-character names. Twelve names are displayed on each page. The Find command takes you to the first page that contains names beginning with a specific letter.

Directory Archiver

The M3000 provides an option to save the contents of the Directory by using the M3000 Directory Archiver. The M3000 Directory Archiver is a small hand-held, battery operated unit that fits in the receiver cradle of the M3000 Touchphone. In addition to saving the contents of the Directory, it saves the following information:

— Last number (Redial)

— Saved number

— Password (Directory and Call Log)

— Call Log control

— Ringing tone and volume

— Volume settings

— Contrast setting

— Touch sound, beep, or click

— Number of times the telephone has been restarted (powered up)

Note: The Directory Archiver is compatible with firmware version 5.5 and later of the M3000 Touchphone.

The Directory Archiver has one push-button and one LED. Once inserted into the handset cradle, the push-button initiates an archiver session and the LED indicates proper functioning. Once the Directory Archiver gains control of the telephone, the screen changes to give you the following options:

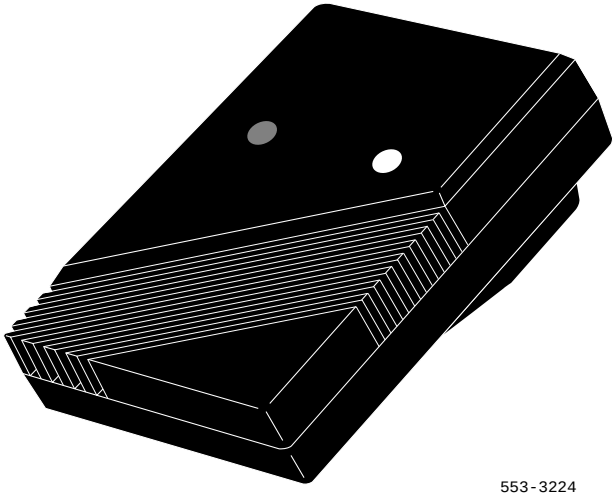
— Backup Directory

— Restore Directory

— Erase archiver

Note: Before using the Directory Archiver, release any voice or data calls and forward your telephone.

Figure 15
Directory Archiver



Dimensions:

Length: 4.5 in (115 mm)

Width: 2.9 in (73 mm)

Height (front): 1.2 in (30 mm)

Height (rear): 2 in (51 mm)

A horizontal bar graph is displayed during an update or restore on the telephone.

CAUTION

Do not remove the Directory Archiver in the middle of operation. If you do, or if you are not sure if the operation was complete, perform the entire operation again.

A screen tells you when the operation has been completed successfully. The screen disappears after about 10 seconds, or you can acknowledge the message by touching the screen. The M3000 returns to normal operation.

Erasing the Directory and Call Log

You can erase the entire Directory and Call Log and reset all of the Touchphone settings to their defaults by touching the numbers along the bottom row of the STARTING UP screen display in the following sequence:

1 3 3 2

The entire memory store of the Touchphone is erased. All Touch Profile parameters are reset to their defaults.

Icon symbols used by the M3000 Touchphone

The Touchphone displays icons to prompt the user without involving letters and language. Table 7 summarizes the Touchphone icons.

Asynchronous Data Option

When an M3000 is equipped with the Asynchronous Data Option (ADO), you can make a data call using keyboard dialing from your attached terminal or personal computer, without interfering with voice communication.

See “Data options” on page 113 for more information on the ADO.

Software requirements

The M3000 Touchphone is supported by X11 release 7 and later software. The option number for the M3000 is package (89). The mnemonic is TSET. The DSET package (88) is also required.

Specifications

This section lists the specifications required for the M3000 Touchphone.

Environmental and safety considerations

The M3000 Touchphone meets the requirements of the Electronic Industries Association (EIA) specification PN-1361.

Temperature and humidity

Operating state:	
Temperature range	0° to 40°C (32° to 104°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 52 mbar of water vapor pressure.
Storage:	
Temperature range	–30° to 60°C (–22° to 140°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 52 mbar of water vapor pressure.

Electromagnetic Interference

The radiated and conducted electromagnetic interference of the Touchphone meets the requirements of Subpart J, Part 15 of the FCC rules for class A computing devices.

Line engineering

The M3000 Touchphone operates through twisted pair wiring on transmission lines that comply with *Digital telephone line engineering* (553-2201-180). Table 9 lists the permissible loop lengths for the M3000 connecting to different line cards using different cable types and gauges.

Table 9
Loop lengths for Meridian digital telephones

	QPC578 A and B	QPC578 C +	NT8D02
PVC insulated cable (polyvinyl chloride)			
22 or 24 AWG	100–3000 ft. (30.5–915 m)	0–4000 ft. (0–1219 m)	0–4000 ft. (0–1219 m)
26 AWG	100–2100 ft. (30.5–640 m)	0–2600 ft. (0–793 m)	0–2600 ft. (0–793 m)

Note 1: No bridge taps or loading coils are allowed.

Note 2: Effect of line protector at MDF reduces loop length by 500 ft.

Circuit features

This section provides an abbreviated summary of circuit and circuit board capabilities. For more detailed information refer to *Meridian 1 line cards description* (553-3001-105).

The M3000 Touchphone provides integrated voice and data communications. The Touchphone communicates with the SL-1 Integrated Services Network using digital transmission over standard twisted pair wiring. The Touchphone interfaces with the Meridian 1 system through the NT8D02 or the QPC578 line card. No additional hardware is required at the line circuit to provide data communications.

Hardware capabilities

Microprocessor The Touchphone has an 8-bit CMOS microprocessor that runs at 10 MHz. This microprocessor coordinates the operation of the display screen and the touch panel. It initiates display prompts, runs features, and relays messages between the Touchphone and the system. It interfaces with all the microcircuits contained within the Touchphone.

Auxiliary Processors The Digital Set Interface Chip (DSIC) provides two-way voice, data, and signaling communications between the Touchphone and the Digital Line Interface Chip (DLIC) that resides in the line card in the system. It controls the Handsfree unit, the handset, and the Asynchronous Data Option.

Power requirements

Only one 110 V 60 Hz (in some countries 220 V 50 Hz) power supply unit is needed to supply the +5 V and ±12 V dc required to operate the Touchphone and the Asynchronous Data Option, if equipped. This power supply plugs into any 110 V (or 220 V) wall outlet and is equipped with a 4-pin keyed connector at the end of the power supply cord for connection to the Touchphone.

If the external power should fail, the M3000 loses all functions until power is restored.

A lithium battery is built into the nonvolatile RAM component that houses the Directory and other information in the M3000 Touchphone. Regardless of whether power to the Touchphone is on or off, the contents of the Directory, Speed Call list, Saved Number, and Last Number (Redial) are saved in battery-backed memory. The contents of the Call Log are lost.

The Directory Archiver runs on a 9-volt alkaline battery, good for approximately 65–75 transactions. Data is stored in EEPROM in the archiver. The Directory Archiver retains its data when the battery is removed.

> ***Note:*** Before changing the battery in the Directory Archiver, first remove excess static electricity from your body by touching any grounded metal surface or conductor.

Alerting tone characteristics

The tone frequency combinations are as follows:

Tone	Frequencies	Warble Rate (Hz)
1	667 Hz, 500 Hz	10.0
2	667 Hz, 500 Hz	2.5
3	320 Hz, 250 Hz	10.0
4	320 Hz, 250 Hz	2.5
5	user defined	custom

Archiver specifications

The radiated and conducted electromagnetic interference of the Directory Archiver meets the requirements of Subpart J, Part 15 of the FCC rules for class A computing devices.

The 9 V dc required by the Directory Archiver is obtained by one 9 V alkaline battery.

Operating temperature:

Temperature range	0° to 50°C (32° to 122°F)
Relative humidity	10% to 90% (noncondensing)

Storage temperature:

Temperature range	–40° to 70°C (–40° to 158°F)
Relative humidity	5% to 95% (noncondensing)

M2317 telephones

This chapter provides feature and specification information for the M2317 telephone.

Functional description

This section provides feature and software requirement information for the M2317.

General features

The M2317 telephone has the following general features:

— A built-in, two-line (40 characters per line) Liquid Crystal Display (LCD) screen and integrated Handsfree.

— A telephone line cord and the handset cord equipped with standard modular connectors at each end, which permits quick replacement when required.

Figure 16 shows the M2317 telephone.

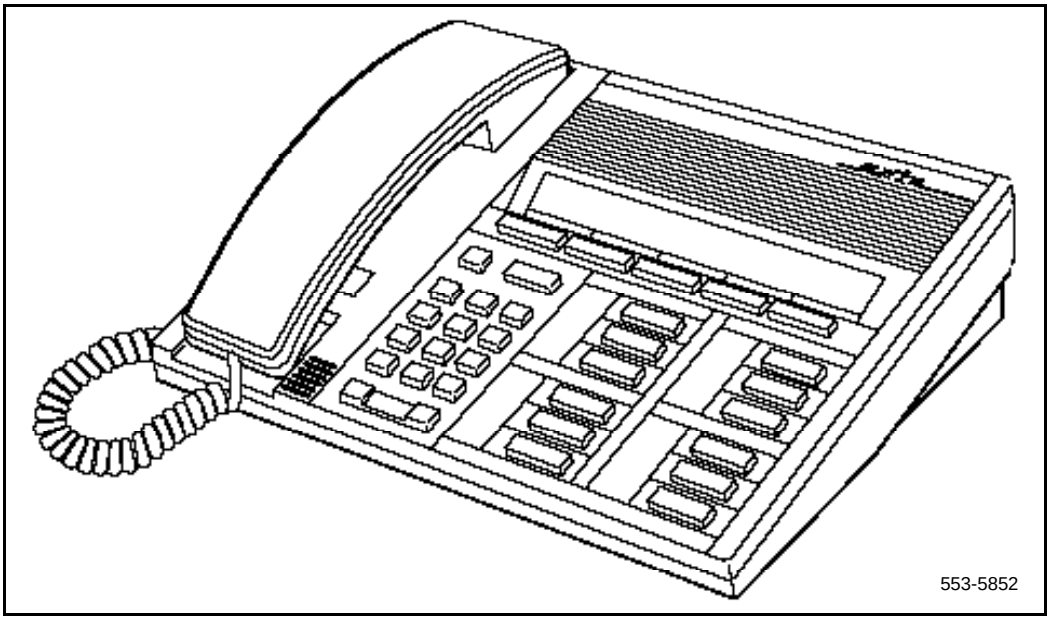
Physical characteristics

The M2317 telephone has the following physical characteristics.

Housing

The housing of the M2317 digital telephone consists of a molded plastic base and faceplate. The display module and the main circuit board are fastened to the underside of the faceplate. The Asynchronous Data Option (ADO) circuit board, if equipped, is mounted inside the base.

Figure 16
M2317 telephone



Keys

The M2317 telephone is equipped with 17 feature keys (see Figure 17) which are arranged as follows:

Fixed keys There are four keys to which a fixed function is assigned. They consist of the following:

— 1 Release key

— 1 Hold key

— 1 Volume control key (with 2 toggle positions)

— 1 Handsfree/Mute key (with associated LCD indicator)

Feature keys There are 11 programmable line/feature keys on the telephone faceplate. Each has an associated LCD indicator. Lines and features are assigned to these keys by service changes in the system software. A maximum of ten voice Directory Numbers and specific features such as, Auto Answerback, Call Waiting, Dial Intercom, and Display can be assigned.

Alphanumeric display screen and softkeys

The M2317 telephone is equipped with a two-line (40 characters per line capacity) Liquid Crystal Display (LCD) screen and five LCD-labeled softkeys located immediately beneath the display screen.

The 155 x 15 mm (6 x 0.6 in) LCD screen has a capacity of 80 characters (two lines of 40 characters each). The first line displays date and time during the idle state, incoming call identification, feature icons, user prompts, and messages, whereas the second line displays the labels for the softkeys (seven characters per key).

There are five softkeys, which are counted one to five from left to right. The fifth softkey ("more…") is used to scroll to a second layer feature menu whenever there are more softkey-assigned features available for the active telephone state. Pressing the "more…" key will bring up the labels for the remaining functions. Softkey label positions on the display screen are fixed by the M2317 telephone firmware and cannot be changed by the user.

Each softkey has a seven-character-wide label on the display immediately above the key. The labels change as the available features change. For example, a softkey could access one feature in the idle state and a different feature in the active state.

Handsfree key When Handsfree is on, you can talk to another party without lifting the handset. Handsfree can be activated by pressing the Handsfree/Mute key, or by pressing a DN key without lifting the handset. The Handsfree/Mute LCD indicator shows the status of the Handsfree. Once Handsfree is activated, it can be deactivated by picking up the handset or by pressing the Release (RLS) key.

Handsfree operates as if an off-hook operation had been performed. For example, when the telephone is idle, pressing the Handsfree/Mute key turns on the integrated Handsfree and selects a DN (depending on line selection as assigned through COS), allowing the user to make a call. When a call comes into an M2317 and the set is ringing, pressing the Handsfree/Mute key turns on the Handsfree and allows the user to answer the incoming (ringing) call (depending on COS-assigned line selection) without picking up the handset.

The M2317 provides independent volume adjustments for Handsfree, handset, and alerting tone volumes (on-hook dialing and buzz). For detailed adjusting information, refer to the *M2317 user quide* (P0744260).

LCD indicators

LCD indicators support the following four key/LCD states:

Function	**LCD state**
idle	off
active	on (steady)
ringing	flash (60 Hz)
hold	fast flash (120 Hz)

The following figures show the M2317 key layout and the different telephone states that can be displayed on the M2317 screen.

Figure 17
M2317 telephone—key identification

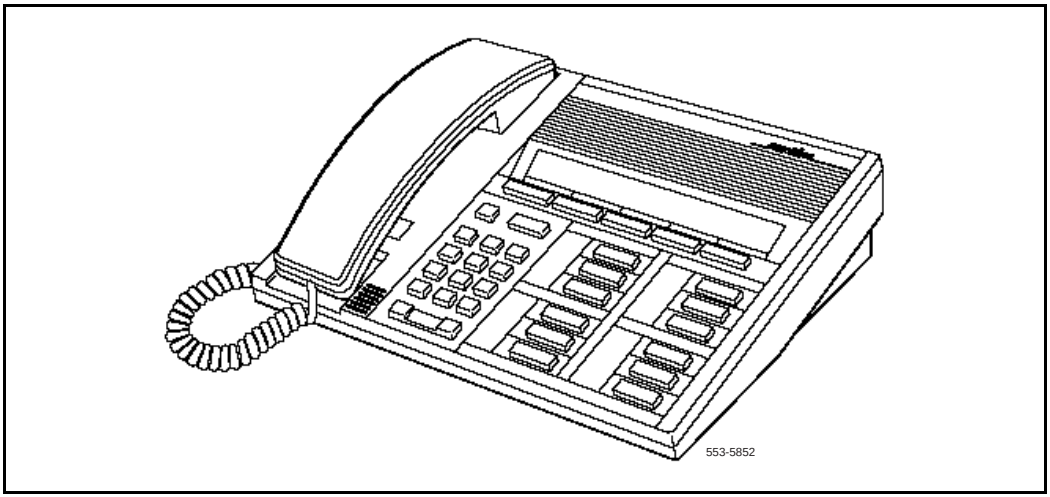
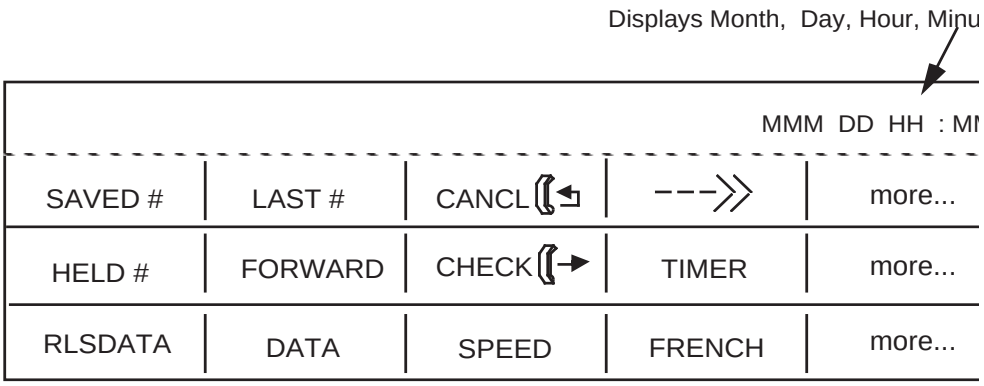


Figure 18
M2317 screen display—available idle state features



Note 1: Only one row of softkey labels is displayed at a time. Additional rows are accessed by operating the "more..." softkey. The five softkeys are located beneath the screen display in line with each displayed label.

Note 2: The HELD # softkey label is displayed on the screen only when there is a held conference/transfer call.

Note 3: The CANCL softkey label is displayed on the screen only when the "Ri Again" feature has been activated.

Note 4: The FORWARD and CHECK (Check Call Forward) labels are mutuall exclusive; the FORWARD key label changes to CHECK when calls ar forwarded.

Note 5: The RLSDATA label is displayed only when there is an active data call.

Note 6: The - - ->> key is only offered when CPND is used.

553-3219

Figure 19
M2317 screen display—dial tone state

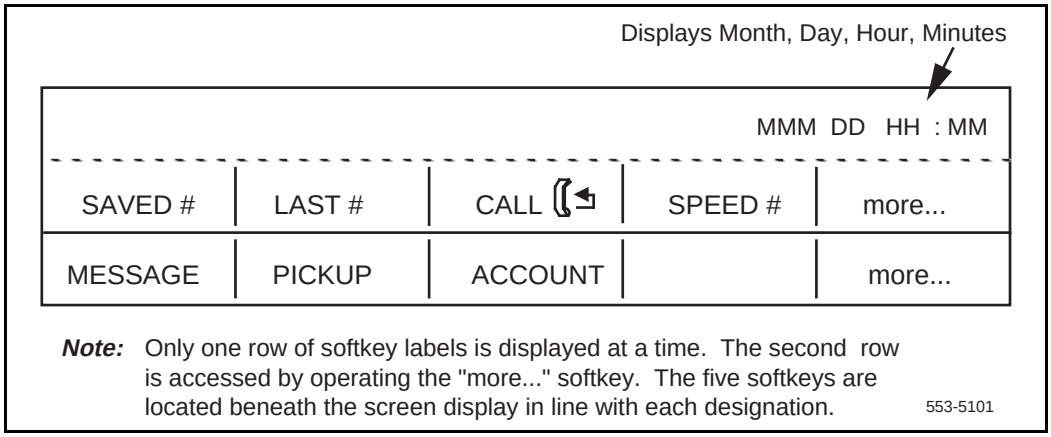


Figure 20
M2317 screen display—dialing state

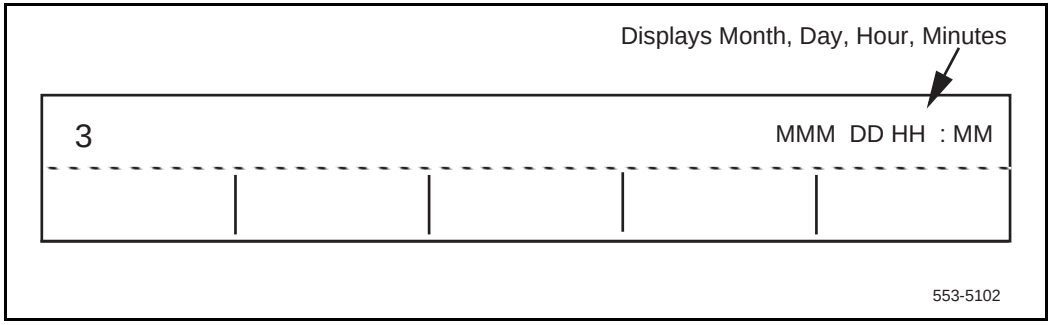
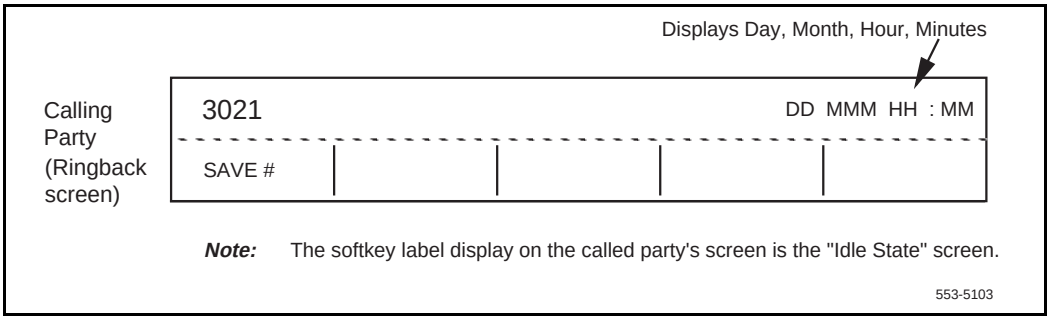


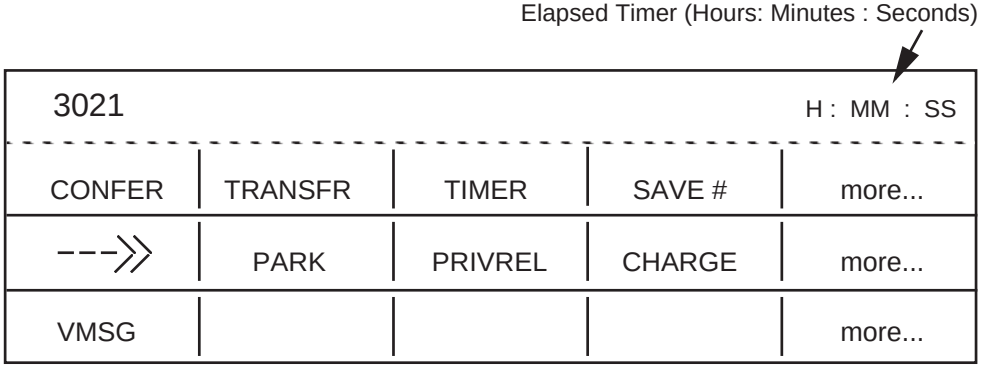
Figure 21
M2317 screen display—ringback state



Note: The softkey label display on the called party's screen is the "Idle State" screen.

553-5103

Figure 22
M2317 screen display—available established state features



Note: Only one row of softkey labels is displayed at a time. Additional rows are accessed by operating the "more... " softkey. The five softkeys are located beneath the screen display in line with each designation.

553-5104

Not all the features listed in Table 10 are necessarily provided for each customer. Check only those features that are enabled in accordance with the work order.

The - - ->> symbol display is associated with the Call Party Name Display (CPND) feature. CPND is only available with software X11 release 10 or later and must be enabled before it can be accessed.

Table 10
M2317 states and associated softkeys (Part 1 of 3)

Screen state	State	Softkey display
Idle	On-hook, voice or data	Saved#, LAST#, CANCL ---->, more..., HELD#, FORWARD, CHECK TIMER, more..., RLSDATA, DATA, SPEED
Dialtone	Ready to transmit dialed digits (voice)	Saved#, LAST#, CALL SPEED#, more..., MESSAGE, PICKUP, ACCOUNT, more...
Intercom dialtone	Ready to transmit dialed digits for an intercom call (voice)	PICKUP
Dialing	Transmitting dialed digits	no softkeys shown
Private Line dialing	Transmitting dialed digits on a private line (voice)	SAVED#, LAST#
Busy	Called party off-hook (voice)	RINGAGN, SAVE#
Reorder	Called party is unavailable (voice)	no softkeys shown
Ringback	Called party is ringing (voice)	SAVE#
ERWT call back	Initial set of ESN routes not available. Set gets Expensive Route Warning Tone (voice).	RINGAGN, SAVE#

Table 10
M2317 states and associated softkeys (Part 2 of 3)

Screen state	State	Softkey display
Established	Voice connection made	CONFER, TRANSFR, TIMER, SAVE#, more…, ——>>, PARK, PRIVREL, CHARGE, more…, MESSAGE, more…
Intercom established	Connection made with an intercom group (voice)	CONFER, TRANSFR, TIMER
Private Line established	Connection made with a private line (voice)	CONFER, TRANSFR, TIMER
Voice Call/Group Call established	Connection made using a voice key or group call key (voice)	no softkeys shown
Conference/Transfer dialtone	Special dialtone (voice)	SAVED#, LAST#, CALL SPEED, ACCOUNT 
Conference/Transfer dialing	After special dialtone is heard, dialing the call (voice)	no softkeys shown
Conference/Transfer busy	After special dialtone is received, called party is off-hook (voice)	RINGAGN, SAVE#
Conference/Transfer reorder	After special dialtone is received, called party is unavailable (voice)	no softkeys shown
Transfer ringback	Used xfer feature, and the called party is ringing (voice)	CONNECT, SAVE#
Conference ringback	Used conf feature, and the called party is ringing (voice)	SAVE#
Consultation	The third party (consulting party called by xfer/conf feature) has answered the call (voice)	CONNECT, SWAP
Consultation Hold	The user is talking to the original party and the consulting party is on hold (voice)	CONNECT, SWAP
Established Hold	Call held by other party (voice)	no softkeys shown

Table 10
M2317 states and associated softkeys (Part 3 of 3)

Screen state	State	Softkey display
User status	Leave telset msg for set's status (voice)	no softkeys shown
Display	The user has operated the feature key "DSP" to display the speed/system speed call numbers (voice or data)	SPEED#, EXIT
Program	User has operated a feature key that requires user-input such as Auto Dial or Controlled Class of Service (COS)	no softkeys shown
Data call initiation	User pressed data DN key to make a data call (data)	CALL  , SPEED#, SAVED#, LAST#
Data call dialing	Transmitting dialed digits (data)	no softkeys shown
Data call busy	Called party off-hook (data)	RINGAGN, SAVE#
Data call reorder	Called party is unavailable (data)	no softkeys shown
Data call ringback	Called party is ringing (data)	SAVE#
Data call ERWT call back	Initial set of routes not available. Set gets Expensive Route Warning Tone (ERWT).	RINGAGN, SAVE#
Data call established	Connection made (data)	SAVE#

Asynchronous Data Option

See “Data options” on page 113 for more information on ADO requirements.

Firmware features

Firmware is chip-dependent and cannot be changed or altered on site. As a general rule, all firmware is on ROM microchips. Firmware is built into the M2317 telephone and into the Meridian 1 system.

The following functions are performed by firmware in the M2317 digital telephone:

— Predial

— Last Number Redial

— Saved Number

— Redial Saved Number

— Timer

— Time and Date

— Call Processing

Software requirements

The M2317 Telephone is available on X11 release 9 and later software.

All information related to the programmable keys must be downloaded into the M2317 RAM memory through the DLC or ISDLC. Downloading to the telephone is performed when the system is loaded or when a telephone is enabled.

Softkeys are automatically defined for the telephone based on Class of Service (CLS), database, or package restrictions. Softkeys work only in conjunction with the LCD display screen.

Table 11 lists the data features supported by the M2317 firmware.

Table 11
M2317 data features

Data features	M2317	DTE Keyboard
Ring Again	X	X
Speed Call	X	X
System Speed Call	X	X
Display		X
Call Forward	X	
Call Transfer (Note 1)		X
Autodial	X	X
Last Number Redial	X	
Save Number	X	
Redial Saved Number	X	

Note 1: Manual modem pooling using keyboard dialing requires only call transfer to be defined.

Note 2: The Data DN must always be assigned to feature key 10.

Specifications

This section lists the specifications required for the M2317 telephone.

Safety considerations

The following safety procedures should be followed.

Shock and fire hazards

For protection against electrical shock, energy hazards, or fire hazards, the telephone meets the following specifications:

CSA, C22.2 No. 0.7—M1985

UL 1459, relevant sections

Overvoltage protection

The M2317 telephone meets the specifications detailed by CSA, C22.2 No.7, paragraph 6.9.3.

Environmental considerations

The following environmental procedures should be followed.

Temperature and humidity

Operating state:

Temperature range	0° to 50° C (32° to 122°F)
	0° to 40° C (32° to 104°F) with Data Option
Relative humidity	5% to 95% from 4° to 29°C (39° to 84° F) noncondensing
	5% to 34% from 29.5° to 49°C (85° to 120°F) noncondensing

Storage:

Temperature range	–20° to 70° C (–4° to 158° F)
Relative humidity	5% to 95% from –20° to 29°C (–4° to 84°F) noncondensing 5% to 15% from 29.5°C to 66°C (85° to 150°F)

Dimensions and weight

The M2317 digital telephone has the following dimensions:

depth	226.5 mm (9 in)
width	272.0 mm (10.1 in)
height (front)	27.5 mm (1.1 in)
height (rear)	73.5 mm (2.9 in)

Excluding the power supply and the NT1F09AC Asynchronous Data Option board, the M2317 weighs approximately 1.4 Kg (3 lb). With the Data Option installed, the telephone, excluding power supply and data cable, weighs approximately 1.56 Kg (3.5 lb).

Line engineering

The M2317 digital telephones operate to their full potential through twisted pair wiring on transmission lines selected by the rules given in *Digital telephone line engineering* (553-2201-180). The maximum permissible loop length is 1067 m (3500 ft.) of 22 or 24 AWG or 760 m (2500 ft.) of 26 AWG standard twisted wire with no bridge taps or load coils.

The 1067 m (3500 ft.) loop length requires the use of a Digital Line Card (DLC) or an Integrated Services Digital Line Card (ISDLC) QPC578, vintage C or later.

Power requirements

The M2317 digital telephone uses loop power for all circuits requiring +10 V. To satisfy the power requirements for those circuits on a maximum loop, as defined in *Digital telephone line engineering* (553-2201-180), 60mA of 13.5 V dc must be available at the telephone. The line card must have compatible voltage and source resistance to meet these requirements.

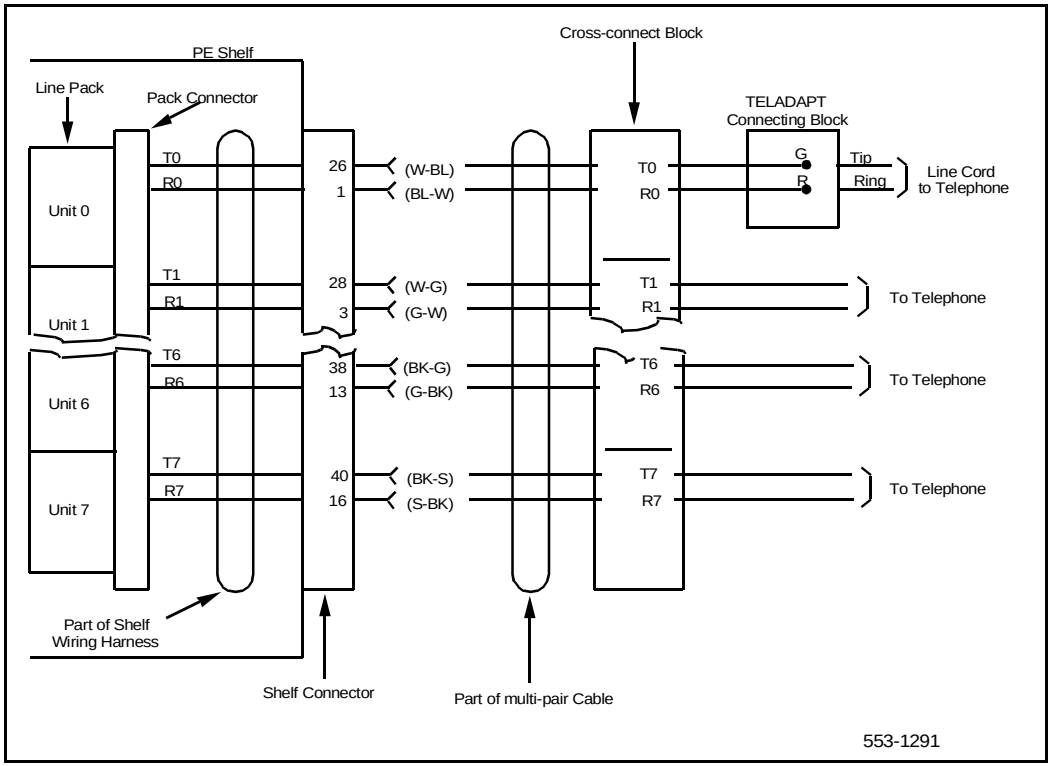
Logic and other circuitry requiring +5 V is powered from an external, regulated +5 V dc supply when the data option is not installed. The external power supply must meet the following specifications:

Input:	95–129 V ac, 60 Hz
Output:	+5 V dc, + or –5%, 300 mA
	10 mV maximum RMS ripple
Cord:	2.5 m (8 ft.) of 20 AWG wire mating to a Switchcraft 722A connector
Case:	Wall mounted, CSA and UL approved.
	Operational within 0°C (32°F) and 50°C (122°F) temperature limits
Impedance:	Greater than 10 M¾ to ground

The external power supply, in all cases where no Asynchronous Data Option is installed, is connected to the mating connector mounted in the rear of the M2317 telephone, covering the area where the RS-232-C interface connector would be located.

> ***Note:*** If the Asynchronous Data Option is installed, an external, multi-output data power supply (refer to NPS50220-03L5) is required. See “Data options” on page 113 for more information on ADO requirements.

Figure 23
M2317 telephone cross-connections



Ordering information

This section provides ordering information for the M2317 telephone. Refer to the Northern Telecom price book or contact your Northern Telecom representative for specific ordering codes.

If the M2317 telephone fails to function properly, or if mechanical breakage occurs, do not attempt to make repairs in the field. Return the unit to the manufacturer.

> ***Note:*** The NT1F09AA Synchronous Data Option must be release 4 or higher and requires the use of the multi-output Data Power Supply (A0336823).

M2000 telephones (retired)

This chapter provides feature, software requirement, and specification information for the M2009, M2112, M2018, and M2018S (secure) telephones. Note that the M2317 and the M2000 Modular telephones are described in earlier chapters.

Functional description

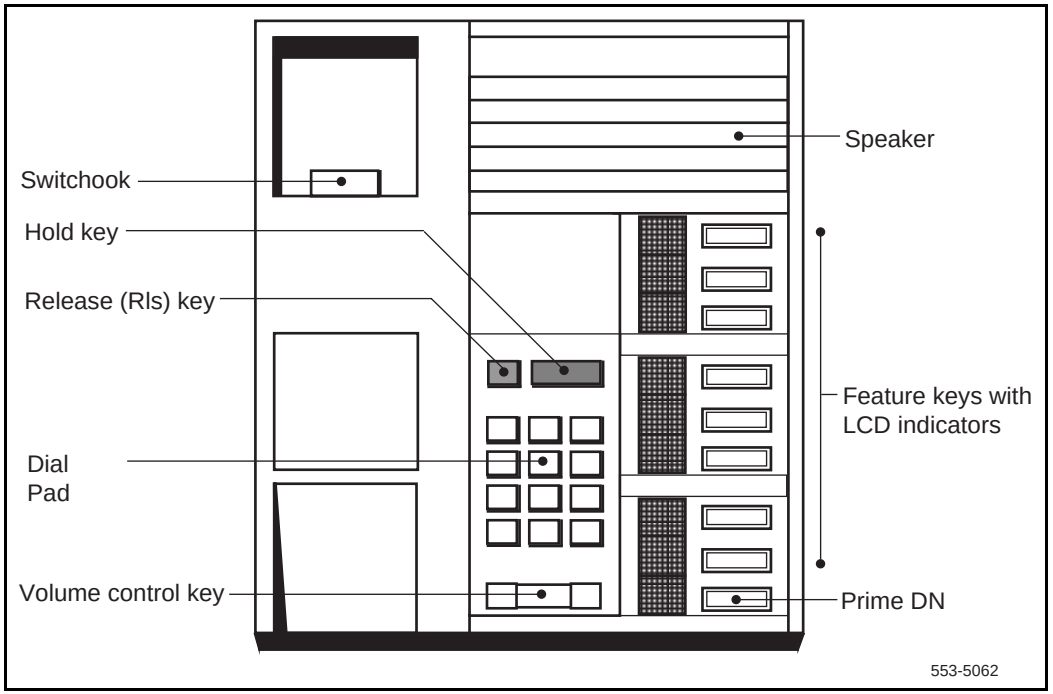
The M2009, M2112, M2018, and M2018S telephones (see Figures 24, 25, and 26) are designed to provide cost-effective integrated voice and data communications capability. These telephones communicate with the Meridian 1, using digital transmission over standard twisted pair wiring; they interface with the Meridian 1 system through the Integrated Services Digital Line Card (ISDLC) or the Digital Line Card (DLC). No additional hardware is required at the line circuit to provide data communications, and so there is a significant cost savings potential. Analog/digital and digital/analog conversion of voice signals is accomplished at the telephone by a codec.

The M2009, M2112, M2018, and M2018S telephones are connected to the system through a two-wire loop carrying two independent 64 kbps PCM channels with associated signaling channels. One of the two PCM channels is dedicated to voice, while the other is dedicated to data traffic. Line cords and handset cords on all Meridian digital telephones are equipped with modular connectors for quick and easy connecting procedures.

The telephone interfaces with the DLC or the ISDLC in the Peripheral Equipment shelf of the Meridian 1 system. The ISDLC supports eight Integrated Voice and Data ports; each port supports two channels, one data and one voice. A voice TN and a data TN are assigned in Meridian 1 system software.

M2009—a multi-line telephone with nine programmable function keys. It is loop powered, but the Asynchronous Data Option (ADO), when equipped, requires an external power supply.

Figure 24
M2009 telephone

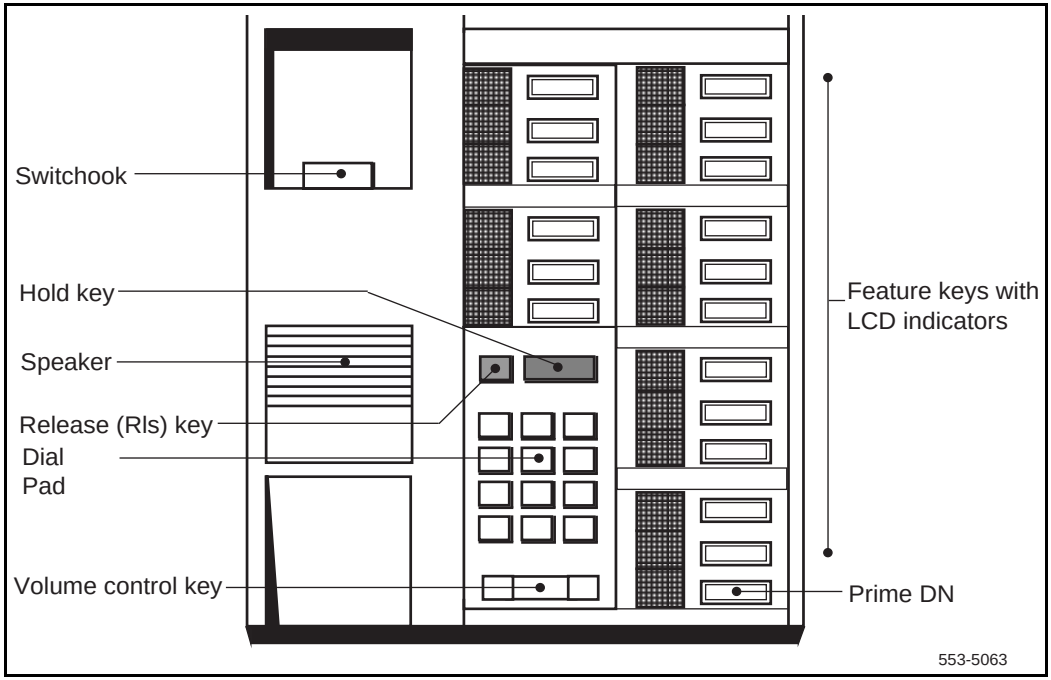


M2018—a multi-line telephone with 18 programmable function keys. It is loop powered, but the ADO, when equipped, requires an external power supply.

M2018S—a multi-line telephone, similar to the M2018, but with the following security feature: The handset is equipped with mercury micro-switches that provide a positive disconnect when the handset is positioned horizontally. A disconnect relay circuit electrically connects the piezo-disc transducer for alerting and on-hook dialing when the telephone is activated and disconnects the piezo-disc transducer when the telephone is idle. This feature eliminates any microphonic capability of the piezo-disc transducer when it is idle.

Note: Wall mounting the M2018S defeats the proper operation of the mercury switched handset and is prohibited.

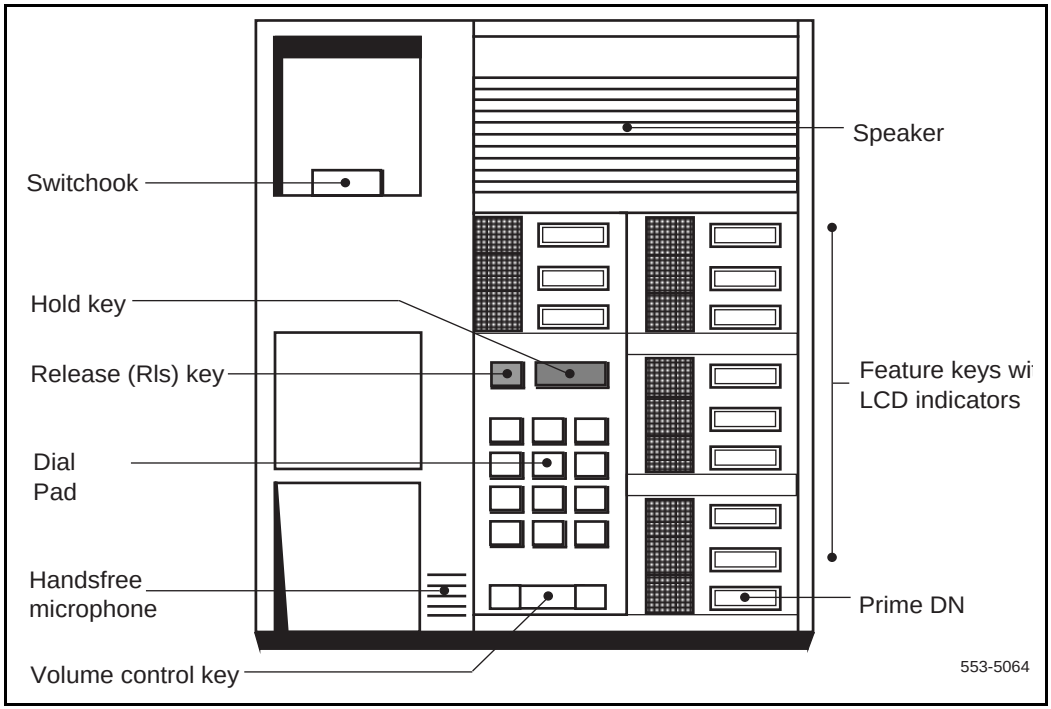
Figure 25
M2018 and M2018S secure telephone



M2112—a high-performance multi-line telephone with 11 programmable function keys and integrated Handsfree unit. A loudspeaker and microphone are provided for alerting tones and for Handsfree operation. The M2112 requires auxiliary power to enable the Handsfree feature (either a QUT125 VAC closet power supply or an A0273077 plug-in transformer). When equipped with the ADO, the multi-output power supply (A0336823) replaces the A0273077 or QUT1 transformer (only one transformer is required at any time). See Figure 26.

For information on powering requirements, see the specifications section.

Figure 26
M2112 telephone



Physical characteristics

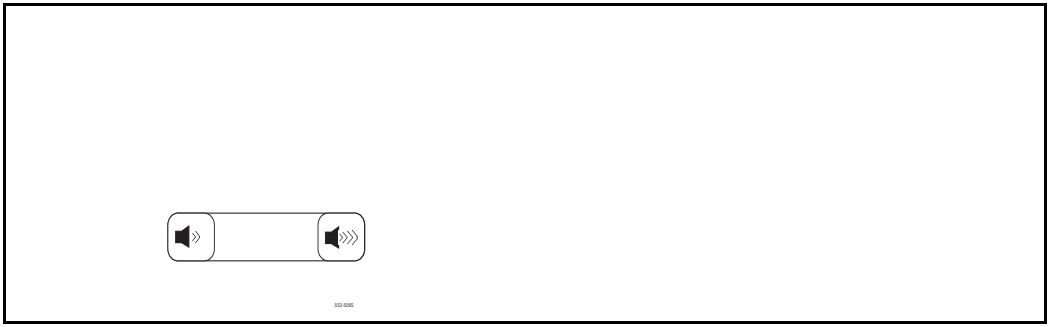
The M2009, M2112, and M2018 telephones and the M2018S secure telephone have the following physical characteristics.

Fixed keys

The fixed keys perform the following functions: Volume control, Hold, Release, and Handsfree (M2112 only).

Volume control key Speaker volume (or piezo-disc transducer volume in digital telephones not equipped with a Handsfree unit) is controlled by one key with two toggle positions as shown in Figure 27. Operating the "Volume Up" or "Volume Down" pad of the key incrementally increases or decreases the volume for the tone or sound that is currently active. Note that to change the volume of the ringing sound, the user must depress "Volume Up" or "Volume Down" during the interval when a burst of ringing is heard. The volume settings are retained for subsequent calls until new volume adjustments are made.

Figure 27
Volume control key



Note: When any M2000 telephone is disconnected, both the speaker volume and alerting tone levels return to default values (midpoint levels) after the telephone is reconnected.

Handsfree key (M2112 only) With the Handsfree on, you can talk to another party without lifting the handset. Handsfree can be activated by pressing the Handsfree/Mute key or by pressing a DN key without lifting the handset. The Handsfree/Mute LCD indicator shows the status of the Handsfree. Once Handsfree is activated, it can be deactivated by picking up the handset or by pressing the Release (RLS) key.

Handsfree operates as if an off-hook operation had been performed. For example, when the telephone is idle, pressing the Handsfree/Mute key turns on the integrated Handsfree and selects a DN (depending on line selection as assigned through COS), allowing the user to make a call. When a call comes in to an M2112 and the telephone is ringing, pressing the Handsfree/Mute key turns on the Handsfree and allows the user to answer the incoming (ringing) call (depending on COS-assigned line selection) without picking up the handset.

When the Handsfree/Mute key is depressed during a Handsfree telephone conversation, the microphone is turned off while the loudspeaker remains on, preventing the far end from overhearing local conversations. The Handsfree/Mute LCD flashes while the Handsfree feature is in the “Mute” mode. Pressing the Handsfree/Mute key again restores microphone operation and the Handsfree/Mute indicator will quit flashing and return to its original state (steadily on).

Asynchronous Data Option

When an M2000 telephone is equipped with the Asynchronous Data Option (ADO), you can make a data call using keyboard dialing from your attached terminal or personal computer, without interfering with voice communication.

See “Data options” on page 113 of this document for more information on the data options for the M2009, M2112, M2018, and M2018S telephones.

Specifications

This section lists the specifications required for M2000 telephones.

Environmental and safety considerations

Both the telephone and the Asynchronous Data Option (ADO) meet the requirements of the Electronic Industries Association (EIA) specification PN-1361.

Temperature and humidity

Operating state:

Temperature range	0° to 50°C (32° to 104°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 52 mbar of water vapor pressure.

Storage:

Temperature range	–50° to 70°C (–58° to 158°F)
Relative humidity	5% to 95% (noncondensing). At temperatures above 34°C (93°F) relative humidity is limited to 52 mbar of water vapor pressure.

Electromagnetic interference

The radiated and conducted electromagnetic interference meets the requirements of Subpart J of Part 15 of the FCC rules for class A computing devices.

Line engineering

M2000 telephones operate through twisted pair wiring on transmission lines selected by the rules given in *Digital telephone line engineering* (553-2201-180). The maximum permissible loop length is 3500 ft. of 24 AWG (0.5 mm) standard twisted wire with no bridge taps.

Local alerting tones

Four alerting tones and a buzz sound are provided. The Meridian 1 controls the cadence of the ringing by sending tone-ON and tone-OFF messages to the telephone. The alerting tone cadences cannot be changed from the telephone but can be altered for individual M2000 telephones by software controlled adjustments in the system. Refer to *X11 input/output guide* (553-3001-400) for more information. All other telephone tones such as dial tone or overflow tones are provided by the system from a Tone and Digit Switch.

Alerting tone characteristics

The tone frequency combinations are as follows:

Tone	Frequencies	Warble rate(Hz)
1	(667 Hz, 500 Hz)	10.4
2	(667 Hz, 500 Hz)	2.6
3	(333 Hz, 250 Hz)	10.4
4	(333 Hz, 250 Hz)	2.6

Note: A 500 Hz buzz signal is provided for incoming call notification while the receiver is off-hook.

Power requirements

Both the M2009 telephone and the M2018 telephone are loop powered. Loop power uses +15 V and –15 V sources and assumes 3500 feet maximum loop length of 24 AWG (0.5 mm) wire and a minimum of 13.5 V at the telephone terminals.

The Handsfree unit, which is integrated in the Meridian M2112, requires an auxiliary power supply. Power can be obtained from either a QUT1 25 VAC closet power supply or a local plug-in transformer (AO273077) over a separate pair of wires.

If the power supply fails, Handsfree will not operate, but all other features will continue to function, provided the power failure does not affect the Meridian 1. The loop-powered functions of all Meridian digital telephones remain operational only if the system is equipped with a backup battery.

Additional power is obtained over a separate pair of wires. Maximum Handsfree current is 110 mA with a minimum of 16 VAC to be present at the telephone terminal. The following rules apply:

— For the QUT1 closet power supply:

- The power supply loop for the Handsfree unit should follow the same rules as the loop powering requirements, that is, the maximum allowable loop length and wire gauge are 3500 ft. of 24 AWG (0.5 mm) wire.
- Each M2112 Handsfree must be powered by one tap of one winding; however, it is permissible to connect two (2) 12.5 VAC windings in a series to provide 25 VAC power for Handsfree.

— For the local plug-in transformer:

- A single winding transformer equipped with a 3 m (10 ft.) cord of 22 AWG two-conductor stranded and twisted wire with a modular duplex adapter (NE-267QA) at the end is required.
- The following minimum specifications have to be met by this transformer:

  No load output voltage: 21 V ac max
  Voltage at rated current: 16 V ac ±10%
  Rated load current: 375 mA

If the ADO is installed, an external power supply is required in addition to the power from the line. See “Data options” on page 113 for a description of the ADO and its requirements.

Ordering information

This section provides ordering information for M2000 telephones. Refer to the Northern Telecom price book or contact your Northern Telecom representative for specific ordering codes.

The M2000 telephones have few field replaceable parts. The handset, handset cord and line cord, equipped with modular connectors, headset, power transformer (external power supply), key lenses and labels, and the ADO circuit board can be changed. If an M2000 fails to function properly, or if mechanical breakage occurs, do not attempt to make repairs in the field. Return the unit to the manufacturer.

M2616CT (Cordless Telephone)

This chapter provides feature and specification information for the Meridian M2616CT cordless telephone.

Functional description

This section introduces the M2616CT (cordless telephone). The M2616CT provides the user with mobility within the office environment. The M2616CT is an unlicensed 900 MHz single cell narrowband digital telephone. It supports 20 users within a maximum area of 50,000 square feet. The maximum range of the M2616CT from base to the register handset is 150 feet, depending on the phone's location. The following information is an overview of the base and handset units.

Physical characteristics

Keys

The M2616CT Cordless telephone is equipped with 17 feature keys which are arranged as follows:

Fixed keys The fully integrated M2616CT base unit provides 13 programmable line/feature keys, plus a dedicated handset Locator, Volume control, Hold, Release, and Handsfree Mute and Program key. The handset has 6 programable keys that corresponds to the 6 keys on the base unit (3 bottom keys on each side of the LED indicator).

There are six keys to which a fixed function is assigned. They consist of the following:

— 1 Release key

— 1 Hold key

— 1 Volume control key (with 2 toggle positions)

— 1 Program Key

— 1 Handsfree/Mute key (with associated LCD indicator)

— 1 Locator key

Volume control key volume is controlled by one key with two toggle positions. Operating the “Volume Up” or “Volume Down” pad of the key incrementally increases or decreases the volume for the tone or sound that is currently active. Note that to change the volume of the ringing sound, the user must depress “Volume Up” or “Volume Down” during the interval when a burst of ringing is heard. The volume settings are retained for subsequent calls until new volume adjustments are made.

Handsfree key When Handsfree is on, you can talk to another party without lifting the handset. Handsfree can be activated by pressing the Handsfree/Mute key, or by pressing a DN key without lifting the handset. The Handsfree/Mute LCD indicator shows the status of the Handsfree. Once Handsfree is activated, it can be deactivated by picking up the handset or by pressing the Release (RLS) key.

The M2616CT provides independent volume adjustments for Handsfree, handset, and alerting tone volumes (on-hook dialing and buzz). For detailed adjusting information, refer to the *M2616CT Cordless Telephone User Guide (P0838286)*.

LCD indicators

LCD indicators support the following four key/LCD states:

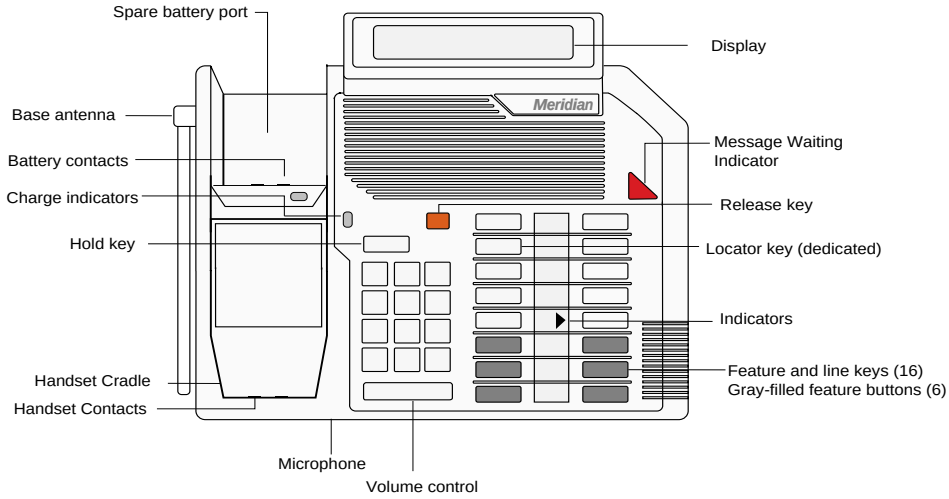
Function	LCD state
idle	off
active	on (steady)
ringing	flash (60 Hz)
hold	fast flash (120 Hz)

Housing

The housing of the M2616CT Cordless Telephone consists of a molded plastic base and faceplate. There is a display on both the base unit and the handset unit.

General features

The figures and figure shows the location of each control on your M2616CT and a brief description of the controls.



Base Unit Controls

— The Base Display is a two-lines, 24 characters display.

— The Feature and line keys allows you to access telephone features and lines. Six feature keys map to the handset feature keys. They are the three bottom keys, on either side of the light indicator LED strip.

— The Handset cradle contacts charges the cordless handset. The charge indicator light indicates the battery status of the handset; green indicates the battery is fully charged.

— The Charge indicator lights indicate the status of the handset battery. Red indicates the handset is charging, green indicates the battery is fully charged. The battery contacts, located on the upper half of the handset cradle, charges the optional spare battery.

— The Diamond indicator light appears beside active lines and features.

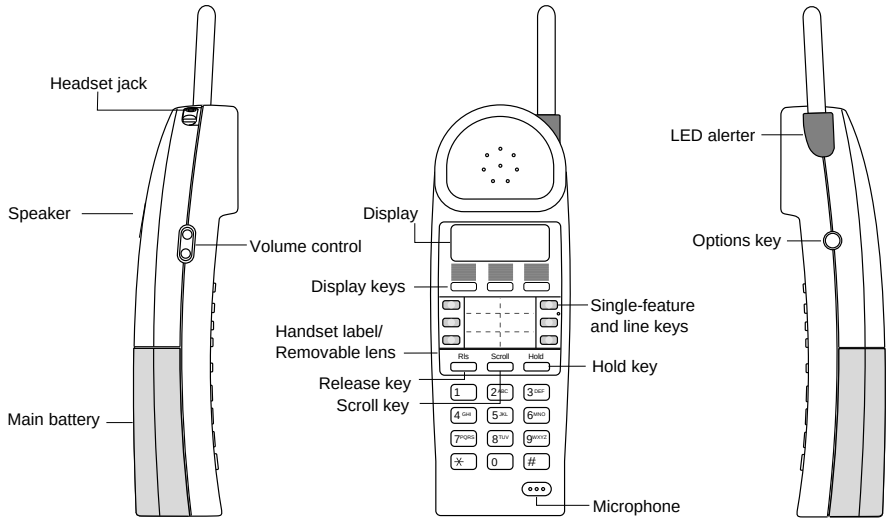
— The Locator key, locates the handset/manual Radio Frequency mode (if feature is assigned).

— The Volume bar controls the volume of the handset, speaker, and ringer.

— The Microphone allows you to have handsfree calling. When Handsfree is on, you can talk to another party without lifting the handset. Handsfree can be activated by pressing the Handsfree/Mute key, or by pressing a DN key without lifting the handset. The Handsfree/Mute LCD indicator shows the status of the Handsfree. Once Handsfree is activated, it can be deactivated by picking up the handset or by pressing the Release (RLS) key.

— The Release key terminates an active calls

— The Message Waiting indicator light indicate that a voice mail message has been left for you.



553-8569

Handset Controls

— The handset Display is a two-line, 16 character display with a scroll button located between the Hold and the Release keys. The scroll key provides the extra 8 characters that map to the two-line, 24 character display on the base unit. An arrow on the display indicates when to use the scroll key to display additional text not shown on the display window.

The M2616CT also displays icon indicator when the user is out of range or when the battery is low. The Display shows the time, date, call information and guides you while using the M2616CT features.

— The Display keys shows the prompts and Option list settings depending upon the state the handset is in. The prompts are displayed above each key. The lower line of the display is used to display instructions.

— The Message Waiting/Ringing Indication is a red LED located on the base of the handset antenna providing message waiting indication as well as flashing visual ringing indication.

— The Handset labels allows you to personalize the feature keys.

— The Headset jack connects the detachable headset unit. Check with your Nortel representative for authorized headset vendors.

— The Hold key places an active call on hold.
The Options key changes the M2616CT settings in the Option list.The Option key, located on the right side of the;M2616CT handset, in conjunction with three display function keys empower users to customize handset options, including:

- Speaker on/off - One-way receive speaker allows users to conveniently listen to voice mail or listen on a conference without holding the handset to their ear.
- Mute - Microphone mute selection
- Ring Selection - allows users to select or change the ringing cycle

or

- Vibrate mode - vibrating notification instead of usual ringing cycle. You must purchase and install a special vibrating battery in order to use this feature. Contact your local Nortel distributor for the part number.
- Backlight (on/off) - lights the display when the handset is in use
- Base Lock/Unlock - allows the user to lock the M2616CT base unit to prevent others from accessing the base while the handset is in use.
- Ring Volume - adjusts the handset receive volume
- Current Audio - resets the handset volume to the default setting
- Move Call Option - allows the user to conveniently move from a handsfree call on the base unit to the handset or move and call from the handset to handsfree on the base unit.

— The Release key terminates an active call.

— The removable lens protects the handset labels.

— The Single-feature and line keys allows one-touch dialing, feature operation or line access. These 6 keys corresponds to six of the single-feature keys on the base. The single-feature keys glow red to indicate when lines or features are active.

— The Scroll key displays additional information in the display window.

— The Volume control adjusts the volume on ring and alerter tones.

— The LED alerter provides visual ringing indicator and message waiting indicator.

— The Speaker allows you to listen to voicemail without holding the handset.

— The Handset automatically goes into Sleep Mode when the handset is idle for more than 45 seconds. The handset can be "awakened" by pressing a DN key, or the display key associated with the "Wake" function on the display.

Firmware features

The M2616CT utilizes the Digital Line Card, NT8D01xx for Meridian 1 Option 11 through 81C and MSL-100, and the Option 11C Compact Mini IPE 24 Port Digital Line Card, NTMW05AA.

System Software

The M2616CT is compatible with the following systems:

— Meridian 1 Option 11 through 81C running X11 Release 14 and higher software

— Option 11C Compact running X27 and higher software

Modular Options

The following modular options are not supported on the M2616CT due to required placement of the RF circuitry within the telephone:

— Meridian Communications Adapter (MCA)

— Analog Terminal Adapter (ATA)

— Key Expansion Module(s)

— External Alerter Interface

Call Center

The Meridian M2616CT does not support ACD features, and therefore, should not be programmed as a Call Center agent or supervisor.

System Administration

To configure the M2616CT (Meridian Digital Cordless) set on the Meridian 1 system, refer to *X11 Software input/output guide* (553-3001-400), LD11.

For the Locator key (key 14) to function, do not assign a feature to this key.

Handsfree is required for the M2616CT to function properly.

M2616CT (Cordless Telephone) Battery

The M2616CT handset uses rechargeable 700 mAh and 1000 mAh Nickel-Cadmium batteries. Use only the battery identified or provided with this product. It should be charged according to the instructions and limitations specified in the *M2616CT Cordless Telephone User Guide* (P0838286).

Handset Registration to Base Unit

Each M2616CT handset is automatically registered to its respective base unit. In cases where a substitute handset is required for troubleshooting purposes, a different M2616CT handset can be reregistered by placing the handset on-hook, and unplugging, then re-plugging in the AC power adapter and telephone line cord.

Wall mounting the M2616CT

The M2616Ct base is equipped with a reversible footstand that allows you to mount the telephone on the wall. For complete details refer to the *M2616CT Cordless Telephone User Guide* (P0838286).

Specifications

This section lists the specifications required for the M2616CT (Cordless Telephone).

Safety considerations

The following safety procedures should be followed.

Shock hazards

The telephone is not intended for direct connection to the public switched network or other exposed plant networks, because the exposed pins on the handset cradle (where the handset sits) creates a possible outlet for harmful voltage. The M2616CT is designed to be used with a Meridian PBX. Before installing the M2616CT refer to *M2616CT Cordless Telephone User Guide* (P0838286)

Proper installation and charging procedures for the M2616CT battery pack are required to reduce risk of fire or injury to persons.

If the battery is cracked or damaged discard the battery. A damaged battery can leak electrolytes which are toxic if swallowed, are corrosive and can cause damage to the eyes and skin.

Do not short circuit the battery. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.

Power requirements

Both the M2616CT telephone and the M2018 telephone are loop powered. Loop power uses +15 V and –15 V sources and assumes 3500 feet maximum loop length of 24 AWG (0.5 mm) wire and a minimum of 13.5 V at the telephone terminals. The RF deck which power the handset requires a wall transformer (Class 2 power supply Output rated at 7.5vdc).

The M2616CT handset uses rechargeable Nickel-Cadmium batteries. Both 700 mAh and 1000 mAh battery with or without vibrate alterter are available.

Battery charge time for the 700 mAh battery takes approximately 2.25 hours when attached to the handset and provides approximately 4 hours continuous talk time if the handset backlight is turned on. If the handset backlight is turned off, up to five hours of continuous talk tome is provided, depending on usage. Up to 72 hours standby battery time is provided when the handset is off of the base unit.

The 1000 mAh battery takes up to 2.5 hours to charge when attached t the handset and provided approximately 5.5 hours continuous talk time if the handset backlight is turned on. If the handset backlight is turned off, up to 7 hours of continuous talk time is provided, depending on usage. Up to 86 hours standby battery time is provided when the handset is off the base unit.

The batteries are charged in both the handset and the base unit. It should be noted that the spare battery charging port on the base unit provides a "trickle charge" that charges the battery at a slower rate than through the handset.

If the power supply fails, the optional spare battery in the spare battery charger will power the handset (available talk-time depends on how much charge remains in the battery). The base phone continues to function without the handset in handsfree mode even if the power supply fails and the spare battery is discharged or not available.

Environmental considerations

The following environmental procedures should be followed.

Environmental Performance

Depending on the environmental conditions, the range of the M2616CT may be reduced. Steel girders and concrete walls can limit the range of the cordless telephone. Line of site conditions provide a maximum range of 150 feet. Some microwave towers and other products that sent out 900MHz frequencies can cause clipping when the handset is in use. A manual radio frequency (RF) channel selection described below prevents interference with other 900 MHz devices.

The M2616CT uses 900 MHz narrowband technology to deliver digital RF signals from the M2616CT base to the handset. Twenty 900 MHz narrow band channels have been allocated to the handset. When the handset is lifted from the base the RF deck in the base scans the 20 channels for a clear channel to use. RF channels can also be manually selected using key 14 on the base.

Frequency Ranges

Channel/	Frequency	Channel/	Frequency	Channel/	Frequency
CH00	902.6	CH06	912.0	CH13	919.6
CH01	904.0	CH07	914.2	CH14	921.4
CH02	905.6	CH08	914.8	CH15	921.4
CH03	907.2	CH09	915.2	CH16	923.0
CH04	908.8	CH10	915.8	CH17	924.8
CH05	910.6	CH11	916.4	CH18	926.4
CH06	912.0	CH12	918.4	CH19	927.6
CH07	914.2				

Range

Up to 20 M2616CT sets can be installed within a coverage area of approximately 50,000 square feet. The typical range of the M2616CT base unit to the cordless handset is between 125 feet to 150 feet. In open environments, additional coverage may be achieved.

If a user steps out of range during an active call, the M2616CT simply places the call on Hold, giving the user an opportunity to step back into range and conveniently resume the call by pressing the DN (Directory Number) key. Out-of-range indication on the handset display is also provided, whether the user is on an active call or when the handset is idle.

Outside Plant

M2616CT is not intended for direct connection to the public switched network or other outside plant networks. The interface in the M2616CT is not suitable for direct connection to lines that exit the building, or connections to non-approved telecommunications products. Exposed contacts at the base of the M2616CT are directly connected to the line cord. Any foreign voltage from the line cord can be exposed to these contacts without proper protection, and may cause personal injury.

Medical Facilities

The M2616CT is a 900MHz radio frequency telephone that may cause problems in medical facilities. Please be advised when using this telephone and ensure that all safety precautions are followed.

Temperature and humidity

Operating state:

Temperature range	0° to 50° C (32° to 122°F)
	0° to 40° C (32° to 104°F) with Data Option
Relative humidity	5% to 95% from 4° to 29°C (39° to 84° F) noncondensing
	5% to 34% from 29.5° to 49°C (85° to 120°F) noncondensing

Storage:

Temperature range	–20° to 70° C (–4° to 158° F)
Relative humidity	5% to 95% from –20° to 29°C (–4° to 84°F) noncondensing 5% to 15% from 29.5°C to 66°C (85° to 150°F)

Battery Disposal

Rechargeable Nickel-Cadmium batteries are recyclable and must be disposed of or recycled properly.

— Discard the battery according to local ordinances.

— Do not discard the battery in office or household waste.

— Do not incinerate the battery, it may explode.

Line engineering

M2616CT telephones operate through twisted pair wiring on transmission lines selected by the rules given in *Digital telephone line engineering* (553-2201-180). The maximum permissible loop length is 3500 ft. of 24 AWG (0.5 mm) standard twisted wire with no bridge taps.

Ordering information

This section provides ordering information for the M2616CT (Cordless Telephone). Refer to the Northern Telecom price book or contact your Northern Telecom representative for specific ordering codes.

If the M2616CT fails to function properly, or if mechanical breakage occurs, do not attempt to make repairs in the field. Return the unit to the manufacturer.

M3900 Series of Meridian Digital Telephones

The M3900 Series Meridian Digital Telephones provide versatile functionality to the desktop environment. The M3900 Series Meridian Digital Telephones have five models:

- M3901 entry level telephone
- M3902 Basic Telephone
- M3903 Enhanced Telephone
- M3904 Professional Telephone
- M3905 Call Center Telephone

For more information on the M3900 Series Meridian Digital Telephone refer to the *M3900 Series Meridian Digital Telephone* (553-3001-216) document

SL-1 telephones

This chapter provides feature, add-on module, and specification information for SL-1 telephones.

Functional description

This section provides feature and software requirement information for SL-1 telephones.

General features

SL-1 telephones have the following general features.

QSU1 telephone

QSU1 telephones previous to vintage F have feature and control keys mounted on the circuit board. The dial pad is connected to the board by a cable harness and plug and is detachable, allowing for easy replacement. The control and feature keys are not detachable from the board. The circuit board is not field-replaceable. The QSU1 telephone has the following features:

— Chameleon ash base and handset, black faceplate

— optional snap-in colored faceplates

— 12-button dial pad

— 10 feature keys (8 with Light Emitting Diode [LED] indicators)

— 3 fixed keys for volume up, volume down, and Hold

— 6-conductor line cord

— wired to accept add-on modules

Phase II QSU1 telephone

The QSU1 telephone of vintage F is referred to as “Phase II” because it incorporates enhancements over the Phase I QSU1. The Phase II enhancements also apply to the QMT1 and QMT2 add-on modules, outlined later in the chapter. QSU1 telephones of vintage F have the dial pad, control keys, and feature keys mounted permanently on a keyboard that is mounted on, and detachable from, the circuit board. In the event of a fault on the keyboard, the keyboard as a whole must be replaced. Circuit boards on Phase II QSU1 telephones are not field-replaceable.

Phase III QSU1 telephone

The Phase III QSU1 telephone incorporates minor mechanical enhancements over the Phase II telephone. In addition, many of the discrete components of the Phase II telephone have been placed on a single chip.

QSU3 telephone

The QSU3 telephone has the same features as the QSU1F telephone and an additional 16-digit display above the dial pad (see Figure 28). The QSU3 telephone requires a 24 V plug-in transformer.

QSU6, QSU7 telephones

The QSU6 and QSU7 telephones are designed for use with Automatic Call Distribution (ACD). They share essentially the same features except for a 16-digit display on the QSU7. The QSU6 and QSU7 have the same components as their standard non-ACD counterparts (QSU1 and QSU3), with the exception of specially designed Printed Circuit Boards (PCBs). These PCBs contain circuitry that accommodates the two jacks. The jacks are located on the telephone as shown in Figure 29. The agent’s jack is used for a two-way conversation; the supervisor’s jack provides a listen-only connection.

QSU6 and QSU7 telephones are not equipped with handsets or headsets, in order to give the user the opportunity to choose their preferred equipment.

The QSU6 and QSU7 telephones require a 24 V plug-in transformer.

QSU60 telephone

The QSU60 telephone is similar to the QSU1F with some minor alterations to meet market requirements in the United States.

QSU61 telephone

The QSU61 telephone is similar to the QSU3 with some minor alterations to meet market requirements in the United States.

QSU71 telephone

The QSU71 telephone is similar to the QSU1 in that it has the dial pad, control keys, and feature keys permanently mounted on the circuit board. The major difference, however, is that it also has a Handsfree enable /disable plug located on the circuit board. The QSU71 telephone has the following unique features:

— integrated Handsfree circuit (can be disabled if not required)

— volume control toggle for speaker and ringer volume

— 8 programmable feature keys with associated LED indicators

— fixed Handsfree key with associated LED indicator

Automatic Answerback (AAB) can be provided on the QSU71 by installing the QKK8 interface kit internally in the base of the telephone. (AAB can still be provided if Handsfree is disabled.)

The QSU71 has no provision for external add-on modules.

Figure 30 shows the QSU71 telephone.

Figure 28
QSU3 telephone

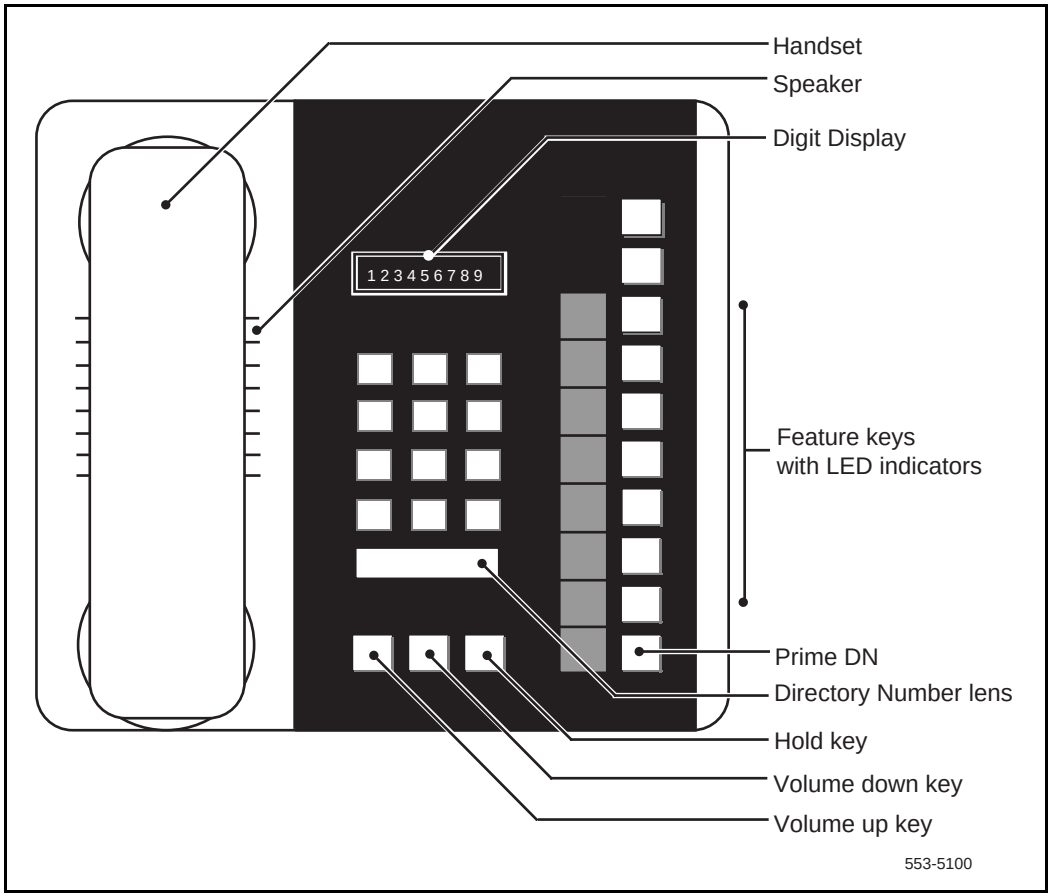


Figure 29
QSU7 telephone for ACD operation

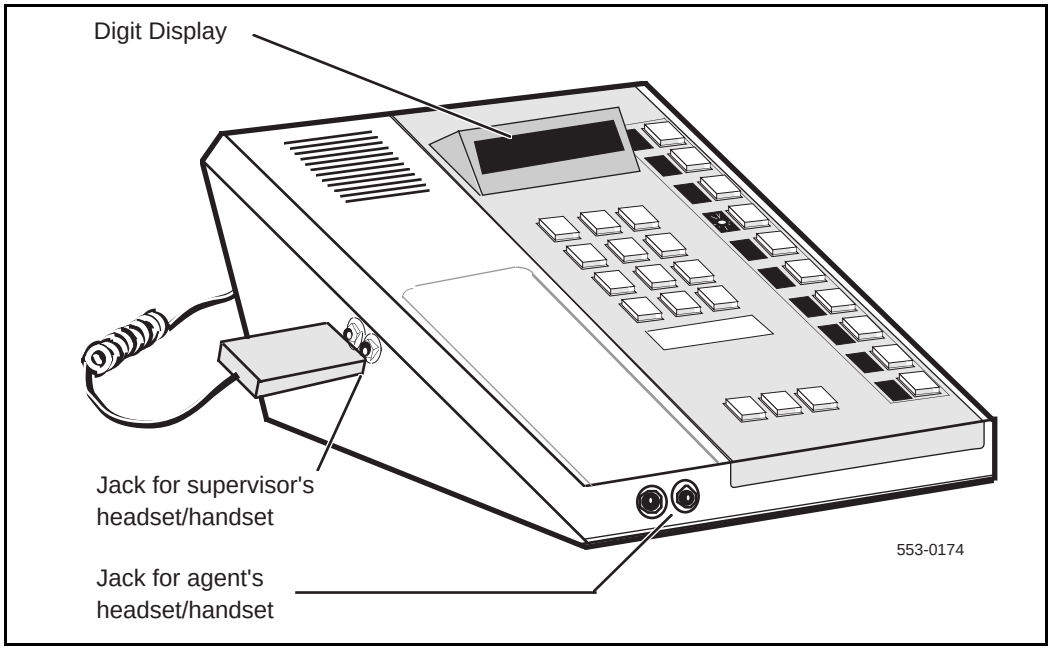
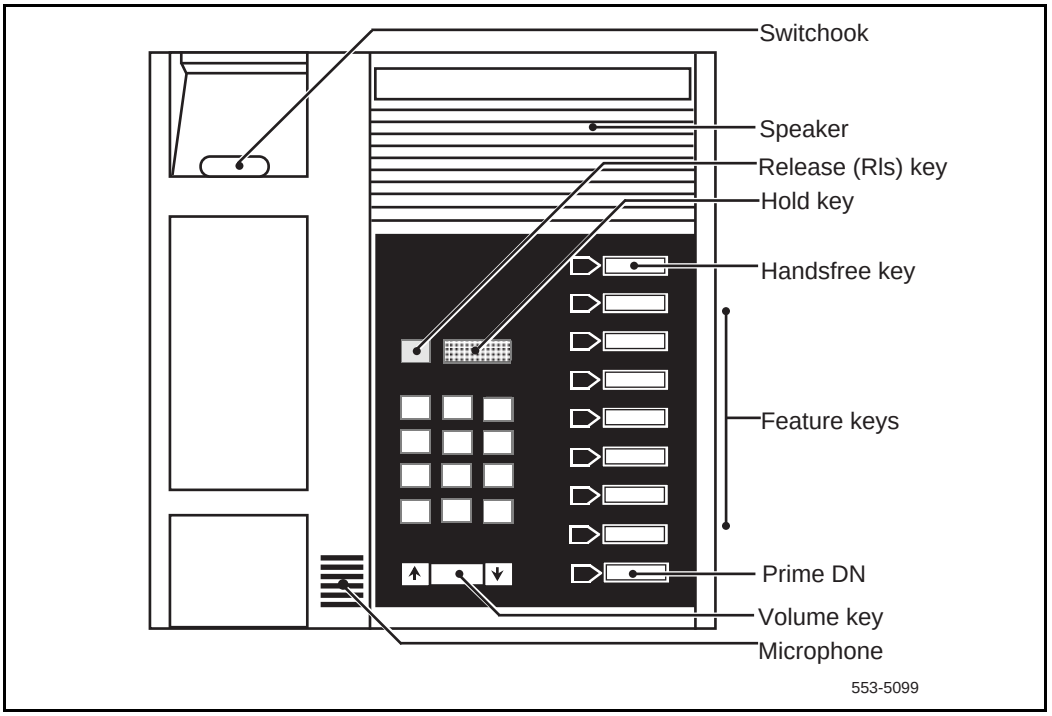


Figure 30
QSU71 telephone



Physical characteristics

SL-1 telephones have the following physical characteristics.

Housing

The housing of SL-1 telephones consists of a molded plastic base that holds the circuit board and control feature keys.

A filler plate is located on each side of the SL-1 telephone. A LOGIC Handsfree unit, a Group Listening Switch, or a Light Probe kit can be installed in place of the left-hand filler plate. An add-on key module can be installed in place of the right-hand filler plate.

SL-1 add-on modules provide the user with the following features:

— additional feature keys

— busy lamp field

— Handsfree operation

— headset operation

— operation for sight-impaired users

— integrated voice and data operation

Cover

Molded in the left-hand side of the cover are two depressions to accommodate the handset. The speaker grill is located between these depressions, under the handset.

> ***Note:*** QSU6 and QSU7 telephones for ACD do not have handset depressions as they are intended for use with headsets.

Designation window

The designation window located below the dial pad provides a display for the area code and prime Directory Number (DN) of the telephone.

Faceplate

Each SL-1 telephone is supplied with a standard black snap-in faceplate. Four optional color faceplates are available that must be ordered separately from the SL-1 telephone. The optional faceplate colors are as follows:

— Deep Blue Regular telephone

— Dark Brown Regular telephone

— Deep Blue Digit Display telephone

— Dark Brown Digit Display telephone

Note: The optional blue faceplates are not available in the United States. Bracketed ordering numbers are required on new telephones not equipped with a faceplate contactor.

Feature keys

Located on the right-hand side of each telephone is a key strip holding ten programmable feature keys, the first eight keys having associated LED indicators. The keys associated with LEDs can be programmed with any feature, including those requiring visual indications, such as Directory Numbers, Call Transfer, and Call Forward. The remaining two keys do not have LEDs and can be programmed for features that do not require indications, such as Release or Privacy Release.

Feature selection is made by pressing and releasing the required feature key. If the key selected has an LED indicator associated with it, the status of the feature will be displayed.

LED indicators

The LED indicators are capable of displaying the following states:

Function	**LED state**
idle	off
active	on (steady)
ringing	flash (60 Hz)
hold (waiting)	fast flash (120Hz)

Fixed keys

The three fixed keys located below the dial pad perform the same functions on all telephones. These functions are volume up, volume down, and hold.

SL-1 telephones use two keys, one to increase and one to decrease volume. Each time one of the keys is pressed, the volume of a signal through the loudspeaker is changed one step, up or down. The signal levels can only be changed when that signal is present at the loudspeaker. Once set, the volume is stored in the system memory and further signals will be reproduced at that level. The signals that can be separately adjusted are as follows:

— Group 1—Ringing tone

— Group 2—Buzz

— Group 3

- Speech
- Busy tone
- Dial tone
- Overflow tone
- Ringback tone

The volume of each group can be adjusted independently of other groups. Adjustment of one level in Group 3 affects the level of all signals in that group.

Handset

The handset used with the QSU1 and QSU3 telephones is the standard G-3 Chameleon ash unit. The handset is connected to the circuit board by the handset cord.

A G6QDC Amplified Handset (A0291605) provides receiver amplification for the hearing impaired. G6QDC can be used on QSU1, QSU3, QSU6, QSU7, QSU60, and QSU61 telephones if the current limiting kit, P0630408, is also installed.

Modular connector compatibility

Modular connectivity uses standard miniature modular jacks and plug-ended cords to connect SL-1 telephones to the Meridian 1 system, permitting greater ease of installation, replacement, and mobility. SL-1 telephones compatible with modular telephones have a -QM suffix at the end of their Q-code designation (QSU60BQM).

Wall mounting

The SL-1 telephones are designed for either desktop use or wall-mounted installation. A P0515934 wall-bracket assembly is needed for wall-mounting.

A QBP7A wall-bracket is required in place of the P0515934 bracket when a LOGIC Handsfree unit is provided. No bracket is necessary for desktop use.

QSU71 physical characteristics

The QSU71 has the following unique characteristics:

— Speed Call directory

A card located on the face of the top cover (to the left of the dial pad) is provided for recording your Speed Call directory or frequently called telephone numbers. Space is also provided on this card for recording the area code and prime Directory Number of the telephone.

— Feature keys

A key strip holding nine nonlocking keys with associated LED indicators is located on the right-hand side of each telephone. The top key is reserved for Handsfree. The remaining eight keys can be programmed for any X11 feature.

— Fixed keys

The Hold and Release keys are located above the dial pad.

Pressing the left side of the volume control key decreases the volume one level for each separate depression. If the volume was at its minimum, it will remain the same. Pressing the right side of the volume control key increases the volume one level for each depression. If the volume was at its maximum, it will remain the same. There are eight volume levels. Once set, the selected volume will remain at that level until changed again. The signals that can be adjusted are as described above (Group 1, 2, and 3) for the other SL-1 telephones.

The Handsfree key is located at the top of the feature key row.

This key is used to turn the Handsfree on or to mute while in the Handsfree mode. Handsfree is turned off by picking up the handset or pressing the Release key. An associated LED indicates status:

off	Handsfree not activated
on	Handsfree activated
fast flashing	Handsfree muted

Each QSU71 telephone is shipped with Handsfree enabled, but Handsfree can be disabled if required. The Handsfree enable/disable plug is located on the circuit board inside the telephone. Handsfree design is optimized for personal operation (the microphone is directional), not group conference. The Handsfree key must be assigned as KEY 8 NUL when inputting SL-1 telephone data. See *X11 input/output guide* for more information.

Add-on modules and interface kits

This section describes the add-on modules and interface kits available for SL-1 telephones.

SL-1 telephones can be expanded by using add-on modules and interface kits. (See Figure 31 for examples of add-on modules and Table 13 for a matrix of available add-on modules and interface kits.)

The available add-on modules and interface kits are listed below:

— QMT1, 10-key/lamp add-on module

— QMT2, 20-key/lamp add-on module

— QMT3, Lamp Field Array

— QKK1, Handsfree interface kit

— QKK3, Automatic Handsfree interface kit

— QKK8, Auto Answerback interface kit (QSU71 only)

— QKN1, Headset interface kit

— QSAM3, Group Listening switch

— QKM13, Light Probe kit

— Add-on data modules

Note: No add-on modules are available for the QSU71 telephone.

The add-on modules and interface kits can be plugged into the SL-1 telephone so that on-site modifications can be made at any time. A 24 V power supply (either a transformer or centralized power supply) is required when an SL-1 telephone is equipped with any of the following:

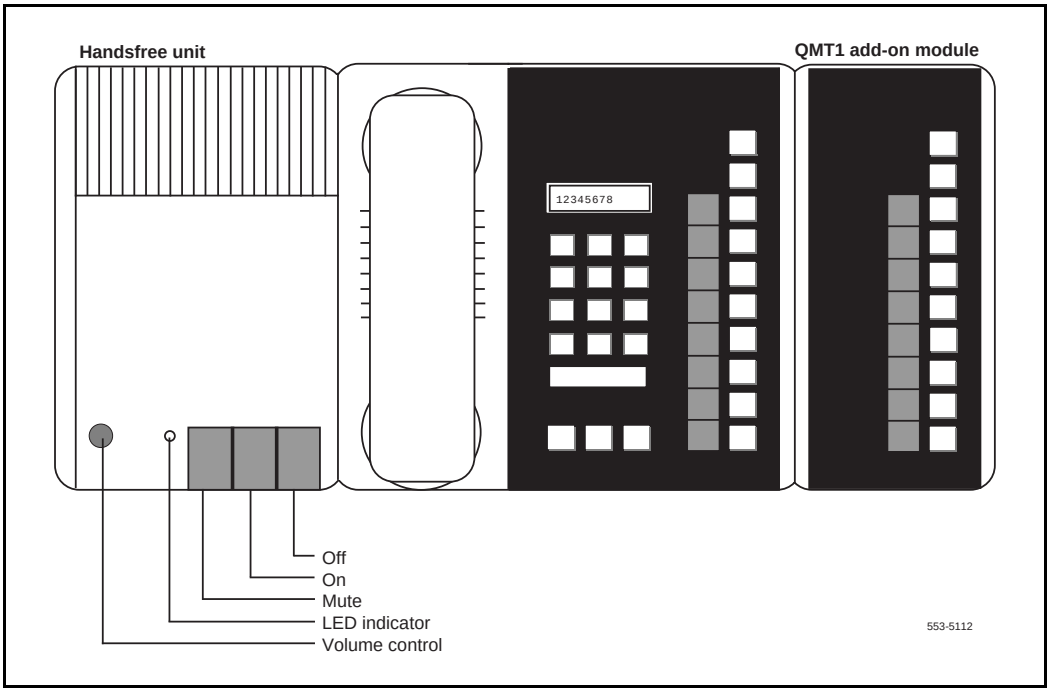
— QMT1 10 button or QMT2 20 button add-on module

— Digit Display

— Logic Handsfree Unit

— QKK3 Automatic Handsfree interface kit

Figure 31
QSU3 with Handsfree unit and QMT1 add-on module



In addition, a 15 V power supply (either a transformer or centralized power supply) is required when the telephone is equipped with the following:

— QMT3 Lamp Field Array

The following are the available power supplies:

— QUT1 Centralized Power Supply (15 and 24 V)

— P0547127—24 V transformer

— P0547128—15 V transformer

QMT1 and QMT2 add-on modules

The QMT1 add-on key module is equipped with a single key/lamp strip. The strip consists of ten nonlocking keys, the bottom eight keys having associated LED indicators. The keys are arranged in a single vertical strip with the LEDs adjacent to the keys.

The QMT2 add-on key module is equipped with two key/lamp strips, each strip containing ten keys and eight LED indicators.

Physical description

The QMT1 and QMT2 add-on modules consist of a molded plastic case, manufactured from the same high-impact resistant material and with the same profile as the SL-1 telephone. Housed within the module are printed circuit boards (one for the QMT1; two for the QMT2) that hold the electronic components, cables, and jacks, and to which are fastened the key and LED strips. For Phase II QMT1 and QMT2, the keys are mounted on a keyboard, which, in turn, is mounted on the circuit board.

— Each add-on module is supplied with a standard black faceplate. The following color faceplates can be ordered separately:

- for 10-button modules

  P0537925 deep blue

  P0537926 dark brown

- for 20-button modules

  P0538025 deep blue

  P0538026 dark brown

Functional description

The QMT1 and QMT2 add-on key modules are used to expand the line and feature keys of an SL-1 telephone. Any feature that can be assigned to a key on the basic telephone can be assigned to the add-on module keys. The operation of a feature assigned to these keys is identical to the operation of the same features assigned to a key on the SL-1 telephone itself.

Module attachment

Located on the right-hand side of the SL-1 telephone (except QSU71) is a filler plate. This plate can be removed to allow the addition of add-on key modules. The add-on modules are equipped with a plug, an adapter, and a plug-ended cable. The basic installation procedure follows:

1 Remove the filler plate from the telephone.

2 Lock the add-on module to the telephone with the plug adapter.

3 Insert the add-on module plug into the feature socket within the telephone.

See *Telephone and attendant console installation* for more information.

QMT3 Lamp Field Array module

The QMT3 (Lamp Field Array) is an add-on module that displays the busy-idle status of 150 successive stations beginning at any 100 point in the numbering plan (for example, 2400 to 2550). One or two QMT3 modules can be assigned per customer group. Hardware required to attach the module to a station telephone consists of the following:

— 24 V power supply

— 15 V power supply

Because all possible designations cannot be screened onto the module faceplate, a label designation sheet is provided with every QMT3 for this purpose. The characters are numbered from 10 to 995 in increments of 5.

Part numbers are as follows:

— QMT3, A0263526 (Lamp Field Array module)

— P0560497 (designation labels)

— QUT1 Centralized Power Supply

or

— P0547127 (24 V Transformer)

— P0547128 (15 V Transformer)

QKK1 Handsfree/QKK3 Automatic Handsfree interface kits

The QKK1 Handsfree/QKK3 Automatic Handsfree Interface kits are used to modify an SL-1 telephone (except QSU71) for the addition of a QSU1-type Logic or CONFERENCE 2000 Handsfree unit (see Figure 31) and/or to provide remote power to extend the operating range of the telephone from a maximum loop resistance of 189 to 252¾ (for length of cable see Table 12). For a detailed description of the Handsfree unit, see *QSU1 Companion and Logic Handsfree units* (512-6251-200).

The QKK3 Automatic Handsfree Interface kit feature is used for Automatic Answerback. Automatic Answerback (AAB) is available with selected software generics. Refer to *X11 features and services* for availability of the AAB feature.

Table 12 shows the maximum loop length for given gauges of cable for the SL-1 telephones (except QSU71) with and without the QKK1 or QKK3. The QSU71 can achieve the "with kit" loop length listed in Table 12 with the addition of a P0547127 power supply.

Table 12
Operating range of SL-1 telephone

Gauge of cable (AWG)	Maximum allowable cable length			
	Without kit		With kit	
	Feet	Meters	Feet	Meters
22	6000	1830	8000	2450
24	3700	1150	5500	1650
26	2300	675	3700	1110
Note: These limits are based on a cable capacitance of 85 nF per mile (1.6 km).				

QKK8 interface kit

QKK8 (provisioned for QSU71 telephones) mounts internally in the base of the QSU71 telephone. QKK8 provides the hardware to allow AAB.

QKN1 headset interface kit

The QKN1 headset interface kit provides jacks to allow an NE-52, VENTURE 1, or equivalent type of headset to be used with the SL-1 telephone (except QSU71). The interface kit consists of an ON/OFF switch, a jack for the headset, and related circuitry and is intended to mount in the left-hand filler plate position. For a full description of the Venture 1 headset, see *Venture 1 QSR2 type head telephone set* (028-3551-200).

The ON/OFF switch allows handset or headset operation to be selected at any time without the loss of transmission.

The interface kit can be installed in the field without removing the telephone from the customer's premises.

QSAM3 Group Listening switch

The SL-1 telephone (except QSU71) can accommodate an optional group listening switch designed to fit in the filler plate opening on the left side of the telephone. The QSAM3 is compatible with Phase II and subsequent SL-1 telephones.

Table 13 lists the add-on modules available for SL-1 telephones.

Table 13
Transformer and add-on module matrix

Unit	Max. number of feature keys	Number of 24V transformers (P0547127) required	Number of 15V transformers (P0547128) required
QSU1	60	1	0
QSU3	60	1	0
QSU1 + HU	60	1	0
QSU3 + HU	60	1	0
QSU1 + LFA	50	1	1
QSU3 + LFA	50	1	1
QSU1 + HU + LFA	50	1	1
QSU3 + HU + LFA	50	1	1
QSU1 + Headset	60	0	0
QSU1 + AAB	50	1	0
QSU3 + AAB	50	1	0
QSU1 + AAB + LFA	40	1	1
QSU3 + AAB + LFA	40	1	1

Legend:

HU Handsfree Unit

LFA Lamp Field Array

AAB Automatic Answerback

For step-by-step installation instructions for add-on modules, see *Telephone and attendant console installation* .

Data options

This chapter describes the Meridian Communications Adapter (MCA), the Meridian Programmable Data Adapter (MPDA), the Asynchronous Data Option (ADO), the Meridian Communication Unit (MCU), and the Analog Terminal Adapter (ATA). This chapter also describes several software features.

Asynchronous Data Option (ADO)

The M2000, M2317, and M3000 can be equipped with an Asynchronous Data Option (ADO) to allow you to make a data call using keyboard dialing from your attached terminal or personal computer. Voice and data communications can be conducted simultaneously without causing any mutual interference.

Functional description

The ADO mounts within the telephone and works in conjunction with the Digital Interface Chip to provide asynchronous communication up to 19.2 kbps from an ASCII data terminal or a personal computer to the Meridian 1 Integrated Services Network. The ADO appears as Data Circuit-terminating Equipment (DCE) in your terminal and connects to the Data Terminal Equipment (DTE) through an RS-232-C connector mounted on the ADO printed circuit board.

The Asynchronous Data Option supports:

— Hayes dialing

— Automatic data rate detection at all rates up to 19.2 kbps

— ASCII keyboard dialing (originating data calls to local and remote hosts or DTE by using the terminal keyboard)

— Call origination to local and remote hosts

— Call termination

— Ring Again Capability

— Auto Dial

— Speed Call

— Automatic or Manual answering of incoming data calls

— Manual Modem pooling

— Remote loopback

— Break detection and generation

ADO operating parameters

Table 14 shows the operating parameters ADO requires.

Table 14
ADO operating parameters

Data type	ASCII
Synchronization	Asynchronous, Start-Stop
Number of bits	8 bits
Parity	none (unchecked)
Data rate	300, 1200, 2400, 4800, 9600, 19200 bits per second (autobaud)
Stop bits	2 bits for 110 bits per second; 1 bit for all other speeds
Transmission	Full duplex

The ADO supports asynchronous ASCII operation. A data byte is received from your terminal or personal computer, a control byte is added, and the two bytes are transferred to the associated line card. In the other direction, two data bytes are received from the line card, the control byte is deleted, and the data byte is delivered to your terminal in a bit serial format, at the terminal's bit rate.

ADO external power supply

The ADO requires an external power supply in addition to the power from the line (see Table 15). A 110 V ac 60 Hz, 100 V ac 50/60 Hz, or a 220 V ac 50 Hz multi-output power supply unit provides nominal voltages of +5 V, +12 V, and –12 V dc. The power supply connects to the back of the telephone through a 5-pin Molex power connector.

If the AC power supply fails, data calls cannot be processed. All external power supplies are equipped with short circuit and thermal shutdown protection.

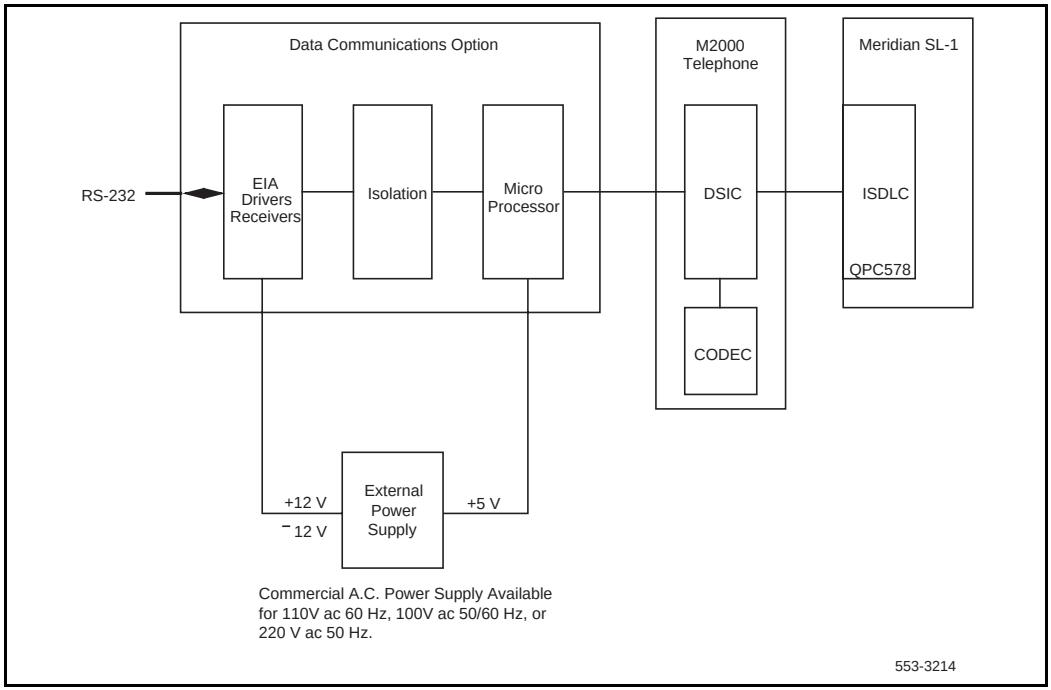
Table 15 lists the input and output requirements for the ADO external power supply.

Table 15
I/O requirements for ADO external power supply

North American version	
NPS50220-03L5	Multi-output external power supply
	(A0336823), UL listed and CSA approved
Input:	57–63 Hz 115–132 V ac
Output:	+5 V dc, 1.0 A (pin 3 for supply, pin 2 for return)
	+12 V dc, 200 mA (pin 6 for supply, pin 1 for return)
	–12 V dc, 200 mA (pin 4 for supply, pin 1 for return)
Japanese version	
NPS50220-03L8	Multi-output external power supply
	(A0336891), Japan Standard (“T” Mark)
Input:	47–63 Hz 85–115 V ac
Output:	+5 V dc, 1.0 A (pin 3 for supply, pin 2 for return)
	+12 V dc, 200 mA (pin 6 for supply, pin 1 for return)
	–12 V dc, 200 mA (pin 4 for supply, pin 1 for return)
European version	
NPS50220-03L5	Multi-output external power supply
	(A0336166), conforming to NPS50561 general requirements and UL1012
Input:	57–63 Hz 200–240 V ac
Output:	+5 V dc, 1.0 A (pin 3 for supply, pin 2 for return)
	+12 V dc, 200 mA (pin 6 for supply, pin 1 for return)
	–12 V dc, 200 mA (pin 4 for supply, pin 1 for return)

Figure 32 shows a block diagram of the ADO and M2000 telephone.

Figure 32
Block diagram of ADO and M2000 telephone



See the *Asynchronous Data user guide* (P0661883), the *M2000 digitial telephone user guide* (P0669419), the *M2317 user quide* (P0744260), and the *M3000 Touchphone user guide* (P0800569) for more information on ADO operation. See also the final sections of chapters 2, 3, and 5 for ADO ordering information for the M2000, M2317, and M3000.

Meridian Programmable Data Adapter (MPDA)

Modular telephones before release 18 can be equipped with a Meridian Programmable Data Adapter (MPDA) to allow you to make a data call using keyboard dialing from your attached terminal or personal computer. Voice and data communications can be conducted simultaneously without causing any mutual interference.

Functional description

The Meridian Programmable Data Adapter (MPDA) mounts within the telephone (see Figure 33) and allows asynchronous ASCII terminals, personal computers, and printers to be connected to the telephone using an RS-232-C interface on a DB-25 female connector.

Features supported by the MPDA include the following:

— Asynchronous transmission at up to 19.2 kbps (autobaud)

— Enhanced Hayes commands, including upper- and lower-case dialing, voice call origination through AT dialing, hang-up data call, and on-line disconnect of voice call

— Script file capability that allows the MDPA to learn a dial-up and logon sequence that can be played back to automatically access a host or service

— Voice Call Origination (VCO)

— DCE mode

— Autodial

— Ring Again

— Speed Call

— Autobaud and Autoparity Detect

— Modem Pool Calling

— Host/Terminal Mode

— Forced Data Terminal Ready (DTR)

— Dynamic Carrier Detect (DCD)

— Inactivity Time-out

— Remote Loopback

— RTS/CTS hardware flow control capability (when calling another MPDA)

The MPDA has the following limitations:

— Only data calls using T-Link, data module-to-data module (DM-DM), or Public Switched Data Service (PSDS) are supported. PSDS can be used only if the transmission mode is set to synchronous.

— The MPDA is supported only on tie, Central Automatic Message Accounting (CAMA), and direct inward dial/direct outward dial (DID/DOD) trunks. CAMA and DID/DOD trunks can be used only for PSDS calls. If a call starts out using T-Link or DM-DM, only tie trunks can be accessed.

— Only tandem data calls are supported across tie trunks, provided all switches involved are NT and data calls are not PSDS calls.

— Meridian 1 ADO does not support T-Link sets. (SL-100 ADO supports T-Link.)

— External data calls can be made only over Digital Trunk Interface (DTI) or ISDN Primary Rate Interface (PRI) trunks.

— External data calls to other Meridian 1 systems require ESN signaling to prevent echo canceling at the far end.

— ADM trunk hunting is not applicable to the MPDA.

— If an MPDA receives extra system parameters, it erases all existing script files stored in its Electronically Erasable Programmable Read only Memory (EEPROM).

— A PSDS call can complete only when both the originating and terminating terminals are set to PSDS; otherwise, the call is dropped.

— Calls connect only if the originating and terminating terminals are set up for synchronous or asynchronous transmission. Both terminals must be in the same mode. For synchronous calls, both terminals must be set at the same speed.

MPDA operating parameters

The MPDA data parameters are stored locally although the configuration is set in the Meridian 1 system. Data parameters may not be set in the system before installing the MCA in the telephone. If the parameters are set before the telephone is installed, the configuration information will be lost.

The MPDA communicates with Data Terminal Equipment (DTE) using the operating parameters shown in Table 16.

Table 16
MPDA operating parameters

Synchronization	Asynchronous, Start-Stop
Number of bits	8 bits
Parity	none (unchecked)
Data rate	110, 150, 300, 1200, 2400, 4800, 9600, 19200 bits per second (autobaud)
Stop bits	2 bits for 110 bits per second; 1 bit for all other speeds
Transmission	Full duplex

Note: The MPDA requires an additional power supply board. See the specifications section of Chapter 4 for power requirements information.

Figure 33 shows the back of a Modular telephone with an MPDA mounted; Figure 34 shows a block diagram of the Modular telephone and MPDA.

See the *Meridian Programmable Data Adaptor user guide* (P0705986) or the *Meridian Modular Telephone user guide—North America* (P0800565) for more information on MPDA operation. See also the final section of Chapter 4 for MPDA ordering information.

Figure 33
Back of telephone showing MPDA

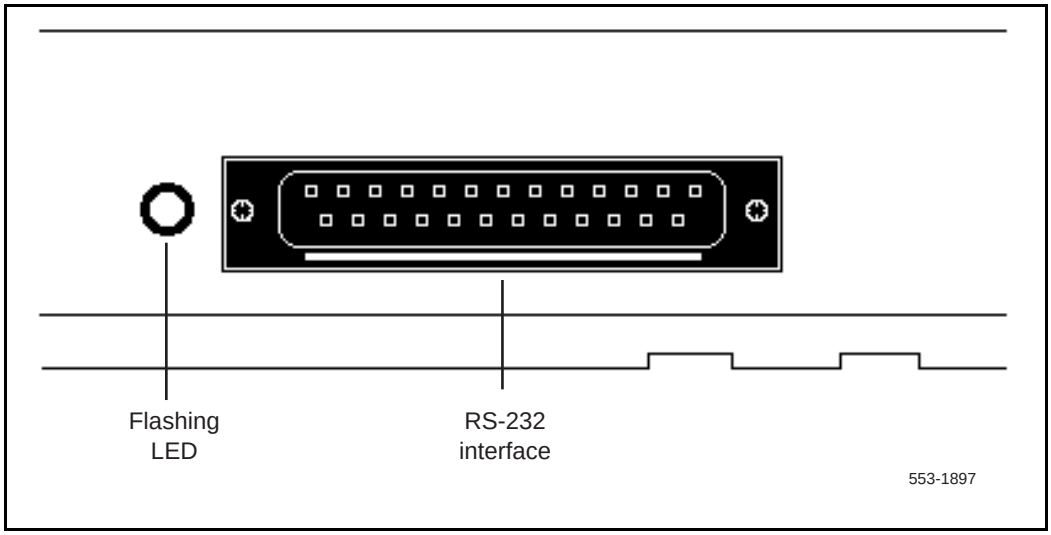
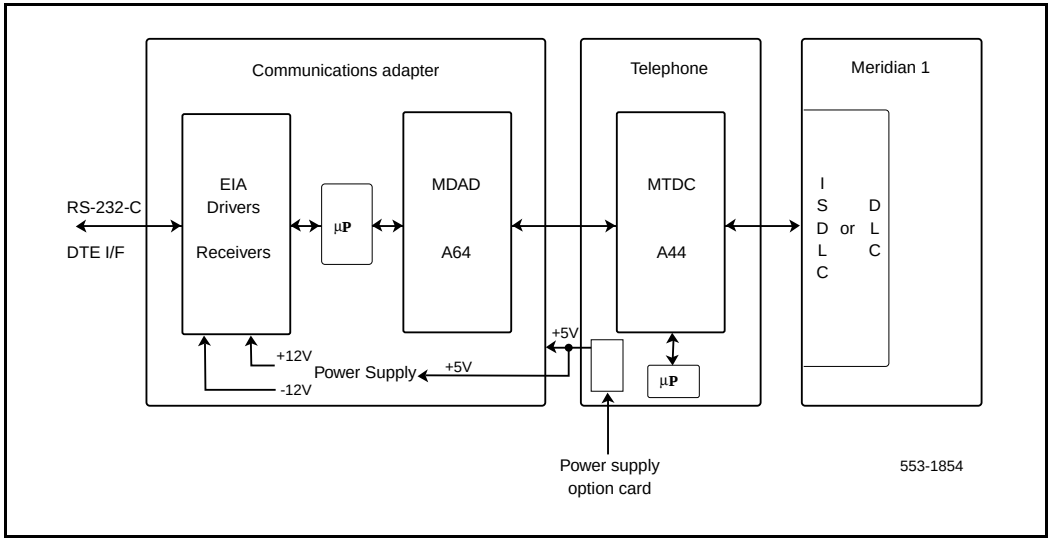


Figure 34
Block diagram of MPDA and Modular telephone



Meridian Communications Adapter (MCA)

The Meridian Communications Adapter (MCA) replaces the MPDA with release 18 and later and offers enhanced capability over the MPDA. An MCA can be configured as an MPDA for use with releases earlier than release 18.

Functional description

The MCA mounts within the telephone (see Figure 3) and allows synchronous and asynchronous ASCII terminals, and personal computers to be connected to the telephone using an RS-232-C or V.35 interface on a DB-25 connector. With release 14 and later, the MCA allows synchronous applications (DTEs such as video conferencing equipment and Group IV fax units) to be connected to the telephone.

Releases 14 through 17 allow access to data functions through the keypad only. However, release 18 and later allow access to data functions via both the keypad and service change in LD 11.

Asynchronous mode features supported by the MCA include the following:

— Asynchronous transmission at up to 19.2 kbps (autobaud)

— Enhanced Hayes commands, including upper- and lower-case dialing, voice call origination through AT dialing, hang-up data call, and on-line disconnect of voice call

— Script file capability that allows the MCA to learn a dial-up and log on sequence that can be played back to automatically access a host or service

— Voice Call Origination (VCO)

— DCE mode

— Autodial

— Ring Again

— Speed Call

— Autobaud and Autoparity Detect

— Modem Pool Calling

— Host/Terminal Mode

— Forced Data Terminal Ready (DTR)

— Dynamic Carrier Detect (DCD)

— Inactivity Time-out

— Remote Loopback

— RTS/CTS hardware flow control capability (when calling another MCA)

Synchronous mode features supported by the MCA include the following:

— Half Duplex/Full Duplex

— Internal and external clocking

— Modem and network capability

— Synchronous transmission up to 64 kbps

— Public Switched Data Services compatibility. MCA extends PSDS and 64K restricted and 64K clear capabilities to Modular telephones.

— V.25 bis dialing protocol support at all synchronous speeds up to 64 kbps. High-Level Data Link Control (HDLC) and Bisynch (character oriented) framing of the V.25 commands is supported.

— Programmable echo canceller disabling for 56 and 64 kbps network calls

Synchronous *and* asynchronous mode features supported by the MCA include the following:

— T-Link and DM-DM support

T-Link and DM-DM are Northern Telecom proprietary protocols. The SL-100 and DMS data devices use T-Link. DM-DM is used by Meridian 1 data devices such as ASIM, AIM, ADM, SADM, Asynchronous Data Option (ADO), and MPDA. MCA can use both DM-DM and T-Link.

— Hotline

— Virtual Leased Line

— V.35 interface capability selectable with jumper plugs on the MCA

— Data tandem calls across tie trunks, provided all switches involved are Northern Telecom machines

— PSDS tandem data calls across tie trunks are supported with release 18 or later when each tandem node uses an ISDN Primary Rate Interface (PRI) or Basic Rate Interface (BRI) connection. See *Transparent Data Networking* (553-2731-110) for more information.

Note: Internal PSDS calls are not supported.

MCA operating parameters

The MCA data parameters are stored locally although the configuration is set in the Meridian 1 system. Data parameters may not be set in the system before installing the MCA in the telephone. If the parameters are set before the telephone is installed, the configuration information will be lost.

Operating parameters are downloaded after the MCA is enabled in LD 11. With release 18 and later, system parameters are downloaded when the MCA is configured in LD 11, and power is reset. (See the *X11 input/output guide* (553-3001-400) for prompt and response details.) Data parameters can also be set, with release 18 and later software, through LD 11, as well as by the keypad.

The MCA communicates with Data Terminal Equipment (DTE) using the operating parameters shown in Table 17.

Table 17
MCA operating parameters

Synchronization	Asynchronous, Start-Stop
Number of bits	8 bits
Parity	none (unchecked)
Data rate	110, 150, 300, 1200, 2400, 4800, 9600,19200 bits per second (autobaud) asynchronous up to 64000 bits per second synchronous
Stop bits	2 bits for 110 bits per second; 1 bit for all other speeds (asynchronous only)
Transmission	Half duplex; full duplex

When installing an MCA or MPDA into NTZK or NT2K phone sets with a date code prior to January 1998, a Power Option board is required, along with an additional power source.

When installing an MCA in an NT9K or NT2K phone set with date code of January 1998 or later you will only install the MCA (an additional Power Option board and Jumper board is not required). See the specifications section of Chapter 4 for power requirements information.

Figure 35 shows the back of a Modular telephone with an MCA mounted; Figure 36 shows a block diagram of the Modular telephone and MCA.

See the *Meridian Communications Adaptor user guide* (P0744323) for more information on MCA operation. See also “Ordering information” on page 31 for MCA ordering information.

Figure 35
Back of telephone showing MCA

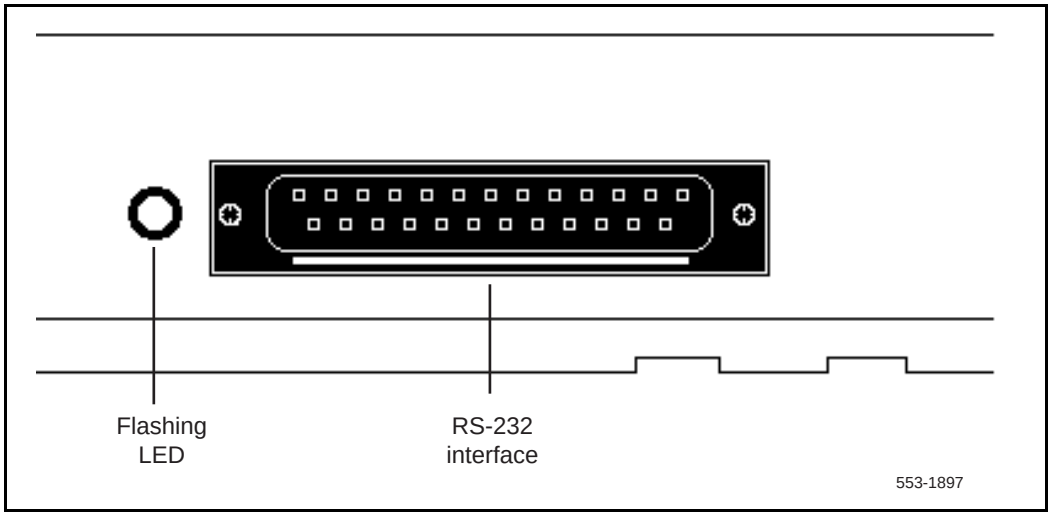
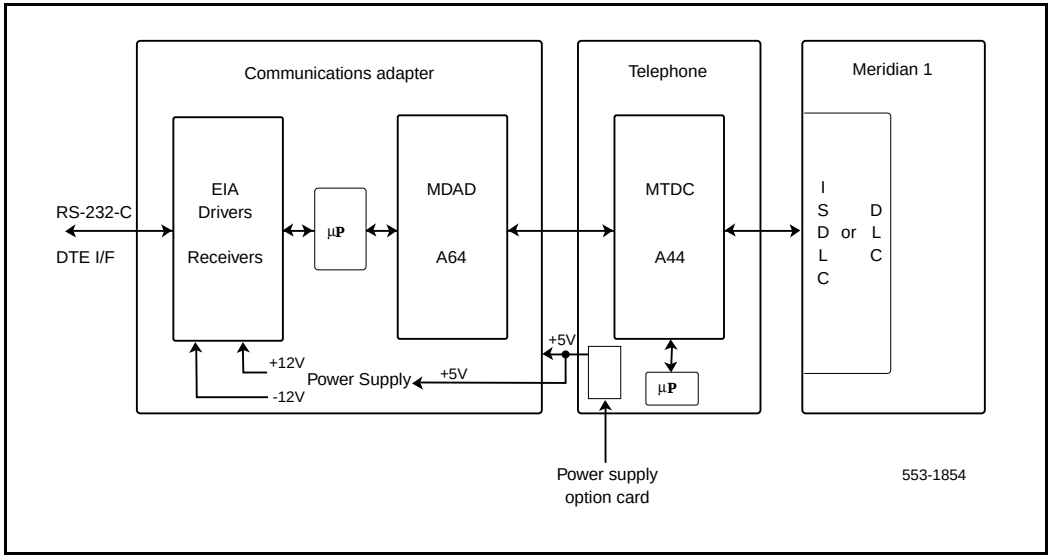


Figure 36
Block diagram of MCA and Modular telephone



Meridian Communications Unit

The Meridian Communications Unit (MCU) is a release 19 feature that provides a stand-alone version of the Meridian Communications Adapter (MCA).

Functional description

The Meridian Communications Unit (MCU) allows you to transmit and receive data using PSDS over either the public network or a private network. The MCU, which replaces the QMT21C, is designed for domestic and international use, with transmission speeds up to 19.2 kbps asynch and 64 kpbs synch, integrated display, and self diagnostics. The MCU supports autodialing, ring again, and speed calling, as well as autobauding and automatic parity detection. You can use the MCU for the following:

— Video conferencing

— LAN bridging

— Bulk data/PC file transfer

— Dial back-up

— Host connectivity

The MCU fully complies with RS-232C and can be configured as DCE or DTE to connect to a terminal, printer, or fax machine.

Unlike the MCA, the MCU provides a dedicated call key and call progress tones. The MCU also permits smart modem pooling.

The MCU supports the DM-DM, T-Link, V.25 bis, and PSDS interfaces as well as the RS-232C, CCITT V.35, CCITT V.24, and RS570/RS3449 (with different cables) interfaces. It complies with V.28 for European approval.

Refer to *Meridian Communications Unit and Meridian Communications Adapter description, installation, administration, operation* (553-2731-109) for detailed information on this feature.

Analog Terminal Adapter

The Analog Terminal Adapter (ATA) allows the use of an off-the-shelf analog device (FAX, Modem, Telephone) to operate simultaneously with your Meridian Digital Telephone set. The Analog Terminal Adapter board fits into the footstand space of your Meridian Digital Telephone set.

Functional description

The Analog Terminal Adapter is mounted in the footstand of your Meridian Digital Telephone set. The ATA requires a separate AC adapter which provides a 24 volt AC external power source. The ATA does not draw power from your Meridian Digital Telephone set.

The Analog Terminal Adapter (ATA) provides a RJ11 connection for analog equipment to operate on the same line as your Meridian Digital Telephone set. The Analog Terminal Adapter allows you to transmit and receive data using the public switched telephone network (PSTN). The ATA supports an analog device link to the desktop or laptop computer users (with modems) in the digital telephone environment. Currently, it is necessary to install a separate analog phone line to be able to interface with the PSTN.

You can use the ATA for the following analog devices:

— FAX Machine

— Modem

— Analog Telephone

ATA operating parameters

The ATA data parameters are stored locally although the configuration is set in the Meridian 1 system. Data parameters may not be set in the system before installing the ATA in the telephone. If the parameters are set before the telephone is installed, the configuration information will be lost.

Simultaneous voice and data capabilities are available with X11 Release 22 or later. When the ATA is installed the System Administrator must activate the Flexible Voice and Data feature by configuring Overlay 11. See the *X11 input/output guide* (553-3001-400) for prompt and response details.

The ATA will not provide simultaneous voice and data if the X11 software release is prior to release 22.

The Analog Terminal Adapter (ATA) is capable of receiving dial pulse or DTMF address signaling from the analog equipment.

The ATA uses the 2nd channel of the TCM loop to add an analog port to the digital terminal. It has an RJ11 type jack accessible from the back of the telset.

The analog interface of the ATA is a 2-wire source, providing A and B leads (tip and ring) across which analog equipment (modem/fax) is connected. The loop length will be >100 feet. The analog interface of the ATA is compatible with the port types listed in Table 18.

Table 18
Port types compatible with ATA

County	Port Type(s)	Defining Standard(s)
United States	ONS Station Interface Class A OPS Station Interface	EIA/Tia-464A FCC Rules Part 68
Canada	ONS Station Interface Class 1300 OPS Station Interface	CAN3-T512.1 CS-03 Part I

Refer to *Analog Terminal Adapter Quick Reference card or Installing an Analog Terminal Adapter* for detailed information on this feature.

Call Pickup Network Wide

Functional description

When multiple Meridian 1 systems are located at one site (e.g., large establishments requiring redundancy), the possibility of having users in close proximity to each other, yet not sharing the same telephone switch exists. This creates the need for a network-wide realization of features previously only meaningful on the local node. One such feature is Call Pickup.

The Call Pickup Network Wide feature allows you to extend the following functionalities over a Meridian Customer Defined Network (MCDN) Integrated Services Digital Network (ISDN) network:

— Ringing Number Pickup

— Directed Call Pickup by Group Number

— Directed Call Pickup by DN

— Display Call Pickup

With the exception of Display Call Pickup, user operation of the above features remains unchanged. To display Call Pickup, press the Display key, followed by the Call Pickup key. Display Call Pickup is modified so that the Ringing Number Pickup (RNP) key flashes for five seconds once a local or remote ringing DN is found and displayed. During this time, the user can press the RNP key to initiate a Call Pickup directed to the displayed DN.

With Call Pickup Network Wide, users must be assigned to the same Call Pickup group regardless of network location. Each Ringing Number Pickup Group may be assigned to a Speed Call List (SCL) which is used when there is not an applicable local set to pick up. Different groups may be assigned to different SCLs.

To route calls through the network from one originating node to a destination node, an ISDN Private Integrated Services Network Exchange (PINX) is defined for each node in the network. The ISDN PINX DN is a DN taken from the customer's numbering plan used to aid with the routing of network calls. It does not correspond to a real terminal on the node, so can never be busy. Each SCL contains a list of PINX DNs which correspond to the remote nodes or customers to be searched. Thus, the purpose of the Speed Call List is to let the system know where to look in the network to pick up the call. A pickup group linked to a Speed Call List is considered as being network wide.

The search is conducted in an ascending order as programmed in the Speed Call List (i.e., entry 0 first). This Speed Call list is used when there is not an applicable local set to pick up.

While a network search is performed, a slight delay occurs before a call is connected or rejected, and the set receives silence. This delay is traffic-dependent. If the call cannot be rerouted to the requesting party, the call will ring again at the originally dialed DN and the requesting party receives an overflow tone.

Call Waiting Redirection

Functional description

Previously, Call Waiting notified an active set that a second call was waiting on the DN. For non-attendant extended calls, the incoming call received Call Waiting treatment until answered by the called party or the calling party disconnected. For attendant-extended calls, the incoming call received Call Waiting treatment until answered by the called party or the calling party disconnected. For attendant-extended calls, the incoming call received Call Waiting treatment until the Call Waiting Recall timer timed out, at which time the call was recalled to the attendant. The attendant had to then extend the call to a message center or voice mail. However, since the attendant was given no indication as the reason for the recall (called party busy or not answering), it was difficult for the attendant to redirect the call properly.

In X11 Release 21, the Call Waiting Redirection feature follows the Call Forward No Answer (CFNA) treatment defined for the DN. No modifications have been made; all existing CFNA functionalities, including external and internal, apply to redirected calls.

Operating parameters

The existing Call Waiting and CFNA limitations apply to the Call Waiting Redirection Feature. The CFNA feature is used by the Call Waiting Redirection feature to redirect “no answer” calls given Call Waiting treatment.

Although the Call Waiting treatment is applied to a busy DN, the CFNA call redirection treatment given by the Call Waiting Redirection feature is for a “no answer” presentation. The unanswered Call Waiting call is treated as a call presented to an idle “no answered” DN. Calls redirected to messaging services or sets with displays are provided with the “no answer” call redirection reason.

The existing implementation of CFNA is used to select the TN with the CFNA DN for the “no answer” Call Waiting call. Calls are redirected according to the call type (internal or external) as defined at the designated call redirection TN chosen by CFNA.

Predictive Dialing

Functional description

Predictive Dialing automates the process of making outgoing calls to customers for Automatic Call Distribution (ACD) agents. Host applications can request the Meridian 1 to make calls using autodialers or phantom TNs. When a call is answered, the application sends a request to the switch to transfer the call to a live agent. The call must be transferred before, or while, the customer starts speaking in order to prevent customers from abandoning the call if they think no one has called them. This transfer was previously performed by Meridian Link in two steps by sending two separate Application Module Link (AML) messages to initiate and then complete the transfer. This operation requires a minimum of 400 to 450 milliseconds.

The Fast Transfer development in X11 Release 21 allows applications residing on the Application Module (AM) or host computers to transfer a call in one step—a blind transfer—by sending only one AML message (Fast Transfer) to the switch, thereby saving approximately 200 to 250 milliseconds of transfer time. This Fast Transfer feature is useful for predictive applications to make outbound calls and then quickly transfer them once the customer has answered (i.e., live voice has been detected). Fast Transfer can also be used in a non-predictive dialing environment. Applications can now perform a blind transfer more quickly.

The Predictive Dialing feature enables applications residing on the AM or host computers to send a combined Make Call and Transfer request on behalf of an autodialer or Phantom TN. As soon as live voice is detected by third-party equipment, or notification is sent to the switch indication the call has been answered (e.g., answer supervision), the application can send the Fast Transfer request to the switch, immediately transferring the call to an ACD agent.

Operating parameters

When Phantom TNs/DNs are used to originate calls as part of a predictive dialing operation, the option 11 will not be supported.

Attendant Consoles and Basic Rate Interface sets cannot initiate Fast Transfer of predictive calls.

The Meridian 1 does not support live voice answer detection. Live voice answer detection is currently achieved through third-party vendor equipment.

If phantom TNs/DNs are used, this development only supports calls and Fast Transfers originated by phantom TNs/DNs which are defined as Associate set (AST) BCS sets on a phantom loop.

Data calls are not supported.

For outbound trunk calls, if no third-party equipment is used to detect live voice answer, the switch depends on receiving answer supervision before transferring the call to the target DN.

If voice detection is used, the application will not be able to Fast Transfer the call before the call is established (i.e., answer notification is received).

The application will not be able to complete the transfer when Fast Transferring over a trunk.

Not all analog trunks support answer supervision. All digital trunks do not provide answer supervision. For trunks that do not support answer supervision, the End-of -Dialing (EOD) timer is used to trigger the transfer.

Receiving answer supervision depends on the accuracy of signals returned by the external network. Answer supervision may be received before an EOD timeout, fake answer supervision may also be received due to an EOD timeout, and a pseudo answer supervision may be received if the far-end has an EOD timeout even though the local switch has answer supervision configured.

The AML requires an Enhanced Serial Data Interface (EDSI) card or Multipurpose Serial Data Link (MSDL) card (NT6D80AA) on the switch. If an option 11 is used, a Serial Data Interface/D-channel (SDI/DCH) card (NTAK02AA) is required to configure the EDSI port.

The AML connection requires an RS232 cable.

Meridian Link software is required for host applications to utilize this feature.

China Phase 11—Flexible Feature Codes (FFC)

Functional description

Three new Flexible Feature Code (FFC) features have been developed to meet the requirements of the Chinese Ministry of Posts and Telecommunications for the rural switch market in China. The three features are Busy Number Redial (BNR), Customer Call Forward (CCFW), and Outgoing Call Barring (OCB). Each of these features has an option to provide a confirmation tone upon feature activation.

Busy Number Redial

Busy Number Redial enables PBX (500/2500) users encountering a busy condition to automatically redial the busy number by performing a switchhook flash and dialing the Busy Number Redial FFC. When the user next goes off-hook without dialing any digit, the busy number is automatically redialed. This feature remains in effect until the desired DN is reached, up to a maximum of 20 minutes.

Customer Call Forward

Customer Call Forward allows PBX users to forward their telephones to a central answering position by dialing the Customer Call Forward FFC. This feature activates the Call Forward All Calls function without having to specify the forwarded to DN.

Outgoing Call Barring

Outgoing Call Barring allows a set to be blocked from making some or all outgoing calls. Three levels of barring are available. The user selects the level by dialing the Outgoing Call Barring FFC, the barring level desired, and the Station Control Password

The three levels are each associated with a New Flexible Code Restriction (NFCR) tree in the Customer Data Block. When a DN is dialed, the digits dialed are compared to the associated NFCR tree and busy tone is given if the call is barred. An FFC is also available to verify that the feature is active.

The active level cannot be changed without first deactivating the feature and reactivating it with a new level.

Operating parameters

Although designed for China, the China Phase II - Flexible Feature Codes feature can be used in other markets.

Busy Number Redial is only available for internal calls and for trunk calls that provide a busy signal when busy tone is given.

Busy Number Redial and Customer Call Forward are only available for PBX (500/2500) sets.

Outgoing Call Barring is only available for PBX and BCS sets (excluding BRI sets).

The Reply DN for CCFW is limited to 16 digits.

OCB will only process “*” and “#” according to the active NFCR tree if the digits are to be outpulsed on a route with OPR active (including all necessary conditions for OPR). If they are dialed as part of an FFC, the call is allowed; otherwise, an octothorpe will cause the call to be blocked. A star will be ignored, except during digit counting. Thus, FFCs containing a “*” or an “#” cannot be blocked by this feature.

OCD will not prevent calls from terminating when there are too few dialed digits to traverse the full NCFR trr (e.g., if the active tree is set up to bar 2001, but a DN of 200 exists, calls to 200 will be allowed with no error message).

The maximum number of digits that will be processed by OCB is 32. If the call is not allowed or denied by that point, the call is barred.

OCB can bar feature access codes such as Special Prefix (SPRE) codes and numeric FFCS. It will not bar the digits dialed after an access code.

Directory Number Delayed Ringing

Functional description

There are two types of Directory Number keys: ringing and nonringing. The Directory Number Delayed Ringing (DNDR) feature provides an audible notification (e.g., ringing, buzzing, etc.) after a specified delay to nonringing keys for a particular Terminal Number (TN). These keys can be either Single Call Non-Ringing (SCN) or Multiple Call Non-Ringing (MCN).

When an incoming call is presented to an SCN/MCN key, the associated lamp flashes. If Directory Number Delayed Ringing is defined for the set, an audible notification is given after a defined number of seconds (from 1 to 120 seconds). The DNDR value is defined in LD11, and the feature is disabled if zero is selected as the delay value. When the feature is disabled, all SCN/MCN keys for this particular TN will not receive audible notifications.

Operating parameters

Only BCS sets with DN key type SCN or MCN may use this feature; PBX (500/2500) sets are not supported.

The DNDR feature is enabled on a TN basis. Thus, all or none of the SCN/MCN keys for the TN will receive the audible notification.

For a single call, two appearances of a Multiple Appearance Directory Number (MADN) may ring simultaneously if their DNDR values differ by two seconds or less.

The DNDR value can be different for multiple TNs with the same DN appearance. Therefore the audible notification may begin at different times for a single call.

Set-Based Administration Enhancements

For the option 11, the functionalities that have been offered by Set-Based Administration prior to Release 21 are now grouped under the following two tasks on the main menu, under administration access:

— Administration: provides a grouping of trunk-related options.

— Installation options: provides the same functions as before; however, it is moved to a new location on the main menu.

Since these capabilities are only available to option 11, they will not be displayed on the main menu for other system types.

Functional description

Previously, Set-Based Administration was a feature available in Meridian 1 option 11 systems that simplified system installation and administration by enabling a set to be used to perform several administrative and maintenance procedures. With the Set-Based Administration Enhancements feature, Set-Based Administration is now available for all system types. In addition, enhancements are provided to the existing capabilities on the option 11.

To further enhance Set-Based Administration, three levels of set-based data administration access are available with the following capabilities:

— Administrator Access allows a system administrator to make changes to any supported telephones within a customer location. The system administrator can perform any of the following tasks through an administration/maintenance set (M2008, M2016, M2616 with display):

- Change the data associated with specific set-related features:
- Hunting, External Hunting, Call Forward No Answer, External Call Forward No Answer, Call Forward, Busy Forward Status, Voice Call, Dial Intercom Group, Group Call, Ringing Number Pickup Group, Speed Call, System Speed Call, and Hot Line
- Add or change the Calling Party Name Display (CPND) names associated with existing DNs
- Change system date and time
- Change toll restrictions of any set
- Determine Directory Number-Terminal Number correspondence

— Installer Access allows an installer to perform any of the following tasks to a set from which the installer is logged in:

- Change the data associated with specific set-related features
- Add or change the CPND names associated with the DN on that set
- Change system data and time
- Change toll restriction for that set

— User Installation allows a user to add or change the user's own CPND when logging in through the user's own set.

Administrator and Installer Access are invoked by dialing the Administrator or Installed Flexible Feature Code (FFC) followed by the Administrator or Installer password. The passwords are defined on a system basis. User Access is activated by dialing the Set-Based Administration User FFC followed by the Station Control Password of the user's set.

The multi-language capability of this feature supports all languages currently supported on the option 11: English, German, Spanish, Swedish, Canadian and Parisian French, Dutch, Italian, Danish, Portuguese, and Norwegian.

Operating parameters

With the exception of CPND, features cannot be added to or deleted from a set using this feature.

The CPND name change enhancement to Set-Based Administration is not supported using non-display sets, due to the complexity of operation without visual feedback.

If the user has the ability to see the data, the data can be changed.

With the exception of CPND support, the Meridian Mail subsystem integration is not supported. Meridian Mail mailbox changes cannot be performed by means of Set-based Administration.

Network login is not supported; a set can only login on its home node.

Entry of "*" and "#" in extension numbers is not supported using Set-Based Administration, because these are the keys that the feature uses to control user navigation through menus.

Access from SL-1 or BRI sets is not supported.

Set-Based Administration logins cannot be made from Direct Inward System Access (DISA) calls.

Collect Call Blocking

Functional description

An automatic long distance collect call service called DDC is available in Brazil. The Collect Call Blocking feature enables a Meridian 1 administrator to block DDC calls on incoming Direct Inward Dialing (DID) and Public Exchange/Central Office trunks (analog or DT12).

Under the following conditions, the Meridian 1 sends a special answer signal to the Central Office to indicate to the Central Office that collect calls cannot be accepted:

— The Collect Call Blocking (CCB) package 290 is enabled

— The incoming route has CCB enabled via the CCB prompt in the Route Data Block

— The call is answered by a CCB user (i.e., Collect Call Blocking Allowed Class of Service or option)

New classes of service and prompts have been introduced to inhibit specific users from receiving collect DID and Central Office calls. These can be configured for the following:

— PBX and BCS through the Collect Call Blocking Allowed/Denied (CCBA/CCBD) option

— Attendant and Network Alternate Route Selection calls on a per customer basis through CCBA/CCBD option

— Automatic Call Distribution (ACD) queues through the CCBA prompt

— Direct Inward System Access (DISA) through the CCBA prompt

— Tandem calls dialed with Coordinated Dialing Plan (CDP) (Trunk Steering Code, Distant Steering Code) through the CCBA prompt

— Tandem non-CDP calls through the CCBA prompt in the Route Data Block from the outgoing trunk route

When a call is answered by a CCB user, the Meridian 1 sends the CCB answer signal in place of the regular signal for incoming DID/CO calls from the routes with CCB enabled. If the call is a collect call, The CO will disconnect the call.

Operating parameters

The Collect Call Blocking feature supports both analog and DT12 trunks, and the following Intelligent Peripheral Equipment (IPE) cards:

— NTCK 16BB Extended Flexible COT Trunk Card (XFCOT) with firmware flash timing

— NT8D14BA Enhanced Extended Universal Trunk Card (EXUT) containing the Centrex Switchhook Flash function in the firmware

— NT8K14AK Extended Universal Trunk Card (XUT), which may be used if the Centrex Switchhook Flash is configured with software timing

The Collect Call Blocking answer signal can only be sent in cases where answer supervision is provided by the Meridian 1.

Once the modified answer signal is sent to the CO, the Meridian 1 has no control over how the call will be handled by the CO.

If a CCB user answers a call from a CO/DID route with Collect Call Blocking activated, the CCB answer signal is sent to the CO for all incoming DID and CO calls. For analog trunks, the user experiences clicking on the line and a temporary break in speechpath (0.5 to 2.5 seconds) while the CCB answer signal is being sent.

If the XFCOT and EXUT cards do not have flexible firmware timing, the CCB flash portion of the CCB answer signal will be ignored by firmware, and the regular answer signal will be returned to the CO. However, software controlled signaling can be done with EXUT cards.

In a standalone environment, all input from a set (except from the Release key) is ignored while the Collect Call Blocking answer signal is being sent.

Collect Call Blocking is applied to attendants on a customer basis only; it cannot be applied on a tenant basis.

The answer signal returned for a call from a route that is Network Attendant Service (NAS) routed and with CCB enabled is determined by the customer option on the source node. Thus, NAS routing can be configured across any Meridian Customer Defined Network environment, but the source node determines the answer supervision sent to the CO.

Call Detail Recording (CDR) record timing begins on the first answer of the CCB answer sequence. For this reason, CDR records will be generated for incoming calls to CCB users across routes on which CCB is enabled. If the call is collect, and is dropped, a CDR record of approximately CCB1+CCB2 length is generated.

For data calls, all calls will be answered with the CCB answer signal, if CCB is enabled. This may have an effect on data protocols, while CCB signaling is taking place.

If firmware timing is used (FWTM=YES in LD14) for sending the CCB flash, the CCB2 timer is downloaded to the card before sending the firmware flash. If the CCB2 timer is changed in the Route Data Block, either the Card must be enabled or the switch must be initialized to get the new CCB2 timer downloaded to the card.

Call Pickup Network Wide

Operating parameters

Call Pickup Network Wide is not supported over a Virtual Network Services (VNS) or QSIG link.

A Speed Call List must be configured with the PINX DNs of both the local and remote switches.

If two calls are ringing on one singe node at the same time, the call with the higher priority is picked up. But if two calls are ringing on two nodes at the same time (one call on each node), the call on the node searched first will be picked up (i.e., a normal ringing call on the local node is picked up before a ringing set on a remote node).

DPNSS Executive Intrusion

Functional description

A station (the originating party) tries to reach a station (the wanted party), but receives busy treatment because a call is already established between the wanted party and a station called the unwanted party.

Executive Intrusion allows the originating party to break into the established call under certain circumstances. If intrusion succeeds, a conference takes place on the wanted node between the originating, wanted and unwanted parties.

Conditions for intrusion success are basically comparisons between the Intrusion Capability Level (ICL) of the originating party and the Intrusion Protection levels (IPL) of the wanted and unwanted parties.

The Meridian-1 implementation provides Executive Intrusion from Attendant Consoles. Executive Intrusion from Telephone Sets is not supported. However, a Meridian 1 PBX will accept an EI activation request from an ordinary set on a third party PBX.

Electronic Lock Network Wide

The Electronic Lock feature allows a set (station) user to “lock” a set to disallow unauthorized use of the telephone. This is done by changing the Class of Service to the restriction level defined in the Customer Data Block (CCRS). The user can toggle the set between lock and unlock. Unlocking a set returns the Class of Service to the level that was originally defined (in Overlay 10/11).

Functional description

The set may be locked/unlocked from:

— the set to be (un)locked—by dialing an appropriate Flexible Feature Code (ELKA/ELKD FFC), followed by the set's Password

— a set other than the one to be (un)locked—by dialing the ELKA/ELKD FFC, the Password of the set to be (un)locked, and its DN

Locking/unlocking can only be done from within the same customer, and not network-wide.

The current implementation of the feature does not affect the Private DNs, i.e. calls can be made on private DNs even if the set locked.

Network Operation

In the Network operation mode (the present enhancement of Electronic Lock), the feature may be activated/deactivated also from a node of the MCDNISDN network, other than the node the set to be (un)locked belongs to, by dialing the ELKA/ELKD FFC, the Password of the set to be (un)locked and the digits he would dial to ring the set to be (un)locked (i.e. the network DN).

Since the password length of the destination node is not known at the originating site, the SCPL must be defined the same all over the network. If the originating node has the FFCT option selected, a confirmation tone will be given when the feature is successfully activated or deactivated. If the network lock/unlock operation is unsuccessful, overflow tone is given and the set's previous state remains unchanged.

There is no specific FFC Verify code for ELCK. To verify the locking/unlocking of the set, the user must activate/deactivate the feature by using ELKA/ELKD FCC. If the operation is successful, confirmation is given that the set is locked/unlocked.

Modified Network Class of Service

A new prompt, CNCS, is added to overlay 15 to select the Controlled Network Class of Service. When the locked set makes an outgoing trunk call, if CNCS is defined, the NCOS defined by CNCS is used instead of the NCOS of the locked set defined in overlay 10/11 when selecting the outgoing trunk. If network signaling is configured for the trunk which would usually transmit the set's NCOS between ESN network nodes, the CNCS is transmitted instead of the NCOS. This feature does not modify the network signaling feature other than to substitute the CNCS for the NCOS if the set us locked.

Modifying the NCOS of a locked set using CNCS, although intended for network use, can be used to better control the locking of sets by changing the NFCR restrictions instead of the “all or nothing” effect of just changing the class of service. This would require the CCRS to be TLD or CTD.

Electronic Lock on Private Lines

This feature introduces a new prompt in the customer data block, PELK (Private Electronic Lock). With the implementation of this feature, an attempt to make an outgoing call on a private line of a locked set when PELK=YES will be subject to the same restrictions as all the other DNs on the telephone. Attempts to make restricted calls on a private line of a locked set will receive the same intercept treatment as would a regular DN key.

The restrictions for private lines (and all other DN Keys) are by the Controlled Class of Service (CCRS) and by the Network Controlled Class of Service (CNCS), if CNCS is defined. Thus for outgoing calls, class of service restrictions and/or NFCR restrictions will apply all to private line keys on locked sets.

The route data block overlay programs (16 and 21) are modified to enable the system administrator to define/print the NFCR definitions (FRL) for private routes.

Electronic Lock on Private Lines only locks outgoing calls. Incoming calls are not affected; incoming private line calls still terminate on a set, regardless of its locked state.

There is no change in the way that the electronic lock is configured or dialed.

The class of service (COS,NCOS) of a non-locked set has no affect on private lines.

If PELK is NO, private lines DNs operate as they did prior this feature's implementation.

Line Disconnect

The 500/2500 Line Disconnect functionality was developed for incoming calls in Release 17. This feature provides the same functionality for outgoing calls as well. With this feature, both incoming and outgoing calls are supported. This feature enhancement provides the same functionality for outgoing calls.

Functional description

When Meridian 1 detects an on-hook/disconnect supervision signal from a party on an answer supervised trunk connected to a 500/2500 port with the class of service (LDTA), dialtone is sent to this 500/2500 port for the duration specified in the customer data block. Dialtone is currently used in central offices as a disconnect signal. This is particularly useful in applications where the 500/2500 port is connected to some sort of Automated Dialing equipment. The dialtone is a signal for this device to disconnect itself and the line port as well. Dialtone is only given to a 500/2500 port with the Class of Service LDTA at disconnect of a simple call. If an ADE/VRU is involved in a conference for example, and one of the other parties disconnect, dial tone will not be given since there is still one or more parties connected to this call. When the last party (other than the VRU/ADE) disconnects then the dial tone will be applied.

This product enhancement applies to any outgoing call that is connected to a 500/2500 port with LDTA class of service (Line Disconnect Tone Allowed). Together with the previously developed feature 500/2500 Line Disconnect for incoming calls, this capability will now operate for all calls that involve a 500/2500 line port with the Class of Service LDTA.

Dialtone duration is already defined in the Customer Data Block as an existing timer, (e.g. LDTT-Line Disconnect Tone Timer) as it was part of the development of the 500/2500 Line Disconnect Feature for incoming calls in X11 Release 17. This enhancement will use the same timer. The default time is set to 6 seconds, the minimum time can be set to 2 seconds and the maximum time to 30 seconds. After dialtone is provided for the specified duration, the port will be in line-lockout mode. Line lockout will be changed to idle upon receipt of an on-hook signal from the ADE. If no on-hook signal is received, the port could be locked up indefinitely.

Series Call

The Series call feature provides the capability to have calls recall to the attendant upon disconnect of the terminating internal party. This feature is packaged with the “SUPP” package.

Functional description

Series Call enables the attendant to mark a call as a Series Call by pressing the new SECL key on the attendant console while dialing, ringing, or talking to the external party. When the (internal) destination party disconnects, the source party returns to the attendant (the same attendant if RTSA is configured) on the RECALL ICI with the SECL key lit. The attendant can then extend the call to another party, canceling the series call by pressing the key if desired.

Multi-Party Operations

Functional description

Multi-Party Operations consists of a number of features as described in this section, namely

— Call Join

— Three Party Service

— Three Party Service Timer Option

— Control Connection Disconnect Option

— Recovery on Mis-operation of Call Transfer

— Ignore Switch Hook Flash from 500/2500 Set

— Forced Register Recall from 500 Set

— Manual Return after Enquiry

Call Join

Call Join applies to all SL-1 sets (regardless of COS) that are equipped with a Conference-3/6 key, and at least one secondary DN or Call Waiting key. This feature allows the CP to conference-in a party held on his or her set to the active call, transfer the active party to an HP by forming a conference, and then disconnect.

Three Party Service

Three Party Service applies to 500/2500 sets with Three party Service Allowed (TSA) COS. 500/2500 set operation is not changed for "XFD" or "XFA" Classes of Service. During a normal two-party call, the CP can place the established call on hold and originate another call. After the second call is established, the CP can dial a Programmable Control Digit (which can take the values CNFD, TGLD and DISD) to:

— Form a three-party conference between the CP, held, and active parties and if the CP wishes, transfer the AP to the HP by forming a three-party conference and then disconnecting. (Control Digit =CNFD)

— Exchange the active and held calls (Control Digit=TGLD)

— Release the active call and reconnect the held call. (Control Digit=DISD)

The Control Digit is programmed in Overlay 15 (CDB). The default values for CNFD,TGLD and DISD are 1,2,3 respectively.

Three Party Service Timer Option

A timer is provided on a customer basis to control the reconnection of HP or AP to CP when CP does not enter the control digit within the specified time. The timer is specified by programming the CDTO prompt in Overlay 15 (CDB) with a value in the range 2-12 seconds. The CDTO has the default value of 14 seconds.

If CDTO has the non-default value and CP does not enter the control digit, and, if MHLD is yes, then silence is given to CP. When user recalls, AP is released and HP is reconnected to CP. Instead, if MHLD is no, then AP is released immediately, and HP is reconnected with CP.

If the user selects either the default option (14 seconds) or enters "14" seconds, then, if a control digit is not entered within CDTO expiry, the overflow tone is given to the user. If CP recalls, then AP is reconnected to CP with HP on hold. If overflow tone times out, MPO action is determined by MHLD option: If MHLD is yes, silence is given to CP, and when the user recalls AP is reconnected to CP. If MHLD is no, then AP is reconnected to CP immediately.

Control Connection Disconnect Option

An option (CCDO) is provided to control the behavior of MPO when any of the parties in the consultation call disconnect. This option is programmed in Overlay 15 (CDB).

Conference-6

If MPO package is enabled, then Conference-6 is available from 500/2500 sets with the combination of TSA and existing C6A COS's. This feature is an extension of Three Party Service which allows the CP to build a conference of up to six parties by consulting and selectively adding members through the use of Control Digits.

Recovery On Mis-operation Of Call Transfer

The "Recovery on mis-operation of Call Transfer" feature provides protection against having outside calls lost due to mis-operation of the "Call Transfer" feature. A mis-operation call occurs whenever the transferring party attempts to complete a transfer before the called party answers.

MPO recognizes two types of mis-operations:

— Mis-operation of Call-Transfer on Ringing with No Answer (RGNA)

— Mis-operation of Call-Transfer for All Other Cases

Mis-operation of Call-Transfer on RGNA

Mis-operation of Call-Transfer on RGNA occurs when the transferring party attempts to complete the transfer while receiving ringback or call waiting tone.

If a station user (SL-1, 500, or 2500 set) transfers a call to an idle station, or a busy station with either Call Waiting (CWA) COS (500/2500 set) or with Call Waiting (CWT) Key lamp (SL-1 set), in the ringing state, then the transferring party receives Ringback Tone while the called station is ringing if it is idle. If the called set (500/2500) is busy but has CWA COS, then it hears Call Waiting Tone. If the called set (SL-1) is busy on a DN Key but has a CWT Key Lamp, then the called party hears CWT key ringing and Lamp flashing. If the user completes the call transfer operation in this case (by pressing the CALL TRANSFER key at the SL-1 set, or by doing on-hook at the 500/2500 set while the called party is still ringing), then mis-operation (RGNA) is detected.

Mis-operation of Call-Transfer for All Other Cases (AOCS)

When a 500/2500 set attempts to complete a transfer in one of the following scenarios, operation is treated as AOCS:

— Call-transfer while dial tone is being heard

— Call-transfer before completing dialing

— Call-transfer during outpulsing of digits on a trunk

— CP goes on-hook during consultation connection (“CCDO=NO”)

— CP goes on-hook during control dial tone

— Call-transfer to intercept treatment for:

- Call-transfer to busy station with CWD (500/2500) or no CWT KEY (SL1)
- Dialing a vacant number
- Terminal is in maintenance busy
- RPE failure state
- Access denial;
- Code/Toll restricted set
- Network blocking
- Invalid, invalid translation, restricted or blocked NARS/BARS calls
- Partial dialing
- Trunk-to-trunk connection restrictions
- Inter-tenant blocking
- During reception of announcements
- During reception of tones (Control, special)

The Recovery options are specified for both RGNA and ACS cases in Overlay 15 (CDB) when MPO package is equipped. You can specify separate treatment for external and internal calls.

Ignore Switch Hook Flash from 500/2500 Set Option

It is optional on a customer basis whether or not to ignore a Switch Hook Flash (IFLS) from a 500/2500 set. This eliminates the confusion between a flash signal and a dial "1" signal on 500 sets, especially when 500 sets have been given DTN Class of Service. If the flash is to be ignored, 500/2500 sets should have a Ground Button in order to use those features which require a Register Recall Signal (an action taken by the user which puts the set in a dialing state).

Forced Register Recall from 500 Set Option

The Forced Register Recall (RALL) option is provided on a customer basis and specifies whether a Register Recall is required on 500 sets before dialing control digits. If the system does not require a Register Recall from 500 sets, then a Switch Hook Flash is interpreted as a dial "1" (default "CNFD") causing that control digit assignment to be activated.

Option RALL is specified in Overlay 15 (CDB). Table 19 shows the allowed values of RALL for 500/2500 sets:

Table 19
Allowed values of RALL

	DTN COS	DIP COS
500 Set	Yes, No	Yes, No
2500 Set	Yes	Not Applicable

Manual Return after Enquiry Option

When a 500/2500 user places a party on hold by using register recall, the user receives SDT followed by Overflow tone. During this period, the HP is listening to silence or recorded announcement, if it is equipped. The Manual Return after Enquiry (MHLD) option controls the way the HP is reconnected to the CP. If MHLD=NO (default), then the CP is automatically reconnected to the HP after the overflow tone timeout. If MHLD=YES, then the CP receives silence indefinitely after the overflow tone timeout until a second recall is performed to retrieve the HP. There is no automatic reconnection of the HP. The CP may manually return to the HP by performing a second recall during Special Dial Tone, Overflow Tone, or during the silence period.

Glossary

ACD

Automatic Call Distribution

ADO

Asynchronous Data Option

ATA

Analog Terminal Adapter

CCOS

Controlled Class of Service

CPND

Calling Party Name Display

DCE

Data Communications Equipment

DLC

Digital Line Card

DN

Directory Number

DSIC

Digital Set Interface Chip

DTE

Data Terminal Equipment

EIA

Electronic Industries Association

FCC

Federal Communications Commission

IDF

Intermediate Distribution Frame

ISDLC

Integrated Services Digital Line Card

LCD

Liquid Crystal Display

LED

Light Emitting Diode (lamp)

MDF

Main Distribution Frame

MPDA

Meridian Programmable Data Adapter

MCA

Meridian Communications Adapter

PCM

Pulse Code Modulation

TN

Terminal Number

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Meridian 1

Meridian 1 telephones

Description and specifications

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Publication number: 553-3001-108
Document release: Standard 8.00
Date: June 1999
Printed in the United States of America

NORTEL NETWORKS™