Meridian 1

Meridian 1 Telephones
Description and Specifications

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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.

Contents

Preface

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described is supported in your area.

This guide provides feature, add-on module, and specification information for the following telephones and data options:

- M2000 Series Meridian Digital Telephones

- M2317 Telephone

- M3900 Series Meridian Digital Telephones

- MCA, MCU and ATA

Other documentation

For more information, refer to the following documentation:

- *Digital Telephone Line Engineering* (553-2201-180)

- *Meridian Communications Unit and Meridian Communications Adapter: Description, Installation, Administration, Operation* (553-2731-109)

- *Spares Planning* (553-3001-153)

- *Equipment Identification* (553-3001-154)

- *Line Cards: Description* (553-3001-105)

- *Telephone and Attendant Console: Installation* (553-3001-215)

- *M3900 Series Meridian Digital Telephones: Description, Installation, and Administration* (553-3001-216)

- *X11 Features and Services* (553-3001-306)

- *X11 Administration* (553-3001-311)

- *Asynchronous Data User Guide*

- *M2317 Quick Reference Card*

- *Meridian Digital Telephones: M2006, M2008/M2008HF, M2616 User Guide*

- *M2216ACD Telephone User Guide*

- *Meridian Digital Telephones and Options: M2006, M2008/M2008HF, M2616, M2216ACD, M2016S Secure Set Quick Reference Guide*

- *Meridian Programmable Data Adapter User Guide*

- *Meridian Communications Adapter User Guide*

- *Installing the Analog Terminal Adapter*

- *Analog Terminal Adapter Quick Reference Card*

M2000 Series Meridian Digital Telephones

Content list

The following are the topics in this section:

Reference list

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• *Digital Telephone Line Engineering* (553-2201-180)

• *Equipment Identification* (553-3001-154)

• *Telephone and Attendant Console: Installation* (553-3001-215)

• *X11 Features and Services* (553-3001-306)

• *X11 Administration* (553-3001-311)

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

Functional description

This section provides feature and software requirement information for the M2006, M2008, M2008HF, M2616, M2016S, and M2216ACD digital telephones.

> *Note:* There are three distinct versions of M2000 Series Meridian Digital Telephones—all three 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 telephone. The three versions are the "NTZK" models, the "NT2K" models with date code prior to April 24, 1998; and the third version includes both the "NT9K" models and the "NT2K" models with date code of April 24, 1998 and later. In addition, the two jacks face in the same direction on "NT2K" and "NT9K" telephones, and in opposite directions on "NTZK" telephones. When appropriate, differences between the models are noted in this document.

M2000 Series Meridian Digital 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.

M2000 Series Meridian Digital 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 M2000 Series 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

M2000 Series Meridian Digital 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

Switchook

Brandline insert

Speaker

Message Waiting lamp

Rls key

Hold key

Function keys and LCDs

DN

Volume control

553-1850

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)
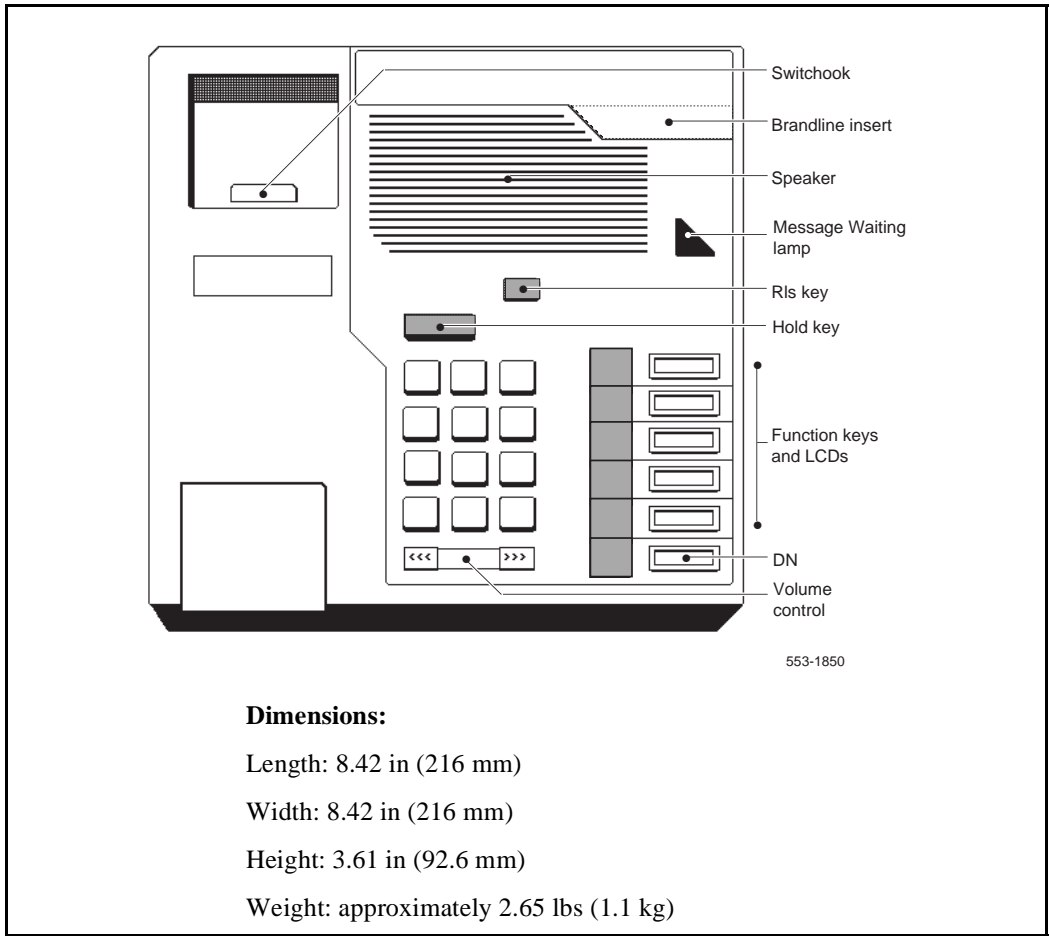
Figure 2
M2008/M2008HF telephone

Filler plate

Brandline insert

Speaker

Message Waiting lamp

Switchook

Rls key

Hold Key

Function keys and LCDs

Volume control

Prime DN

553-1851

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)
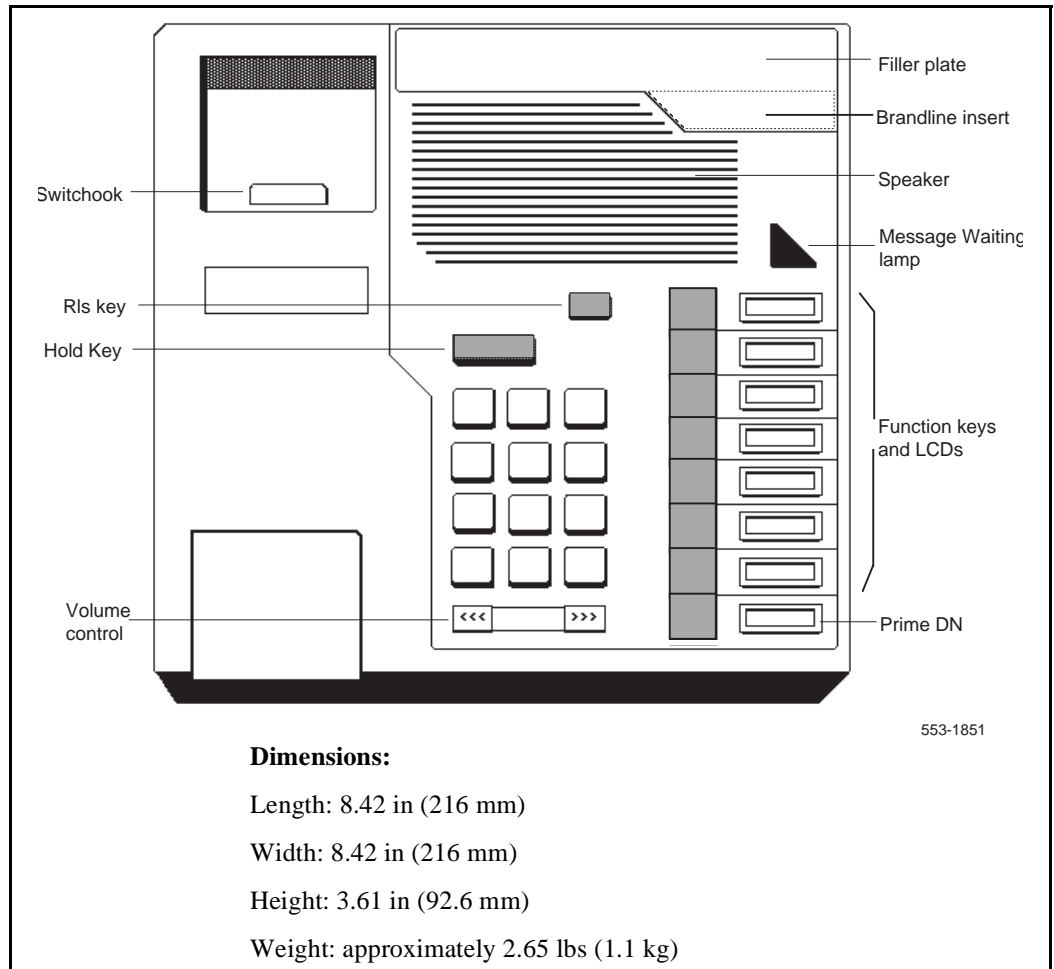
M2016S—a secure telephone (Security Group Class II approved TSG-210291030), designed to provide on-hook security. It is similar to the M2616, with 16 programmable function keys, but has no Handsfree capability. The M2016S uses relay circuitry that physically disconnects the handset from the telephone 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.

Figure 3
M2616 and M2016S telephones

553-1853

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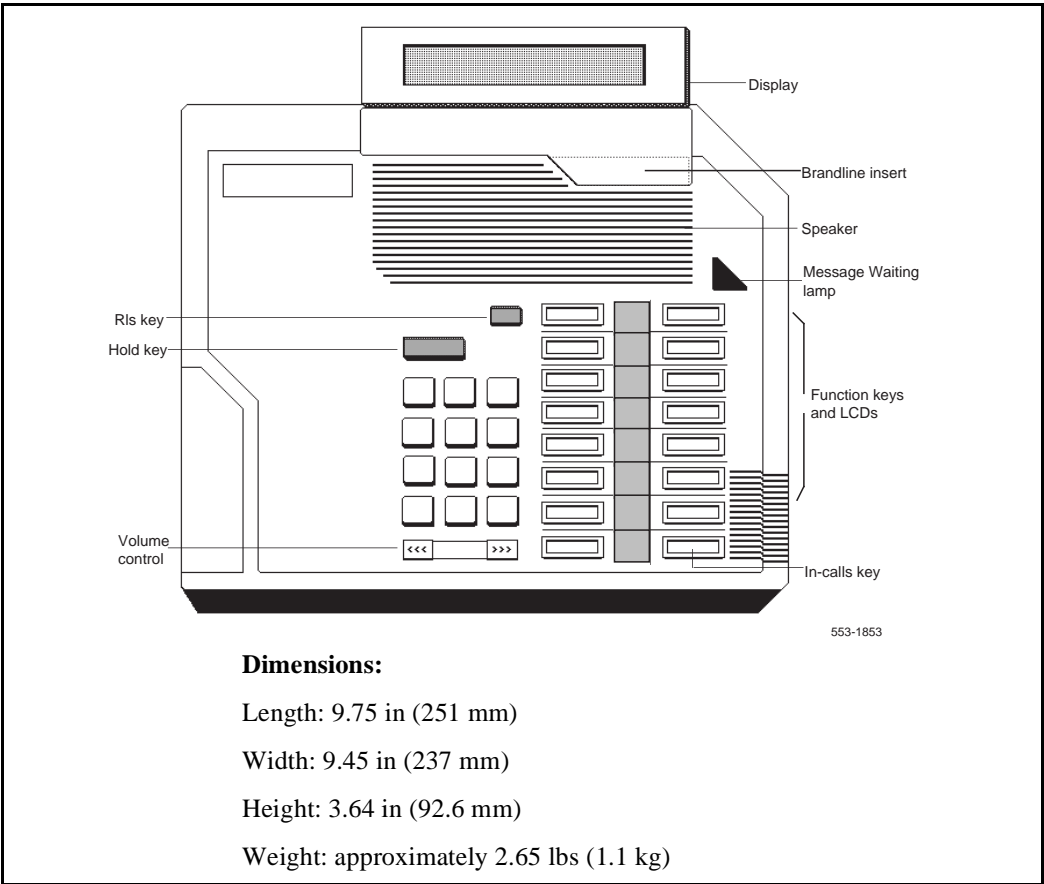
M2216ACD-1—a multi-line telephone for ACD operations See Figure 4. It has 15 programmable function keys, the Special Applications Display module, and two RJ-32 jacks for modular electret headsets. See Figure 5.

Figure 4
M2216ACD-1 and -2 telephones

553-1853

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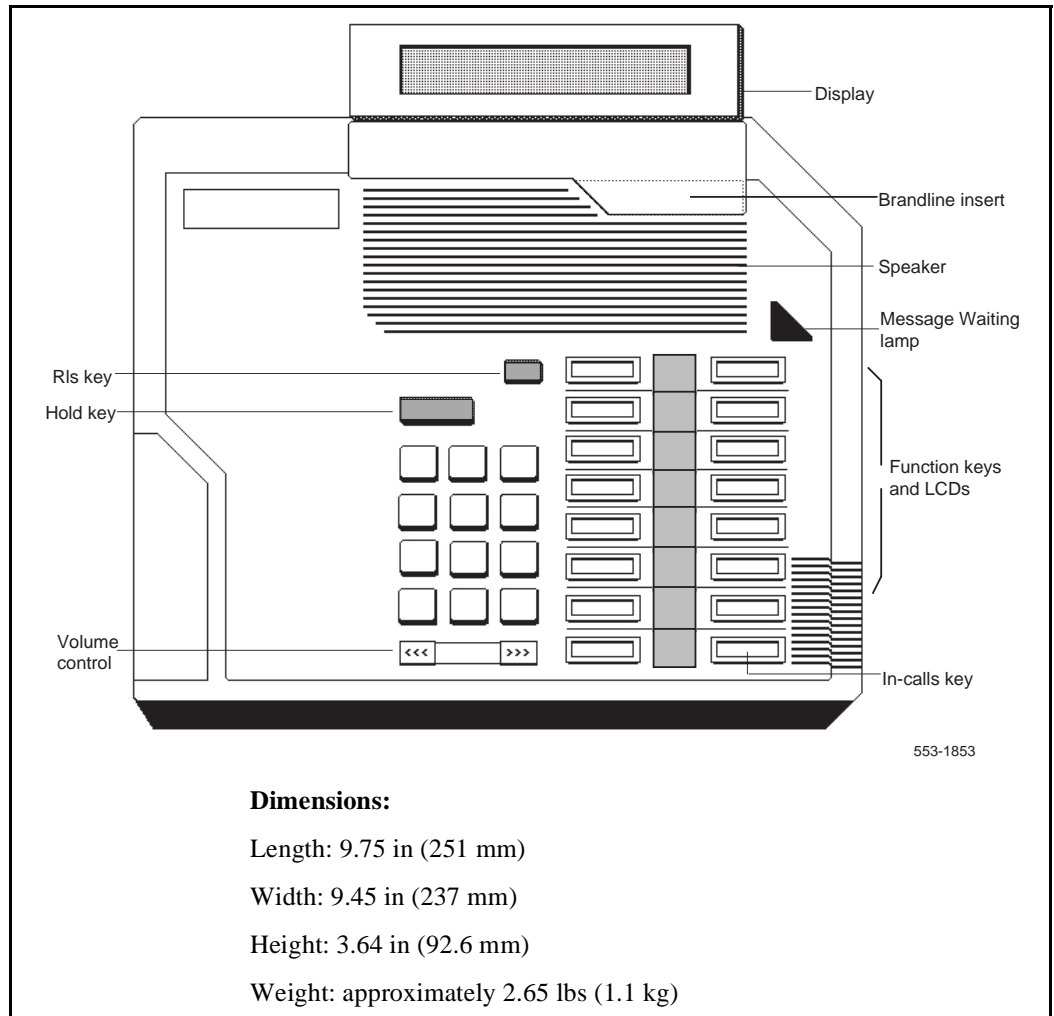
M2216ACD-2 (retired)— a multi-line telephone for ACD operations. It has 15 programmable function keys and the Display module. It is similar to model 1, but with one PJ-327 jack for a carbon agent headset and one RJ-32 jack for an electret supervisor headset. See Figure 5.

Figure 5
M2216ACD-1 and -2 left side showing headset jacks
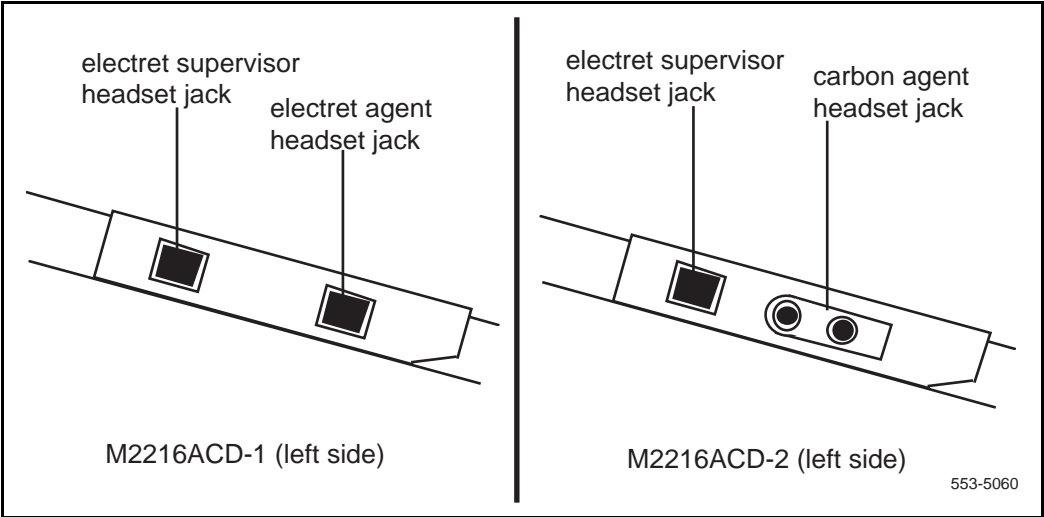
Note: If headset is desired, the amplified type is strongly recommended.

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 an M2000 Series Meridian Digital 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 M2000 Series Meridian Digital 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 M2000 Series Meridian Digital 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 Administration* (553-3001-311).

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 introduced 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 M2000 Series Meridian Digital 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 85 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 85 for more information on the MPDA and MCA.

Software requirements

M2000 Series Meridian Digital Telephones are supported by X11 release 14 and later software. The option number for the M2000 Series Meridian Digital 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 M2000 Series Meridian Digital 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 85 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 M2000 Series Meridian Digital 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 85 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 32.

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 M2000 Series Meridian Digital 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 39. The expansion module may require additional power. See "Power requirements" on page 32.

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

553-1857
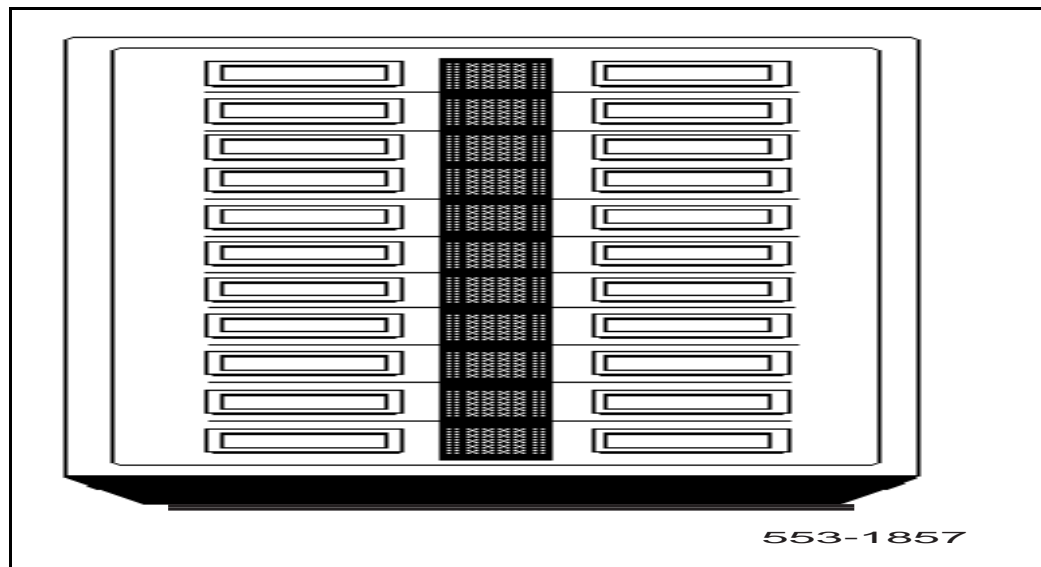
M2000 Series Meridian Digital Telephone relocation

This section describes how to relocate an M2000 Series Meridian Digital Telephone and its associated dataport Terminal Number (TN) without the intervention of a craftsperson.

Modular Telephone Relocation is designed specifically for the M2000 Series Meridian Digital Telephones 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 M2000 Series Meridian Digital Telephone 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* (553-3001-306) for complete details.

How to relocate an M2000 Series Meridian Digital 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 M2000 Series Meridian Digital 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 M2000 Series Meridian Digital Telephones by software controlled adjustments in the system. See *X11 Administration* (553-3001-311). 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

M2000 Series Meridian Digital 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 M2000 Series Meridian Digital 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 4 lists the types of M2000 Series Meridian Digital 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, M2000 Series Meridian Digital 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, M2000 Series Meridian Digital 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 4 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 M2000 Series Meridian Digital Telephone into the RJ-11 transformer adapter, as damage to equipment may result.

Figure 7
Configuration of local plug-in transformer
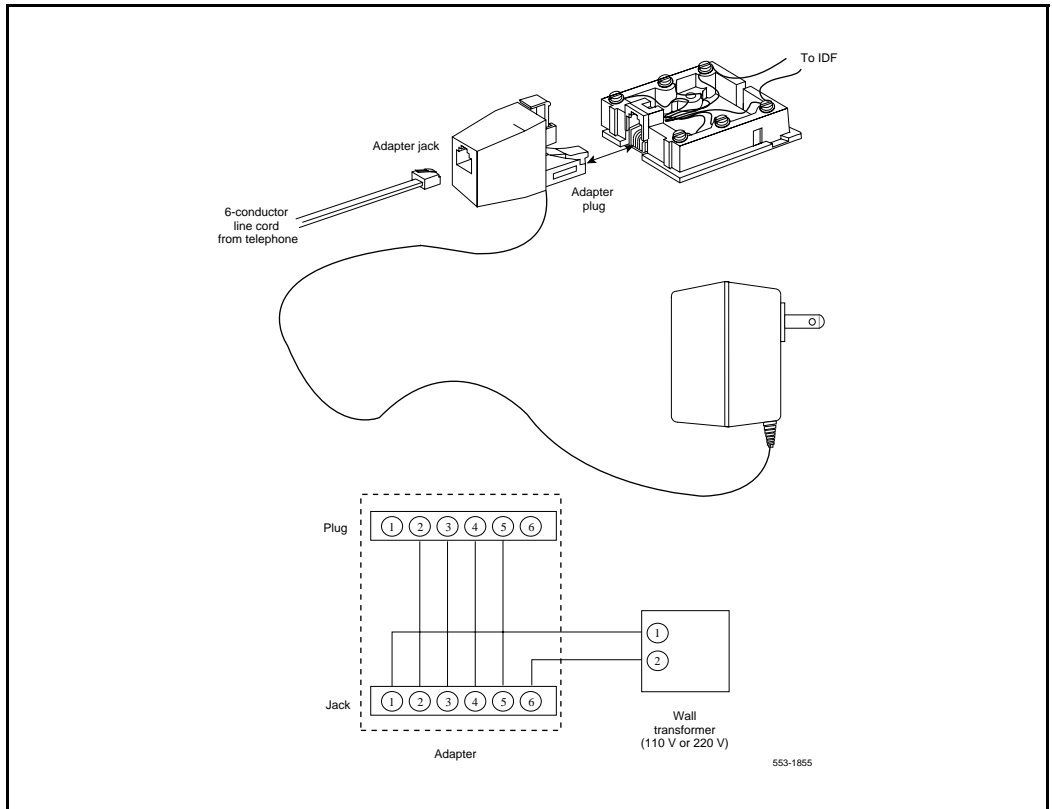
120 V transformer (AO367335 or equivalent) The following minimum specifications must be met by this transformer:

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 M2000 Series Meridian Digital 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 M2000 Series Meridian Digital 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
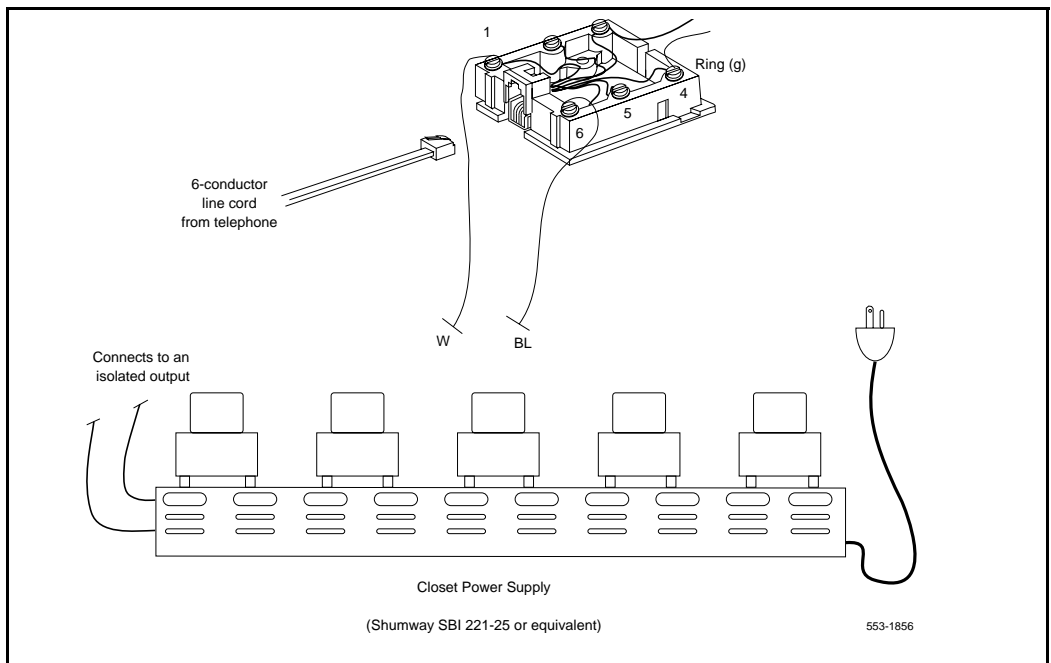
Handsets

This section provides ordering information for M2000 Series Meridian Digital Telephone handsets.

Table 5
Order codes for new handsets for M2000 Series Meridian Digital 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 M2000 Series Meridian Digital 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 Nortel Networks price book, or contact your Nortel Networks representative for specific ordering codes.

Table 1, "Hardware features and options," on page 24 lists the hardware options that you can purchase separately.

For ordering configurations for M2000 Series Meridian Digital Telephones and accessories, see the current price book.

See *Equipment Identification* (553-3001-154) for more information.

M2317 Telephone

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *Digital Telephone Line Engineering* (553-2201-180)

- *M2317 Quick Reference Card*

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 9 shows the M2317 telephone.

Figure 9
M2317 telephone

553-5852
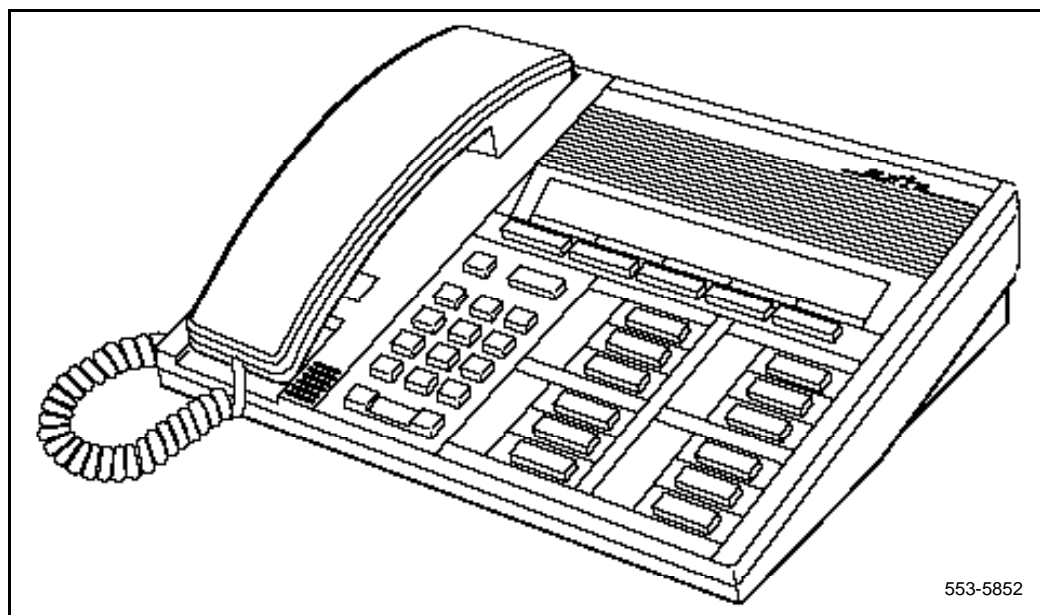
Physical characteristics

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.

Keys

The M2317 telephone is equipped with 17 feature keys (see Figure 10) 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 Quick Reference Card*.

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.
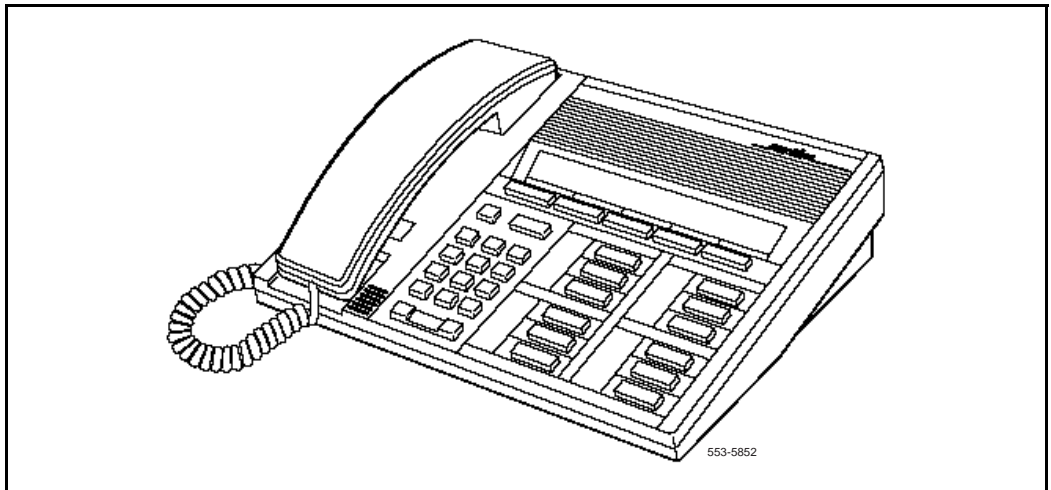
Figure 10
M2317 telephone—key identification
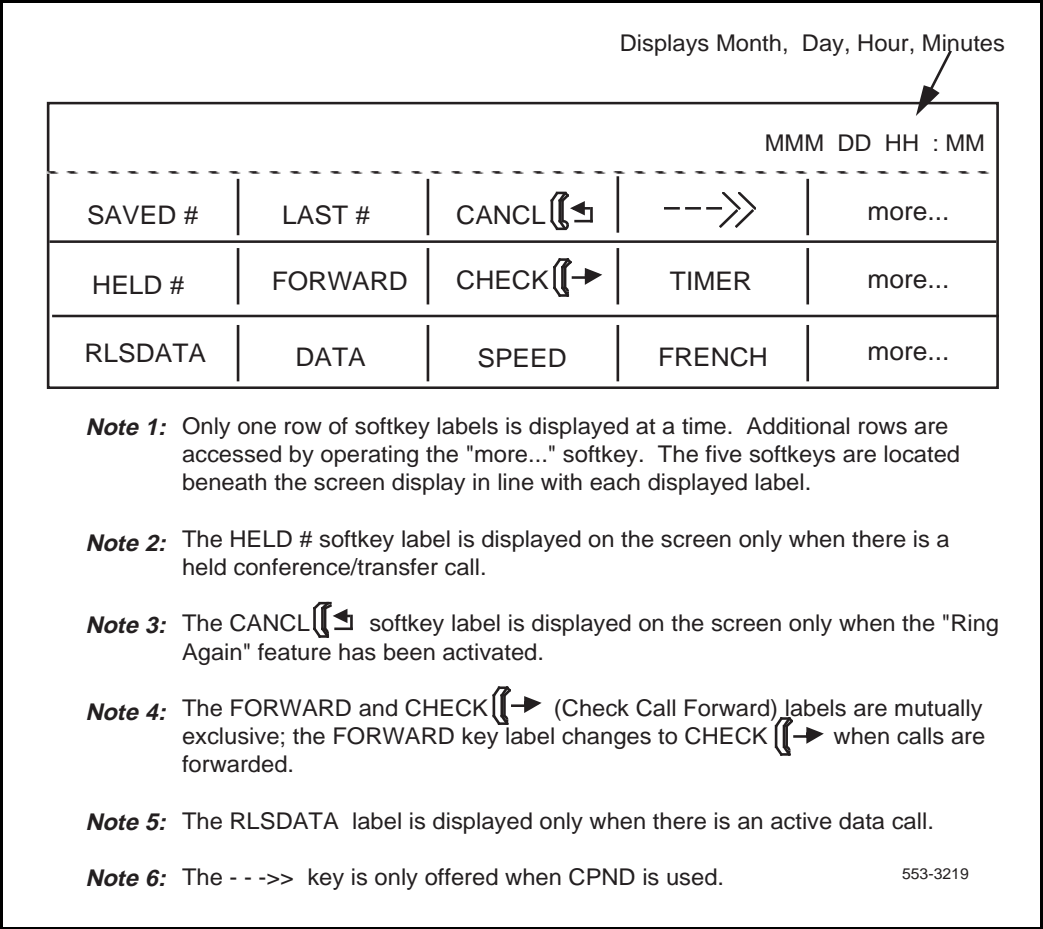
Figure 11
M2317 screen display—available idle state features

Displays Month, Day, Hour, Minutes

MMM DD HH : MM

SAVED #	LAST #	CANCL	---》	more...
HELD #	FORWARD	CHECK	TIMER	more...
RLSDATA	DATA	SPEED	FRENCH	more...

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 "Ring Again" feature has been activated.

Note 4: The FORWARD and CHECK (Check Call Forward) labels are mutually exclusive; the FORWARD key label changes to CHECK when calls are 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 12
M2317 screen display—dial tone state

Displays Month, Day, Hour, Minutes

				MMM DD HH : MM
SAVED #	LAST #	CALL	SPEED #	more...
MESSAGE	PICKUP	ACCOUNT		more...

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

553-5101
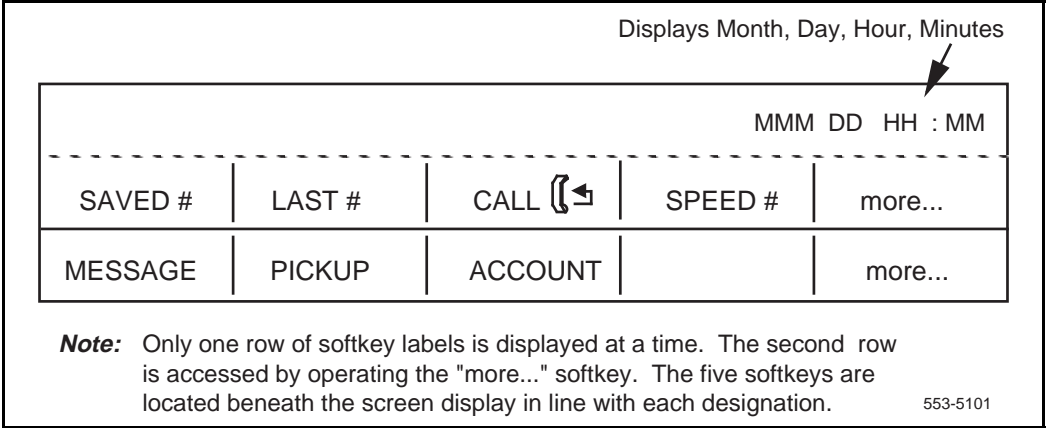
Figure 13
M2317 screen display—dialing state

Displays Month, Day, Hour, Minutes

3				MMM DD HH : MM

553-5102

Figure 14
M2317 screen display—ringback state

Displays Day, Month, Hour, Minutes

Calling
Party
(Ringback
screen)

3021				DD MMM HH : MM
SAVE #				

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

553-5103

Figure 15
M2317 screen display—available established state features

Elapsed Timer (Hours: Minutes : Seconds)

3021				H : MM : SS
CONFER	TRANSFR	TIMER	SAVE #	more...
---≫	PARK	PRIVREL	CHARGE	more...
VMSG				more...

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 7 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 7
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 7
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 7
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 85 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 8 lists the data features supported by the M2317 firmware.

Table 8
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 85 for more information on ADO requirements.

Figure 16
M2317 telephone cross-connections
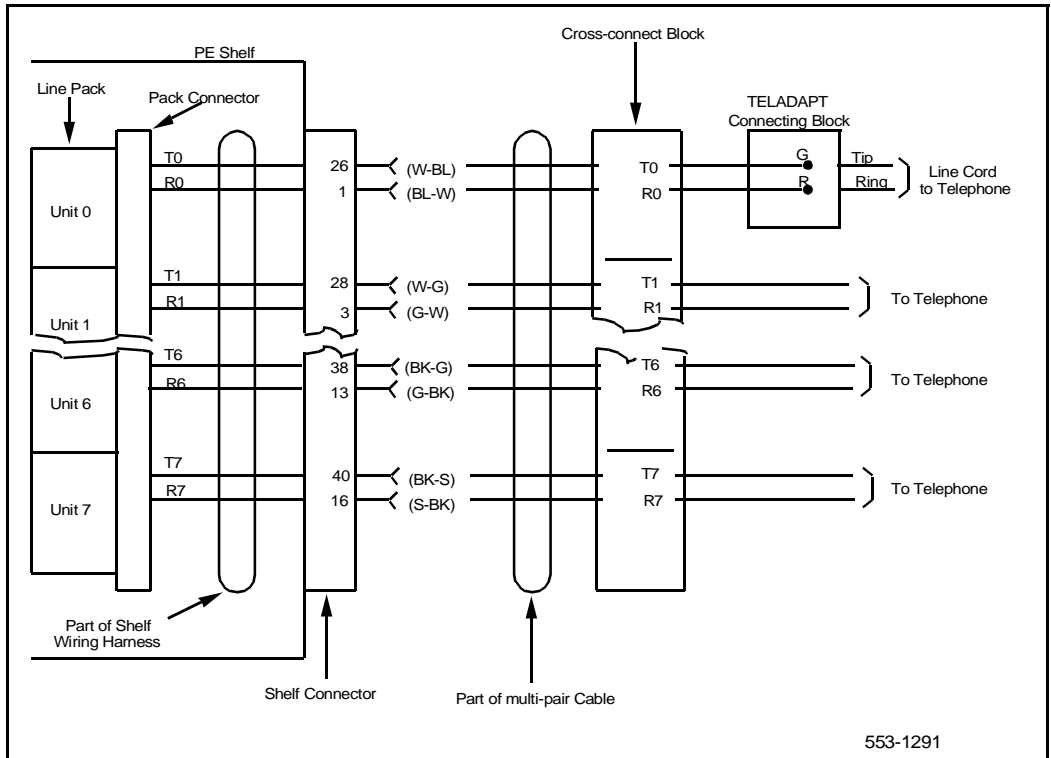
Ordering information

This section provides ordering information for the M2317 telephone. Refer to the Nortel Networks price book or contact your Nortel Networks 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).

M2616CT (Cordless Telephone)

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *Digital Telephone Line Engineering* (553-2201-180)

- *X11 Administration* (553-3001-311)

- *M2616CT Cordless Telephone User Guide*

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 programmable 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*.

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.

Figure 17
M2616CT Base Unit
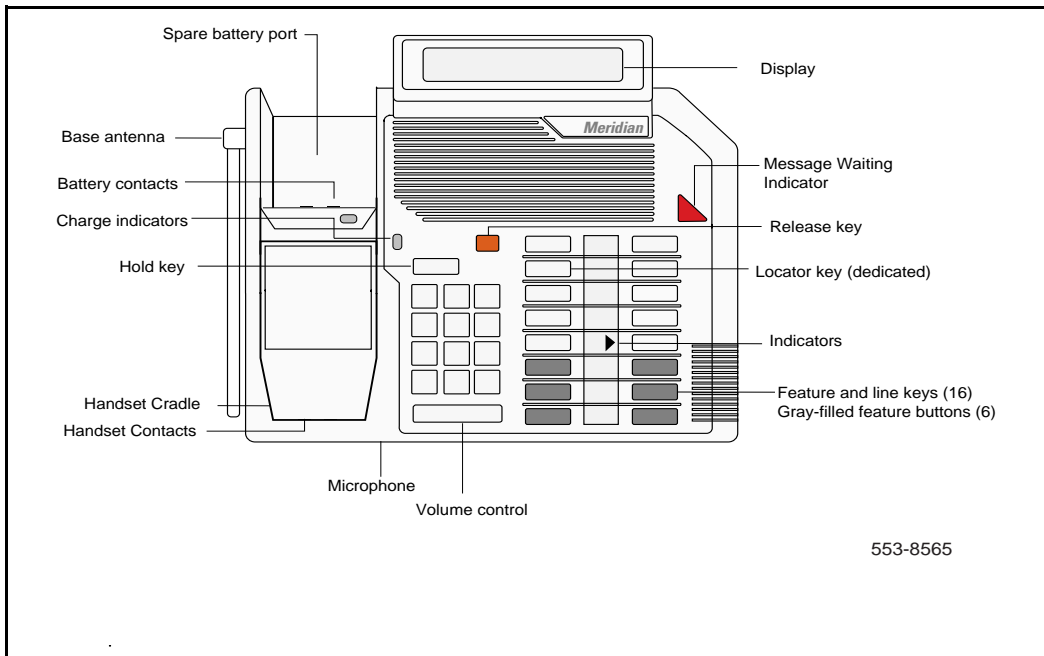
Base Unit Controls

- 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 <u>Charge indicator</u> 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 <u>Diamond indicator light</u> appears beside active lines and features.

- The <u>Locator key</u>, locates the handset/manual Radio Frequency mode (if feature is assigned).

- The <u>Volume bar</u> controls the volume of the handset, speaker, and ringer.

- The <u>Microphone</u> 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 <u>Release key</u> terminates an active calls

- The <u>Message Waiting indicator light</u> indicate that a voice mail message has been left for you.

Figure 18
M2616CT Handset

553-8569
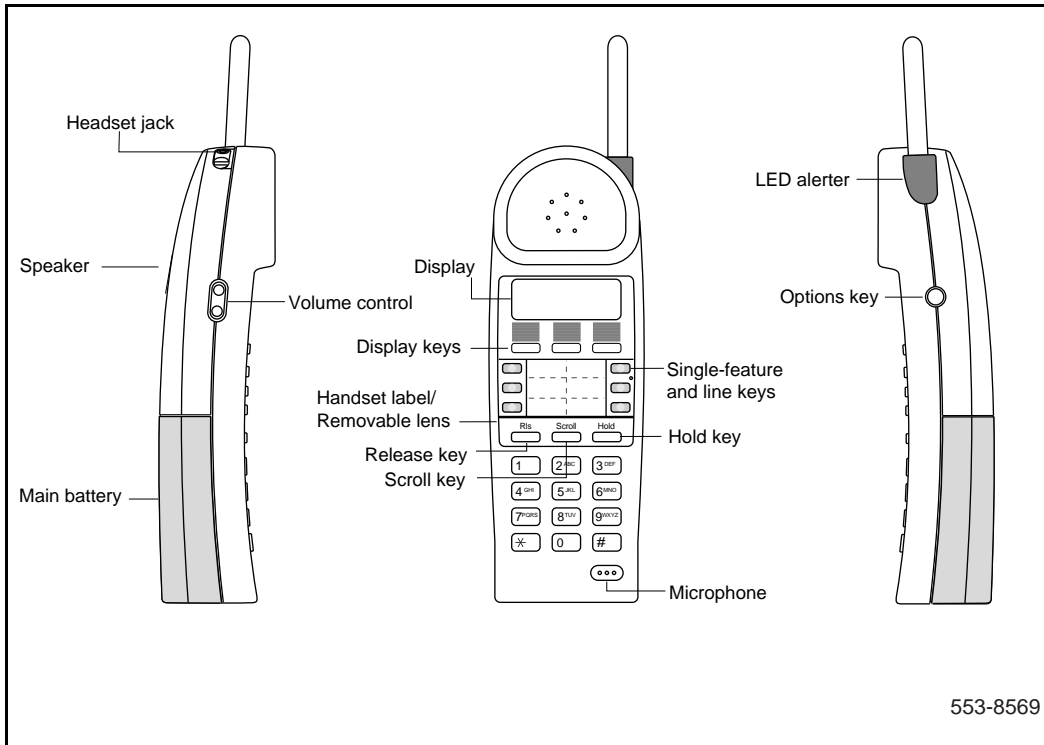
Handset Controls

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

- The <u>Handset labels</u> allows you to personalize the feature keys.

- The <u>Headset jack</u> connects the detachable headset unit. Check with your Nortel Networks representative for authorized headset vendors.

- The <u>Hold key</u> places an active call on hold.
  The <u>Options key</u> 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 Networks 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 <u>Release key</u> terminates an active call.

- The <u>removable lens</u> protects the handset labels.

- The <u>Single-feature and line keys</u> 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 <u>Scroll key</u> displays additional information in the display window.

- The <u>Volume control</u> adjusts the volume on ring and alerter tones.

- The <u>LED alerter</u> provides visual ringing indicator and message waiting indicator.

- The <u>Speaker</u> allows you to listen to voicemail without holding the handset.

- The Handset automatically goes into <u>Sleep Mode</u> 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 Administration* (553-3001-311), 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*.

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*.

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.*

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 alerter 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.

Table 9
M2616CT 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 Nortel Networks price book or contact your Nortel Networks 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 Meridian Digital Telephones

The M3900 Series Meridian Digital Telephones provide versatile functionality to the desktop environment. The M3900 Series consists of 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 Telephones refer to *M3900 Series Meridian Digital Telephones: Description, Installation, and Administration* (553-3001-216).

i2004 Internet Telephone

Content list

This section explains the following topics:

Reference list

This section refers to the *Meridian Internet Telephony Gateway (ITG) Line 2.0/i2004 Internet Telephone Description, Installation, and Operation* (553-3001-204)

Functional description

This section describes the features, keys, options, software requirements and more functional details that describe the i2004.

General features

The i2004 supports most of the combination features and DN types that are supported on the M2616 telephone, except for Distinctive Ringing and DN-Based Message Waiting features (see "M2000 Series Meridian Digital Telephones" on page 11). The total number of features and DNs for any specific i2004 Internet Telephone cannot exceed six assigned to the programmable keys, plus the ten predefined features assigned to the softkeys. The Meridian 1 downloads the soft key labels. Any changes made in the Meridian 1 configuration are reflected immediately in the key labeling. DN keys are labeled with the DN number without the ESN location code.

The i2004 Internet Telephone supports features through Fixed Feature/Service keys and self-labeled Programmable Line/Feature keys.

Figure 19 identifies the i2004 Internet Telephone Fixed Feature/Service and soft keys.

Figure 19
i2004 Internet Telephone
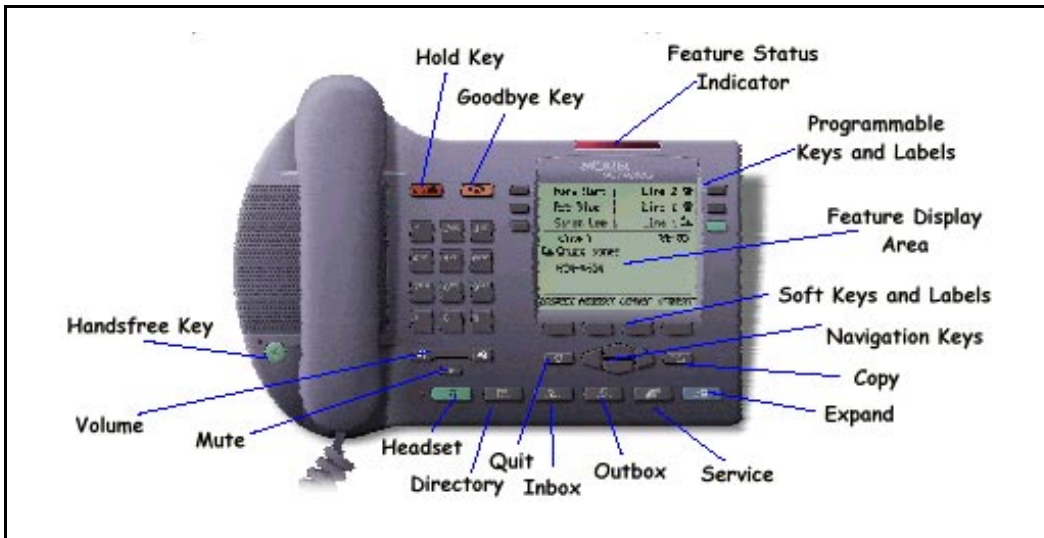
Fixed Feature/Service key description

The fixed feature/service keys are permanently labeled keys that provide quick access to commonly used features. Table 1 describes the Fixed Key icons.

Table 1
i2004 Internet Telephone fixed key icon description (Part 1 of 2)
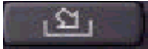
Icon Label	Description
	The Hold key allows the user to place a call on Hold.
	The Goodbye Key allows the user to disconnect any type of call.
	Handsfree button with LED and enhanced audio speaker
	Volume Up/Down control. Handset, headset (receive, transmit), handsfree, ringer and buzzer volume adjustments are supported by the i2004 volume up/down control.
	Mute key with LED
	Quit key - Used to exit displayed options or services
	Copy key
	Headset key - reserved for future use. An audible non-working tone is generated and the LCD displays "Service not available".

Table 1
i2004 Internet Telephone fixed key icon description (Part 2 of 2)

Icon Label	Description
	Directory key - reserved for future use. An audible non-working tone is generated and the LCD displays "Service not available".
	Inbox key - reserved for future use. An audible non-working tone is generated and the LCD displays "Service not available".
	Outbox key - reserved for future use. An audible non-working tone is generated and the LCD displays "Service not available".
	Services key - provides an options list for basic telephone controls.
	Expand key - reserved for future use. An audible non-working tone is generated and the LCD displays "Service not available".

Other i2004 features include:

- 12-Key keypad
- Handset
- four Navigation keys: left, right, up, down
- six programmable DN or feature keys
- four soft-labeled keys
- one 5 x 24 display (1 info line, 3 text lines, and 1 label line)
- Message Waiting Indicator lamp

Message Waiting Indicator (MWI)/Alerting LED

The Message Waiting Indicator (MWI) is a dual-purpose LED that informs the user of new voice messages. The LED on indicates a new message. and it's used during alerting to visually inform the user that the i2004 is ringing (LED flashes during alerting).

The LED flashes for an incoming call with no active calls (i.e. - set idle or all calls on hold, regardless of message waiting state.)

The LED is solid for new messages present and no incoming calls.

i2004 Options

The options functions control user-specific i2004 Internet Telephone operating parameters. If the Meridian 1 initializes, the ITG Line 2.0 card fails or the i2004 Internet Telephone goes through a power-up cycle, the options settings are lost and the i2004 reverts to the default values.

- Volume adjustment

- Language

- Ring Type

- Contrast adjustment

- Display diagnostics

- Key Click

- Time and Date Format

- Call Timer

- Predial recall

Physical characteristics

This section describes the i2004 Internet Telephone physical characteristics.

Housing

The housing of the i2004 Internet Telephone housing consists of a molded plastic footstand and the faceplate. The bottom of the housing provides manufacturing part number and model number information, a power supply connection, an RJ45 Ethernet port, a handset jack and a headset jack. There is also space to write a MAC address, which is a form of IP address.

i2004 display screen and softkeys

The i2004 Internet Telephone has a Liquid Crystal Display (LCD) screen (see Table 20). The i2004 has six soft-label keys, three on either side of the LCD. The banner line is the top line of the main part of the display. This field is logically split into four text fields, from left to right; a Numeric index field allowing three characters, a context field allowing 12 characters, a date field allowing five characters, and a time field allowing up to six characters plus a colon. The status bar/alphanumeric information area accommodates up to three lines of text and associated free-format status icons. The softkey labels are four fields of seven characters each. If the list scroll indicator is turned on (dark), use the navigation up/down arrows to access additional data not shown in the list.

Figure 20
i2004 LCD display screen
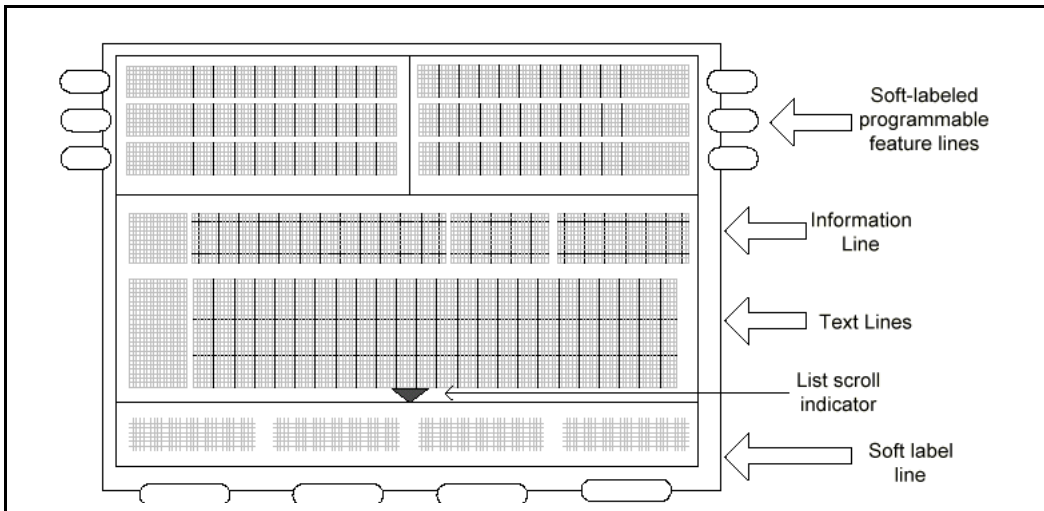
Soft-labeled programmable feature keys

The six soft-labeled programmable feature keys (and dedicated icon) can be assigned with either features or DN's. The DN keys will be labeled with the appropriate digits to reflect that DN.

Soft keys

The four soft keys are dual-purpose keys. In idle or call-in-progress mode, these keys function similar to the soft-labeled programmable feature keys. Key functionality is defined by the Meridian 1 using the **Key Map Download** X11 message. Each key can be assigned with any features defined in Appendix B. The labels associated with these softkeys remain blank until the download messages have been received. If the Meridian 1 assigns more than four functions to these softkeys, the i2004 automatically labels the rightmost softkey as the More… key.

Pressing the More... key gives the user access to other functions not currently shown in the softkey area. Feature labels associated with these keys can use up to seven characters to identify that feature. If the i2004 is executing an application (either local or server based), then these softkeys are controlled by that application. Upon completion of the application, the i2004 returns the function (and corresponding labels) of each soft key to those previously specified by the Meridian 1.

Handset, headset key, handsfree operation summary

The headset and the Handsfree interfaces are controlled by hard keys. The handset operation is typical. Headset operation is simplified in that users are not required to connect/disconnect the device before and after each headset call.

Handsfree is activated by pressing the Handsfree hardkey. In addition, if the i2004 is set to default the voice path to the handset, pressing a line key without lifting the handset will result in dialtone in the Handsfree mode.

While on a call, the user can change the voice path by pressing the appropriate hardkey (headset/Handsfree) or by picking up the handset.

Mute key operation

Pressing the Mute button causes the set to toggle between muted and unmuted. When in the muted state the LED adjacent to the Mute button is lit. When in the muted state all audio input, handset, headset, handsfree, is muted.

Firmware features

The Meridian 1 downloads the set firmware to the i2004. Table 2 lists the data features supported by the i2004 firmware.

Software requirements

The i2004 Internet Telephone is available on X11 release 25 and later software.

Table 2
i2004 data features

Data features	i2004
Ring Again	X
Speed Call	X
System Speed Call	X
Call Forward	X
Call Transfer	
Autodial	X

Specifications

This section lists the i2004 Internet Telephone specifications.

Power and regulatory specifications

The i2004 Internet Telephone must use only the Nortel Networks recommended, approved Limited Power Source, output rated: 16 Vac, 500 mA, 50/60 Hz.

The i2004 Internet Telephone is a Class A device that meets FCC Part 15 and Canadian ICES-003 specifications.

Temperature and humidity specifications

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 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 limited to 53 mbar of water vapor pressure.

Power requirements

The i2004 Internet Telephone is powered by a 16 Vac, 500 mA wall transformer that ships with the i2004 Internet Telephone boxed package. The transformer connects to the i2004 through a "barrel" connector that is installed in a port in the bottom of the i2004 Internet Telephone. There is no provision for closet powering through the RJ45 Ethernet connector.

Data options

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *Meridian Communications Unit and Meridian Communications Adapter: Description, Installation, Administration, Operation* (553-2731-109)

- *Transparent Data Networking* (553-2731-110)

- *X11 Administration* (553-3001-311)

- *Asynchronous Data User Guide*

- *Analog Terminal Adapter Quick Reference Card*

- *Meridian Communications Adapter User Guide*

- *M2317 Quick Reference Card*

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 M2317 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 10 shows the operating parameters ADO requires.

Table 10
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 11). 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 11 lists the input and output requirements for the ADO external power supply.

Table 11
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 21 shows a block diagram of the ADO and M2317 telephone.

Figure 21
Block diagram of ADO and M2317 telephone
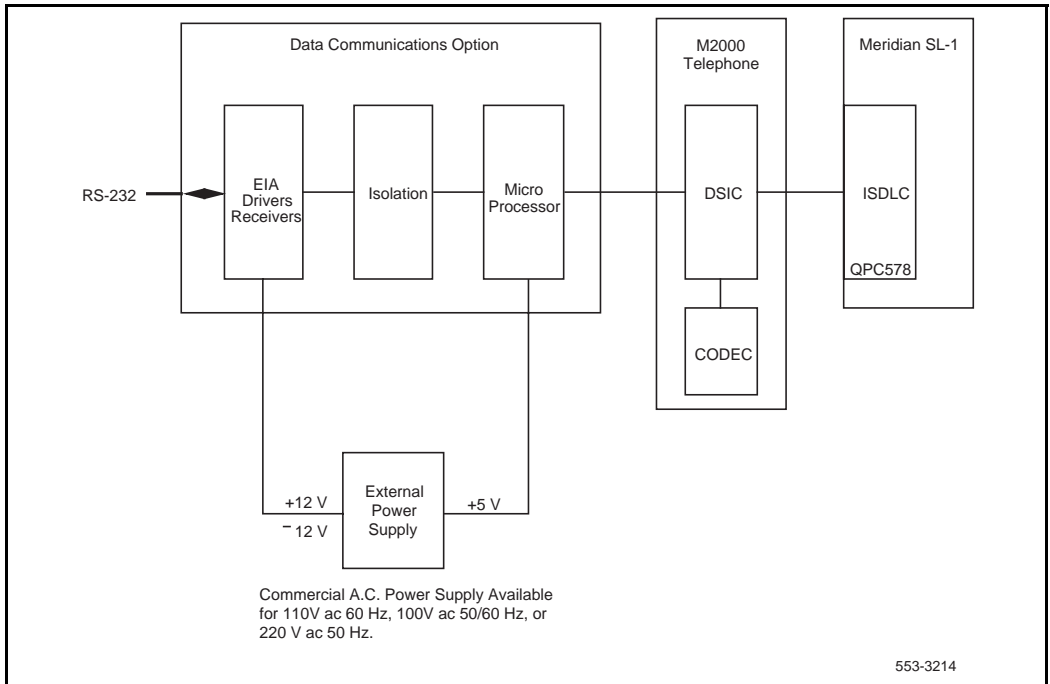
See the *Asynchronous Data User Guide* and the *M2317 Quick Reference Card*, for more information on ADO operation.

Meridian Communications Adapter (MCA)

The Meridian Communications Adapter (MCA) replaced the Meridian Programmable Data Adapter (MPDA) with X11 release 18 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 Nortel Networks 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 Nortel Networks 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 Administration* (553-3001-311) 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 12.

Table 12
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 22 shows the back of a Modular telephone with an MCA mounted; Figure 23 shows a block diagram of the Modular telephone and MCA.

See the *Meridian Communications Adapter User Guide* for more information on MCA operation. See also "Ordering information" on page 39 for MCA ordering information.

Figure 22
Back of telephone showing MCA

Flashing
LED

RS-232
interface

553-1897
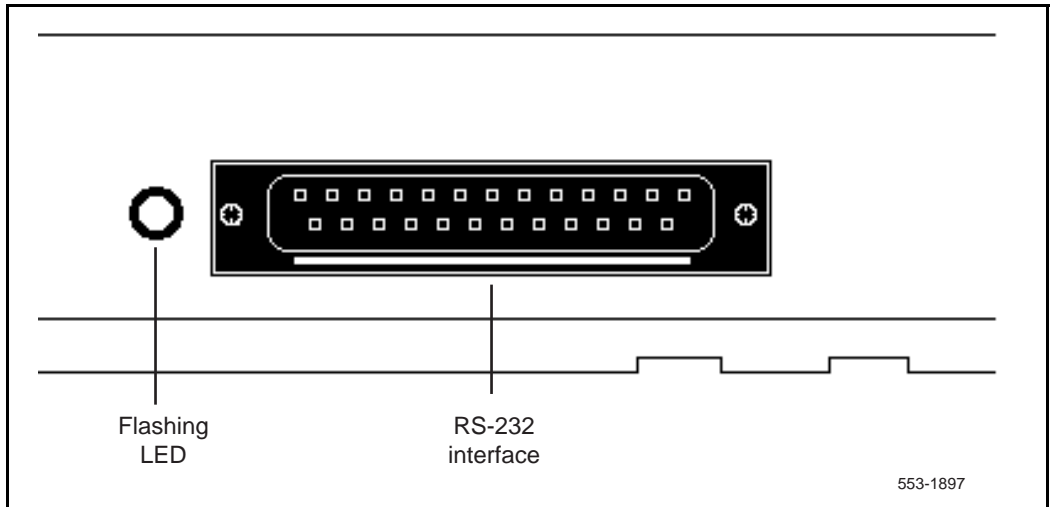
Figure 23
Block diagram of MCA and Modular telephone

553-1854
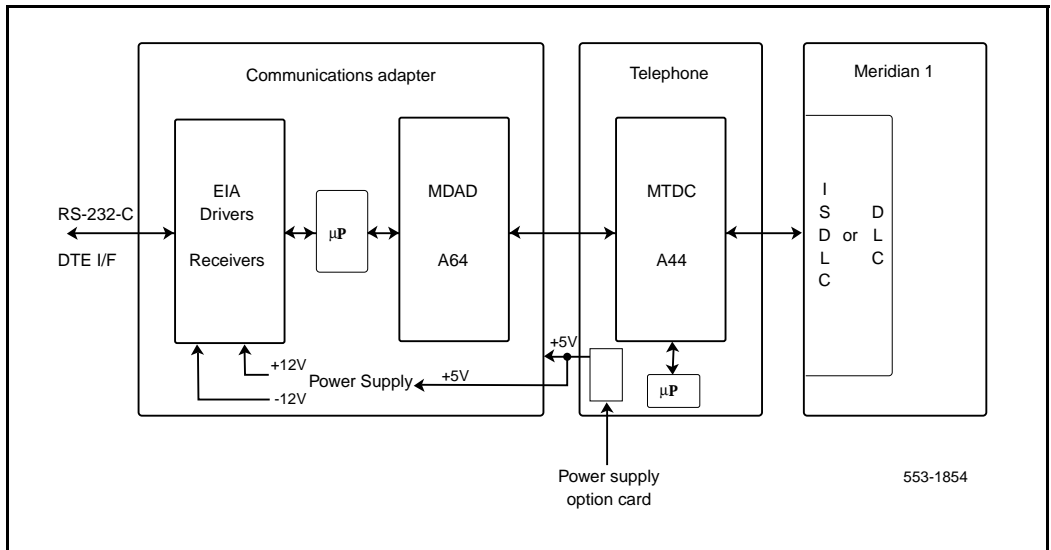
Meridian Communications Unit

The Meridian Communications Unit (MCU) was introduced with X11 release 19 and 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 replaced 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 Administration* (553-3001-311) 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 13.

Table 13
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* for detailed information on this feature.

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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Description and Specifications

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