
Meridian 1

Meridian 1 Telephones

Description and Specifications

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July 1995

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December 1994

Standard, Release 2.00. Reissued to include technical updates.

August 1993

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Contents

About this document	9
References	9
M2000 Series Meridian Digital Telephones	11
Contents	11
Reference list	12
Functional description	12
General features	13
M2216ACD Headset interface	19
Physical characteristics	20
Fixed keys	20
Features keys	23
Software requirements	24
Modular options	24
Display module	25
Program key	26
External Alerter interface	26
Key Expansion Module	26
Brandline insert	27
M2006/M2008/M2008HF/M2216ACD/M2616 telephones	27
M2000 Series Meridian Digital Telephone relocation	27
Specifications	29
Environmental and safety considerations	29

Local alerting tones	29
Line engineering	30
Power requirements	31
Handsets	38
Ordering information	39
M2317 Telephone	41
Contents	41
Reference list	41
Functional description	41
General features	42
Physical characteristics	43
Firmware features	51
Software requirements	52
Specifications	54
Safety considerations	54
Environmental considerations	54
Dimensions and weight	55
Line engineering	55
Power requirements	55
Ordering information for the M2317	56
M2616CT Cordless Telephone	59
Contents	59
Reference list	59
Functional description	60
Physical characteristics	60
Keys	60
General features	61
Firmware features	66
System Software	66
Modular Options	66
Call Center	67
System Administration	67

M2616CT (Cordless Telephone) Battery	67
Handset Registration to Base Unit	67
Wall mounting the M2616CT	67
Specifications	68
Safety considerations	68
Power requirements	68
Environmental considerations	69
Line engineering	72
Ordering information	72
M3900 Series Meridian Digital Telephones	73
Data options	75
Contents	75
Reference list	75
Asynchronous Data Option	76
Functional description	76
Meridian Communications Adapter	80
Functional description	80
Meridian Communications Unit	85
Functional description	85
Analog Terminal Adapter	86
Functional description	86
List of terms	89
Index	91

About this document

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 document 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

For information on the i2004 Internet telephone, refer to *Internet Terminals: Description* (553-3001-217)

References

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

Contents

This section contains information on the following topics:

Functional description	12
General features	13
M2216ACD Headset interface	19
Physical characteristics	20
Fixed keys	20
Features keys	23
Software requirements	24
Modular options	24
Display module	25
Program key	26
External Alerter interface	26
Key Expansion Module	26
Brandline insert	27
M2006/M2008/M2008HF/M2216ACD/M2616 telephones	27
M2000 Series Meridian Digital Telephone relocation	27
Specifications	29
Environmental and safety considerations	29
Local alerting tones	29
Line engineering	30
Power requirements	31
Handsets	38
Ordering information	39

Reference list

The following are the references in this section:

- *Digital Telephone Line Engineering (553-2201-180)*
- *Equipment Identification (553-3001-154)*
- *Telephone and Attendant Console: Installation (553-3001-215)*
- *Features and Services (553-3001-306)*
- *Software Input/Output Guide 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 versions 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; 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 (PE) 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 through 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 on page 14.

M2008/M2008HF – a multi-line telephone with eight programmable function keys. The M2008HF contains an integrated Handsfree unit. See Figure 2 on page 15.

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

Figure 1
M2006 telephone

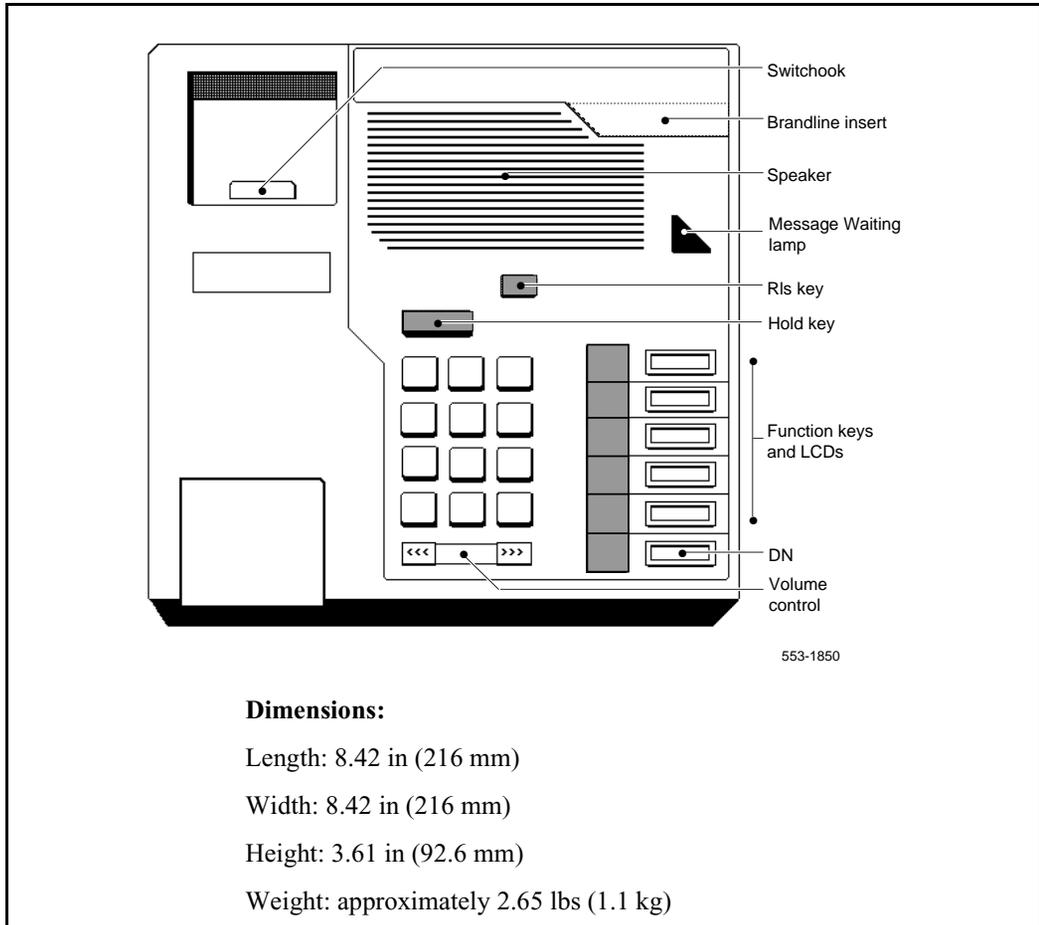
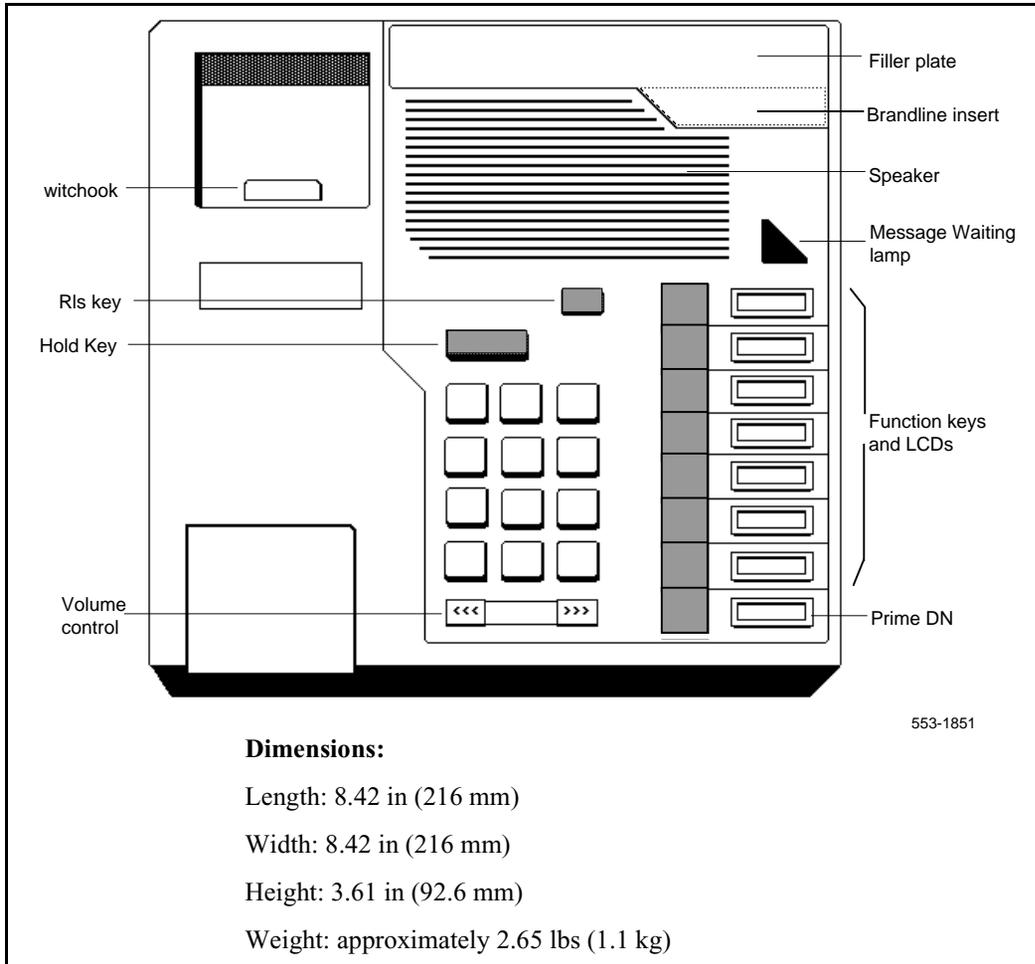
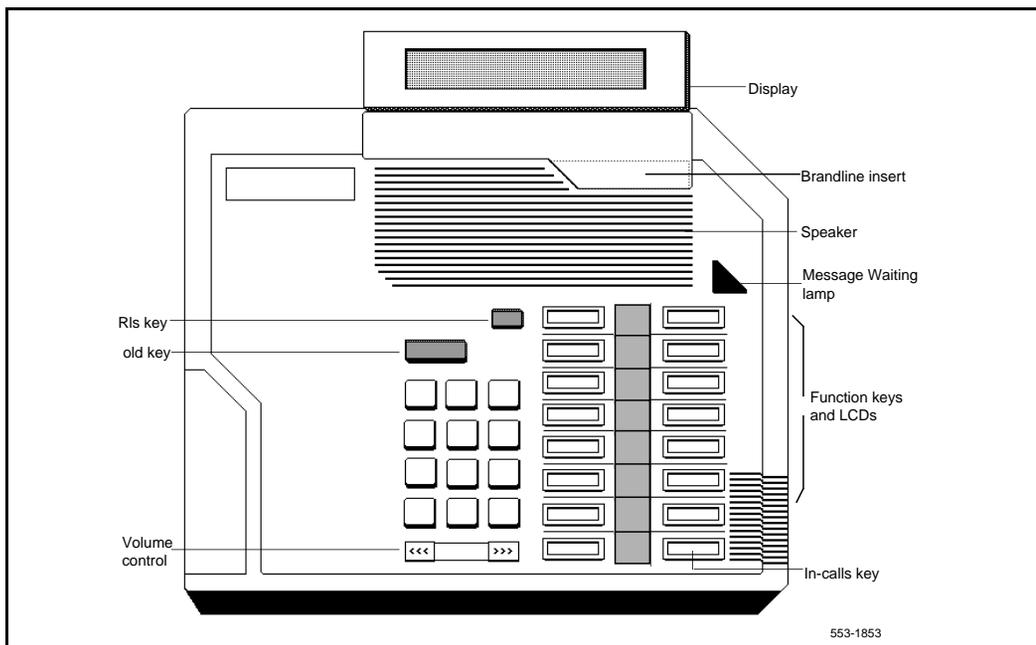


Figure 2
M2008/M2008HF telephone



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



Dimensions:

Length: 9.75 in (251 mm)

Width: 9.45 in (237 mm)

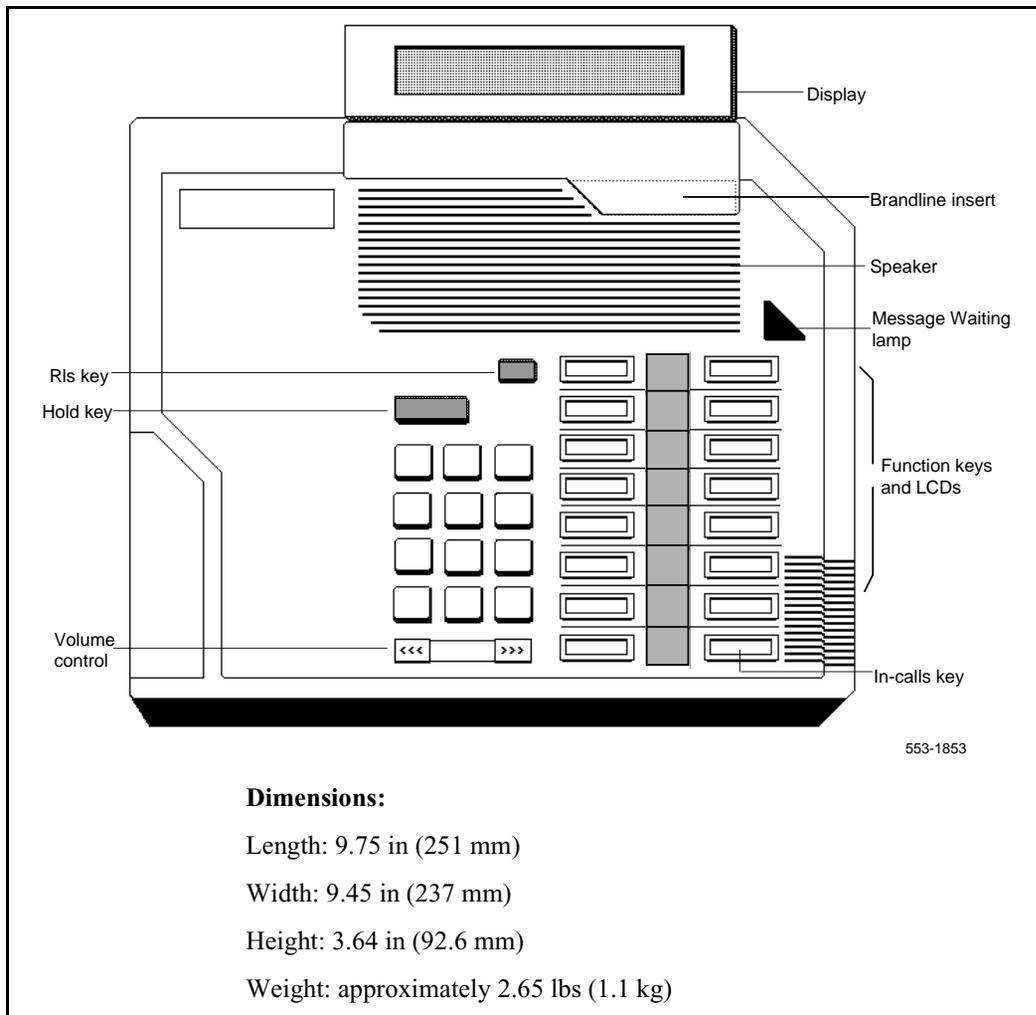
Height: 3.64 in (92.6 mm)

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 on page 18.

Figure 4
M2216ACD-1 and -2 telephones



Dimensions:

Length: 9.75 in (251 mm)

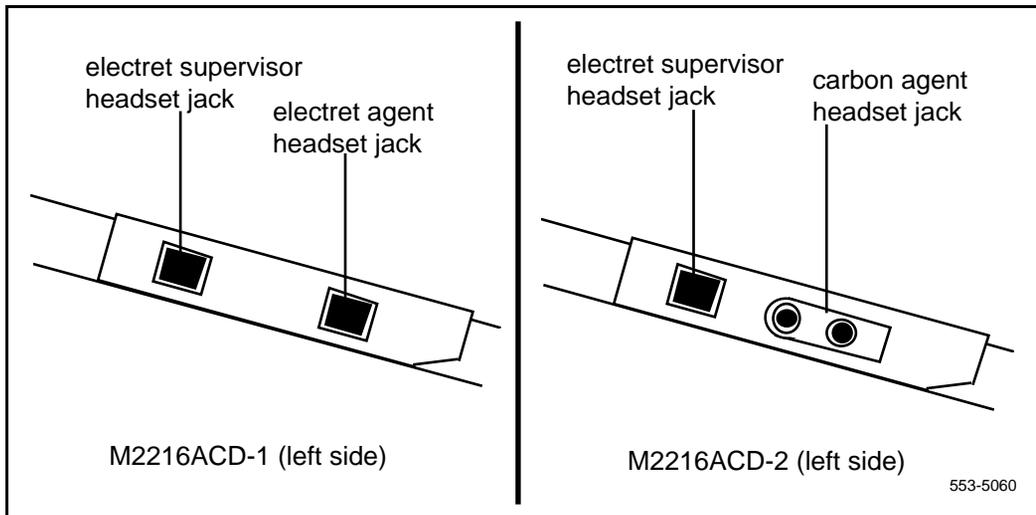
Width: 9.45 in (237 mm)

Height: 3.64 in (92.6 mm)

Weight: approximately 2.65 lbs (1.1 kg)

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, the headset/handset interface of the M2216ACD-1 can be adjusted to optimize performance.

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

- Interface 1 (i.e. Plantronics type)
- Interface 2 (Liberation)
- Interface 3 (Handset)

Note: Try using the headset with each of the three settings to determine which works best. Trial with both internal and external calls is also recommended to determine optimum performance.

Note: When the amplified headset is used, there are two choices for volume control:

- (1) the rocker control on the telephone
- (2) the switch on the headset

The settings which provide 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.

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 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 levels are saved 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).

The volume of the following tones can be changed while they are audible:

- ringing
- Handsfree (M2008HF/M2616)
- handset/headset
- buzz
- on-hook dialing

Note: If the telephone is disconnected, all volume levels will return to default values when reconnected.

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 indicates a message is waiting regardless of whether the telephone has a message waiting key/lamp pair. CLS Message Waiting Allowed must be enabled in LD 11. See *Software Input/Output Guide Administration* (553-3001-311).

If a message waiting key/lamp pair is assigned, there will be two indications of a message waiting:

- the red Message Waiting triangle lights
- the LCD associated with the Message Waiting key flashes

To avoid the double indication, assign an Autodial key that dials the message center (or voice mail system), 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 can be software enabled on the M2008HF/M2616. This allows the user 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 enabled, another feature can be assigned to the “Handsfree” key.

Note: Software Control – CLS Class of Service for M2008HF

The Class of Service feature for M2616 Handsfree control allows system administrators to enable/disable the Handsfree option on the M2008HF (Handsfree) telephone through 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 through the Class of Service prompt HFA included in LD 11 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	m2008 Digital Telephone
CLS	(HFD)	Digital Telephone Handsfree Denied
	HFA	Digital Telephone Handsfree Allowed

MAT

The Meridian M2008HF set is supported by providing a “Class of Service” change for LD 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 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 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 75 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 a 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 a feature key is pressed but the procedure necessary to activate the feature has not been completed.

Data Options

See “Data options” on page 75 for more information on the MPDA and MCA.

Software requirements

The option number for the M2000 Series Meridian Digital Telephones is 170. The mnemonic is ARIE. DSET package 88 and 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 75 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, various telephone features can be modified, such as volume and screen contrast, using the Program key (top right function key). A Call Timer can be enabled, 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 this happens, 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. A variety of display features can be changed, such as screen format, contrast, and language. It also permits changes to 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 key assignments in LD 20 are printed.

See “Data options” on page 75 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 31.

The External Alerter interface can be programmed 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 on page 28. The extra keys can be assigned to any combination of lines and features. Up to two expansion modules can be added to 16-key telephones, providing a total of 60 line/feature keys. A separate footstand is needed 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 31.

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. Blank Brandline Inserts can be ordered, and a printer can silk screen a company logo on them. Brandline Inserts snap easily into and out of the filler plate.

M2006/M2008/M2008HF/M2216ACD/M2616 telephones

An electric headset can be used 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.

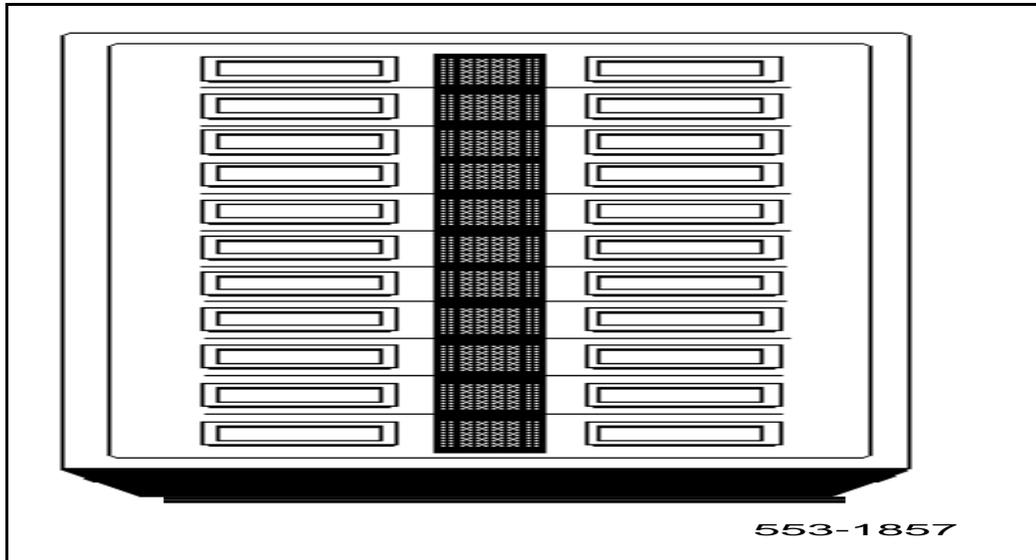
M2000 Series Meridian Digital Telephone relocation

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

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.

Figure 6
M2616 with Display module and Key Expansion module



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 *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 LD 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 *Software Input/Output Guide 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.			

**CAUTION****Damage to Equipment
Service Interruption**

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 ISDL or the DLC, consists of a 30 V dc power source and assumes a 3500 ft. (1219 m) maximum loop length of 24 AWG (0.5 mm) wire and a minimum 15.5 V dc at the telephone terminals.

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

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

Some configurations of telephones and options need more than basic loop power to operate. Table 3 on page 32 lists the types of M2000 Series Meridian Digital Telephones for NTZK telephones and Table 4 on page 33 lists the types for NT2K telephones. They show 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

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

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.

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.

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

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

Refer to Table 3 and Table 4 on page 33 for power supply board requirements.

Local plug-in transformer (A0367335)

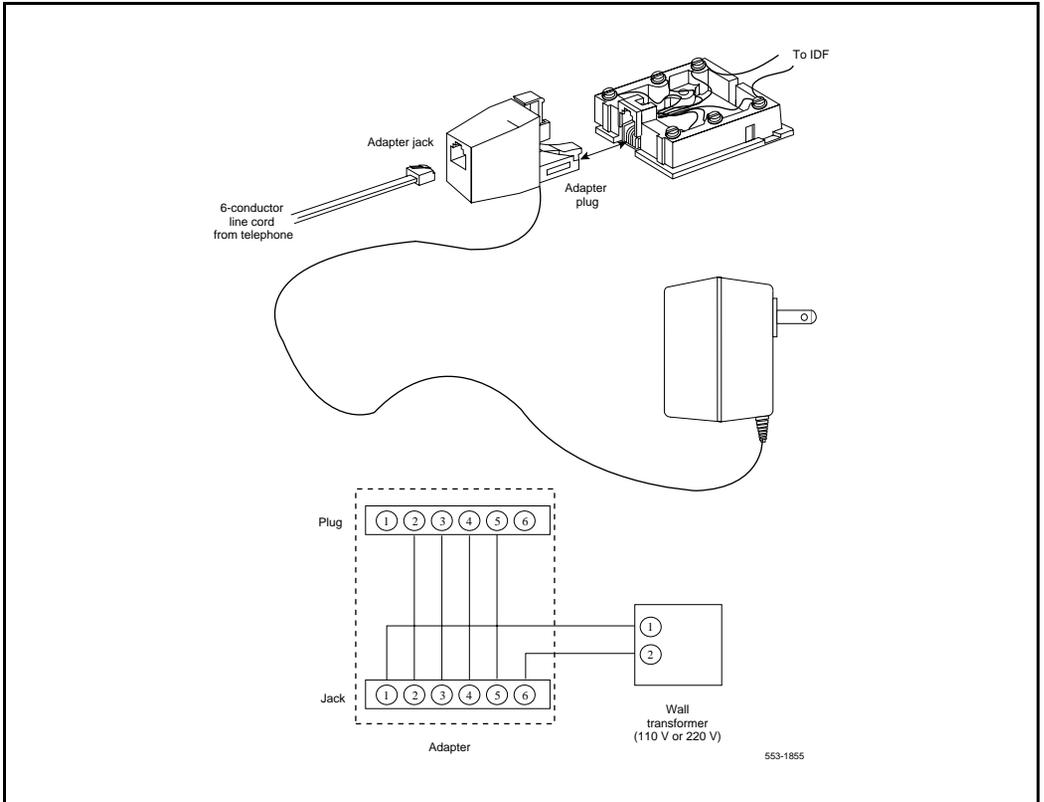
A single winding transformer equipped with a 10 ft. (3 m) cord of 22 AWG two-conductor stranded and twisted wire with a modular RJ-11 duplex adapter can provide the additional power needed to operate the telephone and its options. See Figure 7 on page 35.



CAUTION
Damage to Equipment

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: The telephone cannot be wallmounted over the wall jack when using a transformer, because of the size of the RJ-11 adapter. Hang the telephone 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 on page 37.



CAUTION
Damage to Equipment

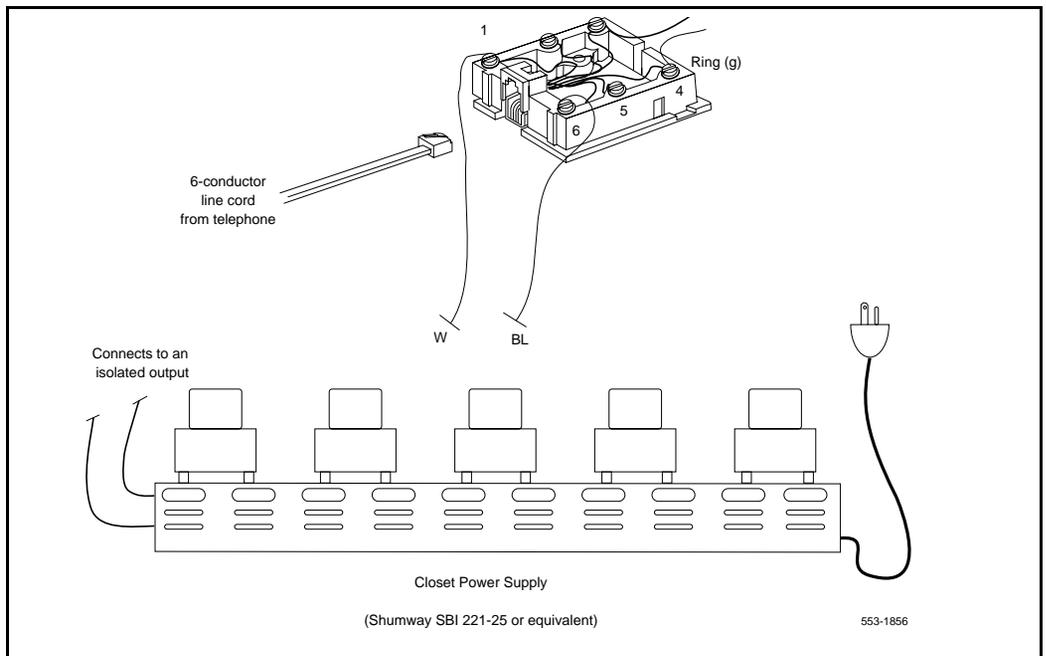
When using closet power, do not plug the modular connector into any equipment (computer, modem, or LAN card) other than the M2000 Series Meridian Digital Telephone, as damage to equipment may result.

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
<p>Note: Handsets designed for NT2K sets (Global handset) will not meet product transmission/reception specifications if used with NTZK sets.</p>	

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
<p>Note 1: Handsets designed for NTZK sets (Legacy handset) will not meet product transmission/reception specifications if used with NT2K sets.</p> <p>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.</p> <p>Note 3: Global handsets are not compatible with M1250 or M2250 (AE or current AF versions) telephones.</p>	

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 can be purchased 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

Contents

This section contains information on the following topics:

Functional description	41
General features	42
Physical characteristics	43
Firmware features	51
Software requirements	52
Specifications	54
Safety considerations	54
Environmental considerations	54
Dimensions and weight	55
Line engineering	55
Power requirements	55
Ordering information for the M2317	56

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.

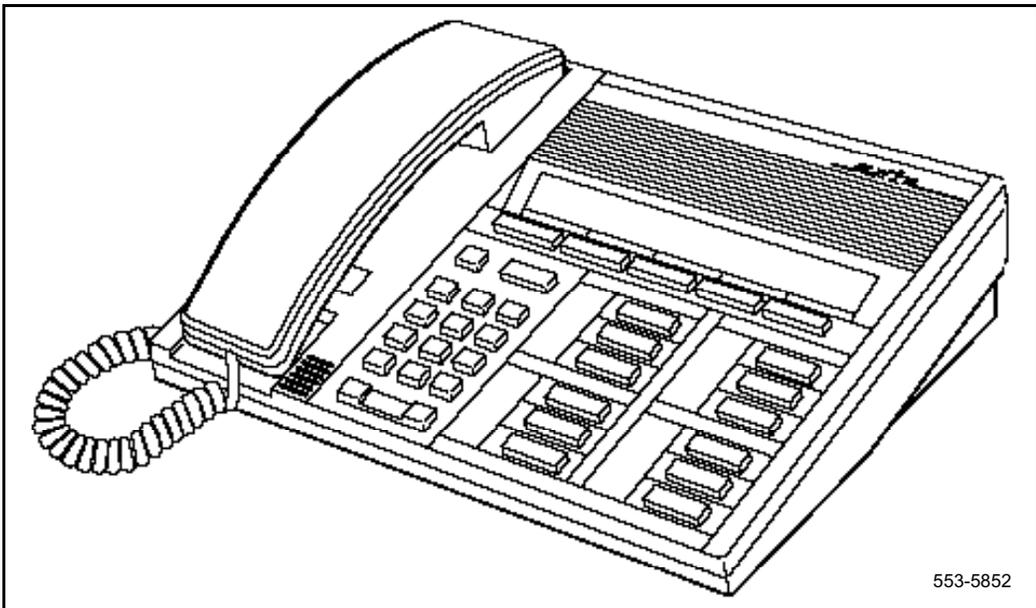
General features

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



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 on page 45.

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) 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. The second line displays the labels for the softkeys (seven characters per key).

There are five softkeys. Count 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 screen 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, a user 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 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 information on adjusting the volume, 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

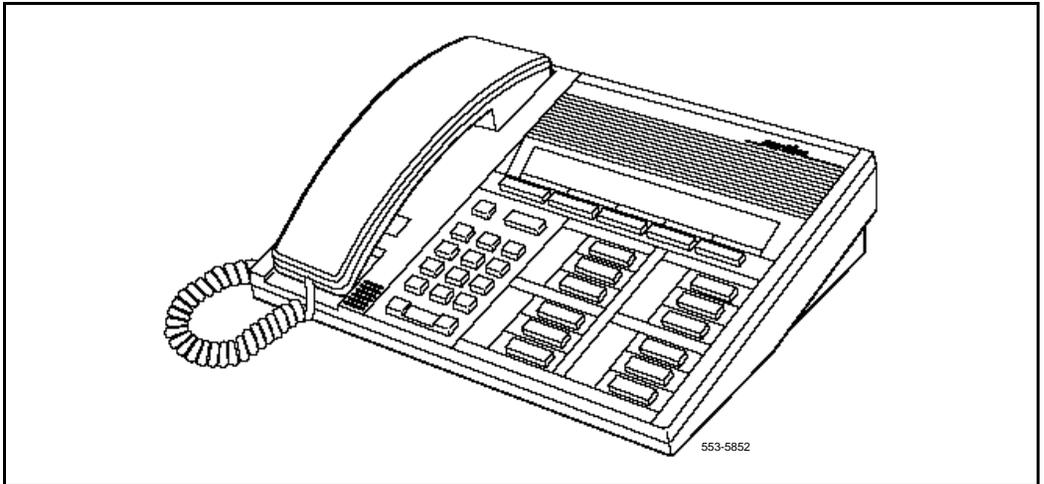


Figure 11
M2317 screen display – available idle state features

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.

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Figure 12
M2317 screen display – dial tone state

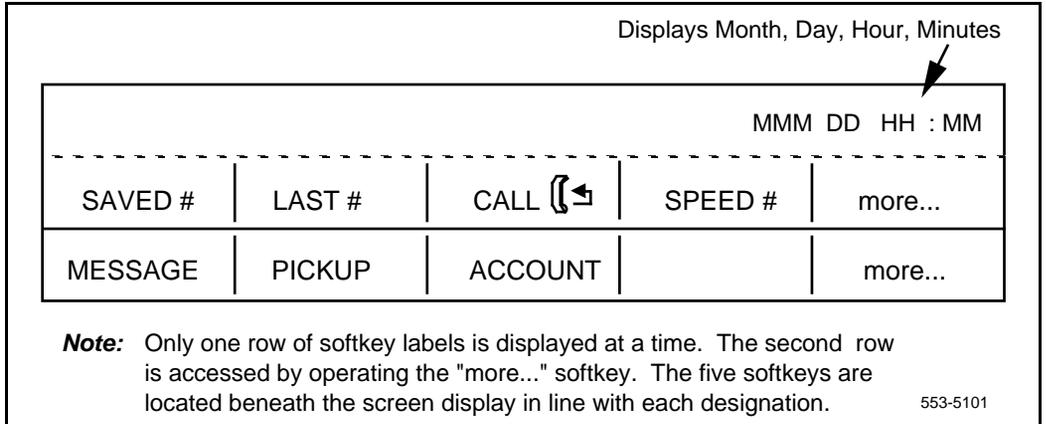


Figure 13
M2317 screen display – dialing state

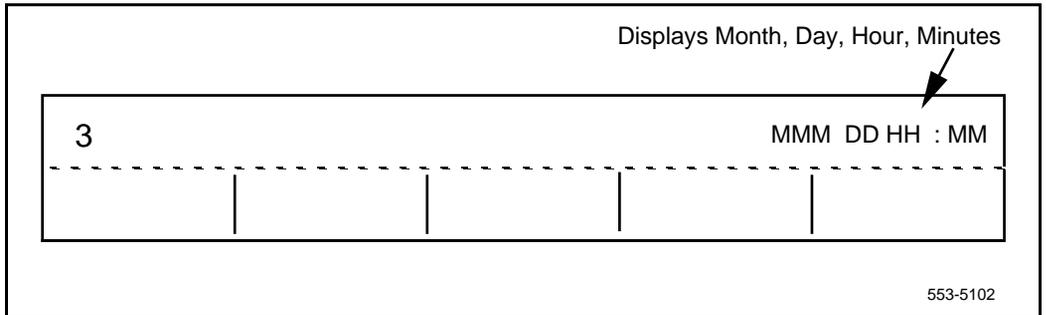


Figure 14
M2317 screen display – ringback state

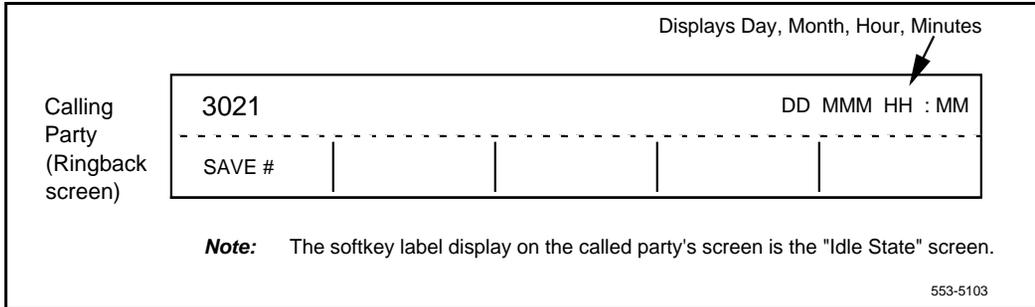
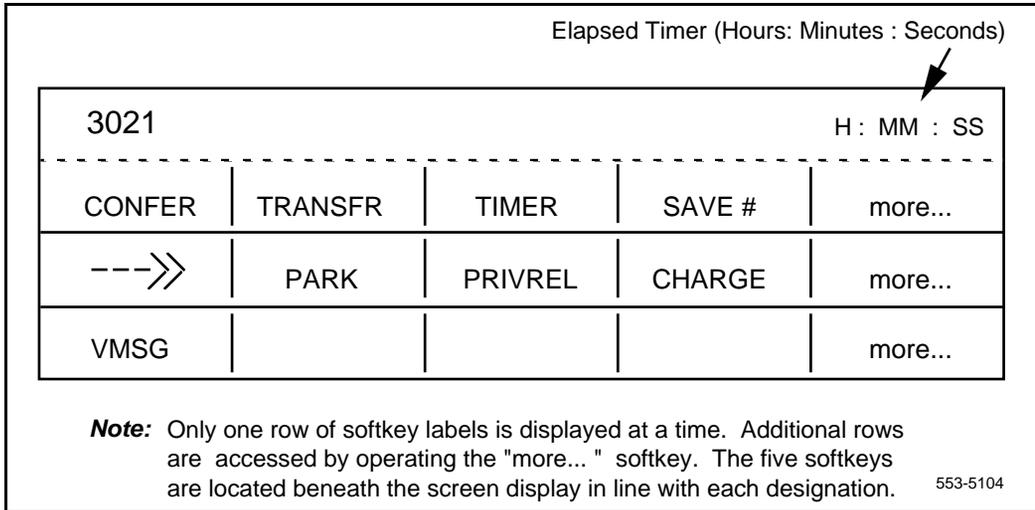


Figure 15
M2317 screen display – available established state features



Not all the features listed in Table 7 are 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 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#
Established	Voice connection made	CONFER, TRANSFR, TIMER, SAVE#, more..., -->>, PARK, PRIVREL, CHARGE, more..., MESSAGE, more...

Table 7
M2317 states and associated softkeys (Part 2 of 3)

Screen state	State	Softkey display
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
User status	Leave telset msg for set's status (voice)	no softkeys shown

Table 7
M2317 states and associated softkeys (Part 3 of 3)

Screen state	State	Softkey display
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 75 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:

- Redial
- Last Number Redial
- Saved Number
- Redial Saved Number
- Timer
- Time and Date
- Call Processing

Software requirements

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	
<p>Note 1: Manual modem pooling using keyboard dialing requires only call transfer to be defined.</p> <p>Note 2: The Data DN must always be assigned to feature key 10.</p>		

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 M Ω 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. It covers 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 is required. Refer to NPS50220-03L5. See “Data options” on page 75 for more information on ADO requirements.

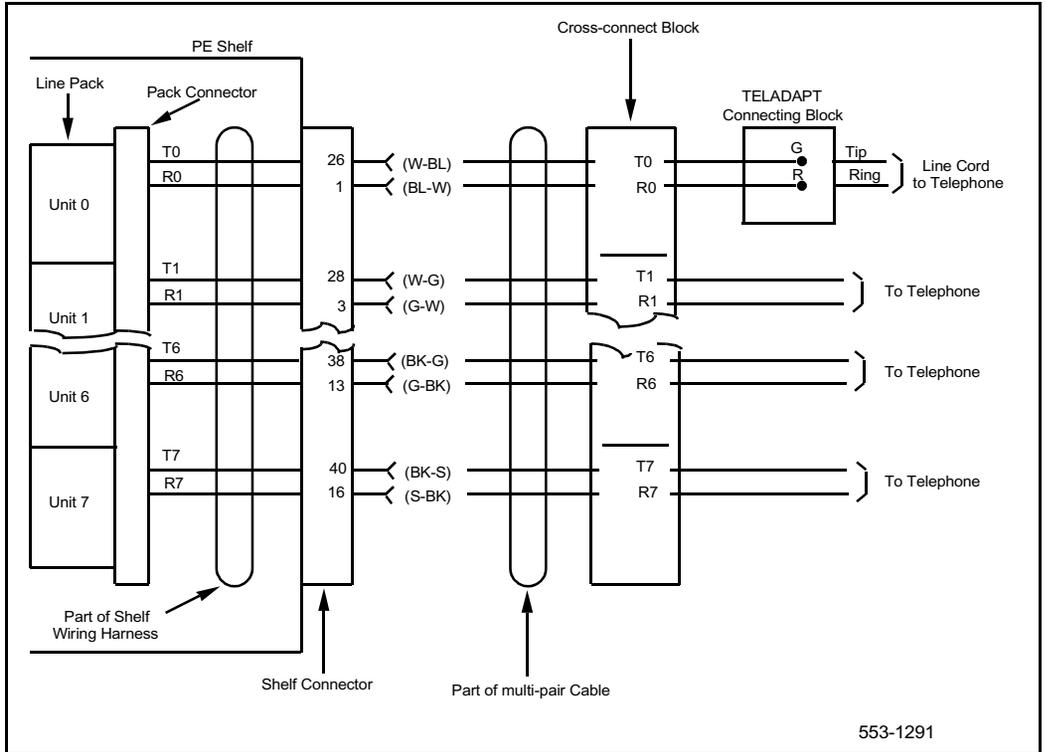
Ordering information for the M2317

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).

Figure 16
M2317 telephone cross-connections



M2616CT Cordless Telephone

Contents

This section contains information on the following topics:

Functional description	60
Physical characteristics	60
Keys	60
General features	61
Firmware features	66
System Software	66
Modular Options	66
Call Center	67
System Administration	67
M2616CT (Cordless Telephone) Battery	67
Handset Registration to Base Unit	67
Wall mounting the M2616CT	67
Specifications	68
Safety considerations	68
Power requirements	68
Environmental considerations	69
Line engineering	72
Ordering information	72

Reference list

The following are the references in this section:

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

- *Software Input/Output Guide 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 (45 m), 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. Press the “Volume Up” or “Volume Down” pad of the key to increase or decrease the volume for the tone or sound that is currently active.

To change the volume of the ringing sound, the user must press “Volume Up” or “Volume Down” while the ringing is heard. The volume settings are saved for subsequent calls until new volume adjustments are made.

Handsfree key

When Handsfree is on, a user can talk to another party without lifting the handset. Activate Handsfree 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)

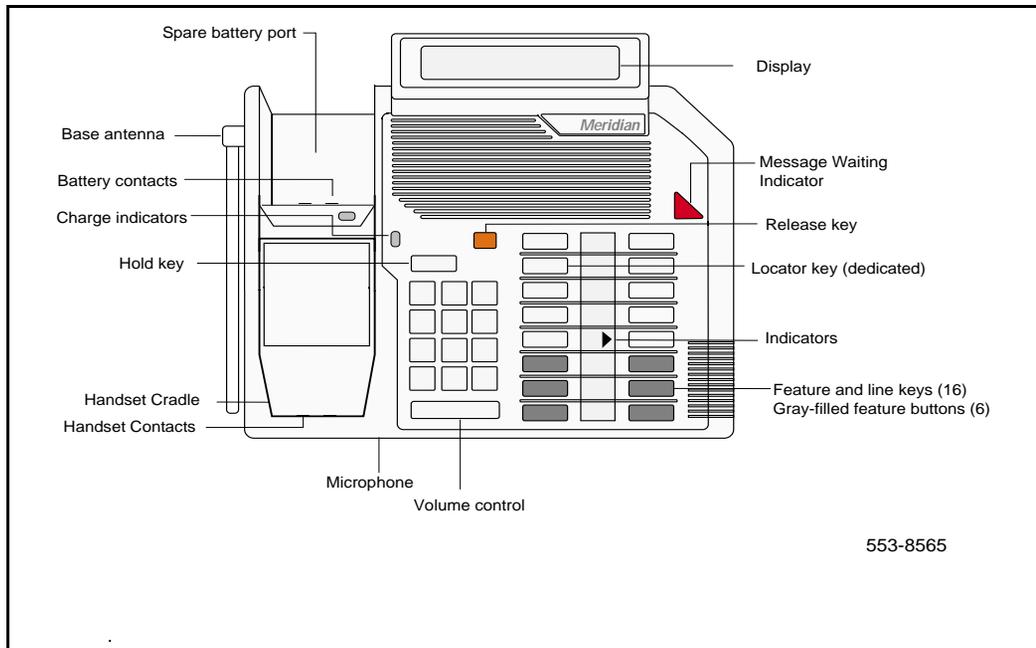
Housing

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 the M2616CT and a brief description of the controls.

Figure 17
M2616CT Base Unit

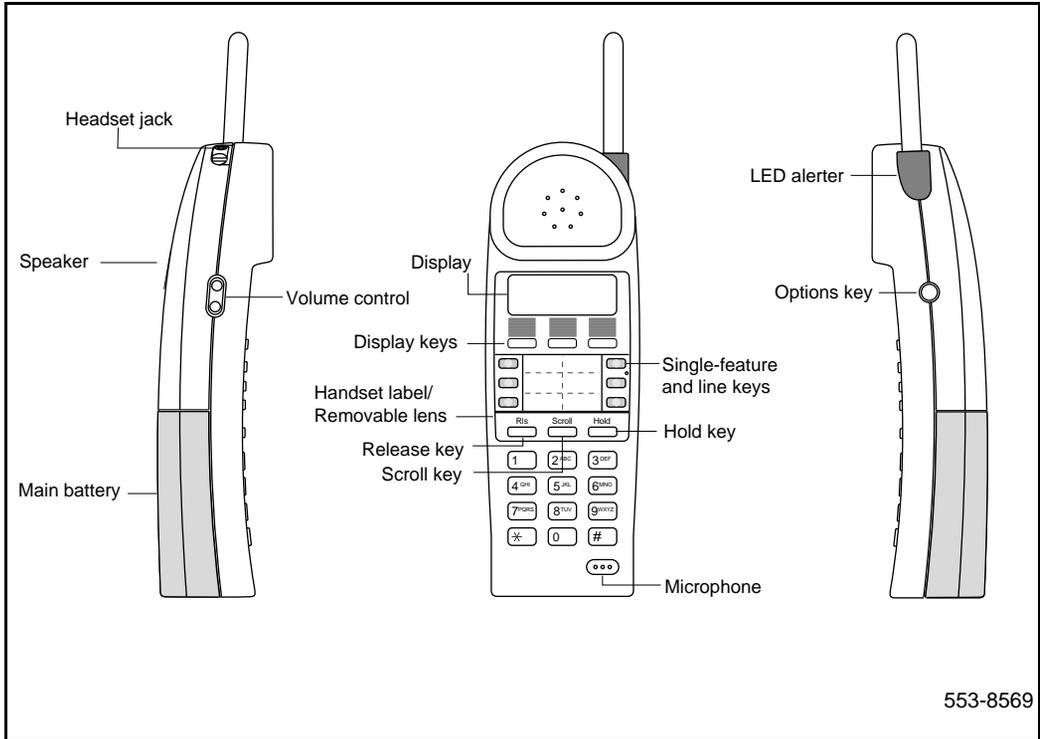


Base Unit Controls

- The **Base Display** is a two-lines, 24 characters display.
- The **Feature and line keys** access telephone features and lines. Six feature keys map to the handset feature keys. They are the three bottom keys, on either side of the light indicator LED strip.
- The **Handset cradle contacts** charges the cordless handset. The charge indicator light indicates the battery status of the handset. Green indicates the battery is fully charged.
- The **Charge indicator** lights indicate the status of the handset battery. Red indicates the handset is charging. Green indicates the battery is fully charged. The battery contacts, located on the upper half of the handset cradle, charges the optional spare battery.

- The **Diamond-shaped indicator light** appears beside active lines and features.
- The **Locator key**, locates the handset/manual Radio Frequency mode (if feature is assigned).
- The **Volume bar** controls the volume of the handset, speaker, and ringer.
- The **Microphone** enables handsfree calling. When Handsfree is on, a user can talk to another party without lifting the handset. Handsfree can be activated by pressing the Handsfree/Mute key, or by pressing a DN key without lifting the handset. The Handsfree/Mute LCD indicator shows the status of the Handsfree. Once Handsfree is activated, it can be deactivated by picking up the handset or by pressing the Release (RLS) key.
- The **Release key** terminates an active call.
- The **Message Waiting indicator light** indicates that a voice mail message has been left.

Figure 18
M2616CT Handset



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 displays an icon that indicates when the handset is out of range or when the battery is low. The display screen shows the time, date, call information and provides guides to various M2616CT features.

The **Display keys** show 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 screen is used to display instructions.

The **Message Waiting/Ringing Indication** is a red LED located on the base of the handset antenna that provides message-waiting indication and flashing visual ringing indication.

The **Handset labels** allow the feature keys to be personalized.

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

The **Hold key** places an active call on hold.

The **Options key** allows changes to be made to the M2616CT settings in the Options list. The Options key is located on the right side of the M2616CT handset. Used with three display function keys, it lets users customize handset options, including the following:

- Speaker on/off – a speaker allows users to listen to voice mail or listen to a conference call without using the handset.
- 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. A special vibrating battery must be purchased and installed 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 ringer 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 a call from the handset to handsfree on the base unit.

The **Release key** terminates an active call.

The **removable lens** protects the handset label.

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

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

The **Volume control** adjusts the volume for ring and alerter tones.

The **LED alerter** provides a visual ringing indicator and message-waiting indicator.

The **Speaker** permits a user to listen to voicemail or a conference call without holding the handset.

The Handset automatically goes into **Sleep Mode** when the handset is idle for more than 45 seconds. The handset can be “awakened” by pressing either 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 11C through 81C
- 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 should not be programmed as a Call Center agent or supervisor.

System Administration

To configure the M2616CT (Cordless telephone) on the Meridian 1 system, refer to LD11 in *Software Input/Output Guide Administration* (553-3001-311).

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

Wall mounting the M2616CT

The M2616CT base is equipped with a reversible footstand that allows the telephone to be mounted on the wall. For instructions, 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*.

Use proper installation and charging procedures for the M2616CT battery pack to reduce risk of fire or personal injury.

Discard the battery if the battery is cracked or damaged. 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. Use care in handling batteries in order to not 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 powers the handset requires a wall transformer (Class 2 power supply Output rated at 7.5v dc).

The M2616CT handset uses rechargeable Nickel-Cadmium batteries. Both a 700 mAh and 1000 mAh battery, with or without a 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 four 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 time is provided, depending on usage. Up to 72 hours of 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 to the handset and provides approximately 5.5 hours continuous talk time, if the handset backlight is turned on. If the handset backlight is turned off, up to seven hours of continuous talk time is provided, depending on usage. Up to 86 hours of standby battery time is provided when the handset is off the base unit.

The batteries charge in both the handset and the base unit. The spare battery- charging port on the base unit provides a “trickle charge” that charges a 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 can be reduced. Steel girders and concrete walls can limit the range of the cordless telephone. Line of sight 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. The manual Radio Frequency (RF) channel selection, described on page 70, 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 if 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. Without proper protection, any foreign voltage from the line cord can be exposed to these contacts, and can cause personal injury.

Medical Facilities

The M2616CT is a 900MHz radio frequency telephone that may cause problems in medical facilities. Please advise 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. Recycle, or dispose of them properly.

- Discard the battery according to local ordinances.
- Do not discard the battery in office or household waste.
- Do not incinerate the battery as 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

Refer to the Nortel Networks price book or contact your Nortel Networks representative for specific ordering codes for the M2616CT (Cordless Telephone).

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).

Data options

Contents

This section contains information on the following topics:

Asynchronous Data Option	76
Functional description	76
Meridian Communications Adapter	80
Functional description	80
Meridian Communications Unit	85
Functional description	85
Analog Terminal Adapter	86
Functional description	86

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)*
- *Software Input/Output Guide 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

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

Functional description

The ADO is mounted in 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 the 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 for the ADO.

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 the 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 the 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 on page 78. 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 (Part 1 of 2)

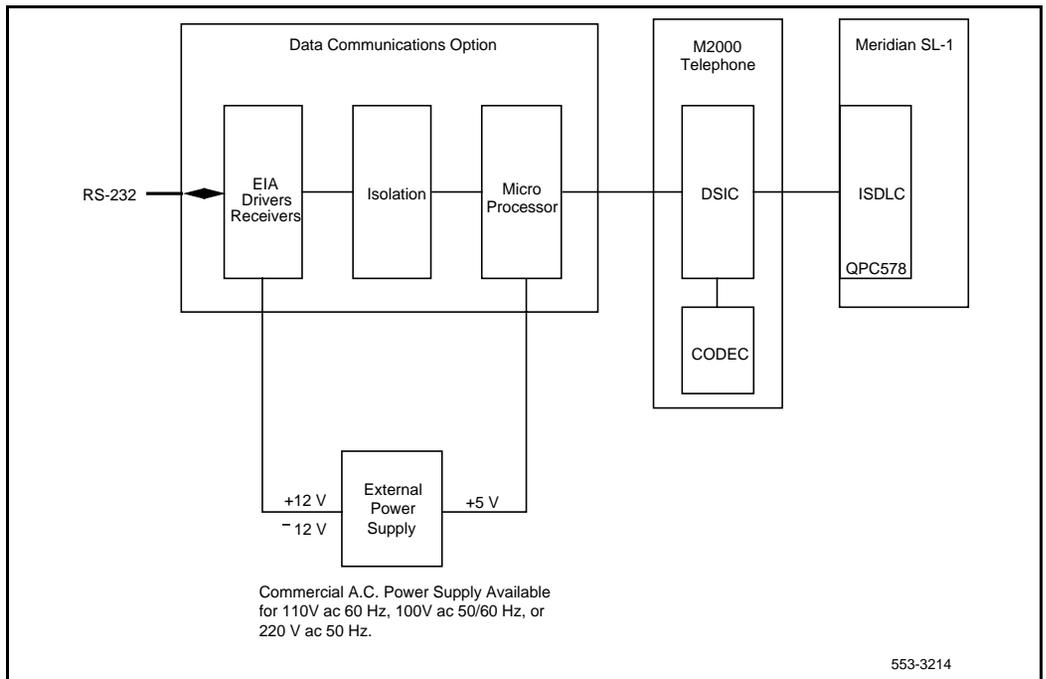
North American version	
NPS50220-03L5	Multi-output external power supply (A0336823), UL listed and CSA approved
Input:	57–63 Hz 115–132 V ac
Output:	+5 V dc, 1.0 A (pin 3 for supply, pin 2 for return) +12 V dc, 200 mA (pin 6 for supply, pin 1 for return) –12 V dc, 200 mA (pin 4 for supply, pin 1 for 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

Table 11
I/O requirements for ADO external power supply (Part 2 of 2)

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 19 shows a block diagram of the ADO and M2317 telephone.

Figure 19
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

The Meridian Communications Adapter (MCA) replaced the Meridian Programmable Data Adapter (MPDA), 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. It 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. See Figure 3 on page 16.

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 through 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 *Software Input/Output Guide 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, 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 20 on page 84 shows the back of a Modular telephone with an MCA mounted; Figure 21 on page 84 shows a block diagram of the Modular telephone and MCA.

See the *Meridian Communications Adapter User Guide* for more information on MCA operation. Also see “Ordering information” on page 39 for MCA ordering information.

Figure 20
Back of telephone showing MCA

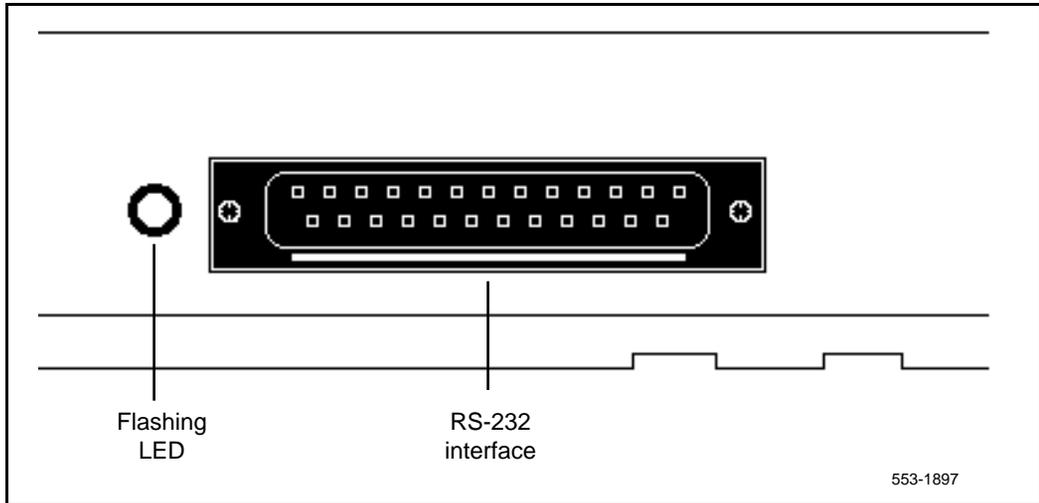
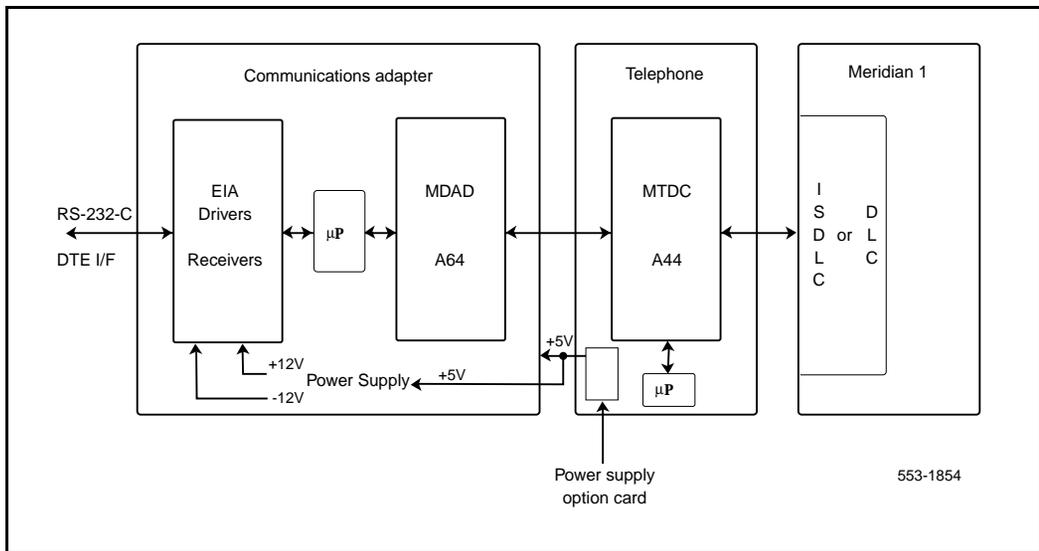


Figure 21
Block diagram of MCA and Modular telephone



Meridian Communications Unit

The Meridian Communications Unit (MCU) provides a stand-alone version of the Meridian Communications Adapter (MCA).

Functional description

The Meridian Communications Unit (MCU) allows data to be transmitted and received 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 kbps synch, integrated display, and self diagnostics.

The MCU supports autodialing, ring again, and speed calling, as well as autobauding and automatic parity detection. The MCU can be used 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 the Meridian Digital Telephone set. The Analog Terminal Adapter board fits into the footstand space of the Meridian Digital Telephone set.

Functional description

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

The Analog Terminal Adapter (ATA) provides a RJ11 connection for analog equipment to operate on the same line as the Meridian Digital Telephone set. The Analog Terminal Adapter allows data to be transmitted and received using the public switched telephone network (PSTN). The ATA supports an analog device link to a desktop or laptop computer (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.

The ATA can be used 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. Do not set data parameters 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. When the ATA is installed, the System Administrator must activate the Flexible Voice and Data feature by configuring LD 11. See *Software Input/Output Guide Administration* (553-3001-311) for prompt and response details.

The 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.

List of terms

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
ISDL	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

Index

A

A0336823, 56

active state

- M2006/2008/2616/2016S/2216ACD Digital telephones, 23
- on M2317, 45
- on M2616CT, 61

ADO (Asynchronous Data Option)

- described, 76, 79
- external power supply, 77
- for M2317, 43, 56
- operating parameters, 77

agent jacks, 32

alerting tones

- M2006/2008/2616/2016S/2216ACD Digital telephones, 29

Analog Terminal Adapter (ATA)

- description, 86

Asynchronous Data Option. *See* ADO (Asynchronous Data Option)

ATA (Analog Terminal Adapter), 86

Autodial feature, 53

B

Brandline Inserts, 27

C

cables. *See* wiring and loop lengths

Call Forward feature, 53

call processing feature, 52

carbon agent headsets, 18, 32

cards

- DLC (Digital Line Card), 13

- ISDL (Integrated Services Digital Line Card), 13

closet power supplies, 32, 36

computers and plugging into RJ-11 transformer adapters, 34

conferencing feature, 50

cords

- and TELADAPT snap-in connectors, 13
- See also* wiring and loop lengths

custom labeling (logos) with Brandline Inserts, 27

D

data calls capability, 51

- See also* ADO (Asynchronous Data Option)

data channels, 13

Data Power Supply (A0336823), 56

dial tone screen

- on M2317 telephone, 47

dialing

- with redial feature, 52
- See also* Handsfree operation

digital telephones. *See*

- M2006/2008/2616/2016S/2216ACD Digital telephones; M3900 Series Meridian Digital Telephones

dimensions. *See under individual modes of telephones*

Display module, 25

DLC (Digital Line Card), 13

E

electret headsets, 17, 18, 27

electromagnetic interference specifications
M2006/2008/2616/2016S/2216ACD Digital
telephones, 29

environmental and safety considerations
M2006/2008/2616/2016S/2216ACD Digital
telephones, 29
M2317 telephone, 54
M2616CT, 68, 69

External Alerter interface, 26

F

frequencies. *See* local alerting tones

G

glossary, 89

H

handset cords, 13

Handsfree operation
M2006/2008/2616/2016S/2216ACD Digital
telephones, 21, 24
on M2317 telephone, 44
on M2616CT, 61

headsets
carbon agent, 18, 32
electret, 17, 18, 27
interfaces, 19
jacks for, 17, 18

hold key, 20

hold state
M2006/2008/2616/2016S/2216ACD Digital
telephones, 23
on M2317 telephone, 45
on M2616CT, 61

humidity range requirements. *See* temperature and
humidity ranges for operations

I

idle state

M2006/2008/2616/2016S/2216ACD Digital
telephones, 23
on M2317 telephone, 45, 46, 48
on M2616CT, 61

Intercom, 50

ISDL (Integrated Services Digital Line Card), 13

J

jacks
for headsets, 17, 27

K

Key Expansion modules, 26, 28

L

LAN cards and caution on plugging into RJ-11
transformer adapters, 34

last number redial feature, 52

LCD indicators
M2006/2008/2616/2016S/2216ACD Digital
telephones, 23
M2317, 45
M2616CT, 61
See also screens

line cord requirements, 42

local alerting tones. *See* alerting tones

logos with Brandline Inserts, 27

loop lengths. *See* wiring and loop lengths

M

M2006/2008/2616/2016S/2216ACD Digital
telephones
configurations and key cap packages, 39
environmental and safety considerations, 29
features keys, 23
fixed keys, 20
functions, connections, and interfaces, 12
hardware features and options, 24
line engineering, 30
local alerting tones, 29
power requirements, 31
relocating, 27

M2216ACD headset interface, 19

- M2317 telephone
 - description and illustration, 41, 45
 - dimensions, 55
 - environmental and safety considerations, 54
 - firmware features, 51
 - line engineering, 55
 - ordering information, 56
 - power requirements, 55
 - screens and softkeys, 43
 - software requirements, 52
- M2616CT (Cordless Telephone)
 - description, 59
 - environmental and safety considerations, 68, 69
 - firmware features, 66
 - line engineering, 72
 - ordering information, 72
- M3900 Series Meridian Digital Telephones, 73
- MCA (Meridian Communications Adapter), 80
 - Program key assignments, 23, 26
- MCU (Meridian Communications Unit)
 - described, 85
- Meridian 1 telephones
 - See also* ADO (Asynchronous Data Option); M2006/2008/2616/2016S/2216ACD Digital telephones; M2317 telephone; M3900 Series Meridian Digital Telephones; MCA (Meridian Communications Adapter), 91
- message waiting feature, 21
- microphone
 - on M2006/2008/2616/2016S/2216ACD Digital telephones, 24
- modems
 - caution on plugging into RJ-11 transformer adapters, 34
- MPDA (Meridian Programmable Data Adapter)
 - described, 80
 - Program key assignments, 23, 26
- N**
 - NT1F09AA Synchronous Data Option, 56
- P**
 - Peripheral Equipment shelf, 13
 - power requirements
 - for ADO (Asynchronous Data Option), 77
 - for headsets, 31
 - for recording devices, 19
 - M2006/2008/2616/2016S/2216ACD Digital telephones, 31
 - M2317 telephone, 54, 55
 - See also* batteries; transformers
 - power supplies and power units
 - MCA and MPDA, 32, 83
 - Power supply boards
 - MCA and MPDA, 32, 83
 - predial feature, 52
 - Program key assignments, 23, 25
 - programmable keys
 - M2006/2008/2616/2016S/2216ACD Digital telephones, 23, 24
 - on M2317 telephones, 43
 - See also* softkeys
- PVC cable, 30
- R**
 - redial feature, 52
 - relocation of M2006/2008/2616/2016S/2216ACD Digital telephones, 27
 - remote ringers, 26
 - ringing state
 - on M2006/2008/2616/2016S/2216ACD Digital telephones, 23
 - on M2317 telephones, 45, 47
 - on M2616CT, 61

S

M2616CT, 72

safety considerations. *See* environmental and safety considerations

screens

on M2317, 42, 43

secure telephones

M2016S, 16, 21

security codes with relocations, 28

softkeys

on M2317 telephones, 48

See also programmable keys

Speed Calling

with M2317 telephones, 53

T

telephones. *See* Meridian 1 telephones

temperature and humidity ranges for operations

M2006/2008/2616/2016S/2216ACD Digital
telephones, 29

M2317 telephone, 54

M2616CT, 71

time and date feature, 52

timer feature, 52

TN (Terminal Number) and relocations, 27

tones. *See* alerting tones; volume control

transformers

local plug-in, 34

See also power requirements

V

voice channels/ports, 13

volume control

M2006/2008/2616/2016S/2216ACD Digital
telephones, 20

M2616CT, 61

W

warble rates. *See* local alerting tones

wiring and loop lengths

M2006/2008/2616/2016S/2216ACD Digital
telephones, 30, 31, 36

M2317 telephone, 55

Meridian 1
Meridian 1 Telephones
Description and Specifications

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