297-2041-900

DMS-100 Family

M5212 ACD Set

General Description, Installation, and Maintenance

BCS33 and up Standard 02.01 October 1991

northern telecom

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BCS33 Standard 02.01 release

- Added feature NC0288, Call Park
- Added feature NC0288, Directed Call Park
- Added information about volume settings for recommended headsets

March 1991

BCS32 Standard 01.01 release First release of this document

Revision bars in the table of contents identify the sections where technical information has been changed. Revision bars in the outside margin of a page indicate text that has been added or revised.

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About this document

This document provides a general description of the M5212, specifications, operations and feature information, installation procedures, and verification and maintenance information. Part numbers and ordering information are also included.

When to use this document

Northern Telecom (NT) software releases are referred to as batch change supplements (BCS) and are identified by a number, for example, BCS29. This document is written for DMS-100 Family offices that have BCS33 and up.

More than one version of this document may exist. The version and issue are indicated throughout the document, for example, 01.01. The first two digits increase by one each time the document content is changed to support new BCS-related developments. For example, the first release of a document is 01.01, and the next release of the document in a subsequent BCS is 02.01. The second two digits increase by one each time a document is revised and rereleased for the same BCS.

To determine which version of this document applies to the BCS in your office, check the release information in *DMS-100 Family Guide to Northern Telecom Publications*, 297-1001-001.

How to identify the software in your office

The *Office Feature Record (D190)* lists your current BCS and the NT feature packages in it. You can view similar information on a MAP (maintenance and administration position) terminal by typing

>PATCHER;INFORM LIST;LEAVE

and pressing the Enter key.

How M5212 ACD Set documentation is organized

This document is part of M5212 ACD Set documentation that supports the Northern Telecom line of M5212 ACD Set products. M5212 ACD Set documentation is a subset of the DMS-100 Family library.

The DMS-100 Family library is structured in numbered layers, and each layer is associated with an NT product. To understand M5212 ACD Set products, you need documents from the following layers:

- DMS-100 Family basic documents in the 297-1001 layer
- M5212 ACD Set documents in the 297-2041 layer

M5212 ACD Set documents and other documents that contain related information are listed in "Finding M5212 ACD Set information" in *M5212 ACD Set Product Guide*, Product guide.

References in this document

The following documents are referred to in this document.

Number	Title
P0726328	*M5212 User's Guide*
297-2011-180	*DMS-100 Business Set Line Engineering*
297-2041-010	*Automatic Call Distribution Product Guide*
297-2041-101	*Automatic Call Distribution Planning and Engineering Guide*
297-2041-301	*Automatic Call Distribution Administration Guide*
297-2041-350	*Automatic Call Distribution Translations Guide*
207-2041-500	*Automatic Call Distribution Tier II Maintenance Guide*
297-2041-503	*Automatic Call Distribution Trouble Locating and Clearing Guide*
297-2041-901	*End-User Load Management*

What precautionary messages mean

Danger, warning, and caution messages in this document indicate potential risks. These messages and their meanings are listed in the following chart.

Message	Significance
DANGER	Possibility of personal injury
WARNING	Possibility of equipment damage
CAUTION	Possibility of service interruption or degradation

Examples of the precautionary messages follow.

DANGER
Risk of electrocution
The inverter contains high voltage lines. Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed first. Until these fuses are removed, the high voltage lines inside the inverter are active, and you risk being electrocuted.

WARNING
Damage to backplane connector pins
Use light thumb pressure to align the card with the connectors. Next, use the levers to seat the card into the connectors. Failure to align the card first may result in bending of the backplane connector pins.

CAUTION
Loss of service
Subscriber service will be lost if you accidentally remove a card from the active unit of the peripheral module (PM). Before continuing, confirm that you are removing the card from the inactive unit of the PM.

Introduction

The M5212 ACD telephone set with display and two headset ports has been designed specifically for use with ACD applications. The M5212 is equipped with:

- 11 buttons with associated liquid crystal display (LCD) indicators that may be assigned to features or line appearances
- One button with associated LCD indicator for handset mute off/on
- HOLD, RELEASE, and VOLUME CONTROL keys
- 2 X 24 alphanumeric display
- 12-key dialpad
- Modular ports for headset support

The alphanumeric display module is mounted at the rear top edge of the telephone and is hinged so that the viewing angle can be adjusted physically to reduce glare and maximize contrast. The maximum display capacity of the screen is two rows of 24 characters each.

The M5212 may be equipped with one to three M518 18-button add-on units, or with one M536 36-button add-on module. Alternatively, a combination of one M536 and one M518 add-on units may be used.

Physical Characteristics

The phone is available in either chameleon-gray or black. Feature and line appearance keycaps are medium dolphin gray. The IN CALLS keycap is green, the HOLD key is red, and the RELEASE key is orange. The line cord is silver satin.

Dimensions

The exterior dimensions of the M5212 ACD set are:

Table 1-1xxx
Physical Dimensions

Dimension	MM	Inches
length	226.5	8.8
width	208.0	8
height (front)	27.5	1.1
height (rear)	73.5	2.88

External Connectors

The modular jacks for the line cord, handset cord and headset cord are located on the bottom of the set. Figure 4-2 on page 4-5 shows the underside of the telephone base with handset and line cord channels, and a connecting cord channel for installations where the telephone is equipped with add-on modules. Figure 3-1 on page 3-2 shows and labels the user accessible main components of the M5212 ACD set.

Specifications

The M5212 ACD set meets or exceeds the functionality standards currently attained by other members of the M5000 terminal portfolio.

LCD Indicators

The M5212 has 12 feature keys with associated LCD indicators. Of these 12 keys, 11 are assignable, and one has a fixed position. The LCD indicators reflect the following states:

Table 2-1xxx
LCD status indicators

Function	LCD State
Idle	LCD Off
Active	LCD On
Ringing or feature pending	LCD Flashing
Hold or feature pending or mute activated	LCD Winking

Feature activation and display messages

Feature activation and display messages are completely controlled by the DMS-100 Meridian Digital Centrex ACD software using stimulus signaling.

Handset operation and mute control

When the headset is connected, the hookswitch is completely bypassed. If the headset is connected, taking the handset off-hook and then placing it back on-hook will not affect the status of a call. When a headset is not connected, this hookswitch bypass is disabled, and the handset operates as it would on another business set.

One feature button is permanently assigned to toggle the handset mute on or off. The mute handset LCD indicator will indicate the following states:

Table 2-2xxx
Mute handset LCD indicators

On/Off Hook - Mute On/Off	LCD State
Handset on-hook	LCD Off
Handset off-hook - mute off	LCD Off
Handset off-hook - mute on	LCD winking

During operations with a headset connected, the default state for handset operations is mute on. Pressing the MUTE button one time during a call places the handset into mute off mode. Once the handset is in the mute off mode, it will not return to a muted mode until the MUTE button is pressed again, the handset is placed on-hook, or the REALEASE (Rls) key is pressed.

Volume control

The VOLUME CONTROL rocker key controls independent volume levels for the headset, handset, ringer, and speaker. A visual bar indication is shown on the main display whenever the VOLUME CONTROL key is used.

Headset volume is controlled only during an active call with the handset on-hook. Once it has been set, the headset volume setting will be maintained unless auxiliary power is lost to the M5212, the headset is disconnected, or the volume setting is changed.

Handset volume is controlled during an active call with the handset off-hook. Once it has been set, the handset volume setting will be maintained unless power is lost to the M5212, the handset is placed on-hook, or the volume setting is changed.

Speaker volumes may be adjusted during on-hook dialing and listen on hold. In addition, the ringer volume can be adjusted while the handset and headset are seated. Changes to the ringer and speaker volume settings are maintained as long as auxiliary power is not lost.

Reliability

MTBF (mean time between failure) predictions were made using the Product Integrity MTBF component database.

Table 2-3xxx
Random electronic failures and MTBF

Item	% Failures per Year
Handset Receiver	0.9
Handset Transmitter	0.5
Alphanumeric Display	1.2
Wall Transformer	0.3
Hookswitch	0.3
Electronic Components	4.4
Total	7.6% MTBF = 13.16 years

Table 2-4xxx
Mechanical Failure

Item	One failure per years
Handset Cord	70
Line Cord	30
Housing	200
All Mechanical Components	19

Recommended headsets

Northern Telecom has fully tested the following headsets and adapters and found them to be acceptable from both safety and performance standards:

Note: "RJ" usually refers to headset types with electret microphones. "PJ" usually refers to headset types with carbon microphones. For proper operation of the headset, ensure that the appropriate type of headset is plugged into the matching jack on the bottom of the set.

Table 2-5xxx
Recommended headsets

Manufacturer	Type	Model no.	Recommended Volume Settings
Plantronics	PJ	HSB552-1, Supra	VOL. II
Plantronics	RJ	MHB528-2, Supra	00110101 VOL. I

The following headsets are electrically compatible but have not completed safety testing:

Table 2-6xxx
Recommended headsets

Manufacturer	Type		Model no.	Recommended Volume Settings
Northern Telecom (Liberation)	PJ	Canada:	X9950640 - ear hook	NOM-MAX
			X9950641 - ear loop	NOM-MAX
			X9980642 - headband	NOM-MAX
		U.S.:	X9950663 - ear hook	NOM-MAX
			X9950664 - ear loop	NOM-MAX
			X9950665 - headband	NOM-MAX
Northern Telecom (Liberation)	RJ	Canada:	X9950644 - MPA	TX at 10
			X9950683 - ear hook	Side Tone at 0
			X9950684 - ear loop	Max. at 12
			X9950685 - headband	VOL. (MIN-NOM)
		U.S.:	X9950644 - MPA	TX at 10
			X9950695 - ear hook	Side Tone at 0
			X9950696 - ear loop	Max. at 12
			X9950697 - headband	VOL. (MIN-NOM
Plantronics	PJ		MHB228-2, Starset	01110001 VOL. I
			HSB343-1, Starset	VOL. II
ACS	PJ		Attendant AT	VOL. 2-3
	PJ/R		MCE	1,2,3,4,5 for S-3; 3,4,5,6 for S-4
	J		ISDN/DMS	3,5,7,9 for S-3; 6,7,9,10 for S-4
	RJ		Micro-power MP	2,6,7 for S-3

WARNING
Potential safety hazard.
Northern Telecom has performed tests to confirm the electric and acoustical compatibility of these headsets with the M5212. No test has been performed, and no representation is made, as to the safety of these headsets.

Table 2-7xxx
RJ to PJ Adapters

Manufacturer	Model no.
Plantronics	18709-01

Environmental and Safety Considerations

The M5212 meets the Canadian and U.S. mandatory interconnect requirements for telephone equipment.

Temperature and Humidity

The M5212 operates within the following conditions:

- Operating state
  - Temperature Range: 5 to 50 degrees Celsius
  - Relative Humidity 20% to 95% non-condensing, 34% for 30 to 50 degrees Celsius
- Non-operating state
  - Temperature Range: -20 to 70 degrees Celsius
  - Thermal Shock: from -30 to 70 degrees Celsius, to room ambient (25 degrees Celsius)
  - Relative Humidity: 20% to 95% non-condensing for 0 to 40 degrees Celsius

Electromagnetic Interference

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

Vibration and shock

The M5212 ACD Set was designed to continue to work to specifications after being subjected to the following vibrations in each of three orthogonal directions for 90 minutes:

- Vibration frequency range of 5 to 200 Hz
- Maximum half displacement 0.35 mm (.014 in)
- Maximum acceleration 1.5/m/s/s

In addition, the design of the set accommodates normal handling during shipment when it is contained in its packaging.

Line Engineering

The M5212 ACD set is designed for direct connection through a non-loaded subscriber loop pair to a Northern Telecom DMS-100 or DMS-250 Digital Switching system. It operates to its full potential through twisted pair wiring on transmission lines selected according to rules detailed in *NTP 297-2011-180, DMS-100 Business Set Line Engineering*. The maximum loop length is 4,572 m (15,000 ft) on 26 AWG standard twisted pair telephone wires.

The interface to the Central Office (CO) equipment is through a business set (6X21AC) line card in the Line Concentrating Module (LCM) of the

DMS-100 or DMS-250. The 6X21AC card supports one business set per line card.

Powering Requirements

The M5212 ACD set is powered through both its loop connection to the CO and through an external power supply.

Loop power

Loop power is supplied by a balanced 440 Ohm battery feed from the switching equipment. The switch battery voltage supplied to the loop is nominally 52 V dc, with a minimum of 42.75 V dc and a maximum of 56 V dc. Under normal conditions, the polarity must be negative on the Ring lead with respect to the Tip lead.

The current drawn from the loop is typically10 mA when the set is idle, and 16 mA when the set is active.

External power

Each M5212 requires an external power supply to be fully operational. If the external power supply fails, only feature keys 0 through 9, and LCDs 0 through 7 will be operational.

This external power supply must be 16 V ac and must satisfy the following set current demands:

- Active state local power consumption: (with 2 carbon equivalent headsets) — Maximum current drawn is 120 mA rms (2.2W)
- Idle state local power consumption: (with no headsets seated) — Maximum current drawn is 40 mA rms (0.750W)

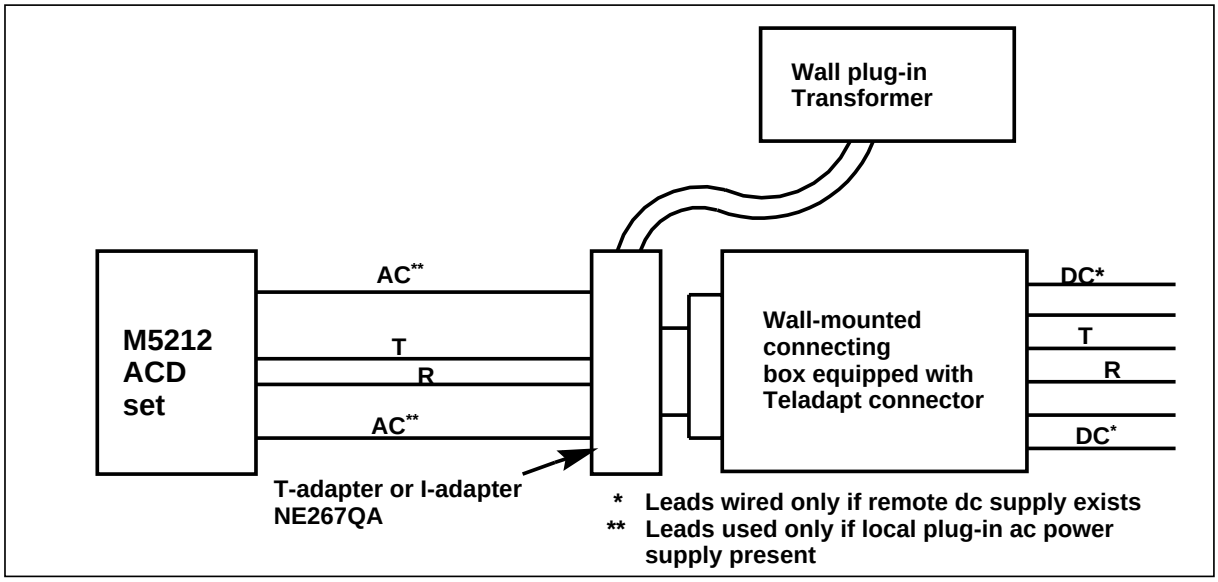
Two closet dc power supply units are recommended:

- Shumway; No. TBA, 110 V ac input, 24 V dc, 200mA outputs
- NPS 50220-07.L8; CPC A0352921 (1 circuit), 110V ac, input, 24V dc, 250mA output

When using the closet power supply, the following points should be observed:

- A separate cable, containing Tip, Ring, and power supply leads, is required for each M5212 set.
- Each M5212 set is to be connected to a different power supply circuit.
- The run length between the closet power supply and the M5212 must not exceed 76m (250 ft) of 24 or 22 AWG wire, or 46m (150 ft) of 26 AWG wire.
- Wire pairs should not be paralleled to reduce feed resistances.

Figure 2-1xxx
Wiring scheme for alternate power supply arrangements



Operations and features

An ACD agent using the M5212 ACD Set can answer ACD calls, answer or place non-ACD voice calls, and operate selected DMS-100 features. All supported features can be accessed through 10 of the 11 assignable feature keys provided on the set. Feature key one is always reserved for the IN CALLS key.

Detailed descriptions of how to answer ACD calls, how to answer or make non-ACD calls, and how to access and use the available Meridian Digital Centrex features are provided in the *M5212 User's Guide, P0726328* which is shipped with each telephone set. Refer to the User's Guide before attempting to operate the M5212 ACD set.

Feature descriptions

The M5212 is characterized by 15 fixed keys with no LCD indicators, one fixed key with an LCD indicator, and 11 assignable key/LCD indicator pairs. Each M5212 ACD set also features an alphanumeric display and a loudspeaker for on-hook dialing and listening on hold. Refer to Figure 3-1 on page 3-2 for the location of these components. The M5212 also features alerting tones compatible with the M5000 terminal line.

Keys

The 15 fixed keys which do not have LCD indicators are assigned as:

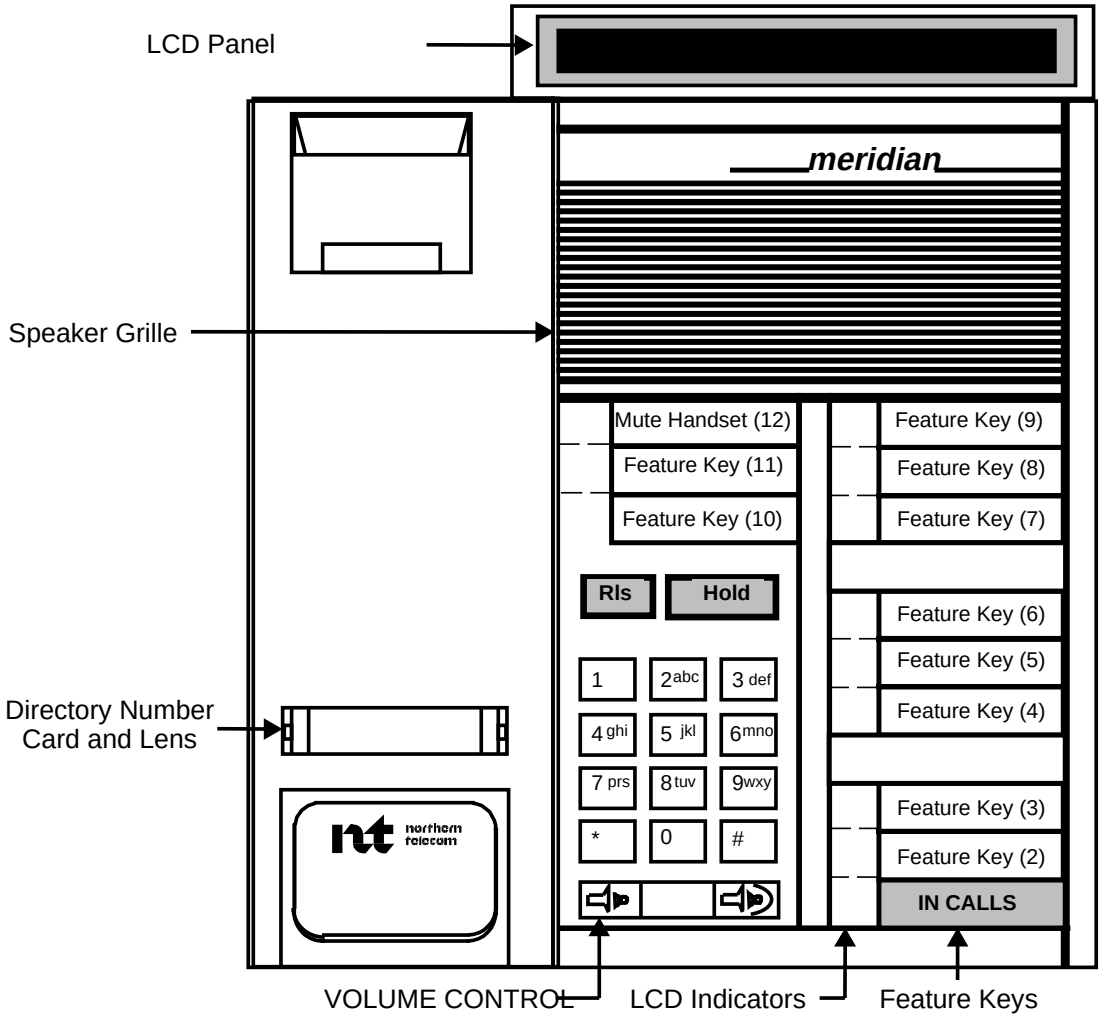
- RELEASE (Rls) key
- HOLD key
- VOLUME CONTROL key
- Dial-pad keys (12)

The single fixed key with an LCD indicator is the MUTE key. The 11 remaining keys with LCD indicators may be assigned to any ACD function, with the exception of the first key. It must be assigned to the IN CALLS function.

LCD indicators

LCD indicators used with feature keys support four key/LCD states as detailed in Table 2-1 on page 2-1.

Figure 3-1xxx
M5212 ACD Set



Note: Feature keys are assignable to ACD or standard business set functions. The number designations are for testing and illustration purposes only. The IN CALLS Key should be equipped with a green button cover. This illustration is not drawn to scale.

Alphanumeric Display

The LCD screen permits alphanumeric display of up to two lines of information, each with 24 characters. The display screen allows access to the following features:

- Called number display (also Called name display where available)
- Calling number display (also Calling name display where available)
- Feature programming
- Feature usage
- Set type and firmware version display on power up

A called number (or the name of the party being called) will be displayed as the digits are dialed. For calling number/name display, the number or name of the calling party is displayed when the first ringing tone sounds if the call originates within the same switch, and terminates on the IN CALLS key. If the incoming call terminates at a secondary DN, the number/name will be displayed only after the receiver is lifted.

Tone Characteristics

A locally generated buzzer (500 Hz) tone is used for call waiting and off-hook alerting. All other telephony tones are provided by the switching equipment from a tone card.

The various tones heard on the M5212 ACD set are defined as follows:

Table 3-1xxx
Tone Characteristics

Tone	Characteristic
Ringing	Interrupted warble tone, typically 2 seconds on, 4 seconds off.
Busy	Interrupted tone, 1 second on, 1 second off.
Call Waiting	Two short bursts of buzzer tone (500 Hz), at 10 second intervals.
Call Arrival for ACD call (headset in use)	One short burst of tone, not repeated.
Confirmation	Three short bursts of tone, not repeated. Informs user that the feature requested has been activated. This tone sounds only when the feature is accessed by dialing an access code.
Dial	Continuous tone (consisting of 2 frequencies).

- continued -

Table 3-1xxx
Tone Characteristics (continued)

Tone	Characteristic
Reorder	Interrupted tone, 1/2 second on, 1/2 second off. Informs the user of unavailable feature, all trunks busy, illegal code, etc.
Ring Again	Short burst of buzzer tone (500 Hz), once only. Informs the user that a previously busy station or trunk line is now free.
Special Dial	Three short bursts of dial tone, followed by continuous dial tone. Informs user that dialed feature (such as call forwarding) has been activated and further digits (such as station directory number to which calls are to be forwarded) can be dialed.
DTMF tones	Generated at the switch. Initiated by dial pad key use on an established connection.
End	

Loudspeaker

A speaker is used for alerting tones and call monitoring - on-hook dialing and listen on hold.

Feature operations

The M5212 ACD set provides access to features specifically designed to help ACD agents perform their jobs, as well as basic business set features incumbent to the M5000 terminal line. There are 11 assignable feature key/LCD indicator pairs to which the ACD and/or business set features may be mapped. Key number one must be assigned to the IN CALLS function. In addition, there are four permanently assigned control type keys, as well as a 12 key dialpad.

Basic features

Every M5212 ACD set has several basic features:

- Automatic prime DN selection
- On-hook dialing
- Listen on hold

Automatic prime DN selection

For the M5212, the primary DN (directory number) is the IN CALLS key. When the headset is not in use, any call presented on the IN CALLS key may be answered by simply going off-hook. It is not necessary to press the IN CALLS key.

On-hook dialing

A call may be dialed by selecting a line and then dialing the number. It is not necessary to lift the handset, or to use the headset until the called party answers. Calls cannot be originated from the IN CALLS key.

Listen on hold

Listen on hold is active only when the headset is not plugged in. To use this feature, the HOLD key is pressed while active on a call. The associated LCD indicator will flash. Place the handset back in its cradle, and then reselect the line whose indicator is flashing.

Permanently assigned keys

The permanently assigned keys are as follows:

- MUTE
- IN CALLS
- RELEASE
- HOLD
- Dial pad (12 keys)
- VOLUME CONTROL

MUTE and IN CALLS both have indicator LCDs associated with them.

Mute handset

The MUTE feature key (labeled Mute Handset) has an associated LCD indicator, and allows the user to listen to a call without the other party hearing any sound. The feature is valid only when using the handset. It has no functionality when only the headset is being used. Pressing the MUTE key will cause the associated LCD indicator to flash. Refer to Table 2-2, page 2-2, for a description of the Handset Mute LCD indicators.

IN CALLS

The IN CALLS function is always assigned to feature key number one. All ACD calls directed by the system to this position will be presented on the IN CALLS key. The key may not be used to originate outgoing calls.

If the handset is being used, the IN CALLS key will be selected whenever the user goes off hook. If the headset is in use, the key must be pressed in order to answer the incoming ACD call unless call forcing is in operation. Refer to *NTP 297-2041-010, Automatic Call Distribution Product Guide* for details on Call Forcing.

Using any of the following permanently assigned keys will change the alphanumeric display window or the status of other feature keys' LCDs. However, these keys do not themselves have LCD indicators.

Release

The RELEASE (Rls) key performs a function similar to going on-hook - when pressed, it terminates the currently active call. The LCD associated with the released call changes from the ON state to the OFF state. If the headset is not in use, the state of the set will remain off hook to the switch, but with call idle (not busy line) until the handset is replaced in its cradle. If the headset is being used, the M5212 ACD set will be available to receive another call.

Hold

The hold function has two modes of operation, manual and automatic. When a user is engaged in a call, that call can be put on hold either by pressing the HOLD key or by pressing another DN key. In either case, the LCD of the active call will change from ON to flashing quickly (winking), and the user will be free to answer or make another call.

Dialpad

Before a call is established, no tone-feedback is provided when the dialing keys are pressed. After a call has been established, end-to-end signaling using Central Office (CO) generated Dual-tone Multifrequency (DTMF) tones is enabled and tone-feedback is provided.

Volume control

The loudness of any sound which comes through the speaker, headset, or handset (including ringing, dial tone, busy tone, and on-hook monitoring) is controlled by one key with two toggle positions. Tapping or continually pressing the key at the right side will increase the volume. Tapping or continually pressing at the left side will decrease it. Headset volume is controlled with the headset connected and the handset on hook. Handset volume is controlled with the handset off hook. The volume settings for both the headset and handset are controlled independently of each other.

Once they are set, ringer and speaker volume levels are maintained until they are changed by the user or power is lost to the set. Disconnecting the headset will cause its settings to revert to nominal. Similarly, placing the handset back on hook will cause loss of its volume settings; the settings revert to nominal.

The volume for alerting tones can only be adjusted while alerting is in progress. The on-hook monitor volume can only be adjusted while monitoring. Both volume levels are automatically stored, after completion of adjustments, for subsequent calls, provided the local power supply (from the ac transformer) is not interrupted. Note that an interruption of the local power supply will occur not only if local power fails, but also if the linecord is disconnected, because the local power supply is fed through the linecord.

If there is an interruption of loop power (while the local ac power remains uninterrupted), at resumption of the loop power supply, the M5212 will have both the on-hook dialtone and alerting tone levels restored to the last setting prior to loop power loss. The tone level restoration will occur at the first occurrence of on-hook dialtone or alerting tones after loop power is restored.

Whenever volume settings are altered, a volume bar for the active path is displayed for five seconds on the lower line of the alphanumeric display.

Assignable feature keys

The M5212 ACD set features ten additional assignable feature key/LCD indicator pairs. ACD features or standard business set features may be assigned to these keys.

ACD features that may be assigned to these keys include:

- Observe Agent
- Emergency
- Night Service
- Call Supervisor
- Call Agent
- Line of Business
- Queue Status Display
- Agent Status Summary Display
- Not Ready

Standard business features that may be selected include:

- Speed Call
- Autodial
- Conf 3
- Call Transfer
- Call Park
- Directed Call Park

Refer to the *M5212 ACD Set User's Guide* for instructions on how to use these features.

Headset operations

The M5212 ACD set is compatible with several commercially available headsets that use an RJ-type modular connector, or a PJ connector. Headset operations are the same, regardless of the type of headset used. Details of headset operations appear in the following table.

Table 3-2xxx
Headset Operations

Initial State	Action	Result	Verification
Idle or Active	Insert headset	Enable	Generates off-hook condition (IN CALLS and Mute Handset LCD indicators turn ON).
Active headset	Depress RELEASE (Rls) key	Disable	Generates release message. Call disconnects.
Active headset	Lift handset	Disable handset/ mute	Routes speech to handset. Mute LCD indicator is winking. Handset microphone is muted for call monitoring only. Depressing the MUTE button turns off the LCD and the muting of the handset microphone.
Active handset	Depress MUTE key	Mute handset micro-phone	Disables handset microphone, but handset receiver remains on. Microphone can be restored by operating the MUTE key again. The Mute LCD indicator winks during microphone muting; winking stops if the MUTE key is depressed again and LCD is off. This Mute feature only functions in handset mode, disabling the mouthpiece microphone (transmitter).
Active headset	AC power failure	Headset disabled Handset enabled	Lift handset and continue conversation until power is restored.

Installation procedures

Installation procedures consist of unpacking the M5212 ACD set and connecting it to the ac wall outlet and telephone line jack.

Note: No headset is shipped with the M5212.

Unpacking

Use proper care while unpacking any M5212 ACD set. Check for damaged containers so that appropriate claims can be made to the transport company for any items that may have been damaged in transit.

If for any reason the phone set must be returned to Northern Telecom, be sure that it is packed in the original container as shown in Figure 4-1 on page 4-4 in order to avoid damage during shipment. Remember to include all loose parts in the shipment, for example, cords, AC transformer, and the handset.

Installation

Installation requires plugging the cords into the Teladapt jacks that are accessible at the base of the set as illustrated in Figure 4-2 on page in 4-5. Cord restraining tabs are provided for security. Make the necessary connections to the Teladapt connecting block (Tip [+] green lead and Ring [-] red lead), and plug the line cord into the Teladapt jack (Figure 4-3 on page 4-6). Proceed with the steps as detailed in Procedure 4-1.

Procedure 4-1xxx
M5212 ACD Set Installation

Step	Action
1	Place the telephone in the work area (close to the line cord connecting block). Turn the phone upside down on several sheets of soft, clean paper on a solid, level work surface in order to prevent damage to movable keys, the telephone face, and the display.

- continued -

Procedure 4-1xxx
M5212 ACD Set Installation (continued)

Step	Action
2	Connect the four-conductor Teladapt connector at the coiled end of the handset cord to the handset Teladapt receptacle. Connect the Teladapt connector at the straight end of the handset cord to the Teladapt receptacle in the base of the telephone. The Teladapt connectors have a latch-tab which ensures correct alignment and prevents the cord from being pulled out inadvertently during service. Be sure that this latch tab is firmly snapped into place.
3	After you have connected the Teladapt connector at the straight end of the handset cord to the Teladapt receptacle in the base of the set, route the handset cord through the channel and past the restraining tabs as illustrated in Figure 4-2.
4	If a headset is being used, connect the headset cord to the correct Teladapt receptacle in the base of the set as shown in Figure 4-2. Route the headset cord to the headset of applicable adapter as shown in Figure on page in 4-2.
5	Connect the line cord to the connector in the base, and push it under the restraining tabs in the line cord channel of the telephone base. (See Figure 4-2.)
6	Turn the telephone right side up and place it in the final workstation position.
7	Print the directory number on the designation card. Remove the number lens by inserting the end of a paper clip in the hole at the side and levering upwards. Insert the designation card and snap the lens with the card back into place.
8	Designate button labels for key designations.
9	Fold the labels and insert them inside the plastic button covers. Snap the button covers over the movable keys, pressing down on each key as required. *Ensure that the green button conver is on Key 1* - IN CALLS.
10	Insert the line cord Teladapt connector into the connecting block and verify that it has securely snapped into place. (Refer to Figure 4-3.)

- continued -

Procedure 4-1xxx
M5212 ACD Set Installation (continued)

Step	Action
10	Observe set type and firmware version display, along with any applicable error messages. (This information will be displayed for 5 seconds following internal power up and self test.) If RAM X or ROM X or both are displayed, the set has failed basic internal tests and must be returned for repair.
11	Wait a minimum of 20 seconds to allow for proper power-up before using the M5212 ACD set. This completes the installation.
	End

CAUTION
Potential installation hazards
Never install telephone wiring during a lightning storm.
Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
Use caution when installing or modifying telephone lines.

Figure 4-1xxx
M5212 ACD Set packaging

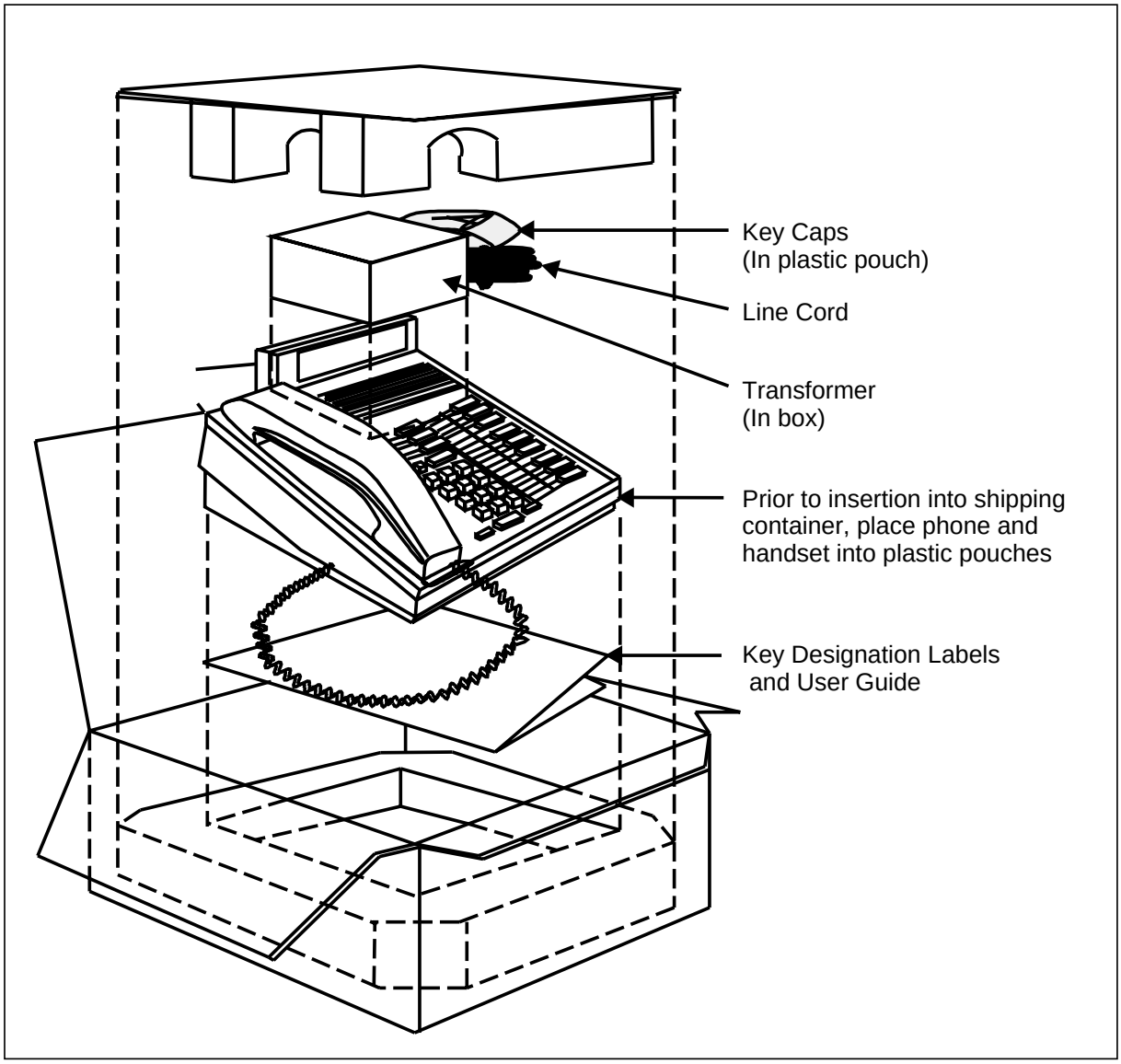


Figure 4-2xxx
M5212 ACD Set bottom view

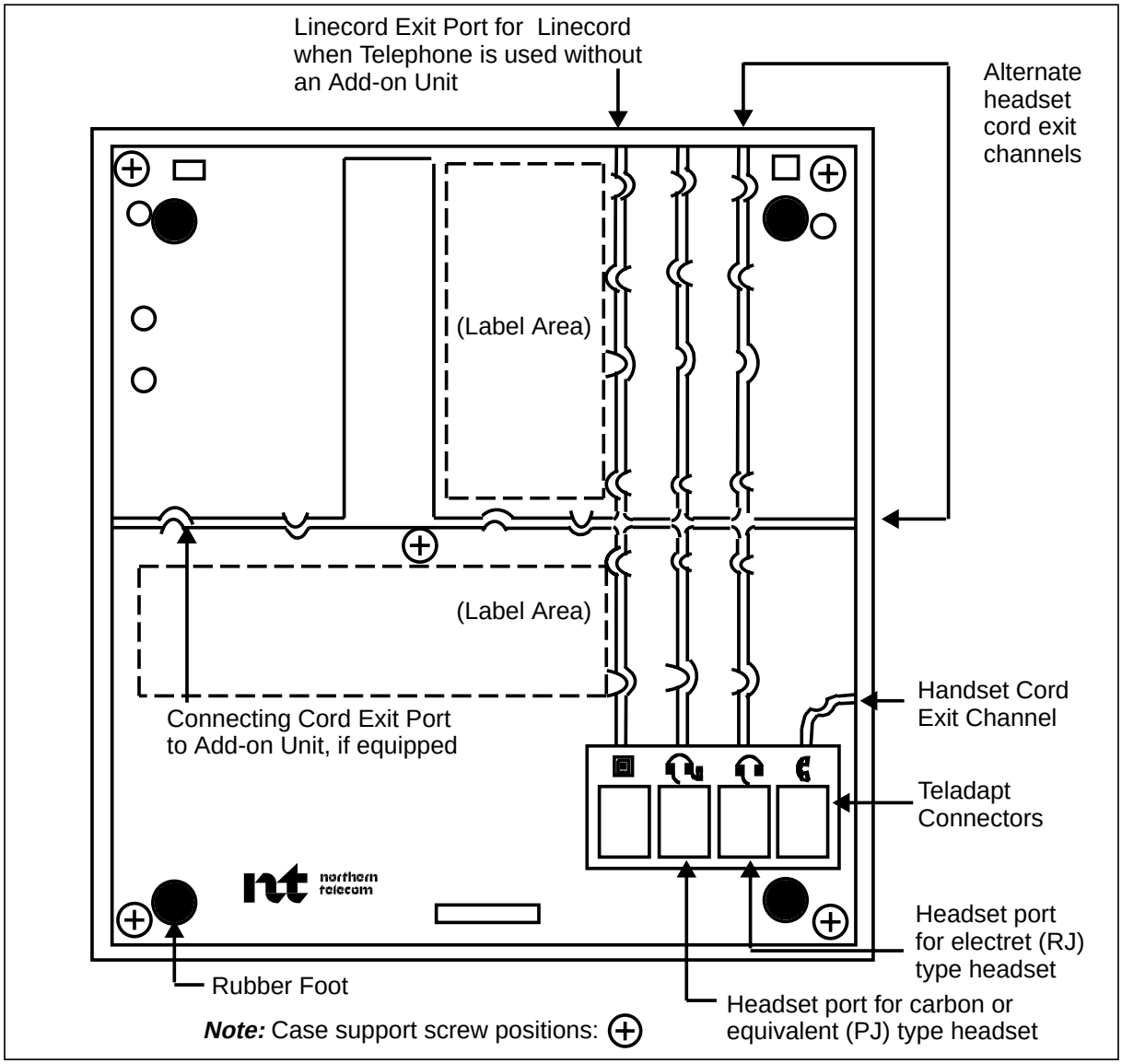
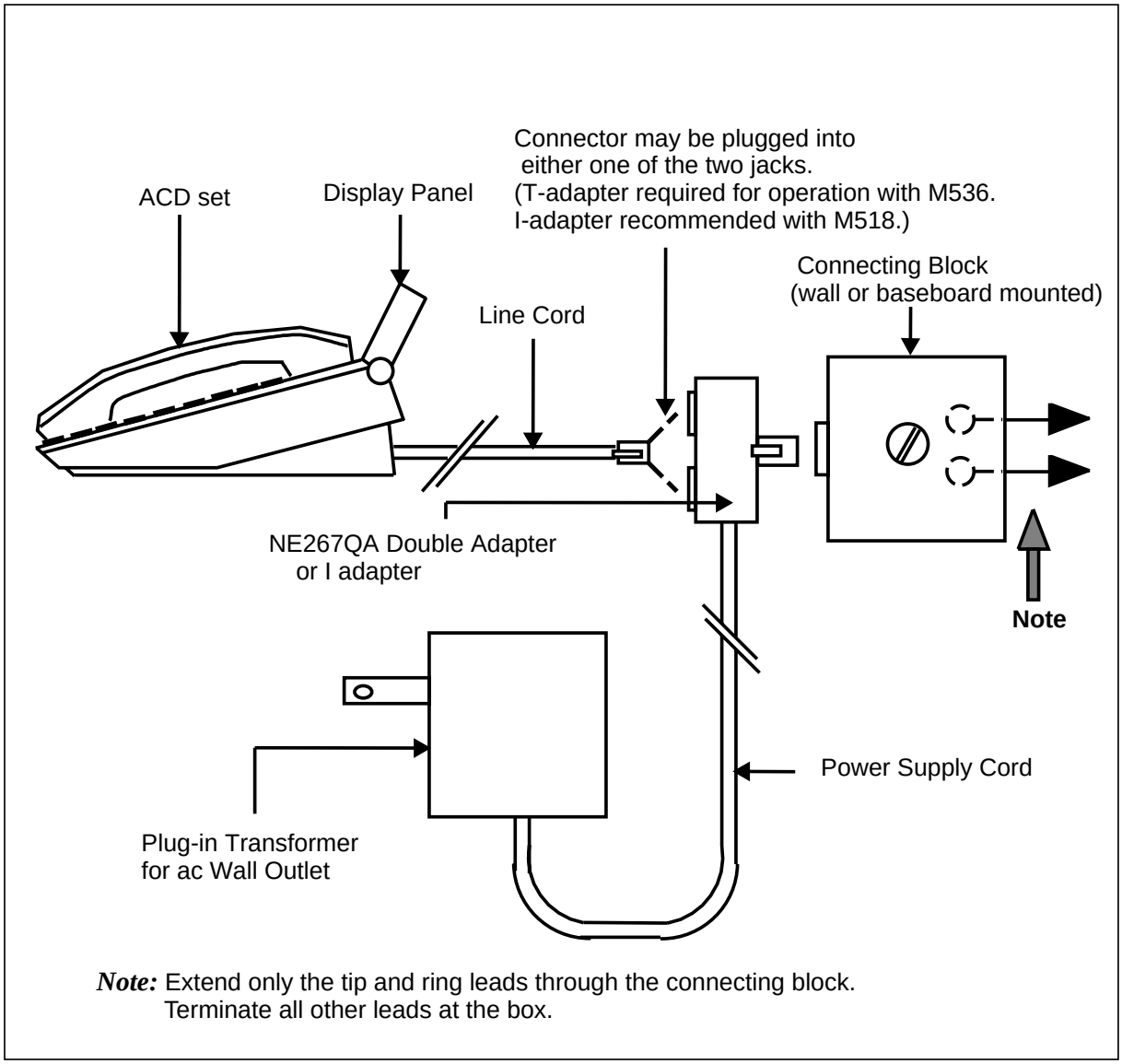


Figure 4-3xxx
M5212 ACD Set loop connection



Note: Extend only the tip and ring leads through the connecting block. Terminate all other leads at the box.

Verification procedures and maintenance

The verification test routines detailed in this section are primarily acceptance tests.

Maintenance

Maintenance in the field should be limited to replacing the handset, handset cord, headset, power supply (transformer), or the entire unit. Mean time to repair should not exceed 15 minutes for a single technician.

CAUTION
No user serviceable parts inside set.
There are no user serviceable parts inside the M5212 set. If maintenance beyond replacing the handset, handset cord, headset, or power supply (transformer), is required, the set must be returned to Northern Telecom for repairs, including fuse replacement.

Verification test routines

There are criteria outlined in *NTP 297-2011-180, Business Set Line Engineering*, that if observed, will make impulse noise, background noise, and crosstalk compatibility unlikely. A loop check should be performed prior to installing the M5212 ACD set. Installation includes verification that on power up, the set displays set type, firmware version, and no RAM or ROM failures. Following installation, the Tip/Ring polarity should be checked before attempting to establish a communication path to another telephone and before going through the different call routines (enabled features) while observing and verifying the responses of the set. The Station Ringer Test can be used to verify Key/LCD indicators. Refer to Procedure 5-3 on page 5-3 for details.

Loop check

Loop and linecard tests are performed at the switching equipment in the Central Office (CO), and should have been completed before installing any M5212 ACD sets.

Polarity Check

The M5212 ACD set is polarity sensitive. If problems occur when the set is put into service, take the following actions:

Procedure 5-1xxx
Polarity check

Step	Action
1	Go off hook, either by lifting the handset or pressing a DN key. If the set does not respond (no dial tone) after 20 seconds, check the polarity of the tip and ring leads (tip +, ring -). Return to hook.
2	Reverse the leads. Go off hook again. If tip and ring lead reversal does not solve the problem, restore tip and ring to their original polarity and change the set.

This test must be performed on the set whenever there is an AC power failure, and the set reverts to POTS mode. There is an internal loop power bridging CKT which may make the set appear to function even with reversed polarity.

Station Ringer Test

The Station Ringer Test (SRT) tests the hardware of the M5212 ACD set, and can be performed by either the installer or the repair technician at the site without involving CO personnel.

Test Set-up

To prepare the set for the Station Ringer Test, perform the following preparatory step.

Procedure 5-2xxx
Station ringer test setup

Step	Action
1	With the handset on hook and all LCD indicators off, press the secondary directory number key and dial the 3- to 14-digit access code.

The access code consists of a one to seven digit number which is assigned by the telephone company according to local preferences, followed by the last two to seven digits of the prime DN assigned to the telephone to be tested. In North America, the access code usually consists of the number 57, followed by the last five digits of the prime DN. If the required digits are dialed incorrectly, a *REORDER* tone will sound. It will then be necessary to press the RELEASE key and start again. If all digits are correct, all the LCD indicators, except the one associated with key 12 (MUTE), will light up and the dialed digits will be cleared from the display.

When this preparatory step has been executed, the Station Ringer Test can proceed. Procedure 5-3 provides the details of the test.

Station ringer test - key sequences

Operations are detailed in the Key or Switch Operated column, and should be performed in the order given in this procedure. The response must be the one shown in the Response Observed column. Refer to Figure 3-1 on page 3-2 for LCD and key numbering. The column labeled Messages Used shows the messages that are generated to produce the correct response.

Be aware that the indicators associated with the MUTE key (key number 12) are affected differently by the station ringer test. Where "All LCDs ..." is given in this procedure, this indicator will remain OFF.

Procedure 5-3xxx
Station ringer test

Step	Key or Switch Operated	Response Observed	Messages Used
1	Handset OFF-HOOK	All LCDs FLASH	LCD Indicator FLASH
2	Handset ON-HOOK	All LCDs WINK	LCD Indicator WINK
3	Handset OFF-HOOK	All LCDs ON	LCD Indicator ON
4	Handset ON-HOOK	All LCDs OFF	LCD Indicator OFF
5	Dial Pad key 1	LCD 1 ON	Soft Reset, LCD ON
6	Dial Pad key 2	LCD 2 ON	Soft Reset, LCD ON
7	Dial Pad key 3	LCD 3 ON	Soft Reset, LCD ON
8	Dial Pad key 4	LCD 4 ON	Soft Reset, LCD ON
9	Dial Pad key 5	LCD 5 ON	Soft Reset, LCD ON
10	Dial Pad key 6	LCD 6 ON	Soft Reset, LCD ON
11	Dial Pad key 7	LCD 7 ON	Soft Reset, LCD ON
12	Dial Pad key 8	LCD 8 ON	Soft Reset, LCD ON
13	Dial Pad key 9	LCDs 1 & 8 ON	Soft Reset, LCD ON
14	Dial Pad key 0	LCDs 2 & 8 ON	Soft Reset, LCD ON

- continued -

Procedure 5-3xxx
Station ringer test (continued)

Step	Key or Switch Operated	Response Observed	Messages Used
15	Dial Pad key *	All LCDs ON	Soft Reset, LCD ON Save Indicator Status
16	Dial Pad key #	ALL LCDs OFF	Soft Reset
17	Feature key 1	LCD 1 ON	Soft Reset, LCD ON
18	Feature key 2	LCD 2 ON	Soft Reset, LCD ON
19	Feature key 3	LCD 3 ON	Soft Reset, LCD ON
20	Feature key 4	LCD 4 ON	Soft Reset, LCD ON
21	Feature key 5	LCD 5 ON	Soft Reset, LCD ON
22	Feature key 6	LCD 6 ON	Soft Reset, LCD ON
23	Feature key 7	LCD 7 ON	Soft Reset, LCD ON
24	Feature key 8	LCD 8 ON	Soft Reset, LCD ON
25	Feature key 9	LCD 9 ON	Soft Reset, LCD ON
26	Feature key 10	LCD 10 ON	Soft Reset, LCD ON
27	Feature key 11	LCD 11 ON	Soft Reset, LCD ON
28	RELEASE key	LCDs 2 & 8 ON	Soft Reset, LCD ON
29	HOLD key	Dial tone, LCDs 1 to 5 ON	Soft Reset, Turn on Tip/Ring to Speaker, LCD ON
30	VOLUME CONTROL *UP*	Volume Up	None (Test Voice Volume Control)
31	VOLUME CONTROL *DOWN*	Volume Down	None (Test Voice Volume Control)
32	Handset OFF-HOOK or headset seated	Dial Tone from Handset only. All LCDs flash.	Turn Off Tip/Ring to Speaker, Turn on Handset, LCD flash

- continued -

Procedure 5-3xxx
Station ringer test (continued)

Step	Key or Switch Operated	Response Observed	Messages Used
33	HOLD key	1 second buzz (500 Hz). LCD indicators 6 to 10 ON. Handsfree LCD indicator OFF.	Turn On/Off Alert B, LCD ON
34	HOLD key	Ringing. All LCDs OFF	Ring tone from CO, Soft reset, Alert ON
35	VOLUME CONTROL *UP*	Volume UP	None (Test Ring Volume Control)
36	VOLUME CONTROL *DOWN*	Volume DOWN	None (Test Ring Volume Control)
	Notes: For Step 37, when the HOLD key is pressed after completion of Step 36, the volume adjustment test (that is, after alerting tones have been silenced), the LCD indicator for keys 2, 3, and 4 will flash for approximately two to four seconds. This indicates that a circuit test is running. No keys should be operated during that time as this may cause the test to fail. When the circuit test is completed, LCD indicators 1 - 10 will turn ON steady and, in most instances, 10/10 will be displayed in the display window, as detailed in Step 37. The numbers in the display, when read from left to right, indicate a count of the messages received against the messages sent. The numbers depend on the office parameter table and may vary between 10 and 50; however, the number to the left of the slash should always equal the number to the right of the slash. If the indications are as described above, the test has passed. Should one or several add-on units be connected to the set being tested, no indications of any kind will occur on the add-on unit or units during the circuit test. A test failure is indicated when the following occurs: (a) the two numbers in the display are not equal (b) only the LCD indicators for keys 1, 2, and 8 are ON (c) LCD indicators for keys 1, 2, and 8 wink Winking LCD indicators for keys 1, 2, and 8 indicate that the test did not run, possibly due to a timeout in the peripherals (example: high test volume). In this case, press the **HOLD** key again (Step 37) and repeat the station ringer test.		
37	HOLD key	LCDs 1 to 10 ON, 10/10 displayed on LCD screen	Soft Reset, LCD ON
38	HOLD key	Display is cleared	Hard Reset, Clear display
		End	

Ordering information

The M5212 ACD set has few field replaceable parts. The handset, handset cord, headset, line cord equipped with Teladapt connectors, key lenses and labels can be changed.

If an M5212 ACD set fails to function properly, or if a mechanical breakage occurs, repairs in the field should not be attempted. The unit should be returned to the manufacturer. The telephone must be packed in its original container for shipment. Refer to Figure 4-1 on page 4-4 for proper packing procedures.

Table 6-1xxx
M5212 ACD set stocklist of field replaceable parts

Description	Ordering code	Engineering code
Meridian M5212 ACD Set, Chameleon-gray, made in Canada for Canadian sales	B0230770	NT4X39AA
Meridian M5212 Set, Black, made in Canada for Canadian sales	B0233449	NT4X39GA
Meridian M5212 ACD Set, Chameleon-gray, made in Canada for U.S. sales	B0233448	NT4X39EA
Meridian M5212 ACD Set, Black, made in Canada for U.S. Sales	B0233450	NT4X39JA
Button labels and directory number card (French)	P0709511	P0709511
Button labels and directory number card (English)	P0709510	P0709510
Button, Handset Mute (English)	P0726332	P0726332
Button, Handset Mute (French)	P0726333	P0726333
Handset Assembly, Chameleon-gray	A0358849	NT0C09EE-35
Handset Assembly, Black	A0338908	NT0C09EA-03

- continued -

Table 6-1xxx
M5212 ACD set stocklist of field replaceable parts (continued)

Description	Ordering code	Engineering code
Handset Cord, 2.8 m (9 ft) long, Chameleon-gray	A0327131	NE-H4DUQC-35
Handset Cord, 2.8m (9 ft) long, Black	A0327133	NE-H4DUQC-03
Label, Button Cover, Clear	P0637674	P0637674
Label, Button Cover, Green	P0657710	P0657710
Lens, Station Identification	P0652720	P0652720
Line Cord, silver-gray, 2.3 M (7.5 ft) long	A0274382	NE-D6QT-87
AC Power adapter with T-connector 16 VAC 375mA	A0329941	NPS50220-08 L4
AC Power adapter I-connector 16 VAC 375mA	A0346828	NPS50220-08 L6
End		

List of terms

ACD

Automatic Call Distribution

ACD set

An electronic business set (with display) customized for ACD use by the addition of two headphone jacks used for hands-free operation. Options include add-on feature key modules

ASCII

American Standard Code for Information Interchange

Automatic call distribution

A Meridian Digital Centrex feature that assigns answering priorities to incoming calls, and then queues and distributes them to a predetermined group of telephone sets designated as answering (agent) positions

Batch change supplement

A DMS-100 Family software release

BCS

Batch Change Supplement

DN

Directory Number

EBS

Electronic Business Set

ETS

Electronic Telephone Set (alias for Electronic Business Set)

LCD lamps

A liquid crystal display located alongside each of the 12 feature keys on the M5212 ACD set. The display can show a black diamond indicator (lamp) against each feature key. The indicator has four states: off, on, flashing (60 times per minute), winking (120 times per minute)

LEN

Line Equipment Number

MAP

Maintenance and Administration Position

Maintenance and administration position

A MAP workstation for user interface to the system

MBS

Meridian Business System

OM

Operational -Measurement

PEC

Product Engineering Code, an eight-character NT marketing code

Secondary directory number

An optional non-ACD directory number assigned to a feature key on an EBS

SDN

Secondary Directory Number

DMS-100 Family

M5212 ACD Set

General Description, Installation, and Maintenance

Publication number: 297-2041-900
Product release: BCS33 and up
Document release: Standard 02.01
Date: October 1991

Printed in Canada and printed in the United States of America.