

SAMSUNG

TECHNICAL MANUAL

NX-828 (For EUROPEAN)





EC DECLARATION OF CONFORMITY

For the following named product :

KEY TELEPHONE SYSTEM, NX-828

We hereby declare, that all major safety requirements, concerning to Electro-Magnetic Compatibility (89/336/EEC) are fulfilled, as laid out in the guidelines set down by the member states of the EEC commission.

This declaration is valid for all samples that are part of this declaration, which are manufactured according to the production chart appendix.

The standards relevant for the evaluation of Electro-Magnetic Compatibility requirements are as follows ;

EN55022 (1987 LIMIT CLASS B)

Radiated Emission : 30 MHz ~ 1 GHz

Conducted emission : 150 MHz ~ 30 MHz

EN60555 (1992 LIMIT CLASS B)

Power Harmonics : 2nd ~ 40th Harmonics

EN50082-1 (1992)

Radiated Susceptibility : 27 MHz ~ 500 MHz (3V/m)

ESD : Air Discharge 8KV

EFT/BURST : AC Power Lines (1000V / 5KHz)
I/O Lines (500V / 5KHz)

IEC950(1991) Second Edition with Amendment 1(1992) and 2(1993) ;

EN60 950(1991) with Amdts. 1 & 2 : EN41 003 and National Deviations



ELECTRONICS

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NX-828

ELECTRONIC KEY/HYBRID
TELEPHONE SYSTEM

TECHNICAL MANUAL

INCLUDES :

GENERAL DESCRIPTION SECTION

INSTALLATION SECTION

FEATURE SECTION

PROGRAMMING SECTION

APPENDIX SECTION

BACK-UP DATA SHEETS

Every effort has been made to eliminate errors and ambiguities in the information contained in this manual. Any questions concerning information presented here should be directed to SAMSUNG ELECTRONICS Co., 9th Fl. Joong-Ang Daily News Bldg. 7, Soonwha-Dong, Chung-ku, Seoul, Korea C.P.O. Box:2775, Tel: (02)751-6508. SAMSUNG ELECTRONICS Co. disclaims all liabilities for damages arising from the erroneous interpretation or use of information presented in this manual.

GENERAL DESCRIPTION

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GENERAL DESCRIPTION

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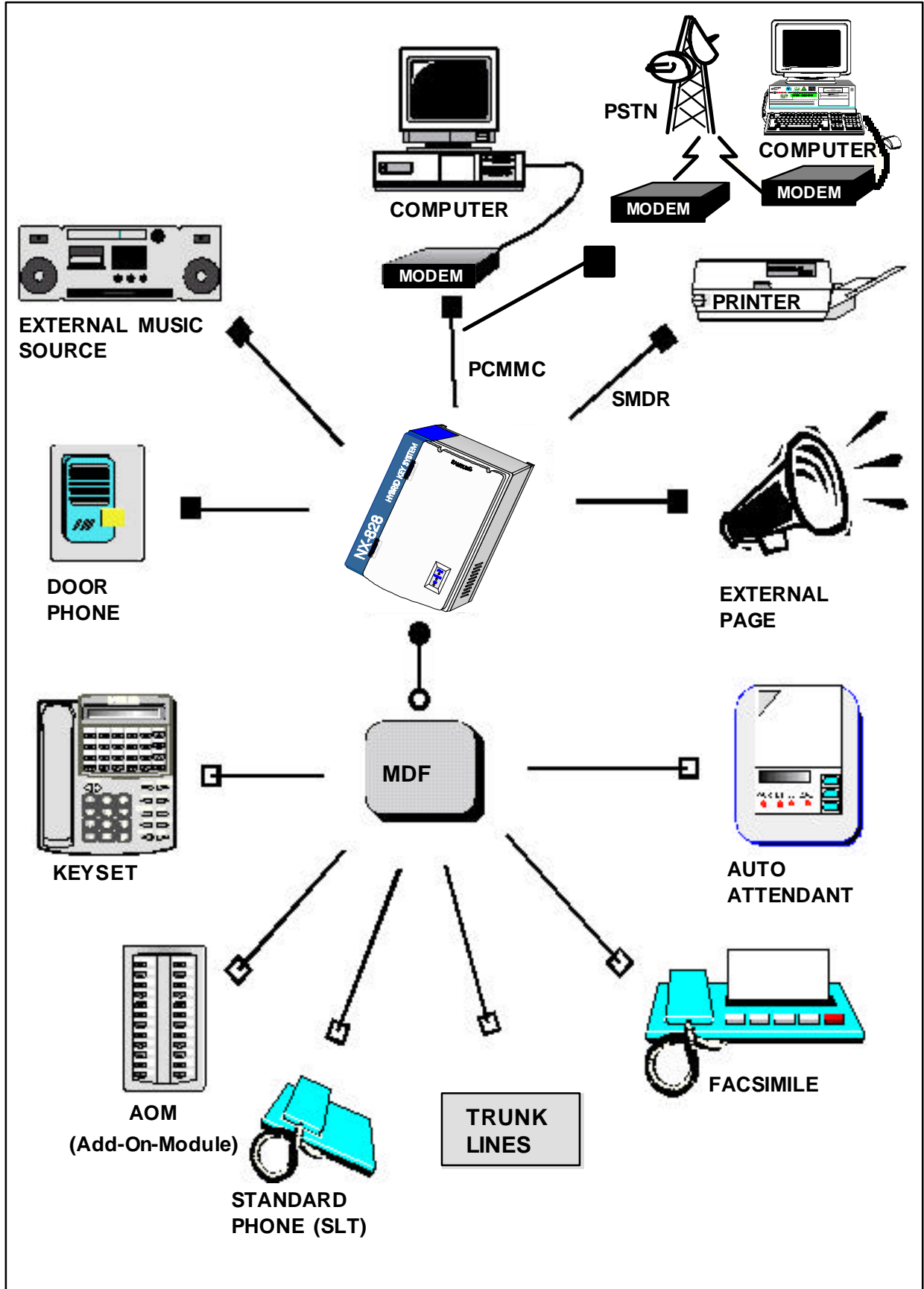
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NX-828 General System Diagram



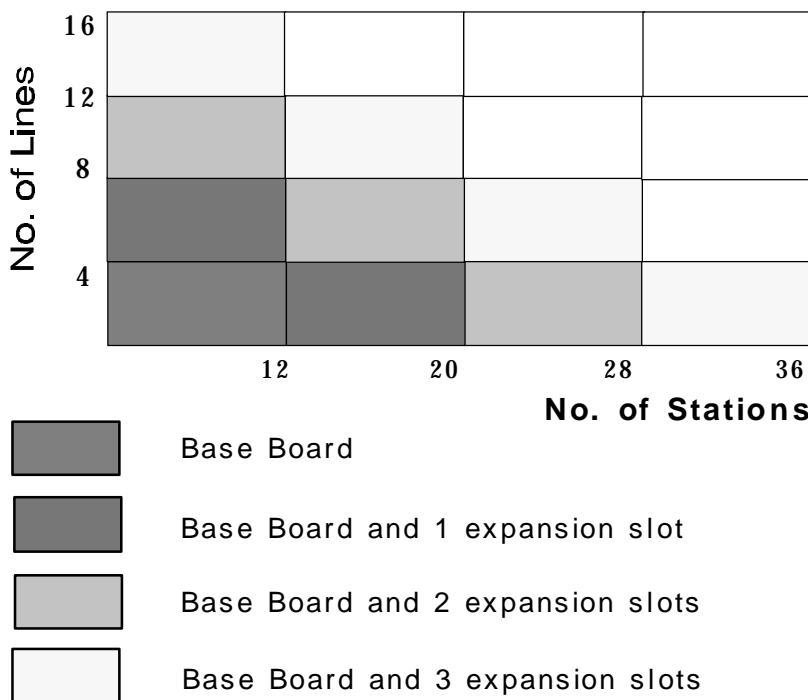
1. System Overview

The NX-828 system is an analogue telephone system designed for small to medium-sized businesses and for meeting CE (EMC + safety) regulations as well as the related PTT regulations. The system has a maximum capacity of forty (40) ports, being the sum of telephone lines and stations-the combinations of which are flexible. Comprising only a Key Service Unit (KSU), option cards, electronic keysets and conventional single line telephones, the system offers small or medium-sized business user's the flexibility and control of telephone communications. A powerful HM64180R1 microprocessor digitally controls all speech paths and system functions. The operating program with default memory is stored in non-volatile ROM 27C 020. Customer data is stored in RAM 681000 and is protected by a rechargeable Ni-Cd battery for up to seven day's continuous loss of system power.

2. System Configuration

The basic KSU comes equipped to operate four (4) telephone lines and twelve (12) stations. Stations from #1 to #4 are assigned to keysets, and stations from #5 to #12 are assigned to single line telephones. The NX-828 system has several types of option card: the NX-4TRK, NX-8KLI, NX-8SLI and NX-4OPX card can be installed in any slot of the three expansion slots. By combining these cards, the system can be increased to its maximum capacity of forty (40) ports. Optionally, the NX-SMDR/R-MMC and NX-DPH/PAGING cards can be installed on the base board for value-added features.

The NX-SMDR/R-MMC card is the serial interface card for SMDR and Remote MMC, and the NX-DPH/PAGING card is the door phone and external paging interface card. The NX-MPD Hybrid IC (50Hz, 12 or 16KHz) can be installed on the base board and the NX-4TRK option card for four (4) trunk ports up to a maximum of four per card. The chart below describes configurations using option cards.



You may connect up to 24 keystations to the system. More than 24 KLI connections may cause problems with system features.

3. Hardware Description

3.1 Key Service Unit (KSU)

The **NX-828** system is a single cabinet, wall mounted, metal-cased unit containing the following:

• **Power Supply**

- System main DC regulator from AC 230V, 50Hz
- Sinusoidal ring signal generator
- Battery charging/ Re-charging circuitry
- DC power regulator for single line telephones
- +12V DC power regulator and -5V DC power regulator

• **Connection Board**

• **Base Board**

- Four (4) loop start trunk line interface circuitry with Metering Pulse Detectors (optionally, 50Hz, 12kHz or 16kHz)
- Four (4) keyset interfaces and eight (8) single line telephone interfaces
- 16 speech paths
- Internal music source and external music interface
- Two (2) power failure transfers (trunk #1, #2 - station #11, #12)
- Memory back-up battery
- Real-time clock
- Four (4) connectors for Metering Pulse Detectors related to four (4) trunks
- Connector for NX-DPH/PAGING card and NX-SMDR/R-MMC card
- Three (3) expansion slots
- +5V DC power regulator

3.2 Option Cards

- **NX-4TRK** card provides four (4) loop start trunk interfaces, with Metering pulse Detectors (optionally, 50Hz, 12KHz or 16KHz).
- **NX-8KLI** card provides eight (8) ports for keysets.
- **NX-8SLI** card provides eight (8) single line telephones indoors.
- **NX-4OPX** card provides four (4) line telephones outdoors.
- **NX-SMDR/R-MMC** card provides two serial ports for SMDR and Remote MMC.
- **NX-DPH/PAGING** card provides two door phone interface and one external paging interface.

- iü **MPD Hybrid IC** can be installed on the system base board and NX-4TRK option card (maximum of four per card) for detecting metering pulses. Optionally, MPD Hybrid ICs for 50Hz, 12kHz or 16kHz can be provided.

- iü **MDF** Samsung Electronics Co. can provide several types if user order. **NX-828** has room enough to accommodate MDF's in the cabinet if user install the MDF's provided by Samsung Electronics Co.

3.3 Station Equipments

- iü **Keypad with 24 buttons (NX-24E, NX-24B)**
 - Built-in speakerphone
 - 24 programmable soft keys (12 with tri-colored LEDs) and 10 fixed function keys
 - UP/DOWN buttons for digital control of speaker, handset and ringer volumes.
 - Four selective ring tones per keypad
 - Desk-mounted or wall-mounted
 - Can be connected to the SKP-308H/816H system
 - NX-24E keypad has a 1-line 16-character display.

- iü **Basic keypad with 6 buttons (NX-6B)**
 - 6 programmable soft keys and 10 fixed function keys
 - UP/DOWN buttons for digital control of speaker, handset and ringer volumes.
 - Four selective ring tones per keypad
 - Desk-mounted or wall-mounted
 - can be connected to **SKP-308H** system

Keypads come in one colour: Dark Grey.

- iü **Add-On Module (NX-AOM)**
 - 24 programmable soft keys

- iü **Door phone set (DPH)**
 - Can be connected to NX-DPH/PAGING card and uses a one (1) pair modular cable.

4. Specifications

4.1 Electrical Specifications

AC INPUT	230 VAC, 50 Hz
POWER CONSUMPTION	55 Watts maximum
MAX CURRENT DRAW AT 230 VAC	0.29 AMP
RING GENERATOR	AC 80 VRMS, 25 Hz
BATTERY BACKUP SUPPLY	24 VDC Batteries rating not less than 6 AH but not more than 26 AH

4.2 Dimensions and Weights

KEY SERVICE UNIT	530 mm H i¿ 412 mm W i¿ 140 mm , 8.9 kg
KEYSET	214 mm H i¿ 206 mm W i¿ 150 mm , 1.1 kg
AOM	214 mm H i¿ 133 mm W i¿ 150 mm , 0.4 kg
DOOR PHONE	158 mm H i¿ 89 mm W i¿ 41 mm , 0.23 kg



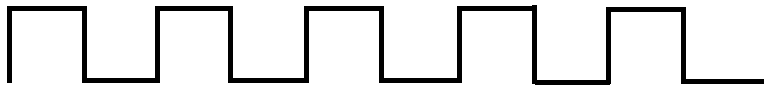

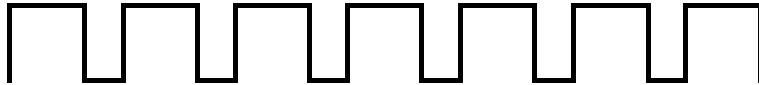



4.3 Environmental Limitations




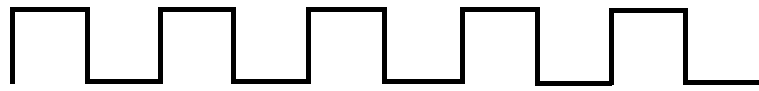
OPERATING TEMPERATURES	0 iÉ - 45 iÉ (18 iÉ - 25 iÉ recommended)
OPERATING HUMIDITY	10 % - 90 % (without condensation)
OPERATING INPUT VOLTAGE	230 VAC(20%), 48~62Hz

4.4 Cable Requirements

ELECTRONIC SET	2 pair twisted, 400 m 24 AWG maximum
SINGLE LINE TELEPHONE	1 pair twisted, 1 km 24 AWG maximum
DOOR PHONE	1 pair twisted, 100 m 24 AWG maximum

4.5 SYSTEM TONES AND RINGS

DIAL TONE	: A steady tone that indicates you can begin dialing.		CONTINUOUS
RING BACK TONE	: Indicates the station you dialed is ringing.		1000 ON / 2000 OFF / 1000 ON / 2000 OFF
BUSY TONE	: Indicates the station you dialed is busy.		500 ON / 500 OFF / 500 ON / 500 OFF
TRANSFER TONE	: Indicates your call is being held and you can dial another party.		200 ON / 200 OFF / 200 ON / 200 OFF
ERROR TONE	: Indicates you have done something incorrectly.		500 ON / 250 OFF / 500 ON / 250 OFF
CONFIRMATION TONE	: Indicates you have correctly set or canceled the system features.		100 ON / 100 OFF / 100 ON / 100 OFF
INTRUSION TONE	: Indicates you are barged.		200 ON / 200 OFF / 200 ON / 5000 OFF
MESSAGE WAITING TONE	: In case of SLT, indicates you have messages left.		200 ON / 200 OFF / 200 ON / 200 OFF

CO LINE RING	: Indicates a outside call is ringing on your station.
	1000 ON / 3000 OFF / 1000 ON / 3000 OFF
STATION RING	: Indicates an intercom call is ringing on your station.
	400 ON / 200 OFF / 400 ON / 3000 OFF
DOORPHONE RING	: Indicates a door phone call is ringing on your station.
	500 ON / 500 OFF / 500 ON / 500 OFF
ALARM RING	: Indicates an alarm ring is ringing on your station.
	500 ON / 500 OFF / 500 ON / 500 OFF

4.6 Keypad LED Indications

CONDITION	LED COLOR	LED STATUS
LINE IDLE	OFF	OFF
LINE IN USE	RED/GREEN	STEADY ON
RECALL	AMBER	FAST FLICKER
CALL ON HOLD	RED/GREEN	SLOW FLICKER
RINGING C.O. CALL	GREEN	FAST FLICKER
RINGING INTERNAL CALL	RED	FAST FLICKER
DND INDICATION	RED	STEADY ON

INSTALLATION

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1. Site Requirements

When planning the installation of the **NX-828** system, choose a site that meets the following requirements:

- Select a location for the Key Service Unit (KSU) that has enough room for installation and has adequate lighting.
- Select a location that minimises cable lengths. Maximum cable length is 400 meters using AWG #24 cable for a keyset and 1 km using AWG #24 cable for a single line telephone.
- The equipment should not be exposed to direct sunlight, corrosive fumes, dust, constant vibration or strong magnetic fields such as those generated by motors and copying machines.
- A direct commercial AC power outlet is required. Do not use extension cords. Preferably, a dedicated circuit should be used to minimise the risk of other electrical equipment being connected that could adversely affect system operation. Ensure that all wires and cables going to and coming from the KSU are properly routed. Do not cross fluorescent lights or run parallel with AC wires.
- The equipment must be located in an environment that will maintain a temperature range of 0 - 40°C and a humidity range of 10% - 90% non-condensing.
- Do not install in close proximity to a fire sprinkler head or other sources of water.
- Do not install within a 2-mile radius of a broadcasting antenna.

2. Installation Basic KSU

2.1 Unpacking basic KSU

After unpacking the KSU, inspect for signs of physical damage. If any damage is detected, do not attempt to install.

Check to see that the KSU carton includes the following items:

- Key Service Unit
- Wall-mount bracket and three (3) screws
- Power cord

2.2 Mounting the KSU

The KSU must be wall-mounted using the bracket supplied (Figure 2-1). The KSU should be mounted on a plywood backboard at least 1.5 mm thick. Attach the bracket to backboard with the two screws supplied. Next, hang the KSU on the mounting bracket

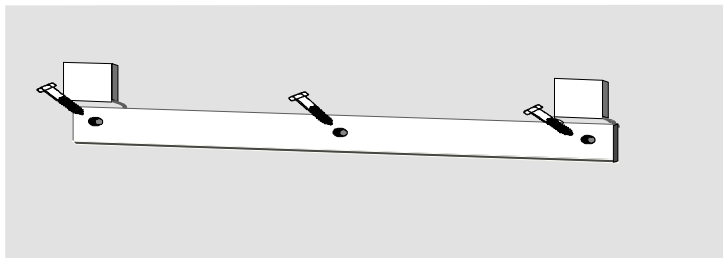
2.3 Grounding the KSU

WARNING: Unplug the power cord from the AC supply before attempting to connect the ground. Hazardous voltage may cause death or injury. Observe extreme caution when working with AC power.

The NX-828 system comes equipped ready to use with a third wire AC ground provided through the power cord (Figure 2-2).

The grounding lug on the bottom of the KSU must be connected to a ground rod or metal cold water pipe using 10 AWG solid copper wire.

CAUTION: Failure to provide an adequate ground may cause problems or even circuit board failure.



1. Fix the 3 screws into the wall
2. Hang the KSU on the wall-mount bracket

Figure 2-1 Mounting the KSU

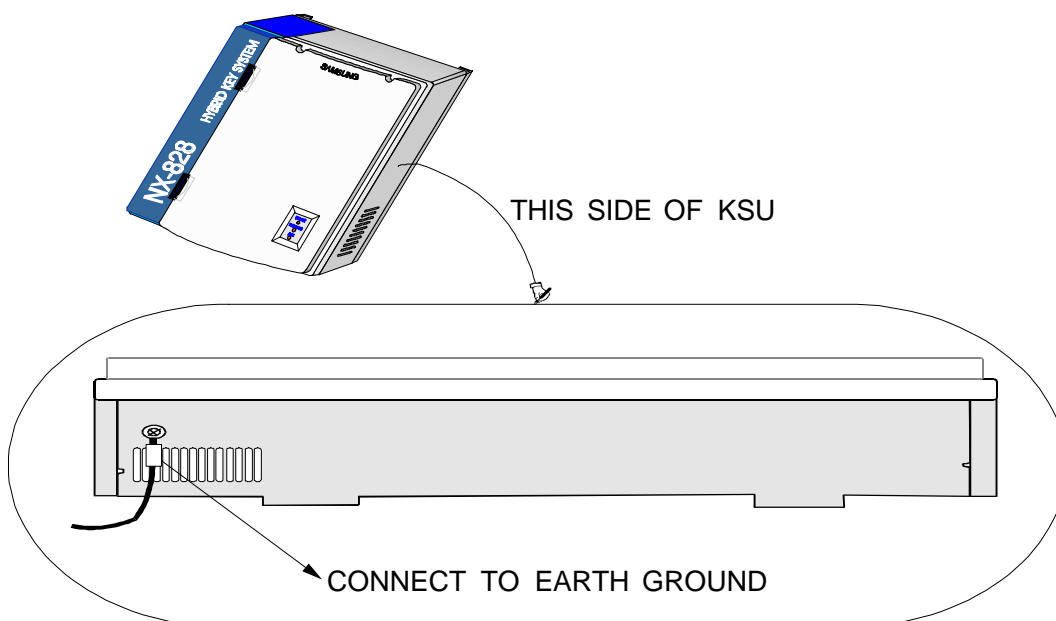


Figure 2-2 Grounding the KSU

2.4 MDF Cabling

All connections to the **NX-828** system are made by way of the main distribution frame (MDF) provided by SAMSUNG. The MDF connection can be done by using a 25 pair female amphenol-type cable. There are five(5) kinds of MDF(MDFB-CEU, MDFB-MEU, MDFD-C, MDFD-M4TRK and MDFD-M) for NX system and **Optional** MDF can be used with the **NX-828** system. MDFB-CEU and MDFB-MEU are for the basic KSU and the MDFD-C, MDFD-M and MDFD-M4TRK are used to connect the expansion B'd.

iü **MDFB (Option B'd)**

Used to connect the **NX-828** basic KSU.

There are two types of MDFB ;

c¹ MDFB-CEU (See **FIGURE 2£-3**)

c¹ MDFB-MEU (See **FIGURE 2£-4**)

iü **MDFD (Option B'd)**

Used to connect the expansion cards :

NX-4TRK, NX-4OPX, NX-8KLI, NX-8SLI

There are three types of MDFD ;

c¹ MDFD-C (See **FIGURE 2£-5A , 2£-5B**)

c¹ MDFD-M4TRK (See **FIGURE 2£-6**)

c¹ MDFD-M (See **FIGURE 2£-7**)

iü **Optional MDF (See FIGURE 2-8)**

The MDF provided by SAMSUNG ELECTRONICS is configured as FIGURE 2-8.

It is composed of sixty (60) pair clips of which "IN" and "OUT" terminal is short internally.

The wire from the **NX-828** system champ connector is connected to the clip terminal marked "IN" and the wire to C.O, station, or the additional feature equipment can be connected from the clip terminal marked "OUT".

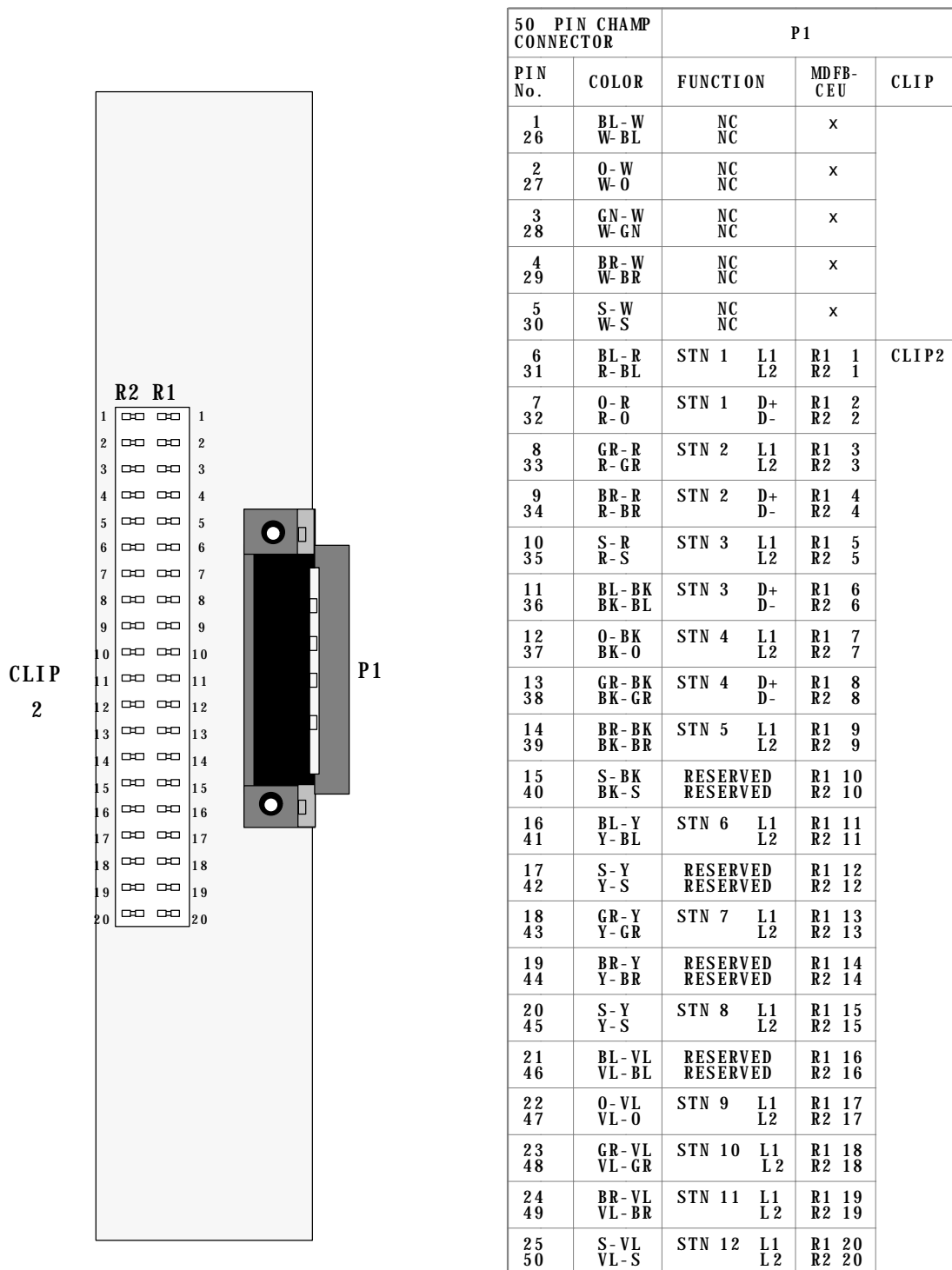


Figure 2-3 MDFB-CEU Connection

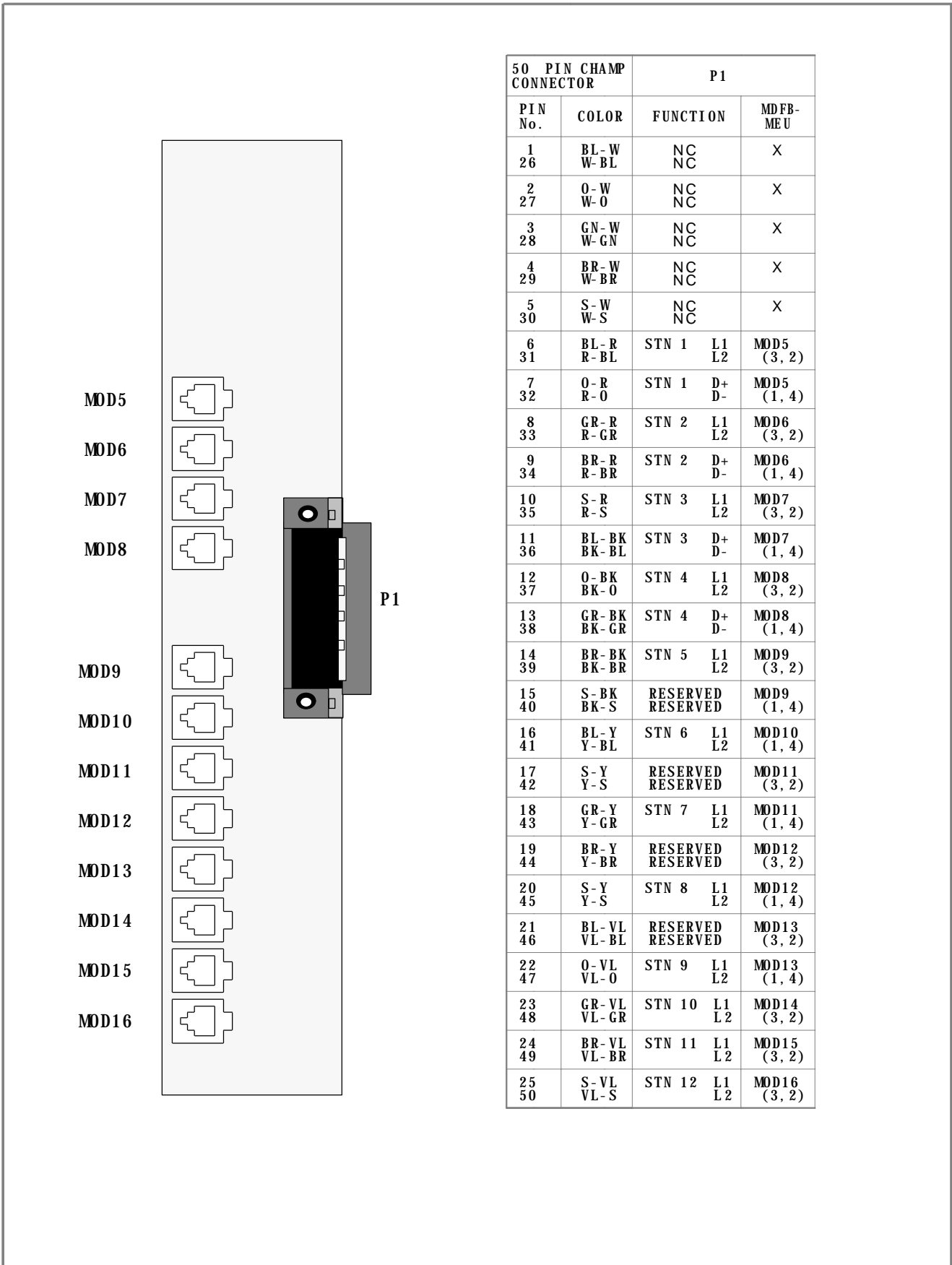
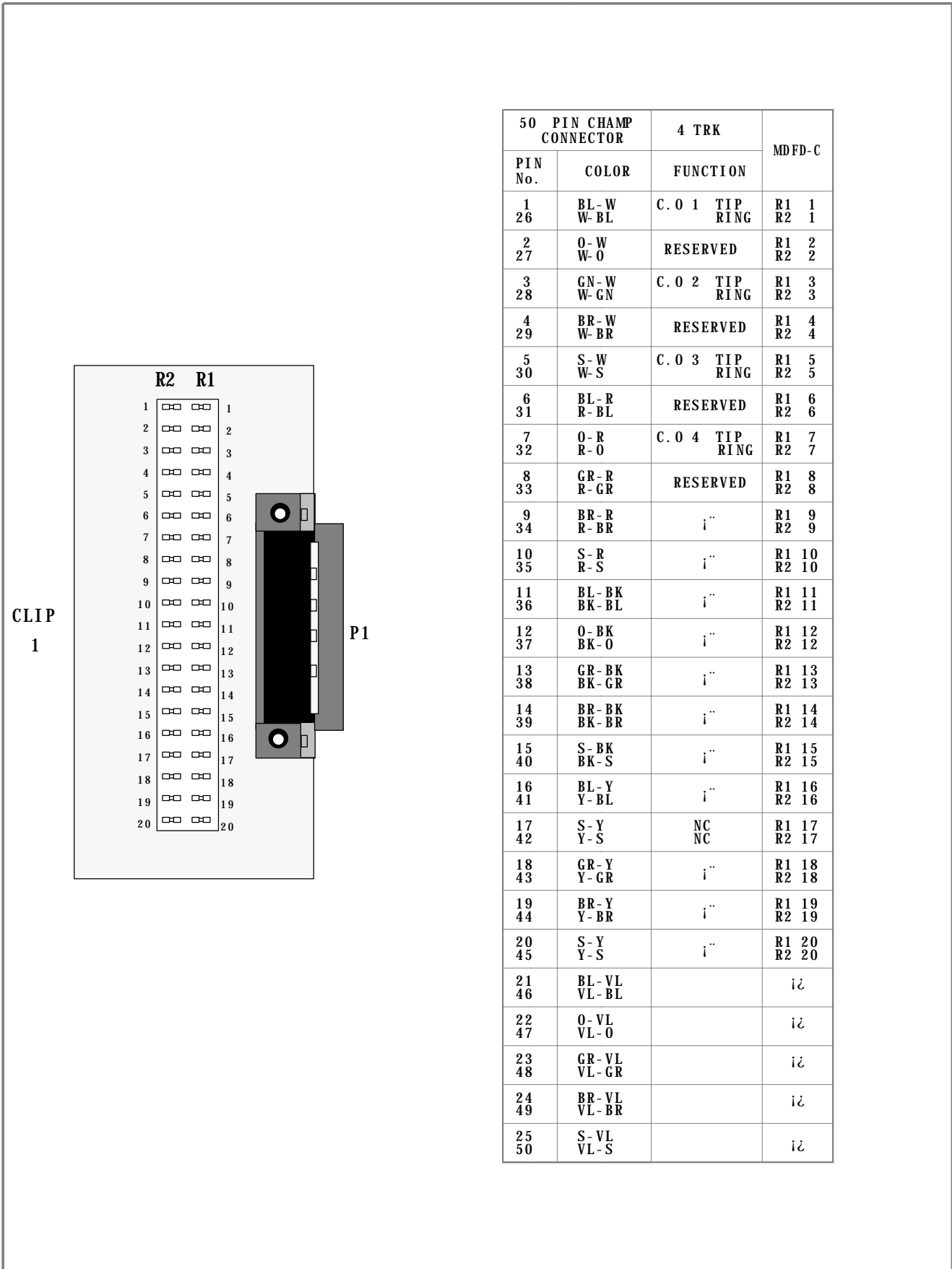


Figure 2-4 MDFB-MEU Connection

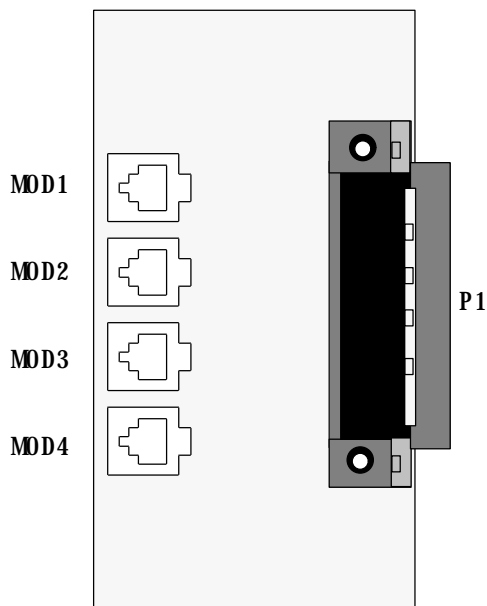


50 PIN CHAMP CONNECTOR		4 TRK	MDFD-C
PIN No.	COLOR	FUNCTION	
1 26	BL-W W-BL	C. 0 1 TIP RING	R1 1 R2 1
2 27	O-W W-O	RESERVED	R1 2 R2 2
3 28	GN-W W-GN	C. 0 2 TIP RING	R1 3 R2 3
4 29	BR-W W-BR	RESERVED	R1 4 R2 4
5 30	S-W W-S	C. 0 3 TIP RING	R1 5 R2 5
6 31	BL-R R-BL	RESERVED	R1 6 R2 6
7 32	O-R R-O	C. 0 4 TIP RING	R1 7 R2 7
8 33	GR-R R-GR	RESERVED	R1 8 R2 8
9 34	BR-R R-BR	i"	R1 9 R2 9
10 35	S-R R-S	i"	R1 10 R2 10
11 36	BL-BK BK-BL	i"	R1 11 R2 11
12 37	O-BK BK-O	i"	R1 12 R2 12
13 38	GR-BK BK-GR	i"	R1 13 R2 13
14 39	BR-BK BK-BR	i"	R1 14 R2 14
15 40	S-BK BK-S	i"	R1 15 R2 15
16 41	BL-Y Y-BL	i"	R1 16 R2 16
17 42	S-Y Y-S	NC NC	R1 17 R2 17
18 43	GR-Y Y-GR	i"	R1 18 R2 18
19 44	BR-Y Y-BR	i"	R1 19 R2 19
20 45	S-Y Y-S	i"	R1 20 R2 20
21 46	BL-VL VL-BL		i
22 47	O-VL VL-O		i
23 48	GR-VL VL-GR		i
24 49	BR-VL VL-BR		i
25 50	S-VL VL-S		i

Figure 2-5A MDFD-C Connection

50 PIN CHAMP CONNECTOR		8 KLI	8 SLI	4 OPX	MDFD-C
PIN No.	COLOR	FUNCTION	FUNCTION	FUNCTION	
1 26	BL-W W-BL	STN 1 L1 L2	STN 1 L1 L2	STN 1 L1 L2	R1 1 R2 1
2 27	O-W W-O	STN 1 D+ D-	RESERVED	RESERVED	R1 2 R2 2
3 28	GN-W W-GN	STN 2 L1 L2	STN 2 L1 L2	STN 2 L1 L2	R1 3 R2 3
4 29	BR-W W-BR	STN 2 D+ D-	RESERVED	RESERVED	R1 4 R2 4
5 30	S-W W-S	STN 3 L1 L2	STN 3 L1 L2	STN 3 L1 L2	R1 5 R2 5
6 31	BL-R R-BL	STN 3 D+ D-	RESERVED	RESERVED	R1 6 R2 6
7 32	O-R R-O	STN 4 L1 L2	STN 4 L1 L2	STN 4 L1 L2	R1 7 R2 7
8 33	GR-R R-GR	STN 4 D+ D-	RESERVED	RESERVED	R1 8 R2 8
9 34	BR-R R-BR	STN 5 L1 L2	STN 5 L1 L2	i"	R1 9 R2 9
10 35	S-R R-S	STN 5 D+ D-	RESERVED	i"	R1 10 R2 10
11 36	BL-BK BK-BL	STN 6 L1 L2	STN 6 L1 L2	i"	R1 11 R2 11
12 37	O-BK BK-O	STN 6 D+ D-	RESERVED	i"	R1 12 R2 12
13 38	GR-BK BK-GR	STN 7 L1 L2	STN 7 L1 L2	i"	R1 13 R2 13
14 39	BR-BK BK-BR	STN 7 D+ D-	RESERVED	i"	R1 14 R2 14
15 40	S-BK BK-S	STN 8 L1 L2	STN 8 L1 L2	i"	R1 15 R2 15
16 41	BL-Y Y-BL	STN 8 D+ D-	RESERVED	i"	R1 16 R2 16
17 42	S-Y Y-S	NC NC	NC NC	NC NC	R1 17 R2 17
18 43	GR-Y Y-GR	i"	i"	i"	R1 18 R2 18
19 44	BR-Y Y-BR	i"	i"	i"	R1 19 R2 19
20 45	S-Y Y-S	i"	i"	i"	R1 20 R2 20
21 46	BL-VL VL-BL				i¿
22 47	O-VL VL-O				i¿
23 48	GR-VL VL-GR				i¿
24 49	BR-VL VL-BR				i¿
25 50	S-VL VL-S				i¿

Figure 2-5B MDFD-C Connection



50 PIN CHAMP CONNECTOR		4 TRK	MDFD-M4TRK
PIN No.	COLOR	FUNCTION	
1 26	BL-W W-BL	C. 0 1 TIP RING	MOD1 (4, 1)
2 27	O-W W-O	RESERVED	i
3 28	GN-W W-GN	C. 0 2 TIP RING	MOD2 (4, 1)
4 29	BR-W W-BR	RESERVED	i
5 30	S-W W-S	C. 0 3 TIP RING	MOD3 (4, 1)
6 31	BL-R R-BL	RESERVED	i
7 32	O-R R-O	C. 0 4 TIP RING	MOD4 (4, 1)
8 33	GR-R R-GR	RESERVED	i
9 34	BR-R R-BR	i	i
10 35	S-R R-S	i	i
11 36	BL-BK BK-BL	i	i
12 37	O-BK BK-O	i	i
13 38	GR-BK BK-GR	i	i
14 39	BR-BK BK-BR	i	i
15 40	S-BK BK-S	i	i
16 41	BL-Y Y-BL	i	i
17 42	S-Y Y-S	NC NC	i
18 43	GR-Y Y-GR	i	i
19 44	BR-Y Y-BR	i	i
20 45	S-Y Y-S	i	i
21 46	BL-VL VL-BL		i
22 47	O-VL VL-O		i
23 48	GR-VL VL-GR		i
24 49	BR-VL VL-BR		i
25 50	S-VL VL-S		i

Figure 2-6 MDFD-M4TRK Connection

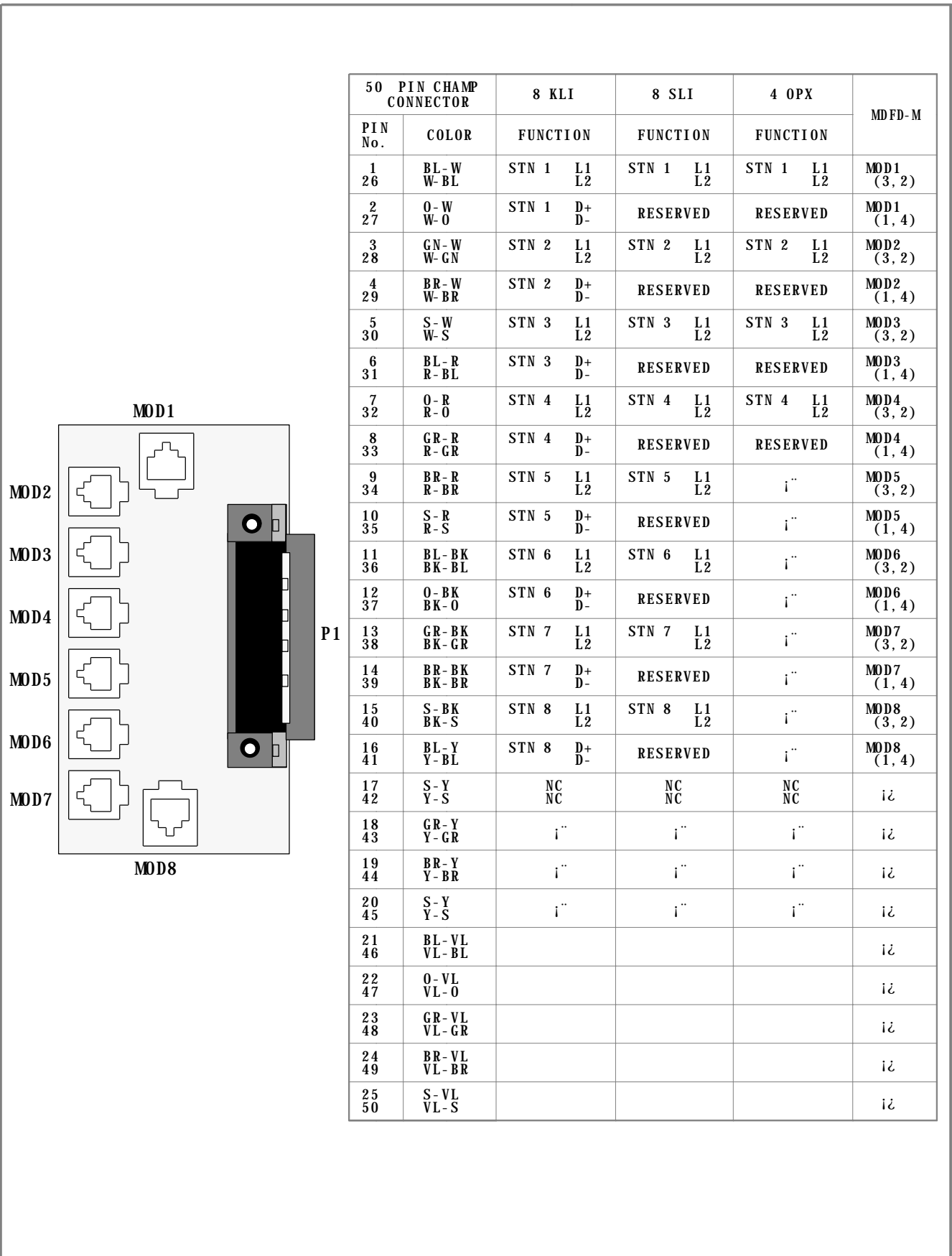
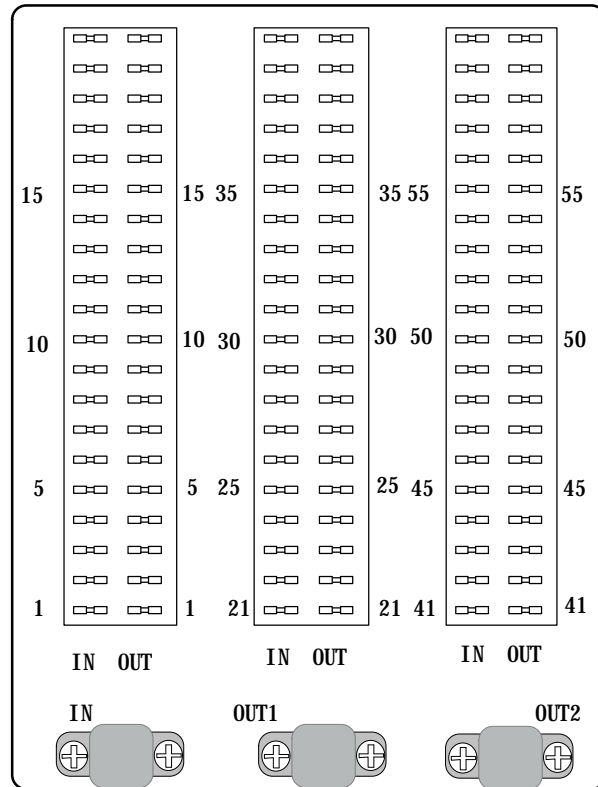


Figure 2-7 MFD-M Connection



MDF Pin No.	Champ Pin No.	MDF Pin No.	Champ Pin No.	MDF Pin No.	Champ Pin No.
1	26	21	36	41	46
2	1	22	11	42	21
3	27	23	37	43	47
4	2	24	12	44	22
5	28	25	38	45	48
6	3	26	13	46	23
7	29	27	39	47	49
8	4	28	14	48	24
9	30	29	40	49	50
10	5	30	15	50	25
11	31	31	41	51	reserved
12	6	32	16	52	reserved
13	32	33	42	53	reserved
14	7	34	17	54	reserved
15	33	35	43	55	reserved
16	8	36	18	56	reserved
17	34	37	44	57	reserved
18	9	38	19	58	reserved
19	35	39	45	59	reserved
20	10	40	20	60	reserved

Figure 2-8 Optional MDF

3. Installation Option Cards

Unpack and inspect each card before installing. Check for signs of physical damage. If any damage is detected, do not attempt to install.

3.1 NX-4TRK

Insert the NX-4TRK card (Figure 2-9) into any expansion slot. Push firmly to ensure that it is fully inserted into the back plane connector.

3.2 NX-4OPX

Insert the NX-4SLI (OPX) card (Figure 2-10) into any expansion slot. Push firmly to ensure that it is fully inserted into the back plane connector.

3.3 NX-8KLI

Insert the NX-8KLI card (Figure 2-11) into any expansion slot. Push firmly to ensure that it is fully inserted into the back plane connector.

3.4 NX-8SLI

Insert the NX-8SLI card (Figure 2-12) into any expansion slot. Push firmly to ensure that it is fully inserted into the back plane connector.

3.5 NX-SMDR/R-MMC

Install the NX-SMDR/R-MMC card (Figure 2-13) on the base board.

3.6 MPD Hybrid IC

Insert into IC socket for MPD Hybrid IC on the NX-4TRK option card and the base board (Figure 2-14).

3.7 NX-DPH/PAGING

Install the NX-DPH/PAGING card (Figure 2-15) on the base board.

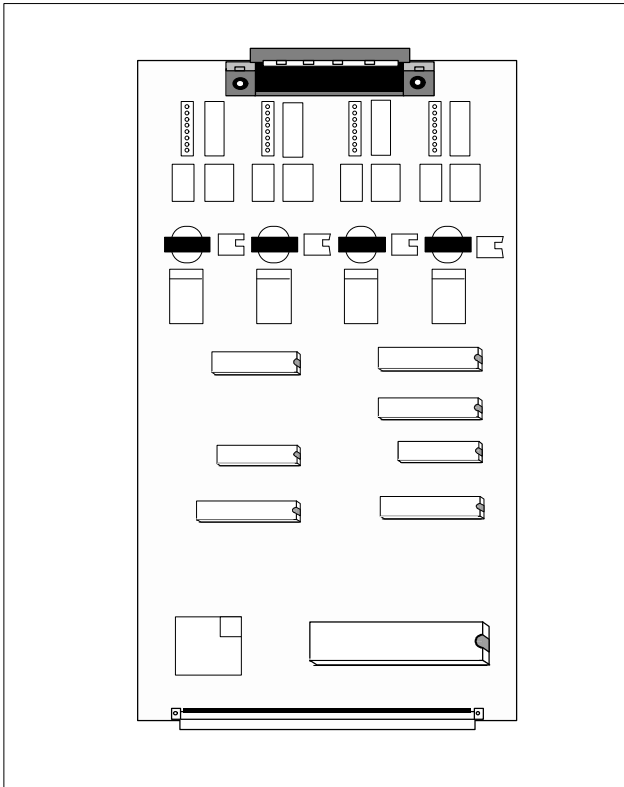


Figure 2-9 4TRK Card

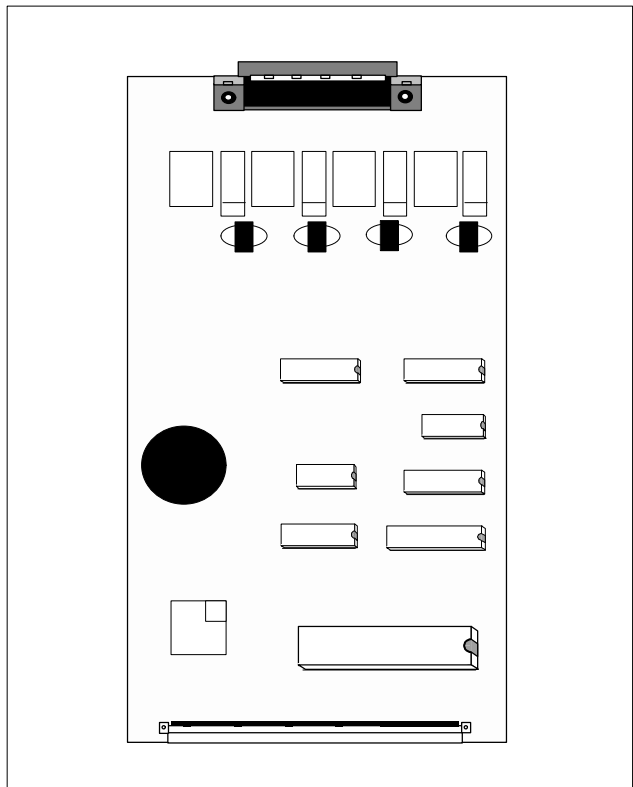


Figure 2-10 4OPX Card

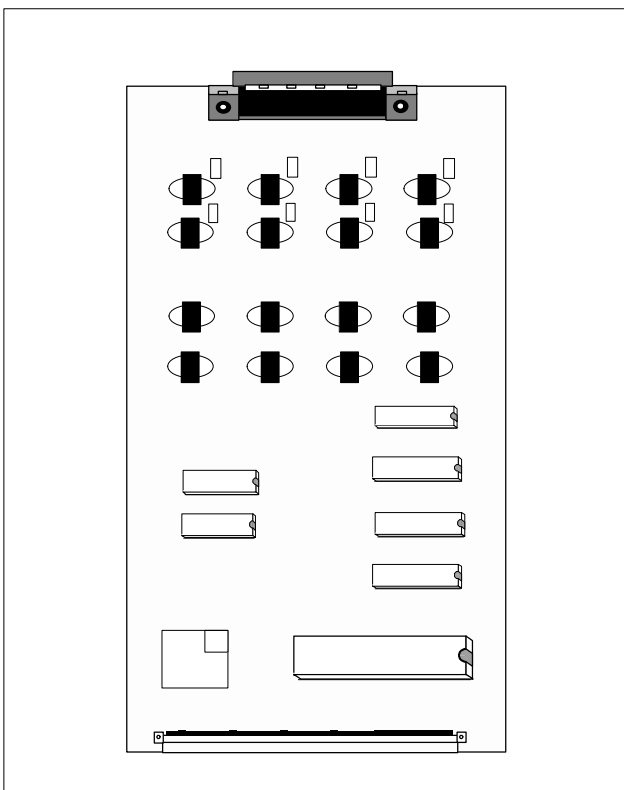


Figure 2-11 8KLI Card

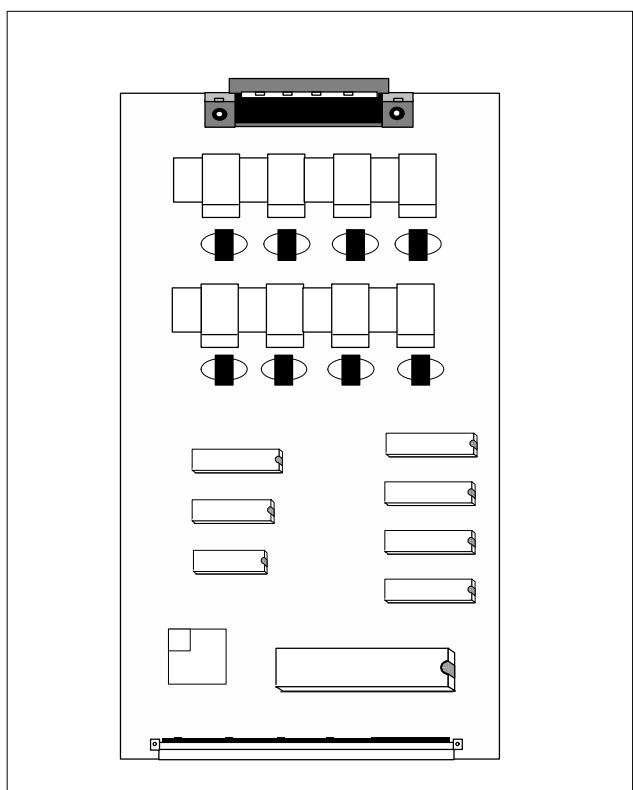


Figure 2-12 8SLI Card

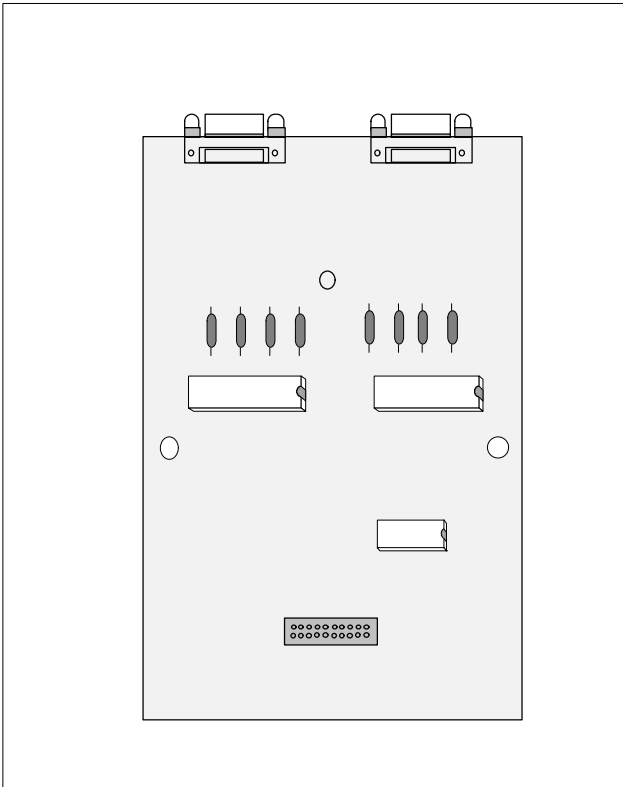


Figure 2-13 SMDR/R-MMC Card

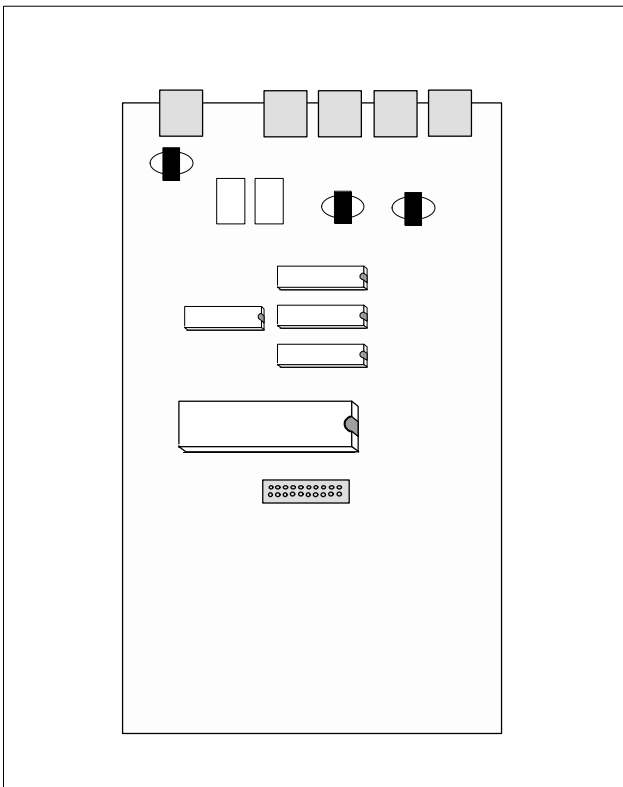


Figure 2-15 DPH/PAGING Card

For 12KHz

For 16KHz

For 50Hz

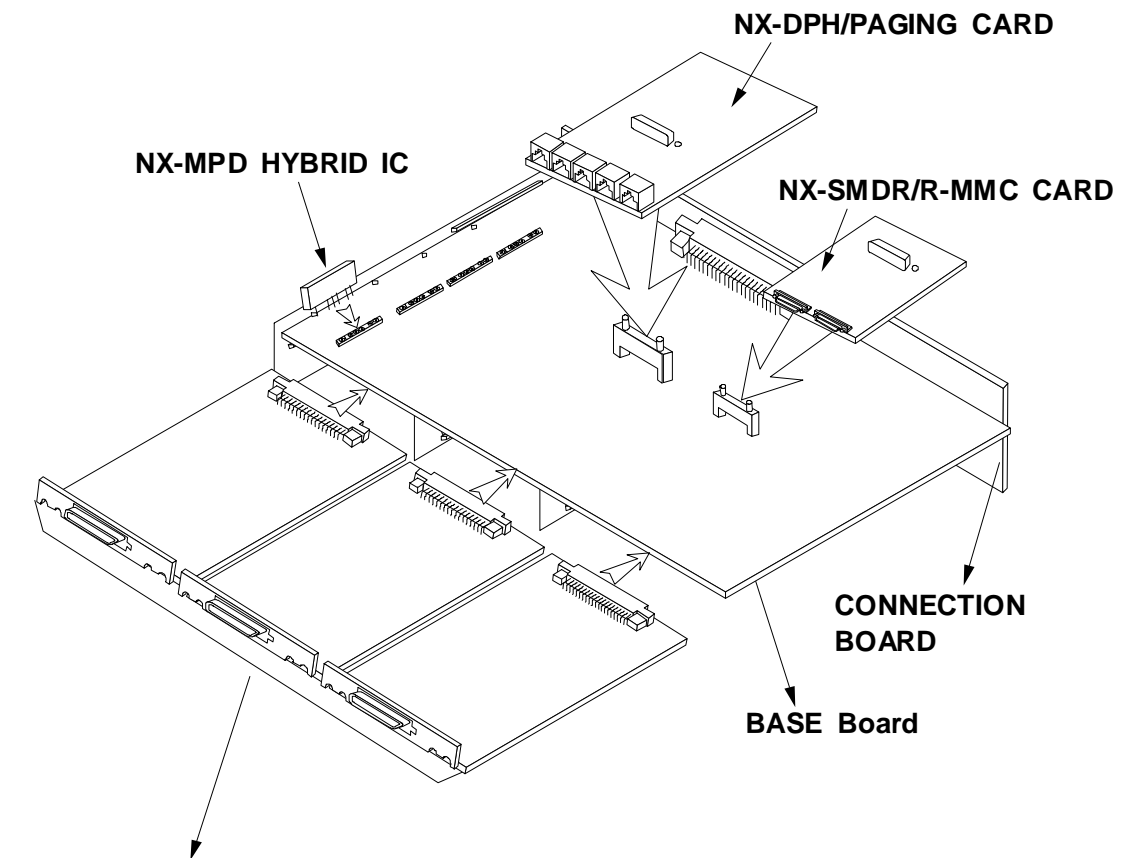
NOTE:

1. Check pin position of MPD Hybrid IC sockets on 4 TRK card and base board.
2. No contact point of pin 2.

Figure 2-14 MPD Hybrid IC

3.8 Installing Expansion Cards on Base Board

NX-828 can have up to three expansion cards under the base board. NX-SMDR/R-MMC, NX-DPH/PAGING and NX-MPD Hybrid ICs are installed on the surface of the base board (Figure 2-16).



Three Expansion cards in any slot :
 Push firmly to ensure cards fully inserted into
 back plane connector on connection board

Figure 2-16 Installing Expansion Cards

4. Connecting Telephone Lines

4.1 Safety Precautions

To limit the risk of personal injury, always follow these precautions before connecting PSTN circuits:

- ⓘ Never install telephone wiring during a lightning storm.
- ⓘ Never install telephone jacks in a wet location 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.

4.2 Loop Start Lines

- ⓘ Using one pair twisted #24 AWG or #26 AWG jumper wire, cross-connect each loop start C.O. line to the trunk port.
- ⓘ Refer to FIGURE 2-5A and FIGURE 2-6.

5. Connecting Station Equipment

5.1 Connecting Keypad/ Aom

To connect the keypad or AOM to the any station from #1 to #4 of basic KSU, see Figure 2-17

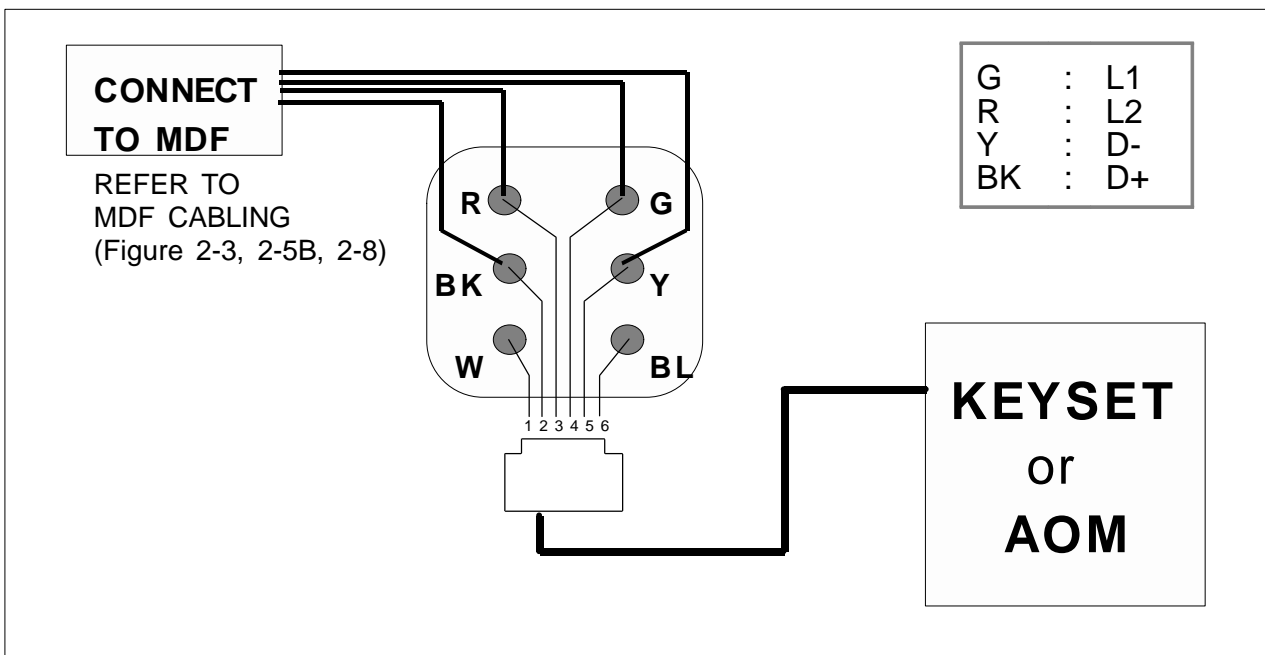


Figure 2-17 Connecting KEYSSET / AOM

5.2 Connecting Single Line Telephone

To connect the single line telephone to the any station from #5 to #12 of basic KSU, see Figure 2-18

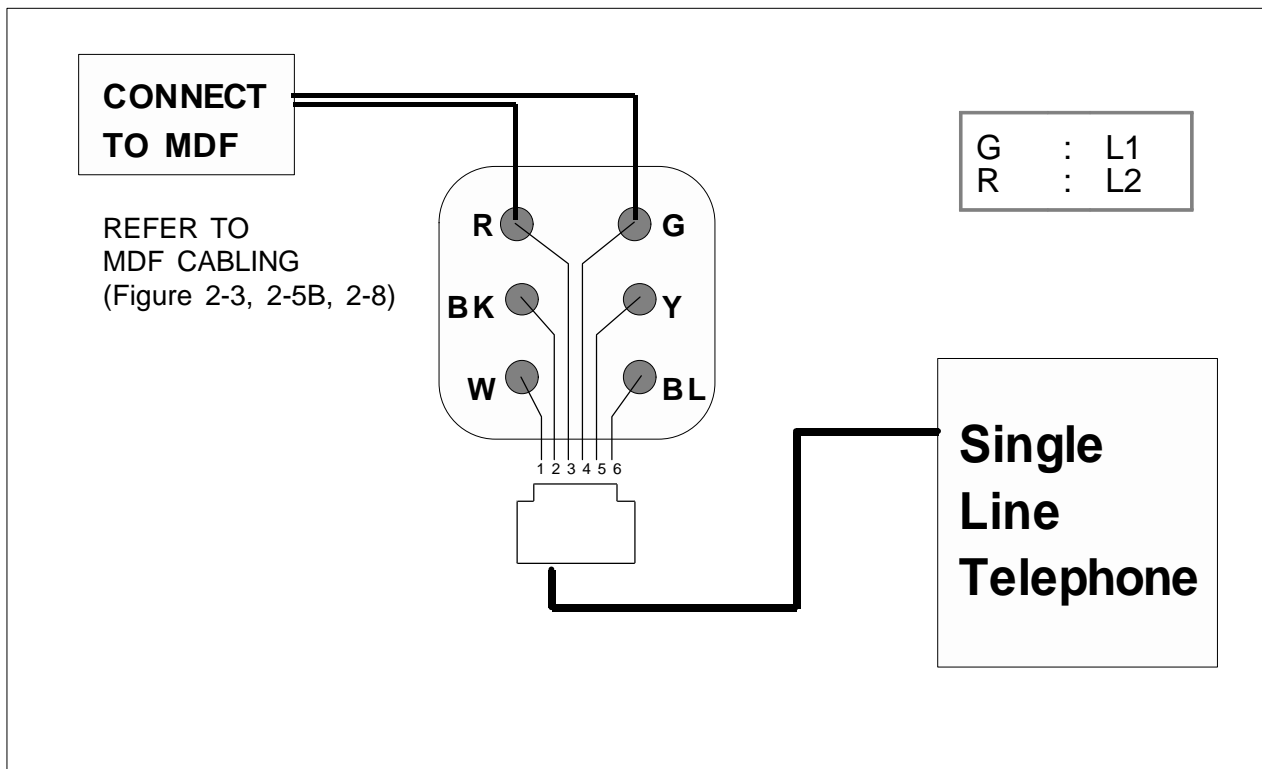


Figure 2-18 Connecting Single Line Telephone

6. Connecting Optional Equipment

6.1 External Music Source

The system is equipped with an internal melody IC chip to provide Music On Hold (MOH) through the keyset. However, when this is not desired, an external music source such as a radio or tape recorder can be connected to the system.

The external music source can be connected to the EXT.MUSIC jack on the KSU using a modular jack (Figure 2-19). After connecting the External Music Source, set the Music Source selection shunt pin to EXT (Figure 2-21).

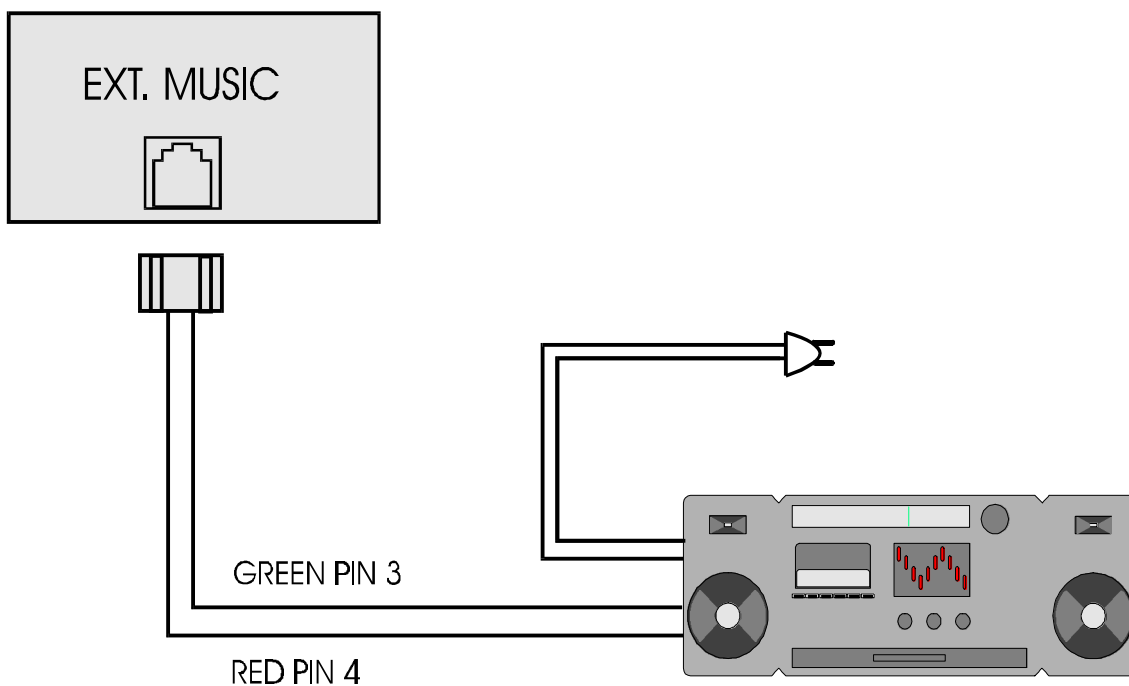


Figure 2-19 Connecting External Music Source

6.2 Door phone and Door Lock Release

System users can communicate with an optional door phone when the NX-DPH/PAGING card is installed. A maximum of two door phones may be installed per system. To connect the door phone, check the polarity and plug a two pair modular cable into the connector on the KSU marked DOOR1 or DOOR2 and connect the cable to the terminal of the door phone as shown in Figure 2-20.

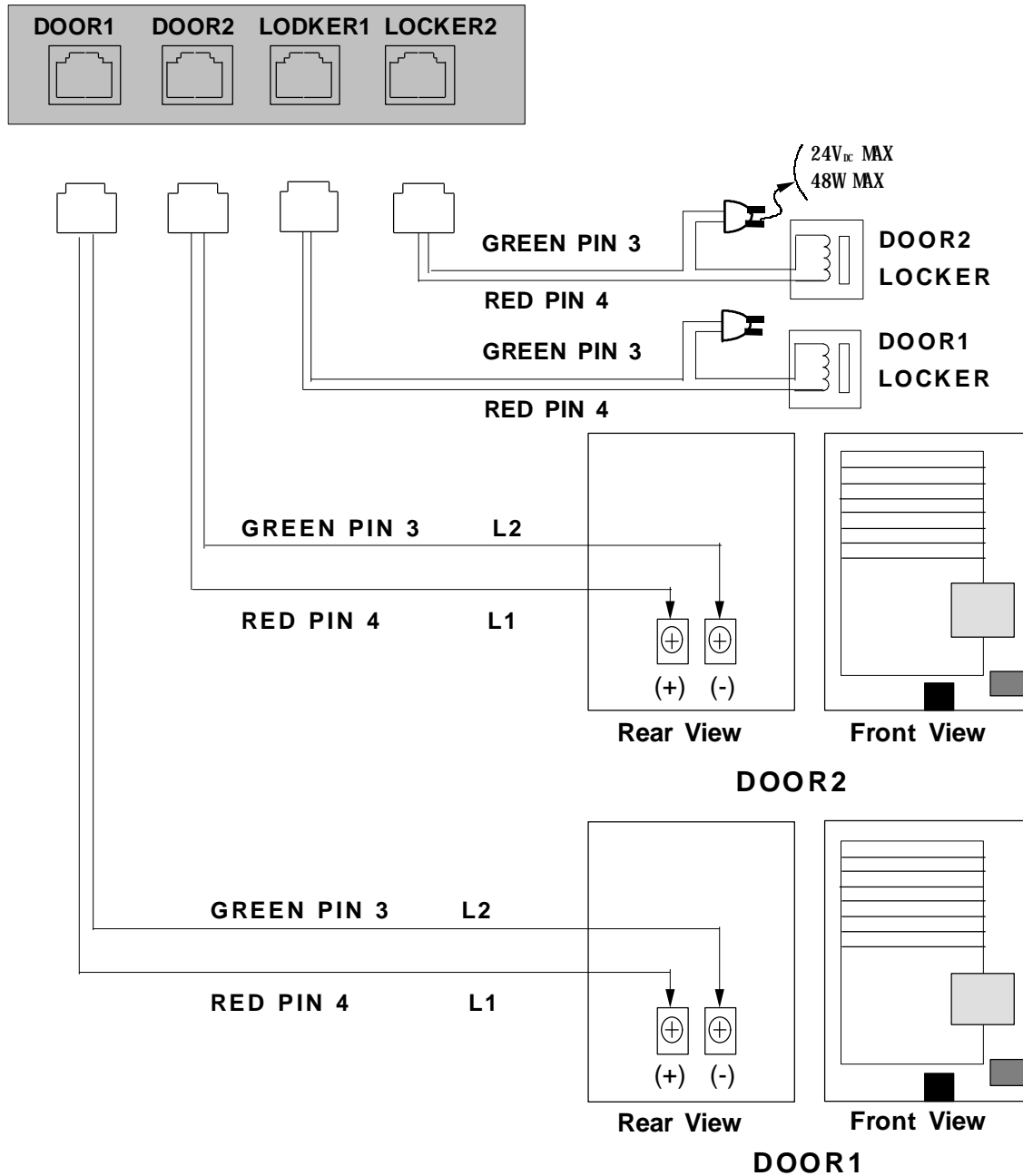


Figure 2-20 Connecting Door Phone / Door Lock Release

To connect the customer-provided electric door lock unit for control of the door lock release mechanism, plug a one pair modular cable into the connector on the KSU marked LOCKER1 or LOCKER2.

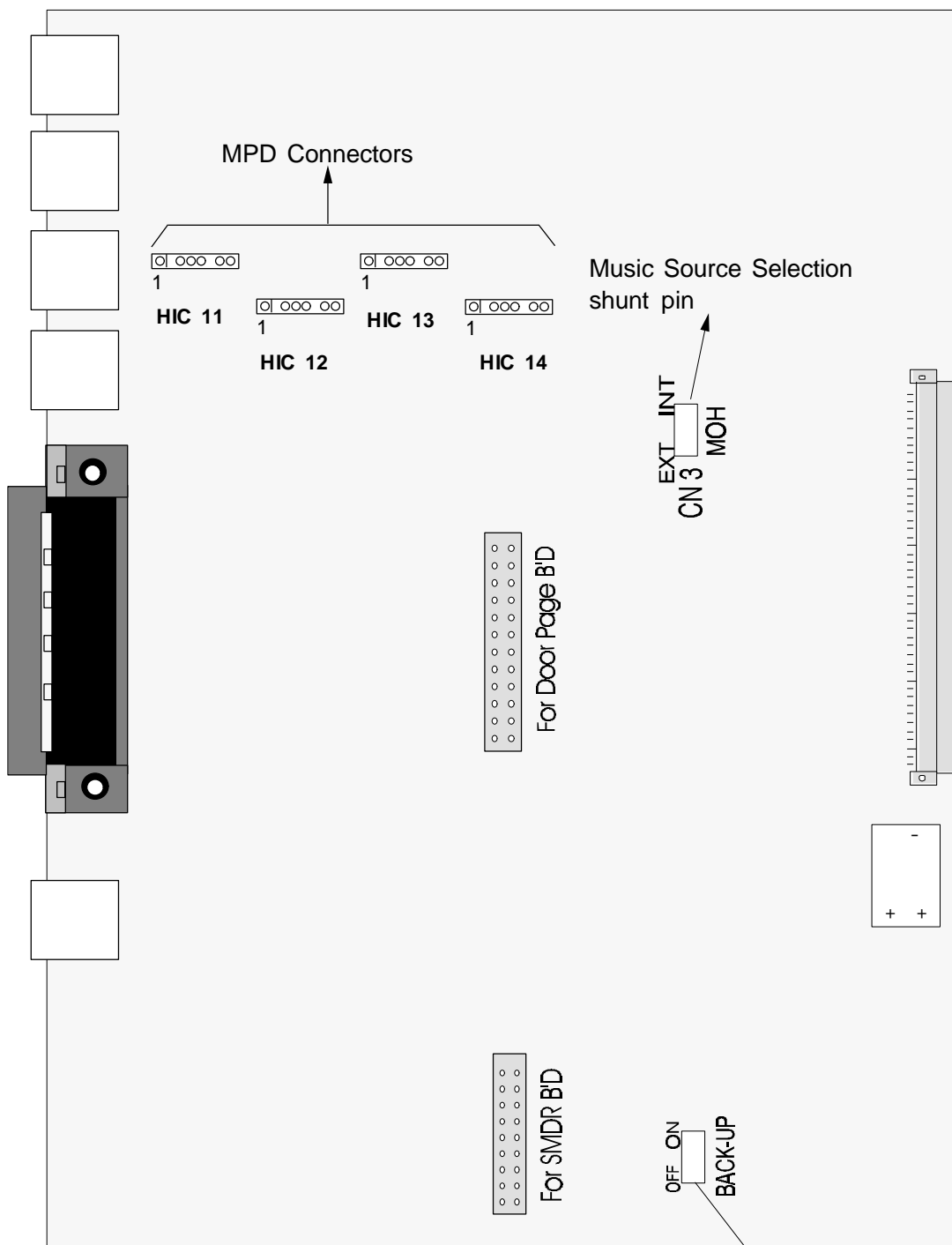


Figure 2-21 KSU Switch Locations

Memory
Back-up
enable
shunt pin

6.3 External Paging

Customer-provided paging equipment can be connected to the PAGING jack using a modular jack when the NX-DPH/PAGING card is installed (Figure 2-22).

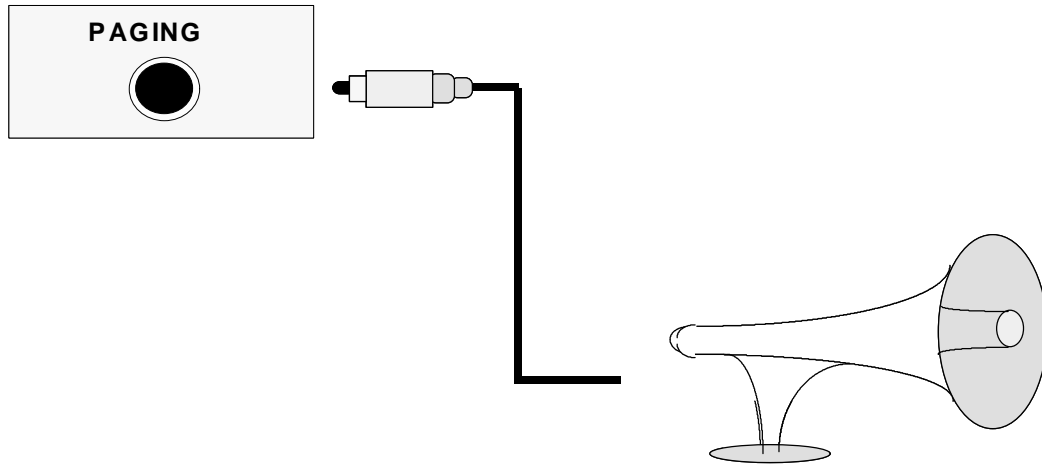


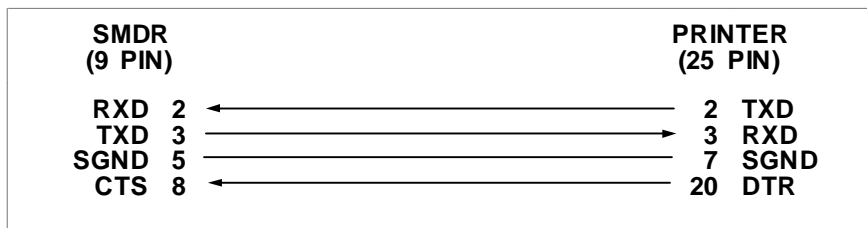
Figure 2-22 Connecting External Paging

6.4 SMDR / Remote Programming

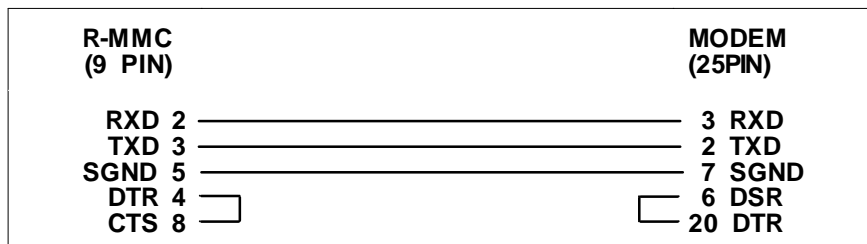
For Station Message Detailed Recording (SMDR) or remote programming, the NX-SMDR/R-MMC card should be installed.

The NX-SMDR/R-MMC card provides two (2) serial I/O ports: R-MMC and SMDR. The port marked 'R-MMC' is used for remote programming and the port marked 'SMDR' is used for SMDR (Figure 2-23). Port parameters can be set using MMC 80 (see Programming section).

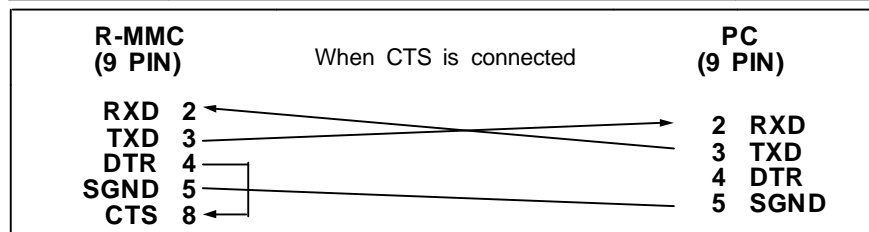
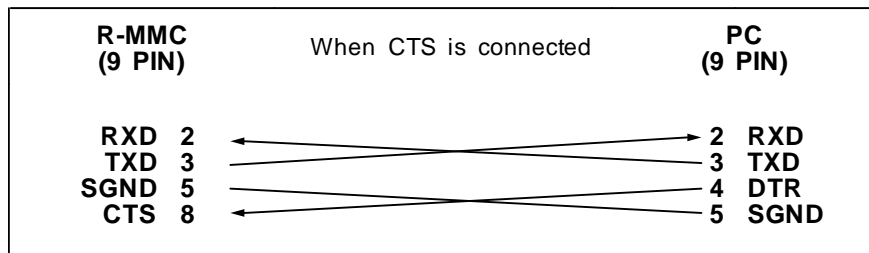
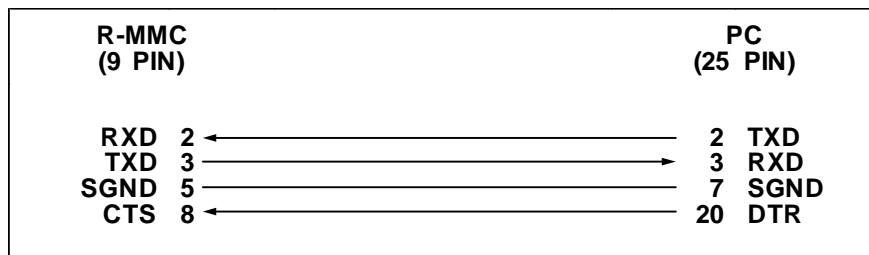
SMDR provides details of outside calls made through the system that can be sent to a customer-provided printer, data buffers or a CRT. Connect the cable for SMDR as shown below.



For remote programming, a customer-provided modem should be connected. Connect the cable for remote programming as shown below.



For on-site programming via a PC terminal, connect the cable as shown below.



NOTE : If the CTS pin is not connected, the system cannot check the printer/modem status (power ON/OFF, paper empty, etc).

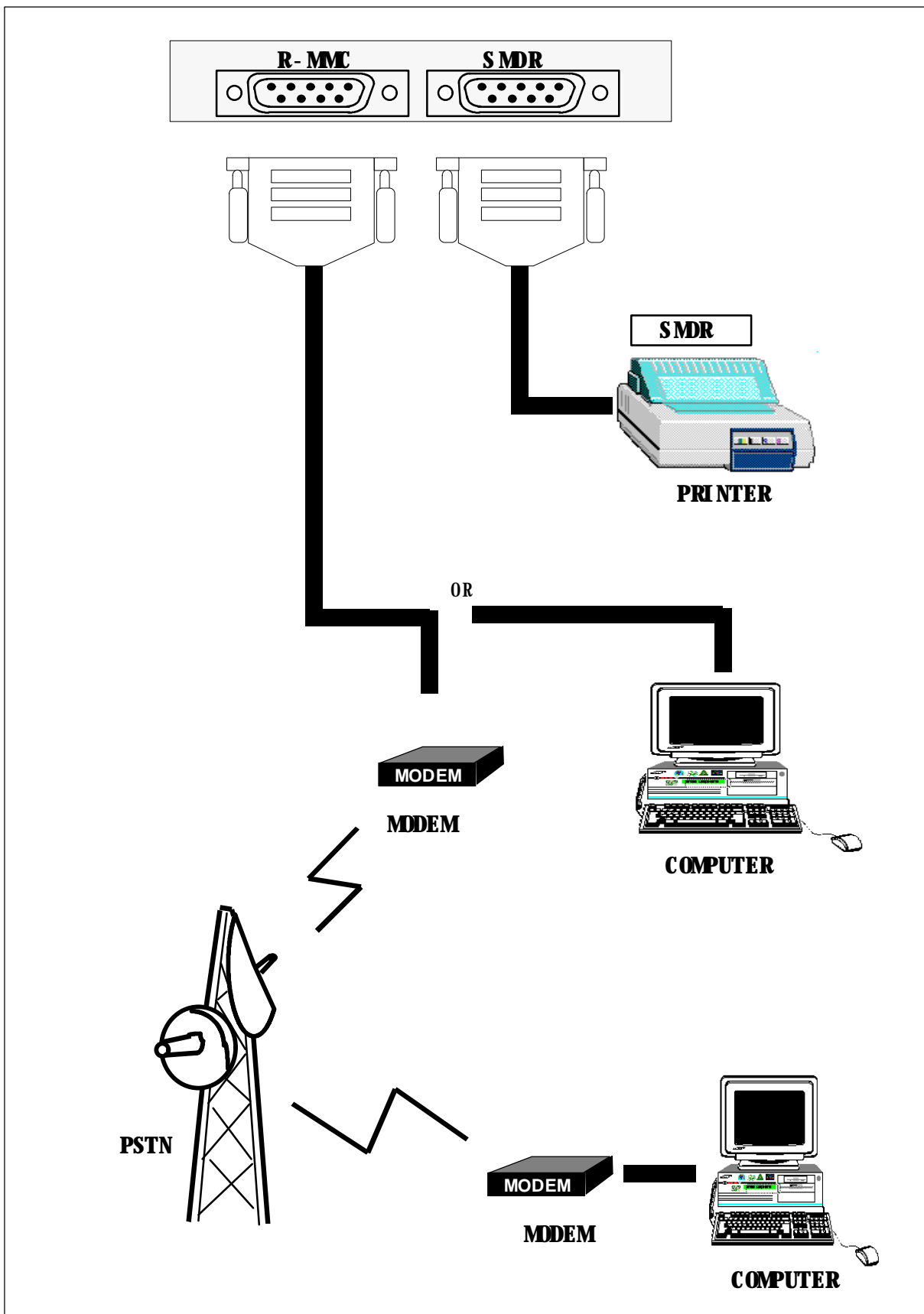


Figure 2-23 Connecting For SMDR / Remote Programming

6.5 Power Failure Transfer

When the system loses AC power, the first two loop start lines in the KSU are automatically switched to the related single line telephones.

The first and second trunk lines are respectively transferred to the 11th and 12th stations which are connected to the single line telephone.

6.6 External Battery

The system can continue full operation during AC power failure. This requires that a 24V battery supply be connected to the bottom of the KSU (Figure 2-24).

When AC power drops below 88V/176 VAC, the system switches over to batteries immediately. Calls in progress will not be interrupted.

To supply 24 volts, use two 12V batteries or four 6V batteries connected in series. Any Ni-Cd battery can be used if its rating is not more than 26AH and not less than 6AH. The system will not operate in power failure mode if battery voltage drops below 21.5 VDC.

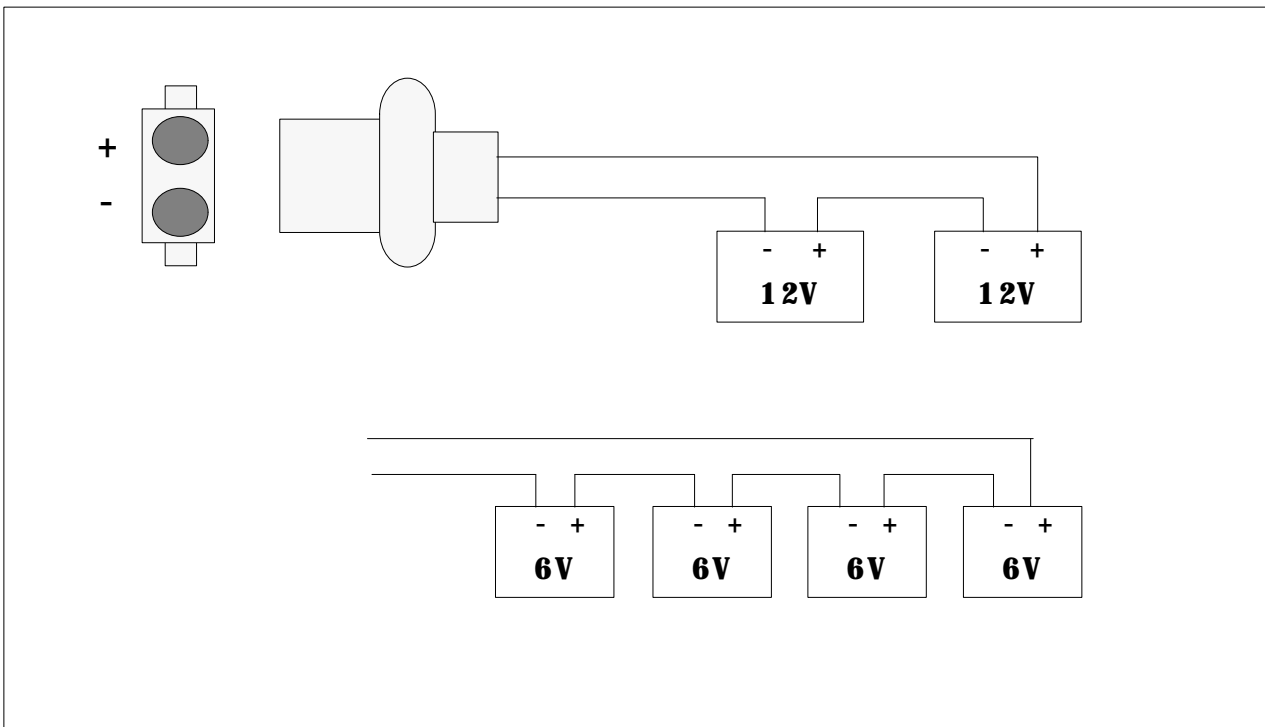


Figure 2-24 Connecting External Batteries

7. Before Power Up

During the initial installation, it is best to verify proper system operation before plugging in any amphenol-type cables to the MDF.

1. If you have already plugged the cables in, unplug them.
2. Verify that the AC voltage at the dedicated electric outlet is in a valid range.
3. Make sure the AC power switch is in the OFF position and the memory back-up switch is ON.
4. Plug the KSU power cord into the dedicated polarised AC outlet.
5. Turn the AC power switch to the ON position. Then verify the status of the 'POWER', 'MONITOR' and 'IDLE' LEDs on the cover of the KSU.

Steady lighting of the 'POWER' LED indicates the presence of power, and a blinking 'MONITOR' LED indicates that the main processor is functioning.

Steady lighting of the 'IDLE' LED indicates that the system is not in use.

If the 'POWER' LED fails to light, unplug the system, remove the power supply and check the AC fuse located on the bottom.

If the fuse is good but the 'POWER' LED does not light, you must correct the problem before continuing. To do this:

1. Turn off the power switch.
2. Unplug all expansion cards except the base board.
3. Turn the system on and check the 'POWER' LED again. If the problem is corrected, you have a defective card. Test and remove the faulty card before continuing.

If the LED still does not light, unplug the KSU and change the power supply or base board. This should solve the problem. If it does not, contact your dealer for advice.

FEATURES

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FEATURES

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	1.1 System Features.....	3- 1
	1.2 Station Features.....	3- 17
	1.3 Display Features.....	3- 24
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1. Feature Description

1.1 System Features

- ACCOUNT CODE (Voluntary)
- ALL CALL VOICE PAGE
- ATTENTION TONE
- AUTHORIZATION CODES (Voluntary)
- AUTOMATIC HOLD
- BACKGROUND MUSIC
- BATTERY BACKUP (Memory Protection)
- BATTERY BACKUP (System)
- CALL FORWARDING
 - FORWARD ALL
 - FORWARD BUSY
 - FORWARD NO ANSWER
 - EXTERNAL CALL FORWARD
- CALL HOLD
- CALL HUNT
- CALL METERING
- CALL PICKUP
- CALL WAITING/CAMP-ON
- CENTREX/PBX USE
- CHAIN DIALLING
- CLASS OF SERVICE
- CONFERENCE
- DATABASE PRINTOUT
- DATA SECURITY
- DIRECT IN LINES
- DIRECT INWARD SYSTEM ACCESS (DISA)
- DISA VOICE ANNOUNCEMENT
- DIRECT TRUNK SELECTION
- DIRECTORY NAMES
- DISTINCTIVE RINGING
- DOOR LOCK RELEASE (Programmable)
- DOOR PHONES OPERATION
- DOOR PHONE DAY/NIGHT RING
- EMERGENCY CALL
- EXTERNAL MUSIC INTERFACE
- EXTERNAL PAGE INTERFACE
- FLASH KEY OPERATION
- FLEXIBLE NUMBERING
- FLEXIBLE RINGING
- HOT/WARM LINE
- IN GROUP/OUT OF GROUP
- INCOMING CALL DISTRIBUTION
- INCOMING / OUTGOING SERVICE
- INDIVIDUAL LINE CONTROL
- LIVE SYSTEM PROGRAMMING
 - TECHNICIAN LEVEL
 - CUSTOMER LEVEL
 - STATION LEVEL
- MEET ME PAGE AND ANSWER
- MESSAGE WAITING INDICATION
- MICROPHONE ON/OFF PER STATION
- NIGHT SERVICE
 - MANUAL NIGHT SERVICE
 - AUTOMATIC NIGHT SERVICE
- OFF PREMISES EXTENSION (OPX)
- OPERATOR GROUP
- OVERFLOW
- PAGING
- PAUSE DIAL
- PORT STATUS CHECK
- POWER FAILURE TRANSFER
- PRIME LINE SELECTION
- PRIVATE LINES
- PROGRAMMABLE LINE PRIVACY
- PROGRAMMABLE TIMERS
- RECALLS
- REMOTE PROGRAMMING(Option)
- RING OVER PAGE
- SINGLE LINE CONNECTIONS
- SPEED DIAL NUMBERS
 - STATION SPEED DIAL
 - SYSTEM SPEED DIAL
- STATION HUNT GROUPS
- STATION MESSAGE DETAIL RECORDING(SMDR)
- STATION TO STATION CALLING RESTRICTION
- SYSTEM DIRECTORY
- SYSTEM HALT
- TOLL RESTRICTION and OVERRIDE
 - SYSTEM SPEED DIAL TOLL RESTRICTION OVERRIDE
 - AUTHORIZATION CODE
 - WALKING CLASS OF SERVICE
 - URGENT CODE
- TONE OR PULSE DIALLING
- TRAFFIC REPORT PRINTOUT
- TRANSFER
- TRUNK DISCONNECT SIGNAL
- TRUNK GROUPS
- UNIVERSAL NIGHT ANSWER (UNA)

Account Code (Voluntary)

Station users may enter an account code (maximum seven (7) digits) before hanging up from a call. This account code will appear in relevant column of the SMDR printout for that call record. Keypad users may enter this code using an ACC button without interrupting a conversation. Single line set users must temporarily interrupt the call by hook-flashing (or pressing the FLASH key on a Samsung Single Line Telephone) and dialling the feature access code. (the default code is 47). If the system has an MPD card installed and uses the call metering feature, the COST will be printed in the cost column of the SMDR printout.

See: MMC 57 Call Cost
MMC 70 Dial Numbering Plan (default code for ACC: 47)
MMC 71 System Key Programming
MMC 72 Station Key Programming

All Call Voice Page

Users can page all keysets and the external paging zone at the same time. Keypads may be restricted from receiving pages in system programming.

See: MMC 22 Customer On/Off

Attention Tone

To get your attention, a brief tone precedes all page announcements or intercom voice calls.

Authorization Codes (Voluntary)

Authorisation codes are used to validate a station user and give permission to make a call. These 4-digit codes are voluntary. Authorisation codes will automatically adjust the dialling station's dialling class of service to the level assigned to the authorisation code. Certain phone numbers (such as emergency numbers) may be dialled even if the authorisation codes are not known. Authorisation table numbers may optionally print on the SMDR output.

See: MMC 63 Authorisation Code
MMC 81 SMDR Option

Automatic Hold

Station users can enable or disable automatic hold at their keysets. While engaged on an outside call, pressing another trunk key automatically puts the call on hold when this feature is enabled. Pressing the TRANSFER, CONFERENCE, PAGE or DSS key automatically puts calls on hold. This is not a user-selectable option.

See: MMC 12 Station On/Off (Default for AUTO HOLD: OFF)

Background Music

Keypad users can choose to hear music through their speakers by pressing the HOLD button while on-hook. There are two types of music sources: internal and external. The music source is selected using the shunt pin on the base board (see Figure 2-15 in the Installation section).

See: MMC 22 Customer On/Off (Default for BGM: ON)

Battery Backup (Memory Protection)

If power is lost to the system, all customer data contained in memory is backed up by a Ni/Cd battery for at least seven (7) days continuous loss of system power. When power is restored, the system will recharge the Ni/Cd battery.

Battery Backup (System)

If a 24VDC battery source is connected, the system is fully operational when AC power is interrupted. When AC power is restored, the system recharges the batteries. Calls in progress are not interrupted when the system switches over.

Call Forwarding

This feature allows the user to forward incoming calls. The calls can be redirected to the operator group, external number, another station or station group. If the destination is in Do Not Disturb (DND) mode, the calling party will receive DND tone. Calls cannot be forwarded to a door phone.

See: MMC 11 Call Forward
MMC 70 Dial Numbering Plan
MMC 71 System Key Programming
MMC 72 Station Key Programming

Forward All

This type of forwarding is not affected by the condition of the station. All calls are immediately redirected to the designated destination.

Forward Busy

Forwards all calls only when the station is busy. The station user can originate calls as usual.

Forward No Answer

Forwards calls that are not answered within a preprogrammed time. The station user can originate calls as usual and receive calls if present. The timer is programmable on a per-station basis to allow for differences in individual work habits.

External Call Forward

A keyset user can be given an External Call Forward button to forward calls to an external phone number. Each outside line may be programmed to either follow or ignore station call forwarding.

Note: The external number to be dialled must be programmed into the system speed dial table

See: MMC 16 Key Extender
MMC 42 Trunk ON/OFF

Call Hold

Both outside and internal calls can be put on hold at any station. Users may dial the access code or press the HOLD button to retrieve the held call. If you leave the call on hold longer than the hold recall time, it will recall your station.

See: MMC 50 System Timers (Default for RCAL HOLD: 045 sec)

Call Hunt

If this feature is enabled on a station, the intercom call on the station which is busy is transferred to the another station in the same station group.

See: MMC 22 Customer On/Off (Default for CALL HUNT: OFF)

Call Metering

You may make a charge for making outside calls using this feature. This feature is enabled by installing MPD Hybrid ICs on the base board and 4 TRK card. The MPD Hybrid IC detects the metering pulse provided by the Exchange and determines the call cost by the number of metering pulses and the pre-programmed unit cost. The number of metering pulses is displayed on keysets with LCDs. The calculated call cost is printed in the COST column of the SMDR printout.

See: MMC 57 Call Cost

Call Pickup

With directed call pickup, users can answer calls ringing or held at any station by dialling a code plus that station's extension number. In addition, calls can be picked up from a station group in a similar manner. The group pickup feature allows users to answer any call ringing within a pickup group. Using the '*' button, users can pick up the call ringing in his/her own pickup group.

See: MMC 34 Assign Pickup Group
MMC 70 Dial Number Plan (Default code for Direct Pickup DPC: 10)
(Default code for Group Pickup GPC: 66)
(Default code for Universal Pickup UPC: 67)

Call Waiting / Camp-on

Busy stations are notified that a call is waiting (camped-on) when they receive a tone. The tone will be repeated at a programmable interval. Keysets receive an off-hook ring signal through the speaker and single line stations receive a tone in the handset. The volume of the camp-on tone can be set by the station user.

See: MMC 50 System Timers (default OFF HOOK RING INTERVAL: 015 sec)

Centrex / PBX Use

Centrex and PBX lines can be installed instead of C.O trunks. Feature codes and the hook flash command can be stored under one-touch buttons. Toll restriction programming ignores PBX or Centrex access codes so toll calls can be controlled when using these services.

See: MMC 62 PBX Access Code

Chain Dialling

Station users may manually dial additional digits following a speed dial call or chain together as many speed dial numbers as required.

See: MMC 16 Key Extender
MMC 17 Station Speed Dial
MMC 71 System Key Programming
MMC 62 Station Key Programming

Class Of Service

System programming allows stations to be assigned one of six outgoing call restriction level. Refer to TOLL RESTRICTION feature.

Conference

Any combination of up to five (5) parties (stations or outside lines) can be joined together in an add-on conference. A station user may set up a conference with two or more outside lines and then exit the conference leaving the outside lines connected in an unsupervised (trunk to trunk) conference. Parties may be eliminated or added after a conference has been established.

Database Printout

Customer data can be printed out. This printout can be directed to a PC and can be done on-site. The database may be printed in its entirety or by specific MMC; for instance, directory names or speed dial lists.

See: MMC 80 I/O Parameter

Data Security

Single line stations used with modems and facsimile machines can be programmed so that they will not receive any system-generated tones that would disrupt data transmissions.

See: MMC 39 Data Line

Direct In Lines

Outside lines may be programmed to bypass the operator(s) and ring directly at any station, group of stations or paging system.

See: MMC 43 Assign Trunk Ring

Direct Inward System Access (DISA)

Users can call in on specific DISA lines at any time and receive system dial tone or the preprogrammed voice messages. If you want to make an internal call, dial the station number or station group number. If you want to make an outside call, you must dial the trunk access code. After a short beep tone, an outside caller has to dial his/her station number and station passcode. If the passcode is correct, the system provides the system dial tone again. The user can then dial the outside call number. Some loss of volume may be experienced when connecting two outside lines together. DISA lines can be used as both-way lines or incoming only.

See: MMC 46 Assign Disa Line
MMC 01 Change User Passcode

DISA Voice Announcement (Available on the Optional DPH/Paging card).

With this option, specified DISA lines may use Customer-programmed voice messages instead of the system tones. The user will be given a voice prompt, explaining how to proceed with the DISA call.

See: MMC 42 Trunk On/Off (Default Code for VOICE MSG RECORDING: 18)

Direct Trunk Selection

Each station can directly select a specific C.O. line simply by pressing a button. This can be used to either answer or originate a call.

Directory Names

Each station and C.O. line may be assigned an associated directory name.

See: MMC 14 Station Name
MMC 44 Trunk Name

Distinctive Ringing

Users will know the type of call received by the type of ring heard. Outside calls have a double ring repeated while internal calls have a single ring repeated.

Door Lock Release (Programmable)

After answering a call from the door phone, user can dial a code to activate a contact closure. This can be used to operate a customer-provided electric door release mechanism. The contact closure timer is programmable from 100-9900 milliseconds.

See: MMC 50 System Timers (Default for DOOR LOCK RELEASE: 100 - 9900 msec)

Door phone Operation

The system provides for connection of two door phones. Pressing the button on the door phone sounds a distinctive ring at the assigned stations. If not answered, the system will release the door phone and stop ringing after a pre-programmed duration. Stations may call the door phone directly and monitor the surrounding areas. Door phones can be programmed with a day ring destination and a night ring destination.

See: MMC 33 Assign Door Ring

MMC 50 System Timers (Default for DOOR RING OFF TIMER: 1 - 255 SEC)

Door phone Day/Night Ring

A different door phone ringing position can be programmed for day and for night.

See: MMC 33 Assign Door Ring

Emergency Call

The system provides a maximum of five urgent codes. These codes can be accessed by any class of service and are useful to allow access to emergency numbers.

See: MMC 64 Override Table

External Music Interface

Although the system provides internal music on hold chimes, a modular jack is also provided to connect a customer-provided music source for music on hold and background music to keysets.

External Page Interface

A paging voice pair with 600 ohm impedance is provided for connection to a customer-provided paging system. The contacts can be wired for either normally open or normally closed operation. They can be used to mute music during page announcements.

Flash Key Operation

While on an outside line, pressing the FLASH key will flash the central office or PBX. This is used for custom calling features on C.O. lines or in conjunction with Centrex/PBX operation. System programming allows flash times for C.O. and PBX lines.

See: MMC 53 Trunk Wide Timers (Default time for NEW CALL: 2000 msec)
(Default time for FLASH PBX: 600 msec)

Flexible Numbering

System programming allows stations to have 2- or 3-digit station numbers which may be changed by programming. These will affect the trunk numbers and other feature IDs.

See: MMC 70 Dial Numbering Plan

Flexible Ringing

Incoming outside calls can be assigned to ring a station or a station group. The system provides separate ringing locations for all trunks in both the DAY and the NIGHT modes.

See: MMC 43 Assign Trunk Ring

Hot/Warm Line

Stations can be programmed to call a pre-defined station, station group, outside line, trunk group or speed dial number whenever the station goes off-hook. A hot line delay time of 1-9 seconds can be programmed to allow sufficient time to make a different call.

See: MMC 25 Hot/Warm Line

In Group / Out Of Group

Individuals assigned to a station hunt group may temporarily remove their telephones from the group by pressing the IOG button. Stations out of a group will not receive calls to that group but will continue to receive calls to their individual extension numbers. When desired, the user may put him/herself back into the group by pressing the button again. Users who do not have this button can dial the access code.

See: MMC 70 Dial Numbering Plan (Default Code for In/Out of Group IOG: 53)
MMC 71 System Key Programming
MMC 72 Station Key Programming

Incoming Call Distribution

Incoming calls can be assigned to ring a distributed station hunt group. This will allow all members of the group to share the call load.

See: MMC 35 Station Group
MMC 43 Trunk Ring

Incoming / Outgoing Service

Outside lines are available for incoming or outgoing service. Programming allows any outside line to be used for incoming calls only, outgoing calls only or both-service.

See: MMC 31 Ext/Trk Use

Individual Line Control

Each station in the system can be individually programmed to allow or deny dialling out as well as allow or deny answering for each outside line.

See: MMC 31 Ext/Trk Use

Live System Programming

The system can be programmed from any display keyset without interrupting normal system operation. There are three levels of programming: technician and customer access are controlled by different security passcode.

See: MMC 20 Open Programming
MMC 21 Change Passcode

Technician Level

Technician level has access to all programs and can allow the customer access to system programs as needed.

Customer Level

This level requires customer passcodes. It provides access to station programs and system programs allowed by the technician in MMC 90. The system allows the customer to have access to certain MMCs. The MMC ranges which customers can access can be changed by programming.

See: MMC 90 Customer Use MMC

Station Level

All keysets can access station programs 10-17 without using a passcode. Each user can only change data for his/her own keyset.

Meet Me Page and Answer

After a user makes an "All page" Call, the user may remain off-hook to allow the paged party to meet the user for a private conversation.

Examples:

To use MEET ME PAGE: PRESS FLASH (or Hook/Flash) + System code 56

To use MEET ME ANSWER: Press system code 56

Message Waiting Indication

When calling a station and receiving a busy signal or no answer condition, the caller can leave an indication that a message is waiting. The MESSAGE button will turn on red at the called keyset. A single line phone will receive a distinctive message waiting dial tone. Five message

waiting indications can be left at any station.

See: MMC 70 Dial Numbering Plan (Default Code for Message Set MSL: 41)
(Default Code for Message Answer MSA: 43)
(Default Code for Message Clear MSC: 42)

MMC 71 System Key Programming

MMC 72 Station Key Programming

Microphone On/Off Per Station

The microphone can be disabled at any keyset. When a microphone is disabled, the user cannot use the keyset's speakerphone, although on-hook dialling and group listening are still possible. This feature does not apply to an NX-6B keyset.

See: MMC 22 Customer On/Off (Default: MIKE ON)

Night Service

There are two kinds of night services: manual and automatic.

Manual Night Service

By pressing the Night Service Button (NIT), the system can enter the night service mode. In this mode, the NIT button is lit red. In day service mode, the NIT button turns off.

See: MMC 71 System Key Programming
MMC 72 Station Key Programming

Automatic Night Service

Automatic night service allows the system to automatically go in and out of night service according to the system clock. This feature can be overridden by a manual night service button.

See: MMC 56 Assign Auto Night Time

Off Premises Extension (OPX)

A single line (tip and ring) extension may be connected to telephone company-provided OPX circuits to remote locations(maximum 4 km).

Operator Group

Stations can be assigned to the operator group for answering incoming calls. Calls to this group can be set for distributed, sequential, conditional, or unconditional ringing. Operators can use the In/Out of Group feature to meet flexible operator requirements. Group 500 is reserved for the operator group and is called by dialling '0'.

See: MMC 35 Assign Station Group

Overflow

When calls ringing a station group go unanswered, they can overflow to another destination after a preprogrammed period of time. Each station group has its own timer. The overflow destination can be a station, station group or ring over page.

See: MMC 50 System Timers

Paging

The system allows for the use of four internal zones and one external zone. Stations can page any individual zone, all internal zones, an external zone, or all zones. Using system programming, each keyset may be allowed or denied the making or receiving of page announcements to/from any zone.

See: MMC 23 Page Zone (Internal Page Zone 1, 2, 3, or 4
All Internal Page: 0
External Page: 5
All Internal and External Page: *)

MMC 22 Customer On/Off (Default for PAGE USE: ON)
(Default for PAGE RECEIVE: ON)

MMC 50 System Timers (Default Timer for PAGE TIME OUT : 20 sec)

Pause Dial

When dialling an outside call, press the Pause (PSE) button to insert a few seconds, pre-programmed, pause. (The PSE button is programmed with the required value.)

See: MMC 71 System Key Programming
MMC 72 Station Key Programming

Port Status Check

Users can see the port status through the keyset LCD. There are sixteen (16) status types: IDLE, BUSY, CALLBACK, PROGRAM, etc.

See: MMC 92 Port Status

Power Failure Transfer

In the event of power loss to the system, the first two outside lines can be automatically connected to the last two single line stations . When power is restored to the system, the

lines and stations will return to normal operation. Calls in progress will be disconnected.

Prime Line Selection

Any station can be programmed to select a specific line, line group, telephone number, station or station group.

Private Lines

For private line use, stations can be prevented from dialling and/or answering any line.

See: MMC 31 Ext/Trk use

Programmable Line Privacy

Each outside line can be programmed to ignore the automatic line privacy. This allows up to four other parties to join a conversation by simply pressing the line button. This is similar to 1A2 key telephone operation.

See: MMC 42 Trunk On/Off (1A2 EMULATION)

Programmable Timers

There are a number of programmable system timers to allow each installation to be customised to best fit the user's application.

See: MMC 50 System Timers

Recalls

Calls put on hold, transferred or camped-on to any station will recall to the originating station if not answered within a programmable period of time. A recall that goes unanswered for the same period of time will recall to the system operator group. Hold and transfer recalls each have their own individual programmable timer.

See: MMC 50 System Timers

Remote Programming (option)

NX-828's remote programming allows the technician to access the system database from a remote location to make programming changes. A traffic report can be remotely requested for use as a troubleshooting aid. A customer-provided modem and PC can also be connected directly to the RS-232C DB9 connector on the optional SMDR/R-MMC card for on-site programming.

See: MMC 80 I/O Parameter

Ring Over Page

A system-generated ring tone can be programmed on a per-line basis to go out over a customer-provided external paging system when the system is in night mode.

See: MMC 42 Trunk On/Off (Default for RING OVER PAGE: OFF)

Single Line Connections

Single line ports allow for connection of a variety of single line telephones plus facsimile machines, answering machines, loud bells, computer modems, cordless phones and credit card machines. When connecting customer-provided equipment to these extensions, compatibility should be checked out before purchase to ensure correct operation. Connecting single line telephones (SLT) to the system requires some programming according to the type of SLTs connected.

According to SLT type:

DTMF Type
DIAL PULSE Type

See: MMC 38 SLT Type

SLT Related Timers

HOOK OFF
SLT FLASH MIN
SLT FLASH MAX

See: MMC 50 System Timers

For Data Security

See: MMC 39 Data Line

Speed Dial Numbers

Station Speed Dial

Each station has 20 speed dial numbers (00-19). Each speed dial number may contain up to 30 digits.

See: MMC 17 Station Speed Dial

System Speed Dial

The system has 80 speed dial numbers (20-99). Each speed dial number may contain up to 30 digits. The system speed dial numbers can be used by any station.

See: MMC 67 Assign System Speed Dial

Station Hunt Groups

System programming allows for up to 20 station groups. One of four ring patterns is

available for each group: SEQUENTIAL, DISTRIBUTE, CONDITION or UNCONDITION. Each group may contain a maximum of eight (8) stations and a station may be contained in only one group at any one time. Group 500 is reserved for the operator group and is called by dialling '0'. Each station group has its own recall time for calls transferred to that group.

See: MMC 35 Assign Station Group

MMC 70 Dial Number Plan (Default Station Groups SGR: 500-519)
(Default Operator Group OPR: 0)

Station Message Detail Recording (SMDR)

The system provides records of calls made, received and transferred. Each call record provides details of the station number, outside line number, date, start time, duration of calls, digits dialled (maximum 18), an account code, (if entered), an Authorisation code (if required) and call Cost. If the MPD card is installed in the system, the calculated call cost is printed in the COST column. A Display keyset will show the number of Meter pulses received.

The SMDR format contains many options that allow it to be customised for a company's individual needs. Options to print include incoming calls and authorisation codes. See sample printout at the end of this section.

See: MMC 80 I/O Parameter
MMC 81 SMDR Options

Station To Station Calling Restriction

Stations can be prevented from calling other stations.

See: MMC 32 Intercom Use

System Directory

Each station and outside line can have a 12-character directory name. This name will appear on keyset displays to provide additional information about lines and stations.

See: MMC 14 Station Name
MMC 44 Trunk Name

System Halt

This is used only when all data processing needs to be stopped. This feature requires technician programming level and, therefore, the technician's passcode.

See: MMC 94 Halt Process

Toll Restriction

There are 250 allow and 250 deny entries of 11 digits each. Each of these entries can apply to dialling classes B, C, D and E. Class A stations have no dialling restrictions and class F stations cannot make outside calls.

See: MMC 30 Station Toll Class
MMC 60 Toll Deny Table / Apply
MMC 61 Toll Allow Table / Apply
MMC 65 Assign Wild Character

Toll Restriction Override

There are several methods of toll restriction override as described below.

System Speed Dial Toll Restriction Override

Program options allow for system speed dial numbers to follow or bypass a station's toll restriction class.

See: MMC 66 System Speed Dial Toll Restriction

Authorization Code

Authorisation codes are used to validate a station user and give permission to make a call. Each authorisation code has an associated toll class. When the code is entered, the station toll class is changed to that of the authorisation code.

See: MMC 63 Authorization Code

Walking Class of Service

You can change a restricted station's toll class to the same class as your station by entering the walking class of service (COS) ID, the station number and the station's passcode. The default station passcode 1234 cannot be used.

See: MMC 70 Dial Numbering Plan (Default Code for COS: 59)

Urgent Code

The system provides a maximum of five urgent codes. These codes can be accessed by any class of service and are useful for allowing access to emergency numbers.

See: MMC 64 Override Table

Tone Or Pulse Dialling

Outside lines can be programmed for either tone or pulse dialling to meet local telephone company requirements.

See: MMC 41 Trunk Dialling Type

Traffic Report Printout

The traffic report prints system-wide totals for incoming calls, outgoing calls and intercom calls. This report also shows the number of outside calls made and answered, as well as the number of intercom calls made and answered for each station. This report can be set for automatic printout at the end of each day or at the end of every week. The report can also be printed on demand. A customer-provided printer must be connected to the SMDR port or R-MMC port to print this report.

See: MMC 80 I/O Parameter
MMC 83 Call Traffic Report

Transfer

System operation permits station users to transfer calls to another station in the system. Transfers can be screened , unscreened or camped-on to a busy station.

Trunk Disconnect Signal

Systems can recognise a trunk disconnect signal generated by central office when an outside party hangs up. The system receives this signal and the call is hung up automatically.

See: MMC 53 Trunk-Wide Timers (CO SUPV TIME)

Trunk Groups

Outside lines can be grouped for easy access by dialling a code or pressing a button. There are 11 trunk groups available. Access codes are 9 and 80-89.

See: MMC 45 Trunk Group

Universal Night Answer (UNA)

Stations may dial the Universal Night Answer (UNA) code to answer any outside lines programmed to ring over the paging system.

See: MMC 42 Trunk On/Off (Default for RING OVER PAGE: Off)

1.2 Station Features

ADD-ON MODULE (AOM)	MESSAGE WAITING LIGHT / INDICATION
APPOINTMENT REMINDER	MUTE MICROPHONE / HANDSET
AUTOMATIC HOLD	OFF-HOOK RINGING
AUTOMATIC PRIVACY	ON-HOOK DIALLING
BACKGROUND MUSIC	ONE TOUCH DIALLING KEYS
BUSY STATION CALLBACK	PROGRAMMABLE KEYS
BUSY STATION INDICATION (BLF)	PROTECTION FROM BARGE-IN
DIRECT STATION SELECTION (DSS)	PULLOUT DIRECTORY TRAY
DO NOT DISTURB (Programmable)	PULSE TO TONE SWITCHOVER
DOOR LOCK RELEASE	REDIAL
EXCLUSIVE HOLD	Automatic Redial
EXECUTIVE/SECRETARY HOT LINES	Last Number Redial
FORCED AUTO ANSWER	Saved Number Redial
GROUP LISTENING	RING MODES
HEADSET OPERATION	Ring Mode
HEARING AID COMPATIBLE	Auto Answer Mode
HOT KEYPAD	Voice Announce Mode
KEY TONE SELECTION	RINGING LINE PREFERENCE
LINE QUEUING WITH CALLBACK	SPEAKER PHONE
LINE SKIPPING	STATION LOCK
	TRI-COLOURED LIGHTS
	VACANT STATION MESSAGES
	VOLUME SETTINGS
	WALL-MOUNTABLE KEYSSETS

Add-On Module

NX-828's unique add-on module (AOM) adds to the capability of a station. Its 24 programmable buttons can be used for feature keys, DSS/BLF keys or one-touch speed dial buttons. Note only one AOM can be assigned to a station.

See: MMC 37 Assign AOM
 MMC 71 System Key Programming

Appointment Reminder

Stations can be used like an alarm clock. Program in a specific time and the keyset will give a distinctive ring to remind you of meetings or appointments. Alarms can be set for 'DAY' or 'DAILY'. Up to three alarms may be set at each keyset.

See: MMC 26 Alarm Reminder

Automatic Hold

Station users can enable or disable automatic hold at their individual keysets. While the user is engaged on an outside call, pressing another trunk key automatically puts the call

on hold when this feature is enabled. Pressing the TRANSFER, CONFERENCE, PAGE or DSS key always puts calls on hold. This type of automatic hold is not a user-selectable option.

See: MMC 12 Station On/Off (Default for AUTO HOLD: OFF)

Automatic Privacy

All conversations on outside lines and intercom calls are automatically private. The privacy feature can be turned off on a per-line basis.

Background Music

The HOLD button turns BGM on or off.

See: MMC 22 Customer On/Off (Default for BGM: ON)

Busy Station Callback

When reaching a busy station, callers may request a callback by pressing one button or dialling a code (44). The system rings the caller back when that station becomes idle.

Busy Station Indication (BLF)

DSS/BLF keys may be assigned to any keyset or AOM. These buttons will be off when the station is idle, lit red when that station is in use and will flash when that station is in Do Not Disturb (DND) mode.

Direct Station Selection (DSS)

Soft keys can be programmed with extension numbers. Users press these keys to make or transfer calls to the assigned stations.

Do Not Disturb (Programmable)

The DND feature is used to stop all calls to a station. System programming can allow or deny use of the DND feature for each station. Parties calling a station in DND mode will receive a distinct DND tone.

See: MMC 22 Customer On/Off (Default for DND: ON)

Door Lock Release

Stations programmed to receive calls from a door phone can dial a code to activate a contact closure for control of a customer-provided electronic door lock.

See: MMC 50 System Timers (Default for DOOR RELEASE TIMER: 100 - 9900 msec)

Exclusive Hold

Pressing the HOLD button twice will hold a call exclusively at that station. No other station can pick up the call.

See: MMC 50 System Timers (Default for RECAL HOLD TIMER: 045 sec)

Executive / Secretary Hot Lines

An immediate hands-free communication link is established when the EXECUTIVE/SECRETARY button is pressed. When the EXECUTIVE is in DND mode, all calls are forwarded to the SECRETARY and only the SECRETARY can call the EXECUTIVE. This feature is only available between two keysets. Each SECRETARY can have up to two EXECUTIVES. An EXECUTIVE station has only one SECRETARY.

See: MMC 36 Assign Boss/Secretary

Forced Auto Answer

The called station automatically answers on the speakerphone. Callers may request this feature by pressing one button or dialling a code (14).

See: MMC 72 Station Key Programming

Group Listening

A keyset assigned this feature button may turn on the speaker while using the handset. This allows a group of people to listen to the distant party over the speaker without turning on the microphone.

See: MMC 72 Station Key Programming

Headset Operation

Every keyset can be programmed to allow for the use of a headset. In headset mode, the hookswitch is disabled and the SPEAKER button is used to answer calls.

See: MMC 12 Station On/Off (Default for HEADSET USE: OFF)

Hearing Aid Compatible

All NX keysets are hearing aid compatible as required by part 68 of the FCC requirements.

Hot Keypad

If hot keypad is enabled, it is no longer necessary to lift the handset or press SPEAKER button before you begin dialling.

See: MMC 12 Station On/Off (Default for HOT KEYPAD: ON)

Key Tone Selection

This feature allows users to hear a slight tone when pressing the keypad on their keyset.

See: MMC 12 Station On/Off (Default for KEY TONE: ON)

Line Queuing With Callback

When the desired outside line is busy, the user can press the CALLBACK key or dial the access code to place his/her station in a queue. The user will be called back when the line is available

Line Skipping

When a user is talking on an outside line and automatic hold is turned off, the user may directly press another line key without causing the previous call to go on hold.

Message Waiting Light / Indication

When a message indication is left at a keyset, the MESSAGE button will light red. Single line telephone users will receive a few seconds of interrupted dial tone to notify them that a message is waiting. Message waiting indications can be left for any station or group of stations.

Mute Microphone / Handset

On NX keysets, pressing the MUTE key will cut off the microphone or the handset transmitter, depending on which is in use. NX-6B keyset users cannot use this feature.

Off-Hook Ringing

When a keyset is in use, the system will provide an off-hook ring signal to indicate that another call is waiting. The ring signal is a single repeated ring. The interval is controlled by a system-wide timer. Single line stations will receive a tone burst through the handset instead of a ring.

On-Hook Dialling

Any keyset user can originate calls without lifting the handset. When the called party answers, speak into the microphone or lift the handset for more privacy.

One-Touch Dialling Keys

Frequently-used speed numbers can be assigned to one-touch dialling keys for fast accurate dialling.

See: MMC 72 Station Key Programming

Programmable Keys

NX keysets have programmable soft keys. Each soft key can be programmed for over 36 different uses to personalise each phone. Examples of soft keys include: individual outside line, individual station line, group of lines, group of stations and one-touch dialling. Using these soft keys eliminates dialling access codes. The following soft keys have extenders that identify what station, group or number that feature key applies to: speed dial, page, directed pickup, group pickup, door phone and vacant messages.

See: MMC 72 Station Key Programming

Pullout Directory Tray

A pullout directory tray is conveniently located beneath all keysets. Use this to record station directory names and speed dial numbers.

Pulse To Tone Switchover

When dialling a number on a dial pulse network, a station user can dial # and the system will begin to send DTMF.

Redial

There are three types of external redial available to all station users, as described below.

Automatic Redial

When a user dials an outside number and receives a busy signal, the automatic redial feature is used to reserve the outside line and automatically redial the number for a programmable number of attempts.

See: MMC 50 System Timers
MMC 52 System-Wide Counters
MMC 72 Station Key Programming

Last Number Redial

The most recent number dialled on a C.O. line is saved and may be redialled by pressing the REDIAL button or dialling the LNR ID.

See: MMC 72 Station Key Programming

Saved Number Redial

Any number dialled on a C.O. line may be saved by pressing the pre-programmed SNR button or dialling the SNR feature code (17) for redial at a later time. It may be redialled by pressing the SNR button or dialling the SNR ID.

See: MMC 70 Dial Numbering Plan (Default Code for SNR: 17)
MMC 72 Station Key Programming

Ring Modes

Each keyset user can select one of three ways to receive intercom calls, as described below. The phone can automatically answer on the speakerphone, voice announce through the speaker or receive ringing.

Ring Mode

Calls are answered by pressing the SPEAKER button or by lifting the handset.

Auto Answer Mode

The keyset will automatically answer calls on the speakerphone.

Voice Announce Mode

Keyset users can hear the caller's voice, but the caller cannot hear the user's voice. For the caller to hear the user's voice, the user presses the SPEAKER button or lifts the handset.

See: MMC 10 Set Answer Mode

Ringling Line Preference

Lifting the handset or pressing the SPEAKER button will automatically answer a call ringing the keyset. Using this method, users will be assured of answering the oldest call first. When ringing preference is turned off, the user must press the flashing button to answer. Users may answer ringing lines in any order by pressing the flashing button.

See: MMC 12 Station On/Off (Default for RING PREFERENCE: ON)

Speaker Phone

Keysets (except NX-6B keysets) have a built-in speakerphone. If the microphone is enabled on the keyset, calls can be made and received without using the handset.

See: MMC 22 Customer On/Off (Default for MIKE: ON)

Station Lock

Station locking prohibits another user from using your station. The system provides two kinds of locking: when LOCKED1 is selected, dialling on your station is prohibited but answering calls is permitted; when LOCKED2 is selected, both dialling and answering calls are prohibited. In UNLOCK condition, you can dial and answer calls as normal.

See: MMC 00 Station Lock (Default for STATION LOCK: UNLOCKED)

Tri-Coloured Lights

Keysets have tri-coloured LEDs. Outside calls in use at a keyset light green at that station and red at all others. Recalls to these keys will have an amber light (red and green together).

Vacant Station Messages

Any keyset may select one of 20 messages to be displayed at a calling party's keyset. 10 messages are fixed and 10 can be customised by the system administrator. (16 characters maximum per message). The 10 fixed messages are:

01 IN A MEETING	02 OUT ON A CALL	03 OUT TO LUNCH
04 LEAVE A MESSAGE	05 PAGE ME	06 OUT OF TOWN
07 IN TOMORROW	08 RETURN AFTERNOON	
09 ON VACATION	10 GONE HOME	

NOTE : The calling party must have a display keyset to view these messages.

See: MMC 27 Vacant Message

Volume Settings

Each keyset may separately adjust the volume of the ringer, speaker and handset receiver. NX keysets use VOLUME (+) and (-) to adjust volume levels.

Wall-Mountable Keysets

Every keyset and AOM comes equipped with a reversible base wedge.

1.3 Display Features

ACCOUNT CODE DISPLAY	ENHANCED STATION PROGRAMMING
CALL DURATION TIMER	IDENTIFICATION OF RECALLS
CALL FOR GROUP IDENTIFICATION	IDENTIFICATION OF TRANSFERS
CALL PROCESSING INFORMATION	MESSAGE WAITING CALLER NUMBER
CALLING PARTY NAME	MULTI-LANGUAGE DISPLAY (3)
CALLING PARTY NUMBER	OUTSIDE LINE IDENTIFICATION
CONFERENCE INFORMATION	STOPWATCH TIMER
DATE AND TIME DISPLAY (4 types)	VACANT STATION MESSAGE DISPLAY
DIALLED NUMBER	

Account Code Display

Account codes are conveniently displayed for easy confirmation. If entered incorrectly, users may press the ACC key again and re-enter the account code.

Call Duration Timer

The system can automatically time outgoing calls and show the duration in hours, minutes and seconds. Station users may manually time calls by pressing the TIMER.

See: MMC 12 Station On/Off (DEFAULT FOR AUTO TIMER: ON)

Call For Group Identification

When a call is made to a station group, the display will show the user's group number. These calls can be answered with a different greeting than calls to the user's extension number.

Call Processing Information

During everyday call handling, the keyset display will provide information that is helpful and in some cases invaluable. In some conditions the user is prompted to take action and in other cases the user receives directory information.

Calling Party Name

For intercom calls, display keysets show the calling party's name when answering. The names must be stored in the system directory list and can be up to 12 characters long.

See: MMC 14 Station Name

Calling Party Number

When receiving an intercom call, all display stations show the calling party's extension number.

Conference Information

When setting up a conference, each extension and outside line number is displayed at the controlling station when it is added. When a station is added to a conference, its display will show [CONFERENCE 203] alerting the user that other parties are on the line.

Date And Time Display

In the idle condition, the current date and time are conveniently displayed. Keysets can have a 12 - or 24-hour clock in either an EASTERN or WESTERN display format.

See: MMC 15 Date Display

Dialled Number

When making outside calls, the digits dialled are displayed as the user dials them. If the display indicates an incorrect number has been dialled, the user can quickly hang up before billing begins.

Enhanced Station Programming

Personal programming options are easier to select and confirm with the help of the display.

Identification Of Recalls

Hold recalls and transfer recalls are identified differently. Hold recalls show [HOLD RECALL 203] and transfer recalls show e.g. [RECALL FROM 204].

Identification Of Transfers

The display identifies who has transferred a call to the user (e.g. [TRSF. FROM 206]) and also shows when a call is camped-on to the user's station.

Message Waiting Caller Number

When the message indication is on, pressing the MESSAGE button will display the station number of the person who has messages for the user. Display keysets scroll up and down to show message indications.

Multi-Language Display (3)

One of three languages can be displayed on an LCD, as selected by the user. The languages available are listed below with their entry numbers.

Entry No.	Language
1	English
2	Spanish
3	Portuguese

NOTE : When users are in MMC mode, English is displayed on the LCD.

See: MMC 93 Selection Languages

Outside Line Identification

Each line can be identified with a name or ID. Incoming calls ringing at your station will display this ID before the call is answered. This is helpful when lines need to be answered with different greetings.

See: MMC 44 Trunk Name

Stopwatch Timer

Display keyset users will find this feature very convenient to time meetings, calls and other functions. Users simply press to start the timer and press again to stop the timer.

Vacant Station Message Display

Vacant station messages set by other stations can be viewed at the user's station when he/she calls them.

See: MMC 27 Vacant Message

2. Feature ID Table

FEATURE	FEATURE ID
Operator Group	0
Hold Pickup Pickup Page Hold Direct Pickup	10 + Station Number/ Trunk Number
Hold	H/F + 11
Call Secretary	12
Call Boss	12 + 1 / 2
Open Doorphone	H/F + 1
Call Doorphone	13 + 1 / 2
Direct Open Doorphone	13 + 3 / 4
Forced Auto Answer	H/F + 14
Programming Personal Speed Dial	15 + Personal Speed Dial Number(00~19) + Telephone Number + H/F
Speed Dial	16 + Speed Dial Number (00 ~ 99)
Saved Number Redial	17
Last Number Redial	19
Leaving a Message	H/F +41,41 + Station/Station Group Number
Cancelling a Message	42 + Station/Station Group Number
Returning a Message	43
Callback	H/F + 44
Camp-On	H/F + 45
Conference	H/F + 46
Account Code	H/F + 47
Vacant Message Setting	48 + message number(01~20)
Vacant Message Cancelling	48 + 00
C.O. Flash (New Call)	H/F + 49
Group In/Out	53 + 1 / 0

FEATURE	FEATURE ID
Station Passcode Changing	54 + old passcode + new passcode
Paging All	55 + *
Paging all internal Zone	55 + 0
Paging internal zone(1~4)	55 + 1 / 2 / 3 / 4
Paging External Zone	55 + 5
Meet Me Page	H/F + 56
Meet Me Answer	56
Alarm Setting	58 + HH + MM
Alarm Cancelling	58 + 3
Walking Class of Service	59 + station number + station passcode
Cancelling Call Forward	60
Call Forward All Setting	61 + 1 + station NO./ station group NO.
Call Forward All Cancelling	61 + 0
Call Forward Busy Setting	62 + 1 + station NO./ station group NO.
Call Forward Busy Cancelling	62 + 0
Call Forward No Answer Setting	63 + 1 + station NO./ station group NO.
Call Forward No Answer Cancelling	63 + 0
DND	64 + 1 / 0
Toll Override	65 + Authorization Code
My Number	#
Group Pickup	66 + pickup group(0~9)
UNA Pickup	67
Answer Mode Setting	68 + 1 / 2 / 3
Headset	69 + 1 / 0
Pickup Group	*
Pulse to Tone Changeover	Dialing + #

Sample Printout of SMDR

For more detailed information on SMDR, refer to STATION MESSAGE DETAIL RECORDING earlier in this section.

SMDR REPORT FOR [01/08/96 15:19]							
EXT	TRK	MM DD	STT. TIME	DURATION	NUMBER DIALED	ACC. CODE	AUTH
201	703	01:08	15:19:11	00:00:22	03465573027		
203	702	01:08	15:19:24	00:00:17	0343923007		
203	703	01:08	15:20:43	00:00:42	INCOMING		
201	701	01:08	15:24:23	00:00:07	4602845		
203	703	01:08	15:24:32	00:00:04	4604367		
204	702	01:08	15:24:35	00:00:04	026770202		