

# **SAMSUNG**

## **DCS-816**

### **INSTALLATION MANUAL**



**TELECOMS**



SAMSUNG ELECTRONICS CO. LTD.

### **Publication Information**

Samsung Electronics reserves the right without prior notice to revise information in this publication for any reason.

Samsung Electronics also reserves the right without prior notice to make changes in design or components of equipment as engineering and manufacturing may warrant.

**Copyright 1999  
Samsung Electronics Co. Ltd**

All rights reserved. No part of this manual may be reproduced in any form or by any means - graphic, electronic or mechanical, including recording, taping, photocopying or information retrieval systems - without express written permission of the publisher of this material.

March/99

## Table of Contents

<b>PART 1. SITE REQUIREMENTS.....</b>	<b>1-1</b>
<b>PART 2. INSTALLING THE BASIC KSU .....</b>	<b>2-1</b>
2.1 System Configuration and Capacity .....	2-1
2.2 Unpacking and Inspection .....	2-2
2.3 Mounting the KSU (Figure 2-1) .....	2-2
2.4 Grounding the KSU (Figure 2-2) .....	2-3
2.5 MDF Cabling (Figure 2-3).....	2-3
2.6 External Battery Connection (Figure 2-4).....	2-6
2.7 Selecting Options on the Basic KSU (Figure 2-5) .....	2-7
<b>PART 3. INSTALLING OPTION CARDS AND TRUNK CARDS (FIGURE 3-1) .....</b>	<b>3-1</b>
3.1 SIO1 Option Card (Figure 3-2) .....	3-2
3.2 AA Option Card (Figure 3-2) .....	3-2
3.3 8TRK Card (Figure 3-3).....	3-3
3.4 2/4BRI Card (Figure 3-3).....	3-3
3.5 4TRK Card (Figure 3-4).....	3-4
<b>PART 4. POWER-UP PROCEDURE .....</b>	<b>4-1</b>
4.1 Connect Power to the System (Figure 4-1, 4-2).....	4-1
4.2 Monitor LED Indication and Memory Backup Selection .....	4-3
4.3 PCB Verification .....	4-3
4.4 Default Trunk and Station Numbering.....	4-3
<b>PART 5. CONNECTING PSTN CIRCUITS .....</b>	<b>5-1</b>
5.1 Safety Precautions .....	5-1
5.2 Loop-Start Lines (Figure 5-1) .....	5-2
5.3 Off Premise Extension (OPX) (Figure 5-2) .....	5-3
5.4 ISDN BRI Lines (Figure 5-3) .....	5-4
<b>PART 6. CONNECTING STATION EQUIPMENT .....</b>	<b>6-1</b>
6.1 Safety Precautions .....	6-1
6.2 Digital Keysets (Figure 6-1).....	6-2
6.3 Single Line Telephones (Figure 6-2).....	6-3
6.4 Door Phone and Door Lock Release (Figure 6-3).....	6-4
6.5 CTM - CTI Module (TAPI) (Figure 6-4) .....	6-5
6.6 ISDN TE (ISDN Phone, G4 FAX, etc) (Figure 6-5) .....	6-6
<b>PART 7. CONNECTING OPTIONAL EQUIPMENT .....</b>	<b>7-1</b>
7.1 Music-on-Hold/ Background Music (Figure 7-1).....	7-1
7.2 External Paging (Figure 7-2) .....	7-2
7.3 Common Bell (Figure 7-3).....	7-3
7.4 Ring Over Page.....	7-4
7.5 Station Message Detail Recording (SMDR) (Figure 7-4) .....	7-4
7.6 PC Programming (Figure 7-5).....	7-5
7.7 Remote Programming (Figure 7-6) .....	7-6
7.8 Power Failure Transfer.....	7-6
7.9 Voice Mail/ Auto Attendant (Figure 7-7) .....	7-7
7.10 Information on DCS-816 Serial Interface (Figure 7-8) .....	7-8

**PART 8. CHANGING SOFTWARE (FIGURE 8-1).-----8-1**

**FIGURES**

<b>FIGURE 2-1</b>	<b>ATTACHING MOUNTING BRACKET TO BACKBOARD</b>
<b>FIGURE 2-2</b>	<b>GROUNDING THE KSU</b>
<b>FIGURE 2-3</b>	<b>MDF CABLING</b>
<b>FIGURE 2-4</b>	<b>CONNECTING A SYSTEM BACKUP BATTERY</b>
<b>FIGURE 2-5</b>	<b>SELECTING OPTIONS ON THE BASIC KSU</b>
<b>FIGURE 3-1</b>	<b>INSTALLING OPTION CARDS AND A TRUNK CARD</b>
<b>FIGURE 3-2</b>	<b>SIO OPTION CARD AND AA OPTION CARD</b>
<b>FIGURE 3-3</b>	<b>8TRK CARD AND 2/4BRI CARD</b>
<b>FIGURE 3-4</b>	<b>4TRK CARD</b>
<b>FIGURE 4-1</b>	<b>CONNECTING POWER TO THE SYSTEM</b>
<b>FIGURE 4-2</b>	<b>REPLACING FUSES (POWER SUPPLY UNIT)</b>
<b>FIGURE 5-1</b>	<b>CONNECTING LOOP-START LINES</b>
<b>FIGURE 5-2</b>	<b>CONNECTING OPX LINES</b>
<b>FIGURE 5-3</b>	<b>CONNECTING BRI LINES</b>
<b>FIGURE 6-1</b>	<b>CONNECTING DIGITAL KEYSETS</b>
<b>FIGURE 6-2</b>	<b>CONNECTING SINGLE LINE TELEPHONES</b>
<b>FIGURE 6-3</b>	<b>CONNECTING A DOOR PHONE AND LOCK RELEASE</b>
<b>FIGURE 6-4</b>	<b>CONNECTING A CTM (TAPI)</b>
<b>FIGURE 6-5</b>	<b>CONNECTING ISDN TE</b>
<b>FIGURE 7-1</b>	<b>CONNECTING EXTERNAL MUSIC</b>
<b>FIGURE 7-2</b>	<b>CONNECTING EXTERNAL PAGING EQUIPMENT</b>
<b>FIGURE 7-3</b>	<b>CONNECTING AN EXTERNAL LOUD BELL</b>
<b>FIGURE 7-4</b>	<b>PIN CONNECTIONS TO PRINTER</b>
<b>FIGURE 7-5</b>	<b>PIN CONNECTIONS TO PC</b>
<b>FIGURE 7-6</b>	<b>PIN CONNECTIONS TO MODEM</b>
<b>FIGURE 7-7</b>	<b>CONNECTING VM/AA</b>
<b>FIGURE 7-8</b>	<b>INFORMATION ON SERIAL INTERFACE</b>
<b>FIGURE 8-1</b>	<b>CHANGING SOFTWARE</b>

## PART 1. SITE REQUIREMENTS

To install the DCS-816 system, choose a site that meets the following requirements.

- ✓ Select a location for the Key Service Unit (KSU) that has enough space for easy installation and adequate lighting. (KSU dimensions [mm]: 465 (H) x 315 (W) x 120 (D))
- ✓ Select a location that minimises cable lengths. See the Cable Requirements table below.
- ✓ 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 copy 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 32°F ~ 104°F (0°C ~ 40°C) and a humidity range of 10% ~ 90% non-condensing.
- ✓ Allow at least 150 mm clearance on both sides and 150 mm clearance on top of the KSU to ensure proper ventilation.
- ✓ Do not install within a 2-mile radius of broadcasting antenna or in close proximity to a fire sprinkler head or other sources of water.

Meeting these requirements will help to ensure proper performance and greater life expectancy of the system.

<b>CABLE REQUIREMENTS</b>				
<b>EQUIPMENT</b>	<b>CABLE</b>	<b>Gauge</b>	<b>MAX FEET</b>	<b>MAX METRES</b>
DIGITAL KEYSETS	1 PR. TWISTED	0.5mm	1300	400
SINGLE-LINE STATION	1 PR. TWISTED	0.5mm	3000	1 KM
DOOR PHONE	2 PR. TWISTED	0.5mm	330*	100
CTI INTERFACE MODULE	1 PR. TWISTED	0.5mm	1300	400

\* This is the maximum distance a door phone can be from the DPIM. The DPIM can be a maximum of 250 cable metres from the KSU

## **NOTICE**

**Only qualified engineers or technicians can have access to the inside of the system. In most countries, it is prohibited by law that non-qualified people install or maintain systems.**

## PART 2. INSTALLING THE BASIC KSU

### 2.1 SYSTEM CONFIGURATION AND CAPACITY

The **DCS-816** system consists of the Basic Key Service Unit (KSU), option cards, trunk interface cards, interface modules and digital keysets. The KSU is a single metal cabinet, and in its basic form has 16 station ports: twelve (12) keyset ports and four (4) SLT (single line telephone) ports. Additionally, the KSU contains one (1) trunk expansion slot, two (2) option connectors and miscellaneous circuits: one (1) external page interface, one (1) general-purpose dry contact and one (1) music interface selectable to internal built-in music (a melody chip) or external music.

Two types of telephones can be connected to the system: proprietary digital stations called "keysets" that connect to Digital Line Interface (DLI) ports and standard telephone sets, generally called "single line telephones", that connect to Single Line Interface (SLI) ports.

The Trunk Expansion slot provides an option to select an analogue trunk card or a basic rate interface (BRI) card.

The DCS-816 system also has some option cards to provide serial I/O ports or AA facilities.

The KSU starts with two (2) analogue trunk ports and 16 stations, and the trunk expansion slot provides a maximum capacity of 10 trunk ports (analogue or digital) and 16 stations.

The system maximum capacity is as follows:

<b>Stations</b>	<b>16 (12 keysets, 4 SLTs)</b>
<b>ISDN channels</b>	<b>8 (4 BRI ports)</b>
<b>Analogue C.O. lines</b>	<b>10</b>
<b>Music channel</b>	<b>1 (Internal or External)</b>
<b>External page</b>	<b>1</b>
<b>General-purpose Dry Contact</b>	<b>1</b>
<b>Serial I/O ports</b>	<b>2 (DB9 connectors)</b>
<b>Auto Attendant channels</b>	<b>4</b>

### CONFIGURATION NOTES

1. No KDBs (keyset daughter-boards for additional DLI or SLI expansion) can be installed.
2. Only one (1) trunk expansion card can be installed.
3. Only one SIO option card and one AA option card can be installed.
4. The system cannot accommodate any cards from other Samsung Digital Systems **except** for DCS Compact BRI cards.
5. Every analogue trunk interface contains an interface for MPD or PRS which is optional. The MPD or PRS hybrid chips of the DCS system can be used.

## 2.2 UNPACKING AND INSPECTION

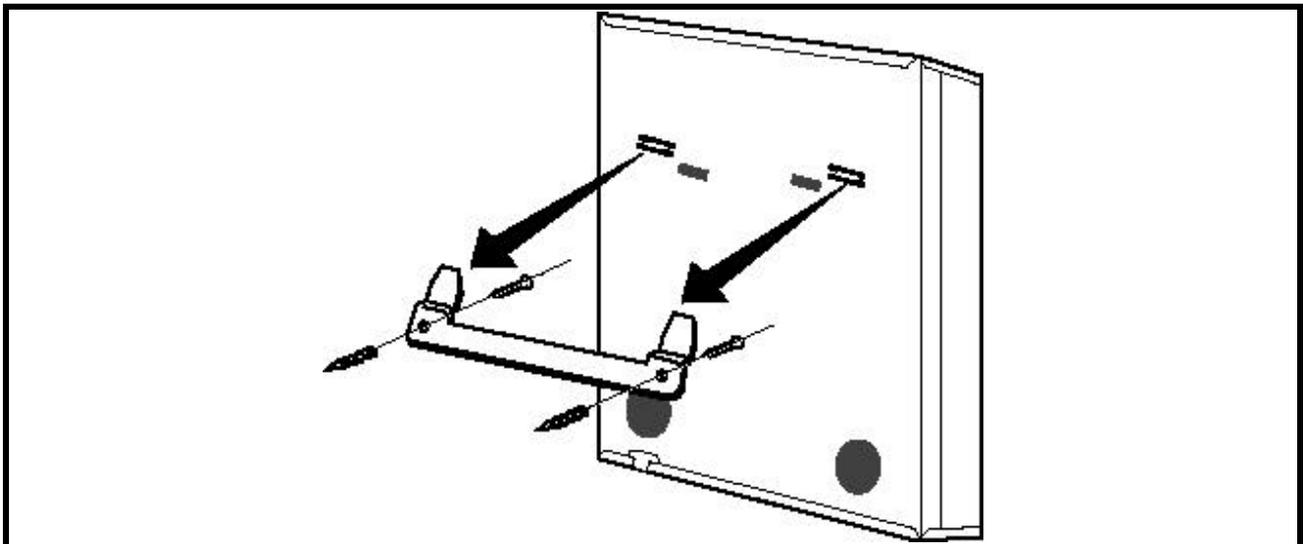
After unpacking the KSU, inspect for any signs of physical damage. If any damage is detected, do not attempt to install. Contact the local distributor for advice.

Check to see that the Basic KSU carton includes the following items.

- ✓ Basic Key Service Unit (KSU)
- ✓ AC Power Cord
- ✓ Wall-mount bracket
- ✓ Spare fuses
- ✓ Cable ties and screws
- ✓ Battery connection cable
- ✓ SLT User's Guide (Standard telephone)

## 2.3 MOUNTING THE KSU (Figure 2-1)

DCS-816 can be wall-mounted. The KSU should be mounted on a plywood backboard at least 15 mm thick. Attach the wall-mount bracket to the backboard with the screws supplied and hang the KSU on the bracket.



ATTACHING MOUNTING BRACKET TO BACKBOARD

**FIGURE 2-1**

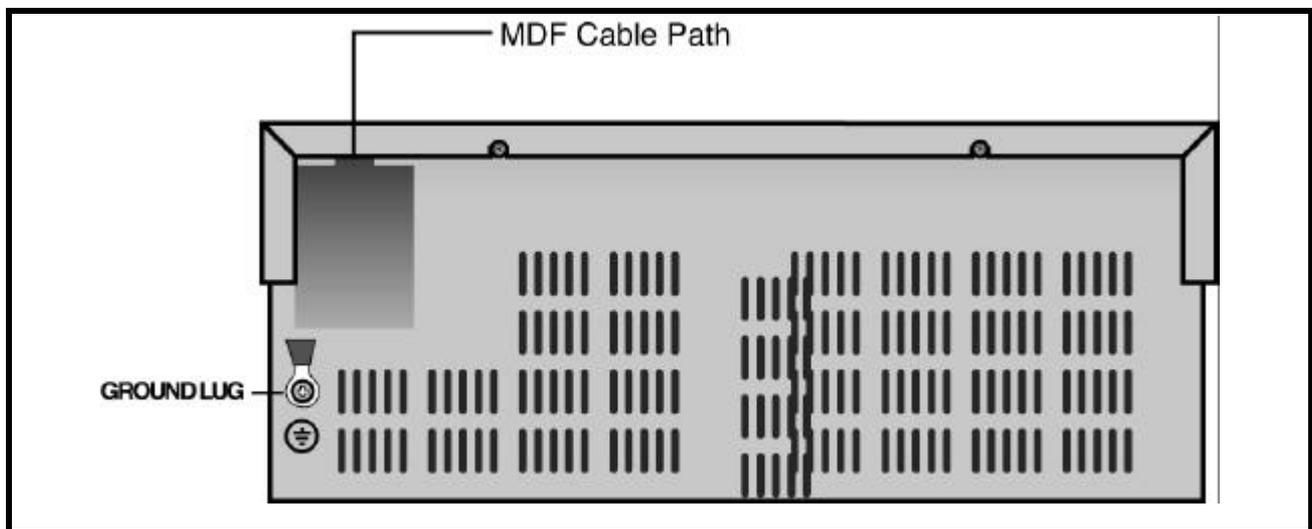
## 2.4 GROUNDING THE KSU (Figure 2-2)

DCS-816 comes equipped ready to use with the third wire AC ground provided through the power cord. This ground will be adequate for most applications. However, if it is suspected that there is a problem with the ground provided at the AC outlet, or local codes require a solid earth ground to be connected to the KSU, the existing third wire ground must be disconnected before power is applied. The grounding lug on the KSU must be connected to a ground rod or metal cold water pipe using #10 AWG (approximately 2.6 mm in diameter) solid copper wire. (See **Figure 2-2.**)

Failure to provide an adequate ground may cause unpredictable operation or even circuit failure.

### **Warning**

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



**GROUNDING THE KSU**

**FIGURE 2-2**

## 2.5 MDF CABLING (Figure 2-3)

All connections to the DCS-816 system are made via a customer-provided main distribution frame (MDF) and the cables can be routed into the KSU cabinet from below.

A 25-pair male champ connector and a 4-pair modular jack (RJ-45) on the base board are prepared for external connections. The connections for SLTs are made through the RJ-45 modular jack and other connections are made through the champ connector. The detailed pin assignments are as follows. (Note that the colour of wires may be differently specified in some countries.)

## Details of Champ Connections

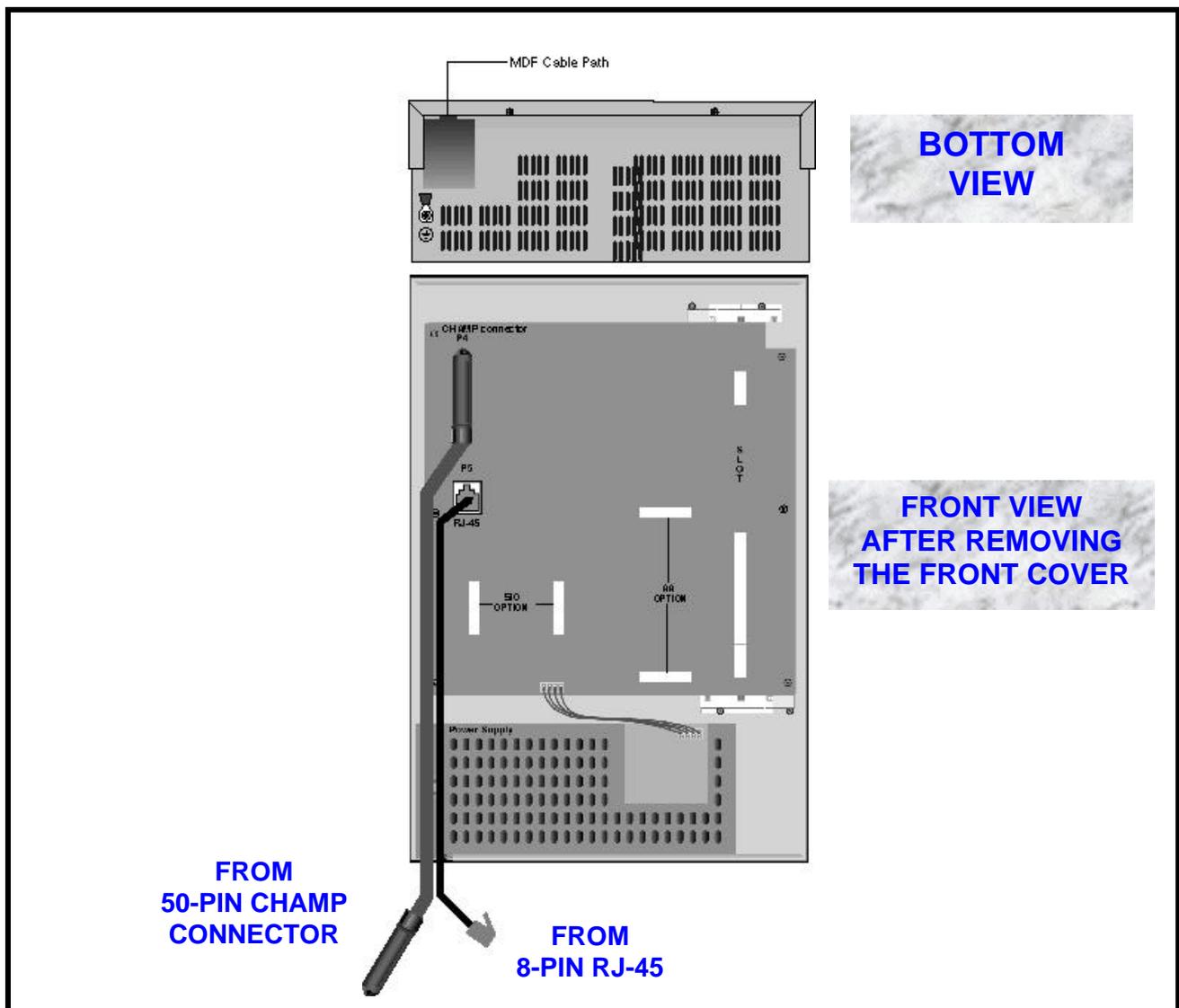
The first 20 pins are assigned to connections for trunk interfaces on a trunk interface card as well as on the base board. The next 6 pins are for connection of miscellaneous circuits and the last 24 pins are assigned to connections for 12 DLI ports on the base board.

Pin	Colour	Circuits/ Functions	Remark
26 1	W-BL BL-W	Tip, 1 <sup>st</sup> Loop-start Trunk Interface on the base board Ring, 1 <sup>st</sup> Loop-start Trunk Interface on the base board	No polarity
27 2	W-O O-W	Tip, 2 <sup>nd</sup> Loop-start Trunk Interface on the base board Ring, 2 <sup>nd</sup> Loop-start Trunk Interface on the base board	No polarity
28 3	W-GR GR-W	Tip of 3 <sup>rd</sup> Analogue Trunk or Tip of 1 <sup>st</sup> BRI TX Ring of 3 <sup>rd</sup> Analogue Trunk or Ring of 1 <sup>st</sup> BRI TX	Expansion card No polarity
29 4	W-BR BR-W	Tip of 4 <sup>th</sup> Analogue Trunk or Tip of 1 <sup>st</sup> BRI RX Ring of 4 <sup>th</sup> Analogue Trunk or Ring of 1 <sup>st</sup> BRI RX	Expansion card No polarity
30 5	W-S S-W	Tip of 5 <sup>th</sup> Analogue Trunk or Tip of 2 <sup>nd</sup> BRI TX Ring of 5 <sup>th</sup> Analogue Trunk or Ring of 2 <sup>nd</sup> BRI TX	Expansion card No polarity
31 6	R-BL BL-R	Tip of 6 <sup>th</sup> Analogue Trunk or Tip of 2 <sup>nd</sup> BRI RX Ring of 6 <sup>th</sup> Analogue Trunk or Ring of 2 <sup>nd</sup> BRI RX	Expansion card No polarity
32 7	R-O O-R	Tip of 7 <sup>th</sup> Analogue Trunk or Tip of 3 <sup>rd</sup> BRI TX Ring of 7 <sup>th</sup> Analogue Trunk or Ring of 3 <sup>rd</sup> BRI TX	Expansion card No polarity
33 8	R-GR GR-R	Tip of 8 <sup>th</sup> Analogue Trunk or Tip of 3 <sup>rd</sup> BRI RX Ring of 8 <sup>th</sup> Analogue Trunk or Ring of 3 <sup>rd</sup> BRI RX	Expansion card No polarity
34 9	R-BR BR-R	Tip of 9 <sup>th</sup> Analogue Trunk or Tip of 4 <sup>th</sup> BRI TX Ring of 9 <sup>th</sup> Analogue Trunk or Ring of 4 <sup>th</sup> BRI TX	Expansion card No polarity
35 10	R-S S-R	Tip of 10 <sup>th</sup> Analogue Trunk or Tip of 4 <sup>th</sup> BRI RX Ring of 10 <sup>th</sup> Analogue Trunk or Ring of 4 <sup>th</sup> BRI RX	Expansion card No polarity
36 11	BK-BL BL-BK	Tip, General-purpose Dry Contact on the base board Ring, General-purpose Dry Contact on the base board	No polarity
37 12	BK-O O-BK	Tip, External Page Interface on the base board Ring, External Page Interface on the base board	No polarity
38 13	BK-GR GR-BK	Tip, External Music Interface on the base board Ring, External Music Interface on the base board	No polarity
39 14	BK-BR BR-BK	Tip, 1 <sup>st</sup> DLI port on the base board Ring, 1 <sup>st</sup> DLI port on the base board	No polarity
40 15	BK-S S-BK	Tip, 2 <sup>nd</sup> DLI port on the base board Ring, 2 <sup>nd</sup> DLI port on the base board	No polarity
41 16	Y-BL BL-Y	Tip, 3 <sup>rd</sup> DLI port on the base board Ring, 3 <sup>rd</sup> DLI port on the base board	No polarity
42 17	Y-O O-Y	Tip, 4 <sup>th</sup> DLI port on the base board Ring, 4 <sup>th</sup> DLI port on the base board	No polarity
43 18	Y-GR GR-Y	Tip, 5 <sup>th</sup> DLI port on the base board Ring, 5 <sup>th</sup> DLI port on the base board	No polarity
44 19	Y-BR BR-Y	Tip, 6 <sup>th</sup> DLI port on the base board Ring, 6 <sup>th</sup> DLI port on the base board	No polarity
45 20	Y-S S-Y	Tip, 7 <sup>th</sup> DLI port on the base board Ring, 7 <sup>th</sup> DLI port on the base board	No polarity
46 21	VL-BL BL-VL	Tip, 8 <sup>th</sup> DLI port on the base board Ring, 8 <sup>th</sup> DLI port on the base board	No polarity
47 22	VL-O O-VL	Tip, 9 <sup>th</sup> DLI port on the base board Ring, 9 <sup>th</sup> DLI port on the base board	No polarity
48 23	VL-GR GR-VL	Tip, 10 <sup>th</sup> DLI port on the base board Ring, 10 <sup>th</sup> DLI port on the base board	No polarity
49 24	VL-BR BR-VL	Tip, 11 <sup>th</sup> DLI port on the base board Ring, 11 <sup>th</sup> DLI port on the base board	No polarity
50 25	VL-S S-VL	Tip, 12 <sup>th</sup> DLI port on the base board Ring, 12 <sup>th</sup> DLI port on the base board	No polarity

### Details of RJ-45 Connections

Eight pins of the RJ-45 connector are assigned to connections of SLT interface ports on the base board.

Pin No.	Circuits/ Functions	Remarks
1 8	Tip, 1 <sup>st</sup> SLT port (STN 13) on the base board Ring, 1 <sup>st</sup> SLT port (STN 13) on the base board	OPX Circuit No polarity
2 7	Tip, 2 <sup>nd</sup> SLT port (STN 14) on the base board Ring, 2 <sup>nd</sup> SLT port (STN 14) on the base board	OPX Circuit No polarity
3 6	Tip, 3 <sup>rd</sup> SLT port (STN 15) on the base board Ring, 3 <sup>rd</sup> SLT port (STN 15) on the base board	No polarity
4 5	Tip, 4 <sup>th</sup> SLT port (STN 16) on the base board Ring, 4 <sup>th</sup> SLT port (STN 16) on the base board	No polarity



MDF CABLING

**FIGURE 2-3**

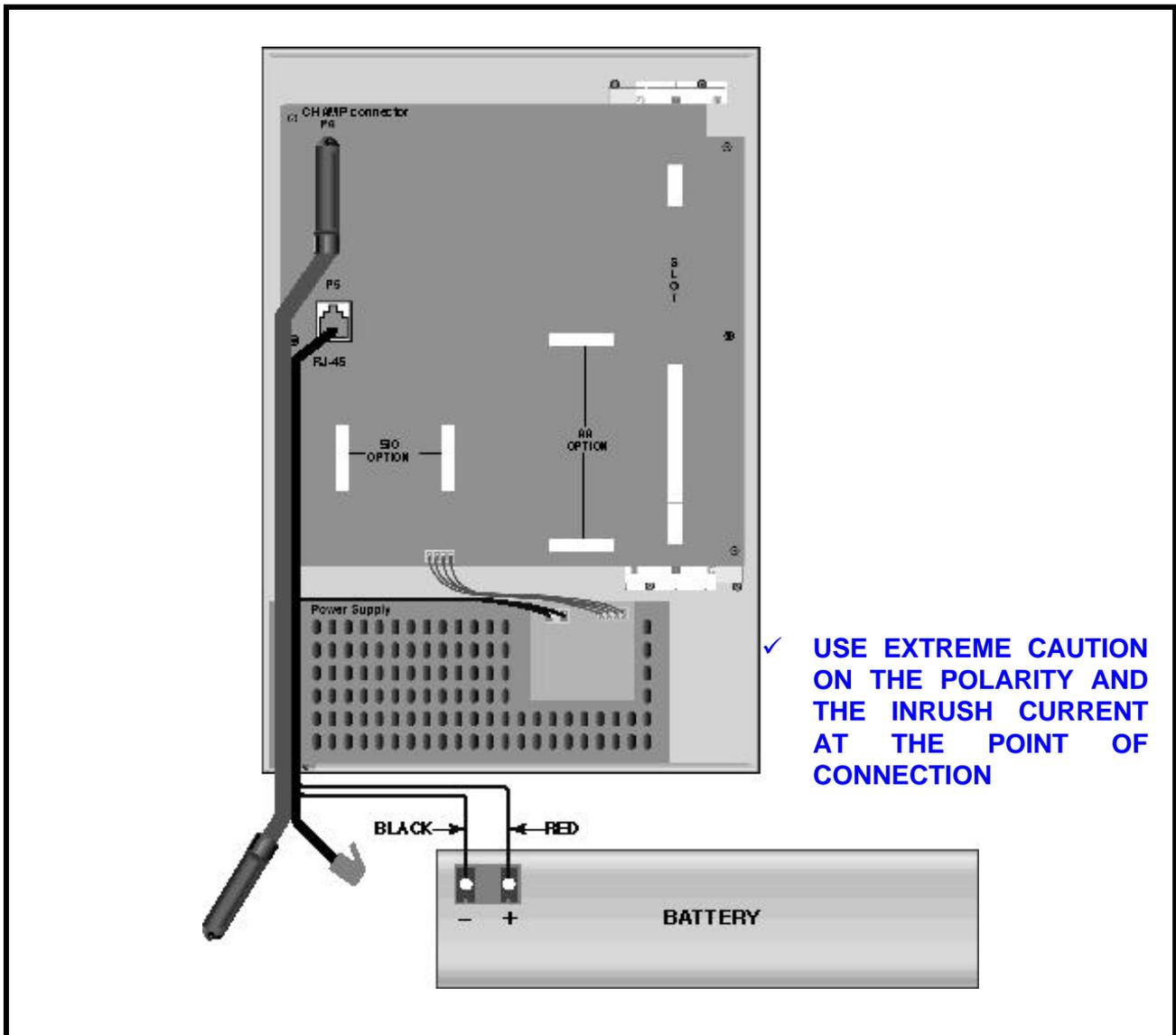
## 2.6 External Battery Connection (Figure 2-4)

It is recommended that an external battery should be installed to backup the system in case of AC power failure. The DCS-816 system is equipped with battery charging and discharging circuits to interface with an external battery.

To decide the capacity of the battery, keep in mind that it may damage the system if too large while it cannot backup the system long enough if too small. The capacity should be not less than 6AH nor more than 26AH. The battery voltage should be 48 volts.

To connect an external battery, first pick out the battery connection cable through the MDF cable path. Connect the RED lead of the cable to the positive (+) terminal of the battery and the BLACK lead to the negative (-) terminal. Then insert the housing connector into the header in the power supply.

NOTE: The actual connection should be done as the final step in the installation of the KSU.



CONNECTING A SYSTEM BACKUP BATTERY

**FIGURE 2-4**

## **2.7 Selecting Options on the Basic KSU (Figure 2-5)**

There are some hardware options to select in the Basic KSU: Memory Backup Selection, Music Source Selection and MPD/PRS selection for the two (2) analogue trunk lines on the base board.

### **2.7.1 Memory Backup Selection**

The system is equipped with 256Kbyte of data memory and memory backup circuitry (a super capacitor) to protect the data in case of any power failure. The memory backup circuitry has a shunt-pin switch to enable backup. Before shipment, the switch is set OFF to prevent the super capacitor from discharging during shipment and storage, and it should be switched ON after installing and programming the system. Otherwise, the customer data and the programmed data will be lost in the event of a power failure. (See Figure 2-5.)

### **2.7.2 Music Source Selection**

The Basic KSU is equipped with a melody chip to provide music to stations and trunk lines as Music-on-Hold or Background Music. In addition, it has an interface for an external music source, (CD player, radio etc).

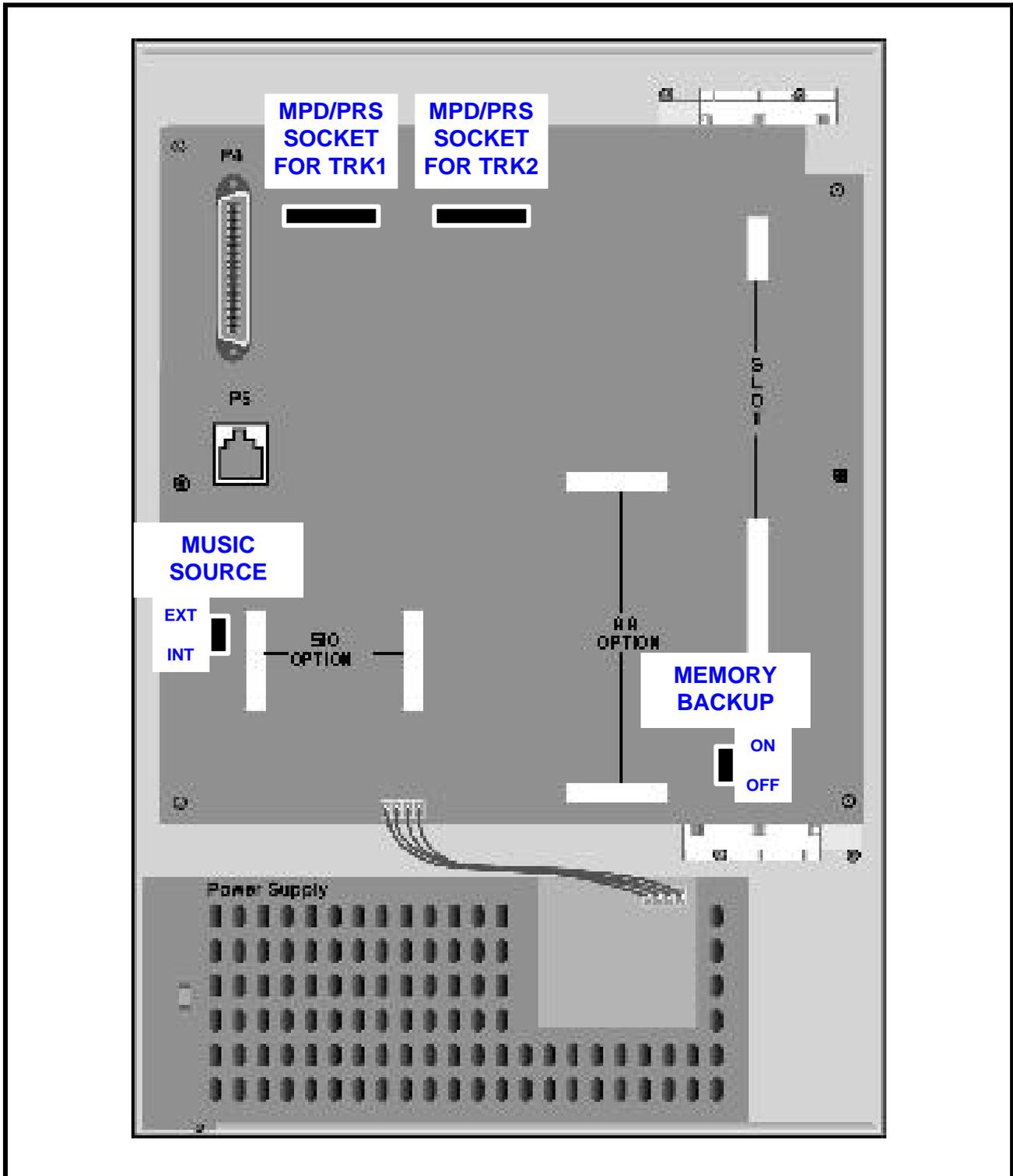
As the system provides only a single music channel for Music-on-Hold or Background Music, refer to Figure 2-5 to select the music source at the end of installation. A shunt-pin switch selects the music source: the internal melody chip or an external music source.

How to connect the external music source is explained in Part 7.

### **2.7.3 MPD/ PRS Selection and Installation**

The Basic KSU has two (2) analogue trunk interfaces and each trunk interface is equipped with a socket to install an option chip for Metering Pulse Detection (MPD) or Polarity Reverse Signal (PRS) detection. (See Figure 2-5 for position of option chip sockets and ensure that the chips are firmly inserted into the sockets.) One chip per line. DCS option chips for MPD or PRS can be installed.

**Contact your dealer for details.**



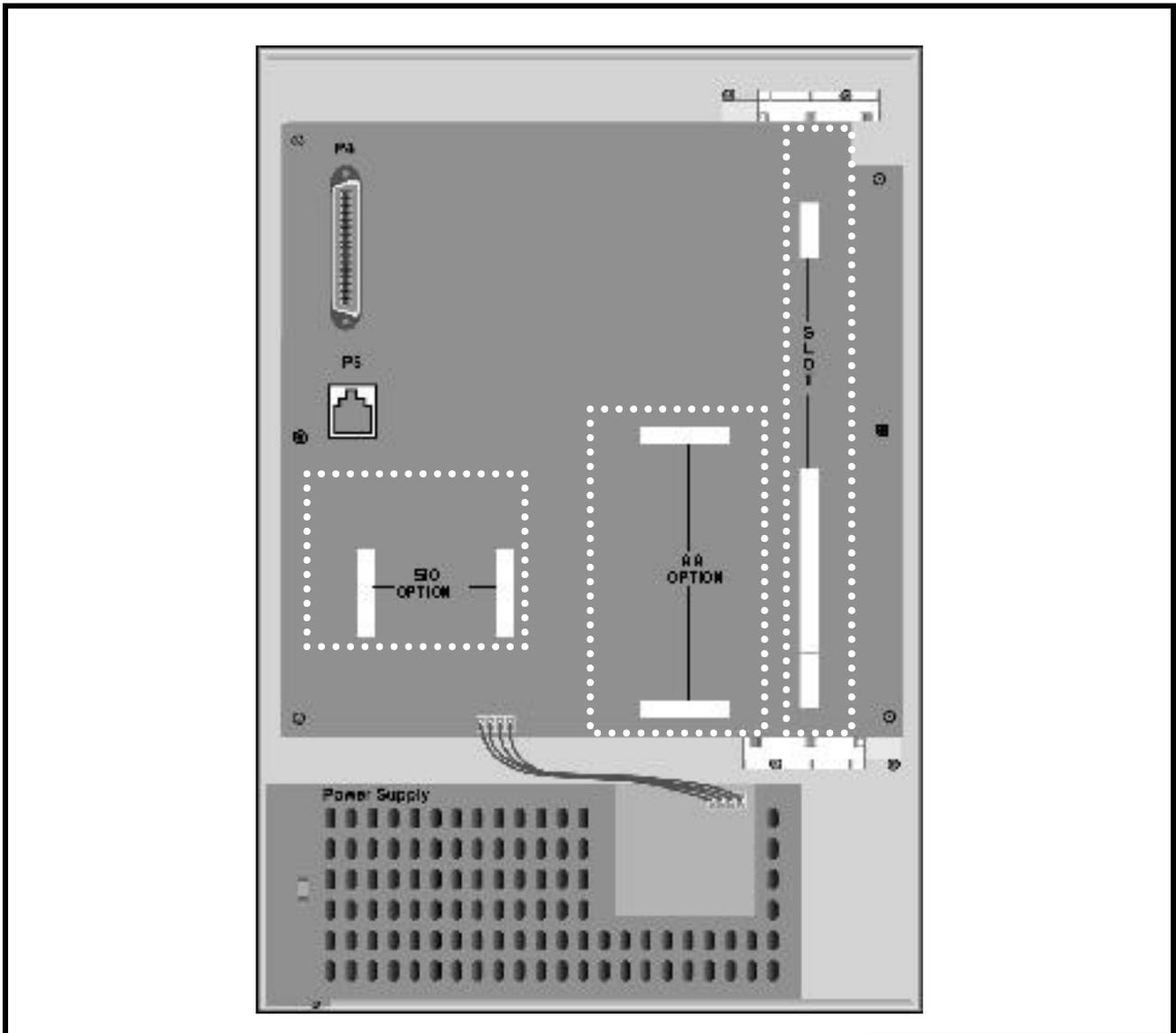
SELECTING OPTIONS ON THE BASIC KSU

**FIGURE 2-5**

### PART 3. INSTALLING OPTION CARDS AND TRUNK CARDS (Figure 3-1)

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

The DCS-816 system has one (1) trunk expansion slot for a trunk card and two (2) option connections for SIO and AA. See Figure 3-1.



INSTALLING OPTION CARDS AND A TRUNK CARD

**FIGURE 3-1**

### 3.1 SIO1 Option Card (Figure 3-2)

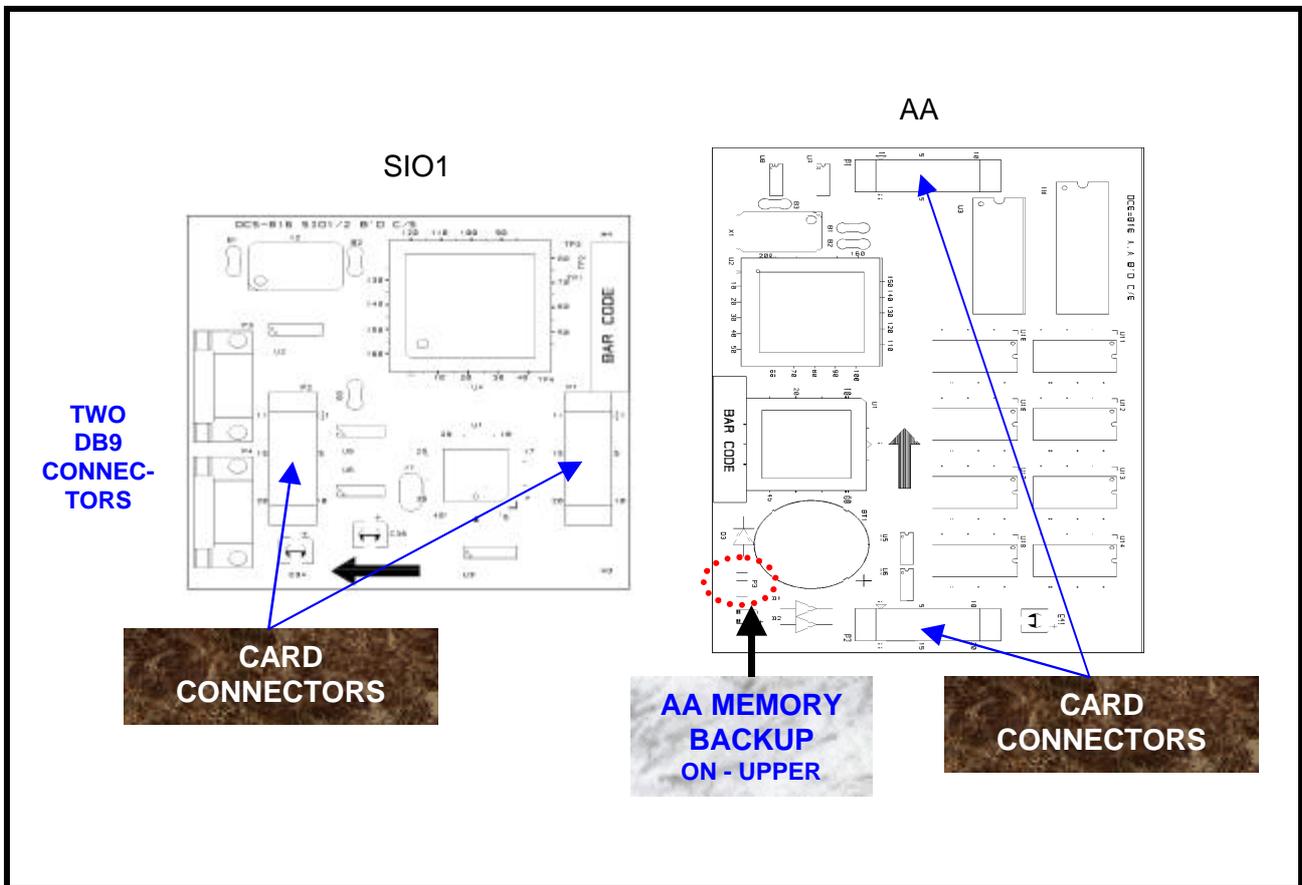
#### Two (2) serial interfaces with DB9 connectors

There are no hardware options to select on this card. Only one card can be installed at the dedicated location. Ensure that it is fully inserted into two (2) card connectors.

### 3.2 AA Option Card (Figure 3-2)

#### Four (4) channel built-in Auto Attendant

There is a memory backup selection switch (a shunt pin) which should be set ON after installation. Only one card can be installed at the dedicated location. Ensure that it is fully inserted into two (2) card connectors.



SIO1 OPTION CARD AND AA OPTION CARD

**FIGURE 3-2**

### 3.3 8TRK Card (Figure 3-3)

#### Eight (8) analogue trunk interfaces with MPD or PRS option

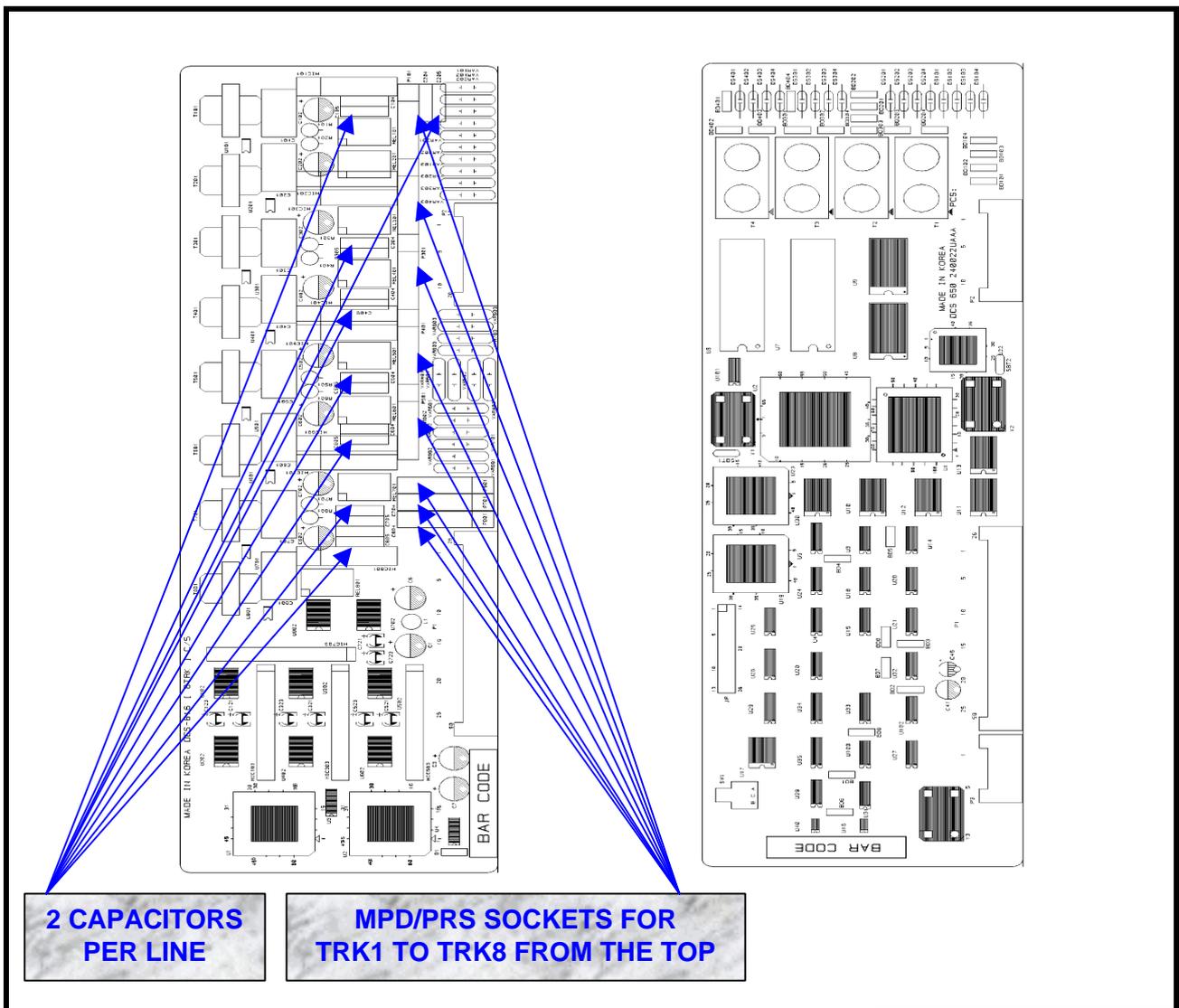
The card has eight (8) interfaces for MPD or PRS optional chips. Install any MPD or PRS chip before installing the card. Only one card can be installed in the expansion slot. Ensure that it is fully inserted into the slot.

### 3.4 2/4BRI Card (Figure 3-3)

#### Two (2) or four (4) ISDN BRI ports

There are no hardware options to select on this card. This card supports both S and T reference points defined by ITU-T. You can select the S/T mode of each port respectively by programming (MMC). Note that the card does not provide power to ISDN terminal equipment even though you select So mode.

Insert the card and ensure that it is pushed firmly into the slot.



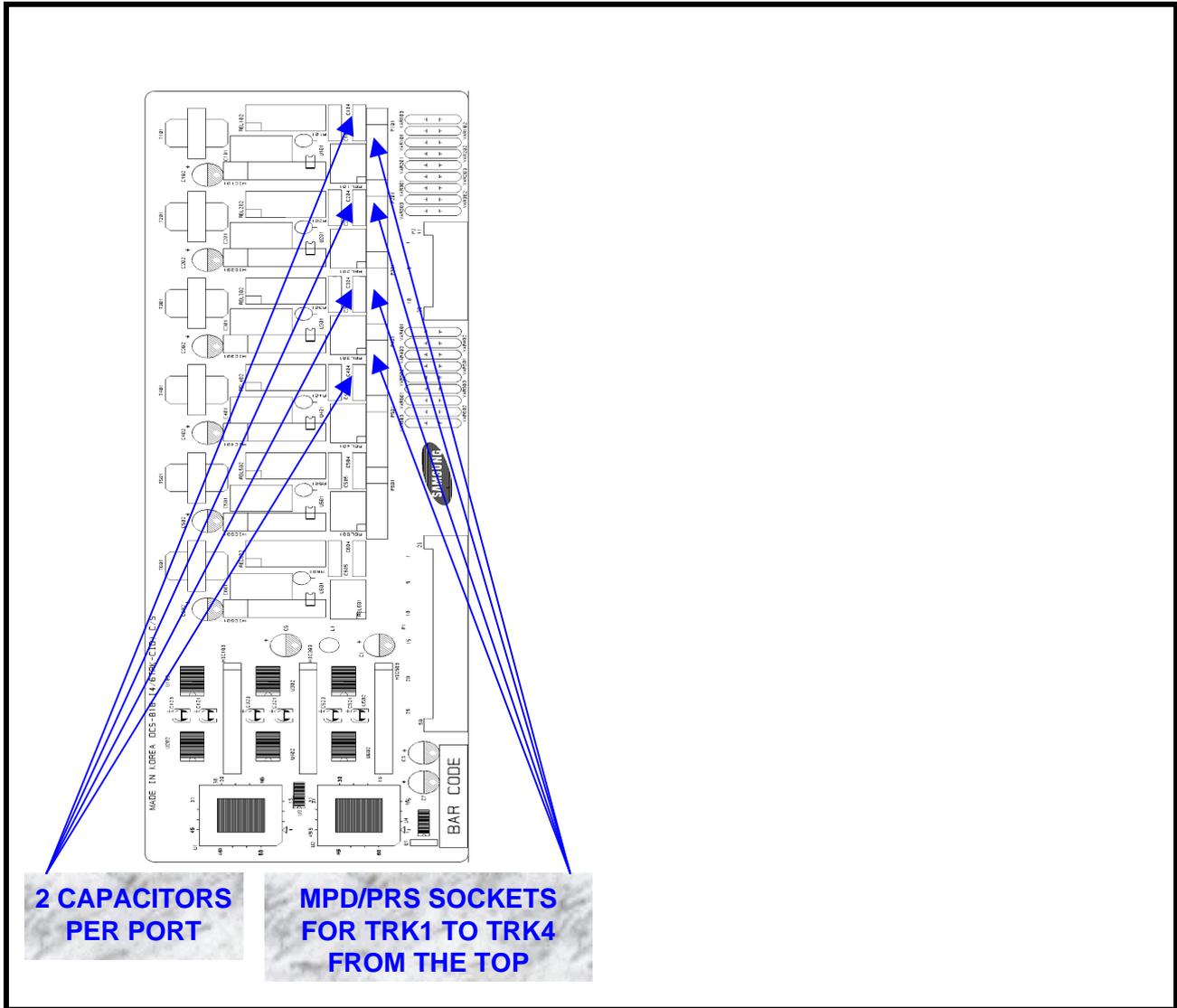
8TRK CARD AND 2/4BRI CARD

**FIGURE 3-3**

### 3.5 4TRK Card (Figure 3-4)

#### Four (4) analogue trunk interfaces with MPD or PRS options

The card has four (4) interfaces for MPD or PRS option chips. Install any MPD or PRS chip before installing the card. For PRS and 50Hz MPD facilities, the capacitors marked on Figure 3-4 should be replaced with wire-jumpers. Install the card and ensure that it is fully inserted into the slot. Some components are not mounted. Only one card per system.



4TRK CARD

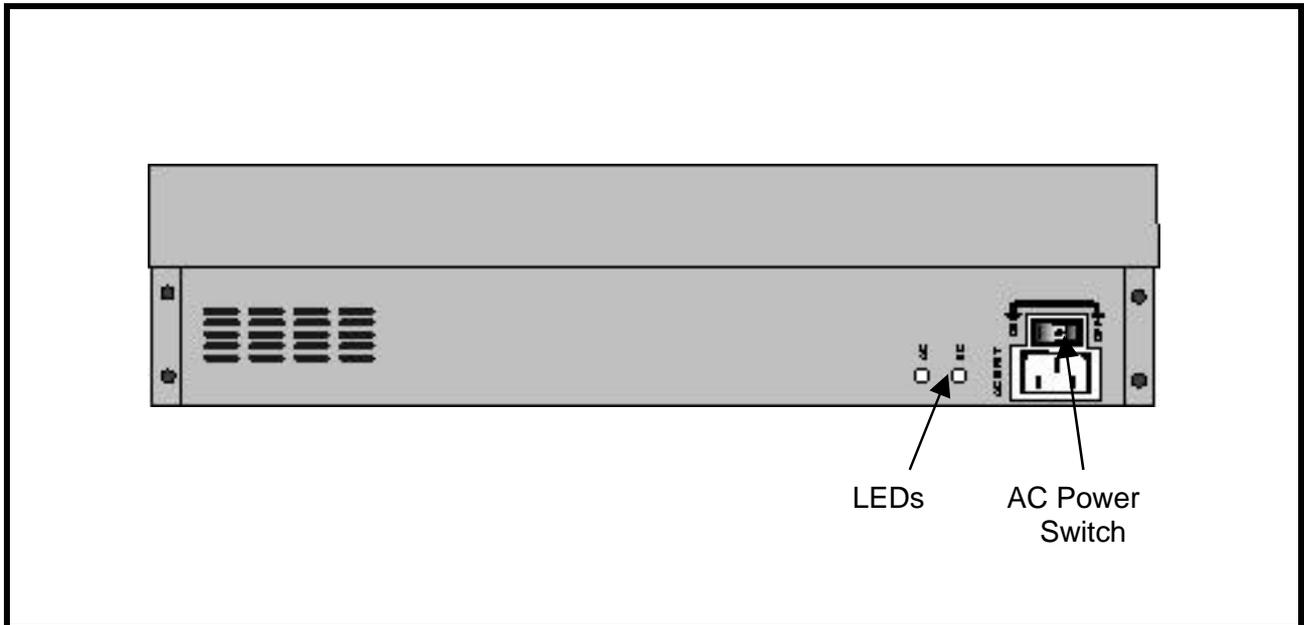
**FIGURE 3-4**

## **PART 4. POWER-UP PROCEDURE**

### **4.1 Connect Power to the System (Figures 4-1 and 4-2)**

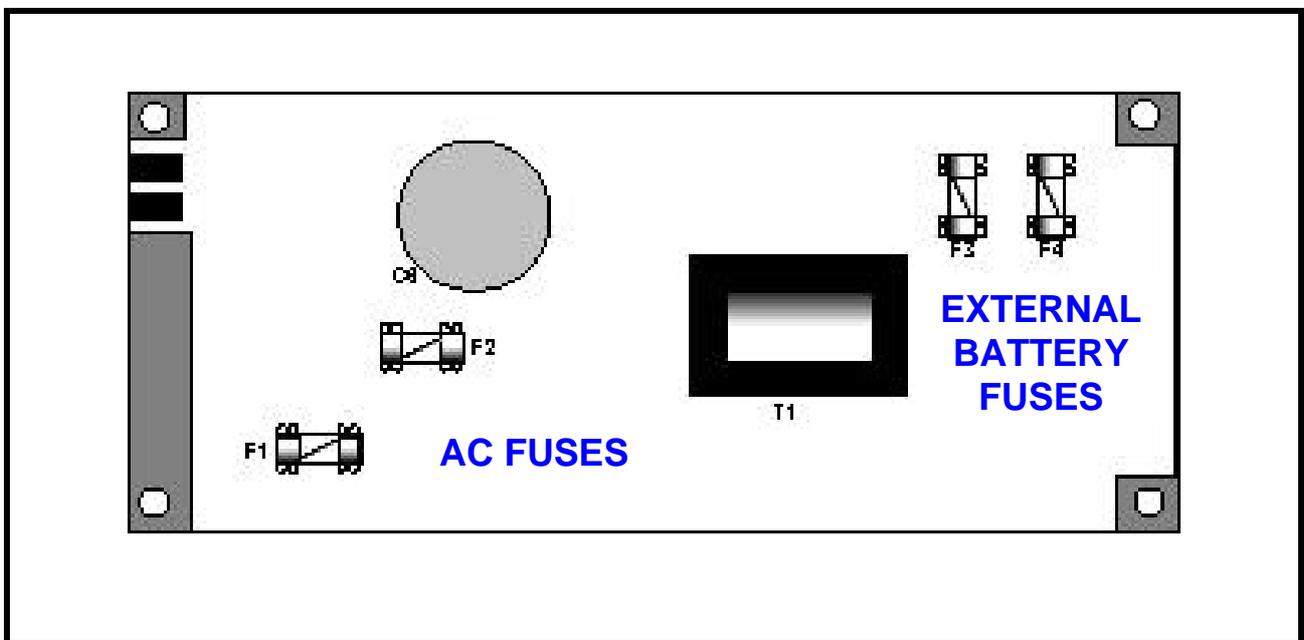
It is recommended that you verify system operation and then make the external connections. The procedures are as follows:

- Remove any cables for external connections from the system if you have already plugged any cables in.
- Verify the AC voltage at the dedicated AC outlet. The voltage should always be between 176 ACVrms and 264 ACVrms, at a frequency between 48 Hz and 63Hz.
- Make sure that the AC power switch is in the OFF position (Figure 4-1) and that the Memory Backup switch is OFF (Figure 2-5).
- Ensure that any option cards and the trunk expansion card (if installed) are firmly inserted.
- Plug the system power cord into the dedicated AC outlet.
- Turn the AC power switch ON.
- Check that the AC LED and the DC LED next to the AC power switch (Figure 4-1) light steady. Otherwise, check the fuses in the power supply unit as follows:
  - ✧ Turn the AC power switch OFF
  - ✧ Remove the front cover and the power supply unit cover
  - ✧ Check the AC fuses (Figure 4-2). Replace them with spare fuses if they are blown out. Otherwise, contact your distributor or dealer for advice.
  - ✧ Remove the option cards and the trunk expansion card (if installed).
  - ✧ Turn the AC power switch ON and check the LED operation again. If the problem is corrected, you have to replace the option cards or the trunk expansion card with new cards because at least one of them must be defective. Otherwise, contact your distributor or dealer for advice.



CONNECTING POWER TO THE SYSTEM

**FIGURE 4-1**



REPLACING FUSES (POWER SUPPLY UNIT)

**FIGURE 4-2**

## **4.2 Monitor LED Indication and Memory Backup Selection**

After verifying proper operation of the power supply, turn your system ON to check the operation of the monitor LED on the base board. The LED should flicker rapidly indicating the main processor is functioning.

Now move the Memory Backup Selector to the ON position (Figure 2-5). Failure to do so may result in a loss of programming data and customer data in the event of a power failure.

## **4.3 PCB Verification**

Before connecting all MDF cabling, plug in a test cable to the Champ connector on the base board (Figure 2-3). Connect a display set and verify that it is working.

Use maintenance program MMC 727 (System Version Display) to verify the system version and software version and to confirm the status of installed cards. Otherwise, please contact your dealer for advice.

Remove the test cable and plug in an amphenol-type cable and an RJ-45 cable to the MDF. Proceed with the rest of the installation.

## **4.4 Default Trunk and Station Numbering**

At the beginning of system operation the CPU reads the expansion slot and the option connections for the presence of a card and identifies the type. It stores this as the default configuration.

The system assigns trunk numbers beginning with 701. Station numbers begins with 201. The keyset connected to the lowest port is assigned to the operator by default and all incoming trunk calls ring the station until the default data is changed by programming.

Station and trunk numbers can be changed, rearranged and reassigned as needed using program MMC 724 (Dial Numbering Plan).

This page is intentionally left blank.

## **PART 5. CONNECTING PSTN CIRCUITS**

### **5.1 Safety Precautions**

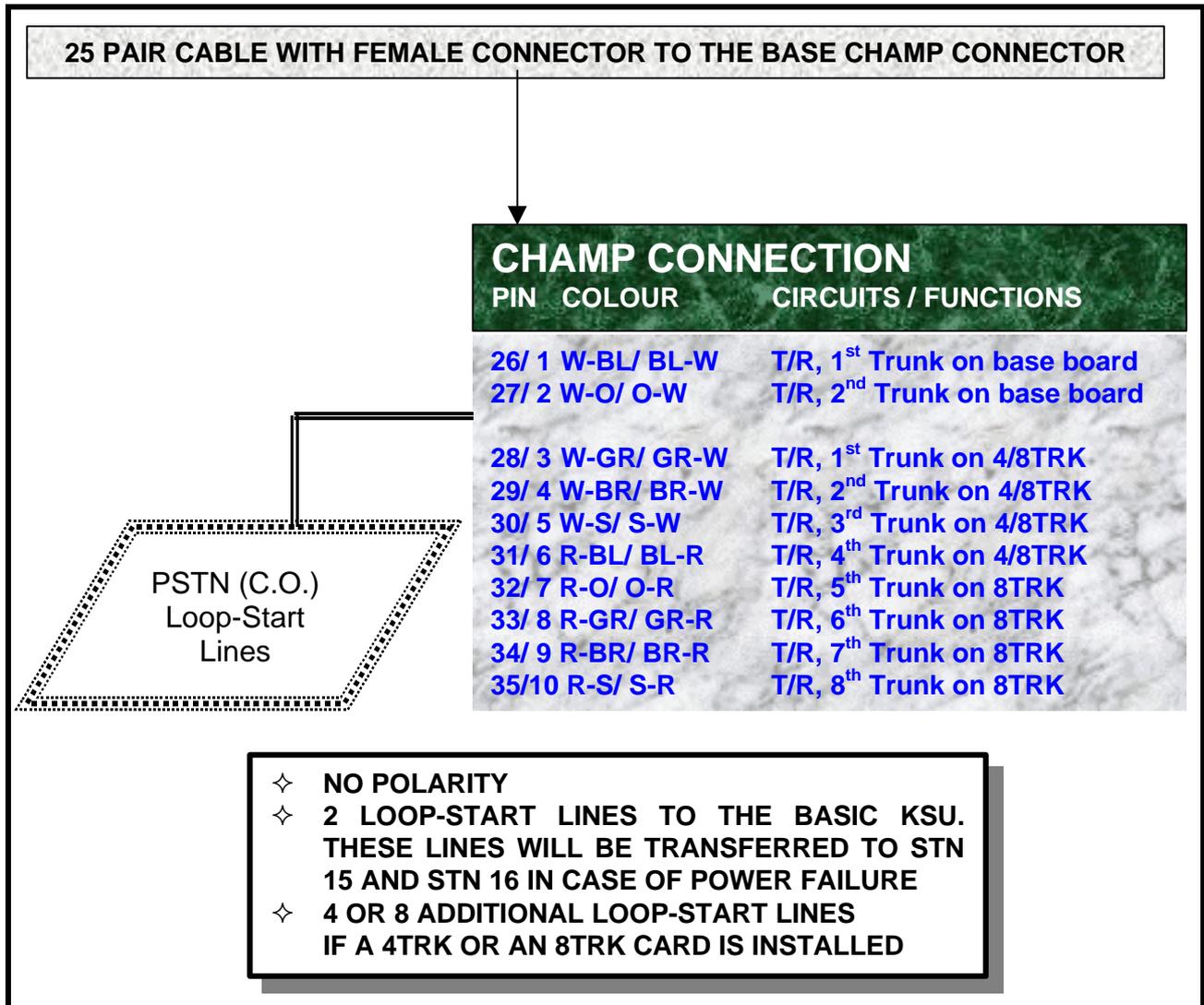
To prevent risk of personal injury, follow these precautions at all times when connecting PSTN circuits.

- ✓ The Protective Earth (PE) should be firmly connected to the system at all times.
- ✓ Never install telephone wiring during periods when lightning may occur.
- ✓ Never install telephone jacks in a wet location unless the jack is specially designed for wet locations. Use extreme caution.
- ✓ Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- ✓ Use extreme caution when installing or modifying telephone lines.

## 5.2 Loop-start Lines (Figure 5-1)

The DCS-816 system requires MDF connection for analogue trunk (loop-start) lines. The Basic KSU itself is equipped with two analogue trunk lines. Additionally, a 4TRK or an 8TRK card can be installed in the trunk expansion slot. All connections for loop-start lines can be done through the champ connector on the base board. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use one pair twisted wires and connect each loop-start C.O. line to the trunk port you choose via the champ connector on the base board.



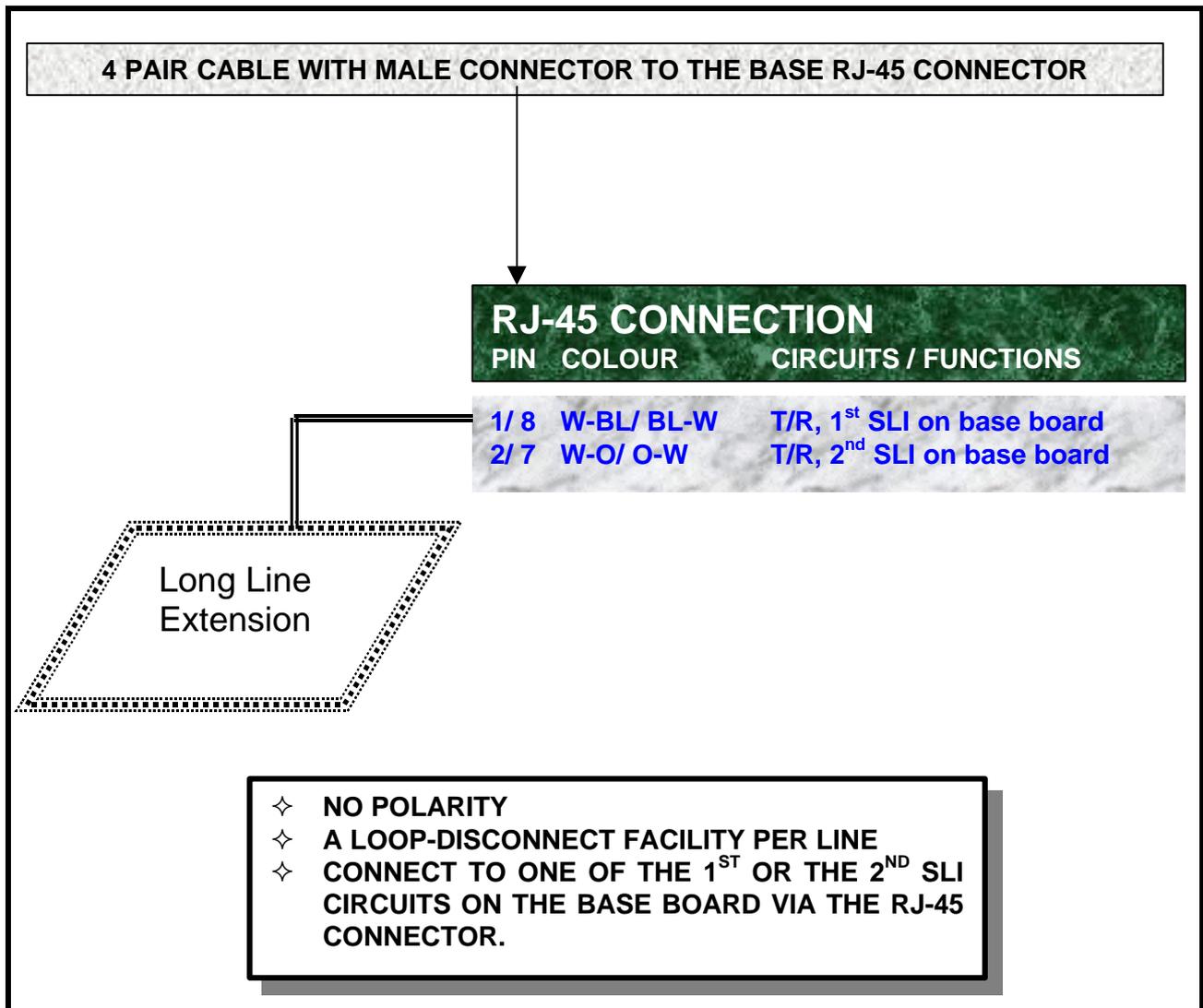
CONNECTING LOOP-START LINES

**FIGURE 5-1**

### 5.3 Off Premise Extension (OPX) (Figure 5-2)

The Basic KSU is equipped with four (4) SLI interfaces and only the first two (2) SLI interfaces are specially designed for Long Line or Off Premise Extension (OPX) connections. The interfaces have the same over-voltage and over-current protection circuits as an analogue trunk interface. All connections for OPX lines can be done through the RJ-45 connector on the base board. See Figure 2-3 and refer to the section 2.5 (MDF Cabling).

Use one pair twisted wires and connect each OPX line to the SLI port of your choice via the RJ-45 connector on the base board.



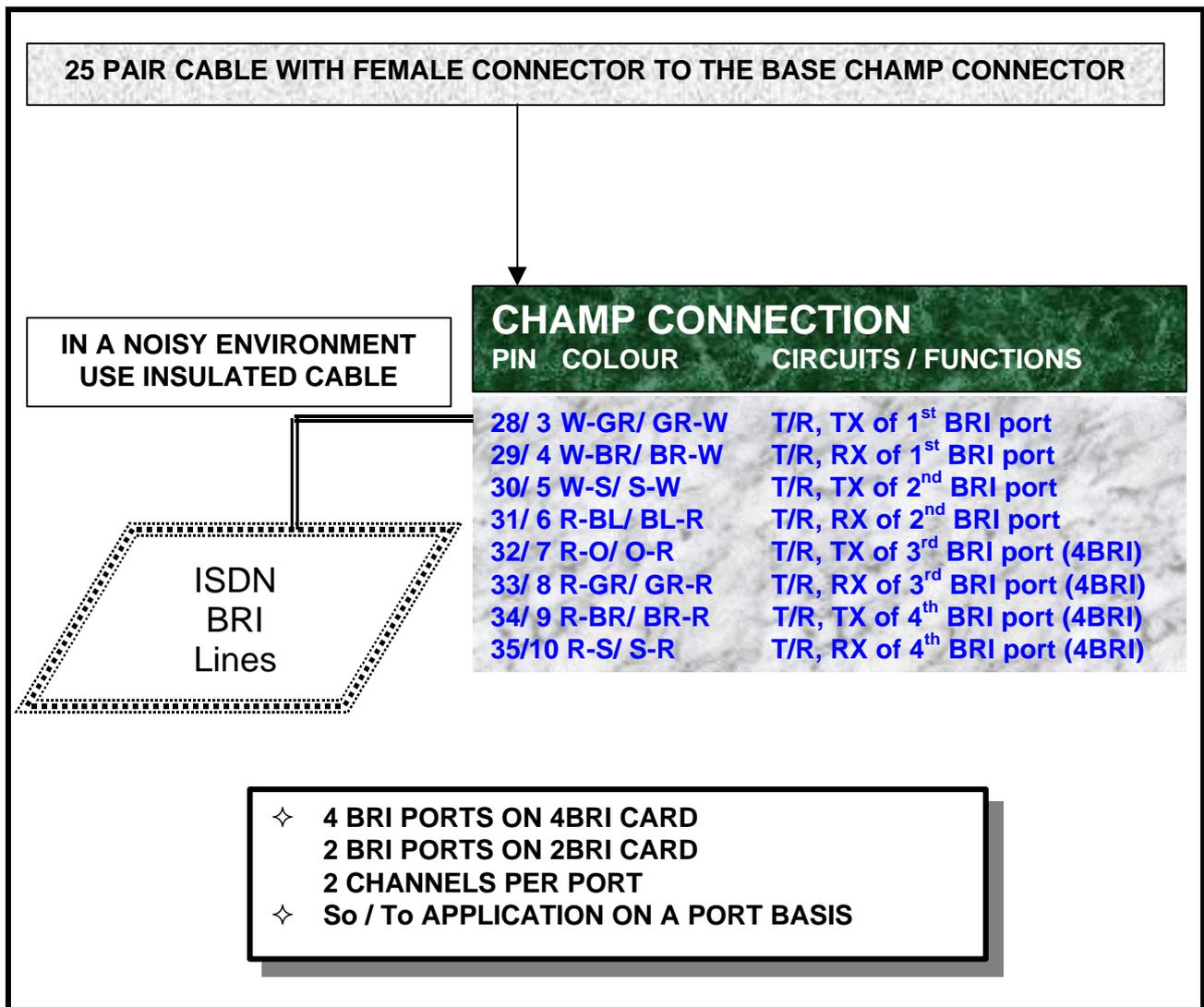
**CONNECTING OPX LINES**

**FIGURE 5-2**

### 5.4 ISDN BRI Lines (Figure 5-3)

The DCS-816 system requires MDF connection for ISDN BRI (Basic Rate Interface) lines. The system has a trunk expansion slot where a 4BRI card or a 2BRI card can be installed. All connections for ISDN BRI lines can be done through the champ connector on the base board. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use two pair twisted wires and connect each BRI line to the trunk port of your choice via the champ connector on the base board.



CONNECTING BRI LINES

**FIGURE 5-3**

## **PART 6. CONNECTING STATION EQUIPMENT**

### **6.1 Safety Precautions**

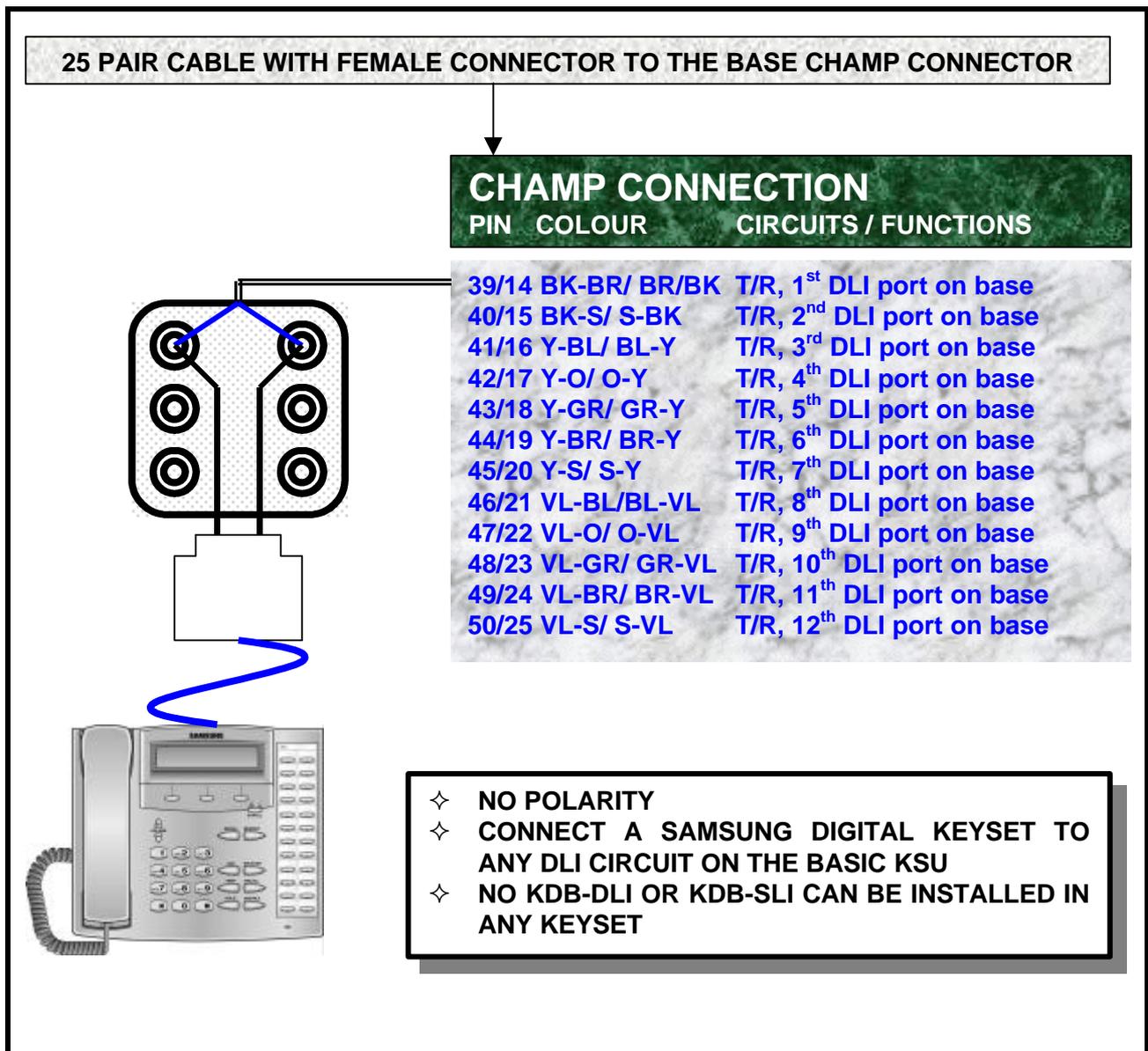
To prevent risk of personal injury, follow these precautions at all times when connecting station equipment.

- ✓ The Protective Earth (PE) should be firmly connected to the system at all times.
- ✓ Never install telephone wiring during periods when lightning may occur.
- ✓ Never install telephone jacks in a wet location unless the jack is specially designed for wet locations. Use extreme caution.
- ✓ Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- ✓ Use extreme caution when installing or modifying telephone lines.

## 6.2 Digital Keysets (Figure 6-1)

A variety of Samsung Digital Keysets can be connected to the DCS-816 system which can accommodate a maximum of 12 keysets. The system requires MDF connection for digital keysets and all connections can be done through the champ connector on the base board. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use one pair twisted wires and connect each keyset to the DLI port of your choice via the champ connector on the base board.



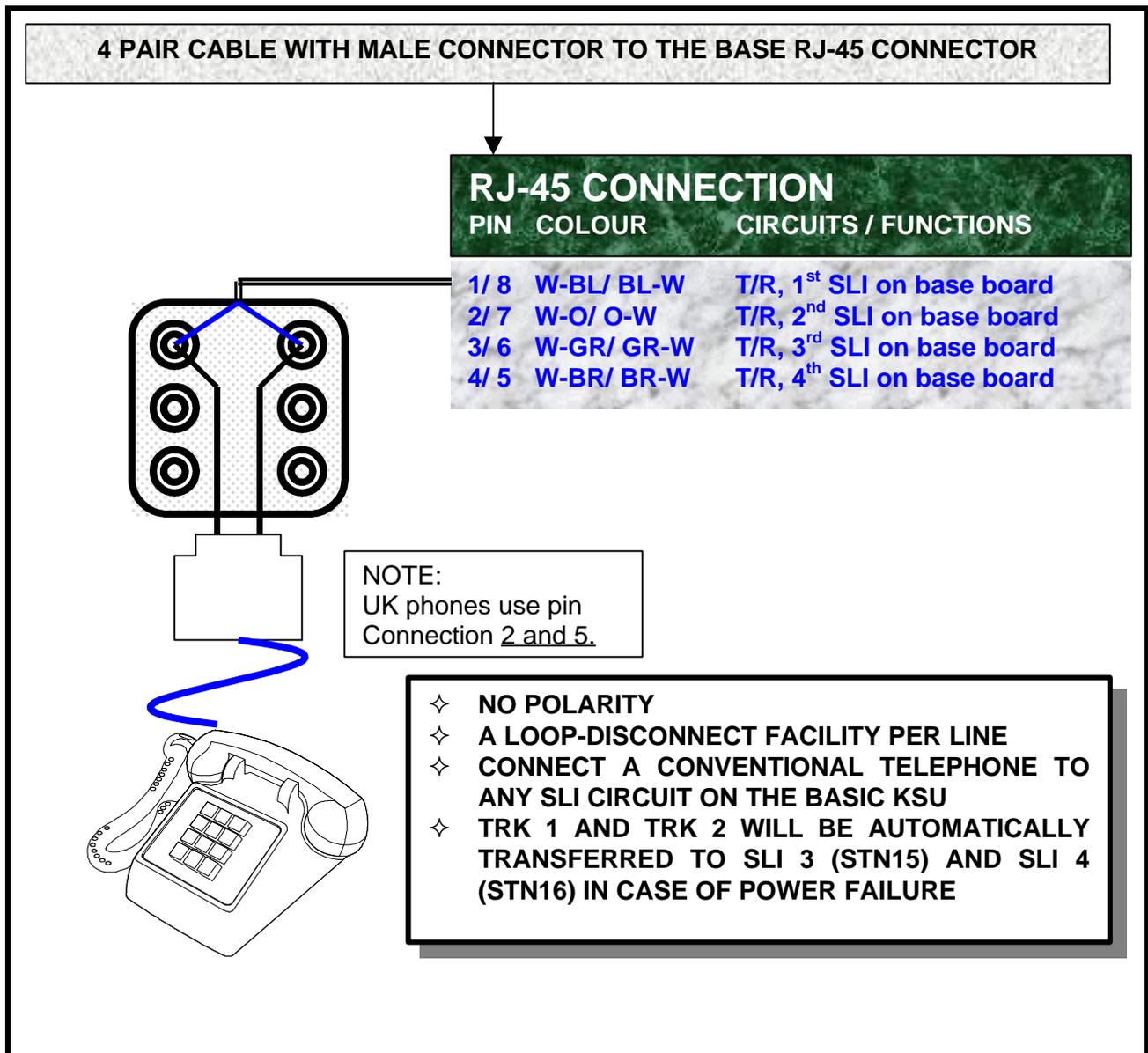
**CONNECTING DIGITAL KEYSETS**

**FIGURE 6-1**

### 6.3 Single Line Telephones (Figure 6-2)

The DCS-816 system has four (4) SLT interfaces to which conventional telephones or OPX lines can be connected. The system requires MDF connection for single line telephones and all connections can be done through the RJ-45 connector on the base board. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use one pair twisted wires and connect each telephone to the SLI port of your choice via the RJ-45 connector on the base board.



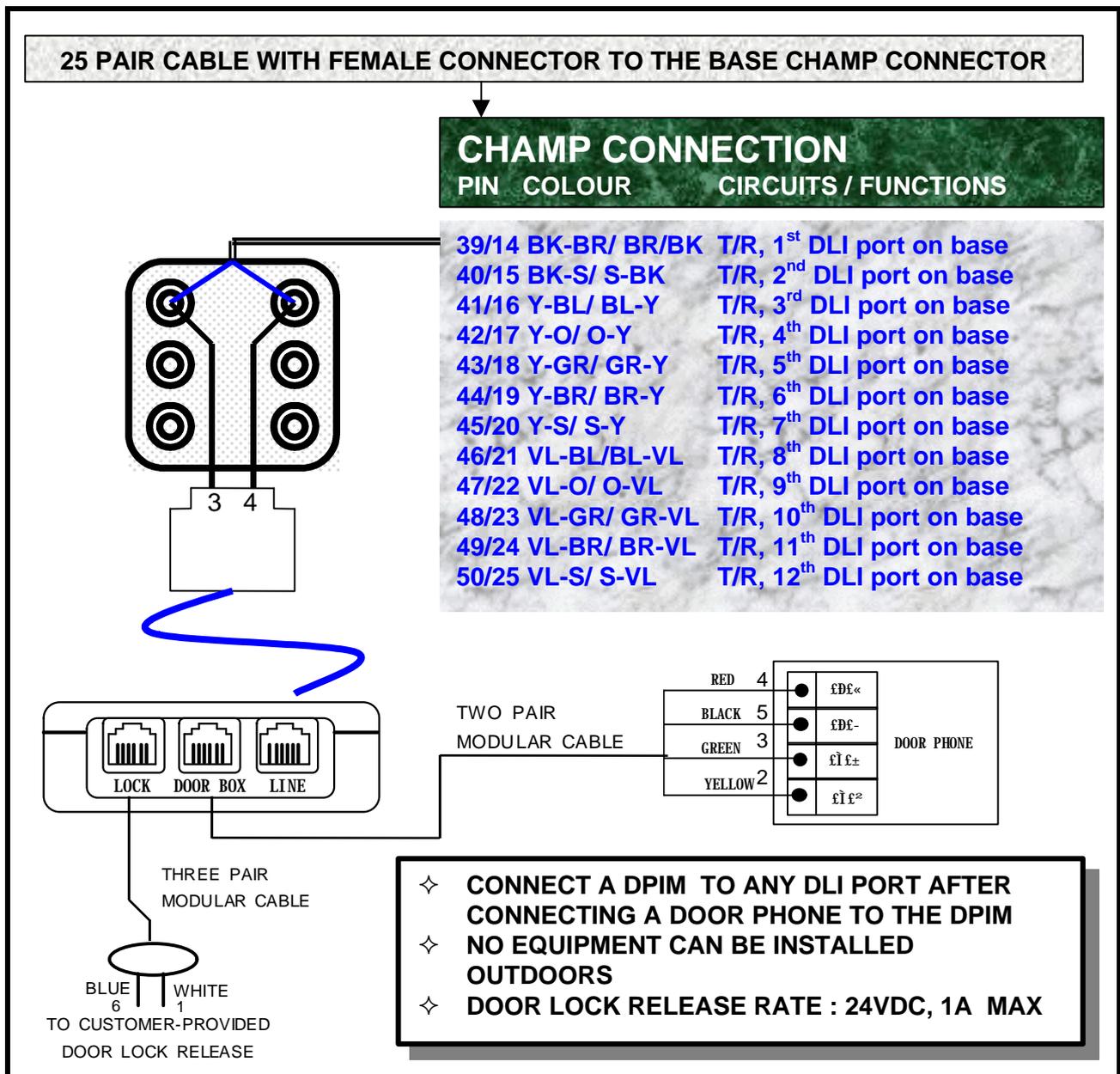
**CONNECTING SINGLE LINE TELEPHONES**

**FIGURE 6-2**

### 6.4 Door Phone and Door Lock Release (Figure 6-3)

The DCS DPIM module is required to install a door phone or a door lock release. The DPIM has a door phone interface and a door lock release circuit, which can be connected to any DLI port of DCS-816. The system requires MDF connection for DPIM modules and modular jack connection for a door phone or a door lock release. DPIM connections can be done through the champ connector on the base board. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use one pair twisted wires, connect each DPIM module to the DLI port of your choice via the champ connector on the base board and connect a door phone or a door lock release to the DPIM.

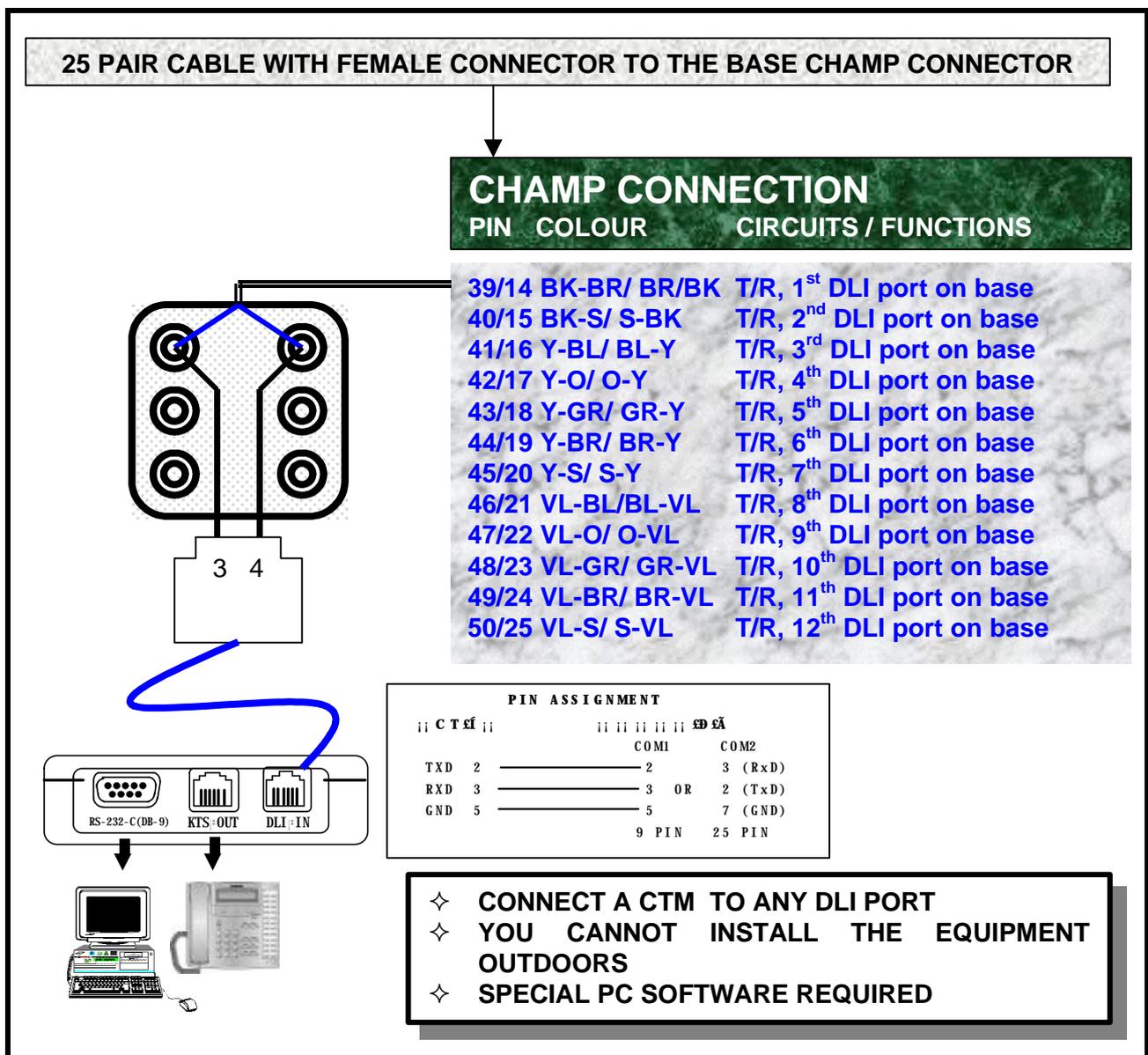


### 6.5 CTM - CTI Module (TAPI) (Figure 6-4)

The DCS CTM module is required to support CTI (TAPI) in the system. The CTM has a DLI connection and a personal computer (PC) interface, which can be connected to any DLI port of DCS-816. The system requires MDF connection for CTM modules and modular jack connection for a keyset. A PC may connect to the module via the DB9 connector. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Using one pair twisted wires, connect each CTM module (via the modular jack marked 'DLI IN') to the DLI port of your choice via the champ connector on the base board and then connect the module (via the other modular jack marked 'KTS OUT') to a keyset. A PC can be connected to the module via the DB9 connector.

A special PC software package is required to run CTI (TAPI) and how to set up the software is described in the other document in detail. Contact your dealer for information.



CONNECTING A CTM (TAPI)

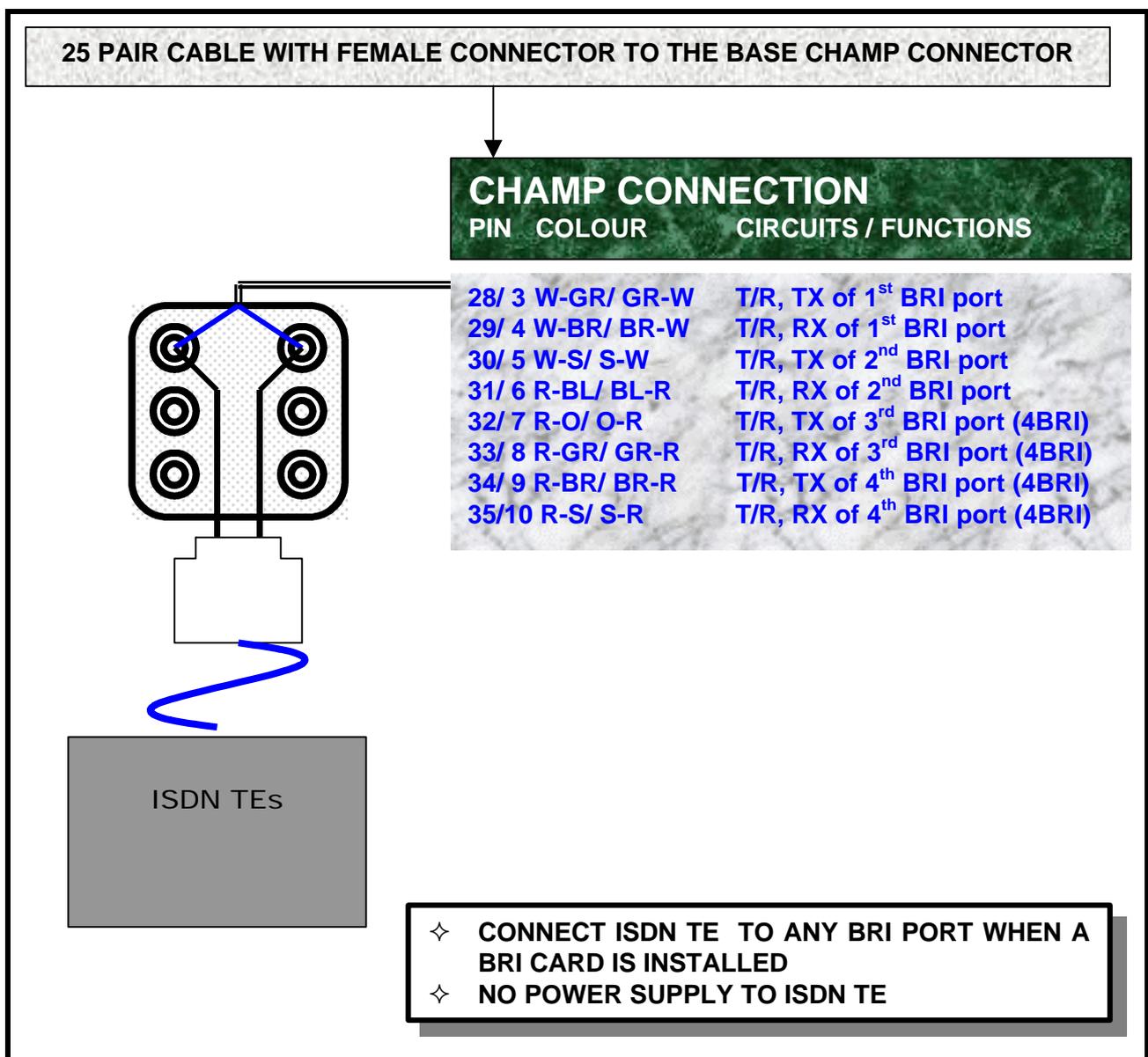
**FIGURE 6-4**

### 6.6 ISDN TE (ISDN phone, G4 FAX, etc) (Figure 6-5)

ISDN Terminal Equipment can be connected to any circuit on the BRI card if installed. As described in section 5.4, the system provides So as well as To application on a port basis. The system requires MDF connection for a BRI card and the connection can be made through the champ connector. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use two pair twisted wires and connect each ISDN TE to the BRI port of your choice via the champ connector on the base board.

Note that the DCS Compact BRI card does not provide power to the ISDN terminal equipment.



CONNECTING ISDN TE

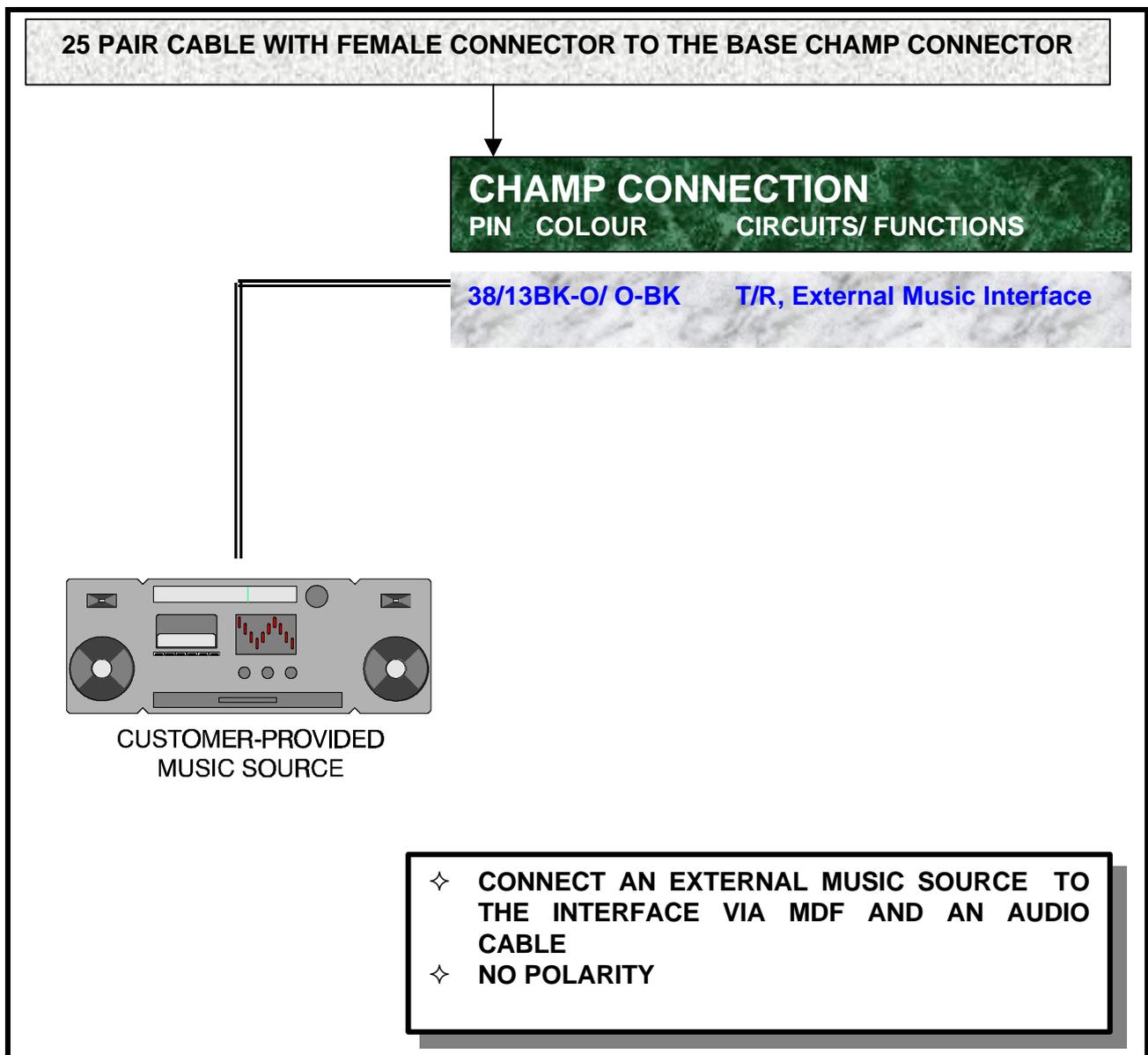
**FIGURE 6-5**

## PART 7. CONNECTING OPTIONAL EQUIPMENT

### 7.1 Music-on-Hold / Background Music (Figure 7-1)

The DCS-816 system provides one music channel which is from the built-in melody chip (internal) or an external music source (CD player, radio etc). Section 2.7 describes how to select the source. For the external music interface, the system requires MDF connection and the connection can be made through the champ connector. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use one pair twisted wires and connect a CD player or radio to the external music interface via the champ connector on the base board.



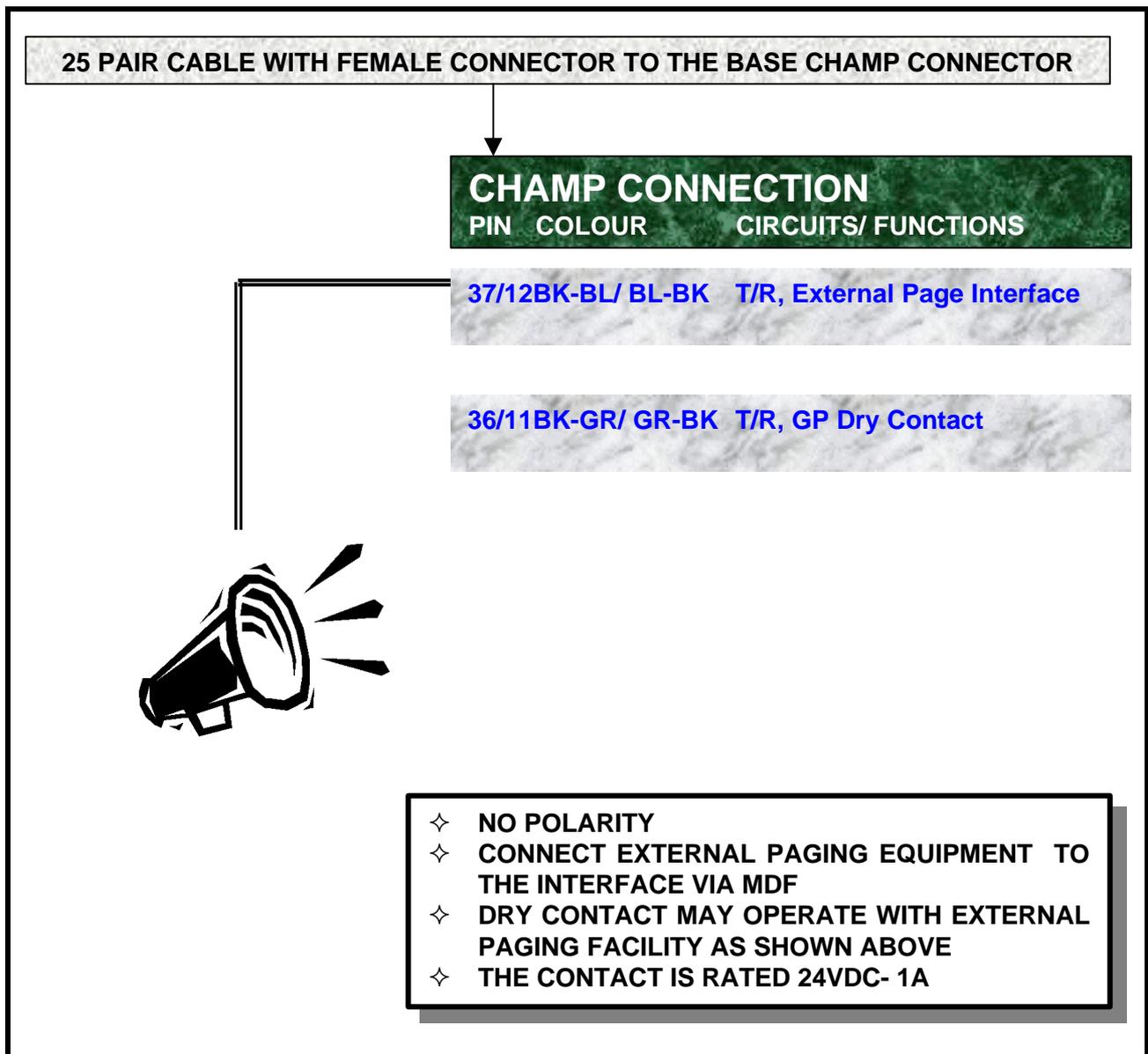
CONNECTING EXTERNAL MUSIC

**FIGURE 7-1**

## 7.2 External Paging (Figure 7-2)

The DCS-816 system is equipped with an interface for external paging. It can be connected to customer-provided paging equipment. The interface is designed to match 600 Ohm and an impedance matching transformer may be required if the impedance of the paging equipment is not 600 Ohm. The system requires MDF connection for external paging and the connection can be made through the champ connector. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Using one pair twisted wires, connect customer-provided paging equipment to the external paging interface via the champ connector on the base board.



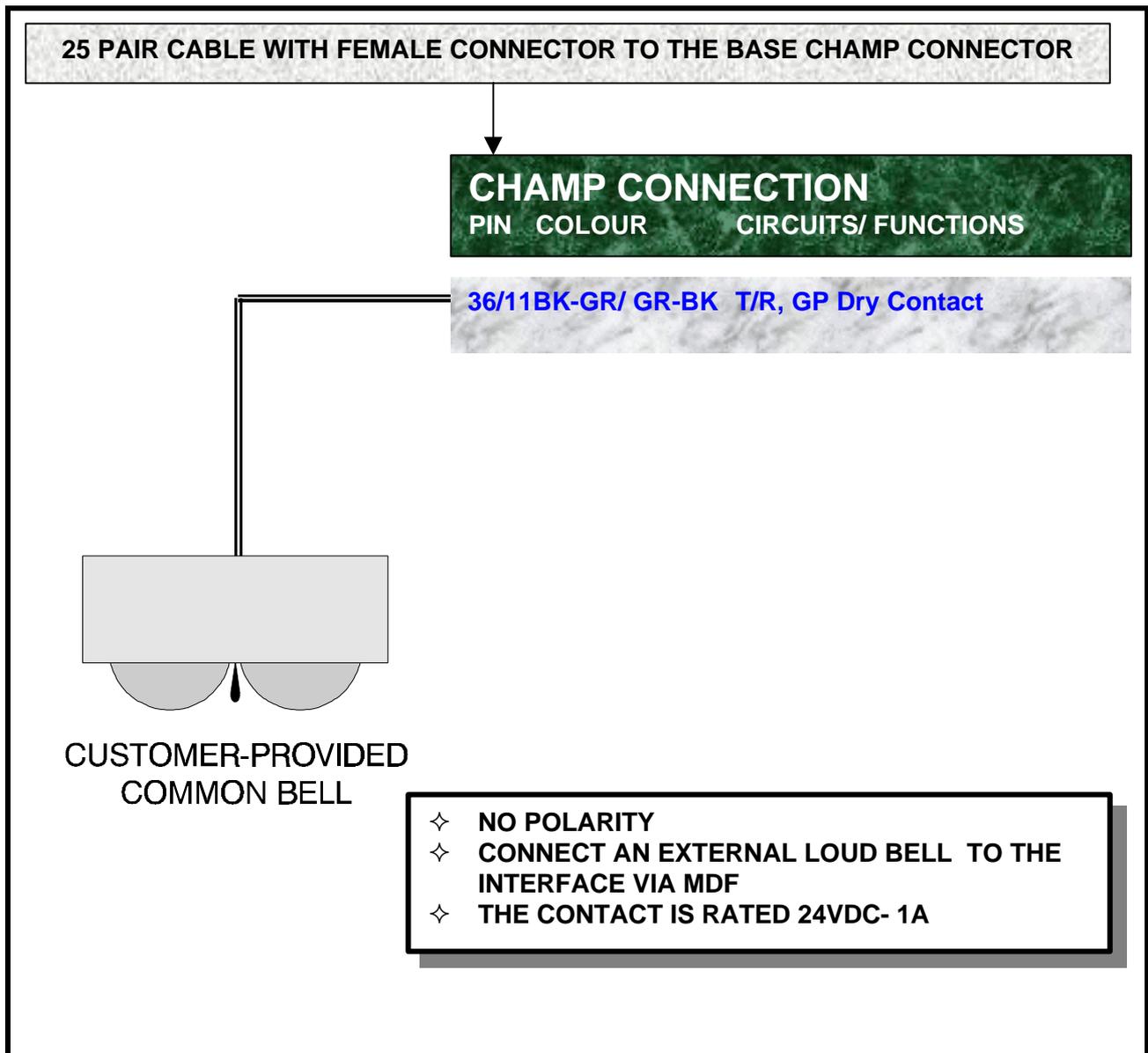
CONNECTING EXTERNAL PAGING EQUIPMENT

**FIGURE 7-2**

### 7.3 Common Bell (Figure 7-3)

A customer-provided loud ringing device can be controlled by the general-purpose dry contact of the DCS-816 system by means of the relevant program (MMC). Note that the dry contact is rated 24VDC, 1 Amp. The system requires MDF connection for the dry contact and the connection can be made through the champ connector. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Using one pair twisted wires, connect a customer-provided loud bell to the general-purpose dry contact via the champ connector on the base board.



CONNECTING AN EXTERNAL LOUD BELL

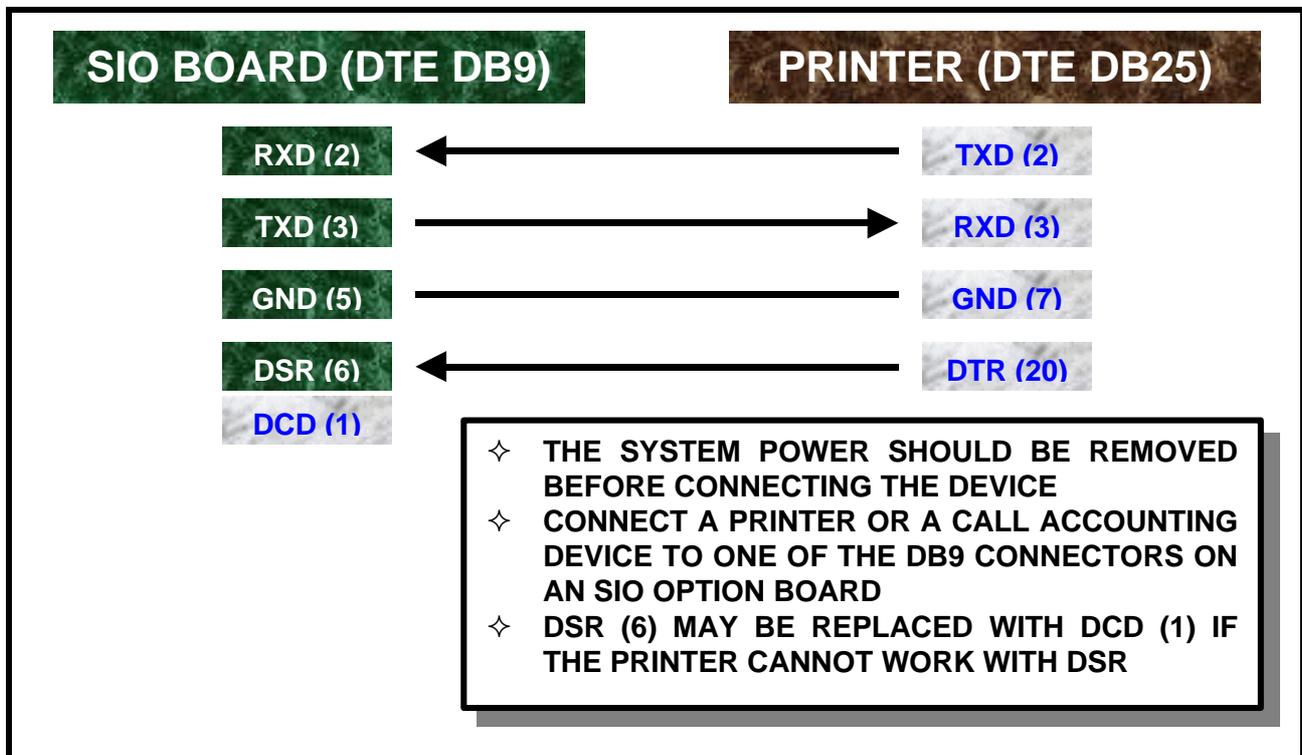
**FIGURE 7-3**

## 7.4 Ring Over Page

When a customer-provided paging system is installed (refer to section 7.2), incoming calls can be assigned to Ring Over Page (ROP). By means of the relevant program (MMC), program a line or lines to ring a hunt group and assign ROP as a destination in this hunt group. ROP can be used for day or night operation or both. Refer to the *DCS-816 Programming Manual*.

## 7.5 Station Message Detail Recording (SMDR) (Figure 7-4)

To receive an SMDR printout, connect a customer-provided printer to one of the serial interface connectors (DB9) on an SIO option card (Figures 3-1 and 3-2). Before connecting the printer or the call accounting device, ensure that the system power is turned OFF. Any external battery, if installed, should also be removed. Otherwise, the system as well as the external device may be severely damaged.



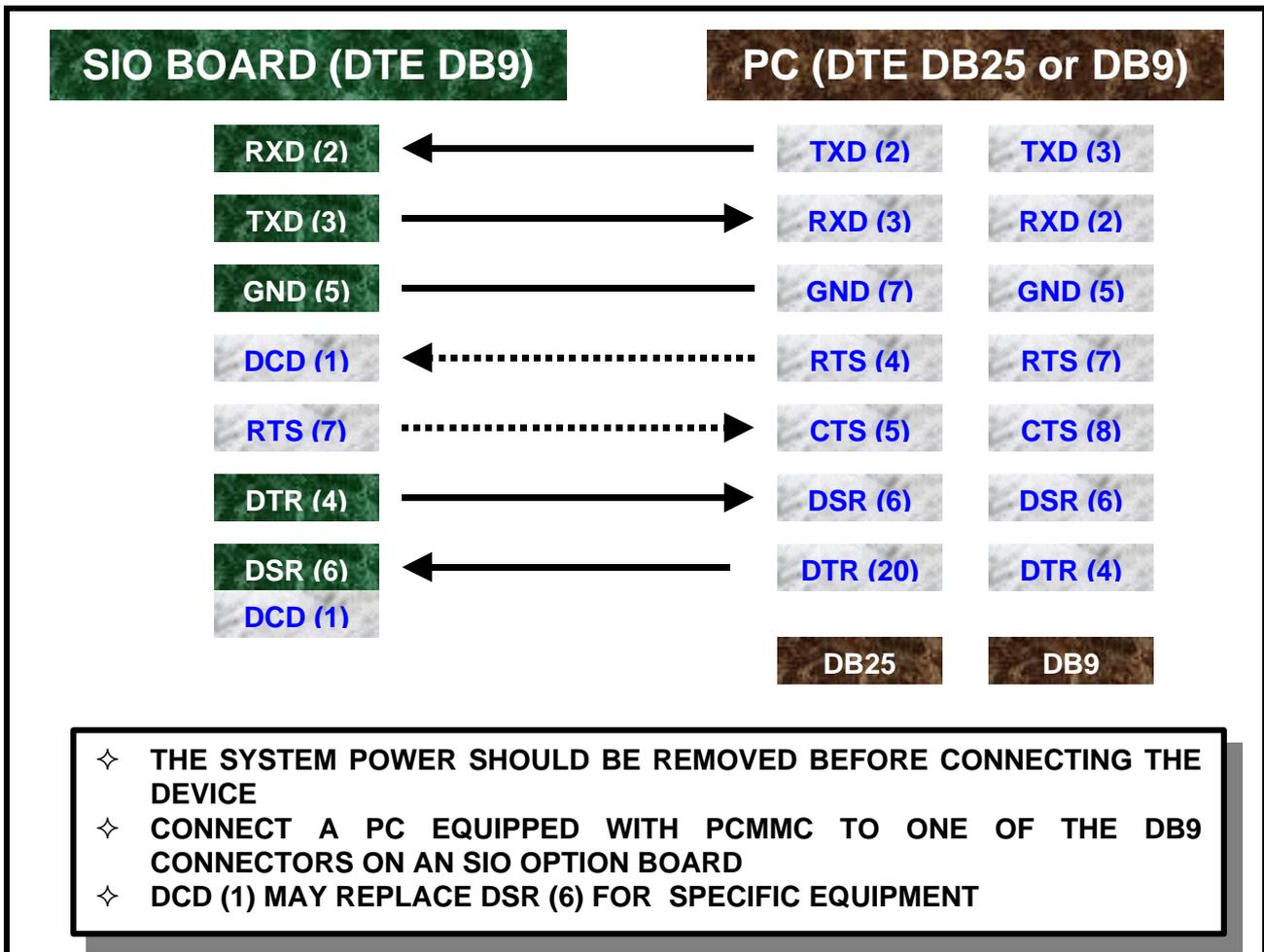
**PIN CONNECTIONS TO PRINTER**

**FIGURE 7-4**

Use a pin-to-pin RS232C cable. Only pins 2, 3, 5 and 6 are required. When the printer or optional call accounting device needs to be more than 5 metres away from the system, shielded computer cable is required. Connect a male DB9 connector to the SIO card and then connect a connector that meets the requirement of the printer or the call accounting device to the other end. The cable must not exceed 100 metres.

### 7.6 PC Programming (Figure 7-5)

To program the system via a personal computer (PC), connect a PC equipped with the proprietary program, PCMMC, to one of the serial interface connectors (DB9) on an SIO option card (Figures 3-1 and 3-2). Before connecting the PC, ensure that the system power is turned OFF. Any external battery, if installed, should also be removed. Otherwise, the system as well as the PC may be severely damaged.



#### PIN CONNECTIONS TO PC

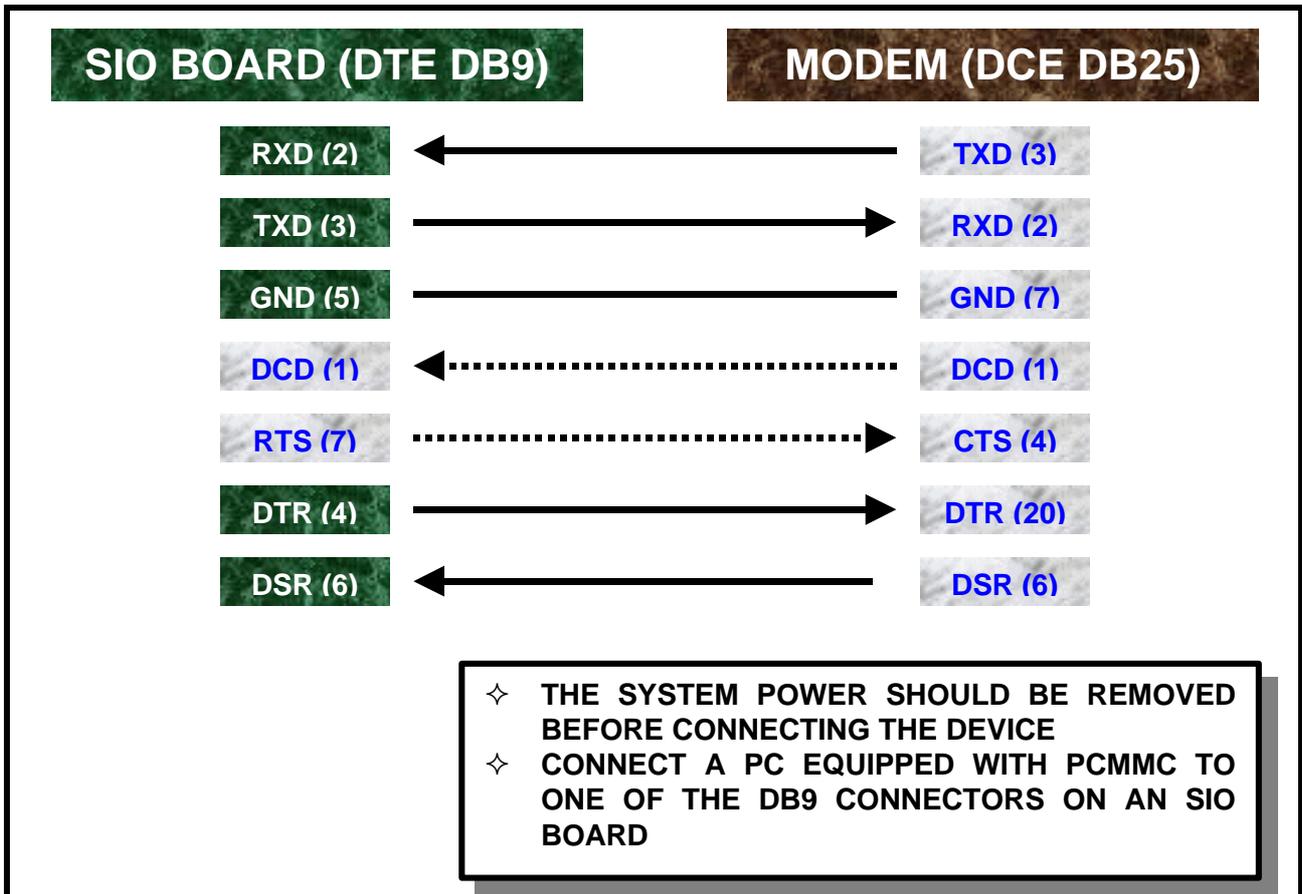
**FIGURE 7-5**

Use a pin-to-pin RS232C cable. Only pins 2, 3, 4, 5, and 6 are required. When the PC needs to be more than 5 metres away from the system, shielded computer cable is required. Connect a male DB9 connector to the SIO card and then connect a connector that meets the requirement of the PC to the other end. The cable must not exceed 100 metres.

The signal DCD (1) and RTS (7) are optional, which means the system does not refer to the signal status. For specific equipment, DSR (6) may not detect the DTR signal from the external source. In this case, connect the DTR signal wire to the DCD (pin 1) of the DCS-816 serial interface.

### 7.7 Remote Programming (Figure 7-6)

To remotely program the system, connect a customer-provided modem to one of the serial interface connectors (DB9) on an SIO option card (Figures 3-1 and 3-2), and to an unused SLT port. Before connecting the modem, ensure that the system power is turned OFF. Any external battery, if installed, should also be removed. Otherwise, the system as well as the modem may be severely damaged.



**PIN CONNECTIONS TO MODEM**

**FIGURE 7-6**

Use a pin-to-pin RS232C cable. Only pins 2, 3, 4, 5, 6, 7 and 8 are required. When the modem needs to be more than 5 metres away from the system, shielded computer cable is required. Connect a male DB9 connector to the SIO card and then connect a connector that meets the requirement of the modem to the other end. The cable must not exceed 100 metres.

### 7.8 Power Failure Transfer

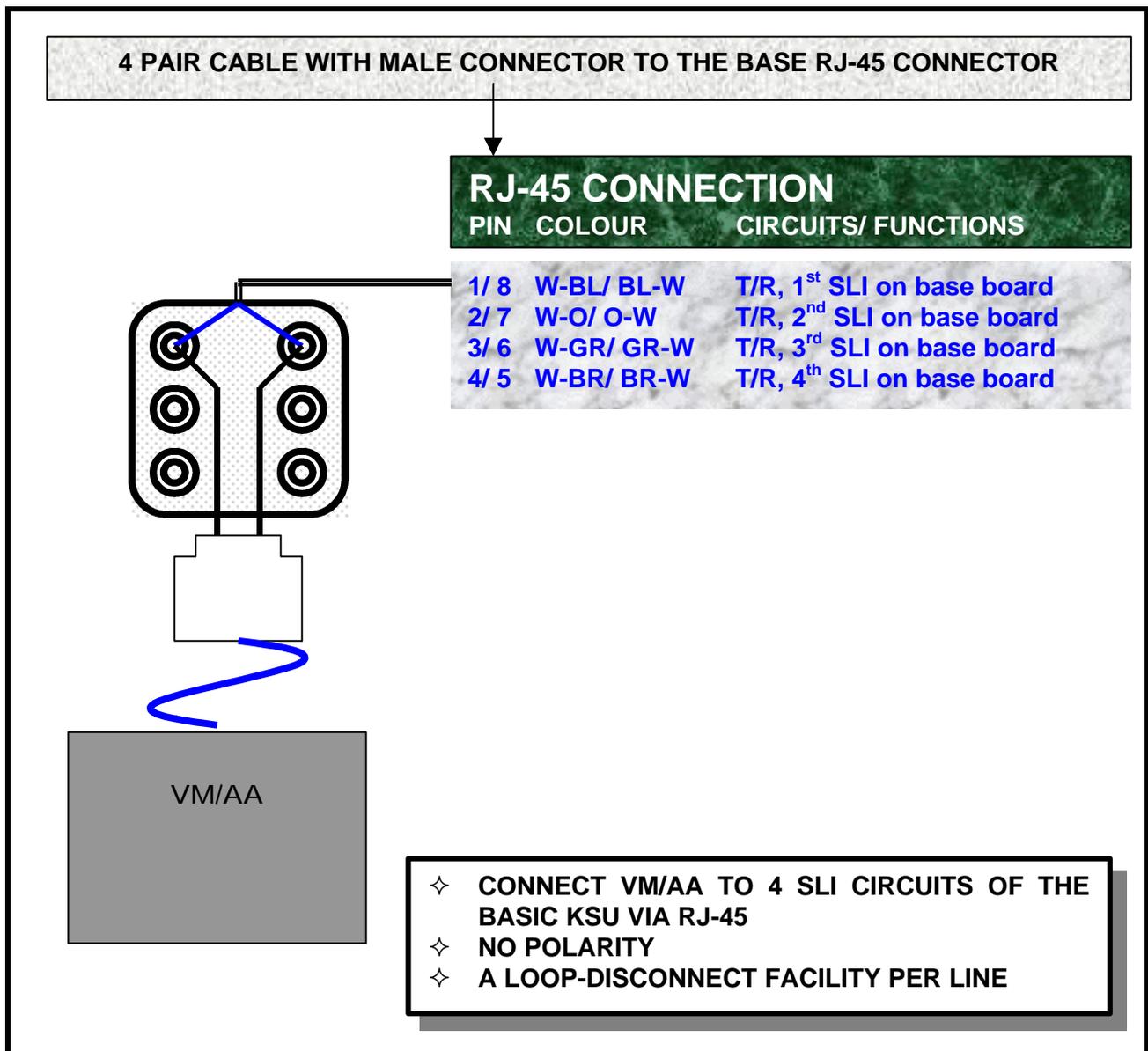
If the system loses AC power and has no external battery, the two (2) analogue trunk lines on the base board are automatically switched to the last two (2) stations.

<b>1<sup>st</sup> Trunk line</b>	<b>to</b>	<b>Station 15 (SLT)</b>
<b>2<sup>nd</sup> Trunk line</b>	<b>to</b>	<b>Station 16 (SLT)</b>

### 7.9 Voice Mail / Auto Attendant (Figure 7-7)

The DCS-816 system provides special programming and hardware for a customer-provided Voice Mail / Auto Attendant (VM/AA) system. All SLI circuits are designed to provide a disconnect signal required for VM/AA operation. The system requires MDF connection for single line telephones and all connections can be made through the RJ-45 connector on the base board. See Figure 2-3 and refer to section 2.5 (MDF Cabling).

Use one pair twisted wires and connect each system/device to the SLI port of your choice via the RJ-45 connector on the base board.



**CONNECTING VM/AA**

**FIGURE 7-7**

### 7.10 Information on DCS-816 Serial Interface (Figure 7-8)

There is a variety of data terminal equipment and data communication equipment at sites and sometimes it may be confusing how to connect the equipment to the SIO card. Generally, the connections described in sections 7.5 to 7.7 are sufficient to work most equipment. However, the following, more detailed information, should help if you encounter any problems.

SIO BOARD (DTE DB9)	
DCD (1)	Input, Carrier Detect, Optional, Replacing DSR sometimes
RXD (2)	Input, Received Data, Essential
TXD (3)	Output, Transmitted Data, Essential
DTR (4)	Output, DTE Ready, Essential
GND (5)	Signal Ground, Reference, Essential
DSR (6)	Input, DCE Ready, Essential, Replaced with DCD sometimes
RTS (7)	Output, Request to Send, Optional
CTS (8)	Input, Clear to Send, Not Connected
RI (9)	Ring Indicator, Not Connected

#### INFORMATION ON SERIAL INTERFACE

#### FIGURE 7-8

The signal "DSR (6)" is pulled-up with a resistor in the serial interface which meets the requirements of most data equipment. However, some printers cannot operate with the pull-up resistor and may cause trouble. If so, DCD (1) may replace DSR (6).

For signalling protocol, all parameters can be adjusted with relevant programming (MMCs 725 and 804) and the default settings are as follows:

Serial Port 1: PCMMC  
 Serial Port 2 : SMDR  
 SIO Protocol      1 Start bit, 8 data bits, 1 Stop bit, No parity  
                          9600 Baud rate, No DSR check, 3 times retry

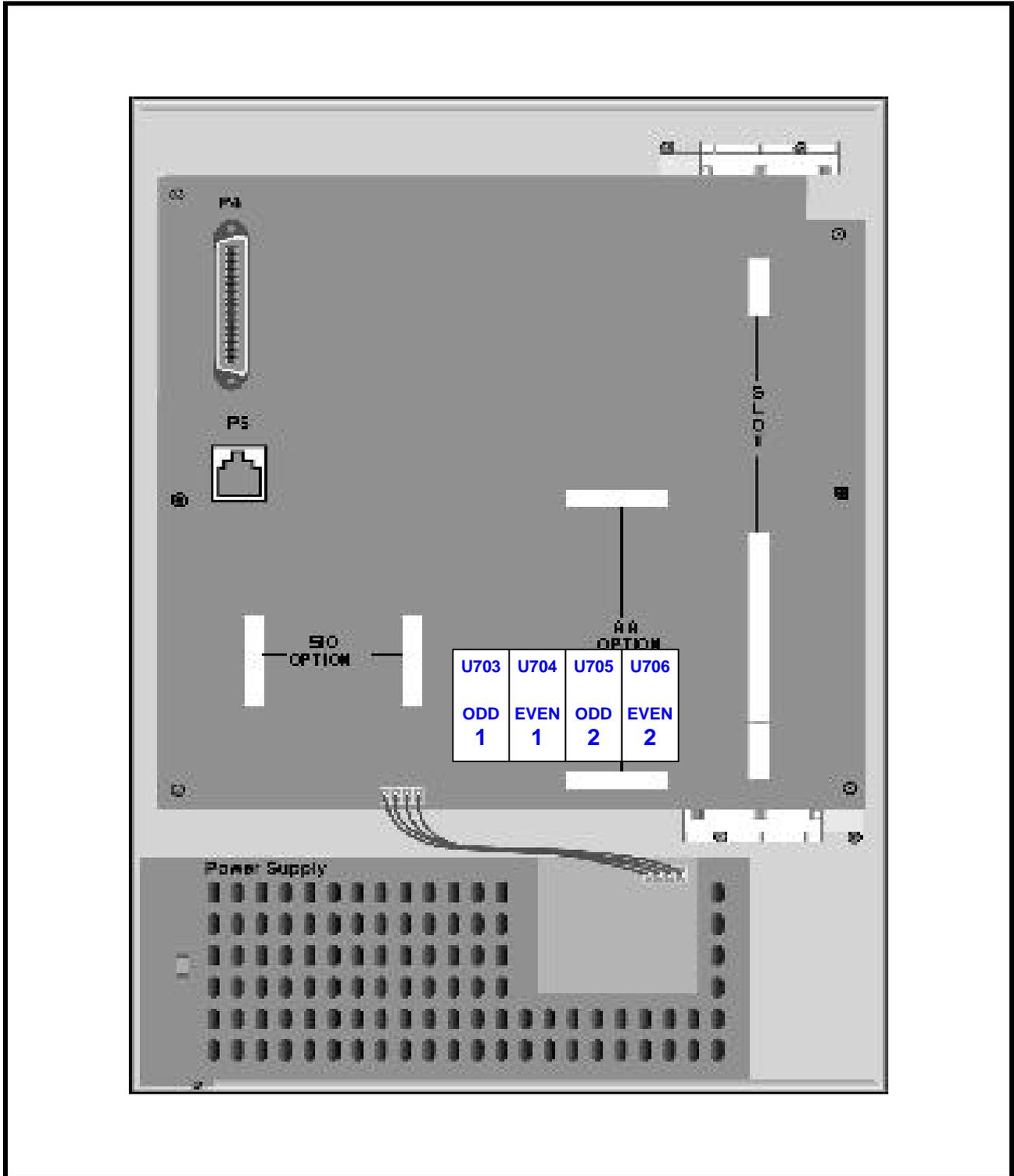
## **PART 8. CHANGING SOFTWARE (Figure 8-1)**

In order to easily replace the system software, it may be necessary to partially disassemble the KSU. Follow this procedure step by step.

1. Read carefully the instructions released with the new software or contact your distributor or dealer for advice.
2. Remove the KSU front cover.
3. Check the memory backup switch on the base board and do as instructed.

**In most cases it is recommended you keep the switch ON to prevent data loss. However, new software sometimes needs to change the database structure, and this requires you to clear all the data. If so, you will have to set the switch OFF and reprogram the system after replacing the software (you will need to store user data on your PC or write it down on paper). Contact your distributor or dealer for advice.**

4. Remove the external battery (if installed) and switch OFF the system.
5. Remove the four EPROMs (U703, U704, U705 and U706) from the base board using a chip extraction tool or by gently prising with a small, flat-bladed screwdriver. Put the removed EPROMs aside carefully in case you need to reinstall them.
6. Remove the new EPROMs from their protective package and check that the legs of the EPROMs are straight. Carefully insert the new EPROMs into their designated sockets.
7. Switch the system ON and verify that it is operating. If the system fails to operate, switch the system OFF and replace the new EPROMs with the old ones. Contact your distributor or dealer for advice if you cannot fix the trouble by yourself.
8. If the system operates satisfactorily, switch the memory backup switch ON and replace the cover. Reconnect the external battery, if installed.
9. Program the system if required.



CHANGING SOFTWARE

**FIGURE 8-1**

Samsung Telecoms (U.K.) Limited  
Brookside Business Park Greengate Middleton Manchester M24 1GS  
Tel: 0161 655 1100 Fax: 0161 655 1166



GA68-60751B ED:01

Technical Manuals Online! - <http://www.tech-man.com>