vantage X 24/48

System Survey Form
And Programming Guide

Customer Name: _____

Address: _____

_____

Phone: _____

Contact Name: _____

Survey Prepared By: _____ Date: _____

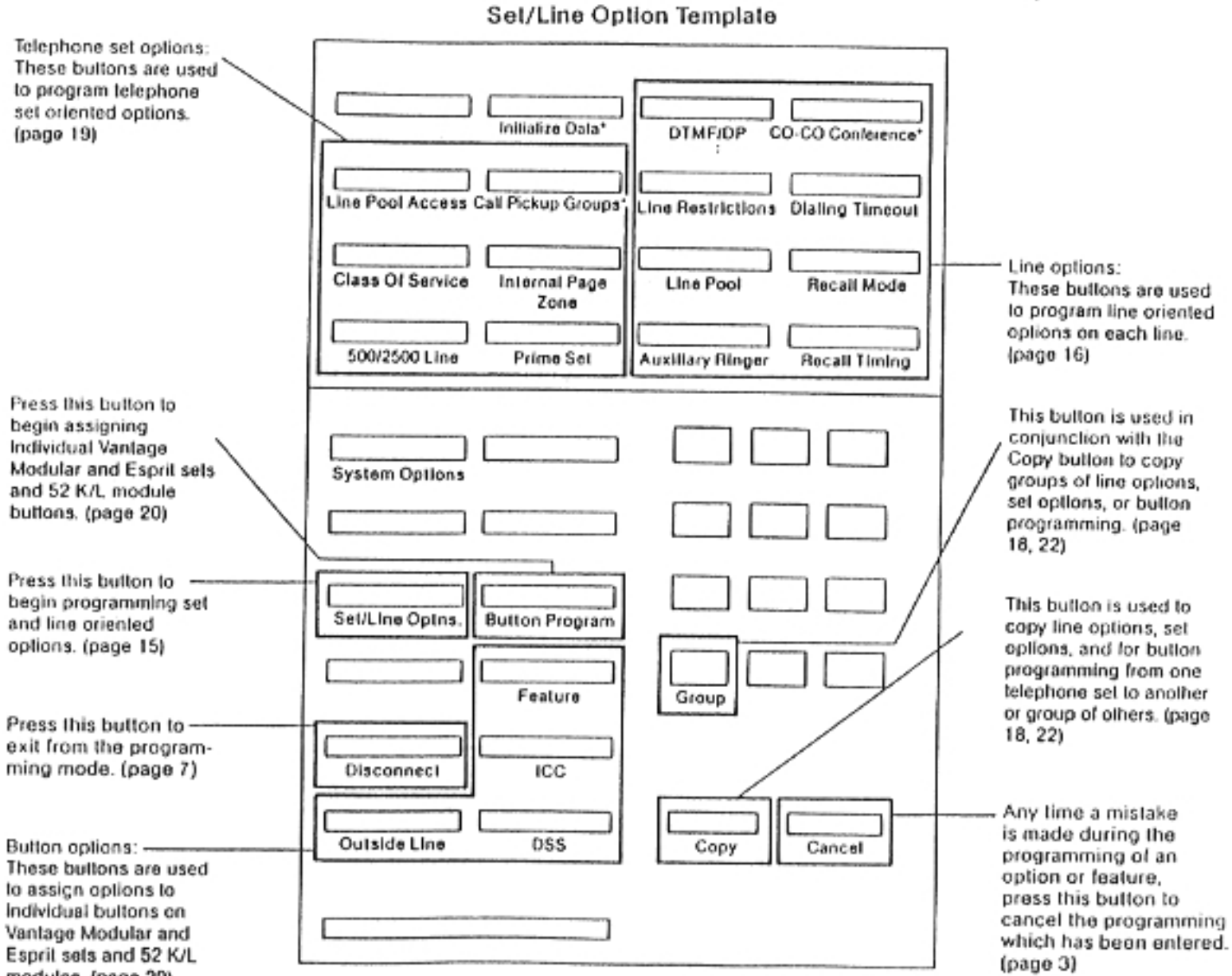
Installed By: _____ Date: _____

This survey form has been designed to be used on those Vantage 24/48 systems that contain the current CPU card. While it may be used for systems having an NT2B05AA CPU card, some features may not apply.

nt northern telecom

5072/85
December 1, 1985

B. Programming Station Set and Line Features



* Not available on systems equip NT2B05AA CPU

I SYSTEM OPTIONS

	(✓)
DND	
HLR	
I-Hold	
SMDR-(COS)	
LPT (SLS)	
DRT (SLS)	
CBT 18-24-30-36 Sec.	
CO-Call-PU	

II LINE OPTIONS

LINE NUMBER (✓)		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Line Pool																	
Aux Ring																	
Incoming Only																	
CO-CO Conf																	
(DTMF = 0) (DP = 1) (Both-2)																	
Recall Mode (Set For Loop)																	
Recall Time 300-700 ms. 1000-1600 ms.																	
Dialing Time Out 12 Sec.																	
In Pool: (Each Line Can Be In One Pool Only)	1																
	2																
	3																
	4																

III CLASS OF SERVICE (COS)

10	No Restrictions	
11	Cannot Dial Out	
12	0	Restricted
13	1	"
14	0, 1	"
15	0, 1, 411	"
16	9	"
17	90	"
18	91	"
19	90, 91	"
20	90, 91, 9411	"
21	0 As First Or Second Digit	"
22	9 Followed By 0 Or 1 As	"
	First Or Second Digit	

FLEXIBLE CALL RESTRICTIONS

X = A Single Digit
# = Any Digit 0-9

	XXXXX	XXXXX	XXXXX
90			
91			
92			
93			

COS OVERRIDES

X = A Single Digit
# = Any Digit 0-9

	XXXXXX
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

VI

STATION USER LIST

Designation Card Reference

STATION	NAME	STATION	NAME
30		42	
31		43	
32		44	
33		45	
34		46	
35		47	
36		48	
37		49	
38		50	
39		51	
40		52	
41		53	

...ll Pick-Up Groups Enter Button Number						Feature Keys: Call Forward	Speed Dial	Zone Paging 1, 2, Both		Voice Call Prohibit	Signal Call	Headset On/Off	Leave Message	Line Pool Access Enter Button Number				C: In-Call Pick-Up Group(s)	COS	Can Access Line Pool Group(s)				D: SLS Only — Dial 9 Access To Dedic. Line OR A Line Pool		
3	4	5	6	7	8			Key	Z					1	2	3	4	#–#		1	2	3	4	Line No.	Ring 0 or 1	Pool #

VMS SET

P1 P2 P3 P4

P5 P6 P7 P8

P9 P10 P11 P12

P13 P14 P15 P16

V1 V2

V3 V4

ICC ICC

P1 & P2 programmable on 16 K/L at CAP sets only

ESPRIT SET

E7 E6 DND

E1 E3 ICC

E2 E4 ICC

HOLD

LINK

E5

52 KEY/LP

*Default Functions

CT–Call Transfer

CB–Callback

NT–Night Transfer

NOTE: These features may be put onto a CAP phone.

*CT *CB *NT TEST

B VANTAGE MODULAR AND ESPRIT STATIONS

BUTTON OR KEY ASSIGNMENTS

Outside Lines

Enter Button Number and Ring Status

Ring = 1
No Ring = 0

E4 E5 E6 E7

13 P14 P15 P16

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

System Call PU

1 2

X VANTAGE DEFAULT LIST

Options	Value
SYSTEM OPTIONS	
Set Time	00 - 00 - 00
Set Date	00 - 03 - 01
CO Call Pick-Up	0 - Allow
500/2500 LPT	1 - Allow
HLR	1 - Allow
500/2500 DRT	1 - Allow
Do Not Disturb	0 - Allow
I-Hold	1 - Allow
Call Back Time	2 - (30 Sec.)
SMDR By COS	11 - Print All Calls
LINE OPTIONS	
DTMF/DP	2 - Both Modes
Line Restrictions	0 - Incoming and Outgoing Calls
Line Pool	1 - Line is in Pool 1 (Except Line 10)
Auxiliary Ringer	0 - No. Aux. Ringing
CO-CO Conference	1 - Allow
Dialing Time Out	1 - (12 Sec.) Allow
Recall Mode	0 - Loop Start
Recall Timing	1 - 700 ms.
STATION OPTIONS	
Line Pool Access	1 - Allow (To All 4 Pools)
Class of Service	10 - No Restrictions
Call Pick-Up Group	Not In Any Group
Internal Page Zone	0 - Receive No Page
Prime Set	0 - No (30 & 38 Are Prime By Default if CAP)
SINGLE-LINE SET OPTIONS	
Line Pool Access	1 - Allow (To All 4 Pools)
Class of Service	10 - No Restrictions
Line or Line Pool	291 - Entry Into Line Pool 1 When Dialing "9"
Call Pick-Up Group	Not In Any Group

Vantage 48 Configuration Guide

The Vantage 48 Configuration Guide is intended to assist the installer in properly assigning and connecting the lines and station sets to the system and assigning the appropriate line cards to the proper line card slots in the Common Equipment cabinet.

Prior to connecting the lines and stations and inserting circuit cards into the cabinet please complete the **Vantage 48 C.O./P.B.X. Line Configuration Sheet** accompanying this guide. This sheet may be left on premise as a permanent record of the system's configuration.

System Requirements

Installations may be tailored to individual requirements by selecting either a one or two Common Equipment cabinet configuration. The primary cabinet can house enough line cards to accommodate a maximum configuration of 12 lines and 24 station sets. Beyond this configuration, an extension cabinet is required to expand the system to its capacity of 16 lines and 48 stations. In both types of installation, the primary C.E. cabinet houses the following circuit cards:

- Memory card NT2B11
- Central Processing Unit (CPU) NT2B05
- Tone and Page card NT2B06
- Group Switch cards NT2B07
- Line and Station Interface cards

Only the Primary cabinet will house the first three circuit cards listed above. These are common control cards which are necessary regardless of the size of the system. Multiple Group Switch and Line and Station Set Interface cards must be provided depending on the configuration of the system. When an Extension cabinet is added it simply extends the line and station capacity of the Primary cabinet. The Extension cabinet does not require additional common control cards, only Group Switch, line, and station set cards.

An additional circuit card the:

- Bus Terminator card NT2B12

must also be installed with each system. In a single cabinet system, it occupies the slot on the far right of the Primary cabinet. In a dual cabinet system, it occupies the slot on the far left of the Extension cabinet. For circuit card assignments, see figure 1.

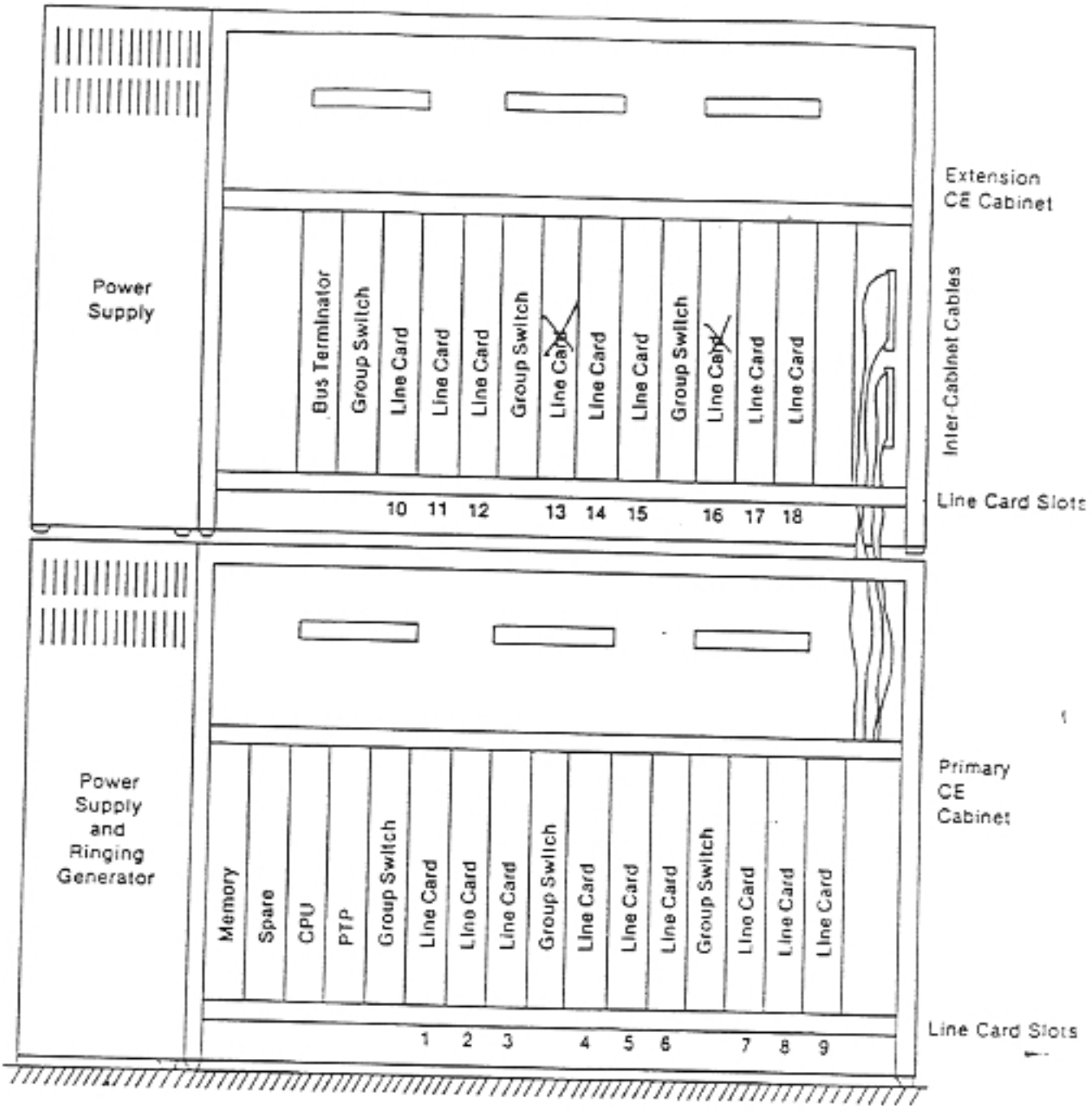


Fig. 1
Dual Cabinet Vantage 48 Installation

Selection of Line and Station Set Interface Cards

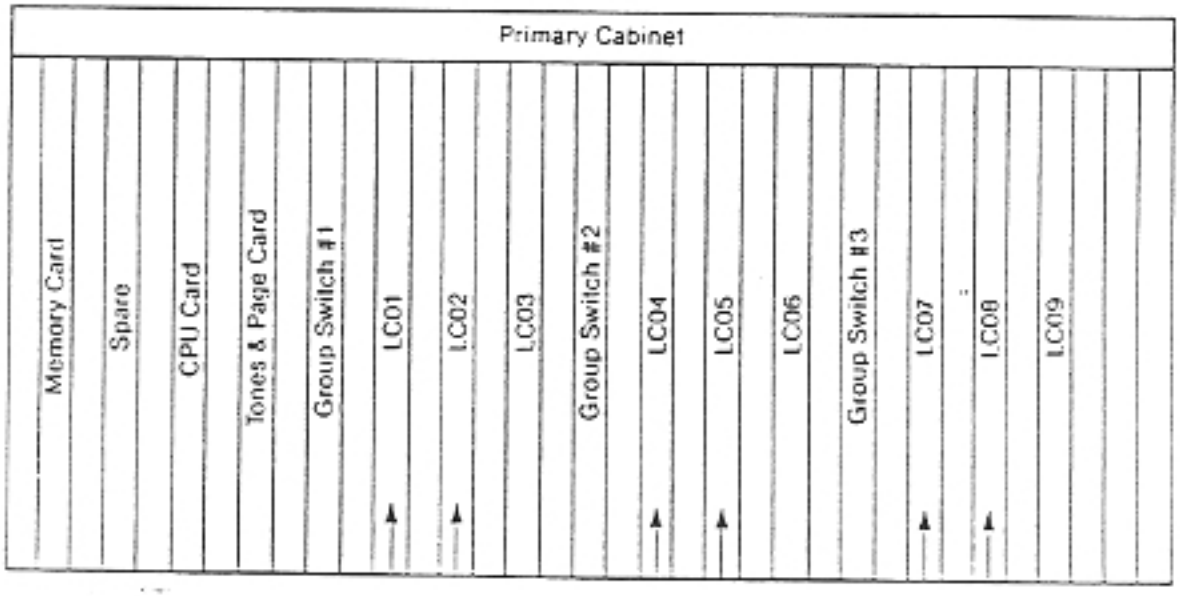
The following is a list of the circuit cards which may be selected to configure a Vantage 48 system.

- Group Switch cards, (NT2B07) comprising the switch network
- 1x2 line cards, (NT0B43) serving 1 C.O. line and 2 Vantage telephone sets
- 4x0 line cards (NT2B09) serving 4 C.O. lines
- 0x4 station set cards, (NT2B08) serving 4 Vantage telephone sets
- 0x4 station set cards, (NT2B10) serving 4 500/2500 telephone sets

As shown in figure 2, line and station set cards are installed in the C.E. cabinets in groups of up to three cards, with each cabinet having a capacity of three groups. Each group is separated from the next by a Group Switch card. The Group Switch card serves all lines interfaced by that group of line cards, and has a capacity of serving up to 4 C.O. lines and 8 station sets. In other words, various combinations of the line and station set cards listed above may be used in each line card grouping, but the total lines and stations may not exceed 4x8. The only restrictions other that the 4x8 capacity of each group is in the location of line cards. These restrictions are shown in the following diagrams.

1x2 LINE CARDS

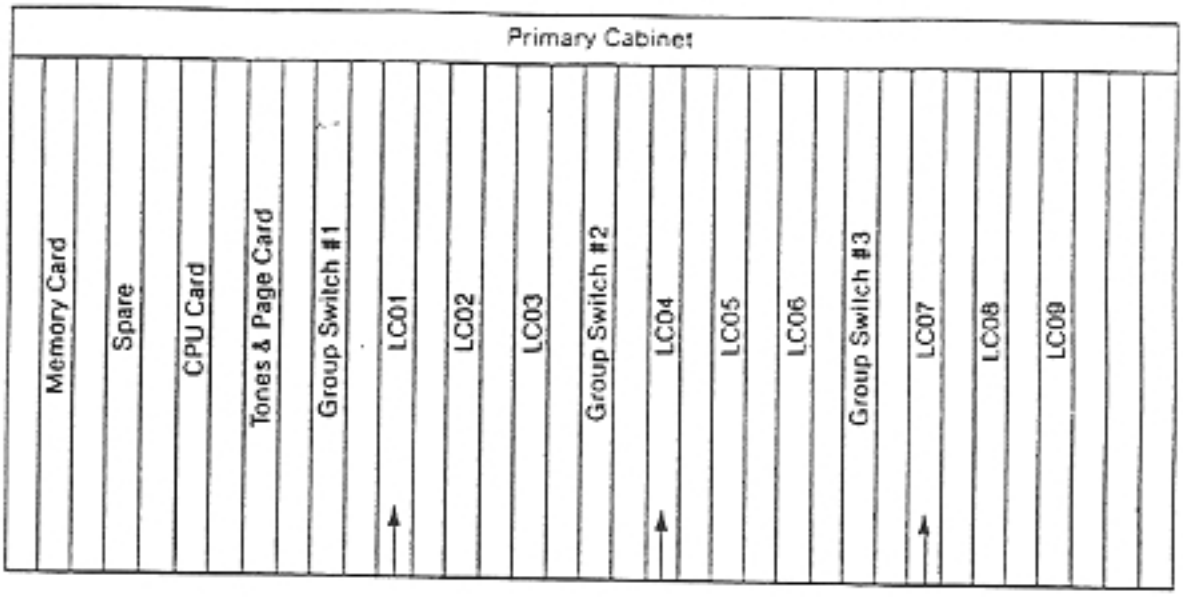
Fig. 2



1x2 Line cards may only be placed in the first two slots of any line card group.

4x0 LINE CARDS

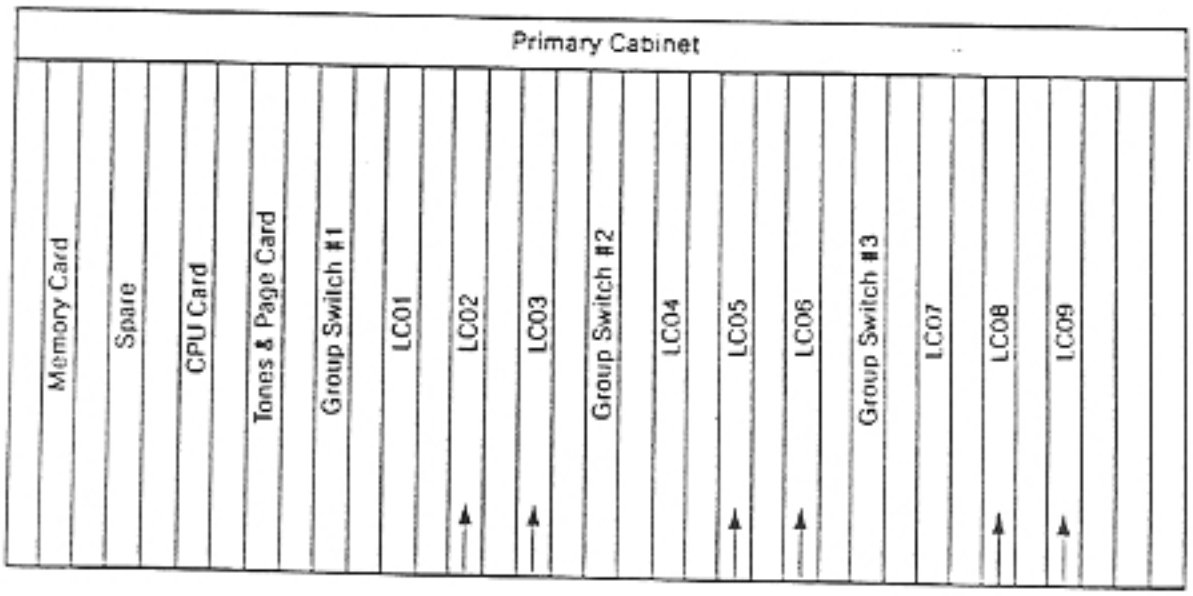
Fig. 3



4x0 Line cards may only be placed in first slot of any line card group.

0x4 STATION SET CARDS

Fig. 4

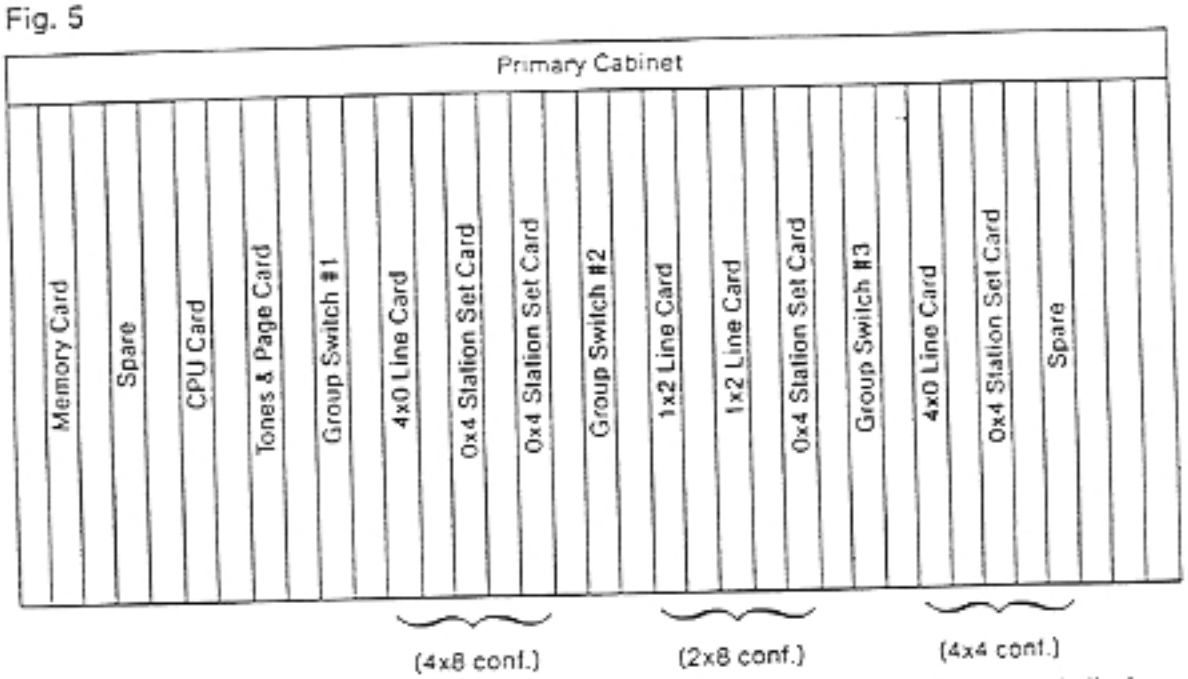


0x4 Station Set cards may only be placed in the last two slots of any line card group.

Given these configuration parameters, various line card group configurations are available. Three of these are shown below.

VALID CONFIGURATIONS

Fig. 5



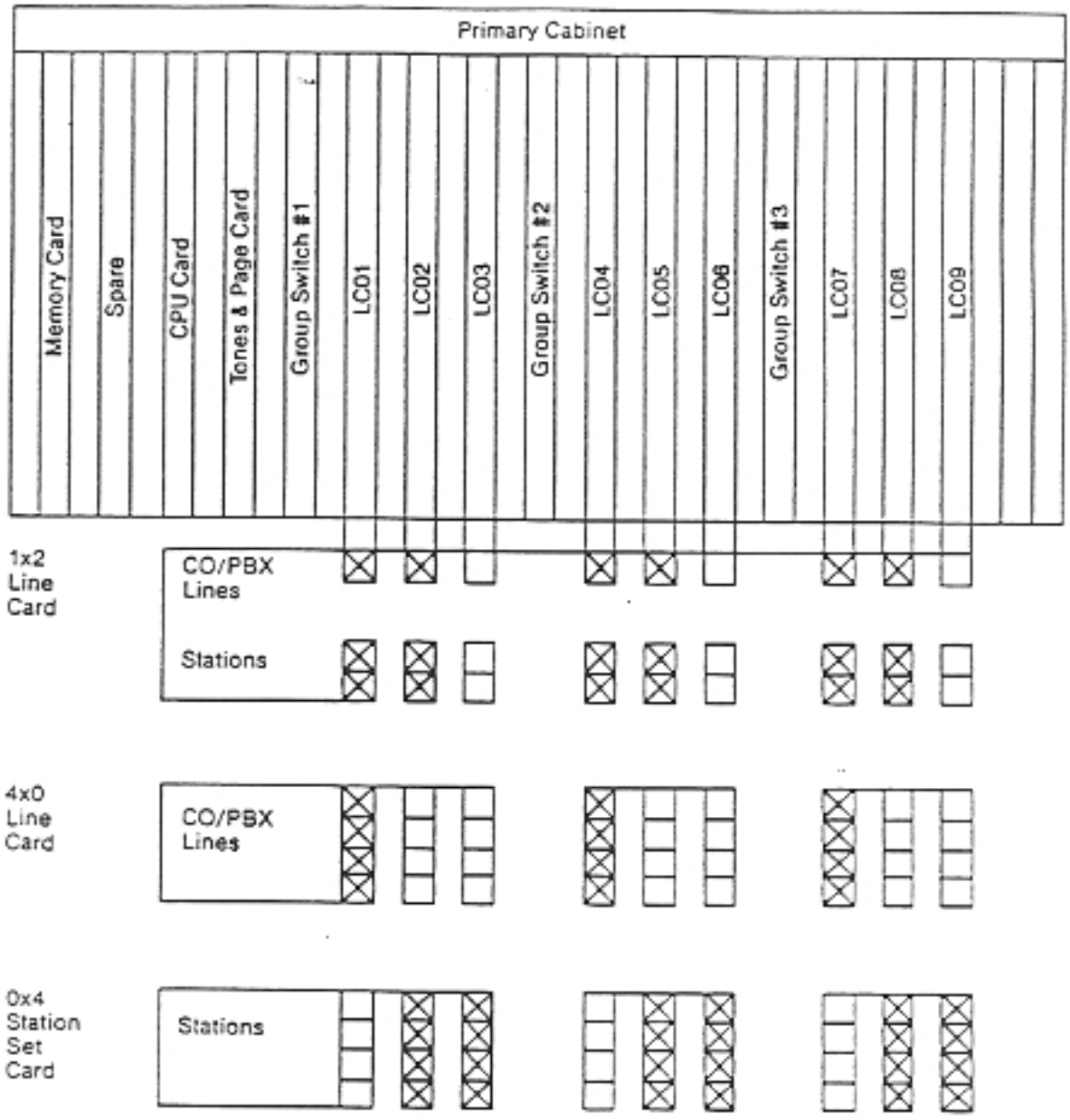
These configurations are valid because they don't exceed the 4x8 maximum, and all of the cards are in valid positions.

Line and Station Assignments

Specific lines and/or stations are assigned to particular line card slots in the Common Equipment cabinets. On the **Vantage 48 C.O. Line Configuration Sheet** you will notice that line cards may be used to serve C.O. lines in from one to three separate line card slots. Following is a diagram showing which lines and stations are accessed in each line card slot in the primary and extension cabinets.

C.O./P.B.X. LINES AND STATION SET COMMON EQUIPMENT CABINET SLOT ASSIGNMENTS

Fig. 7



Note: "X" denotes the only slots where card can be placed
Designated cards cannot be placed in blank slots

Vantage 48 - Hardware Installation Guide

Introduction

This mini-Installation guide may be used to install, test, and trouble shoot a Vantage 48 Electronic Key Telephone System. General considerations for installation planning are outlined in Vantage 48 Technical Documentation 519-1021-200 and detailed installation information is given in 519-1021-210.

System Overview

Vantage 48 is a small business communication system designed for use in applications requiring up to 16 telephone lines and up to 48 telephone sets. System hardware consists of Common Equipment cabinets, power supply cabinets, telephone sets, and telephone set add-on modules. Two CE cabinets are available. The primary CE cabinet houses common control cards and line cards capable of accommodating up to 12 telephone lines and 24 telephone sets, while an extension cabinet, which houses additional line cards, may be added to bring the system to its maximum capacity. Both cabinets require separate, attachable power supplies.

Up to two of the Vantage electronic telephone sets may be used as Central Answering Positions, and these may operate with optional 52 Key Lamp modules. Also, a maximum of six of the Vantage sets may be designated as Prime sets. Of the 48 telephone sets accommodated by the system, a maximum of 16 may be single line sets.

System cabling consists of two-conductor cables for each Central Office (C.O.)/PBX line, and a four conductor cable for each telephone set.

General Considerations

AC Power—Each CE cabinet requires a power supply of 115V ac ± 10% (60 Hz ± 5%). The ac outlet to which the power supply is to be connected must be a protected socket which is grounded and fused at 15 Amps maximum. The power supply power cord is terminated in a three prong plug and is approximately 7 ft. (2 m) long. The CE and power supply cabinets must be located close enough to the ac socket to allow the power cord to plug directly into the socket without the need for an extension.

Grounding—The CE cabinets must be connected to an approved building ground with a 12-14 AWG cable. A grounding lug is provided on the cabinet to facilitate the ground connection.

Environment—The CE cabinets and telephone sets must be installed in a clean atmosphere and dry location. In addition, the equipment should not be in close proximity (4 m or 13 ft) to large electrical machines such as photocopiers or heat sources.

Cable Lengths—The maximum cable lengths in the VANTAGE 48 system are:

a) Telco CO line to CE cabinet (TELADAPT cord version only): 50 ft. (15.2 m) (FCC Rules and Regulations).
b) CE cabinet to telephone set (22 AWG): 2600 ft. (800 m).
c) If CE cabinet to telephone set cable length exceeds 2600 ft. (800 m), an OPX module is required at the telephone set location.

Tools—The following tools are required when installing a VANTAGE 48 system:

- Slot screwdriver
- Wirecutters
- 714 Connecting tool (for 66-block option)
- QT BIX 16A (for BIX connector option)

Vantage System Installation

Unpack and Inspect Equipment

Note: Follow this procedure before beginning the installation to ensure that all items have been received in good order. Report all problems to the supplier.

Step	Procedure
1	Check all items received against the shipping order form and the packing slip. Report any errors immediately to the supplier.
2	Open the shipping carton and remove the cabinet. Do not discard the carton until the equipment has been fully installed and tested.
3	Inspect the cabinet for damaged connectors, broken or bent connector pins or any scratches or dents.
4	Remove the power supply from its shipping carton and inspect it for damaged connectors, damaged cords and scratches or dents.

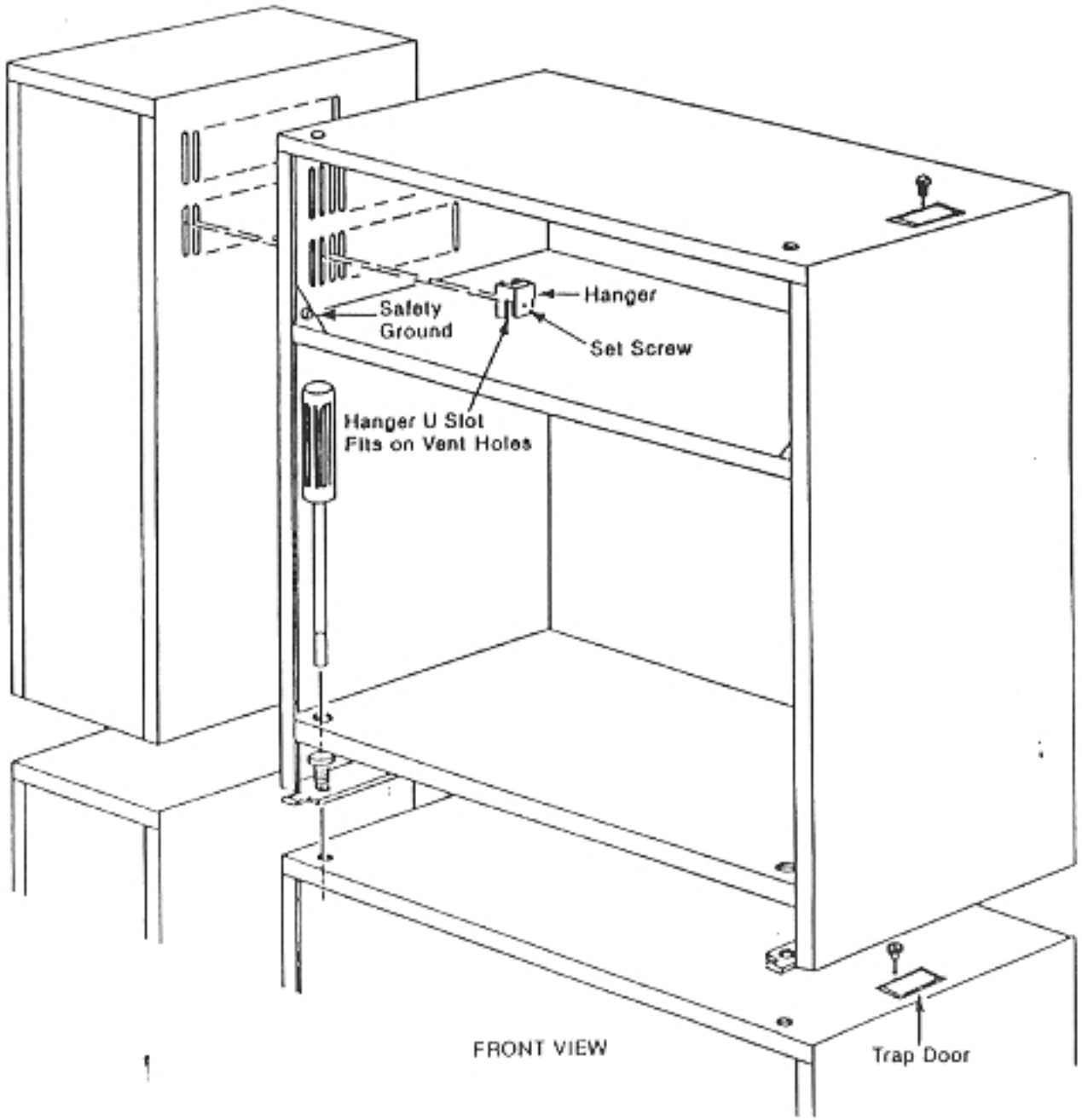
Install and Test System

The CE cabinets may be installed on the floor or mounted on a wall. Either an NT2B37 Floor Mount Kit or an NT2B25 Wall Mount Kit is required for installation. Each cabinet contains one 25-pair multi-pin connector to facilitate connection to the CO/PBX lines and two to facilitate connection to the station sets. If alternate connection arrangements are required, a BIX, 66-Block or TELADAPT connector adapter may be installed in the CE cabinet. Installation details are provided in the following steps:

1. Installing a single floor mounted cabinet.
2. Installing an extension floor mounted cabinet.
3. Installing a single wall mounted cabinet.
4. Installing an extension wall mounted cabinet.
5. Installing optional connector blocks.
6. Installing system options.
7. Installing circuit cards.
8. Setting circuit card dip switches.
9. Setting telephone set dip switches.
10. Installing telephone sets.
11. Turning the system on.
12. Verifying system operation.
13. Clearing faults.

1. Installing a single floor mounted cabinet

Step	Procedure
1-1	Remove the primary cabinet cover (disengage the two captive locking screws which secure the cover and pull the cover off) and the Power Supply cover (pull cover straight outwards).
1-2	Using the Floor Mount Kit NT2B37 fasten the Power Supply unit to the side of the CE cabinet by placing the hanger on adjacent vent holes at the front of the cabinet (see fig. 1).
1-3	Loosen the right center screw of the C.E. cabinet and the left center screw of the Power Supply unit at the rear of the cabinets and place the bracing plate over both screws (see fig. 1).
1-4	Align both cabinets, then tighten the set screw on the hanger located at the vent holes.
1-5	Tighten the cabinet frame screws on the bracing plate.
1-6	Check that the cabinets rest on all eight feet to prevent them from rocking. Correct any rocking by placing shims under the cabinet feet.
1-7	Connect the male power cable extending from the lower left rear corner of the CE cabinet to the female connector at the rear of the Power Supply unit (fig. 1). NOTE: DO NOT CONNECT THE SYSTEM TO THE AC SOURCE AT THIS TIME.
1-8	Connect a 14 AWG copper wire between the safety ground screw located at the lower rear of the Power Supply to the safety ground screw located on the left front of the CE cabinet upper panel. Route the wire through the oval access hole at the upper rear of the CE cabinet. A 14 AWG copper wire must also be connected between the safety ground screw on the CE cabinet and an approved earth ground (metallic cold water pipe with no plastic segments). It is also routed through the oval access hole at the rear of the cabinet.
1-9	Check that there is adequate unobstructed ventilation, allowing cooling air to enter the bottom of the cabinet.
1-10	Replace the front covers of both cabinets if no further work is to be performed at this time.



FRONT VIEW

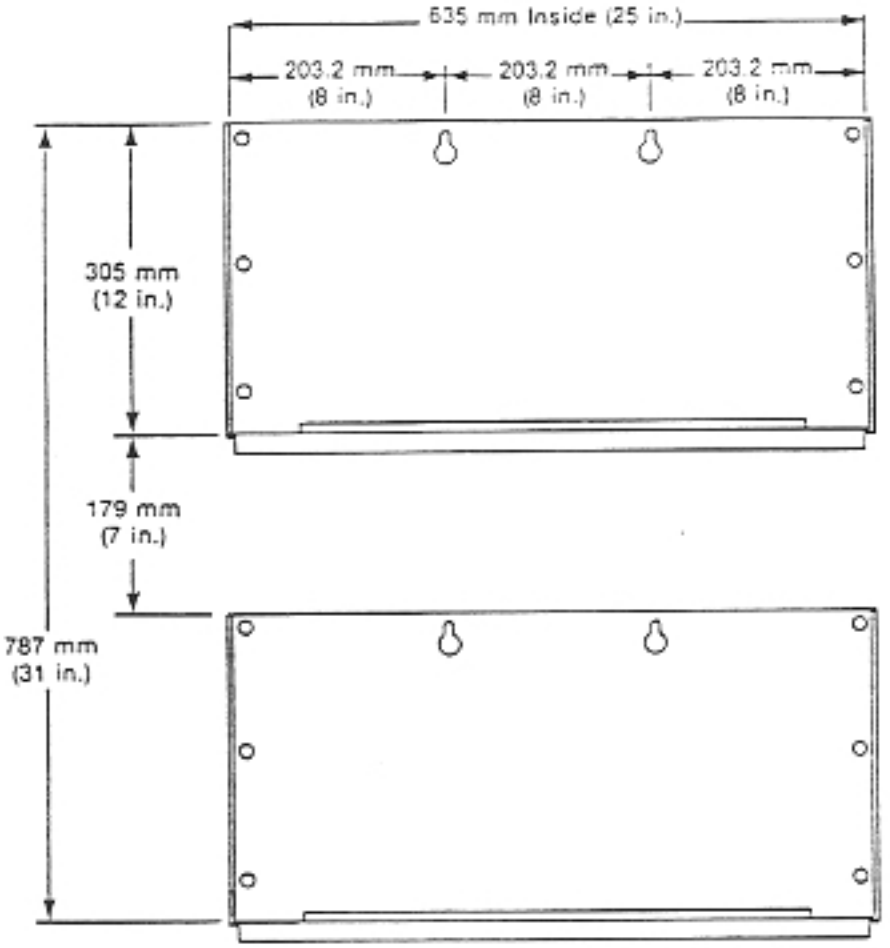
Fig. 1

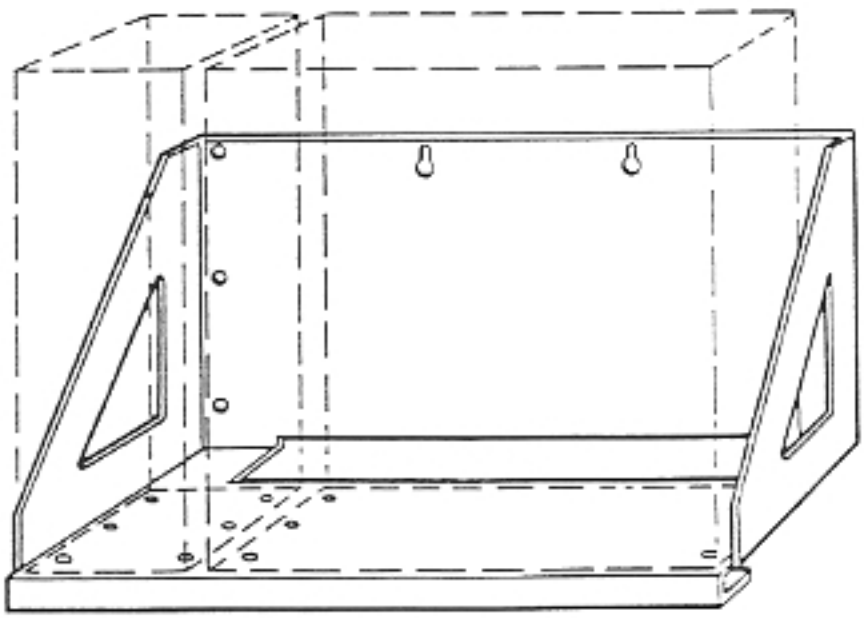
2. Installing extension floor mounted cabinet.

Step	Procedure
2-1	Remove the front cover of the extension CE cabinet.
2-2	Remove the left and right screws from the front top of the Primary CE cabinet, then remove the trap door covering the ribbon cable wiring access hole by removing the screws and lifting the trap door up (fig. 1).
2-3	Place the extension CE cabinet on top of the Primary cabinet and secure the two cabinets together using the two screws removed in Step 2-2. Access for fastening the screws is via the left and right holes located in the bottom front base of the Extension CE cabinet (fig. 1).
2-4	Remove the cover of the extension Power Supply unit.
2-5	Place the extension Power Supply unit on top of the Primary unit, and fasten it to the extension cabinet using the method described in steps 1-2 through 1-5.
2-6	Connect the male power cable extending from the lower left rear corner of the CE cabinet to the female connector located at the rear of the Power Supply unit (fig. 1). NOTE: DO NOT CONNECT THE SYSTEM TO THE AC RECEPTACLE AT THIS TIME.
2-7	Plug the power cord of the extension Power Supply module into the receptacle on the rear of the Primary Power supply module (fig. 3).
2-8	Connect the intercabinet connectorized ringing cable between the two CE cabinets (fig. 3).
2-9	Connect an intercabinet ribbon cable to the bottom connector at the right hand end of the Primary CE cabinet backplane.
2-10	Feed the cable through the holes in the top of the Primary CE cabinet and the bottom of the extension cabinet.
2-11	Connect the cable to the bottom connector the right hand end of the extension cabinet backplane.
2-12	Repeat steps 2-8 to 2-10 to install the second intercabinet ribbon cable to the top connectors of each CE cabinet.
2-13	The following step applies to both the Primary CE and extension CE cabinets (separate ground wire for each cabinet). Connect a 14 AWG copper wire between the safety ground screw located on the lower rear of the Power Supply to the safety ground screw located on the left front of the CE cabinet upper panel. Route the wire through the oval access hole at the upper rear of the CE cabinet. A 14 AWG copper wire must also be connected between the safety ground screw on the CE cabinet and an approved earth ground (metallic cold water pipe with no plastic segments). It is also routed through the oval access hole at the rear of the cabinet.
2-14	Check that there is adequate unobstructed ventilation, allowing cooling air to enter the bottom of the cabinet.
2-15	Replace the front covers of all cabinet if no further work is to be performed at this time.

3. Installing a single wall mounted cabinet.

Step	Procedure
3-1	Attach a piece of 18 mm (¾ in.) plywood measuring a minimum of 305 x 635 mm (12 x 25 in.) and capable of supporting 40 kg (90 lb.), to the wall.
3-2	Secure the CE cabinet wall bracket to the plywood backing using woodscrews. The bracket must be able to support 40 kg (90 lbs.). Install the two screws for the top center key hole locations, hang the bracket on these screws, and then install the remaining screws (see fig. 2).
3-3	Place the CE cabinet onto the bracket, with the feet placed in the appropriate holes.
3-4	Place the Power Supply module alongside the left of the CE cabinet and connect the power cable extending from the CE cabinet to the connector at the rear of the Power Supply module. NOTE: DO NOT CONNECT THE SYSTEM TO THE AC SOURCE AT THIS TIME.
3-5	Connect a 14 AWG copper wire between the safety ground screw located at the lower rear of the Power Supply to the safety ground screw located on the left front of the CE cabinet upper panel. Route the wire through the oval access hole at the upper rear of the CE cabinet. A 14 AWG copper wire must also be connected between the safety ground screw on the CE cabinet and an approved earth ground (metallic cold water pipe with no plastic segments). It is also routed through the oval access hole at the rear of the cabinet.





THREE DIMENSIONAL VIEW OF MOUNT

Fig. 2

4. Installing an extension wall mounted cabinet.

Step	Procedure
4-1	Secure the extension wall mount bracket 178 mm (7 in.) directly above the primary wall mount bracket onto plywood backing. If a single piece of plywood is used for both brackets, it should be able to support 80 kg (180 lbs.). If each bracket is secured to separate pieces of plywood, they should be able to support 40 kg (90 lbs.) each (see fig. 2).
4-2	Remove the primary CE cabinet trap door located on the right side of the primary CE cabinet top cover.
4-3	Remove the covers from all CE cabinets.
4-4	Place the extension CE cabinet onto the bracket, with the feet placed in the appropriate holes.
4-5	Place the Power Supply module alongside the left of the extension CE cabinet and connect the power cable extending from the CE cabinet to the connector at the rear of the Power Supply module. NOTE: DO NOT CONNECT THE SYSTEM TO THE AC SOURCE AT THIS TIME.
4-6	Connect a 14 AWG copper wire between the safety ground screw located at the lower rear of the Power Supply to the safety ground screw located on the left front of the CE cabinet upper panel. Route the wire through the oval access hole at the upper rear of the CE cabinet. A 14 AWG copper wire must also be connected between the safety ground screw on the CE cabinet and an approved earth ground (metallic cold water pipe with no plastic segments). It is also routed through the oval access hole at the rear of the cabinet.
4-7	Reach behind the Primary CE cabinet, and connect the male connector of the Extension CE ringing cable to the J1 connector of the Primary CE cabinets.
4-8	Connect an intercabinet ribbon cable to the bottom connector at the right end of the Primary CE cabinet backplane.
4-9	Feed the cable through the holes in the top of the Primary CE cabinet and the bottom of the extension cabinet.
4-10	Connect the cable to the bottom connector at the right hand end of the extension cabinet backplane.
4-11	Repeat steps 8-10 to install the second intercabinet ribbon cable to the top connector of each C.E. cabinet.
4-12	Grasp the Primary Power Supply module at the bottom. Lift slightly and pull it out far enough to allow access to its rear ac power receptacle.
4-13	Plug the power cord of the extension Power Supply unit into the ac receptacle on the rear of the Primary Power Supply unit.

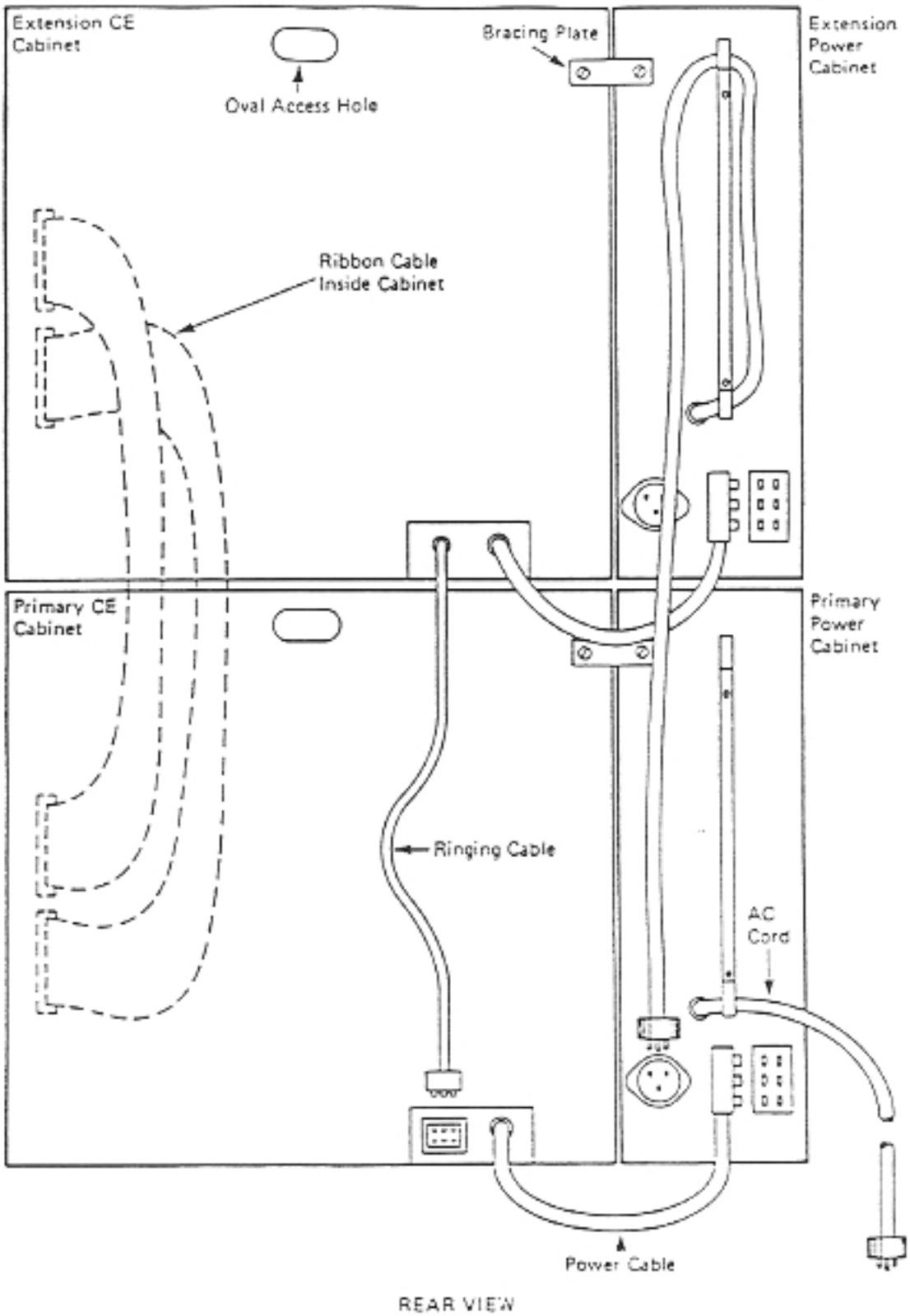


Fig. 3
Intercabinet Cables

C.O. PBX Line Connections to C.E. Cabinet
to P1A Connector

4x0 Line Card	Colour	CO/PBX Line	1x2 Line Card
LC1	W/BL	T10	LC1
	BL/W	R10	
	W/O	T11	LC2
	O/W	R11	
	W/G	T12	
	G/W	R12	
	W/BR	T13	
	BR/W	R13	
LC4	W/S	T14	LC4
	S/W	R14	
	R/BL	T15	LC5
	BL/R	R15	
	R/O	T16	
	O/R	R16	
	R/G	T17	
	G/R	R17	
LC7	R/BR	T18	LC7
	BR/R	R18	
	R/S	T19	LC8
	S/R	R19	
	BK/BL	T20	
	BL/BK	R20	
	BK/O	T21	
	O/BK	R21	
Tone and Paging			
T&P	BK/G	Page Signal	
	G/BK	Page Signal	
	BK/BR	Page Zone 1 Control	
	BR/BK	Page Zone 1 Control	
	BK/S	Aux Ring Control (Auxiliary	
	S/BK	Aux Ring Control Ringer)	
	Y/BL	Aux Ring Control (Night	
	BL/Y	Aux Ring Control Bell)	
	Y/G	Mu on Hold Ground	
	G/Y	Mu on Hold Signal	
	Y/O	Spare	
	O/Y	Spare	
	Y/BR	Page Zone 2 Control	
	BR/Y	Page Zone 2 Control	

C.O. PBX Line Connections to C.E. Cabinet
to P1A Connector

4x0 Line Card	Colour	CO/PBX Line	1x2 Line Card
T&P	Y/S	Spare	
	S/Y	Spare	
	V/BL	Spare	
	BL/V	Spare	
	V/O	Spare	
	O/V	Spare	
	V/G	Spare	
	G/V	Spare	
	V/BR	Spare	
	BR/V	Spare	
	V/BR	Spare	
	BR/V	Spare	
	V/S	Spare	
	S/V	Spare	

Telephone Line Connections to C.E. Cabinet
to P2A Connector

0x4 Station Set	Colour	Station No.	1x2 Line Card
LC2	W/BL	TV 30	LC1
	BL/W	RV 30	
	W/O	TD 30	
	O/W	RD 30	
	W/G	TV 31	
	G/W	RV 31	
	W/BR	TD 31	
	BR/W	RD 31	
	W/S	TV 32	LC2
	S/W	RV 32	
	R/BL	TD 32	
	BL/R	RD 32	
	R/O	TV 33	
	O/R	RV 33	
	R/G	TD 33	
	G/R	RD 33	
LC3	R/BR	TV 34	
	BR/R	RV 34	
	R/S	TD 34	
	S/R	RD 34	
	BK/BL	TV 35	
	BL/BK	RV 35	
	BK/O	TD 35	
	O/BK	RD 35	
LC3	BK/G	TV 36	
	G/BK	RV 36	
	BK/BR	TD 36	
	BR/BK	RD 36	
	BK/S	TC 37	
	S/BK	RV 37	
	Y/BL	TD 37	
	BL/Y	RD 37	

Telephone Line Connections to C.E. Cabinet
to P2A Connector

0x4 Station Set	Colour	Station No.	1x2 Line Card
LC5	Y/O	TV 38	LC4
	O/Y	RV 38	
	Y/G	TD 38	
	G/Y	RD 38	
	Y/BR	TV 39	
	BR/Y	RV 39	
	Y/S	TD 39	
	S/Y	RD 39	
	V/BL	TV 40	LC5
	BL/V	RV 40	
	V/O	TD 40	
	O/V	RD 40	
	V/G	TV 41	
	G/V	RV 41	
	V/BR	TD 41	
	BR/V	RD 41	
	V/S	Spare	
	S/V	Spare	

Telephone Line Connections to C.E. Cabinet
to P3A Connector

0x4 Station Set	Colour	Station No.	1x2 Line Card
LC6	W/BL	TV 42	
	BL/W	RV 42	
	W/O	TD 42	
	O/W	RD 42	
	W/G	TV 43	
	G/W	RV 43	
	W/BR	TD 43	
	BR/W	RD 43	
	W/S	TV 44	
	S/W	RV 44	
	R/BL	TD 44	
	BL/R	RD 44	
	R/O	TV 45	
	O/R	RV 45	
	R/G	TD 45	
	G/R	RD 45	
LC8	R/BR	TV 46	LC7
	BR/R	RV 46	
	R/S	TD 46	
	S/R	RD 46	
	BK/BL	TV 47	
	BL/BK	RV 47	
	BK/O	TD 47	
	O/BK	RD 47	
	BK/G	TV 48	LC8
	G/BK	RV 48	
	BK/BR	TD 48	
	BR/BK	RD 48	
	BK/S	TV 49	
	S/BK	RV 49	
	Y/BL	TD 49	
	BL/Y	RD 49	

Telephone Line Connections to C.E. Cabinet
to P3A Connector

0x4 Station Set	Colour	Station No.	1x2 Line Card
LC9	Y/O	TV 50	
	O/Y	RV 50	
	Y/G	TD 50	
	G/Y	RD 50	
	Y/BR	TV 51	
	BR/Y	RV 51	
	Y/S	TD 51	
	S/Y	RD 51	
	V/BL	TV 52	
	BL/V	RV 52	
	V/O	TD 52	
	O/V	RD 52	
	V/G	TV 53	
	G/V	RV 53	
	V/BR	TD 53	
	BR/V	RD 53	
	V/S	Spare	
	S/V	Spare	

C.O./PBX Line Connections to C.E. Cabinet
to P1B Connector

4x0 Line Card	Colour	CO/PBX Line	1x2 Line Card
LC10	W/BL	T 22	LC10
	BL/W	R 22	
	W/O	T 23	LC11
	O/W	R 23	
	W/G	T 24	
	G/W	R 24	
	W/BR	T 25	
	BR/W	R 25	
LC13	W/S	T 12	LC13
	S/W	R 12	
	R/BL	T 13	LC14
	BL/R	R 13	
	R/O	T 16	
	O/R	R 16	
	R/G	T 17	
	G/R	R 17	
LC16	R/BR	T 20	LC16
	BR/R	R 20	
	R/S	T 21	LC17
	S/R	R 21	
	BK/BL	T 24	
	BL/BK	R 24	
	BK/O	T 25	
	O/BK	R 25	
	BK/G	Spare	
	G/BK	Spare	
	BK/BR	Spare	
	BR/BK	Spare	
	BK/S	Spare	
	S/BK	Spare	
	Y/BL	Spare	
	BL/Y	Spare	
	Y/O	Spare	
	O/Y	Spare	
	Y/G	Spare	
	G/Y	Spare	
	Y/BR	Spare	
	BR/Y	Spare	
	Y/S	Spare	
	S/Y	Spare	
	Y/BL	Spare	
	BL/Y	Spare	
	V/O	Spare	
	O/Y	Spare	
	V/G	Spare	
	G/V	Spare	
	V/BR	Spare	
	BR/V	Spare	
	V/S	Spare	
	S/V	Spare	

Telephone Line Connections to C.E. Cabinet

to P2B Connector

0x4 Station Set	Colour	Station No.	1x2 Line Card
LC11	W/BL	TV 54	LC10
	BL/W	RV 54	
	W/O	TD 54	
	O/W	RD 54	
	W/G	TV 55	
	G/W	RV 55	
	W/BR	TD 55	
	BR/W	RD 55	
	W/S	TV 56	LC11
	S/W	RV 56	
	R/BL	TD 56	
	BL/R	RD 56	
	R/O	TV 57	
	O/R	RV 57	
	R/G	TD 57	
	G/R	RD 57	
LC12	R/BR	TV 58	
	BR/R	RV 58	
	R/S	TD 58	
	S/R	RD 58	
	BK/BL	TV 59	
	BL/BK	RV 59	
	BK/O	TD 59	
	O/BK	RD 59	
	BK/G	TV 60	
	G/BK	RV 60	
	BK/BR	TD 60	
	BR/BK	RD 60	
	BK/S	TV 61	
	S/BK	RV 61	
	Y/BL	TD 61	
	BL/Y	RD 61	

Telephone Line Connections to C.E. Cabinet
to P2B Connector (Continued)

0x4 Station Set	Colour	Station No.	1x2 Line Card
LC14	Y/O	TV 62	LC13
	O/Y	RV 62	
	Y/G	TD 62	
	G/Y	RD 62	
	Y/BR	TV 63	
	BR/Y	RV 63	
	Y/S	TD 63	
	S/Y	RD 63	
	V/BL	TV 64	LC14
	BL/V	RV 64	
	V/O	TD 64	
	O/V	RD 64	
	V/G	TV 65	
	G/V	RV 65	
	V/BR	TD 65	
	BR/V	RD 65	
	V/S	Spare	
	S/V	Spare	

Telephone Line Connections to C.E. Cabinet
to P3B Connector

0x4 Station Set	Colour	Station No.	1x2 Line Card
LC15	W/BL	TV 66	
	BL/W	RV 66	
	W/O	TD 66	
	O/W	RD 66	
	W/G	TV 67	
	G/W	RV 67	
	W/BR	TD 67	
	BR/W	RD 67	
	W/S	TV 68	
	S/W	RV 68	
	R/BL	TD 68	
	BL/R	RD 68	
	R/O	TV 69	
	O/R	RV 69	
	R/G	TD 69	
	G/R	RD 69	
LC17	R/BR	TV 70	LC16
	BR/R	RV 70	
	R/S	TD 70	
	S/R	RD 70	
	BK/BL	TV 71	
	BL/BK	RV 71	
	BK/O	TD 71	
	O/BK	RD 71	
	BK/G	TV 72	LC17
	G/BK	RV 72	
	BK/BR	TD 72	
	BR/BK	RD 72	
	BK/S	TV 73	
	S/BK	RV 73	
	Y/BL	TD 73	
	BL/Y	RD 73	
LC18	Y/O	TV 74	
	O/Y	RV 74	
	Y/G	TD 74	
	G/Y	RD 74	
	Y/BR	TV 75	
	BR/Y	RV 75	
	Y/S	TD 75	
	S/Y	RD 75	
	V/BL	TV 76	
	BL/V	RV 76	
	V/O	TD 76	
	O/V	RD 76	
	V/G	TV 77	
	G/V	RV 77	
	V/BR	TD 77	
	BR/V	RD 77	
	V/S	Spare	
	S/V	Spare	

Legend:

Station Set Lines	CO/PBX Lines
TV tip voice	T Tip
RV ring voice	R Ring
TD tip data	
RD ring data	

Colour	Abbreviations
Blue	BL
Orange	O
Green	G
Brown	BR
Slate	S
White	W
Red	R
Black	BK
Yellow	Y
Violet	V

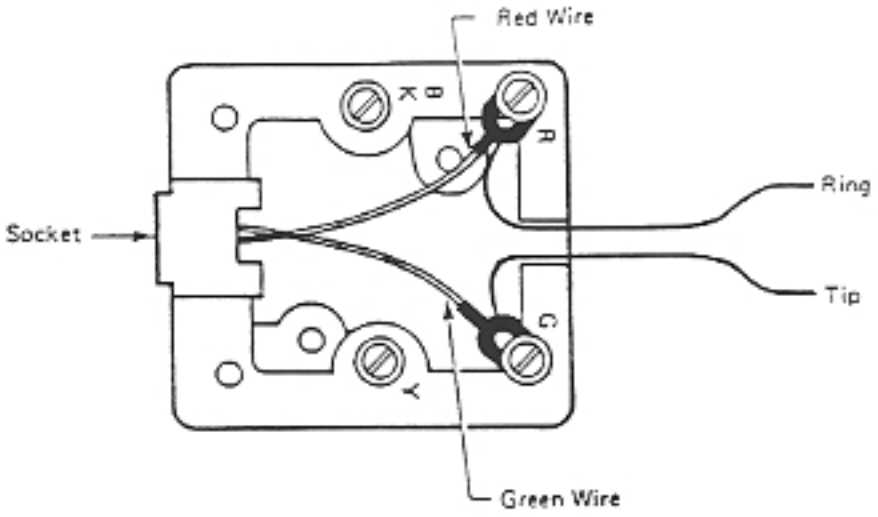


Fig. 4
500/2500 Set Connections

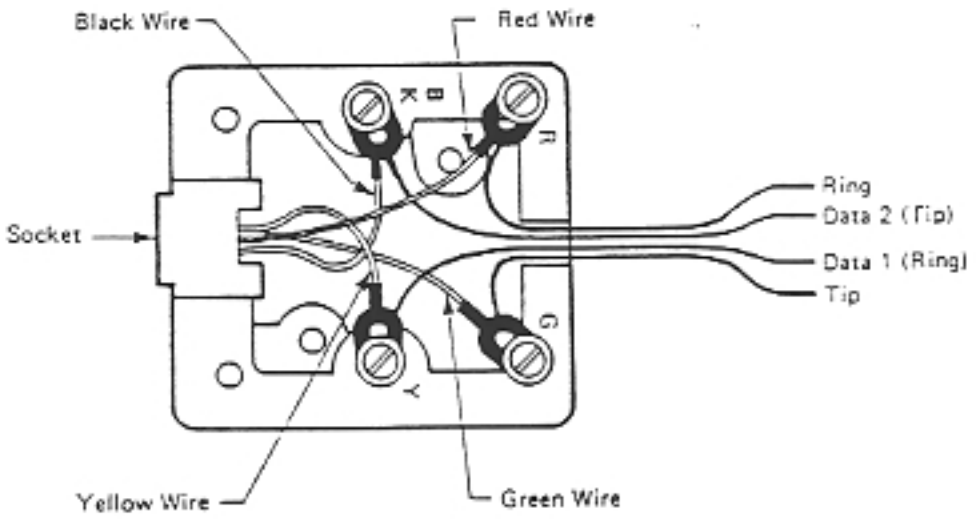


Fig. 5
Vantage Set Connections

5. Installing optional connector blocks.

Step	Procedure
5-1	Place the connector blocks (BIX, 66 or TELADAPT, see fig. 6, 7, 8) into the proper position by aligning the two fixed nuts on the bottom of the blocks, with the mounting holes located on the top of the card cage in the CE cabinet (the CO connector block is installed on the left side of the CE cabinet, the station set connector block to the right).
5-2	From the underside of the top of the card cage thread the two supplied bolts upwards through the card cage mounting holes into the fixed nuts of the connector block mounting plate.
5-3	Connect the Amphenol connector associated with the CO block to the P1A connector on the Primary cabinet and the P1B connector on the Extension cabinet located at the left rear of both cabinets.
5-4	Connect the Amphenol connector on the left hand side of the station set block to the P2 connector located at the center rear of the C.E. cabinet and the connector on the right hand side to the P3 connector located at the right rear of the CE cabinet.

Connect Lines (CO and Telephone) to CE cabinet

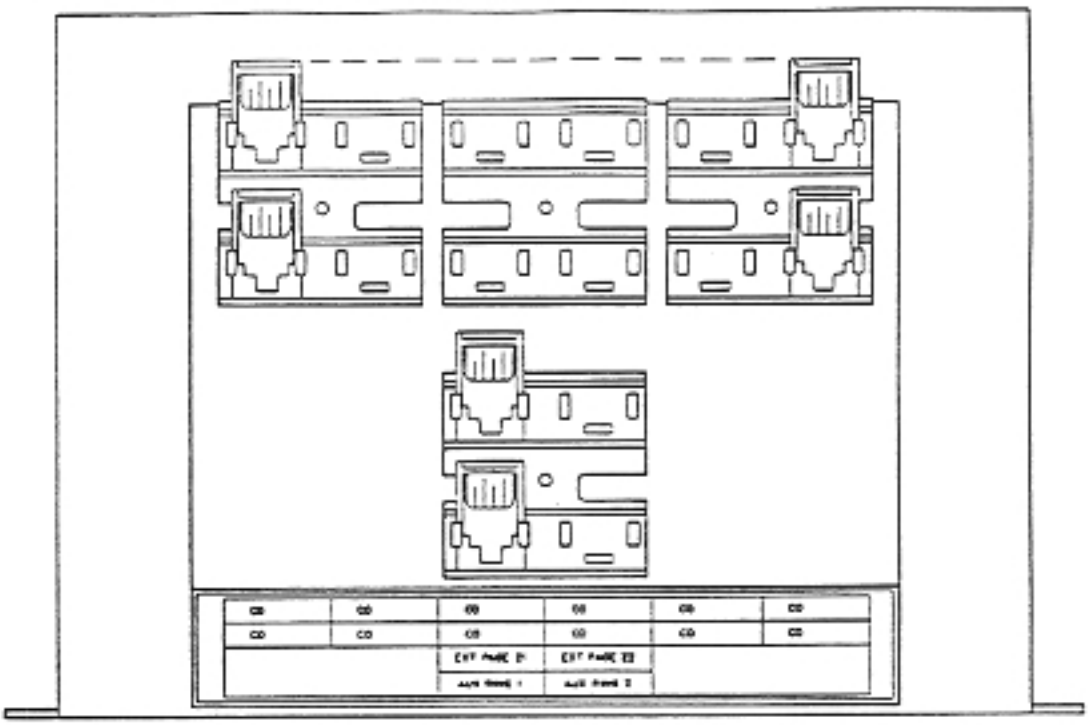


Fig. 6
TELADAPT CO Block Connections

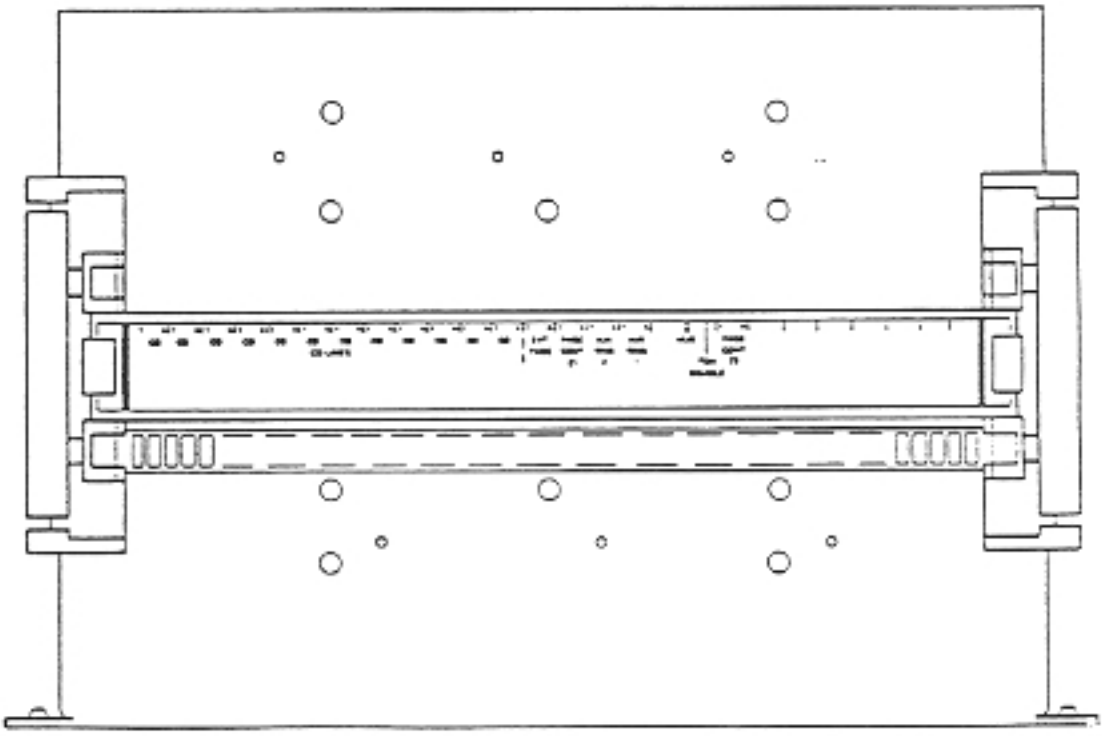


Fig. 7
BIX CO Block Connections

Connect Lines (CO and Telephone) to CE Cabinet

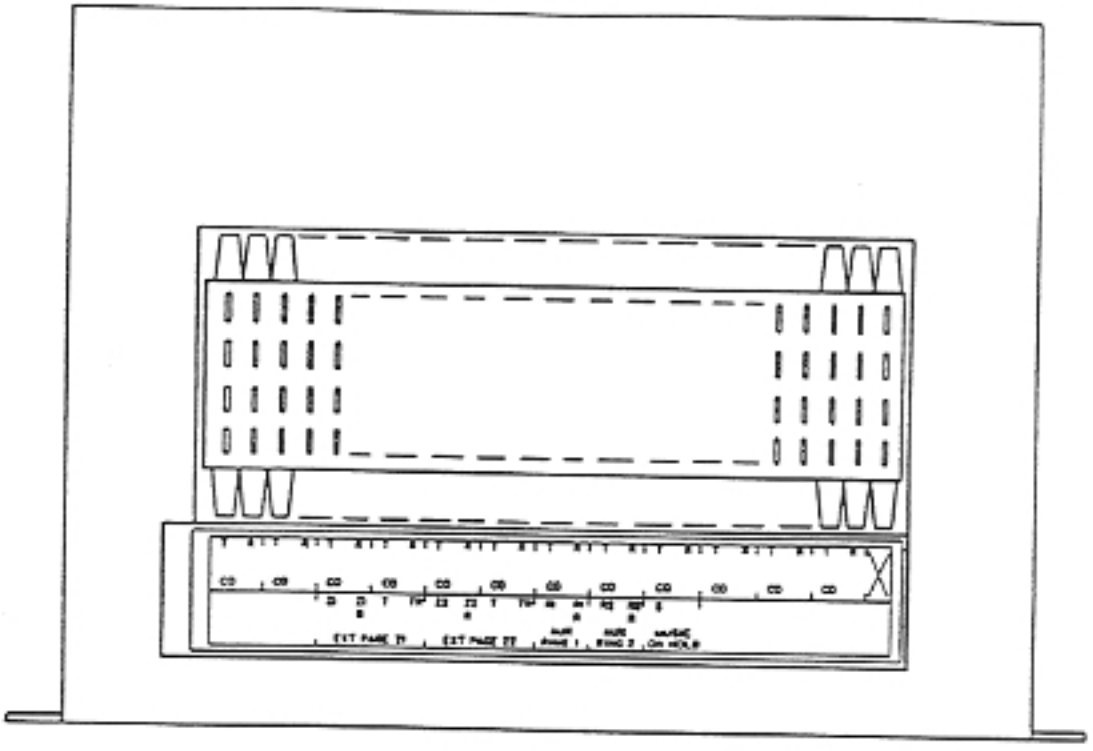


Fig. 8
66 CO Block Connections

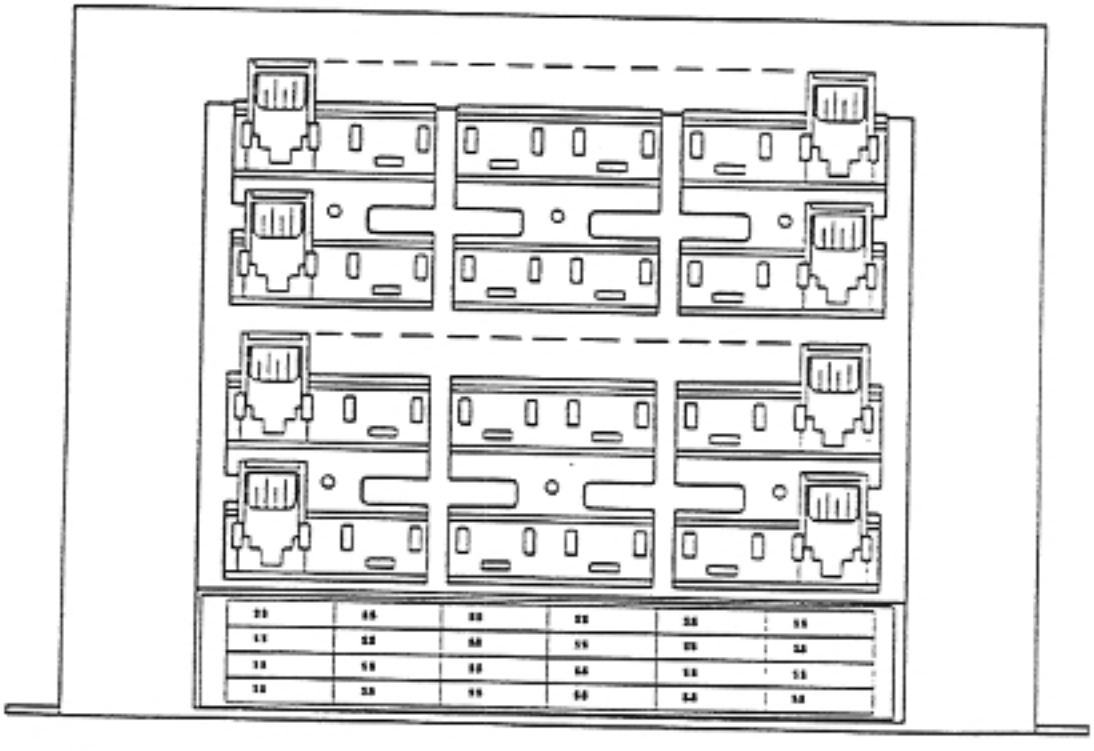


Fig. 9
TELADAPT SS Block Connections

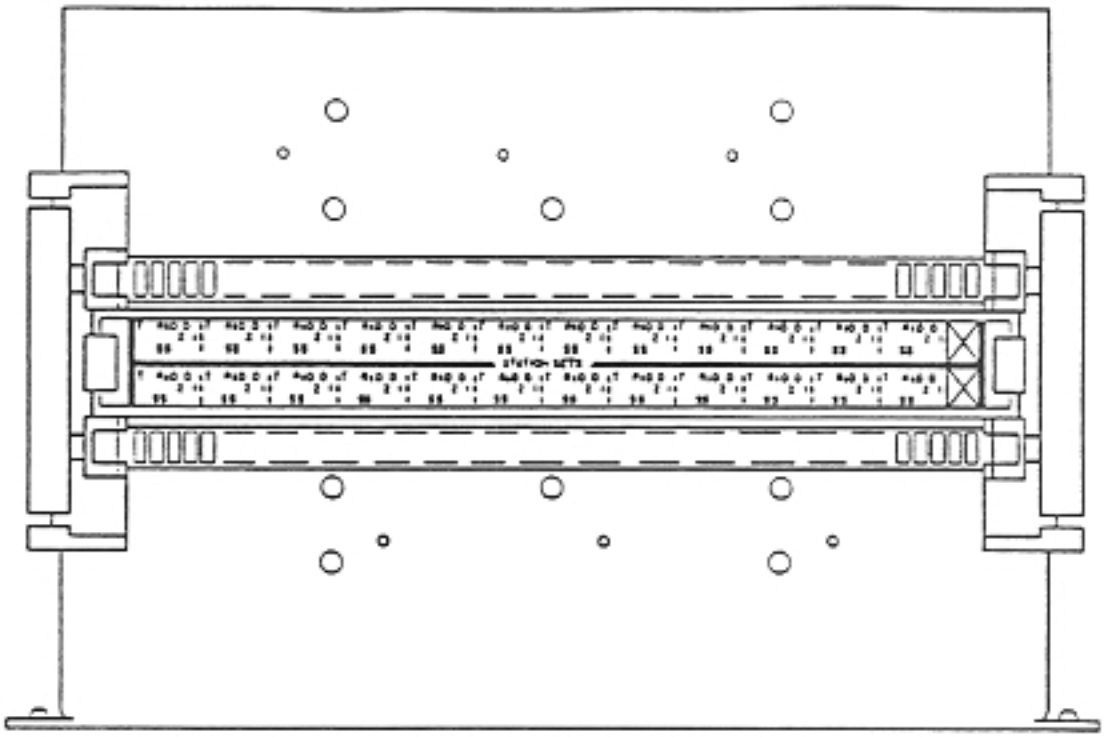


Fig. 10
BIX SS Block Connections

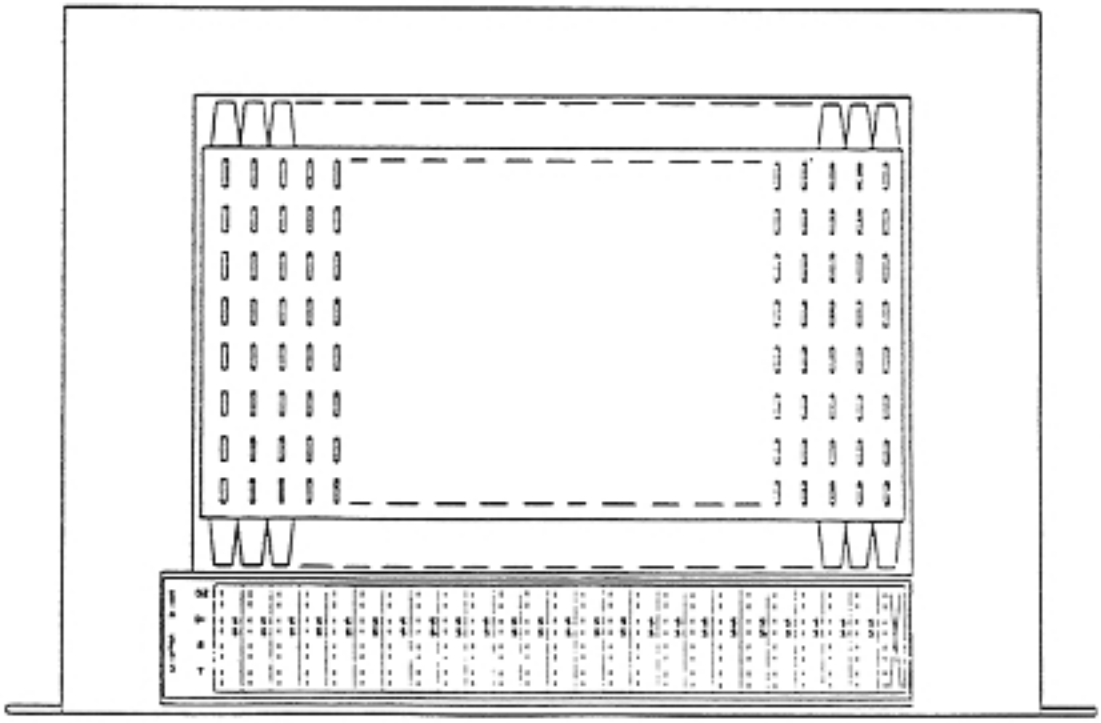


Fig. 11
66 SS Block Connections

System Option	Connection Details
Music on Hold	This feature is activated by connecting the cable from the customer provided music source to one of the following: a) The MUSIC-ON-HOLD jack located on the Tones and Page circuit card. This method uses a miniature phone plug (e.g. Switchcraft Tini-Plug 750 or equivalent). b) The C.O. connector terminals labelled MUSIC-ON-HOLD. This method also requires the insertion of a dummy miniature plug in the MUSIC-ON-HOLD jack located on the Tones and Page circuit card. c) The cross connect field associated with the Amphenol connectors (see page 10). This method also requires the insertion of a dummy miniature plug in the MUSIC-ON-HOLD jack located on the Tones and Page circuit card.
External Paging	This feature is activated by connecting the cable from the customer provided external paging amplifier to the following P1A terminals: 1) Page Signal 2) Either Zone 1 Control or Zone 2 Control
Night Bell	Connect customer provided Night Bell to the output terminals of the Auxiliary Ringing Generator module in appropriate location. Route the 22-26 AWG wire pair from the ARG to the P1A terminals labelled Night Bell Control.
Common Auxiliary Ringer	Mount and connect common ringer in the same manner as a Night Bell (previous example). However, connect the required Auxiliary Ringing Generator by routing the associated 22-26 AWG wire pair from the ARG to the P1A terminals labelled Aux. Ring. Control.
Auxiliary Ring Generator	a) Remove the cover and mount the unit as per local instructions. b) Connect one end of an 18 AWG wire pair to the OUTPUT terminals on the Auxiliary Ring Generator circuit board. c) Replace the cover over the baseplate so that the 18 AWG wire pair exits through the exit window. d) Connect a 22-26 AWG wire pair (or the leads of a D4QH Teladapt cord, if required) to the INPUT terminals. e) Route and connect the 18 AWG wire pair to the alerting device as per local instructions. f) Route the 22-26 AWG wire pair (or Teladapt cord) to the CE cabinet and make the appropriate connections as per Night Bell and Auxiliary Ringer connection details. g) Ensure that the ON/OFF switch is in the OFF position, then plug the AC power cord into the AC power receptacle. h) Set the ON/OFF switch to ON.

System Option	Connection Details

Install Printer

a) Route a 4 pair cable from the printer to the Primary CE cabinet. Leave enough slack in the cable at the printer end to allow access to the rear of the printer and at the CE cabinet end to pass into the rear of CE cabinet.

b) Terminate the printer end of the cable, as applicable.

c) Set the ac printer power OFF and connect the printer ac power cord to the commercial power supply.

d) Terminate a RS232C type connector at the CE cabinet end to the 4 pair cable. The pins used are:

Pin	Function
1	Ground
2	Receive Data (RD)
3	Transmit Data (TD)
4	Clear to send (CTS)
5	Request to send (RTS)
6	Data Terminal Ready (DTR)
7	Ground
20	Data Set Ready (DSR)

e) Pass the 4 pair cable through the oval access hole at the rear of the Primary cabinet.

f) Connect one end of the SMDR Port Extender cable (NT2B2311) to the RS-232C connector on the Memory card, and the other end to the printer RS-232C cable. Vantage requires a high on Clear To Send (pin 4) to produce an output on Transmit Data (pin 3).

g) Set the RS-232C parity and Baud Rate on the Memory card DIP switches.

h) Set the printer parameters and turn the printer ON.

7. Installing Circuit Cards

Step	Procedure

7-1 Ensure that the power supply cord is removed from the AC source before inserting or removing any common control circuit cards. Line cards may be inserted or removed with power on.

7-2 Unpack circuit cards. Prior to handling note the following:

a) The installer must touch the metal frame of the CE cabinet (use a grounding wrist strap) to discharge any build up of static electricity.

b) Do not handle or unpack the circuit cards near large electrical machines such as photocopiers.

c) Handle the circuit cards by the latches or the edges of the card. Do not touch the circuit card components or wiring.

d) Circuit cards should not be inserted or removed from the CE cabinet unnecessarily. In addition, take care not to drop or jar the card.

e) When not in use, store the circuit cards in their anti-static bags and shipping containers. Do not lay cards on anti-static bags.

f) Only the following cards can be inserted under power: 4x0, 0x4 Vantage, 1x2.

g) The following card can be inserted under power only if the associated sets are disconnected: 0x4 500/2500.

7-3 The Vantage 48 Configuration Guide must be consulted in order to properly configure the line cards.

Ring Generator Card

7-4 Insert the Ring Generator Card into the cavity at the lower front of the Power Supply module, ensuring that it fits properly within the metal guides.
NOTE: ONLY ONE RING GENERATOR CARD IS REQUIRED PER SYSTEM. IT MUST BE INSTALLED IN THE PRIMARY POWER SUPPLY MODULE.

7-5 If the Power Supply cord is connected to the AC source, ensure that the Ring Generator Card fuse is removed prior to the next step.

7-6 Plug the connector located at the front of the Ring Generator Card into the jack provided in the Power Supply module. If the fuse has been removed, re-insert it at this time.

7-7 Likewise, if you wish to remove the Ring Generator Card while the Power Supply cord is connected to the AC source first remove the cards fuse, remove the card, and then re-insert the fuse.

8. Setting circuit card dip switches

Switches are provided on the facing edge of the Memory Card, 1 x 2 Regular Line Card, and 1 x 2 Emergency Transfer Line Card. Please note that the switches used for feature programming are present only on the Memory Card. With the exception of switches 6 and 7 on the ET Line Card, which are used to activate the batteries, switches on the line cards are to be disregarded.

To program these cards simply follow the steps listed below. An explanation of each switch setting, as well as a guide which shows how to set each switch is listed in the following pages.

Setting the Switches

The installer should be able to set the dip switches on the circuit cards after they have been installed in the CE cabinet. The switches can be set using a pointed instrument such as a pen. Prior to setting the switches please note the following precautions:

1. The installer must touch the metal frame of the CE cabinet (or use a grounding wrist strap) to discharge any buildup of static electricity.
2. If the cards must be removed from the cabinet, handle them by the latches or the edges of the card. Do not touch the circuit card components or wiring.

Memory Card Options See Table 1

Switch Number	Function
1	Administration Programming—This option enables or disables the ability to program from the Administration set.
2	DSS Programming—This option enables or disables the ability of the individual station set user to set or change the DSS keys.
3-4	RS232 Port Mode—Determines the mode of RS232 port. See NOTE D for explanation.
5-6	RS232 Parity—Determines whether parity from the RS232 port is checked and whether it is even or odd.
7-9	RS232 Baud Rate—Determines one of six band rates of output from the RS232 port.
10	DTMF Feedback Tone—This option enables or disables the tone signal or dialing.
11	Dial Pulse Ratio—This option provides a choice of either the International or North American digit-pulse standard.

Table 1

Memory Card Switch Settings

Function *Factory Setting	Switch Settings (X - Closed or on O - Open or Off)										
	1	2	3	4	5	6	7	8	9	10	11
Administration Programming											
Programming not allowed	X										
*Programming allowed	O										
DSS Programming											
Programming not allowed		X									
*Programming allowed		O									
RS232 Settings											
RS232 Port Mode											
SMDR			X	X							
Configuration Dump			X	O							
Unused			O	X							
*Unused			O	O							
RS232 Parity											
Parity checked					X						
*Parity not checked					O						
Parity even						X					
Parity odd						O					
RS232 Baud Rate											
110 Baud							X	X	X		
*300 Baud							X	X	O		
1200 Baud							X	O	X		
2400 Baud							X	O	O		
4800 Baud							O	X	X		
9600 Baud							O	X	O		
Unused							O	O	X		
Unused							O	O	O		
DTMF Feedback Tone (Note)											
Disabled										X	
*Enabled										O	
Dial Pulse Ratio											
*60/40 (North America)											X
66/33 (International)											O

Note: This feature is currently not available.

Emergency Transfer Line Card (1 x 2) See Table 2

Switch Number	Function
1-5	Unused on Vantage 48. Please disregard these switches.
6-7	Activates the batteries in order to provide emergency transfer service.

Regular Line Card (1 x 2) See Table 2

Switch Number	Function
1-6	Unused on Vantage 48. Please disregard these switches.

Table 2

Emergency Transfer Line Card (1x2)

Function *Factory Setting	Switch Settings (X - Closed or on O - Open or Off)							
	1	2	3	4	5	6	7	
Disregard	O	O	O	O	O			
Batteries								
*Disabled						O	O	
Enabled						X	X	

Regular Line Card (1x2)

Function *Unused	Switch Settings						
	1	2	3	4	5	6	
Disregard	O	O	O	O	O	O	

9. Setting telephone set dip switches

Switches are provided beneath the designation card on the lower right hand corner of the station set (see fig. 12). These switches are used to access features which are specific to each station set.

Setting the Switches

Step	Procedure
9-1	Remove station set designation card if installed.
9-2	Set the feature switches according to Table 3.
	Note: A pointed instrument such as a pen may be used to set the switches.
9-3	Replace the designation card and faceplate.

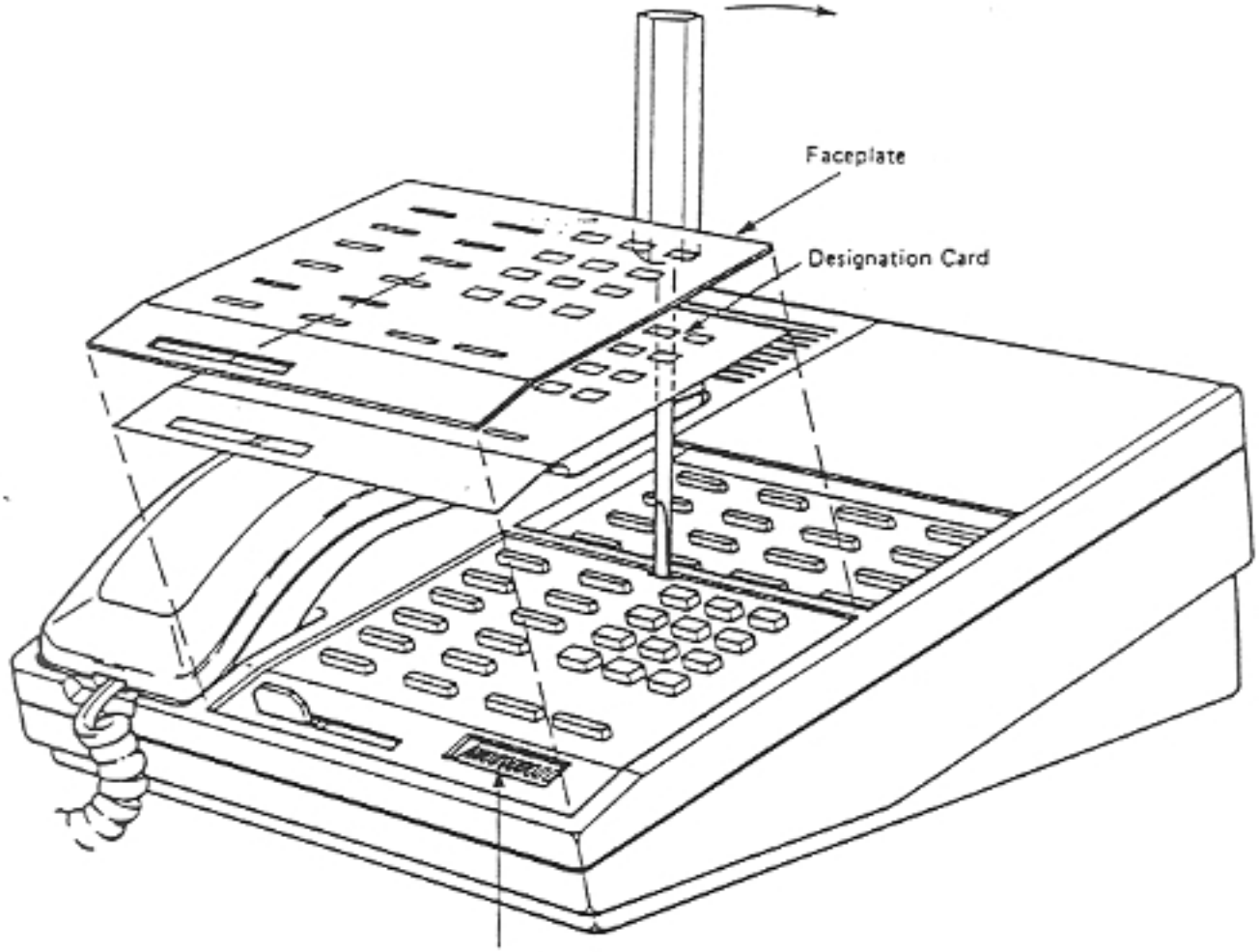
Switch Option

Switch Number	Function
1-4	Unused on Vantage 48. Disregard these switches.
5	Determines whether the prime line or the prime ICC is automatically selected when the user goes off-hook.
6	Determines whether or not incoming calls to the station set will also ring at the Prime Set after three rings.
7-8	Used to set the ringing cadence of the station set.
9	Allows the amplification of the handset receiver by 12 dB in order to utilize an optional NTOB21 Volume Control Handset.

Table 3

Station Set Switch Settings

Feature	Switch Settings (X - Closed or on O - Open or Off)									
	1	2	3	4	5	6	7	8	9	
Not Used	X	X	X	X						
Automatic Prime Line/ICC Button Preselection										
Prime ICC Selected					O					
Prime Line Selected					X					
Station Delayed Ring Transfer										
Disabled						O				
Enabled						X				
Distinctive Set Ringing										
375/500 Hz							X	X		
375/750 Hz							X	O		
500/750 Hz							O	X		
500/1500 Hz							O	O		
Receiver Amplification										
Disabled									O	
Enabled									X	



1-4 Not Used

5 Auto Prime Line/ICC Selection

6 Delayed Ring Transfer

7-8 Distinctive Ringing

9 Receiver Amplification

10 Not Used

Fig. 12
Exposing Feature Selection Switches

10. Install Telephone Sets

Step	Procedure
A.	**Set Internal Switches**
10-1	Remove the telephone set faceplate and set the internal option switches as described in step 9.
10-2	Type out the required information on the designation card then replace the card and the telephone set faceplate.
B.	**Install Add-On Modules**
	PEM or PEM/Convenience Dialer Modules
10-3	Open the privacy lid and remove the faceplate, designation cards and card tray from the feature well, then remove the connector cover from the rear of the telephone set (fig. 13).
10-4	Place the PEM (or PEM/Convenience Dialer) module into the feature well and connect the cable from the module to the connector pins (fig. 13).
10-5	Type the required information on the designation card(s) then place the card(s) and the faceplate (supplied with the module) over the module. If the Handsfree module is not to be installed, replace the connector access cover on the rear of the telephone set.
	Handsfree Module
10-6	If required, remove the connector access cover from the rear of the telephone set and connect the cable from the handsfree unit to the connector pins as shown in fig. 14.
	NOTE: The connector access cover is not used when the handsfree unit is installed.
10-7	Pass the telephone line cord through the slot in the bottom of the handsfree module then secure the handsfree unit to the bottom of the telephone set using the screws provided (fig. 15).
	Headset Module
10-8	Remove the connector access cover from the rear of the telephone set and connect the ribbon cable from the headset unit to the headset socket inside the set (fig. 16).
10-9	Push the headset unit into the cavity in the bottom of the set until it locks in place.
10-10	Push the headset plug into the headset jack located on the headset unit (fig. 16).

Step	Procedure
	Wall Mounting Bracket
10-11	Mount the wall mounting bracket then install the telephone set on the bracket as shown in fig. 17.
	Volume Control Handset
10-12	Remove the regular handset by releasing the TELADAPT connector at the left side of the VANTAGE set, then plug the cord from the volume control handset into the TELADAPT socket.
	NOTE: When the volume control handset is installed on a VANTAGE telephone set, ensure that Switch 9 (12dB Amplification), of the telephone set's internal switches, is closed.
C.	**Connect Telephone Set Line Cord**
10-13	Connect the telephone set line cord to the wall jack (prewired in fig. 5). If the cable between the CE cabinet and the telephone set is longer than 2600 ft. (800 m), and OPX module must be used between the wall jack and the telephone set.
D.	**Install 52 Key/Lamp Module**
10-14	Connect the teladapt cord that is attached to the bottom of the 52 Key Lamp module to the RJ14C (Teladapt) jack mounted on the wall. The 52 K/L module must be located in station set position 31 or 39. (Use data pair.)
10-15	Connect the cord from the ac adapter into the jack located on the rear of the 52 K/L module.

11. Turning the System On

NOTE: THE SYSTEM SHOULD NOT BE TURNED ON UNTIL AT LEAST ONE VANTAGE TELEPHONE SET HAS BEEN INSTALLED. FAILURE TO DO SO WILL RESULT IN THE SYSTEM ENTERING THE E.T. MODE.

Step	Procedure
11-1	Plug the ac power cord from the Power Supply cabinet into the ac receptacle.
	NOTE: the ac receptacle must be protected and grounded and fused at 15 amps maximum.

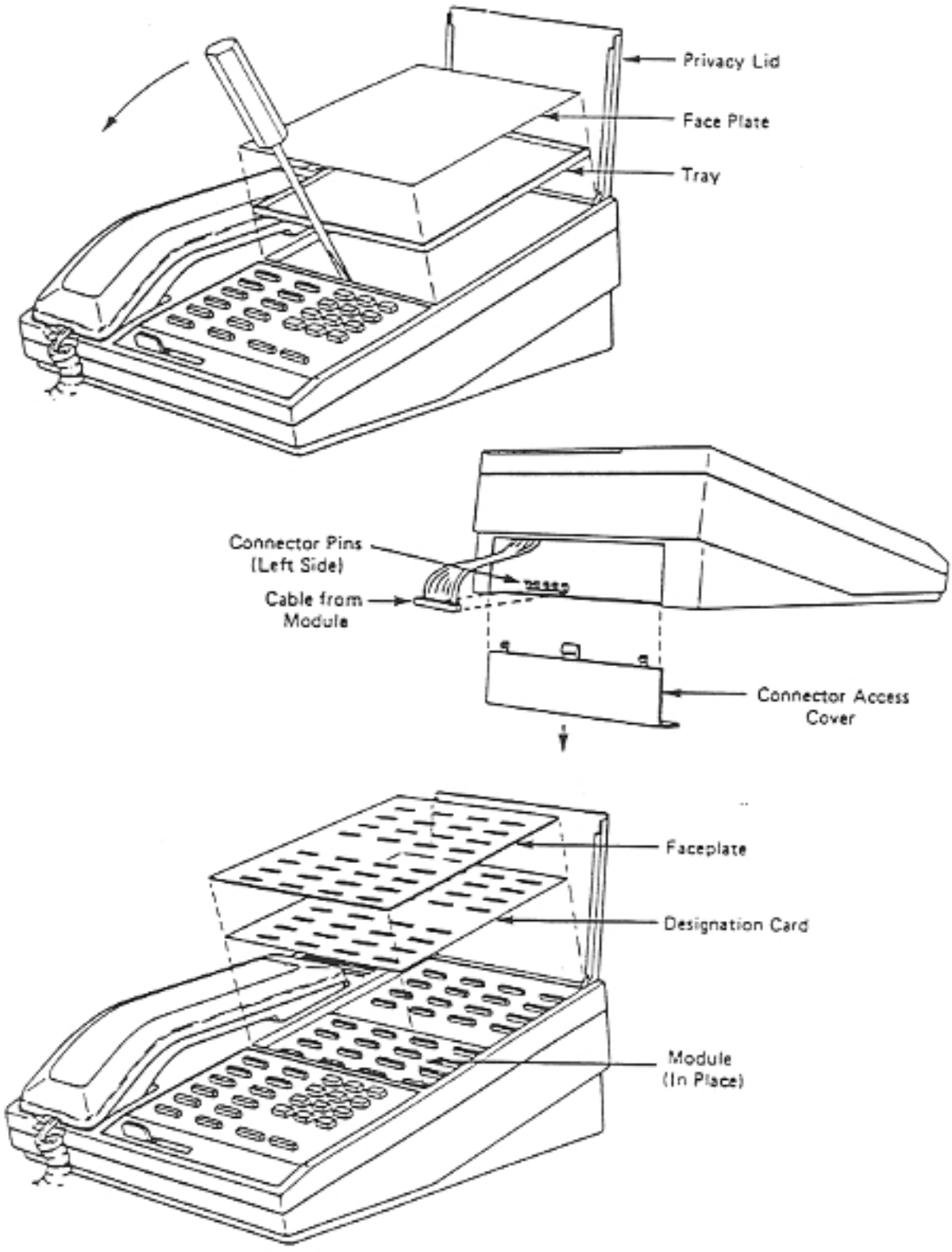


Fig. 13
Installing PEM/Convenience Dialer Modules

Installing Handsfree Unit

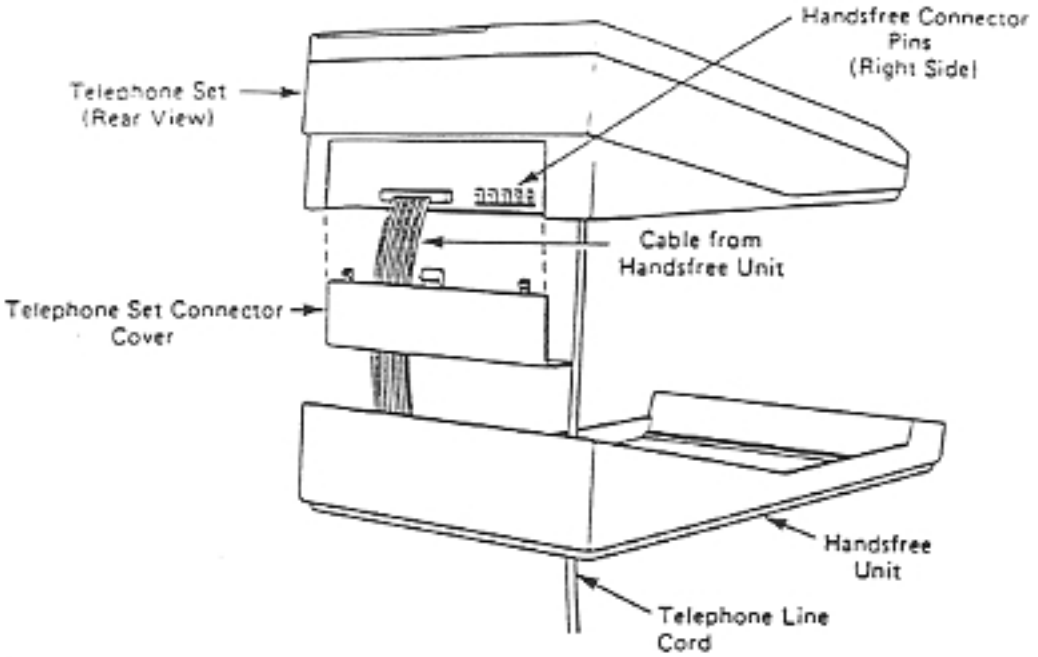


Fig. 14
Connecting Handsfree Unit Cable

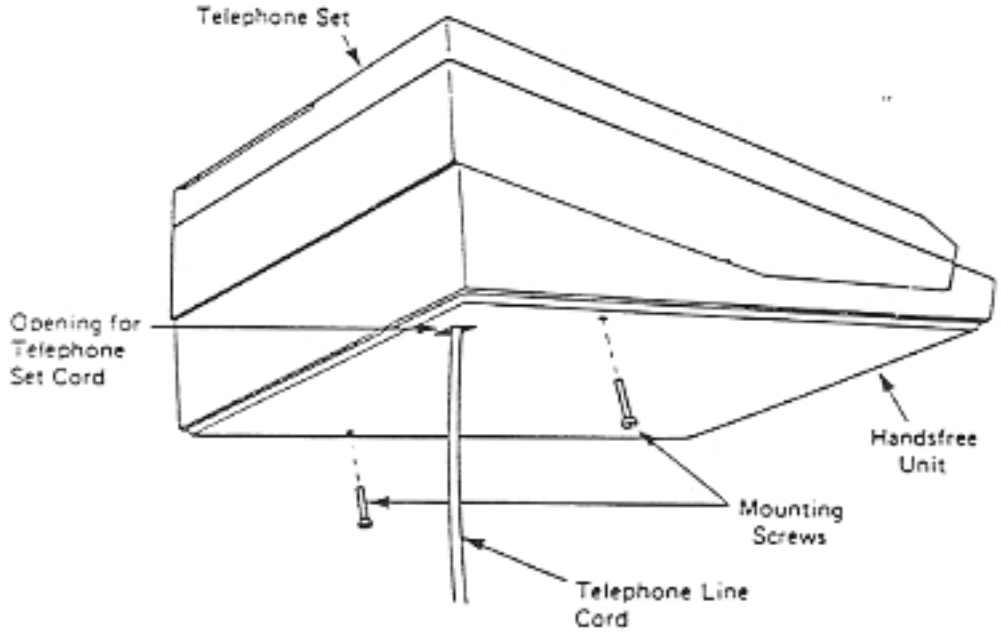


Fig. 15
Securing Handsfree Unit to Telephone Set

Install or Remove a Headset Module

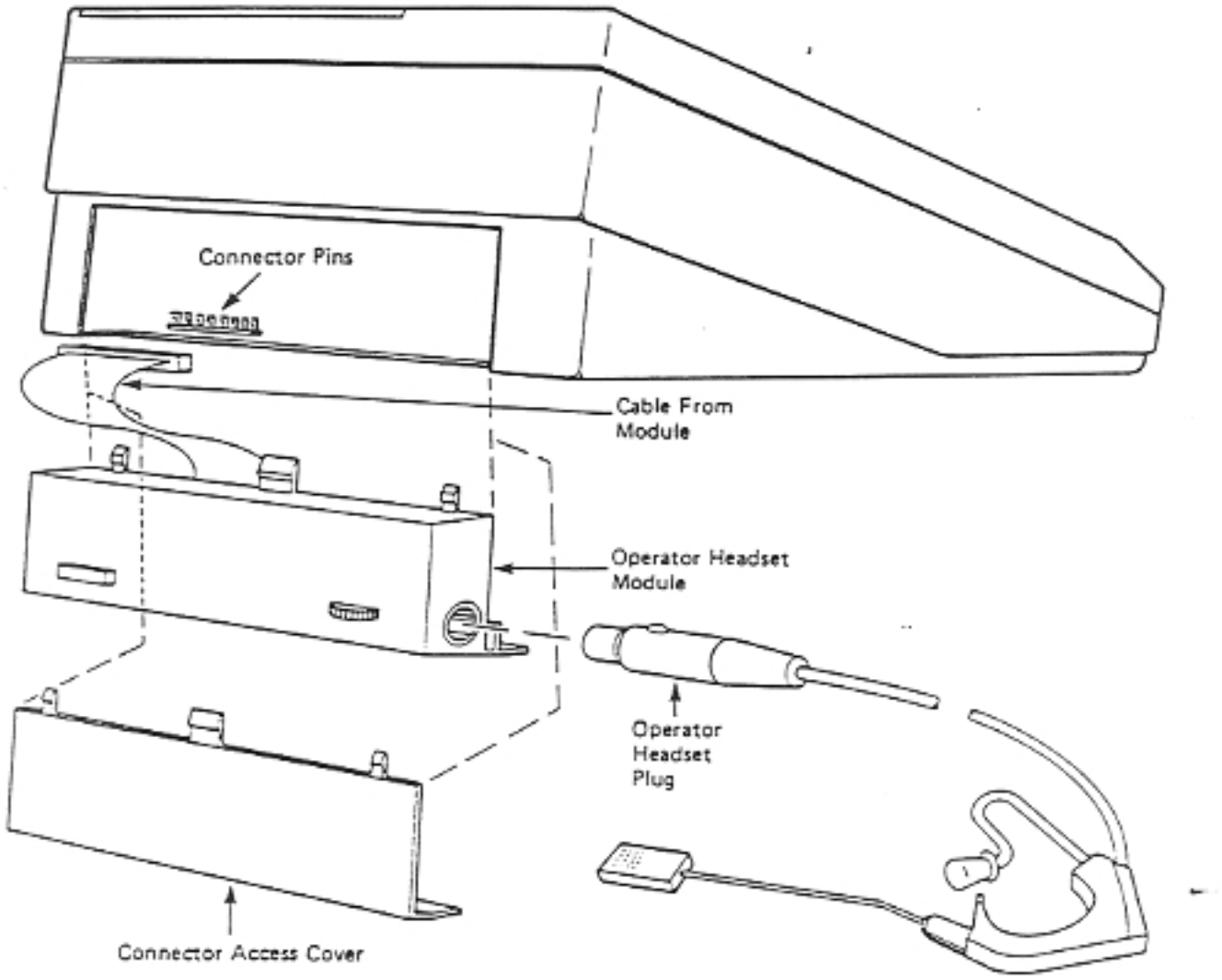


Fig. 16
Headset Unit/Telephone Set Interconnection

Install Wall Mounting Bracket

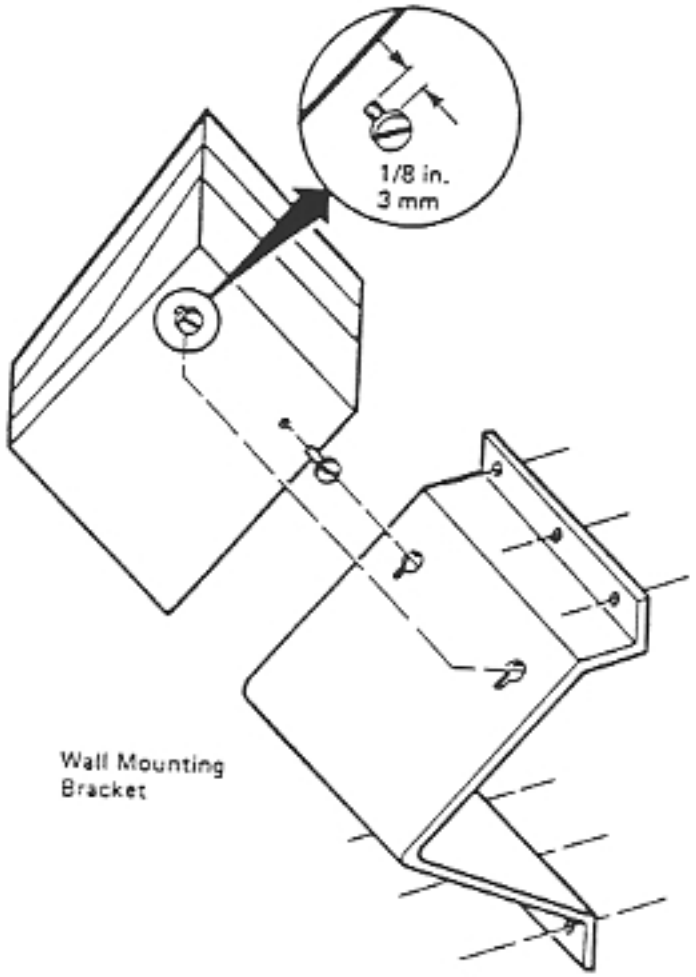


Fig. 17
Installing Wall Mounting Bracket

12. Verifying System Operation

NOTE 1: For detailed procedures on telephone set operation, refer to the user guide provided with the system.

NOTE 2: For detailed procedures on system verification, refer to Technical Documentation 519-1021-210.

Step	Procedure
A.	**Check Telephone Set Operation**
12-1	At each Vantage telephone set:

a) Check for dial tone on each eligible line and for overflow tone on each restricted line.

b) Make a call on one of the eligible lines and check voice quality, operation of the speaker features and ensure that all LED indicators light when appropriate.

c) If dialing restrictions have been selected, dial the applicable codes and check that the overflow tone is heard in the speaker.

d) Depending on how telephone DIP switch 5 is set, ensure that when the set goes off-hook, either the prime CO line or the prime intercom circuit is selected.

e) Check that all of the programmable buttons have been programmed with appropriate feature and that this feature can be accessed by pressing the designated button.

f) If a PEM module has been provided, depress the VOICE PROHIBIT key and check that the associated LED indicator lights. Depressing the key again must turn the indicator off.

g) If a convenience dialer has been provided, check operation by storing a telephone number in one of the memory locations then make an automatic call using the stored number.

h) If a handsfree unit has been installed, check operation of the handsfree feature and the associated muting feature. Ensure that all associated LED indicators light at the appropriate times.

i) If a 52 Key Lamp module has been installed the following tests apply.

Step	Procedure
12-2	At each 500/2500 telephone set.
	a) Check that upon going off-hook, dial tone is heard. Make an intercom call by dialing an extension number. Check that ringback tone is heard and a two-way conversation can be established.
	b) Attempt to dial numbers which correspond to class of service dialing restrictions. Dialing restricted numbers should result in overflow tone being heard.
	c) Dial the digit "9" to check that line pool access is correctly programmed. If enabled, dialing "9" should result in dialtone being heard. If disabled, dialing "9" should result in overflow tone being heard.
B.	**Check System Features**
12-3	Check Maintenance Features
	NOTE: When performing this procedure service will be cut off to all but ET telephones connected to ET line cards.
	a) Depress and hold STEP key on the CPU cards. The two digit display changes every two seconds until all error codes (up to 16) have been displayed.
	b) Depress and hold the CLEAR key on the CPU card. Every two seconds a code will be cleared from the display (within 36 seconds the buffer is cleared).
	c) Remove a line card from its slot and check that the associated fault code is displayed on the Memory card fault display. (See page 43 of this guide for fault code listings.) Replace the line card. The fault code will remain on the display until manually cleared.
12-4	Check Common Auxiliary Ringer Operation
	Make a call to one of the lines which has been programmed to operate the auxiliary ringer and check for proper operation.
12-5	Check External Paging System Operation
	On a telephone set equipped with an intercom module, depress the PAGE key and speak into the handset. Check that your voice was heard on the external paging system.
12-6	Check Music On Hold Operation
	Make a call to one of the VANTAGE 12 telephone sets and place the call on hold at the VANTAGE 12 set end. Check that the music source connected to the VANTAGE 12 system can be heard on the telephone line.
12-7	Check Night Bell Operation
	Press the Night key on both CAPS and make a call to a CO line present at one of the CAPs. Check to ensure that the night bell rings once the call has been placed and stops ringing once the call has been answered.

13. Fault Clearing

The general sequence followed in fault clearing is:

1) recognition of the trouble indication
2) trouble analysis
3) repair
4) test

Indications

Troubles in the Vantage 48 system are usually indicated by a feature or service either not operating or operating in a faulty manner. As described in the previous section, verifying the system will assist in detecting such problems. In addition, three other indicators are present which identify faults in the system. They are:

—Run and ET LEDs on CPU card (in Primary CE cabinet)

RUN	ET	MEANING
on	off	normal operation
on	on	manual ET mode (ET on means operation in emergency transfer mode)
off	on	CPU or system failure (RUN LED off means power failure or system recovery in progress)
off	off	should not occur.

—Group Switch indicators (in CE cabinets). All indicators are lit at start-up, and then extinguish as cards are verified. Lit indicator indicates a fault within the card or an associated circuit.

—Fault Buffer Display (on Memory card in Primary CE cabinet)

The fault display shows 2-digit hex codes which correspond to faults present in the system. The fault buffer will store up to 16 separate fault codes in the sequence in which the faults occurred. Maintenance personnel can review the status of the system by pressing the STEP button. The first depression of the STEP button will bring out a blank display. Each subsequent depression will display a fault code, beginning with the first fault identified and progressing to the most recent. The following table describes each fault code and classifies its severity.

Hex Display Codes

Code	Class	Description
Physical Configuration		
00		CPU unable to respond.
01-03		not used
04	MJ Alarm	Tones/Page card missing, faulty or not responding.
05	MJ Alarm	Group Switch card slot 5 missing, faulty or not responding. (GS 1)
06	MN	Card in slot 6 missing, fault, not responding or wrong type. (LC 1)
07	MN	same as 06 but for slot 07. (LC 2)
08	MN	same as 06 but for slot 08. (LC 3)
09	MJ Alarm	same as 05 but for slot 09. (GS 2)
10	MN	same as 06 but for slot 10. (LC 4)
11	MN	same as 06 but for slot 11. (LC 5)
12	MN	same as 06 but for slot 12. (LC 6)
13	MJ Alarm	same as 05 but for slot 13. (GS 3)
14	MN	same as 06 but for slot 14. (LC 7)
15	MN	same as 06 but for slot 15. (LC 8)
16	MN	same as 06 but for slot 16. (LC 9)
17	MJ Alarm	same as 05 but for slot 17. (GS 4)
18	MN	same as 06 but for slot 18. (LC 10)
19	MN	same as 06 but for slot 19. (LC 11)
20	MN	same as 06 but for slot 20. (LC 12)
21	MJ Alarm	same as 05 but for slot 21. (GS 5)
22	MN	same as 06 but for slot 22. (LC 13)
23	MN	same as 06 but for slot 23. (LC 14)
24	MN	same as 06 but for slot 24. (LC 15)
25	MJ Alarm	same as 05 but for slot 25. (GS 6)
26	MN	same as 06 but for slot 26. (LC 16)
27	MN	same as 06 but for slot 27. (LC 17)
28	MN	same as 06 but for slot 28. (LC 18)
29		not used
2A	ET	no GROUP SWITCH cards were found
2B	ET	no sets currently responding
2C	ET	no UARTS responding.
Station Set or Set Interface		
30-77		faults reported by these codes are any one, or a combination of the following: — station has stopped responding to regular status poll. — station set is sending a continuous message stream. — station set is either receiving or sending erroneous messages but not necessarily in a continuous manner. — DTMF Receiver associated with a 2500 set is faulty.

Hex Display Codes

Code	Class	Description
Line or Line Interface Faults		
80		DTMF failure associated with line 1
81-89		as for 80 except applicable to lines 2 through 10.
8A-8F		as for 80 except applicable to lines 11 through 16.
General Hardware Faults		
		hardware faults are subdivided into the following subgroups:
System (probably CPU, MEM, or backplane)		
90	ET	too many initializations to allow call processing to proceed.
91	ET	excessive RAM parity errors and call processing is unreliable.
92	ET	excessive "Watchdog Timeouts".
93	ET	RAM parity errors detected.
94	MN	"Watchdog Timeout" detected.
95	MN	ROM space "Write-attempt" detected.
96	MN	invalid Hardware Bus state detected.
CPU		
98	MN	ROM Checksum is not correct.
99		ROM "Write-attempt" detection circuitry failed test.
9A	MN	RAM Address and Data Retention test failure.
9B	MN	RAM "Parity-violation Detection" circuitry failed test.
9C		RAM-EEPROM Comparison test failed.
9D	MN	SMALL BLOCK Memory Pool fault limit exceeded.
9E	MN	LARGE BLOCK Memory Pool fault limit exceeded.
9F	MN	EEPROM Checksum is not correct.
A0	MJ Alarm	"Watchdog Test" failure.
A1	MJ	Programmable Timers test failure.
A2	MJ	Programmable interrupt controller failed.
A3	MJ	CPU interrupt line found "stuck active".
A4	MJ	EEPROM interrupt line found "stuck active".
A5	MJ	offboard interrupt line found "stuck active".
A6	MJ Alarm	EEPROM write failure.
A7	ET	All Group Switches have failed.
A8	ET	Cannot disable Group Switch fault.

Hex Display Codes

Code	Class	Description
Group Switch		
AA	MN	UART failure GS 1
AB-AF		as for AA except applicable to GS 2 through 6
B6	MN	Digital Loopback failure GS 1
B7-B9		as for B6 except applicable to GS 2 through 4
BA-BB		as for B6 except applicable to GS 5 through 6
BC	MN	Crosspoint failure GS 1
BD-BF		as for BC except applicable to GS 2 through 4
C0-C1		as for BC except applicable to GS 5 through 6
Junctor		
CB	MN	Intercom Junctor 1 has failed
CC-CF		as for CB except applicable to Intercom Junctors 2 through 5
DO	MN	CAP Intercom Junctor has failed
D1	MN	CO Line 1 Junctor has failed
D2-D9		as for D1 except applicable to CO Line Junctors 2 through 9
DA-DF		as for D1 except applicable to CO Line Junctors 10 through 15
EO		CO Line Junctor 16 has failed
General Software		
E1-F7		Software detected software problem. Clear from display.
EB		Memory fault (Suspect Group Switch Failure)
System Start Up Status Indicators		
F8		"cold start" is in progress
F9		RAM Test has been completed
FA		ROM Test has been completed
FB		Analog Network has been cleared
FC		System start up has been completed
FD		EEPROM Initialization
FE		not used

Notes

(NEWER HSU)

Vantage 48C Hardware Installation Guide

Issue 1

PO 677905

TABLE OF CONTENTS

1.0 INTRODUCTION

This mini-installation guide may be used to install, test, and trouble shoot a Vantage 48 Electronic Key Telephone System. General considerations for installation planning are outlined in Vantage 48 Technical Documentation 519-1021-200 and detailed installation information is given in 519-1021-210.

System Overview

Vantage 48C is a small business communication system designed for use in applications requiring up to 16 telephone lines and 48 telephone sets. The Common Equipment cabinet houses common control cards and line/station cards. The configuration depends on the type of telephone sets used. The cabinet contains an integral power supply.

The system can accommodate three different types of proprietary electronic telephones: The Vantage Esprit Plus, the Vantage Esprit, and the Vantage Modular set with its optional drop-in modules. All three types have an optional handsfree.

Up to two of the Vantage Modular telephone sets may be used as Central Answering Positions, and these may operate with optional 52 Key Lamp modules. Also, a maximum of six of the Vantage sets may be designated as Prime sets. All telephone sets accommodated by the system may be single line sets, provided only remote administration is used. If a Vantage Modular set or Vantage Esprit Plus set is used as the administration set, then only 20 single line sets can be used.

System cabling consists of two conductor cables for each Central Office (C.O.)/PBX line and a four conductor cable for each proprietary Vantage set. Single line sets use one pair cable.

2.0 GENERAL CONSIDERATIONS

The common equipment cabinet is designed to be wall-mounted. The cabinet contains one 25-pair multi-pin connector to facilitate connection to the CO/PBX lines, and four more to facilitate connection to the station sets. In addition, a screw terminal block allows connection of auxiliary services required by the particular installation (e.g. Music-On-Hold source, etc.)

AC Power

The CE cabinet requires a power supply of 115V ac ± 10% (60 Hz ± 5%). The ac outlet to which the power supply is to be connected must be a protected socket which is grounded and fused at 15 Amps maximum. The power supply power cord is terminated in a three prong plug and is approximately 6 ft. (2 m) long. The CE cabinet must be located close enough to the ac socket to allow the power cord to plug directly into the socket without the need for an extension cord.

Grounding

The CE cabinet must be connected to an approved building grounded with a 12-14 stranded AWG cable. A grounding lug is provided on the cabinet to facilitate the ground connection.

Environment

The CE cabinet and telephone sets must be installed in a clean atmosphere and dry location. In addition, the equipment should not be in close proximity (4 m or 13 ft) to large electrical machines such as photocopiers or heat sources.

Cable Lengths

The maximum cable lengths in the VANTAGE 48 system are:

a) CE cabinet to telephone set (22 AWG): 2600 ft (800m)

b) If CE cabinet to telephone set cable length exceeds 2600 ft. (800m), an OPX module is required at the telephone set location. (Does not apply to 500/2500 sets.)

Tools

The following tools are required when installing a VANTAGE 48 system:

- Slot screwdriver (2 sizes)
- Wirecutters
- 714 Connecting tool (for 66-block cross connections)
- QT BIX 16A (for BIX cross connections)

EXPANSION OF A VANTAGE 24 TO A VANTAGE 48C

A Vantage 24 Cabinet can easily be expanded to a Vantage 48C, provided the following differences are taken into consideration at the time of changing the cabinets.

1. **CO Line Interfaces**

   On a Vantage 24 Cabinet CO's 10-21 appear on the P1A Connector. (The other 4 COs would be on the P1B Connector in the old second cabinet.)

   In the V48C all the CO's appear at the P1 Connector CO's 10-21 are pin compatible with the old P1A Connector, and CO's 22-25 follow in the same sequence.

2. **Auxiliary Circuits**

   The auxiliary circuits such as Music-on-old are now found on a screw-connector block on the backplane, rather than in the P1 amphenol connector. The move was brought about as a result in a change of requirements by FCC and DOC for certification.

3. **Ring Generator**

   If a ring generator was installed in the Vantage 24 power supply for single line set use then it can be transferred to the new Vantage 48C. However, in these circumstances, *a safety cage must be ordered separately and installed around the ring generator in the Vantage 48C.*

4. **Station Set Circuits**

   All station set connections are pin to pin compatible with the Vantage 24/48 amphenol connectors.

5. **Fault Code Display**

   There is a perceived difference in the fault code display between a V24/48 and a V48C. This is brought about by using the same software in the different cabinets.

   When interpreting the fault code display it should be noted that the software still "sees" the same number of card slots as in a V24/48 configuration, whereas there are in fact fewer card slots in a V48C. A full explanation of the affect of this is described in the Hardware Installation Guide in the Vantage 48C Installation package.

3.0 VANTAGE SYSTEM INSTALLATION

3.1 Unpack and Inspect Equipment

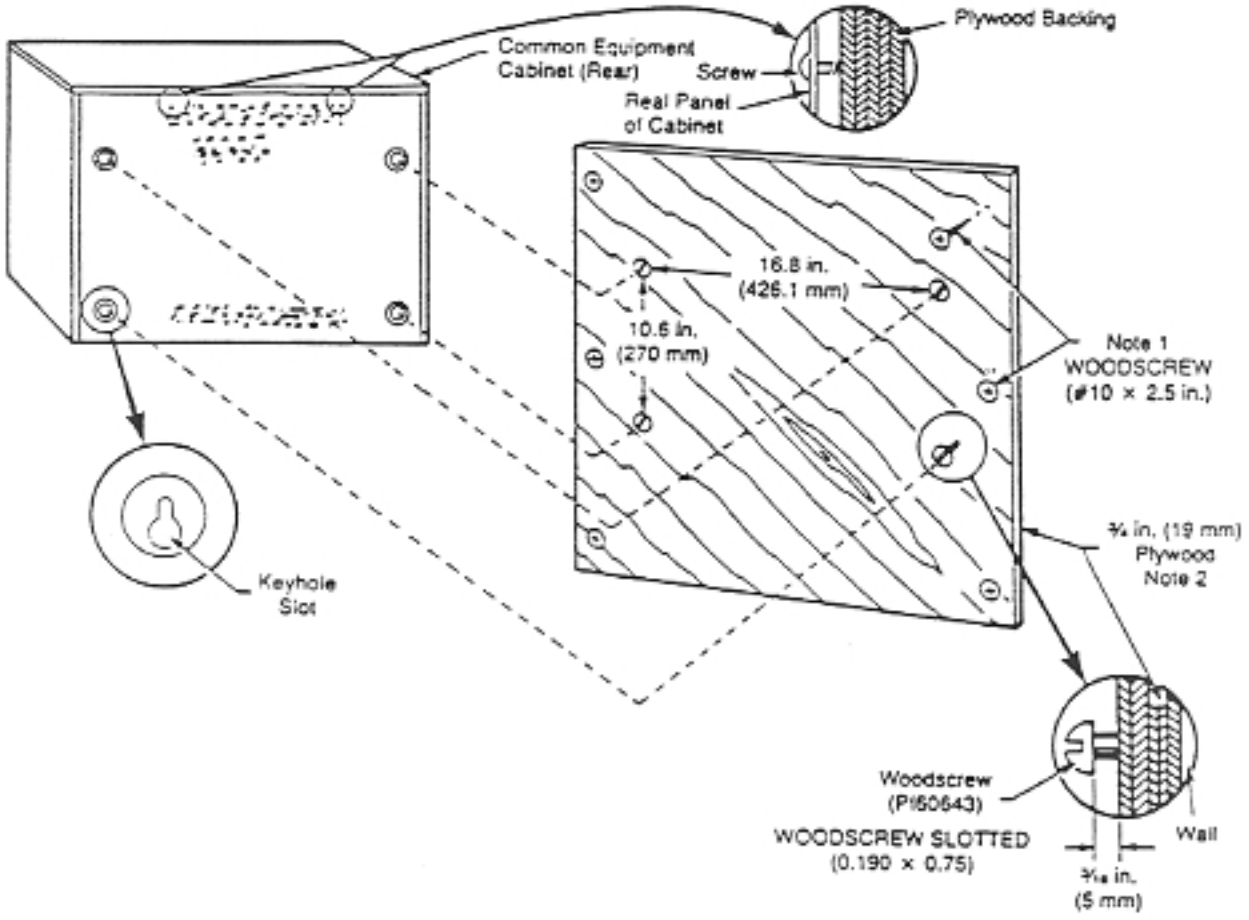
Note: Follow this procedure before beginning the installation to ensure that all items have been received in good order. Report all problems to the supplier.

STEP PROCEDURE

1 Check all items received against the shipping order form and the packing slip. Report any errors immediately to the supplier.

2 Open the shipping carton and remove the cabinet. Do not discard the carton until the equipment has been fully installed and tested.

3 Inspect the cabinet for damaged connectors, broken or bent connector pins or any scratches or dents.



Note 1: The fasteners used to attach the plywood backing to the wall are to be supplied by the user, and *must be suitable* for the construction of the wall.

Note 2: The plywood backing used to mount the cabinet to the wall is supplied by the user.

Fig. 3.1.

3.2 MOUNT CABINET ON WALL

STEP PROCEDURE

3.2.1 Backing plywood onto wall with wood studs (@ 16 In. center)

Attach a piece of 18 mm (¾ in.) plywood measuring a minimum of 34" × 25" and capable of supporting 40 kg. (90 lb.), to the wall with 6 woodscrews of size #10 × 2.5 in. (The 34" width allows access to 3 studs at a standard 16" spacing wall construction). All the woodscrews should penetrate the studs and be tightened until the screwheads are flush with the plywood. There should be a minimum of 6" clearance between the top and sides of the cabinet and the nearest wall/ceiling to allow sufficient ventilation.

3.2.2 Common Equipment Cabinet

- Installation to be performed by a skilled technician.
- Common Equipment shall be UNPLUGGED from power source during installation
- Cabinet will usually have 3 common cards inside (CPU, MEM, T/P) these need not be removed for installation.

Using the supplied template, mark the position of the four mounting screws, ensuring the cabinet will hang in a level manner when installed.

Screw in 4 × 1" No. 10 woodscrews until the heads are about (⅛") from the wall. Hang the cabinet on these screws.

4 screws (P0160643) provided.

3.2.3 Connect a 14 AWG copper wire between the safety ground screw located at top right of the cabinet, just in front of the backplane. Route the wire through the oval access hole on the right hand side of the cabinet and connect it to an approved electrical ground (i.e. a metallic cold water pipe with no plastic segments) see figure 3.1.

3.2.4 Route the amphenol cables through the oval access hole into the cabinet.

Note: If a large RS232C cable and connector will be used, route this through the hole *before* the amphenol cables.

3.2.5. Slide the cover on the outside of the cable access so that it fits snugly against the cables and secure it by tightening the screws in the slide slots. (see figure 3.1).

3.3 CROSS CONNECT INFORMATION

3.3.1 C.O. PBX Line Connections to C.E. Cabinet P1 Connector

4X0 LINE CARD	COLOUR	CO/PBX LINE	1X2 LINE CARD
LC1	W/BL	T10	LC1
	BL/W	R10	
	W/O	T11	LC2
	O/W	R11	
	W/G	T12	
	G/W	R12	
	W/BR	T13	(LC9)[1]
	BR/W	R13	
LC3	W/S	T14	LC3
	S/W	R14	
	R/BL	T15	LC4
	BL/R	R15	
	R/O	T16	
	O/R	R16	
	R/G	T17	
	G/R	R17	
LC5	R/BR	T18	LC5
	BR/R	R18	
	R/S	T19	LC6
	S/R	R19	
	BK/BL	T20	
	BL/BK	R20	
	BK/O	T21	(LC10)[2]
	O/BK	R21	
LC7	BK/G	T22	LC7
	G/BK	R22	
	BK/BR	T23	LC8
	BR/BK	R23	
	BK/S	T24	
	S/BK	R24	
	Y/BL	T25	
	BL/Y	R25	
	Y/O	SPARE	
	O/Y	SPARE	
	Y/G	SPARE	
	G/Y	SPARE	
	Y/BR	SPARE	
	BR/Y	SPARE	
	Y/S	SPARE	
	S/Y	SPARE	
	Y/BL	SPARE	
	BL/Y	SPARE	
	V/O	SPARE	
	O/V	SPARE	
	V/G	SPARE	
	G/V	SPARE	
	V/BR	SPARE	
	BR/V	SPARE	

Note: 1. ONLY IF LC1 IS NOT A 4X0.
2. ONLY IF LC5 IS NOT A 4X0.

3.3.2 Telephone Line Connections to C.E. Cabinet P2 Connector

0X8 STATION SET	0X4 STATION SET	COLOUR	STATION NO.	1X2 LINE CARD
LC2	LC2	W/BL	TV 30	LC1
		BL/W	RV 30	
		W/O	TD 30	
		O/W	RD 30	
		W/G	TV 31	
		G/W	RV 31	
		W/BR	TD 31	
		BR/W	RD 31	
		W/S	TV 32	LC2
		S/W	RV 32	
		R/BL	TD 32	
		BL/R	RD 32	
		R/O	TV 33	
		O/R	RV 33	
		R/G	TD 33	
		G/R	RD 33	
		R/BR	TV 34	
		BR/R	RV 34	
		R/S	TD 34	
		S/R	RD 34	
		BK/BL	TV 35	
		BL/BK	RV 35	
		BK/O	TD 35	
		O/BK	RD 35	
		BK/G	TV 36	
		G/BK	RV 36	
		BK/BR	TD 36	
		BR/BK	RD 36	
		BK/S	TC 37	
		S/BK	RV 37	
		Y/BL	TD 37	
		BL/Y	RD 37	
LC4	LC4	Y/O	TV 38	LC3
		O/Y	RV 38	
		Y/G	TD 38	
		G/Y	RD 38	
		Y/BR	TV 39	
		BR/Y	RV 39	
		Y/S	TD 39	
		S/Y	RD 39	
		V/BL	TV 40	LC4
		BL/V	RV 40	
		V/O	TD 40	
		O/V	RD 40	
		V/G	TV 41	
		G/V	RV 41	
		V/BR	TD 41	
		BR/V	RD 41	
		V/S	SPARE	
		S/V	SPARE	

3.3.2 Telephone Line Connections to C.E. Cabinet P3 Connector

0X8 STATION SET	0X4 STATION SET	COLOUR	STATION NO.	1X2 LINE CARD
LC4		W/BL	TV 42	
		BL/W	RV 42	
		W/O	TD 42	
		O/W	RD 42	
		W/G	TV 43	
		G/W	RV 43	
		W/BR	TD 43	
		BR/W	RD 43	
		W/S	TV 44	
		S/W	RV 44	
		R/BL	TD 44	
		BL/R	RD 44	
		R/O	TV 45	
		O/R	RV 45	
		R/G	TD 45	
		G/R	RD 45	
LC6	LC6	R/BR	TV 46	LC 5
		BR/R	RV 46	
		R/S	TD 46	
		S/R	RD 46	
		BK/BL	TV 47	
		BL/BK	RV 47	
		BK/O	TD 47	
		O/BK	RD 47	
		BK/G	TV 48	LC6
		G/BK	RV 48	
		BK/BR	TD 48	
		BR/BK	RD 48	
		BK/S	TV 49	
		S/BK	RV 49	
		Y/BL	TD 49	
		BL/Y	RD 49	
LC6		Y/O	TV 50	
		O/Y	RV 50	
		Y/G	TD 50	
		G/Y	RD 50	
		Y/BR	TV 51	
		BR/Y	RV 51	
		Y/S	TD 51	
		S/Y	RD 51	
		V/BL	TV 52	
		BL/V	RV 52	
		V/O	TD 52	
		O/V	RD 52	
		V/G	TV 53	
		G/V	RV 53	
		V/BR	TD 53	
		BR/V	RD 53	
		V/S	SPARE	
		S/V	SPARE	

3.3.2 Telephone Line Connections to C.E. Cabinet P4 Connector

0X8 STATION SET	0X4 STATION SET	COLOUR	STATION NO.	1X2 LINE CARD
LC8	LC8	W/BL	TV 54	LC7
		BL/W	RV 54	
		W/O	TD 54	
		O/W	RD 54	
		W/G	TV 55	
		G/W	RV 55	
		W/B	TD 55	
		B/W	RD 55	
		W/S	TV 56	LC8
		S/W	RV 56	
		R/BL	TD 56	
		BL/R	RD 56	
		R/O	TV 57	
		O/R	RV 57	
		R/G	TD 57	
		G/R	RD 57	
		R/BR	TV 58	
		BR/R	RV 58	
		R/S	TD 58	
		S/R	RD 58	
		BK/BL	TV 59	
		BL/BK	RV 59	
		BK/O	TD 59	
		O/BK	RD 59	
		BK/G	TV 60	
		G/BK	RV 60	
		BK/BR	TD 60	
		BR/BK	RD 60	
		BK/S	TV 61	
		S/BK	RV 61	
		Y/BL	TD 61	
		BL/Y	RD 61	
LC9	LC9	Y/O	TV 62	LC9
		O/Y	RV 62	
		Y/G	TD 62	
		G/Y	RD 62	
		Y/BR	TV 63	
		BR/Y	RV 63	
		Y/S	TD 63	
		S/Y	RD 63	
		V/BL	TV 64	
		BL/V	RV 64	
		V/O	TD 64	
		O/V	RD 64	
		V/G	TV 65	
		G/V	RV 65	
		V/BR	TD 65	
		BR/V	RD 65	
		V/S	SPARE	
		S/V	SPARE	

3.3.2 Telephone Line Connections to C.E. Cabinet P5 Connector

0X8 STATION SET	0X4 STATION SET	COLOUR	STATION NO.	1X2 LINE CARD
LC9		W/BL	TV 66	
		BL/W	RV 66	
		W/O	TD 66	
		O/W	RD 66	
		W/G	TV 67	
		G/W	RV 67	
		W/BR	TD 67	
		BR/W	RD 67	
		W/S	TV 68	
		S/W	RV 68	
		R/BL	TD 68	
		BL/R	RD 68	
		R/O	TV 69	
		O/R	RV 69	
		R/G	TD 69	
		G/R	RD 69	
LC10	LC10	R/BR	TV 70	LC10
		BR/R	RV 70	
		R/S	TD 70	
		S/R	RD 70	
		BK/BL	TV 71	
		BL/BK	RV 71	
		BK/O	TD 71	
		O/BK	RD 71	
		BK/G	TV 72	
		G/BK	RV 72	
		BK/BR	TD 72	
		BR/BK	RD 72	
		BK/S	TV 73	
		S/BK	RV 73	
		Y/BL	TD 73	
		BL/Y	RD 73	
LC10		Y/O	TV 74	
		O/Y	RV 74	
		Y/G	TD 74	
		G/Y	RD 74	
		Y/BR	TV 75	
		BR/Y	RV 75	
		Y/S	TD 75	
		S/Y	RD 75	
		V/BL	TV 76	
		BL/V	RV 76	
		V/O	TD 76	
		O/V	RD 76	
		V/G	TV 77	
		G/V	RV 77	
		V/BR	TD 77	
		BR/V	RD 77	
		V/S	SPARE	
		S/V	SPARE	

LEGEND:

STATION SET LINES		CO/PBX LINES	
TV	tip voice	T	Tip
RV	ring voice	R	Ring
TD	tip data		
RD	ring data		

COLOUR	ABBREVIATIONS
BLUE	BL
ORANGE	O
GREEN	G
BROWN	BR
SLATE	S
WHITE	W
RED	R
BLACK	BK
YELLOW	Y
VIOLET	V

3.3.3 Screw Terminal Designations For System Options

Screw #	Designation
1	Music-on-hold (Signal)
2	Tone-on-hold disable
3	Page Zone 2 Control
4	Page Zone 2 Control
5	Page Zone 1 Control
6	Page Zone 1 Control
7	Aux. Ring Control — Night Bell
8	Aux. Ring Control — Night Bell
9	Aux. Ring Control — Auxiliary Ringer
10	Aux. Ring Control — Auxiliary Ringer
11	Page Signal
12	Page Signal
13	Spare
14	Spare
15	Ground
16	Ground

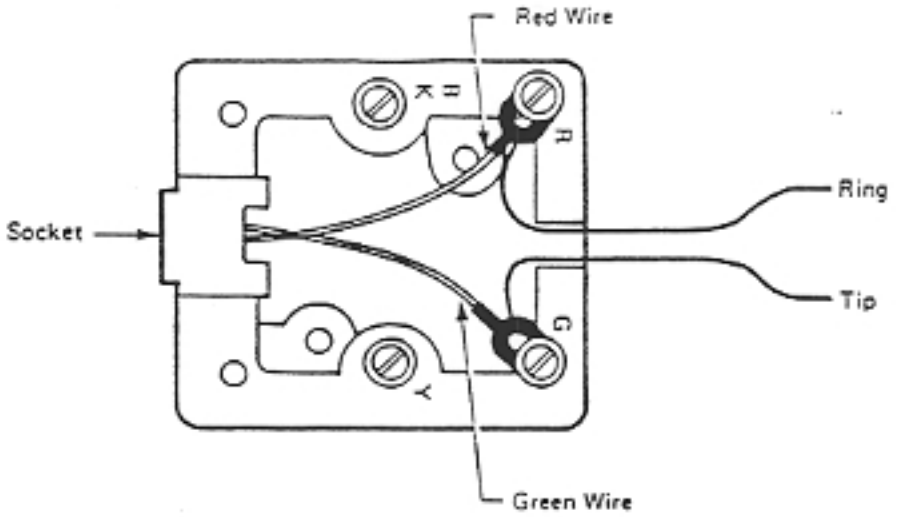


Fig. 3.2
500/2500 Set Connection

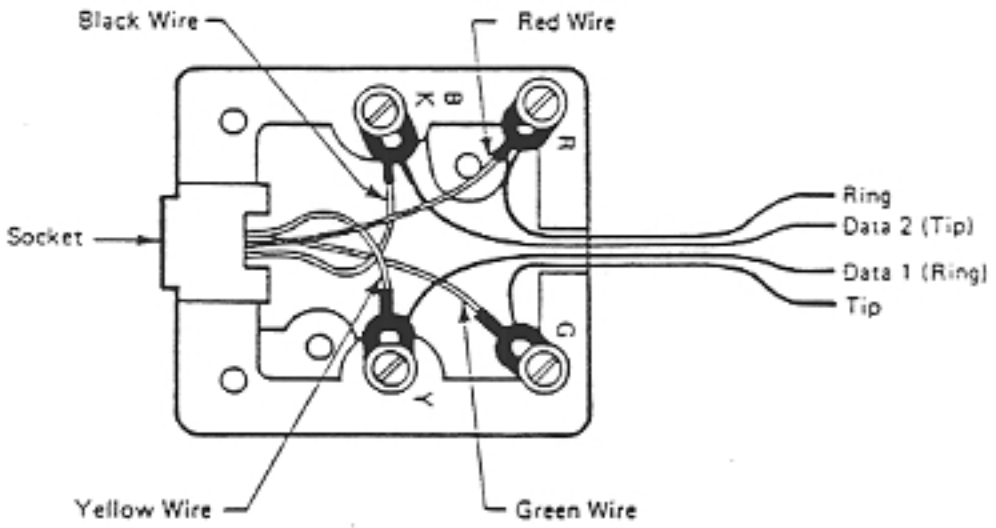


Fig. 3.3
Vantage Set Connections

3.4 INSTALLING SYSTEM OPTIONS

3.4.1 Install Ring Generator

IMPORTANT: For all installations (new and retro-active) the V48C cabinet must be powered down before this procedure is attempted.

a. Remove the two screws and nuts from the side of the cabinet where the ring generator card will mount.

b. Place the ring generator in the cabinet on the cross support and butt it to the right hand side of the cabinet.

c. Assemble the two screws and nuts through the cabinet and ring generator and tighten them.

d. Plug in the ring generator cable to the connector on the backplane. (It may be necessary to cut the cable tie on the ring generator cable, nearest the connector on the backplane, to ensure a good fit.)

e. Replace the cage over the ring generator card, ensuring that the cable sits through the slot in the side of the cage, and push it down so the press-fit connectors hold it securely.

CAUTION: The ring generator card must never be installed without the cage around it. If necessary, ring generator cages can be ordered separately under part number PO676728.

3.4.2 Tone-on-Hold

In its normal state the Tones and Page circuit card provides Tone-on-Hold.

To disable Tone-on-Hold connect screw terminal No. 2 to chassis ground (screw terminals 15 or 16).

Music-on-Hold

To disable Tone-on-Hold, connect the customer provided music source in the following manner.

a) Disable Tone-on-Hold (as above).

b) Connect screw terminal No. 1 to the music source, and connect the music source ground to (chassis) ground at screw terminal No. 15 or 16.

Earlier versions of the Tone and Page card contains a Music-on-Hold jack. If the Tone and Page card in your system has such a jack (miniature phone plug) then observe the following method of installation.

Music-on-Hold

This feature is activated by connecting the cable from the customer provided music source to one of the following:

a) The MUSIC-ON-HOLD jack located on the Tones and Page circuit card. This method uses a 2.5 mm miniature phone plug (e.g. Switchcraft Tini-Plug 750 or equivalent).

b) The screw connector terminals as above. This method also requires the insertion of a dummy miniature plug in the MUSIC-ON-HOLD jack located on the tones and Page circuit card.

RING GENERATOR INSTALLATION DIAGRAM

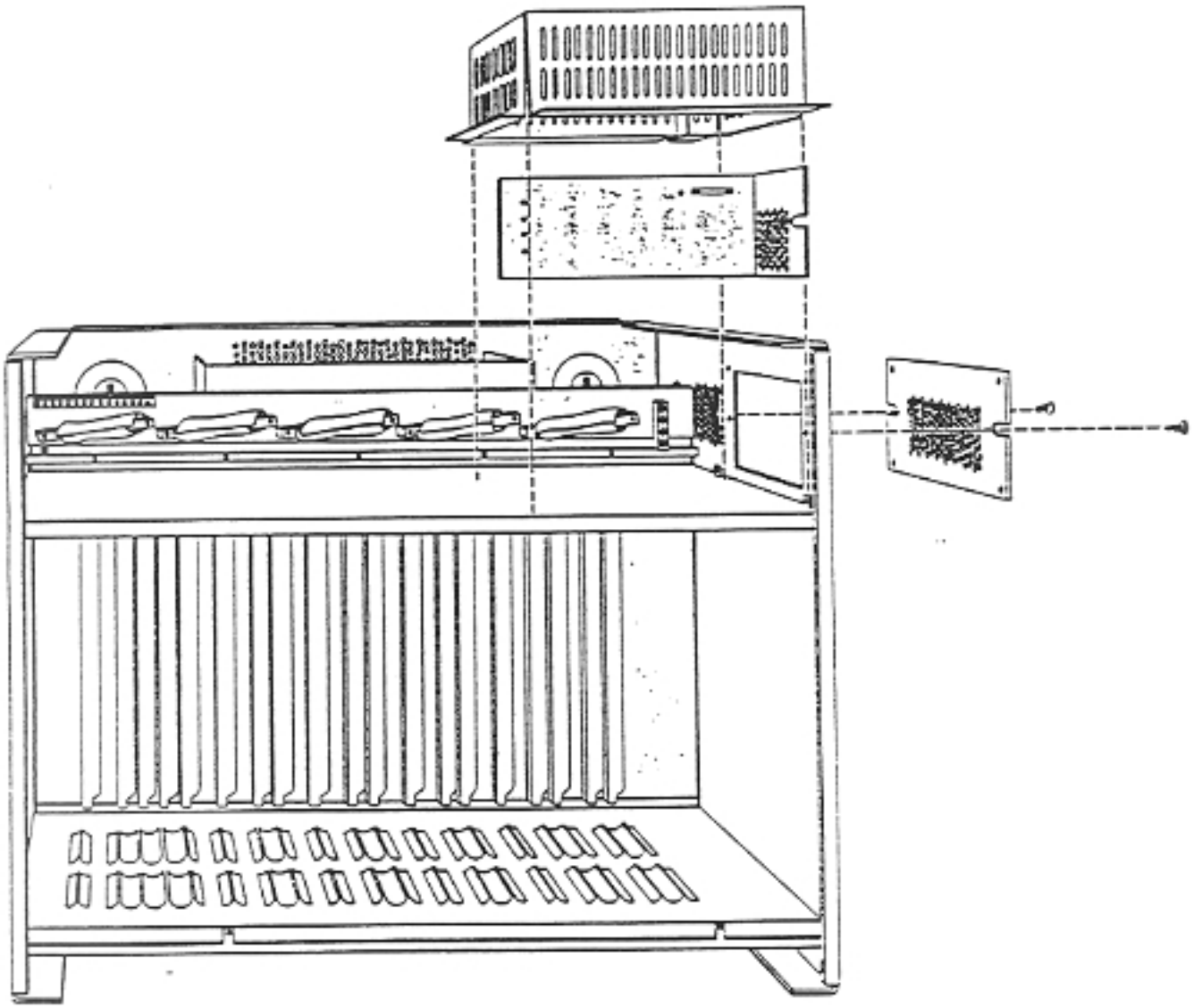
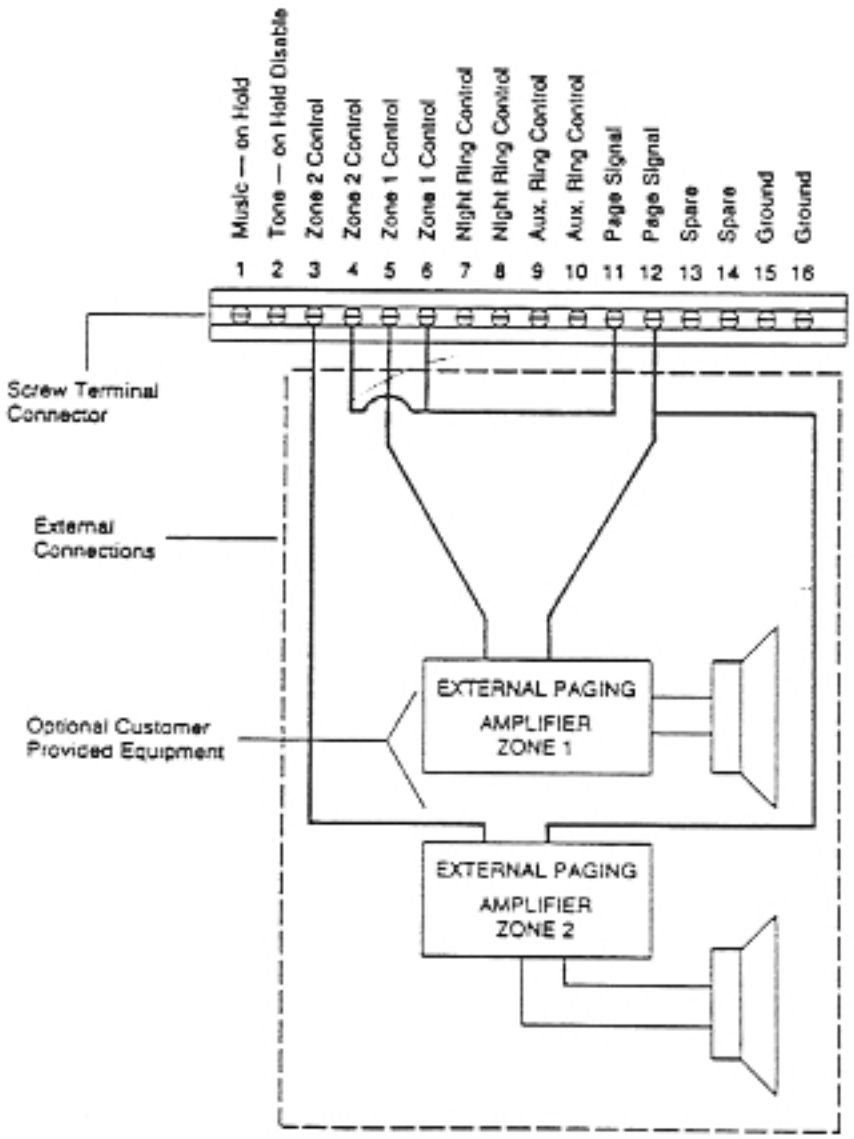


Fig. 3.4

3.4.3 External Paging

The Vantage 48C has the provision to "control" 2 zones of external paging. The paging signal is provided on pins 11 and 12 of the screw terminal connector. This signal is a common paging signal, and if you require to page 2 separate zones you must control that signal through the Zone 1 (pins 5-6) or Zone 2 (pins 3-4) control contacts. The following connections should be made as shown by the following diagram:

VANTAGE 48C PAGING CONNECTIONS



3.4.4 Night Bell

Connect customer provided Night Bell to the output terminals of the Auxiliary Ringing Generator module in appropriate location. Route the 22-26 AWG wire pair from the ARG to the screw terminals labelled Night Bell Control. (Nos. 7 and 8)

3.4.5 Common Auxiliary Ringer

Mount and connect common ringer in the same manner as a Night Bell (previous example). However, connect the required Auxiliary Ringing Generator by routing the associated 22-26 AWG wire pair from the ARG to the screw terminals labelled Aux. Ring. Control. (Nos. 9 and 10).

3.4.6 Auxiliary Ring Generator

a) Remove the cover and mount the unit as per local instructions.

b) Connect one end of an 18 AWG wire pair to the OUTPUT terminals on the auxiliary Ring Generator circuit board.

c) Replace the cover over the baseplate so that the 18 AWG wire pair exits through the exit window.

d) Connect a 22-26 AWG wire pair to the INPUT terminals.

e) Route and connect the 18 AWG wire pair to the alerting device as per local instructions.

f) Route the 22-26 AWG wire pair (or Teladapt cord) to the CE cabinet and make the appropriate connections as per Night Bell and Auxiliary Ringer connection details.

g) Ensure that the ON/OFF switch is in the OFF position, then plug the AC power cord into the AC power receptacle.

h) Set the ON/OFF switch to ON.

3.4.7 Install Printer

a) Route an EIA cable from the customer provided terminal equipment (TE) through the common equipment to the memory card (NT2B11).

b) The following functions are provided on the Vantage RS232C connector.

PIN	FUNCTION
1	Ground
2	Receive Data (RD)
3	Transmit Data (TD)
4	Clear to send (CTS)
5	Request to send (RTS)
6	Data Terminal ready (DTR)
7	Ground
20	Data Set Ready (DSR)

Options

1. **Terminals (NT2B05AB only)**

   The RS232C port on the memory card is configured to be pin for pin compatible to a terminal.

2. **Printers**

   Some alterations to the cable may be required for use with a printer. Vantage requires a high on CTS to produce an output on TD. Consult printer documentation for appropriate pins.

3. **Modems (NT2B05AB only)**

   Some alterations to the cable will be required for this application. Consult the modem documentation for appropriate pins.

4. Set the RS232C parity and Baud Rate on the Memory card DIP switches as appropriate for the terminal equipment.

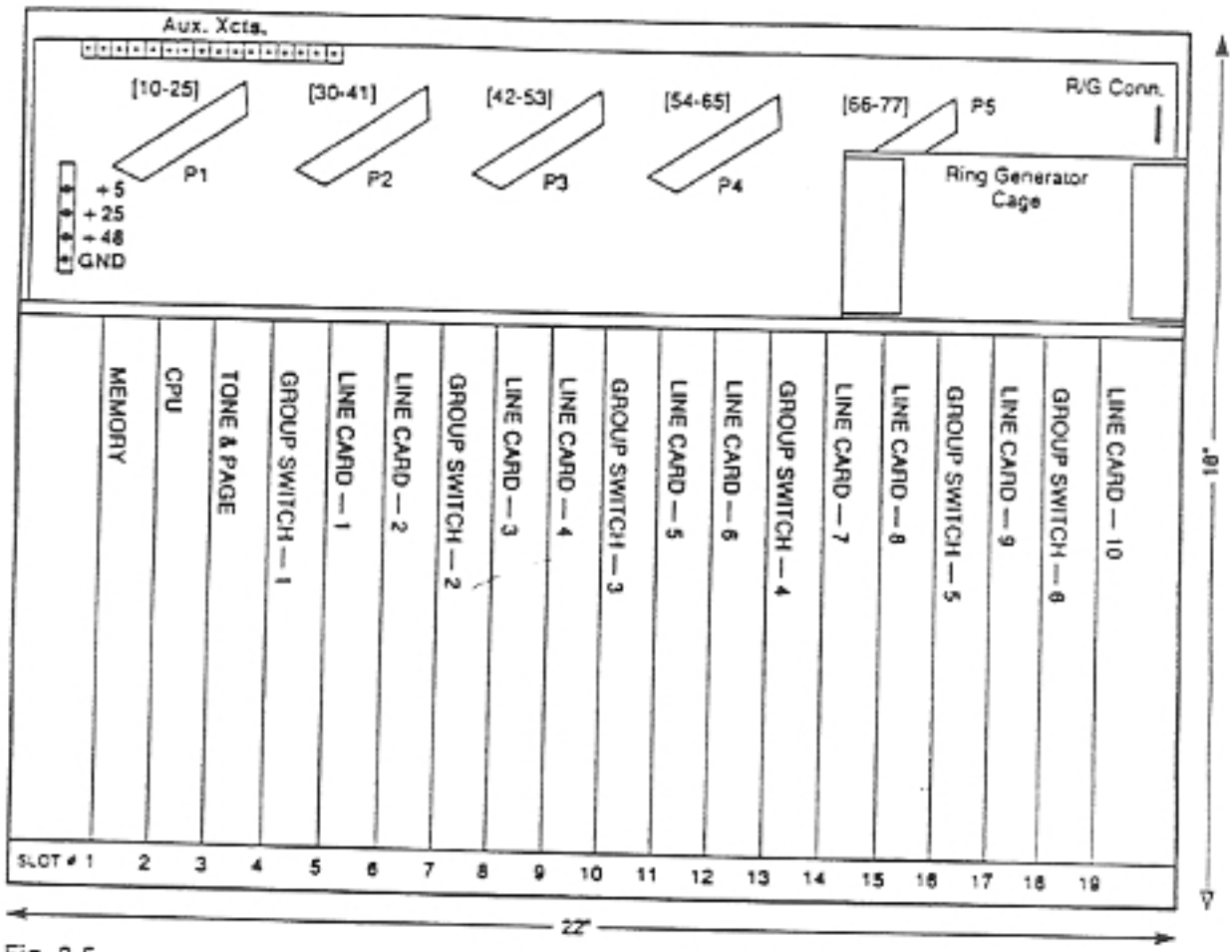


Fig. 3.5

General

The Vantage 48C cabinet houses the following circuit cards:

- Memory card NT2B11
- CPU (Central Processing Unit) NT2B05
- Tone and Page Card NT2B06
- Group Switch Cards NT2B07
- Line and Station Interface Cards

The first three cards listed above are common control cards which are necessary regardless of the size of system and are supplied already installed in the cabinet. Multiple group switch and Line and Station Set Interface cards must be provided depending on the size of the system.

The general arrangement of the cards in the cabinet is shown in Figure 3.5.

Selection

The following cards may be selected as necessary to configure a Vantage 48C system.

— Group Switch cards (NT2B07) comprising the switch network.
— 1X2 Line Cards (NT0B43) serving 1 C.O. and 2 Vantage telephone sets.
— 4X0 Line Cards (NT2B09) serving 4 C.O. lines.
— 0X8 Station Set Cards (NT2B41) serving 8 Vantage telephone sets.
— 0X4 Station Set Cards (NT2B08) serving 4 Vantage telephone sets.
— 0X4 Station Set Cards (NT2B10) serving 4 500/2500 telephone sets.

Configuration Rules

a) A Group Switch Card is required to service each group of 4 C.O. Lines and/or 8 Station Sets. They can be installed in slots 4, 7, 10, 13, 16 and 18 of the cabinet and service the two line card slots to the right of them; until group switches numbers 5 & 6 which service only one line card each to their right.

b) To obtain maximum system density (i.e. 16 × 48 size) then 4X0 line cards may be installed in slots 5, 8, 11, 14 and 0X8 Station Cards in slots 6, 9, 12, 15, 17 and 19.

c) To reduce potential Station Set capacity, then 0X4 Station Set cards (either Vantage or 500/2500 type) can be installed in any slot where a 0X8 Station Card can legally be installed. In this case the system only recognises and accesses the four lower numbered station sets of the group of 8 that potentially can be assigned to that slot.

d) For Emergency Transfer applications (and other special circumstances) then 1X2 cards may be used, with resulting reduction in system capacity.

   — If a 1X2 line card is installed in any of slots 4, 8, 11, or 14 then the other line card on the group switch *must* also be a 1X2 line card.

e) A 1X2 Line Card can be installed in slot 17, provided Line Card #1 in slot 5 is *not* a 4X0 Line Card.

f) A 1X2 Line Card can be installed in slot 19, provided Line Card #5 in slot 11 is *not* a 4X0 Line Card.

In summary, the following combinations are *not allowed* in the pairs of slots 5, 6; 8, 9; 11, 12; 14, 15.

They are:

1X2, 0X4]
1X2, 0X8] illegal combinations
4X0, 1X2]

The following cobinations *are allowed* in the pairs of slots 5, 6; 8, 9; 11, 12; 14, 15.

They are:

1X2, 1X2 — Legal combination, reduced line and station density.
4X0, 0X4 — Legal combination maximum C.O. but reduced station density.
4X0, 0X8 — Legal combination maximum density (C.O. and Station).

Slots 17 and 19 may be either 0X8, 0X4 or 1X2 cards (see e and f above).

3.6 INSTALLING CIRCUIT CARDS

STEP PROCEDURE

3.6.1 Ensure that the power supply cord is removed from the AC source before inserting or removing any common control circuit cards.

3.6.2 Prior to handling any circuit cards note the following:

a) The installer must use a grounding wrist strap or touch the metal frame of the C.E. cabinet to discharge any build up of static electricity.

b) Do not handle or unpack the circuit cards near large electrical machines such as photocopiers.

c) Handle the circuit cards by the latches or the edges of the card. Do not touch the circuit card components or wiring.

d) Circuit cards should not be inserted or removed from the CE cabinet unnecessarily. In addition, take care not to drop or jar the card.

e) When not in use, store the circuit cards in their anti-static bags and shipping containers.

f) Only the following cards can be inserted under power: 4x0, 0x4 Vantage, 0X8 Vantage, 1X2.

g) The following card can be inserted under power only if the associated sets are disconnected: 0x4 500/2500.

3.6.3 Common Control Cards (CPU, Memory, Tone and Page). To ensure these cards are correctly seated following transportation to the site loosen the latches on each of the three common control cards and pull the card out by about 25mm (1"). Then firmly press home each of the cards and latch them into position.

3.6.4 Install group switch cards, line and/or station cards according to the configuration previously determined in section 3.5.

3.7 SETTING CIRCUIT CARD DIP SWITCHES

Switches are provided on the facing edge of the Memory Card, 1X2 Regular Line Card, and 1X2 Emergency Transfer Line Card. Please note that the switches used for feature programming are present only on the Memory Card. With the exception of switches 6 and 7 on the ET Line Card, which are used to activate the batteries, switches on the line cards are to be disregarded.

To program these cards simply follow the steps listed below. An explanation of each switch setting, as well as a guide which shows how to set each switch is listed in the following pages.

Setting the Switches

The installer should be able to set the dip switches on the circuit cards after they have been installed in the CE cabinet. The switches can be set using a pointed instrument such as a pen. Prior to setting the switches please note the following precautions:

1. The installer must use a grounding wrist strap or touch the metal frame of the CE cabinet to discharge any buildup of static electricity.
2. If the cards must be removed from the cabinet, handle them by the latches or the edges of the card. Do not touch the circuit card components or wiring.

TABLE 1

Memory Card Switch Settings

Function *Factory Setting	Switch Settings (X-Closed or on — O-Open or Off) S01 1	2	3	4	5	6	S02 1	2	3	4	5	6
Administration Programming												
Programming not allowed	X											
*Programming allowed	O											
DSS Programming												
Programming not allowed		X										
*Programming allowed		O										
RS232 Settings												
RS232 Port Mode												
SMDR			X	X								
Configuration Dump			X	O								
System Spd Dial Numbers Dump			O	X								
*Unused			O	O								
RS232 Parity												
Parity checked					X							
*Parity not checked					O							
Parity even						O						
Parity odd						X						
RS232 Baud Rate												
110 Baud							X	X	X			
*300 Baud							X	X	O			
1200 Baud							X	O	X			
2400 Baud							X	O	O			
4800 Baud							O	X	X			
9600 Baud							O	X	O			
Unused							O	O	X			
Unused							O	O	O			
Memory Power Back-Up (Note 1)												
Back-up enabled										X		
*Back-up disabled										O		
Dial Pulse Ratio												
*50/40 (North America)											X	
66/33 (International)											O	
Memory Purge (Note 2)												
Clear Memory												X
*Normal Operation												O

Note 1: On NT2B11AA and AB Memory Cards this function is not available. This switch should be left permanently in the OFF position. (See page 31 for important instructions pertaining to the NT2B11AC Mem. Card).

Note 2: Not available on NT2B11AA and NT2B11AB.

Memory Card Options See Table 1

Switch	Number	Function
S01	1	Administration Programming — This option enables or disables the ability to program from the Administration set.
S01	2	DSS Programming — This option enables or disables the ability of the individual station set user to set or change the DSS keys.
S01	3-4	RS232 Port Mode — Determines the mode of RS232 port.
S01	5-6	RS232 Parity — Determines whether parity from the RS232 port is checked and whether it is even or odd.
S02	1-3	RS232 Baud Rate — Determines one of six baud rates of output from the RS232 port.
S02	4	*Memory power back-up — Must be enabled at installation to ensure data will not be lost during a commercial power failure.
S02	5	Dial Pulse Ratio — This option provides a choice of either the International or North American digit-pulse standard.
S02	6	*Memory Purge — used to clear the memory card of all programmed data.

*Not available on NT2B11AA and NT2B11AB Memory Cards

Emergency Transfer Line Card (1X2) See Table 2

Switch Number	Function
1-5	Unused on Vantage 48. Please disregard these switches.
6-7	Activates the batteries in order to provide emergency transfer service.

Regular Line Card (1X2) See Table 2

Switch Number	Function
1-6	Unused on Vantage 48. Please disregard these switches.

TABLE 2

Emergency Transfer Line Card (1X2)

Function *Factory Setting	Switch Settings (X-Closed or on — O-Open or Off)						
	1	2	3	4	5	6	7
Disregard	O	O	O	O	O		
Batteries							
*Disabled						O	O
Enabled						X	X

Regular Line Card (1X2)

Function *Unused	Switch Settings					
	1	2	3	4	5	6
Disregard	O	O	O	O	O	O

4.0 INSTALL TELEPHONE SETS

4.1 INSTALL VANTAGE ESPRIT PLUS TELEPHONE SETS

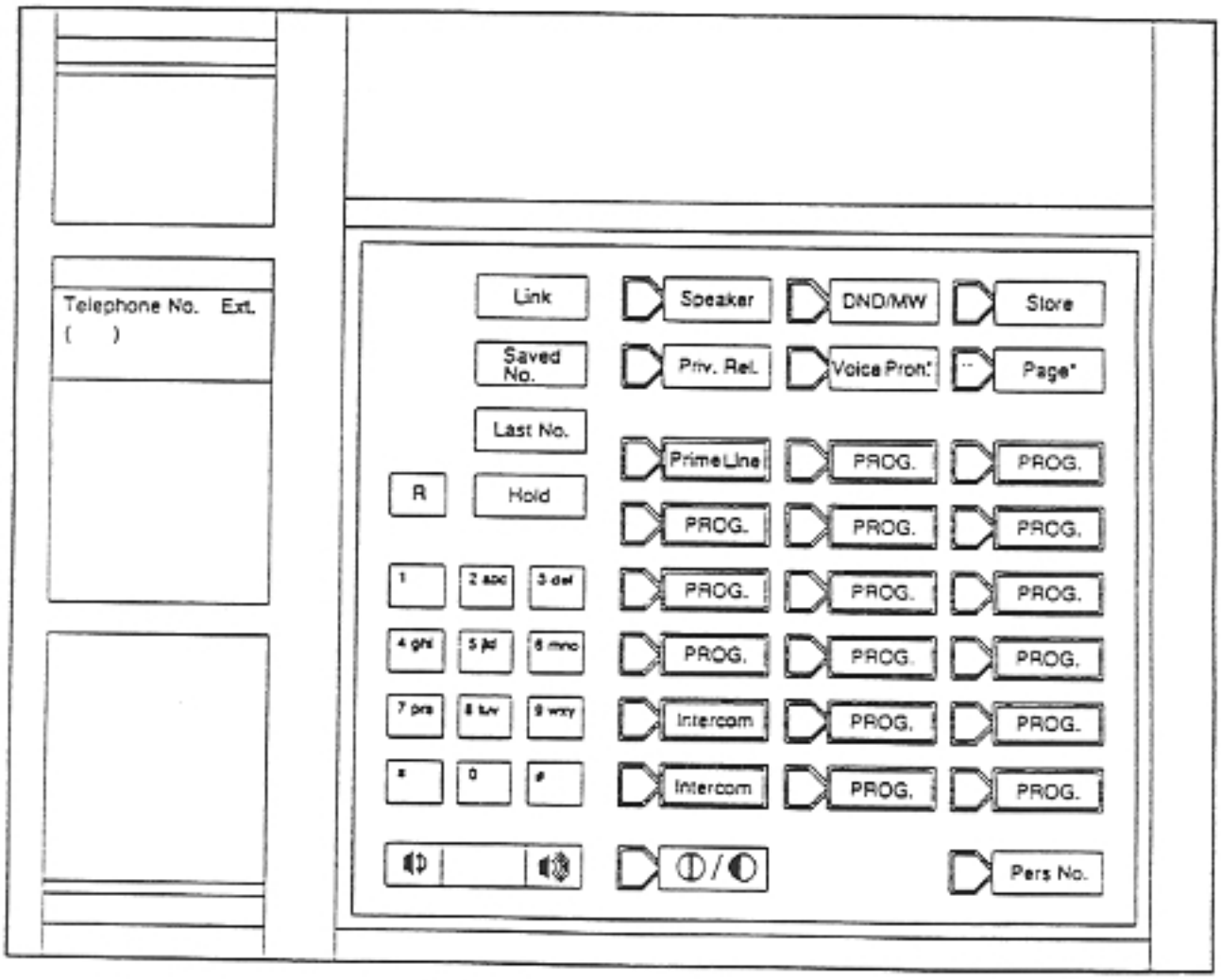
STEP PROCEDURE

4.1.1 The Vantage Esprit Plus leaves the factory with its keys configured for a Vantage 48 (all vintages). The spare key caps may be used if appropriate for some of the Vantage 48 features.

4.1.2 Type out the line numbers on the green coloured blank key cap inserts, or select the pre-printed feature labels and assemble them onto the programmable keys.

4.1.3 Select the Vantage 48 feature list and install it under the plastic faceplate located beneath the handset.

4.1.4 Connect the telephone set line cord to the wall jack.



*May be reprogrammed. Defaurt is illustrated.

Fig 4.1
Vantage Esprit Plus key Notation

4.2 INSTALL VANTAGE ESPRIT TELEPHONE SETS

STEP PROCEDURE

4.2.1 From the kit of key caps provided, select and assemble the feature key caps on the keys as per Fig. 4.2.

4.2.2 Type out the line numbers on the blank key cap inserts or select the pre-printed feature labels and assemble them onto the programmable keys.

4.2.3 Select and install under the plastic faceplates, the feature list and blank speed call list designation cards.

4.2.4 Connect the telephone set line cord to the wall jack.

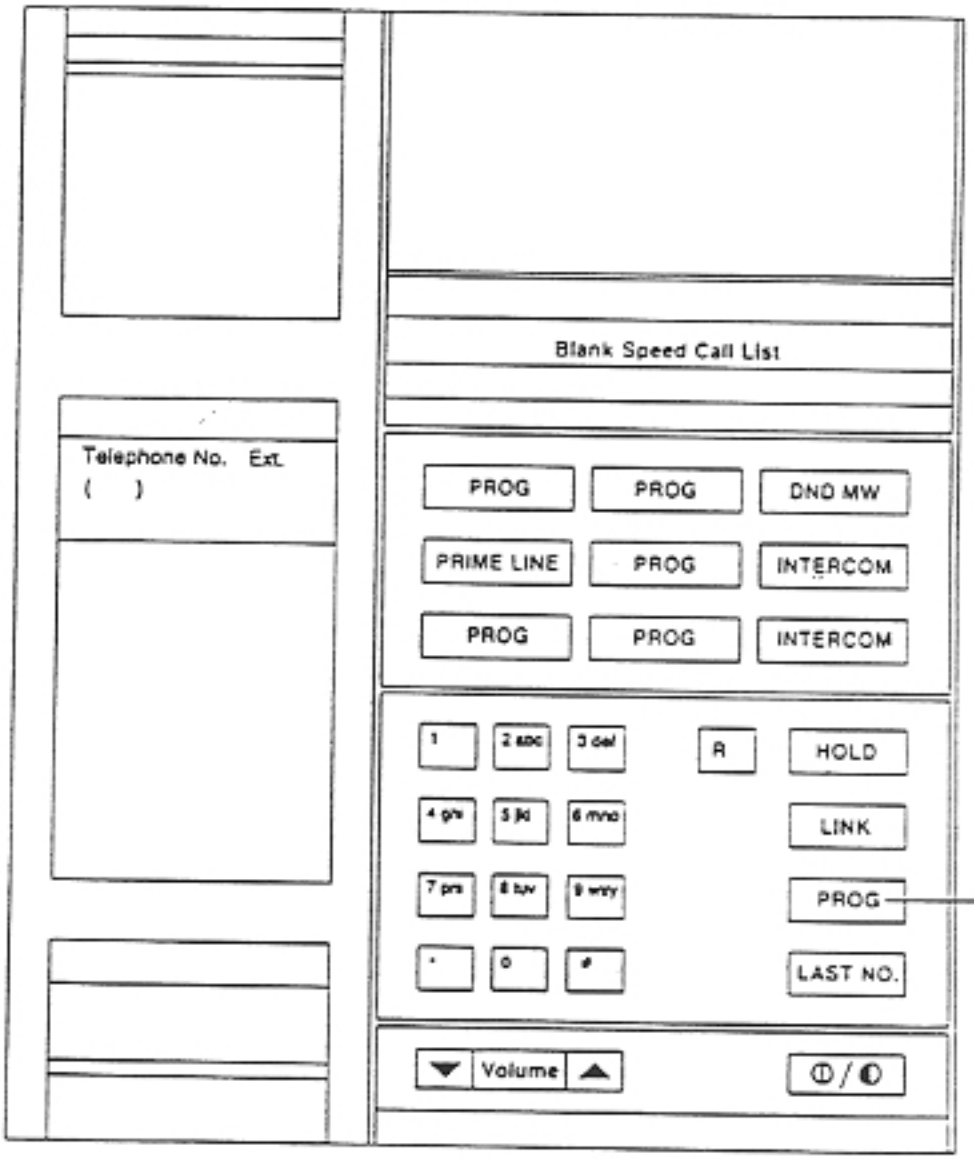


Fig. 4.2.
Vantage Esprit Key Notation

4.3 INSTALL VANTAGE MODULAR SETS

STEP PROCEDURE

A. **Install Add-On Modules**

PEM or PEM/CONVENIENCE Dialer Modules.

Open the privacy lid and remove the faceplate, designation cards and card tray from the feature well, then remove the connector cover from the rear of the telephone set (fig. 4.3).

Place the PEM (or PEM/Convenience Dialer) module into the feature well and connect the cable from the module to the connector pins (fig 4.3).

Type the required information on the designaton card(s) then place the card(s) and the faceplate (supplied with the module) over the module. If the Handsfree module is not to be installed, replace the connector access cover on the rear of the telephone set.

Handsfree Module

If required, remove the connector access cover from the rear of the telephone set and connect the cable from the handsfree unit to the connector pins as shown in fig. 4.4.

Note: The connector access cover is not used when the handsfree unit is installed.

Pass the telephone line cord through the slot in the bottom of the handsfree module then secure the handsfree unit to the bottom of the telephone set using the screws provided (fig. 4.5).

Headset Module

Remove the connector access cover from the rear of the telephone set and connect the ribbon cable from the headset unit to the headset socket inside the set (fig. 4.6).

Push the headset unit into the cavity in the bottom of the set until it locks in place.

Push the headset plug into the headset jack located on the headset unit (fig. 4.6).

Set Internal Switches

Remove the telephone set faceplate and set the internal option switches as described in step 4.4.

Type out the required information on the designation card or use the pre-printed, gummed labels, then replace the card and the telephone set faceplace.

Volume Control Handset

Remove the regular handset by releasing the TELADAPT connector at the left side of the VANTAGE set, then plug the cord from the volume control handset into the TELADAPT socket.

Note: When the volume control handset is installed on a VANTAGE telephone set, ensure that Switch 9 (12dB Amplification), of the telephone set's internal switches, is closed.

B **Connect Telephone Set Line Cord**

Connect the telephone set line cord to the wall jack (prewired in fig. 3.3). If the cable between the CE cabinet and the telephone set is longer than 2,600 ft. (800 m), an OPX module must be used between the wall jack and an OPX telephone set (NTCBOOFF).

C **Install 52 Key/Lamp Module**

Connect the teladapt cord that is attached to the bottom of the 52 Key Lamp module to the RJ14C (Teladapt) jack mounted on the wall. The 52 K/L module must be located in station set position 31 or 39. (Use data pair).

Connect the cord from the AC adapter into the jack located on the rear of the 52 K/L module.

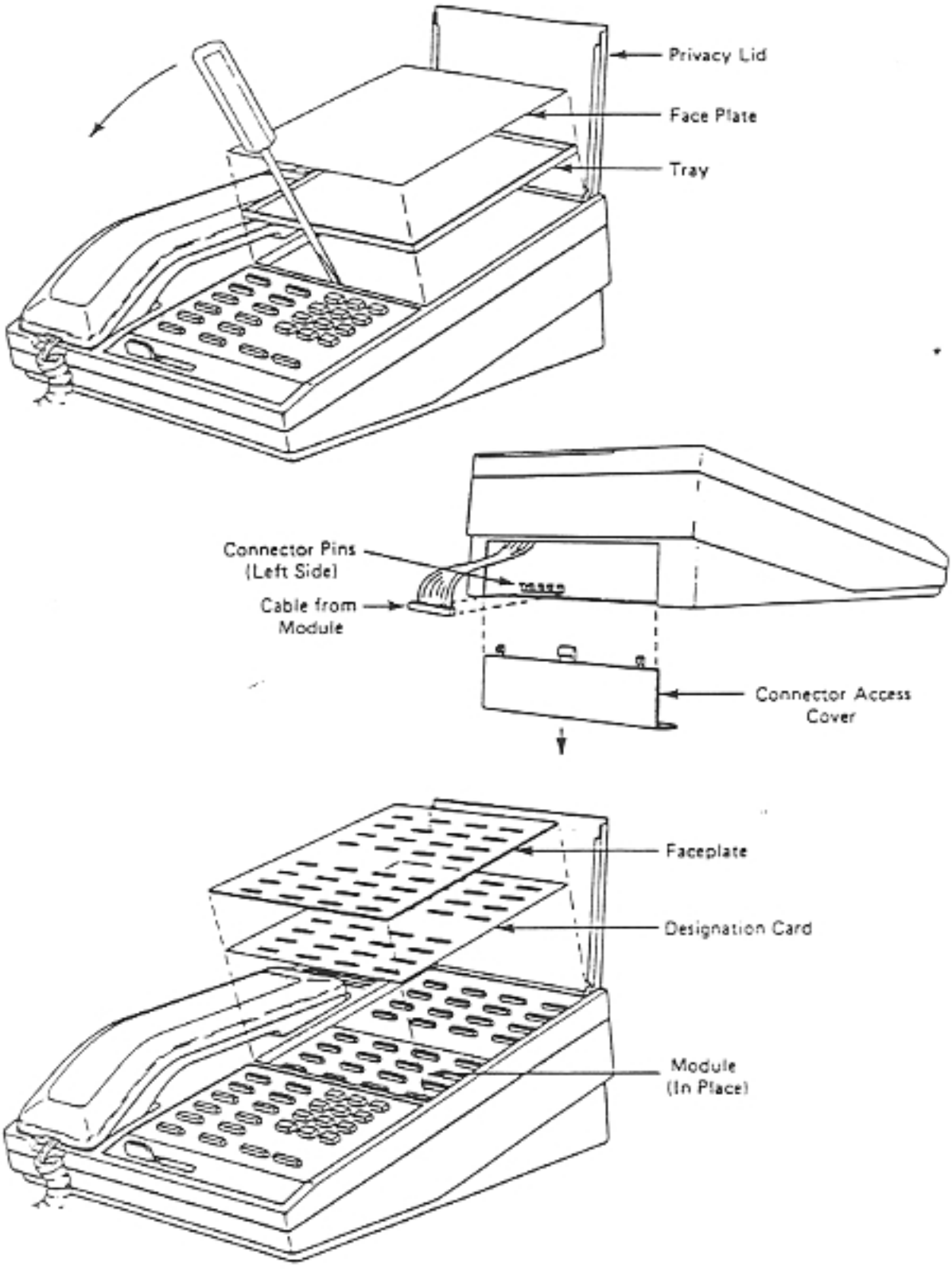


Fig. 4.3
Installing PEM/Convenience Dialer Modules

Installing Handsfree Unit

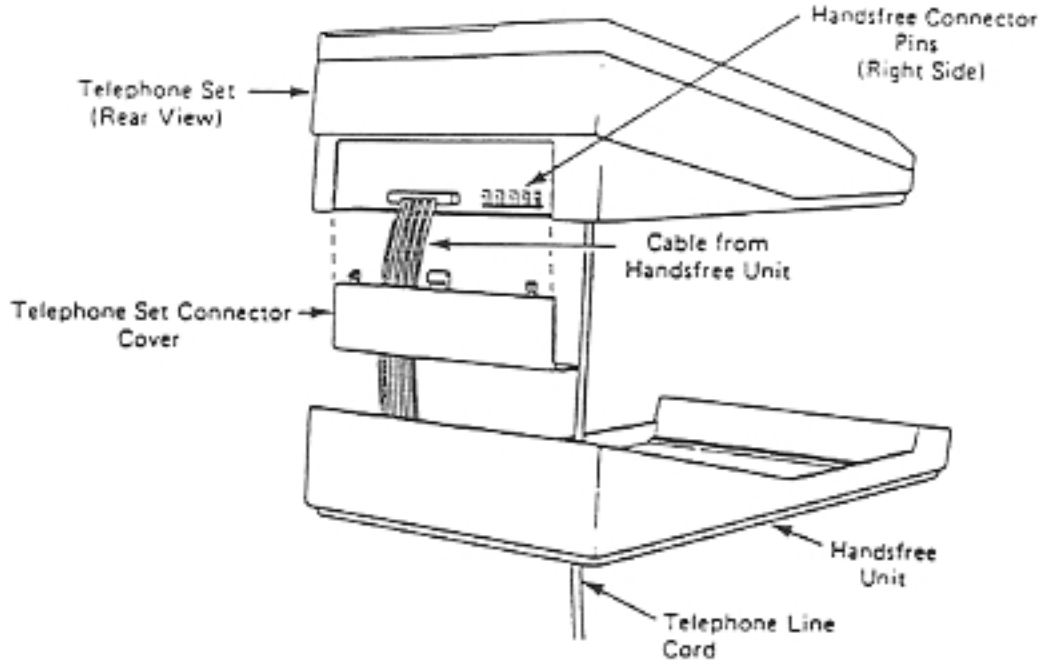


Fig. 4.4
Connecting Handsfree Unit Cable

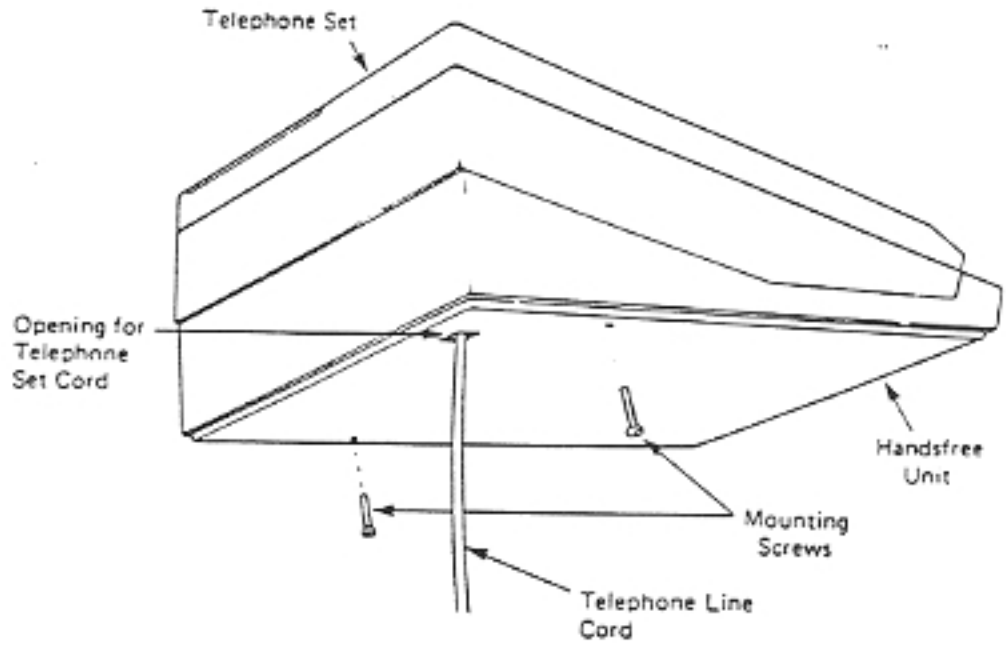


Fig. 4.5
Securing Handsfree Unit to Telephone Set.

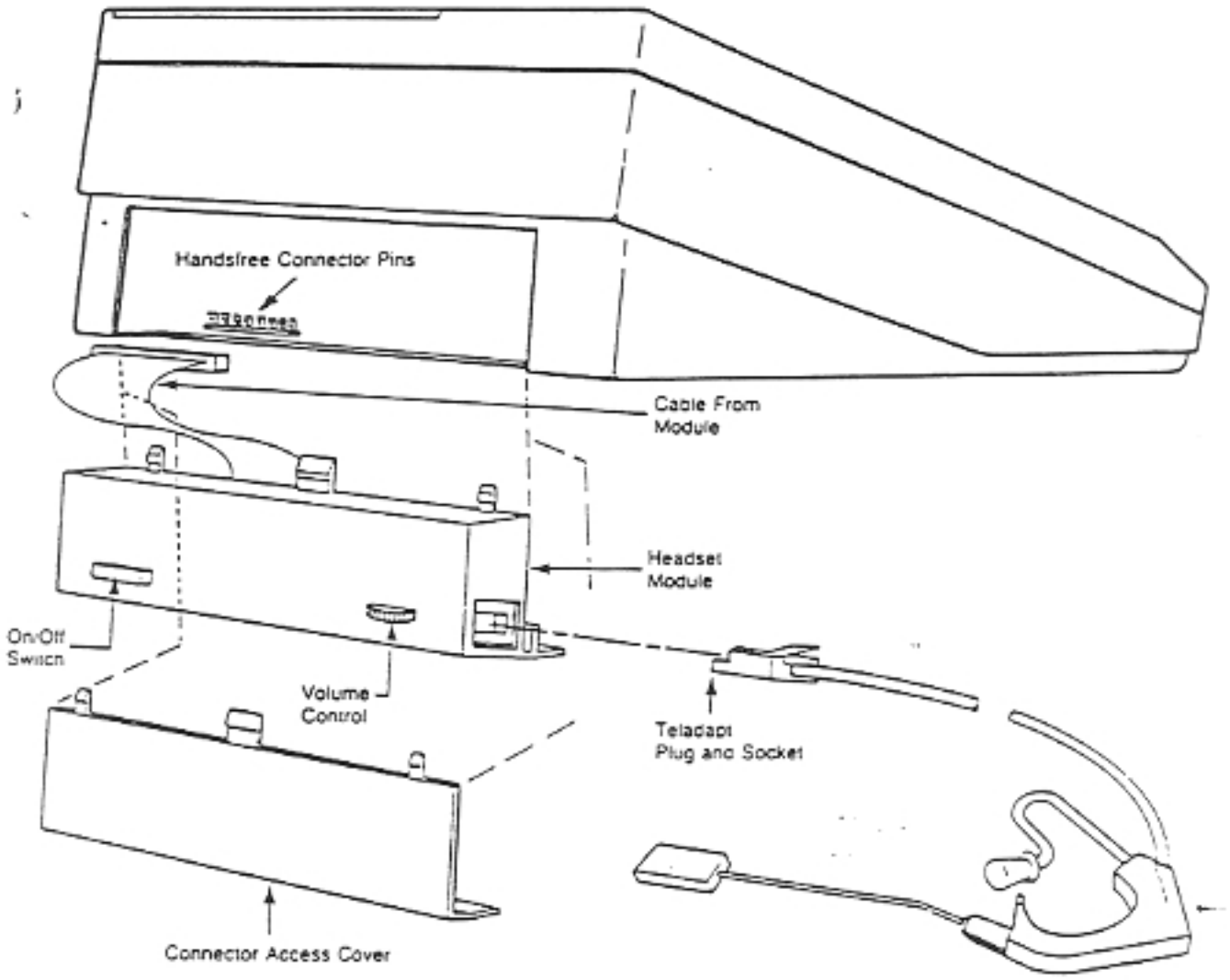


Fig. 4.6.
Headset Unit/Telephone Set Interconnection

4.4 SETTING VANTAGE MODULAR SET DIP SWITCHES

Switches are provided beneath the designation card on the lower right hand corner of the station set (see fig. 4.7). These swtiches are used to access features which are specific to each station set.

SETTING THE SWITCHES

STEP PROCEDURE

4.4.1 Remove station set designation card if installed.

4.4.2 Set the feature switches according to Table 3.

Note: A pointed instrument such as a pen may be used to set the switches.

4.4.3 Replace the designation card and faceplate.

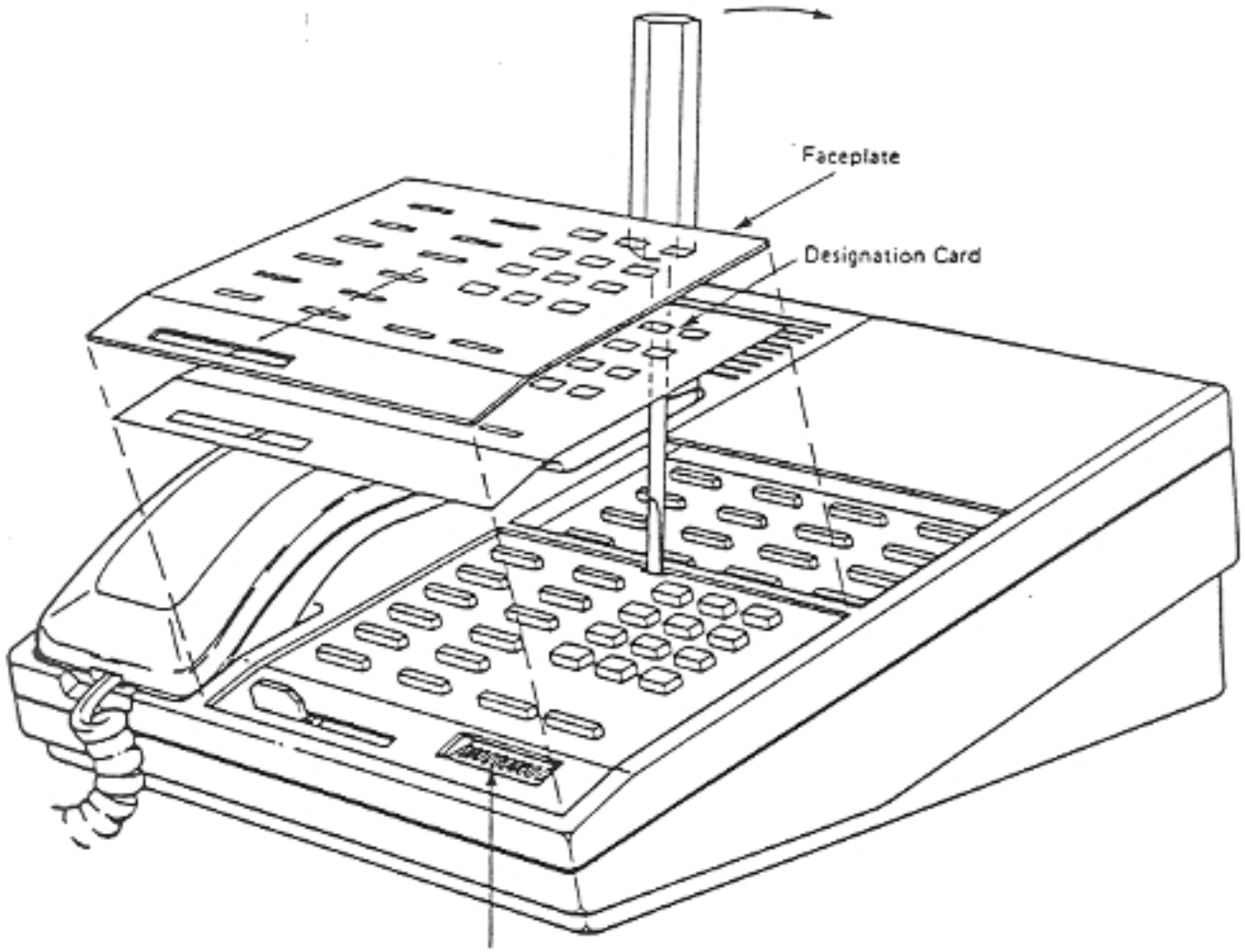
Switch Option

Switch Number	Function
1-4	Unused on Vantage 48. Disregard these switches.
5	Determines whether the prime line or the prime ICC is automatically selected when the user goes off-hook.
6	Determines whether or not incoming calls to the station set will also ring at the Prime Set after three rings.
7-8	Used to set the ringing cadence of the station set.
9	Allows the amplification of the handset receiver by 12dB in order to utilize an optional NT0B21 Volume Control Handset.

TABLE 3

Station Set Switch Settings

Function *Factory Setting	Switch Settings (X-Closed or on — O-Open or Off)								
	1	2	3	4	5	6	7	8	9
Not Used	X	X	X	X					
Automatic Prime Line/ICC Button Preselection									
Prime ICC Selected					O				
Prime Line Selected					X				
Station Delayed Ring Transfer									
Disabled						O			
Enabled						X			
Distinctive Set Ringing									
375/500 Hz							X	X	
375/750 Hz							X	O	
500/750 Hz							O	X	
500/1500 Hz							O	O	
Receiver Amplification									
Disabled									O
Enabled									X



1-4 Not Used

5 Auto Prime Line/ICC Selection

6 Delayed Ring Transfer

7-8 Distinctive Ringing

9 Receiver Amplification

10 Not Used

Fig. 4.7
Exposing Feature Selection Switches

5.0 TURNING THE SYSTEM ON

Note: The system should not be turned on until at least one Vantage telephone set has been installed. Failure to do so will result in the system entering the E.T. mode.

STEP	PROCEDURE

5.1 Plug the AC power cord from the Power Supply cabinet into the AC receptable.

Note: the AC receptacle must be protected and grounded and fused at 15 amps maximum.

5.2 Enable the power back-up to the NT2B11AC Memory Card by setting No. 4 on Switch S02 to the "ON" (closed) position.

FAILURE TO DO SO WILL RESULT IN LOSS OF ALL PROGRAMMING DATA DURING A COMMERCIAL POWER FAILURE.

5.3 Clear the NT2B11AC Memory Card prior to programming in the following manner; with Power On.

a. Set No. 6 of Switch S02 to the ON (closed) position.
b. Press RESET on the CPU.
c. Wait until the FD code in the fault code display has gone. THIS CAN TAKE UP TO 4 MINUTES.
d. Set No. 6 of Switch S02 to the OFF (open) position.
FAILURE TO DO SO WILL RESULT IN LOSS OF ALL PROGRAMMING DATA UPON THE NEXT SYSTEM RESET OR COMMERCIAL POWER FAILURE.

Note: When an NT2B11AC Memory Card is used in a system with an NT2B05AA CPU, the "9B" Fault code is normal and should be ignored. On some models, the letter characters A through F are displayed along with a period (.) to avoid confusion between lower case "b" and the number "6".

5.4 Program the system following the procedures detailed in the Programming Guide supplied with this package.

6.0 VERIFY SYSTEM OPERATION

Note 1: For detailed procedures on telephone set operation, refer to the user guide provided with the system

Note 2: For detailed procedures on system verification, refer to Technical Documentation 519-1021-210.

STEP PROCEDURE

A. Check Telephone Set Operation

6.1 At each Vantage telephone set:

a) Check for dial tone on each eligible line and for overflow tone on each restricted line.

b) Make a call on one of the eligible lines and check voice quality, operation of the speaker features and ensure that all LED indicators light when appropriate.

c) If dialing restrictions have been selected, dial the applicable codes and check that the overflow tone is heard in the speaker.

d) Check that all of the programmable buttons have been programmed with an appropriate feature and that this feature can be accessed by pressing the designated button.

e) Check operation of the convenience dialer function by storing a telephone number in one of the memory locations then make an automatic call using the stored number.

f) If a handsfree unit has been installed, check operation of the handsfree feature and the associated muting feature. Ensure that all associated LED indicators light at the appropriate times.

g) If a 52 Key Lamp module has been installed, check that a call can be answered and then transferred to another set (using the transfer key).

6.2 At each 500/2500 telephone set.

a) Check that upon going off-hook, dial tone is heard. Make an intercom call by dialing an extension number. Check that ringback tone is heard and a two-way conversation can be established.

b) Attempt to dial numbers which correspond to class of service dialing restrictions. Dialing restricted numbers should result in overflow tone being heard.

c) Dial an appropriate line pool access code to check that line pool access is correctly programmed. If enabled, dialtone should be heard. If disabled, overflow tone should be heard.

B. Check System Features

6.3 Check Maintenance Features

Note: When performing this procedure service will be cut off to all but E.T. telephones connected to E.T. line cards.

a) Depress the hold STEP key on the CPU card. The two digit display changes every two seconds until all error codes (up to 16) have been displayed.

b) Depress and hold the CLEAR key on the CPU card. Every two seconds a code will be cleared from the display (within 36 seconds the buffer is cleared).

c) Remove a line card from its slot and check that the associated fault code is displayed on the Memory card fault display. This may take up to 4 minutes. (See section 7.0 of this guide for fault code listings). Replace the line card. The minor alarm should cancel, but the fault code will remain on the display until manually cleared.

6.4 Check Common Auxiliary Ringer Operation

Make a call to one of the lines which has been programmed to operate the auxiliary ringer and check for proper operation.

6.5 Check External Paging System Operation

On a telephone set so equipped depress the PAGE key and speak into the handset. Check that your voice was heard on the external paging system.

6.6 Check Music On Hold Operation

Make a call to one of the VANTAGE telephone sets and place the call on hold at the VANTAGE set end. Check that the music source connected to the VANTAGE system can be heard on the telephone line.

6.7 Check Night Bell Operation

Press the Night key on both CAPS and make a call to a C.O. line present at one of the CAPS. Check to ensure that the night bell rings once the call has been placed and stops ringing once the call has been answered.

The general sequence followed in fault clearing is:

1) recognition of the trouble indication
2) trouble analysis
3) repair
4) test

Indications

Troubles in the Vantage 48 system are usually indicated by a feature or service either not operating or operating in a faulty manner as described in the previous section verifying the system will assist in detecting such problems. In addition, three other indicators are present which identify faults in the system. They are:

— Run and ET LEDs on CPU card (in Primary C.E. cabinet)

RUN	ET	MEANING
on	off	normal operation
on	on	manual E.T. mode (E.T. on means operation in emergency transfer mode)
off	on	CPU on system failure (RUN LED off means power failure or system recovery in progress)
off	off	should not occur.

— Group Switch indicators (in C.E. cabinets) all indicators are lit at start-up, and then extinguish as cards are verified. Lit indicators indicates a fault within the card or an associated circuit.

— Fault Buffer Display (on Memory card in primary C.E. cabinet)

Fault Buffer Display Code Interpretation

This section coordinates the assignment of 2 digit, displayable, hexadecimal codes (out of the total of 256 available) which the Vantage 48 system uses to communicate internal status and event notification to maintenance personnel. It may be used as a starting point for any troubleshooting.

Important

Although a hex code may point to replacing some hardware, it should be remembered that the situation that caused the error may have been temporary. Therefore the codes should be logged and then cleared; the system should be allowed to run through its midnight system test routines; and if any trouble re-occurs then the appropriate hardware replaced.

The description of the Fault Codes consists of the following three sections:

General Description specifies the functions of the displayable codes along with a breakdown of the 256 possible codes into smaller groups of related codes.

External Interface describes the basic manipulation of the display control switch to retrieve information from the system.

Detailed Description provides the list of displayable codes for each related group of codes including unused ones. The description that accompanies each code explains what information the code represents and what the problem may be if it is a fault code related problem. Also indicated is the severity of alarm associated with each displayable code.

General Description

In general terms, the fault code display is a Man-Machine Interface (MMI) that can be used by the V48 system to communicate status information about the system for maintenance personnel usage.

The information has been divided into groups of related status indicators such that closely related information is carried by closely related codes. The above mentioned display is a 2 digit hexadecimal display that can convey 256 separate pieces of information (codes).

The major groups of related status indicators are as follows:

- PCB Physical Configuration Faults
- Station Set or Set Interface PCB Faults
- General Hardware Faults
- General Software Faults
- System Start Up Status Indicators
- Blank Codes

The breakdown of the available codes between the major groups of related status indicators is shown below in Figure 7.1 — "Code Map Partitioning". The allocated spaces include blank entries which are not used.

External Interface

Output Display

The 2 digit display is used to output information about the systems internal status. The display is located on the memory card in the first slot of the primary shelf. The digits are mounted such that the most significant digit is directly above the least significant digit and they are aligned vertically as shown in Figure 7.2 — "Display Mounting".

The character set displayed can be any of '0', '1', '2', '3', '4', '5', '6', '7', '8', '9', 'A', 'B' (or 'b'), 'C', 'D' (or 'd'), 'E' and 'F'. Note that on some models, the alpha characters A through F are displayed along with a period (.) to avoid confusion between lower case 'b' and the number '6'.

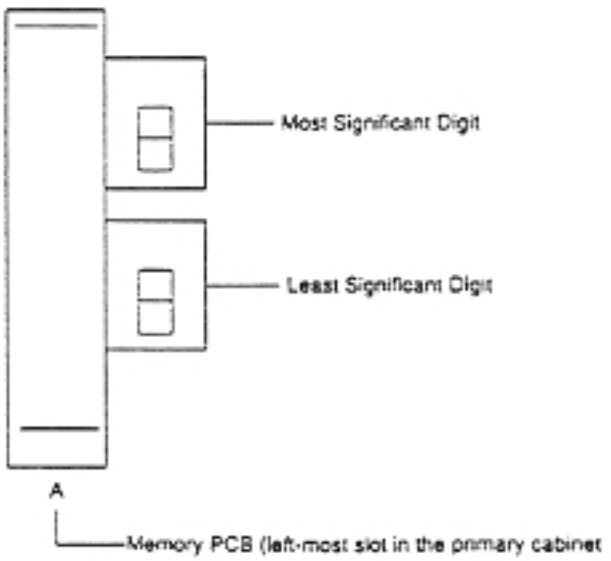


Figure 7.2. Display Mounting

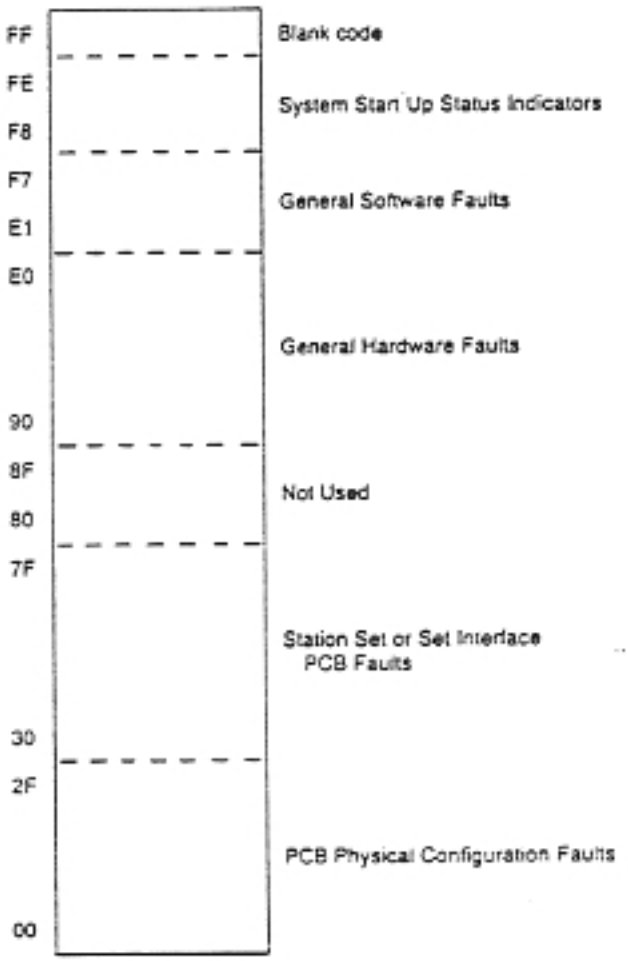


Figure 7.1. Code Map Partitioning

Display Control

Within the system, a list is kept of the displayable codes that are required to be communicated to the V48 maintenance personnel. The list has a maximum length of 16 entries. The positions within the list are filled in chronological order so that a review of the list from start to end will be the time sequence in which they were generated. All fault codes generated after the list is full will be ignored.

Of the 16 available fault code positions, the first 14 may be any code in the defined list. However, the fifteenth position is reserved for fault codes that have an associated ALARM condition. The sixteenth position is reserved for only those codes which have an associated ALARM condition that also requests an Emergency Transfer condition. This prevents minor alarm codes from filling the list which could prevent potentially more serious codes from getting into the list.

Under normal system operation, the V48 fault code display will show the most recent displayable code received (i.e. the last valid code). The next code to be displayed is always blank because it signifies the end of the current list of fault codes. The following code is then the first entry in the list as the display cycles back to the top of the list. Note that the other system indicators, Group Switch/UART LED's and CAP Alarm LED, will always show their worst state in association with the severity of the fault codes in the fault code list.

Maintenance personnel interaction with the fault code display is through one double function toggle switch located on the CPU PCB. If the display is not accessed (either STEPed or CLEARed) for more than 5 minutes, it will revert to the normal condition and display the last (the most recent) code in the list. In the enhanced system version (PHASE II), users can also interact with the fault code list via the RS-232 interface in the Remote Maintenance Mode. These allow the maintenance personnel to review and control the fault code list at will.

The 2 functions mentioned are:

> STEP function — used to display the next available code within the list. Also has an auto-stepping mode implemented by holding the STEP switch in the STEP position for over 1.5 seconds. The next available code will be displayed after 1 second.
>
> CLEAR function — used to clear the currently displayed code from the list. To prevent accidental clearing of the display, the CLEAR switch must be pushed and held in the CLEAR position for a full 1.5 seconds before the currently displayed member of the fault code list is cleared. Also has an auto-clearing mode selected by holding the CLEAR switch in the CLEAR position for over 1.5 seconds. The next available code will be cleared after 1 second.

Note: that if the Fault Code display is cleared for a particular fault code but the fault is not correctly diagnosed and repaired, the system will identify the fault condition after running its tests and add the fault code to the Fault Code display again.

Detailed Description

Each of the major groups identified in the General Description section of this document is presented separately in this section. Within some groups subgroupings may be used to further divide the codes by related information. In general, the fault codes are given with their associated interpretation of the information that they are intended to convey.

Please note that where a fault code may be used to indicate 2 or more problem areas, the list of possible problem areas is ordered in decreasing order of likelihood.

Note that the alarm severity is ranked as follows:

- None — No alarm state is associated with this code
- Mn — Alarm is minor in nature, the system will continue operation
- Mj — Alarm is major in nature, the system may continue operation in a degraded mode.
- ET — Alarm state is so severe that Call Processing cannot continue, hence the system will be locked into ET mode until it is reset.

Those faults marked as ALARM under the CAP column will cause the CAP alarm LED to flash at 69 IPM. All other fault codes will not cause the CAP alarm LED to turn on.

PCB Physical Configuration Fault Codes

The following fault codes indicate a failure directly associated with a particular Printed Circuit Board (PCB) slot. The number displayed directly corresponds with the slot, when the slots are numbered in order starting with the Memory Card as 1. The following table lists the numbers used, the severity of the fault and the board(s) designated.

- For the CPU PCB the board is missing or is not operating at all (eg: The microprocessor is not functioning). This fault code is purely transitory to indicate that the CPU PCB is not operating and is not stored in the displayable code list.
- For the Tones Page PCB the board is missing, faulty or Not Responding.
- For Group Switch/UART's, the PCB in the slot is missing, faulty or not responding.
- For Line cards, the PCB equipped in the slot is missing, faulty, not responding, or is the wrong type (and/or is not allowed) from that expected. i.e.: The PCB has been swapped with one that is different from what was equipped on the system or the PCB is in a disallowed configuration with respect to other line card types interfacing to the Group Switch/UART PCB.

Code	Severity	Cap	NT2B23/24 series Vantage 24/48 Meaning/Slot	NT2B42 Series Vantage 48C Meaning/Slot
00	ET		CPU PCB not installed or not operating	CPU PCB not installed or not operating
01-03	None		Not Used	Not Used
04	Mj	Alarm	Tones/Page PCB	Tones/Page PCB
05	Mj	Alarm	Group Switch/UART 1	Group Switch/UART 1
06	Mn		Line Card 1	Line Card 1
07	Mn		Line Card 2	Line Card 2
08	Mn		Line Card 3	Line Card 2
09	Mj	Alarm	Group Switch/UART 2	Group Switch/UART 2
0A-0F	None		Not Used	Not Used
10	Mn		Line Card 4	Line Card 3
11	Mn		Line Card 5	Line Card 4
12	Mn		Line Card 6	Line Card 4
13	Mj	Alarm	Group Switch/UART 3	Group Switch/UART 3
14	Mn		Line Card 7	Line Card 5
15	Mn		Line Card 8	Line Card 6
16	Mn		Line Card 9	Line Card 6
17	Mj	Alarm	Group Switch/UART 4	Group Switch/UART 4
18	Mn		Line Card 10	Line Card 7
19	Mn		Line Card 11	Line Card 8
1A-1F	None		Not Used	Not Used
20	Mn		Line Card 12	Line Card 8
21	Mj	Alarm	Group Switch/UART 5	Group Switch/UART 5
22	Mn		Line Card 13	Not Used (Note 1)
23	Mn		Line Card 14	Line Card 9
24	Mn		Line Card 15	Line Card 9
25	Mj	Alarm	Group Switch/UART 6	Group Switch/UART 6
26	Mn		Line Card 16	Not Used (Note 1)
27	Mn		Line Card 17	Line Card 10
28	Mn		Line Card 18	Line Card 10
29	None		Not Used	Not Used
2A	E.T.		No Group Switch/UARTs present	No Group Switch/UARTs present
2B	E.T.		No Sets Currently Responding	No Sets Currently Responding
2C	E.T.		No UARTS on any Group Switches are currently responding	No UARTs on any Group Switches are currently responding
2D-2F	None		Not Used	Not Used

Note 1: This code should not appear. Clear the code from the display.

Station Set or Set Interface PCB Faults

Since the Directory Numbers (DN) of the V48 station sets are fixed and the numbering scheme starts at 30 and goes to 77, the fault codes associated with station sets and the set interafce PCB's will use the associated DN.

Note: that due to the somewhat flexible configuration arrangements, station sets may be interfaced to the system via 2 different slots (not at the same time), yet it is the same DN and logically the same set interface.

Therefore, references should be made to the configuration guide which will allow the maintenance personnel to establish the Group Swtich/UART group that a DN is associated with and the specific PCB that is its interface. Since all of the assigned codes in this grouping only specify different DN's but the same failure symptoms, the description of the fault code meaning will only be given once.

The class of faults reported via these fault codes represent any of the following (or combination thereof):

- Station set has stopped responding to regular status poll
- Station set is sending a continuous message stream

The fault codes indicate the following problems, in decreasing order of likelihood:

- Station set faulty
- Station set wiring faulty
- Station set interface on line card faulty
- Group Switch interface for line card faulty

The severity of the error code is only considered as a minor alarm. That is, attention should be brought to this fault condition, however the system will continue on with normal call processing.

NO alarm will be displayed at the CAP.

Code (DN)	Severity	Used As
30-39	MN	DN
3A-3F	None	Not Used
40-49	MN	DN
4A-4F	None	Not Used
50-59	MN	DN
5A-5F	None	Not Used
60-69	MN	DN
6A-6F	None	Not Used
70-77	MN	DN
78-7F	None	Not Used

General Hardware Faults

The faults that fall under the classification of this group are faults that are not associated with particular lines, sets or even PCB's. Although all faults are again divided here into subgroups based on PCB's, it should be noted that not all faults can be absolutely traced to a specific PCB because the failure symptom is the only detectable event or non-event that can be monitored. The causes may have more than one source although hopefully the range of tests used will isolate the faults well.

The subgroups used in this section are:

- System Fault Subgroup
- CPU Fault Subgroup
- Group Switch/UART Subgroup

System Fault Subgroup

This group of fault codes is based on the detectable symptoms of serious software/hardware faults of the CPU which are detected by 'external to the CPU' dedicated hardware circuits.

All the fault codes for this subgroup are most likely related to either the CPU PCB, the memory PCB, or the backplane interfaces.

No alarm will be displayed at the CAP.

The codes and their meanings are:

Code	Severity	Meaning
90	E.T.	Too many initializations to allow Call Processing to proceed
91	E.T.	Excessive RAM Parity errors — Call Processing is unreliable PHASE I only.
92	E.T.	Excessive WATCHDOG TIMEOUTS
93	Mj	RAM Parity Errors Detected PHASE I only.
94	Mn	Watchdog Timeout Detected
95	Mn	ROM space 'write-attempt' detected
96	Mn	Invalid Hardware Bus state detected
97	None	Not used

The following fault codes are not used:

Code	Severity	Used As
80	None	Not Used
81	None	Not Used
82	None	Not Used
83	None	Not Used
84	None	Not Used
85	None	Not Used
86	None	Not Used
87	None	Not Used
88	None	Not Used
89	None	Not Used
8A	None	Not Used
8B	None	Not Used
8C	None	Not Used
8D	None	Not Used
8E	None	Not Used
8F	None	Not Used

CPU Fault Subgroup

This group of fault codes is based on the results of tests that are organized and executed by the maintenance software of V48. They are all related to circuitry found only on the CPU PCB and/or the Memory PCB where EEPROM non-volatile memory (NVM) Configuration Data is stored. The codes, their associated alarm severity and their meanings are as follows:

Code	Severity	Cap	PCB	Meaning
98	Mj		CPU	ROM Checksum is not correct. Change CPU PCB.
99	None		CPU	ROM 'Write Attempt' Detection circuitry failed test. Change CPU PCB.
9A	Mj		Memory CPU	RAM Address and Data Retention test failure. Memory and/or CPU PCB.
9B	Mn		Memory CPU	RAM 'Parity-Violation Detection' circuitry failed test. Phase I. Memory and/or CPU PCB.
9C	None		Memory CPU	RAM-EEPROM (NVM) Comparison test failed. Perform Config Update. Check configuration and program as required. Memory and/or CPU PCB.
9D	Mn		Memory	SMALL BLOCK Memory Pool fault limit exceeded. Change Memory PCB.
9E	Mn		Memory	LARGE BLOCK Memory Pool fault limit exceeded. Change Memory PCB.
9F	Mn		Memory CPU	EEPROM (NVM) Checksum is not correct. See NOTE 1.
A0	Mj	Alarm	CPU	Watchdog Test Failure. Change CPU PCB.
A1	Mj		CPU	Programmable Times test failure. Change CPU PCB.
A2	Mj		CPU	Programmable Interrupt Controller test failed. Change CPU PCB.
A3	Mj		CPU Memory	CPU Interrupt line found 'stuck active'. CPU and/or Memory PCB.
A4	Mj		Memory CPU	EEPROM (NVM) interrupt line found 'struck active'. Memory and/or CPU PCB.
A5	Mj		GrpSw Memory CPU	Offboard interrupt line found 'struck active'. Group Swtiches, Memory and/or CPU PCB.
A6	Mj	Alarm	Memory CPU	EEPROM (NVM) Write Attempt Failed. Check Config. Reprogram as required. If persists change Memory and/or CPU PCB.
A7	E.T.		GrpSw	All group switches have failed.
A8	E.T.		GrpSw	Cannot disable group switch faults.
A9	None			Not used.

Note 1: Perform Configuration Update. If fault code persists reprogram System Options and perform Configuration Update. Note that once a '9F' fault code has been registered in the hex display, it may not be possible to clear it using standard clearing procedures since it may keep reappearing. As a result the code can be left in the display, and should not degrade the system functionality. See also section on SYSTEM VINTAGE COMPATIBILITY. Memory and/or CPU PCB.

Group Switch/UART Subgroup

This group of fault codes is based on the results from various tests, run by the maintenance software, that involve components on the 6 Group Switch/UART PCB's. As seen below, the fault codes are each replicated six times so that a type of fault can be uniquely identified for each Group Switch/UART PCB. Note that due to the large number of identifiable components on each PCB, the codes have been reduced to one per type rather than one per component.

No alarms will be displayed at the CAP

Code	Severity	Meaning
AA	Mn	UART Failure (Change Group Switch 1)
AB	Mn	UART Failure (Change Group Switch 2)
AC	Mn	UART Failure (Change Group Switch 3)
AD	Mn	UART Failure (Change Group Switch 4)
AE	Mn	UART Failure (Change Group Switch 5)
AF	Mn	UART Failure (Change Group Switch 6)
B0	None	Not used
B1	None	Not used
B2	None	Not used
B3	None	Not used
B4	None	Not used
B5	None	Not used
B6	Mn	Digital Loopback Failure (Change Group Switch 1)
B7	Mn	Digital Loopback Failure (Change Group Switch 2)
B8	Mn	Digital Loopback Failure (Change Group Switch 3)
B9	Mn	Digital Loopback Failure (Change Group Switch 4)
BA	Mn	Digital Loopback Failure (Change Group Switch 5)
BB	Mn	Digital Loopback Failure (Change Group Switch 6)
BC	None	Not used
BD	None	Not used
BE	None	Not used
BF	None	Not used
C0	None	Not used
C1	None	Not used
C2	None	Not used
C3	None	Not used
C4	None	Not used

The following fault codes are not used.

Code	Severity	Meaning
C5	None	Not used
C6	None	Not used
C7	None	Not used
C8	None	Not used
C9	None	Not used
CA	None	Not used
CB	None	Not used
CC	None	Not used
CD	None	Not used
CE	None	Not used
CF	None	Not used
D0	None	Not used
D1	None	Not used
D2	None	Not used
D3	None	Not used
D4	None	Not used

Code	Severity	Meaning
D5	None	Not used
D6	None	Not used
D7	None	Not used
D8	None	Not used
D9	None	Not used
DA	None	Not used
DB	None	Not used
DC	None	Not used
DD	None	Not used
DE	None	Not used
DF	None	Not used
E0	None	Not used

General Software Faults

The Software of the Vantage 48 system is resident on the CPU PCB. The codes used to identify software problems to the maintenance personnel are detected by the software's Operating System, and may require a system reset.

Any of the software fault codes are intended only for in-lab debugging. Replacing the CPU and/or the memory PCB may clear the problem. These codes may be noted by maintenance personnel if a problem is persistent, and report to the ITAS personnel at Northern Telecom's Business Products Division in Calgary, Alberta, but in general it should just be cleared from the display.

No alarm will be displayed at the CAP.

Code Range	Severity
E1-F7	None

The following software fault codes cause a system reset when generated:

Code	Meaning
E8	No memory available
EA	No memory available
EB	No memory available
F1	Cannot Schedule or no memory available
F2	Possible memory corruption by software
F3	No memory available

System Start Up Status Indicators

The codes in this group are used to provide a visual indication that a system start-up either in progress or has occurred. Most of these codes are purely transitory to mark initialization progress and are not stored in the displayable code list.

No alarm will be displayed at the CAP.

Code	Meaning
F8	Cold Start is in Progress
F9	RAM Test has been completed
FA	ROM Test has been completed
FB	Analog Network has been cleared
FC	System start up has completed
FD	EEPROM (NVM) Initialization in Progress. System may stay in this state for up to 4 minutes
FE	Not used

These progress markers are only used to represent the progress of the initialization sequences rather than any specific test results. They are not meant to be a comprehensive list of tests and initializations performed as there are a considerable number of such procedures executed.

Blank Code

One of the 256 codes was chosen to represent a blank display. The chosen code is FF. Therefore this code will never appear in the 2 digit display.

VANTAGE 48 CO/PBX LINE CONFIGURATION SHEET

C.O. Line Number	Telephone Number	Card Slot Number Check ( ) Appropriate Slot	Colour Tip	Colour Ring
10		( ) LC01	W/BL	BL/W
11		( ) LC01 ( ) LC02	W/O W/O	O/W O/W
12		( ) LC01	W/G	G/W
13		( ) LC01 ( ) LC09	W/BR W/BR	BR/W BR/W
14		( ) LC03	W/S	S/W
15		( ) LC03 ( ) LC04	R/BL R/BL	BL/R BL/R
16		( ) LC03	R/O	O/R
17		( ) LC03	R/G	G/R
18		( ) LC05	R/BR	BR/R
19		( ) LC05 ( ) LC06	R/S R/S	S/R S/R
20		( ) LC05	BK/BL	BL/BK
21		( ) LC05 ( ) LC10	BK/O BK/O	O/BK O/BK
22		( ) LC07	BK/G	G/BK
23		( ) LC07 ( ) LC08	BK/BR BK/BR	BR/BK BR/BK
24		( ) LC07	BK/S	S/BK
25		( ) LC07	Y/O	O/Y

V48-Programming Guide Using a Vantage Modular Set as the Administration Set

The Vantage 48 Programming Guide is intended to provide a step-by-step procedure for an installer to program features on a Vantage 48 key telephone system. Prior to programming, the installer must have the system hardware installed, with appropriate circuit card dip switches set, and be aware of the features required on both a system-wide basis and the features required by each individual station set. To assist in gathering this information, data sheets have been provided along with this installation package. They are:

System and Line Options Survey Sheet
Station Set Survey Sheet
CO/PBX Line Configuration Sheet (in the Hardware Installation Guide).

These survey sheets should be filled out prior to system programming, as the data contained in them will help greatly to speed up the process.

Programming Vantage 48 is done in two steps. While the order of the steps may be changed, we suggest the following:

a) System features programmed via codes keyed into the Administration Set.

b) Station Set and Line features programmed via codes keyed into the Administration Set.

The Table of Contents on page 2 outlines the operations required to program all system and set options.

Contents

Beginning the Programming Process

The Administration set

In the two programming sections of this guide,

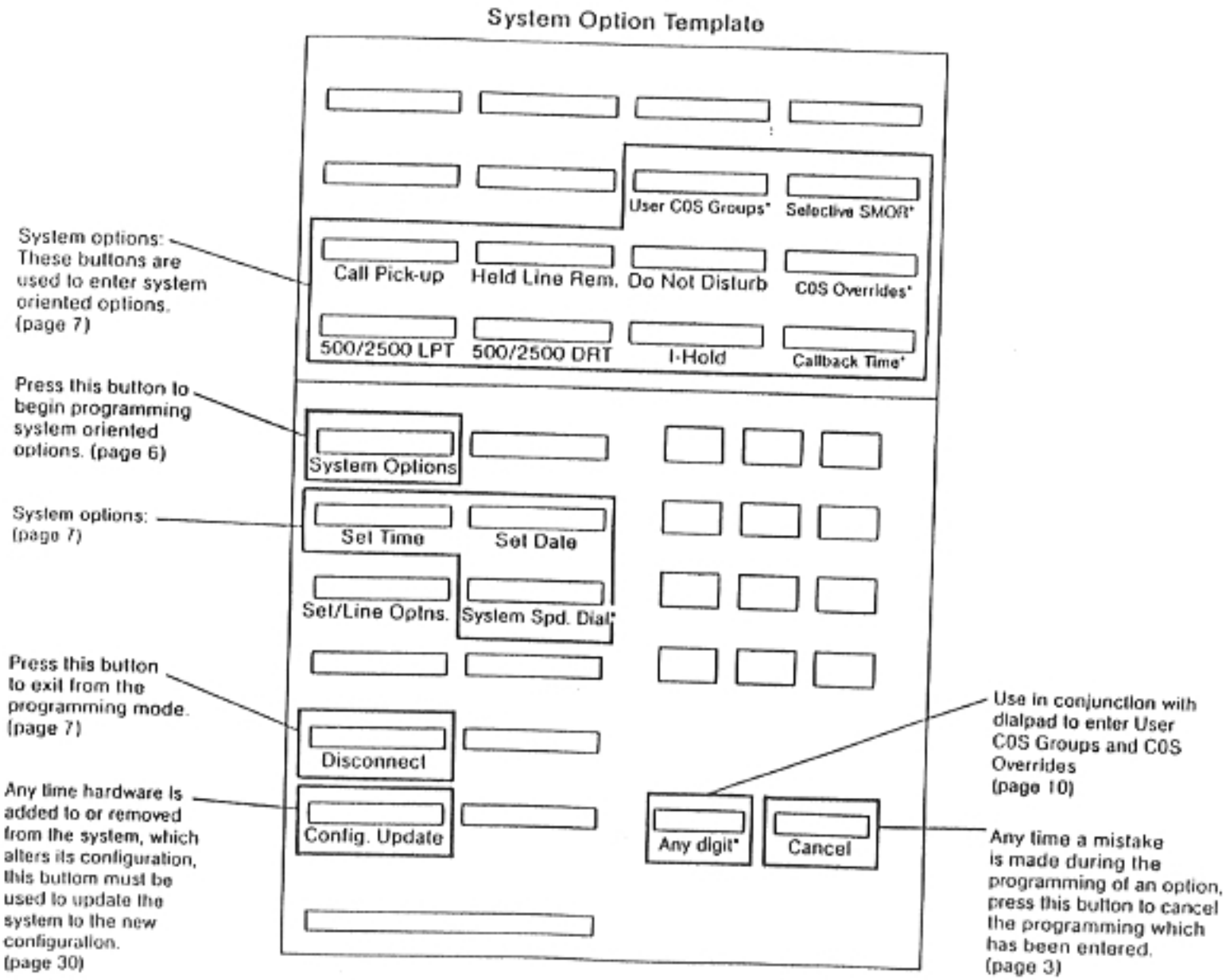
A) Programming System Features, and
B) Programming Station Set and Line Features

features and options are programmed by keying codes into the Administration set. An administration set is any Vantage set installed as extension number 38. If a 16 K/L PEM is to be installed in any station set in the system, the Administration set must contain one to provide programming. Once the Common Equipment has been installed and is powered up, and the Administration set has been installed, you are ready to begin programming.

When programming on the Administration set, remember the following:

1. If you make an error by entering an invalid code, an overflow tone will sound and all LEDs associated with the programming of that feature will be turned off. The system will disregard the programming of that feature, but will retain all of the programming associated with other features previously entered.
2. If you change your mind and don't wish to continue programming a particular feature, simply press the CANCEL button. The system will disregard the programming of that feature and return to its previous state.
3. If you wish to discontinue programming at any time during the programming process, simply press the DISCONNECT button.
4. All systems leave the factory with certain system, set and line features pre-programmed. Program only those options which must be changed from these factory settings. (These settings are listed in Tables A-1, B-2, B-3.)
5. If you wish to return a set or a line back to the factory settings, use the INITIALIZE DATA button.

A. Programming System Features



* Not available on systems equipped with NT? AA CPU

A. Programming System Features

Complete the Vantage 48 System and Line Survey Sheet prior to starting

The programming of system options is a three step procedure in which programming codes are keyed into the Administration set (explained on page 3). These steps are:

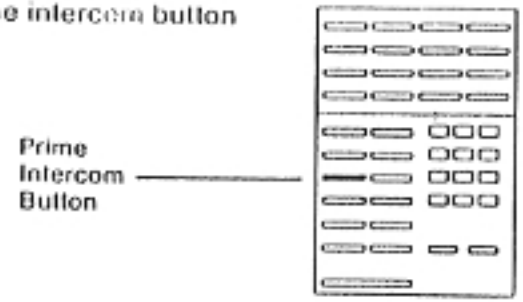
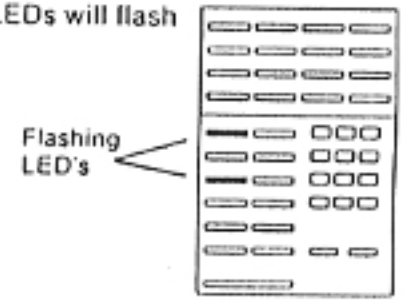
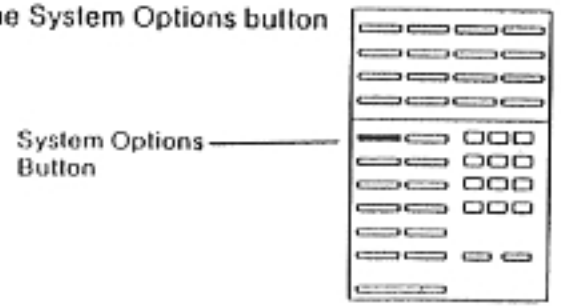
1) Keying a code into the Administration set dialpad to enter the programming mode.
2) Keying codes into the Administration set dialpad to program options and features.
3) Exiting from the programming mode.

Additionally, a procedure for updating the system when hardware is added or removed is provided on page 23.

Simply follow the step by step procedure.

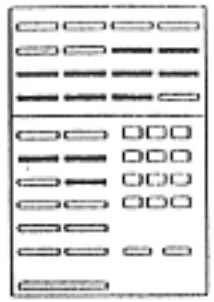
Programming System Features cont'd

Entering the programming mode

Action	System Response
• press prime intercom button (Note) 	• LED glows steadily
• using the dialpad, enter the code 8977	• two LEDs will flash 
• place the System Option Template over the Administration set	
• press the System Options button 	• System Options LED will glow steadily • Set/Line Options LED will go dark • A confirmation tone will sound

Note: Dip switch 1 (Administration lock) on Memory Card NT2B11 must be set to the open (off) position.

Programming System Features cont'd

	Action	System Response
Programming the system options	• press the desired option button. Note 1 	• associated option button LED glows steadily
	• using the dialpad, enter the appropriate value for the option. Values are listed in table A-1, page 8.	• confirmation tone sounds • option button LED goes dark
	• repeat these two instructions until all of the required System Options have been set.	
Exiting from the programming mode. (Notes 2 and 3)	• once all of the required options have been programmed, exit from the programming mode and return the administration set to normal service by pressing the DISCONNECT button, or returning the handset to its cradle. Remove the System Option Template.	

Note 1: All systems leave the factory with features pre-programmed. Program only those features that must be changed from these factory settings. The settings are listed in Table A-1.

Note 2: If you wish to proceed directly to the programming of Set or Line Options, do not exit from the Programming mode. Proceed directly to the "Programming the Set and Line Options" portion of Section B.

Note 3: During the programming of system options you may wish to obtain a print-out detailing what options have been selected. For details on how this can be obtained, see p. 31.

Programming System Features cont'd

Table A-1 — System programming options and settings

Option	Valid Settings
Set Time	Enter the present time in the 24 hour clock format: HHMMSS (i.e.: 2:20.15 P.M. would be entered as 142015) *Factory setting is 000000
Set Date	Enter the present date in the format: YYMMDD (i.e.: June 3, 1985 would be entered as: 850603) *Factory setting is 000301.
Call Pick-up, C.O. lines (System Call Pickup)	*0—allows system wide access to Call Pick-up ringing C.O. lines. 1—denies system wide access to Call Pick-up ringing C.O. lines.
500/2500 Set Line Pool Transfer (500/2500 LPT)	0—denies automatic progression to the Line Pool when designated line is busy. *1—allows automatic progression to the Line Pool when designated line is busy.
Held Line Reminder. (Held Line Rem)	0—disables the feature *1—enables the feature, causing a tone to sound at the set if a call has been held longer than 60 seconds.
500/2500 Delayed Ring Transfer (500/2500 DRT)	0—disables the feature *1—enables the feature causing 500/2500 set incoming calls to also ring at the Prime Set after 3 ring cycles.
Do Not Disturb	*0—allows all Vantage sets to use the Do Not Disturb feature. 1—denies all Vantage sets the use of the Do Not Disturb feature.
I-Hold LED Presence (I-Hold)	0—Regular flashing rate held line indication at the set which put the call on hold. *1—Faster flashing rate held line indication at the set which put the call on hold.
CAP Transfer Callback Time Note 1 (Callback Time)	0 –18 seconds 1 –24 seconds *2 –30 seconds 3 –36 seconds

*Factory Settings

Table A-1 (cont) — System programming options and settings.

Option	Valid Settings
SMDR Printout. (Note 1) (Selective SMDR)	10-Prints all outgoing calls *11-Prints all calls: (incoming & outgoing) 12-Prints outgoing calls starting with 0 13-Prints outgoing calls starting with 1 14-Prints outgoing calls starting with 0 or 1 15-Prints outgoing calls starting with 0, 1 or 411 16-Prints outgoing calls starting with 9 17-Prints outgoing calls starting with 90 18-Prints outgoing calls starting with 91 19-Prints outgoing calls starting with 90 or 91 20-Prints outgoing calls starting with 90, 91 or 9411 21-Prints outgoing calls starting with 0 or 1 as first or second digit 22-Prints outgoing calls starting with 9 followed by 0 or 1 as first or second digit 90-93 Prints outgoing calls starting with digits in programmable COS 90-93 respectively.

Note 1: Not programmable on systems equipped with NT2B05AA CPU.

Programming System Features cont'd

Programming COS Overrides and User COS System Options

These procedures assume the Administration set is currently in the System programming mode. If it is not, follow the procedure on page 6.

COS Overrides

Allows the programming of up to 10 dialing sequences that will bypass any class of service restriction.

Action	System Response
• press the COS Overrides button	o LED glows steadily
• dial 0 to 9 to select one of the ten sequences that you wish to program/ reprogram	o LED flashes
• dial the sequence (6 digits max.) that you wish to be ignored by COS restrictions (e.g. 1-800)	o LED continues to flash
• to enter the dialed number sequence, press COS Overrides button again	o LED goes dark o A confirmation tone sounds
• repeat the previous four instructions to program all COS Override sequences desired (max. of ten)	

Note 1: To blank COS Overrides sequences, follow the above procedure but skip the third step, i.e. do not dial in any COSO digits.

Note 2: The "Any digit" button can be used in the third step to enter a "wild card" digit in the COSO sequence, e.g. Dialing 1-any digit-0-0, will allow dialling of 1-000+, 1-100+, 1-200+, ... 1-900+ numbers.

Note 3: This option is not available on systems equipped with NT2B05AA CPU.

User COS Groups

In addition to the fixed Class of Service codes (10-22), up to four programmable COS's are available (90-93). Each programmable COS can have one, two, or three separate dialing sequences that are checked. Each dialing sequence can be up to 5 digits long.

Action	System Response
• press the User COS Groups button	○ LED glows steadily
• dial 90 to 93 to select one of the four programmable COS's that you wish to program/reprogram	○ LED flashes
• dial 1, 2 or 3 to select one of the three sequences that you wish to program/ reprogram	○ LED flashes rapidly
• dial a sequence (5 digits max.) that you wish to be denied by this COS.	○ LED continues to flash rapidly
• to enter the dialed number sequence, press the User COS Groups button again	○ LED goes dark ○ A confirmation tone sounds
• repeat the previous five steps to enter up to three sequences for each COS.	

Note 1: To assign COS's to individual sets, see Section B, page 19.

Note 2: To blank COS sequences, follow the above procedure, but skip the fourth step.

Note 3: The "Any digit" button can be used in the fourth step to enter a "wild card" digit in the COS sequence, e.g. Dialing Any digit-0 will deny any dialing sequence with a 0 as a second digit.

Note 4: This option is not available on systems equipped with NT2B05AA CPU.

Programming System Features cont'd

Programming System Speed Dial Numbers

This procedure assumes the Administration set is already in the System programming mode. If it is not, see procedure on page 6.

Action	System Response
• press System Speed Dial button	o LED glows steadily
• dial 30-61 to select a system speed dial memory location to be programmed	o LED flashes
• dial the number to be stored. Use the * key to insert 1.5 second pauses. (Note 1.)	o LED continues to flash
• press System Speed Dial button again to enter number	o LED goes dark o confirmation tone is heard
• repeat the above four steps to program all 32 system speed dial numbers.	

Note 1: Each memory location can store a maximum of 20 digits including pauses. Use 'pauses' to allow for waiting for dial tone.

Note 2: See also User Guide.

Note 3: This feature is not available on systems equipped with NT2B05AA CPU.

V48—Programming Guide

The Vantage 48 Programming Guide is intended to provide a step-by-step procedure for an installer to program features on a Vantage 48 key telephone system. Prior to programming, the installer must have the system hardware installed, with appropriate circuit card dip switches set, and be aware of the features required on both a system-wide basis and the features required by each individual station set. To assist in gathering this information, data sheets have been provided along with this installation package. They are:

System Options Survey Sheet
CO/PBX Line Survey Sheet
Station Set Survey Sheet
CO/PBX Line Configuration Sheet

These survey sheets should be filled out prior to system programming, as the data contained in them will help greatly to speed up the process.

Programming Vantage 48 is done in two steps. While the order of the steps may be changed, we suggest the following:

a) System features programmed via codes keyed into the Administration Set.

b) Station Set and Line features programmed via codes keyed into the Administration Set.

The Table of Contents on page 2 outlines the operations required to program all system and set options.

Contents

Beginning the Programming Process

The Administration set

In the two programming sections of this guide,

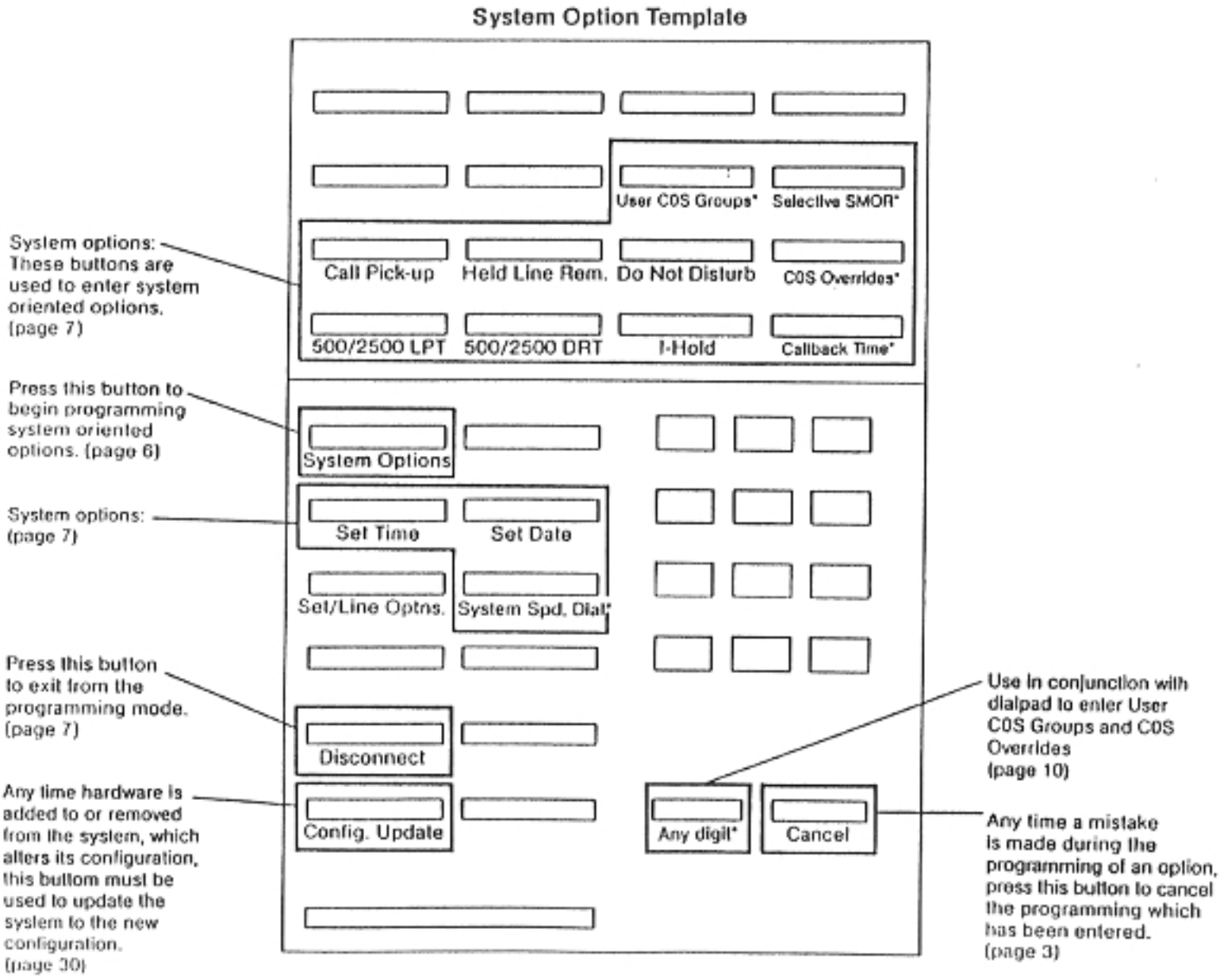
A) Programming System Features, and
B) Programming Station Set and Line Features

features and options are programmed by keying codes into the Administration set. An administration set is any Vantage set installed as extension number 38. If a 16 K/L PEM is to be installed in any station set in the system, the Administration set must contain one to provide programming. Once the Common Equipment has been installed and is powered up, and the Administration set has been installed, you are ready to begin programming.

When programming on the Administration set, remember the following:

1. If you make an error by entering an invalid code, an overflow tone will sound and all LEDs associated with the programming of that feature will be turned off. The system will disregard the programming of that feature, but will retain all of the programming associated with other features previously entered.
2. If you change your mind and don't wish to continue programming a particular feature, simply press the CANCEL button. The system will disregard the programming of that feature and return to its previous state.
3. If you wish to discontinue programming at any time during the programming process, simply press the DISCONNECT button.
4. All systems leave the factory with certain system, set and line features pre-programmed. Program only those options which must be changed from these factory settings. (These settings are listed in Tables A-1, B-2, B-3.)
5. If you wish to return a set or a line back to the factory settings, use the INITIALIZE DATA button.

A. Programming System Features



* Not available on systems equipped with NT2B05AA CPU

A. Programming System Features

Complete the Vantage 48 System Survey Sheet prior to starting

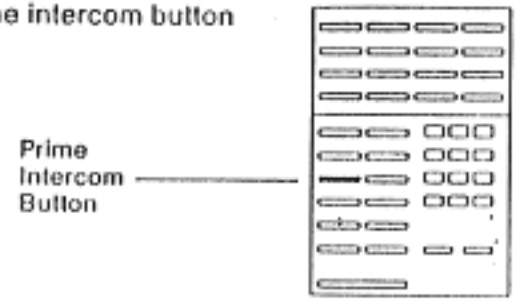
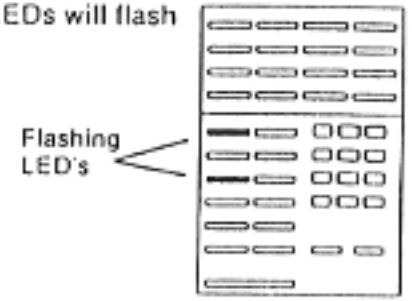
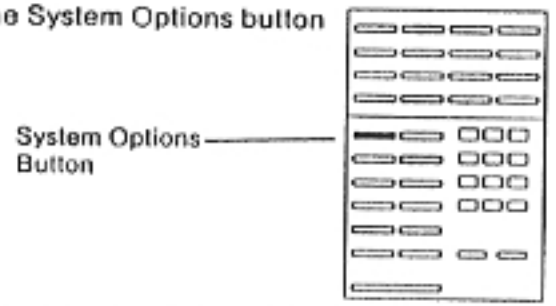
The programming of system options is a three step procedure in which programming codes are keyed into the Administration set (explained on page 3). These steps are:

1) Keying a code into the Administration set dialpad to enter the programming mode.
2) Keying codes into the Administration set dialpad to program options and features.
3) Exiting from the programming mode.

Additionally, a procedure for updating the system when hardware is added or removed is provided on page 23.

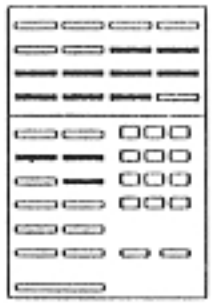
Simply follow the step by step procedure.

Entering the programming mode

Action	System Response
• press prime intercom button (Note) 	• LED glows steadily
• using the dialpad, enter the code 8977	• two LEDs will flash 
• place the System Option Template over the Administration set	
• press the System Options button 	• System Options LED will glow steadily • Set/Line Options LED will go dark • A confirmation tone will sound

Note: Dip switch 1 (Administration lock) on Memory Card NT2B11 must be set to the open (off) position.

Programming System Features cont'd

	Action	System Response
Programming the system options	• press the desired option button. Note 1 	• associated option button LED glows steadily
	• using the dialpad, enter the appropriate value for the option. Values are listed on the Vantage 48 System Survey Sheet. (see table A-1, page 8, for option settings).	• confirmation tone sounds • option button LED goes dark
	• repeat these two instructions until all of the required System Options have been set.	
Exiting from the programming mode. (Notes 2 and 3)	• once all of the required options have been programmed, exit from the programming mode and return the administration set to normal service by pressing the DISCONNECT button, or returning the handset to its cradle. Remove the System Option Template.	

Note 1: All systems leave the factory with features pre-programmed. Program only those features that must be changed from these factory settings. The settings are listed in Table A-1.

Note 2: If you wish to proceed directly to the programming of Set or Line Options, do not exit from the programming mode. Proceed directly to the "Programming the set and Line Options" portion of section B.

Note 3: During the programming of system options you may wish to obtain a print-out detailing what options have been selected. For details on how this can be obtained, see p. 31.

Table A-1 — System programming options and settings

Option	Valid Settings
Set Time	Enter the present time in the 24 hour clock format: HHMMSS (i.e.: 2:20.15 P.M. would be entered as 142015) *Factory setting is 000000
Set Date	Enter the present date in the format: YYMMDD (i.e.: June 3, 1985 would be entered as: 850603) *Factory setting is 000301.
Call Pick-up, C.O. lines (System Call Pickup)	*0—allows system wide access to Call Pick-up ringing C.O. lines. 1—denies system wide access to Call Pick-up ringing C.O. lines.
500/2500 Set Line Pool Transfer (500/2500 LPT)	0—denies automatic progression to the Line Pool when designated line is busy. *1—allows automatic progression to the Line Pool when designated line is busy.
Held Line Reminder. (Held Line Rem)	0—disables the feature *1—enables the feature, causing a tone to sound at the set if a call has been held longer than 60 seconds.
500/2500 Delayed Ring Transfer (500/2500 DRT)	0—disables the feature *1—enables the feature causing 500/2500 set incoming calls to also ring at the Prime Set after 3 ring cycles.
Do Not Disturb	*0—allows all Vantage sets to use the Do Not Disturb feature. 1—denies all Vantage sets the use of the Do Not Disturb feature.
I-Hold LED Presence (I-Hold)	0—Regular flashing rate held line indication at the set which put the call on hold. *1—Faster flashing rate held line indication at the set which put the call on hold.
CAP Transfer Callback Time Note 1 (Callback Time)	0—18 seconds 1—24 seconds *2—30 seconds 3—36 seconds

*Factory Settings

Table A-1 (cont) — System programming options and settings.

Option	Valid Settings
SMDR Printout. (Note 1) (Selective SMDR)	10-Prints all outgoing calls *11-Prints all calls: (incoming & outgoing) 12-Prints outgoing calls starting with 0 13-Prints outgoing calls starting with 1 14-Prints outgoing calls starting with 0 or 1 15-Prints outgoing calls starting with 0, 1 or 411 16-Prints outgoing calls starting with 9 17-Prints outgoing calls starting with 90 18-Prints outgoing calls starting with 91 19-Prints outgoing calls starting with 90 or 91 20-Prints outgoing calls starting with 90, 91 or 9411 21-Prints outgoing calls starting with 0 or 1 as first or second digit 22-Prints outgoing calls starting with 9 followed by 0 or 1 as first or second digit 90-93 Prints outgoing calls starting with digits in programmable COS 90-93 respectively.

Note 1: Not programmable on systems equipped with NT2B05AA CPU.

Programming System Features cont'd

Programming COS Overrides and User COS System Options

These procedures assume the Administration set is currently in the System programming mode. If it is not, follow the procedure on page 6.

COS Overrides

Allows the programming of up to 10 dialing sequences that will bypass any class of service restriction.

Action	System Response
• press the COS Overrides button	○ LED glows steadily
• dial 0 to 9 to select one of the ten sequences that you wish to program/ reprogram	○ LED flashes
• dial the sequence (6 digits max.) that you wish to be ignored by COS restrictions (e.g. 1-800)	○ LED continues to flash
• to enter the dialed number sequence, press COS Overrides button again	○ LED goes dark ○ A confirmation tone sounds
• repeat the previous four instructions to program all COS Override sequences desired (max. of ten)	

Note 1: To blank COS Overrides sequences, follow the above procedure but skip the third step, i.e. do not dial in any COSO digits.

Note 2: The "Any digit" button can be used in the third step to enter a "wild card" digit in the COSO sequence, e.g. Dialing 1-any digit-0-0, will allow dialling of 1-000+, 1-100+, 1-200+, ... 1-900+ numbers.

Note 3: This option is not available on systems equipped with NT2B05AA CPU.

User COS Groups

In addition to the fixed Class of Service codes (10-22), up to four programmable COS's are available (90-93). Each programmable COS can have one, two, or three separate dialing sequences that are checked. Each dialing sequence can be up to 5 digits long.

Action	System Response
• press the User COS Groups button	o LED glows steadily
• dial 90 to 93 to select one of the four programmable COS's that you wish to program/reprogram	o LED flashes
• dial 1, 2 or 3 to select one of the three sequences that you wish to program/ reprogram	o LED flashes rapidly
• dial a sequence (5 digits max.) that you wish to be denied by this COS.	o LED continues to flash rapidly
• to enter the dialed number sequence, press the User COS Groups button again	o LED goes dark o A confirmation tone sounds
• repeat the previous five steps to enter up to three sequences for each COS.	

Note 1: To assign COS's to individual sets, see Section B, page 19.

Note 2: To blank COS sequences, follow the above procedure, but skip the fourth step.

Note 3: The "Any digit" button can be used in the fourth step to enter a "wild card" digit in the COS sequence, e.g. Dialing Any digit-0 will deny any dialing sequence with a 0 as a second digit.

Note 4: This option is not available on systems equipped with NT2B05AA CPU.

Programming System Features cont'd

Programming System Speed Dial Numbers

This procedure assumes the Administration set is already in the System programming mode. If it is not, see procedure on page 6.

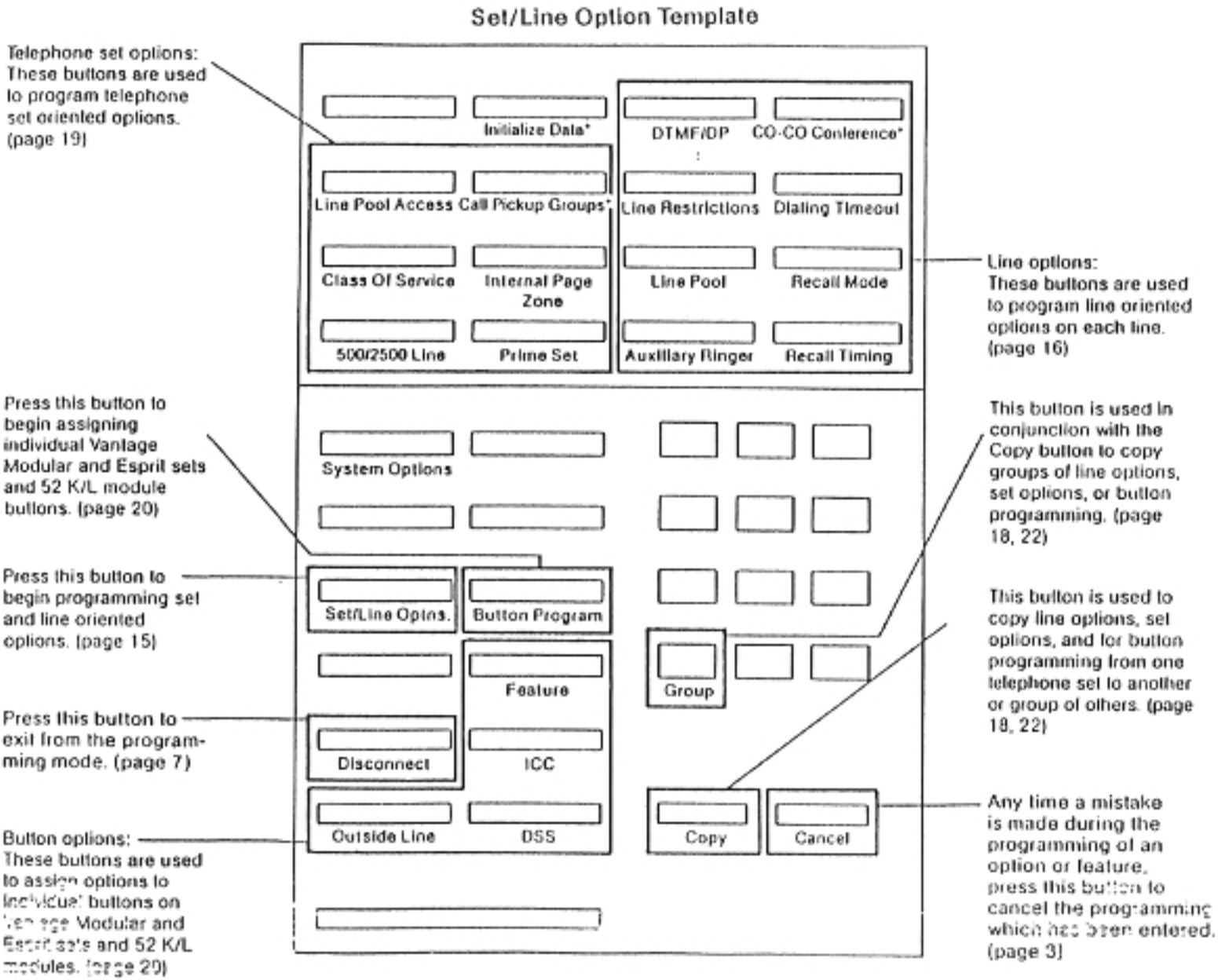
Action	System Response
• press System Speed Dial button	○ LED glows steadily
• dial 30-61 to select a system speed dial memory location to be programmed	○ LED flashes
• dial the number to be stored. Use the * key to insert 1.5 second pauses. (Note 1.)	○ LED continues to flash
• press System Speed Dial button again to enter number	○ LED goes dark ○ confirmation tone is heard
• repeat the above four steps to program all 32 system speed dial numbers.	

Note 1: Each memory location can store a maximum of 20 digits including pauses. Use 'pauses' to allow for waiting for dial tone.

Note 2: See also User Guide.

Note 3: This feature is not available on systems equipped with NT2B05AA CPU.

B. Programming Station Set and Line Features



* Not available on systems equipped with NT2B05AA CPU.

B. Programming Station Set and Line Features

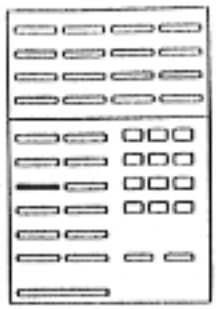
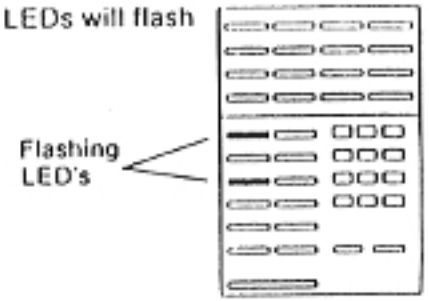
Complete the Vantage 48 CO/PBX Line survey sheet and Vantage 48 station set survey sheet prior to starting.

As with the programming of system options, programming station set and line features follows a three step procedure in which programming codes are keyed into the administration set (administration set is explained on page 3). These steps are:

1) Keying a code into the Administration set to enter the programming mode.
2) Keying codes into the Administration set to program options and features.
3. Exiting from the Administration mode.

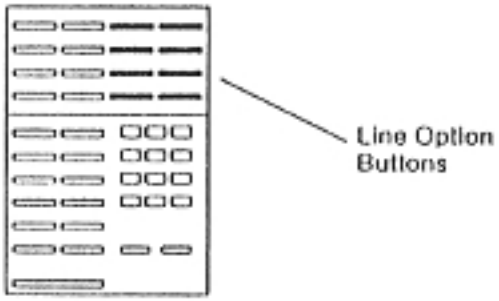
Simply follow the step by step procedure.

Programming Station Set and Line Features cont'd

Action	System Response
Entering the programming mode. DIP switch 1 (Administration lock) on Memory Card NT2B11 must be set to the open (off) position. • press prime intercom button 	• LED glows steadily
• using the dialpad, enter the code 8977	• two LEDs will flash 
• place the Set/Line Option Template over the Administration set.	
• press the Set/Line Options button 	• Set/Line Options LED glows steadily. • System Options LED will go dark.

Programming the Line Options.

This procedure assumes the Administration set is currently in the Set/Line programming mode. If it is not, see procedure on page 15.

Action	System Response
• using the dialpad, enter the number of the line to be programmed. (lines are numbered 10-25)	• confirmation tone sounds
• press the desired line option button 	• associated option button LED glows steadily
• using the dialpad, enter the appropriate value for the option. Values are listed on the Vantage CO/PBX Line Survey Sheet. (See Table B-1, page 17, for valid settings).	• confirmation tone sounds • option button LED goes dark
• repeat the previous two instructions until all of the required line options have been programmed for that line.	
• press the set/line options button again and repeat this procedure for remaining lines.	

Note: After one line has been programmed, you may wish to use it as a model to program other lines by using the COPY key. This can reduce your programming time considerably. For instructions on how to COPY program, see page 18.

Programming Line Features cont'd

Table B-1 — Line programming options and features

Option	Valid Settings
Dual Tone Multi Frequency or Dial Pulse (DTMF/DP)	0–DTMF is to be used 1–DP is to be used *2–both DTMF and DP can be used
Line Restrictions	*0–line has both incoming and outgoing calls allowed 1–line is restricted to incoming calls only
Line Pool (Note 1)	0–line is not to be included in any line pool *1–line is to be part of line pool 1 (291 access) 2–line is to be part of line pool 2 (292 access) 3–line is to be part of line pool 3 (293 access) 4–line is to be part of line pool 4 (294 access) Note: Line 10 is factory set to not be in the line pool.
Auxiliary Ringer	*0–incoming calls on the line will not cause an auxiliary ringer to sound. 1–incoming calls on the line will cause an auxiliary ringer to sound.
CO-CO Conferencing Denial (Note 2)	0–line cannot be conferenced with another line. *1–line can be conferenced with another line.
Dialing Timeout	0–no timeout *1–a twelve second timeout is activated.
Recall Mode	*0–for loop current 1–for ground signal
Recall Timing	0– 300 ms recall timing *1– 700 ms recall timing 2–1000 ms recall timing 3–1600 ms recall timing
Initialize Date (Note 2)	no code required; resets line options to factory settings.

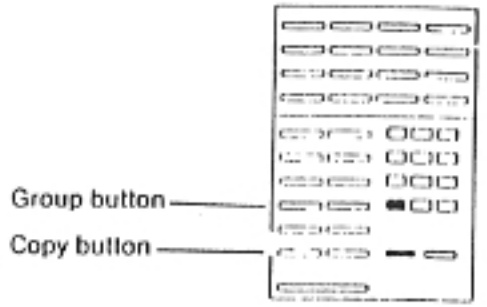
* Factory Settings.

Note 1: Systems with NT2B05AA CPU have a single line pool and will accept a 0 or 1 only.

Note 2: Not programmable on systems equipped with NT2B05AA CPU.

Using the COPY and GROUP buttons to duplicate line features.

This procedure assumes the Administration set is currently in the programming mode.
If it is not, see procedure on page 15. (Note 1.)

Action	System Response
• press the Set/Line Options button.	• the Set/Line Options LED glows steadily.
• using the dialpad, enter the number of the line to be programmed (10-25). If a consecutive group of lines are to be programmed, enter the first line number, press the GROUP button, and then enter the last line number.	• confirmation tone sounds 
• press the COPY button	
• using the dialpad enter the number of the line being copied.	• confirmation tone sounds when copying is completed

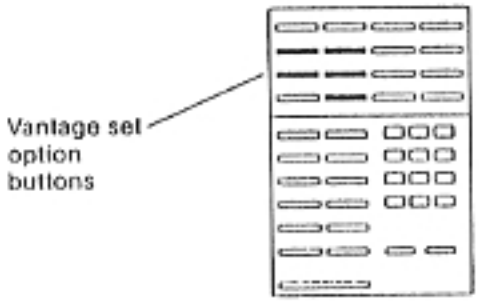
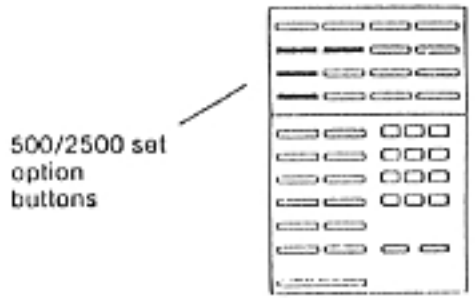
Note 1: Copy and Group buttons can be used separately. Copy and Group functions require that all Lines involved in the operation must be equipped (line card provided).

Programming Station Set Features

Programming Set Options

500/2500 and Vantage type sets.

This procedure assumes the Administration set is in the Set/Line programming mode. If it is not, see procedure on page 15.

Action	System Response
• using the dialpad, enter the extension number of the station set to be programmed (30-77) followed by one of the following digits, which identify the type of station set. 0–for a 500/2500 set 1-for a Vantage Modular or Esprit set 2-for a CAP set 3-for a CAP 52 key/lamp module	• confirmation tone sounds
• press the desired set option button. Please note those options to be programmed for Vantage sets and those to be programmed for 500/2500 sets.  	• associated option button LED glows steadily 
• using the dialpad, enter the appropriate value for the desired option. Values are listed on the Vantage 48 Station Set Survey Sheet. (See Table B-2, page 23.)	• confirmation tone sounds • option button LED goes dark
• repeat the previous two instructions until all of the required set options have been programmed for that set.	

Note 1. If more than four Vantage sets are to be prime sets but not CAPS, program the CAP positions first.

Programming Vantage Set Buttons

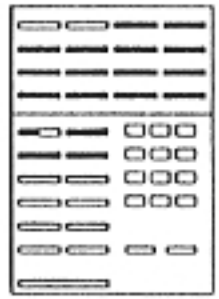
Vantage Modular, Esprit and 52 K/L Sets only.

This procedure assumes the Administration set is in the Set/Line programming mode (page 15) and a valid set extension mode has been entered (page 19, step 1)

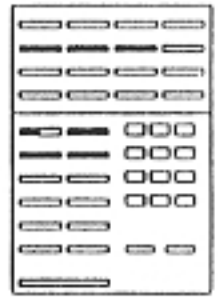
Action	System Response
• press the Button Program button.	• Button Program LED glows steadily

Action	System Response
• press a programmable button on the Administration set which corresponds to the button you wish to assign on the Vantage Set. If necessary, refer to page 22, for a detailed explanation of this procedure.	• associated LED glows steadily

Button equivalency for Vantage Modular Set (One to One). Note that prime line key ▬ must be a line



Button equivalency for Vantage Esprit Set (page 28). Note that prime line key ▬ must be a line



Button equivalency for 52 K/L Module (Page 29). Note that these keys must be features.

Action	System Response
• press the desired button option button. (Line, DSS, Feature or ICC)	• associated LED glows steadily

Programming Station Set Features cont'd

Programming Vantage Set Buttons cont'd

Action	System Response
• press the desired button option button. (Line, DSS, Feature or ICC)	• associated LED glows steadily
• using the dialpad, enter the appropriate option code (see Table B-3, page 26, for valid settings). Appropriate codes will have been entered on the Station Set Survey Sheet.	• confirmation tone sounds • all LEDs except the set/line options LED go dark
• repeat the previous four instructions until all of the programmable buttons have been programmed for that Vantage set.	
• to begin setting options for another set, depress Set/Line Options button again and return to page 19.	
• when all Station Set Options have been set, return the Administration Set to normal service by depressing the Disconnect button, or by returning the handset to its cradle.	

Note 1: At any time during the programming of sets and lines you may wish to obtain a print-out detailing the lines, features, and options programmed for each set. For details on how this can be obtained, see page 31.

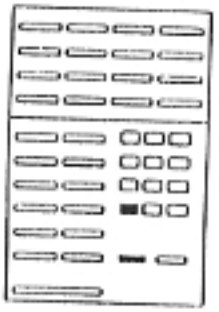
Note 2: After one set has been programmed, you may wish to use it as a model to program other sets by using the COPY key. This can reduce your programming time considerably. For instructions on how to duplicate the programming of one set for the purpose of programming other sets, see page 22.

CAUTION! The system will not permit programming the same C.O. line/Feature/DDS on more than one key. (Attempting to do so will result in overflow tone being returned.) An exception to this rule is inoperable DSS key assignment, i.e. DSS 0. In order to minimize the possibility of button programming conflicts, it is recommended that all programmable buttons be initially set to DSS 0. The prime line key can be programmed to Line 0. This is similar to the factory settings. To reset a Station set to the factory settings, use the Initialize Data button (page 23) or follow the procedure on page 30, note 1.

Programming Station Set Features cont'd

Using the COPY and GROUP buttons to duplicate station set features

This procedure assumes the Administration set is currently in the programming mode.
If it is not, see procedure on page 15, Note 1.

Action	System Response
• press Set/Line Options button	• the Set/Line Options LED glows steadily.
• using the dialpad, enter the extension number of the station set to be programmed (30-77) followed by one of the following digits, which identify the type of station set. 0-for a 500/2500 set 1-for a Vantage Modular, Esprit Plus or Esprit set 2-for a CAP set 3-for a CAP 52 key/lamp module If a consecutive group of sets is to be programmed, provided they are identical set types, then enter the first station set, press the GROUP button, and then enter the last station set extension number. The maximum number of sets that can be in a programming group is 16.	• confirmation tone sounds 
• press the COPY button	
• using the dialpad, enter the station set extension number being copied.	• confirmation tone sounds when copying is completed

Note 1: Copy and Group buttons can be used separately. Copy and Group functions require that all sets involved in the operation must be equipped (station card provided), and be of the same type i.e., 500/2500 or Vantage Modular/Esprit Plus/Esprit or Vantage CAP or Vantage 52 K/L.

Programming Station Set Features cont'd

Table B-2 — Station set programming options

Option	Restrictions	Valid Settings
Line Pool Access Note 1	not applicable to 52K/L Module	0—to deny the set access to one or more line pools. *1—to allow the set access to one or more line pools. If LED flashes, enter the line pool numbers (1-4) that are to be denied/allowed. Following this, press the Line Pool Access button again. 1-291 access line pool 2-292 access line pool *all allowed 3-293 access line pool 4-294 access line pool
Class of Service Note 2	not applicable to 52 K/L Module	*10—no restrictions 11—restrict outgoing calls 12—restrict 0 dialing 13—restrict 1 dialing 14—restrict 0, 1 dialing 15—restrict 0, 1 and 411 dialing 16—restrict 9 dialing 17—restrict 90 dialing 18—restrict 91 dialing 19—restrict 90, 91 dialing 20—restrict 90, 91 and 9411 dialing 21—restrict 0 or 1 as first or second digit 22—restrict 9 then 0 or 1 as first subsequent digit 90-93—programmable COS's (see System Options, page 10)
Initialize Data Note 3		no code required; resets options and buttons to factory settings

* factory setting

Note 1: Systems equipped with NT2B05AA CPU have single line pool only and will accept the initial 0 or 1 input only.

Note 2: Systems equipped with NT2B05AA CPU do not have programmable COS's 90-93.

Note 3: Not available on systems equipped with NT2B05AA CPU.

Programming Station Set Features cont'd

Table B-2 (continued) Station set programming options

Option	Restrictions	Valid Settings
Dedicated Line with Ring preference or Line Pool (500/2500 Line) Note 3	500/2500 set only	If the 500/2500 set is to have dial "9" access to a dedicated line, enter the number of the line (10-25) followed by: 0—the line won't ring at the set 1—the line will ring at the set If the set is not to have a dedicated line but have dial "9" access to a Line Pool, enter: *291 – for dial "9" access to line pool 291 292 – for dial "9" access to line pool 292 293 – for dial "9" access to line pool 293 294 – for dial "9" access to line pool 294 If the set is not to have dial "9" access to any line or Line Pool, enter 0.
Station Call Pickup Group Assignment (Call Pickup Group) Note 4	not applicable to 52 K/L Module	0—to remove the set from one or more call pickup groups 1—to add the set to one or more call pickup groups The LED will flash. Enter the station call pickup group numbers (1-8) that the set is to be added to or removed from. Following this, press the Call Pickup Group button again. 1—821 access call pickup group 2—822 access call pickup group 3—823 access call pickup group 4—824 access call pickup group *no membership 5—825 access call pickup group in any group 6—826 access call pickup group 7—827 access call pickup group 8—828 access call pickup group

* factory setting

Note 3: Systems equipped with NT2B05AA CPU have single line pool only. For line pool programming, only 29 will be accepted.

Note 4: This feature is not available on systems equipped with NT2B05AA CPU.

Programming Station Set Features cont'd

Table B-2 (continued) Station set programming options

Option	Restrictions	Valid Settings
Internal Page Zone	Vantage Modular, Esprit Plus and Esprit Sets only	*0-receive no paging 1-receive zone 1 paging 2-receive zone 2 paging
Prime Set This set receives delayed ring transfer ringing, DND forced ringing, and Held Line Reminder transfer.	Vantage Modular, Esprit Plus and Esprit Sets only	*0-Is not a prime set 1-is a prime set (6 per system maximum)

* Factory Settings

Table B-3 — Vantage station set button programming

Option	Valid Settings
Outside Line	enter the line number (10-25) to be assigned to this button followed by: 0-the line won't ring at the set 1-the line will ring at the set (Note 1) OR enter one of these codes (Note 2) 290-button access to 290-general line pool access (Note 3) 291-button access to 291 access line pool 292-button access to 292 access line pool 293-button access to 293 access line pool 294-button access to 294 access line pool
DSS	OR enter: 0-inoperative line button (Note 4) enter the extension number (30-77) of the set that will be rung by the depression of that DSS button.
ICC	OR enter: *0-inoperative DSS button (Note 5) no code necessary (Note 6)

* Factory Settings

Note 1: The prime line button is factory set to be line 10, with ringing.

Note 2: Systems equipped with NT2B05AA CPU have a single line pool only. For programming button access to line pool, only 29 will be accepted.

Note 3: A general line pool button is *not* allowed in the prime line position, however specific line pool buttons are.

Note 4: Set prime line button to inoperative line if neither auto prime line nor auto intercom selection is desired.

Note 5: Factory setting for all Vantage programmable buttons except prime line, voice prohibit and page. (Note 1, and page 27, Note 4.) DSS buttons can be reprogrammed to different stations by end users. See User Guide.

Note 6: A maximum of 5 Intercom (ICC) buttons are allowed on each Vantage station set.

Table B-3 (continued) Vantage station set button programming

Option	Valid Settings
Feature	enter one of the following codes: 80—system call pickup ringing CO's (Note 1) 810—general page, dial the zone (Note 2) 811—page zone 1 only (Note 2) 812—page zone 2 only (Note 2) 813—page both zones (Notes 2 and 4) 820—general group call pickup, dial the group (Note 3) 821—specific group call pickup, 821 group (Note 3) 822—specific group call pickup, 822 group (Note 3) 823—specific group call pickup, 823 group (Note 3) 824—specific group call pickup, 824 group (Note 3) 825—specific group call pickup, 825 group (Note 3) 826—specific group call pickup, 826 group (Note 3) 827—specific group call pickup, 827 group (Note 3) 828—specific group call pickup, 828 group (Note 3) 831—voice prohibit (Note 4) 832—transfer (Note 5) 833—night service (Note 5) 834—signal call 835—headset on/off 836—callback (Notes 3 and 5) 837—speed dial (Note 3 and 6) 838—leave message (Note 3 and 6) 839—call forward (Note 3 and 6)

Note 1: See also System Options, page 8.

Note 2: On systems equipped with NT2B05AA CPU, the total number of page keys must not exceed 90.

Note 3: Not available on systems equipped with NT2B05AA CPU.

Note 4: Voice Prohibit and Page Both Zones are the factory settings for the two right side keys in the top row of the FEM module.

Note 5: These features can only be programmed on 52 K/L modules (ext. 31, 39) or Vantage CAP sets (ext. 30, 38). Transfer, Call back and Night Service are the factory settings for the three programmable keys on the 52 K/L module.

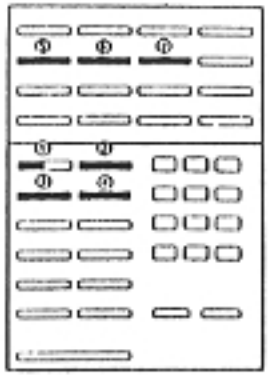
Note 6: These features cannot be programmed on 52 K/L modules (ext. 31, 39)

Programming Station Set Features cont'd

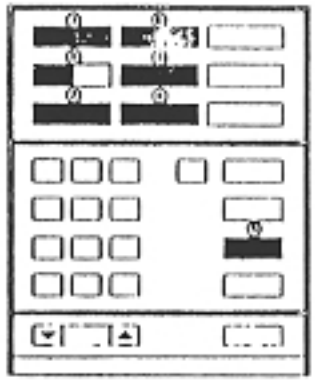
Vantage ESPRIT set button programming

The programmable buttons on a Vantage Esprit set can be programmed as either outside line, feature ICC or DSS buttons in exactly the same manner as a Vantage Modular set. When selecting the button on the Esprit set to be programmed, use the corresponding button on the Administration set as shown in the diagram below.

Esprit Set Programmable buttons. Note that prime line key ⟷ must be a line.



Administration Set



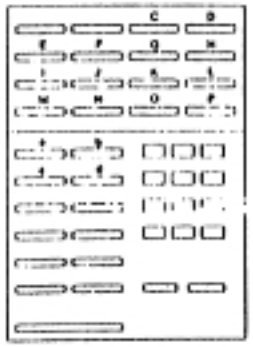
Esprit Set

Note 1: Programmable button 5 on the Vantage Esprit does not have a corresponding LED indicator. This makes it unsuitable for Lines and some features. Recommended features for this button are Speed Dial or Call Pickup.

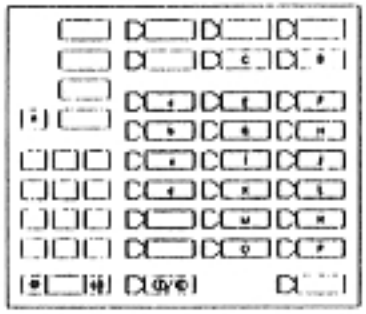
Note 2: The programmable buttons on the Vantage Modular and Vantage Esprit sets are a subset of programmable buttons on the Vantage Modular set. The system will not permit programming the same C.O./Feature/DSS on more than one button. It is therefore advisable to start programming by setting all programmable buttons (including those not actually on the Vantage Esprit) to DSS 0. The Prime Line can be set to Line 0. This is similar to the factory settings and the Initialize button can be used to accomplish most of this. By following this procedure, the system administrator will avoid problems in button programming caused by inadvertently attempting to program a C.O./Feature/DSS that already exists on another button.

Vantage Esprit Plus Set Button Programming

The programmable buttons on a Vantage Esprit Plus set can be programmed as either outside line, feature, ICC or DSS buttons in exactly the same manner as Vantage Modular set. When selecting the button on the Esprit Plus set to be programmed, use the corresponding button on the Vantage Modular Administration set as shown in the diagram below.



Modular Set (Administration set)



Esprit Plus Set

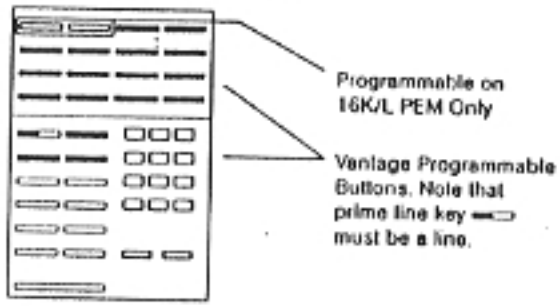
Note 1: If an Esprit Plus Set is used as a CAP set then the keys marked XX on the Administration set cannot be programmed on the Esprit Plus Set.

Note 2: The default valve for Key #5 on the Esprit Plus is Voice Prohibit, and for Key #6 is Page (the same defaults as on the PEM of a Modular Set).

Programming Station Set Features cont'd

Vantage CAP set and 52 K/L Module button programming

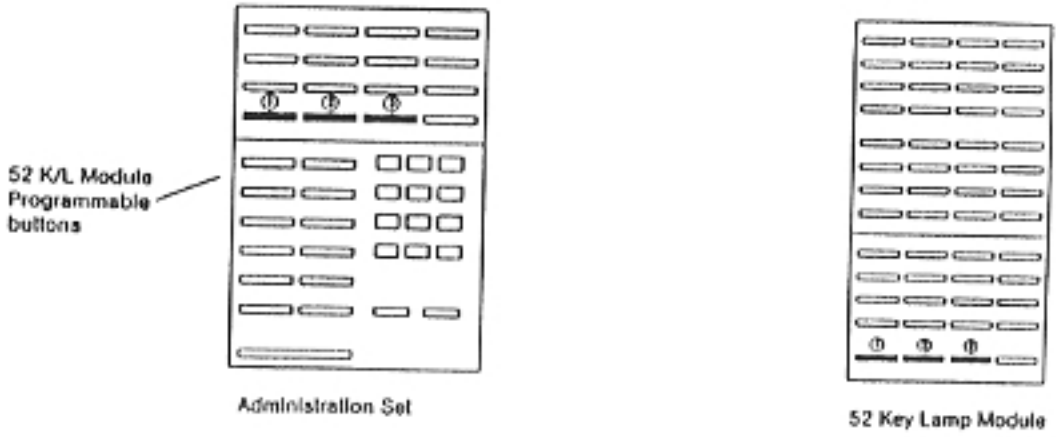
The programmable buttons on the CAP station set can be programmed as either outside line, feature ICC or DSS buttons, in exactly the same manner as a Vantage Set (see page 20). The only difference is that the CAP station set may be equipped with a 16 key/lamp PEM which allows the normally inoperative, top two left-hand buttons to be programmed like any other programmable buttons.



Note: The 52 K/L Module must be physically connected to the system for programming to be allowed.

52 Key/Lamp Module Programming

The lower left three buttons of the 52 K/L module are programmable for features only. They are programmed in the same manner as Vantage station set buttons except that the three lower left buttons of the Administration set's Programmable Expansion Module are used to correspond to the three lower left buttons of the 52 K/L module. See the diagram below:



See Table B-3 for the valid settings of these buttons.

Adding or Removing System Hardware

When hardware (line card, station sets, extension cabinet, etc.) is added to or removed from the system, two methods of informing the system that a new hardware configuration is present are available.

1) The system will automatically update itself when the power is turned on, or the reset button is pushed.

When a system is initially installed this would be the easiest method for the system to establish its configuration status. However, if an installer wishes to add or remove system hardware while the system is in use, it often isn't possible to take the system out of service by powering down and then powering up in order for the system to update its status. Therefore, a second method is available.

2) Use the Configuration Update key.

This method will allow the installer to change the hardware configuration in the system and have the system update its status without powering down. The procedure for this manual update is as follows. Using the Administration set (any Vantage set installed as extension number 38):

	Action	System Response
Enter programming mode	• press prime intercom key	• LED glows steadily
	• key in the code 8977	• two LEDs will flash
	• place System Option Template over the Administration set	
	• press the System Options key	• System Options LED will glow steadily • Set Line Options LED will go dark • a confirmation tone will sound.
Update Configuration Status	• press the Configuration Update key	• LED comes on • LED goes dark when the process has been completed. • Confirmation tone sounds
Exit from Administration mode	• press the Disconnect key or return handset to cradle.	• all LEDs go dark

Note: Updating the system (by either method) with a line or station card removed will cause the lines/stations associated with that card to reset to the factory set options and features.

Configuration Print-out

At any time during the programming of system and/or set and line features and options you may wish to obtain a print-out detailing what has been programmed into the system. To do this you must connect a standard printer to the RS-232C port located on the Memory Card. Once this has been done, continue as follows:

Procedure

- At the Memory Card, set the RS-232C DIP switches to the configuration dump position; 3 on, 4 off.
- After 5 seconds observe that the printer is printing the configuration data dump.
- When complete, return the DIP switches to their normal position.

Programming Station Set Features cont'd

Programming Vantage Set Buttons cont'd

Action	System Response
• using the dialpad, enter the appropriate option code (see Table B-3, page 26, for valid settings). Appropriate codes will have been entered on the Station Set Survey Sheets.	• confirmation tone sounds • all LEDs except the set/line options LED go dark
• repeat the previous four instructions until all of the programmable buttons have been programmed for that Vantage set.	
• to begin selling options for another set, depress Set/Line Options button again and return to page 19.	
• when all Station Set Options have been set, return the Administration Set to normal service by depressing the Disconnect button, or by returning the handset to its cradle.	

Note 1: At any time during the programming of sets and lines you may wish to obtain a print-out detailing the lines, features, and options programmed for each set. For details on how this can be obtained, see page 31.

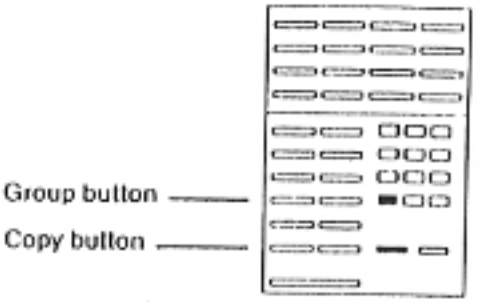
Note 2: After one set has been programmed, you may wish to use it as a model to program other sets by using the COPY key. This can reduce your programming time considerably. For instructions on how to duplicate the programming of one set for the purpose of programming other sets, see page 22.

CAUTION! The system will not permit programming the same C.O. line/Feature/DDS on more than one key. (Attempting to do so will result in overflow tone being returned.) An exception to this rule is inoperable DSS key assignment, i.e. DSS 0. In order to minimize the possibility of button programming conflicts, it is recommended that all programmable buttons be initially set to DSS 0. The prime line key can be programmed to Line 0. This is similar to the factory settings. To reset a Station set to the factory settings, use the Initialize Data button (page 23) or follow the procedure on page 30, note 1.

Programming Station Set Features cont'd

Using the COPY and GROUP buttons to duplicate station set features

This procedure assumes the Administration set is currently in the programming mode.
If it is not, see procedure on page 15, Note 1.

Action	System Response
• press Set/Line Options button	• the Set/Line Options LED glows steadily.
• using the dialpad, enter the extension number of the station set to be programmed (30-77) followed by one of the following digits, which identify the type of station set. 0–for a 500/2500 set 1–for a Vantage Modular or Esprit set 2–for a CAP set 3–for a CAP 52 key/lamp module If a consecutive group of sets is to be programmed, provided they are identical set types, then enter the first station set, press the GROUP button, and then enter the last station set extension number. The maximum number of sets that can be in a programming group is 16.	• confirmation tone sounds 
• press the COPY button	
• using the dialpad, enter the station set extension number being copied.	• confirmation tone sounds when copying is completed

Note 1: Copy and Group buttons can be used separately. Copy and Group functions require that all sets involved in the operation must be equipped (station card provided), and be of the same type i.e. 500/2500 or Vantage Modular/Esprit or Vantage CAP or Vantage 52 K/L.

Programming Station Set Features cont'd

Table B-2 — Station set programming options

Option	Restrictions	Valid Settings
Line Pool Access Note 1	not applicable to 52K/L Module	0—to deny the set access to one or more line pools. *1—to allow the set access to one or more line pools. If LED flashes, enter the line pool numbers (1-4) that are to be denied/allowed. Following this, press the Line Pool Access button again. 1-291 access line pool 2-292 access line pool 3-293 access line pool 4-294 access line pool *all allowed
Class of Service Note 2	not applicable to 52 K/L Module	*10—no restrictions 11—restrict outgoing calls 12—restrict 0 dialing 13—restrict 1 dialing 14—restrict 0, 1 dialing 15—restrict 0, 1 and 411 dialing 16—restrict 9 dialing 17—restrict 90 dialing 18—restrict 91 dialing 19—restrict 90, 91 dialing 20—restrict 90, 91 and 9411 dialing 21—restrict 0 or 1 as first or second digit 22—restrict 9 then 0 or 1 as first subsequent digit 90-93—programmable COS's (see System Options, page 10)
Initialize Data Note 3		no code required; resets options and buttons to factory settings

* factory setting

Note 1: Systems equipped with NT2B05AA CPU have single line pool only and will accept the initial 0 or 1 input only.

Note 2: Systems equipped with NT2B05AA CPU do not have programmable COS's 90-93.

Note 3: Not available on systems equipped with NT2B05AA CPU.

Table B-2 (continued) Station set programming options

Option	Restrictions	Valid Settings
Dedicated Line with Ring preference or Line Pool (500/2500 Line) Note 3	500/2500 set only	If the 500/2500 set is to have dial "9" access to a dedicated line, enter the number of the line (10-25) followed by: 0—the line won't ring at the set 1—the line will ring at the set If the set is not to have a dedicated line but have dial "9" access to a Line Pool, enter: *291 — for dial "9" access to line pool 291 292 — for dial "9" access to line pool 292 293 — for dial "9" access to line pool 293 294 — for dial "9" access to line pool 294 If the set is not to have dial "9" access to any line or Line Pool, enter 0.
Station Call Pickup Group Assignment (Call Pickup Group) Note 4	not applicable to 52 K/L Module	0—to remove the set from one or more call pickup groups 1—to add the set to one or more call pickup groups The LED will flash. Enter the station call pickup group numbers (1-8) that the set is to be added to or removed from. Following this, press the Call Pickup Group button again. 1—821 access call pickup group 2—822 access call pickup group 3—823 access call pickup group 4—824 access call pickup group *no membership 5—825 access call pickup group in any group 6—826 access call pickup group 7—827 access call pickup group 8—828 access call pickup group

* factory setting

Note 3: Systems equipped with NT2B05AA CPU have single line pool only. For line pool programming, only 29 will be accepted.

Note 4: This feature is not available on systems equipped with NT2B05AA CPU.

Programming Station Set Features cont'd

Table B-2 (continued) Station set programming options

Option	Restrictions	Valid Settings
Internal Page Zone	Vantage Modular and Esprit Sets only	*0–receive no paging 1–receive zone 1 paging 2–receive zone 2 paging
Prime Set This set receives delayed ring transfer ringing, DND forced ringing, and Held Line Reminder transfer.	Vantages Modular and Esprit Sets only	*0–is not a prime set 1–is a prime set (6 per system maximum)

* Factory Settings

e B-3 — Vantage station set button programming

Option	Valid Settings
Outside Line	enter the line number (10-25) to be assigned to this button followed by: 0—the line won't ring at the set 1—the line will ring at the set (Note 1) OR enter one of these codes (Note 2) 291—button access to 291 access line pool 292—button access to 292 access line pool 293—button access to 293 access line pool 294—button access to 294 access line pool OR enter: 0—inoperative line button (Note 3)
DSS	enter the extension number (30-77) of the set that will be rung by the depression of that DSS button. OR enter: *0—inoperative DSS button (Note 4)
ICC	no code necessary (Note 5)

* Factory Settings

Note 1: The prime line button is factory set to be line 10, with ringing.

Note 2: Systems equipped with NT2B05AA CPU have a single line pool only. For programming button access to line pool, only 29 will be accepted.

Note 3: Set prime line button to inoperative line if neither auto prime line nor auto intercom selection is desired.

Note 4: Factory setting for all Vantage programmable buttons except prime line, voice prohibit and page. (Note 1, and page 27, Note 4.) DSS buttons can be reprogrammed to different stations by end users. See User Guide.

Note 5: A maximum of 5 intercom (ICC) buttons are allowed on each Vantage station set.

Table B-3 (continued) Vantage station set button programming

Option	Valid Settings
Feature	enter one of the following codes: 80—system call pickup ringing CO's (Note 1) 810—general page, dial the zone (Note 2) 811—page zone 1 only (Note 2) 812—page zone 2 only (Note 2) 813—page both zones (Notes 2 and 4) 820—general group call pickup, dial the group (Note 3) 821—specific group call pickup, 821 group (Note 3) 822—specific group call pickup, 822 group (Note 3) 823—specific group call pickup, 823 group (Note 3) 824—specific group call pickup, 824 group (Note 3) 825—specific group call pickup, 825 group (Note 3) 826—specific group call pickup, 826 group (Note 3) 827—specific group call pickup, 827 group (Note 3) 828—specific group call pickup, 828 group (Note 3) 831—voice prohibit (Note 4) 832—transfer (Note 5) 833—night service (Note 5) 834—signal call 835—headset on/off 836—callback (Notes 3 and 5) 837—speed dial (Note 3 and 6) 838—leave message (Note 3 and 6) 839—call forward (Note 3 and 6)

Note 1: See also System Options, page 8.

Note 2: On systems equipped with NT2B05AA CPU, the total number of page keys must not exceed 90.

Note 3: Not available on systems equipped with NT2B05AA CPU.

Note 4: Voice Prohibit and Page Both Zones are the factory settings for the two right side keys in the top row of the PEM module.

Note 5: These features can only be programmed on 52 K/L modules (ext. 31, 39) or Vantage CAP sets (ext. 30, 38). Transfer, Call back and Night Service are the factory settings for the three programmable keys on the 52 K/L module.

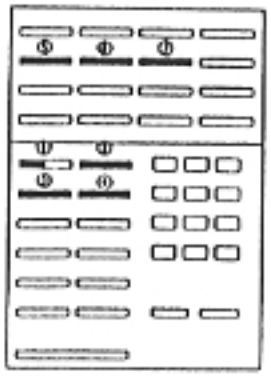
Note 6: These features cannot be programmed on 52 K/L modules (ext. 31, 39)

Programming Station Set Features cont'd

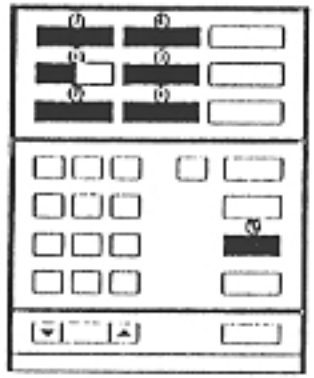
Vantage ESPRIT set button programming

The programmable buttons on a Vantage Esprit set can be programmed as either outside line, feature ICC or DSS buttons in exactly the same manner as a Vantage Modular set. When selecting the button on the Esprit set to be programmed, use the corresponding button on the Administration set as shown in the diagram below.

Esprit Set Programmable buttons. Note that prime line key ⟹ must be a line.



Administration Set



Esprit Set

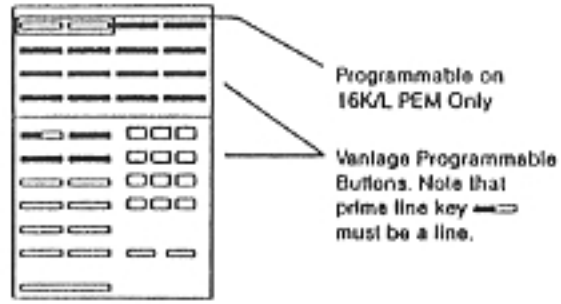
Note 1: Programmable button 5 on the Vantage Esprit does not have a corresponding LED indicator. This makes it unsuitable for Lines and some features. Recommended features for this button are Speed Dial or Call Pickup.

Note 2: The programmable buttons on the Vantage Modular and Vantage Esprit sets are a subset of programmable buttons on the Vantage Modular set. The system will not permit programming the same C.O./Feature/DSS on more than one button. It is therefore advisable to start programming by setting all programmable buttons (including those not actually on the Vantage Esprit) to DSS 0. The Prime Line can be set to Line 0. This is similar to the factory settings and the Initialize button can be used to accomplish most of this. By following this procedure, the system administrator will avoid problems in button programming caused by inadvertently attempting to program a C.O./Feature/DSS that already exists on another button.

Programming Station Set Features cont'd

Vantage CAP set and 52 K/L Module button programming

The programmable buttons on the CAP station set can be programmed as either outside line, feature ICC or DSS buttons, in exactly the same manner as a Vantage Set (see page 20). The only difference is that the CAP station set may be equipped with a 16 key/lamp PEM which allows the normally inoperative, top two left-hand buttons to be programmed like any other programmable buttons.



52 Key/Lamp Module Programming

The lower left three buttons of the 52 K/L module are programmable for features only. They are programmed in the same manner as Vantage station set buttons except that the three lower left buttons of the Administration set's Programmable Expansion Module are used to correspond to the three lower left buttons of the 52 K/L module. See the diagram below:

See Table B-3 for the valid settings of these buttons.

Adding or Removing System Hardware

When hardware (line card, station sets, extension cabinet, etc.) is added to or removed from the system, two methods of informing the system that a new hardware configuration is present are available.

1) The system will automatically update itself when the power is turned on, or the reset button is pushed.

When a system is initially installed this would be the easiest method for the system to establish its configuration status. However, if an installer wishes to add or remove system hardware while the system is in use, it often isn't possible to take the system out of service by powering down and then powering up in order for the system to update its status. Therefore, a second method is available.

2) Use the Configuration Update key.

This method will allow the installer to change the hardware configuration in the system and have the system update its status without powering down. The procedure for this manual update is as follows. Using the Administration set (any Vantage set installed as extension number 38):

	Action	System Response
Enter programming mode	• press prime intercom key	• LED glows steadily
	• key in the code 8977	• two LEDs will flash
	• place System Option Template over the Administration set	
	• press the System Options key	• System Options LED will glow steadily • Set Line Options LED will go dark • a confirmation tone will sound.
Update Configuration Status	• press the Configuration Update key	• LED comes on • LED goes dark when the process has been completed. • Confirmation tone sounds
Exit from Administration mode	• press the Disconnect key or return handset to cradle.	• all LEDs go dark

Note: Updating the system (by either method) with a line or station card removed will cause the lines/stations associated with that card to reset to the factory set options and features.

Configuration Print-out

At any time during the programming of system and/or set and line features and options you may wish to obtain a print-out detailing what has been programmed into the system. To do this you must connect a standard printer to the RS-232C port located on the Memory Card. Once this has been done, continue as follows:

Procedure

- At the Memory Card, set the RS-232C DIP switches to the configuration dump position; 3 on, 4 off.
- After 5 seconds observe that the printer is printing the configuration data dump.
- When complete, return the DIP switches to their normal position.

Vantage 48/Vantage 48C
RS232C Interface Information

ISSUE 1

PO677900

CONTENTS

1. GENERAL

1.01 The RS232 Interface port on the NT2B11 C.E. Memory card will provide data flow for SMDR (Station Message Detail Recording) or Configuration Data output. On Vantage 48 systems equipped with NT2B05AB CPU, the port is capable of System Speed Call Data output and two-way data communication.

Configurations

1.02 The three port configurations available on Vantage 48 systems equipped with NT2B05AB CPU are:

- Data Recording Configuration (NT2B05AA and NT2B05AB CPU)
- Local Applications Configuration (NT2B05AB CPU only)
- Remote Applications Configuration (NT2B05AB CPU only)

The Remote Applications Configuration allows the operation of the RS232 interface to be extended to off-site locations via a modem and a remote modem interface.

2. OPERATIONAL MODES

2.01 There are three modes of operation associated with the RS232C Interface. The RS232C Interface is always in one of these three modes. They are:

(1) **Data Recording (default):**

While in the Data Recording mode, the operating information known as Station Message Detail Recording (SMDR) and Data records (or Dumps) may be obtained either by use of the RS232 mode DIP switches on the memory card, or (on systems equipped with the NT2B05AB CPU) by an appropriate command received at the interface from the peripherals.

In this mode, it is impossible to alter any data stored in the Vantage 48 system — only displays of data are possible.

(2) **Administration via RS232 Interface:**

The Administration mode provides the facility whereby any administrative function capable of being performed on the Administration set may be duplicated via the Interface. In addition, this mode will operate regardless of the settings of the "Administrative Lock" DIP switches (see Table 1).

(3) **Maintenance via RS232 Interface:**

This mode provides the operator with the capability of examining and/or deleting the elements of the maintenance fault Hex code list (see Hardware Installation guide).

Mode Switching

2.02 The 'Data Recording' mode is the default mode which will be initially encountered on establishing a connection with the RS232C port. The other two modes can be accessed only from the Data Recording mode.

While in the Data Recording mode, internal system information cannot be changed.

TABLE 1

Memory Card Switch Settings

Function *Factory Setting	Switch Settings (X-Closed or on — O-Open or Off) S01 1	2	3	4	5	6	S02 1	2	3	4	5	6
Administration Programming												
Programming not allowed	X											
*Programming Allowed	O											
DSS Programming												
Programming not allowed		X										
*Programming allowed		O										
RS232 Settings												
RS232 Port Mode												
SMDR			X	X								
Configuration Dump			X	O								
System Spd Dial Numbers Dump			O	X								
*Unused			O	O								
RS232 Parity												
Parity checked					X							
*Parity not checked					O							
Parity even						O						
Parity odd						X						
RS232 Baud Rate												
110 Baud							X	X	X			
*300 Baud							X	X	O			
1200 Baud							X	O	X			
2400 Baud							X	O	O			
4800 Baud							O	X	X			
9600 Baud							O	X	O			
Unused							O	O	X			
Unused							O	O	O			
Memory Power Back-Up (Note 1)												
Back-up enabled										X		
*Back-up disabled										O		
Dial Pulse Ratio												
*60/40 (North America)											X	
66/33 (International)											O	
Memory Purge (Note 2)												
Clear Memory												X
(Normal Operation												O

3. DATA RECORDING CONFIGURATION

3.01 The Vantage 48 Data Recording Configuration is available on all vintages of the V-48 system. The configuration produces output of SMDR (Station Message Detail Recording) and Configuration Data to a serial printer or similar storage device and is initiated by manipulating the DIP switches on the Primary C.E. cabinet Memory card (see Table 1). On systems equipped with the NT2B05AB CPU. System Speed Call Data may also be output to the storage device.

The printer is connected to the RS232C port on the Memory Card via a NT2B2311 Extension Cable. (see Figure 3-1) or other suitable cable in the manner described in the Hardware Installation Guide.

Peripherals

3.02 Any ASCII oriented device capable of receiving and displaying ASCII alpha-numerics may be used for recording the data generated by the Vantage 48 system. Other than a serial printer, the peripheral could be a recording-type device which puts the output data directly onto tape or other suitable medium for automated processing at a later time. This is especially useful in the case of SMDR where a record of external calls from the sytem is desired to be kept on tape.

PERFORM CONFIGURATION DATA DUMP

STEP	PROCEDURE
1	On Memory card NT2B11, record the DIP switch positions for future reference.
2	Set S01 DIP switch 3 to ON and switch 4 to OFF.
3	Observe that the Configuration Data is being dumping to the printer.
4	When data dump is completed, or if the user wishes to terminate the dump, restore switches 3 and 4 to the positions recorded in Step 1.
5	If data is not printed out, verify printer is functional.

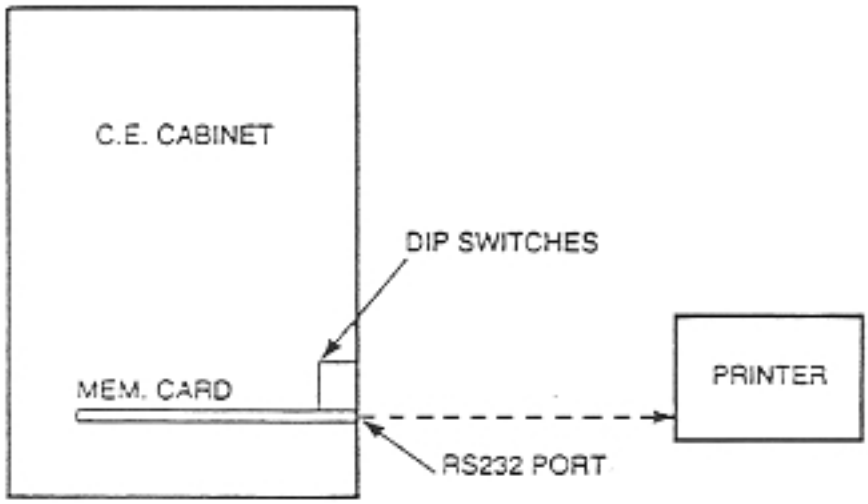
PERFORM SYSTEM SPEED CALL DATA DUMP

STEP	PROCEDURE
1	On Memory card NT2B11, record the DIP switch positions for future reference.
2	Set SO1 DIP switch 3 to OFF and switch 4 to ON.
3	Observe that the System Speed Call Data is being dumped to the printer.
4	When data dump is completed, or if the user wishes to terminate the dump, restore switches 3 and 4 to the positions recorded in Step 1.
5	If data is not printed out, verify printer is functional.

PERFORM SMDR DUMP

Types of calls printed will vary, depending on how SMDR is programmed for system (see Programming Guide).

STEP	PROCEDURE
1	On Memory card NT2B11, record the DIP switch positions for future reference.
2	Set SO1 Dip switch 3 to ON and Switch 4 to ON.
3	Observe that the SMDR data is being printed out.
4	When the user wishes to terminate the dump, restore switches 3 and 4 to the positions recorded in Step 1.
5	If data is not printed out, verify printer is functional.



NOTE: NT2BO5AA and NT2BO5AB CPU.

Fig. 3-1
Data Recording Configuration

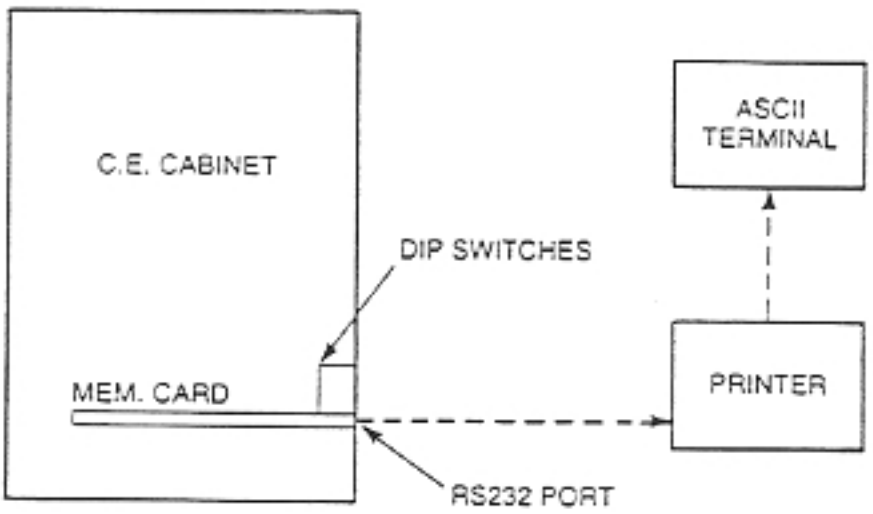
4.01 In Vantage 48 systems equipped with the NT2B05AB CPU, the RS232 port on the Memory Card is capable of two-way data flow. Thus, the interface may be used for the three operation modes described briefly in Section 2 of this Pracitce:

- Data Recording
- Administration via RS232
- Maintenance via RS232

Peripherals

4.02 To use the full complement of features available via the RS232C port on systems equipped with the NT2B05AB CPU, the peripheral connected to the port must be capable of generating ASCII alpha-numeric characters. This means that any simple ASCII line printer, printer/terminal, or video terminal may be used.

The most commonly used devices which could be connected to the RS232C Interface for the Local Applications Configuration would normally be a video or printer type terminal. This type of device is required if Administration and/or Maintenance is to be performed via the RS232 port. Since many video terminals have serial peripheral output jacks on them, it may be convenient to attach a line printer or recording device to this output for the added flexibility it would provide (see Figure 4-1).



NOTE: NT2B05AB CPU ONLY.

Fig. 4-1
Local Applications Configuration

COMMON FEATURES

Operation

4.03 The RS232C Interface is used by connecting some appropriate peripheral (eg: ASCII video terminal) to the RS232 serial port and then selecting the desired interface mode by entering the appropriate ASCII command(s) via the serial port.

Mode Switching

4.04 The allowed switching between these three modes is shown in Figure 4-2. The Data Recording mode is the power-up default mode for the interface and is typically the mode normally running. This is the only mode in which internal system information cannot be altered.

To gain access to other modes from the Data Recording Mode requires the use of fixed 'passwords'. These ASCII string passwords are:

MODE TO BE ENTERED	ASCII STRING 'PASSWORD'
Administration	e8977 or f8977
Maintenance	e8978 or f8978

4.05 This method of access to modes where system data can be changed is consistent with conventional Vantage 48 administration procedures. For example, to enter the Administration mode from the system Administration set, the user would first press an Intercom key and then the numbers '8977'. From the key mapping used for these operations (shown in Figures 4-3 and 4-4), it is seen that the fixed Intercom keys correspond to the lower case ASCII letters 'e' and 'f'. The '8977' sequence is also the same.

To exit the Administration mode, the Disconnect key would normally be pressed on the Administration set. This key corresponds to the lower case ASCII letter 'i' (in Figures 4-3 and 4-4).

Note: The Maintenance mode (8978) is not available at the Administration set and is only provided at the RS232C Interface, since the normal Administration set does not have a display medium suitable for displaying the Maintenance fault lists.

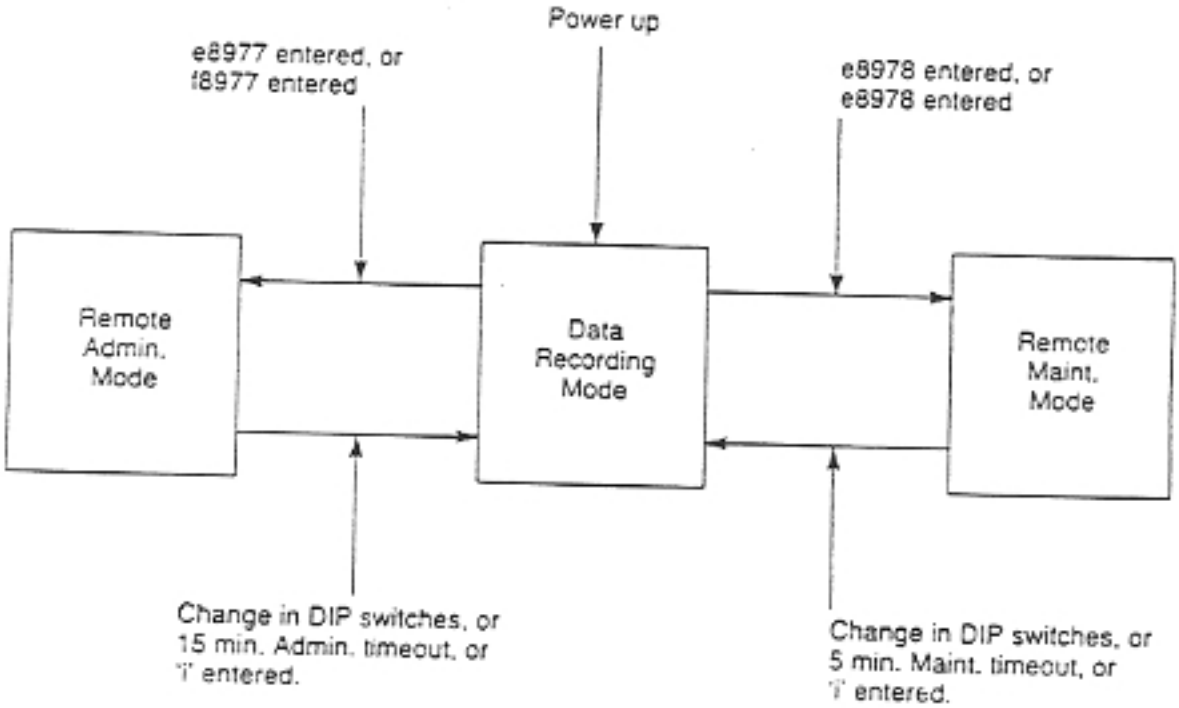


Fig. 4-2
RS232 Interface Modes

Serial Interface

4.06 The serial interface is a standard RS232 type interface set up to operate full duplex at selectable baud rates of 110 to 9600. Parity is selectable as odd, even, or "not checked". These selectable features are obtained via the DIP switches located on the CE Memory card (see Table 1). The TX/RX character's size are fixed at 7 bits (plus the optional 8th bit for parity if selected). Transmitted characters are each followed by 2 stop bits.

The pin allocation of the port is as follows:

FUNCTION	PIN No.	TYPE
Ground	1	Common
Ground	7	Common
Transmit Data (TXD)	3	Output
Receive Data (RXD)	2	Input
Data Terminal Ready (DTR)	6	Output
Data Set Ready (DSR)	20	Input
Request to Send (RTS)	5	Output
Clear to Send (CTS)	4	Input

4.07 Note that the 3 signal pairs: TXD/RXD, DTR/DSR and RTS/CTS have been reversed internally, effectively forming an internal "null modem" type of interface. This is most useful for applications where the data logging equipment is on site with the Vantage system and no modem is required. Since the CTS line is only available on one pin, a normal pin to pin type RS232 connector may not be used (without modification) in many cases.

The use of modems to extend the range of this interface is explained in the Remote Applications Configuration section.

Mode Identification

4.08 Since there are three distinct modes of operation, an identification technique is used to identify the currently active mode. Anytime that a mode change occurs, the first thing to be output will be a message indicating which mode is currently active. The three mode prompt messages have the following formats:

- Data Recording Mode
- Remote Administration Mode
- Remote Maintenance Mode

Since a mode identification message will normally be issued only once (at the entrance to a new mode), a facility is provided so that the prompt may be viewed again at any time. This is achieved by entering a carriage return character which will cause a carriage return, line feed, and then a mode prompt to be issued to the peripheral attached to the interface. This may be performed at any time.

Caution: If a carriage return entry is performed during a Data Recording output, it will cause the output to terminate.

Peripheral Keystroke Parsing

4.09 The input for the RS232C Interface is keystroke oriented. This means that when a key is pressed on the keyboard, it is processed immediately in much the same fashion as pressing a key on the Administration set during an administration sequence, as opposed to the more conventional terminal sequence of entering a command line, then terminating it with a Carriage Return before it actually "executes". The Interface is designed to behave as similarly as possible to the Administration set. The fact that keystrokes are processed immediately means "backspace rubouts" are not possible. If an error is made in the keystroke(s), the appropriate error response will be returned to the peripheral.

The actual character set used by the input parsing of the RS232C Interface is:

'A-P', 'a-n', '0-9', '*' and '#'.

All mode selections, mode substate selections and system data alterations are performed using this set of characters. The reason for this limited character set is to provide a one-to-one mapping of these characters onto the regular Administration set's keyboard. This relationship is illustrated in Figures 4-3 and 4-4. Using this simple mapping, anyone familiar with conventional administration programming from the Administration set may perform the same type of operations using equivalent keystroke functions at a terminal. A more detailed coverage of this subject is given later in this section.

4.10 In addition to the above mentioned characters, the following special characters are also accepted:

- Space
- Carriage Return
- XON (ctrl Q)
- XOFF (ctrl S)
- Null,
- 'T'

The Space character has no syntactic meaning and exists only for the purpose of generating "white space" on the output. The Carriage Return will cause the mode prompt to be issued (see Mode Identification). The XON and XOFF are used in the typical fashion of starting and stopping the output. Null is ignored causing no errors and is simply echoed. The ASCII character 'T' is the "Terseness Toggle". It is used to control the level of detail of outputs and is implemented for the Administration mode only (see Administration Responses).

Even though the above mentioned characters are the only ones used by the parsing, all printable ASCII characters (ie: hex 20 to hex 76) are echoed. If the character is NOT in the set of defined characters, the message:

<ILLEGAL CHARACTER>

will be issued from the Interface. For example, this message would be issued in response to entering the ASCII character 'Z'. This message will also be issued if the character is defined but not allowed at the time it was entered. An example of this would be to enter an ASCII 'A' (a defined character for Administration) while in the Data Recording mode.

In the event that a numeric value which requires more than one digit to be entered is given an incorrect value, the following message will be issued:

<ILLEGAL VALUE>

This type of message would occur if (for example) a line number of 29 was entered when selecting a Configuration Dump of a range of C.O. lines.

Note that anytime a sequence of characters has to be input, any condition which arises that would cause an error or status message to be output will cause the sequence to be prematurely terminated.

For example, if the sequence 'e8977' is entered as 'e8z' (the illegal character 'z' entered), the issuing of the error message will cause the parser to start looking for another sequence's "first character". There is only one exception to this rule and that is the during Administration mode. When the issuing of a parsing message (ie: a non-administration type message such as '<ILLEGAL CHARACTER>') will NOT cause the input sequence to terminate even though the issuing of the message may start a new line on the peripheral's screen. The control during this mode is described in the Administration via RS232 mode.

Hardware Configuration Errors

4.11 The serial interface hardware in the Vantage 48 Common Equipment must be configured to match that of the peripheral device connected to it. This is done using the RS232 Mode, Parity and Baud Rate DIP switches located on the Memory car (510-1021-210, DP 1032). If this is not done correctly, or there are characters received which have been corrupted in some fashion, one or more of the following types of errors can occur:

- Parity error
- Overrun error
- Framing error

When any of the above errors occur, the key character that was just received by the RS232C Interface (accompanied by the error) will not be processed or echoed. Instead, an appropriate error message will be issued:

Parity Error

Parity checking and handling are done on the basis of the "Parity Check" and "Parity Type" DIP switches on the Memory Card. All characters transmitted from the Interface are always assigned their parity based on the "Parity Type" DIP switch. When receiving, parity is not verified unless the "Check Parity" DIP switch is turned on. If it is not on, all characters received are assumed to be correct and are processed and echoed as covered in Keystroke Parsing. If parity checking is enabled, incorrect parity characters will not be processed or echoed. Instead, the message:

<PARITY ERROR>

will be issued.

Overrun Error

If too many characters are input too fast to the Common Equipment, overruns will occur. This is signaled by the message:

<OVERRUN ERROR>

Since the last character received by the Common Equipment overran some previous input, the last character may be misleading, therefore it is not processed.

This type of error may occur when the user peripheral is automated (such as a computer) and is sending large bursts of information to the Vantage 48 Common Equipment. These errors may be avoided in these cases by using handshaking (waiting for the expected echo responses for key entries) and/or by using a lower baud rate setting.

Framing Error

If the number of bits in the received characters is not seven (or is not eight if parity is enabled), or the baud rate is incorrect, framing errors will occur resulting in the error message:

<FRAMING ERROR>

being issued.

Output Message Overruns

4.12 Since keystrokes are still processed even if the output of the Interface has been suspended via the XOFF directive, keystroke echoes and error messages are capable of overflowing the message outputting facility of the RS232C Interface. When this occurs, the oldest message(s) (ie: the next to be output) are lost by being displaced by the newer message(s) and at the next available time, the message:

<OUTPUT OVERFLOW>xxxx...

is issued, where "xxxx..." is the remaining part (if any) of the displaced message(s).

DATA RECORDING

4.13 This section is not intended to document the actual features of the Data Recording mode but rather to cover the methodologies of implementing them via the RS232C Interface. The appropriate features, their description and output format are covered in the appropriate Practices included with a set of Vantage 48 NTPs.

The Data Recording mode is the power-up default mode for the RS232C Interface. While in this mode, SMDR and Data Dump output records may be obtained.

Mode Substates and their Selection

4.14 When the Data Recording mode is active, only one of its substates will be active at any given time. A list of the mode's substates preceded by the corresponding ASCII symbol entry to access the substate is given here:

ENTRY	SUBSTATE
0	SMDR DUMP* The system dumps the contents of the SMDR buffer. The interface may be left in this mode for continuous output of SMDR to a printer or display terminal.
1	Complete Configuration Dump* The system dumps a complete record of System, Line and Set Features provided.
2	System Speed Call Numbers Dump* The system dumps the programmed System Speed Call numbers.
3	Stop* The system stops the output in progress and remains in the Data Recording mode in an idle state.
4	System Configuration Dump The system dumps a record of the System Features provided.
5	Line or Set Configuration Dump The system dumps a record of the Line or Set Features provided. Enter the code 5xxyy — where 'xx' and 'yy' are the range limits (10-25 for lines and 30-77 for station sets).

Note: Those substates in the list followed by a '*' correspond to features which are also selectable via the "RS232 Mode" DIP switches on the Memory card (see Hardware Installation Guide).

4.15 The syntax for selection of the Substate operations (excluding select number 5) is:

x

Where:

x = the Select Number of the operation required (0 to 4).

The Configuration Dump for Line/Set data, however requires a set of range parameters for how long the list should be. Therefore, the syntax for this operation will consist of five numeric characters.

5xxyy

Where:

5 = the select number for this substate

xx = first line number (10 to 25) or first set number (30 to 77) for output.

yy = last line number (10 to 25) or last set number (30 to 77) for output.

With the rules that xx is less than or equal to YY and that xx determines whether the output will be sets or lines (only one kind of output is given at any one time). Therefore, after the appropriate heading is output:

- If xx is greater than yy, no line or set data will be output.
- If xx equals yy, a single line or set's data will be output (assuming that the particular line/set is equipped. Otherwise no line or set data will be output)
- If xx is less than yy, all of the line's or set's data will be output, starting at set/line number xx and ending (including) set/line number yy (assuming that they are equipped. Line or Set numbers which do not exist or are not equipped do not produce any output).

4.16 There is no wrap around in the output, so if the user wanted a Configuration dump on lines 10, 11 and 12 and sets 74, 75, 76 and 77, the command:

57412

would not work and would cause the error message:

<ILLEGAL VALUE>

to be issued. Instead, two separate commands would be necessary, ie:

51012 and 57477

Furthermore there is no carry over from lines to sets. For example, the command:

51077 would not output all of the line's data followed by all of the set's data. Instead, it would only cause the message:

<ILLEGAL VALUE>

to be issued again.

In order to maintain the integrity of the various output reports obtainable from the Data Recording mode, the "STOP" substate (ie: Entry number 3) has been designated as the ONLY substate in which character echoes and error messages may occur while in the Data Recording mode. If any key is pressed (on the user's peripheral) that would cause a character to be echoed, the currently active substate will terminate and the "Stop" substate will be entered. If the keystroke contained enough information to enter another substate (eg: a "1"), that substate will then immediately be entered. If the keystroke requires more input (eg: a "5" or an "e"), the Data Recording mode will remain in the "Stop" substate until the proper characters are completely entered to cause a change.

4.17 Whenever a new substate (operation) is initiated, any previous one is terminated. For example, if a Configuration dump of all the system data is currently being output and SMDR is selected, the Configuration dump would stop immediately and SMDR records would begin being output. This action is the same regardless of how the new substate was selected (ie: via DIP switch settings or ASCII input at the Interface). Furthermore, the entering of any character which causes an output (such as a character echo) will terminate any of the substates and send the interface into the 'Stop' substate.

4.18 In the case where selection is being attempted from some user supplied peripheral connected to the Interface port, the selection is made (while in the Data Recording mode) by hitting the appropriate numeric key. For example, hitting the '0' key (causing an ASCII '0' to be sent) will cause any data output presently active to be terminated and SMDR records will begin to be output.

Note: Changing the DIP switches causes the newly selected substate in the Data Recording mode to begin and whatever was running to stop, even if it was Administration or Maintenance (see Figure 4-2).

4.19 The configuration dumps of System and Set/Line data (Entry numbers 4 and 5) are subsets of the Complete Configuration Dump (Entry number 1). These dumps as well as the System Speed Call Numbers Dump are output once only. Once the report is dumped, nothing else happens until another substate change is requested (even if it is a "change" back to the same substate). On the other hand, SMDR output continues for as long as no substate or mode changes are entered and there are calls to be recorded.

ADMINISTRATION VIA RS232

4.20 The Administration Via RS232 feature mimics as closely as possible the administration operations as they would normally be performed at the Administration set (SS38). This is to eliminate any confusion which might exist by having two types of administration operations; one for the Administration set and one for the RS232 Interface.

In order to accomplish this, it is necessary to use a "virtual Administration set" for the peripheral connected to the RS232 Interface. This "virtual" set has (at least) the same number of administration type keys as the Administration set. This is essential to duplicate the keys on the real peripheral for the appropriate keys on an Administration set.

Note: Before programming via the port, the system administrator should be familiar with the System, Line and Set Features programming procedures contained in the 'V-48 Programming Guide', included in this Installation Package supplied with each system.

4.21 The Programming Templates (for System and Set/Lines Features) incorporate key designations on the templates with the corresponding terminal key designation (as in Figs. 4-3 to 4-6). The templates may then be used as references for the terminal key sequence and the resultant system response.

Since a "virtual Administration set" must input and output all the same type of information as a normal Administration set, it is useful here to itemize these different forms of information:

- **Key press transmission:**
  For every normal administration type key press, there must be a corresponding UNIQUE key press capability from the peripheral (virtual Administration set). The keys on the peripheral are therefore mapped to the keys on the Vantage Administration set on a one to one basis.
- **LED display information:**
  The "virtual Administration set" must be capable of providing alternative feedback for Administration set LEDs and their various states (eg: on, off, flash rate, . . . etc.).
- **Tone control:**
  The normal Administration set handles error responses from the system by using various tones (ie: Confirmation and Overflow). The "virtual Administration set" must also present this information in some form.

The following sections detail how each of the above data items are handled by the RS232C Interface.

4.22 Figures 4-3 to 4-6 show all of the Administration set keys which are mapped for usage, together with the ASCII character which corresponds to each key.

Notice the sequential pattern of character assignments and that the keys on the UPPER key module are assigned UPPER case characters whereas the keys on the LOWER module are assigned LOWER case characters. Furthermore, the numeric pad characters are exactly the same as on the Vantage set. From this pattern, anyone familiar with performing administration from an Administration set could easily reconstruct this map and perform Administration via the RS232C Interface since the keystrokes will be the "same" in both cases.

4.23 When administration is initiated through the RS232C Interface, the following sets are Force Disconnected:

- Any sets assigning their own DSS Keys.
- CAP set(s) performing Speed Call administration.
- Administration set (SS38) performing conventional administration.

These set(s) receive Overflow tone, then return to conventional operation status.

Note: Administration via RS232 is NOT affected by the Administration Lock DIP switch settings.

Administration Responses

4.24 During administration, there is feedback information which is returned to the Administrator. This information is presented on the conventional Administration set in the form of the LED display associated with each key and tones heard through the set's speaker. For the RS232C interface, all responses from the system during Administration will come in the form of an ASCII string of characters bounded by the ASCII angle brackets. For example:

<TIMEOUT>

These messages simply tell what would be heard and seen at a normal Administration set except the ASCII messages provide more detail. There will be one string for EACH response and therefore multiple LED responses (more than one LED changing state at a time) will come as multiple strings, each presented on a different line.

4.25 **LED Responses**

A list of all the possible LED responses with a brief description of each is as follows:

<Y ON>	LED 'Y' on steady
<Y OFF>	LED 'Y' off
<Y WINK>	wink LED 'Y'
<Y FLUTTER>	flutter LED 'Y'
<Y FLASH>	flash LED 'Y'
<RESET>	turn all LEDs off

where Y = the ASCII character mapped to the Administration key associated with the LED being controlled. For example:

<a ON>

means that the LED on the Prime Line key should be on steady (or would be if a conventional Administration set were being used).

The LED responses which occur during the Administration sessions may be toggled on or off at any time by entering the ASCII character 'T'. This is the "Terseness Toggle" character and when toggled on, will disallow the LED response messages from being output from the interface. The default setting when entering the Administration mode for this restriction is 'LED responses allowed'.

4.26 **Disconnect/Release Response**

<DISCONNECT>	Indicates that the Disconnect sequence for Administration has completed.

4.27 **Tone Responses**

A list of all the possible tone responses with a brief description of each is given here. The responses are grouped in terms of the tones that they would normally generate on a conventional Administration set:

(a) Confirmation Tone Response

<CONFIRM>	Indicates that an Administration sequence has been successful.

(b) Overflow Tone Responses

<TIMEOUT>	No Administration operations have been performed for 15 minutes.
<ERR XXX>	A general error has occurred. (XXX = the 3 digit error code)

The following is a list of all the error codes which may occur with the <ERR XXX> Overflow Tone Response and (with each code), a list of possible reasons why the error was reported:

099 Invalid option setting.

100 Invalid template key.
Cancel key pushed.

101 Invalid set or line number.

102 Invalid line number.
No line interface card.

103 Invalid set number.
No set interface card.

104 Set type doesn't match interface card.
Trying to program a non-52-Key/Lamp Module where a 52-Key/Lamp Module is equipped.
Trying to program a 52-Key/Lamp Module where a non-52-Key/Lamp Module is equipped.
Invalid set number for a CAP or 52-Key/Lamp Module.
Trying to program a new CAP set when there are already the maximum number of Prime sets in the system.

200 Invalid system option key.
Cancel key pushed.

201 Invalid digit.
More than the allowed number of digits before the End of Digits marker.

209 Invalid User COS number or sequence.

211 Invalid COS Override number.

213 Invalid System Speed Dial number.

300 Invalid line option key.
Cancel key pushed.

301 Invalid line number.

311 Invalid line number.
Same line number as is currently being programmed.
No line interface card.

400 Invalid set option key.
Cancel key pushed.

401 Invalid set number.

408 Invalid programmable key for set type.

411 Invalid set number.
Same set number as is currently being programmed.
No set interface card.
A set type is different from that of the set currently being programmed.

421 Invalid set number.
Would create too many Prime sets.
Set type is inconsistent.

430 Invalid line pool number.

460 Invalid 500/2500 line setting.

470 Invalid option setting.
Would create too many Prime sets.

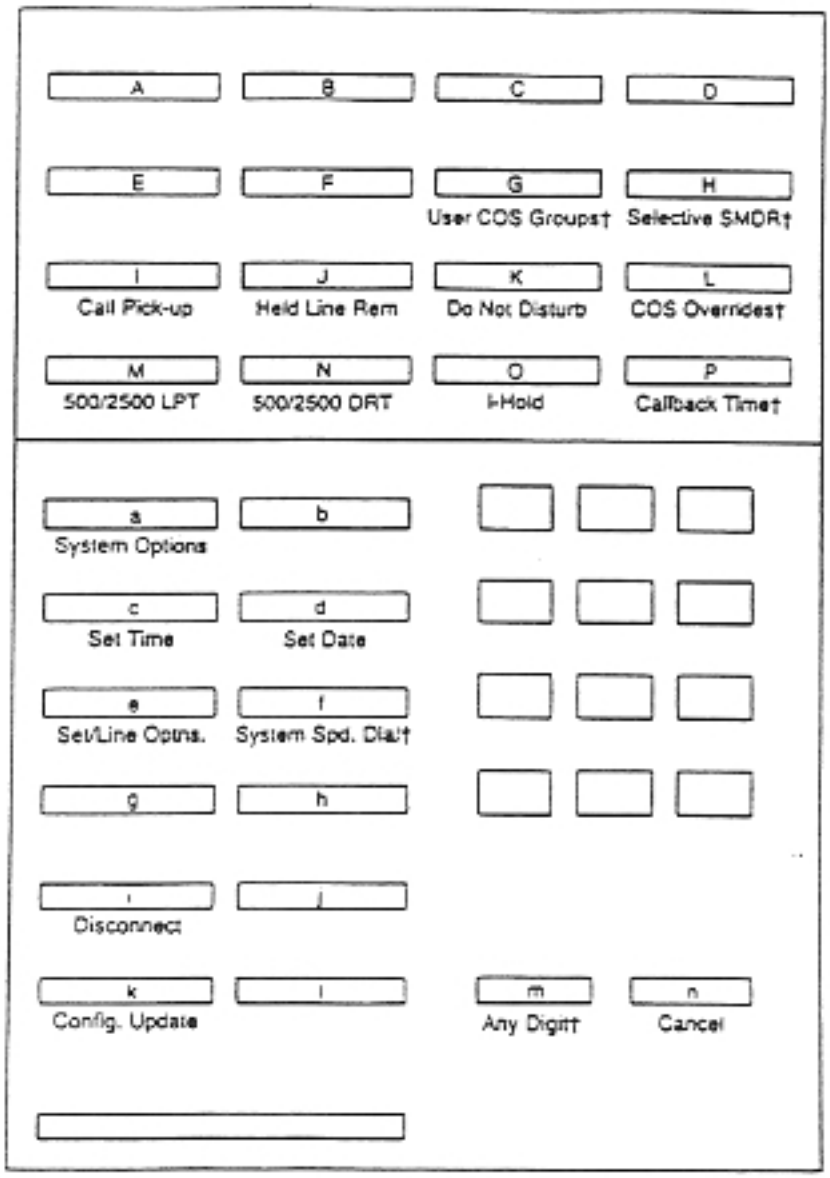
480 Invalid key type for set type.
Invalid key type for key being programmed.
Would create too many Intercom keys on the set.

481 Invalid line key setting.

482 Invalid DSS key setting.

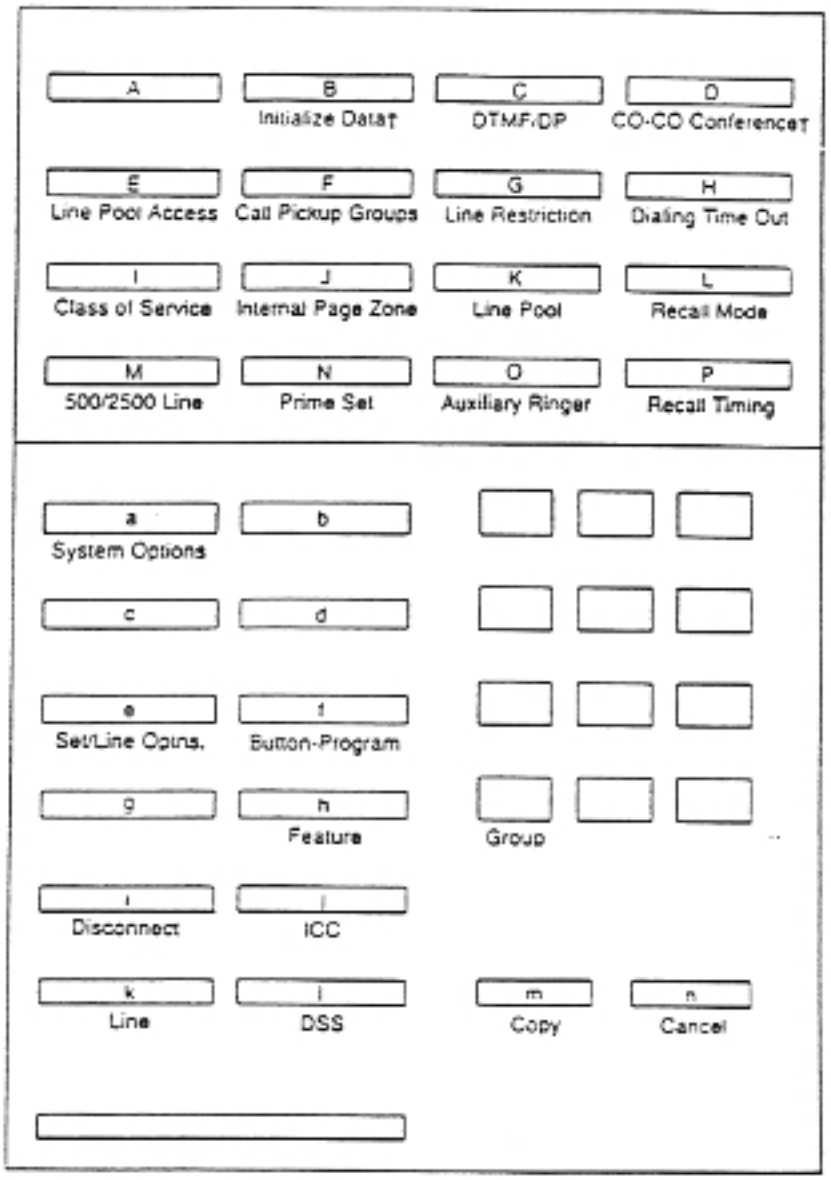
483 Invalid feature key setting.

490 Invalid call pickup group number.



† — Not available on systems equipped with NT2B05AA.

Fig. 4-3
System Features Template (Vantage Modular Set)/
ASCII Terminal Key Equivalent Designations



† — Not available on systems equipped with NT2B05AA.

Fig. 4-4
Line and Set Features Template (Vantage Modular Set)/
ASCII Terminal Key Equivalent Designations

Examples

4.28 Here are a few examples of how parts of an Administration via RS232 session might look.

(1) **Programming a COS of class 93, sequence 3, for the sequence 3,4m (Any Digit),7,2.**

G	User COS groups key pressed
<G ON>	LED for COS groups key comes on
93	Class entered
<G WINK>	LED starts to wink
3	Sequence number entered
<G FLUTTER>	LED starts to flutter
34m72G	Sequence value and end of digits entered
<G OFF>	LED goes off
<CONFIRM>	Confirmation "tone" received

(2) **When entering the System options administration mode, the following example would be typical:**

a	System options key pressed
<a ON>	LED for System options key comes on
<e OFF>	LED for Line/Set options goes off
<CONFIRM>	Confirmation "tone" received

(3) **The example which follows could occur during the setup of line 13 as the prime line on a set with ringing:**

f	Button Program key pressed
<f ON>	LED for Button Program key comes on
a	System Options key pressed
<a ON>	LED on System Options key come on
k	Line key pressed
<k ON>	LED for Line key comes on
131	Line number and ringing option entered
<k OFF>	line LED goes off
<f OFF>	Button Program LED goes off
<a OFF>	System Options LED goes off
<CONFIRM>	Confirmation "tone" received
—OR—	
<ERR 481>	Overflow "tone" for invalid line

4.29 Note that the above examples are not exactly as they would normally appear at the output of the Interface since they were drawn for clarity. In fact, the first example listed would actually appear as:

G<G_ON>

93<G_WINK>

3<G_FLUTTER>

34m72G<G_OFF>

<CONFIRM>

This is due to the fact that error and response messages (like keystroke echoes are output on the current line.

MAINTENANCE VIA RS232

Syntax and Operation

4.30 After entering the Maintenance mode (see Mode Switching), the Hex fault code list may be examined and any of its elements deleted as desired.
Entering an 'i' (Disconnect) or not doing anything for 5 minutes will force the Maintenance mode to exit.

If the Maintenance mode is forced to exit due to the five-minute timeout, the message:

<TIMEOUT>

will be issued.

Displaying the Fault Code List

4.31 In order to display the Hex fault code list, the command will be:

l

for l(ist). The output at the RS232C Interface that results from the request will have the following format:

```
FAULT NUMBER:   01 02 03 ..........14 15 16
FAULT CODE:     AA BB CC ..........MM NN OO
```

where the fault codes AA to OO are 2 digit hexadecimal numbers which correspond to those described in the Hardware Installation Guide. The Fault Numbers are references to indicate the positions of specific fault codes for use during fault list element deletions. The fault numbers also indicate the relative time of occurrence of the individual fault codes, since whenever a fault code appears it is added to the end of the list, the highest number being the newest in the list.

Since there are not always 16 fault codes in existence, the list will be left justified on the printout with all the unused fault code positions to the right (highest fault numbers), blank. For example, if fault numbers 01 to 05 had fault codes associated with them (fault codes for fault numbers 06 to 16 were blank) and fault number 03 were deleted, the fault codes for fault numbers 04 and 05 would "slide down" to fault number positions 03 and 04 respectively and the fault code position for fault number 05 would then become blank.

Caution: In the event that the fault code list becomes "full" (all 16 positions are taken), the list becomes fixed and no more faults will be added. Therefore, if the list does not have elements removed from it when it is full, the more recent fault codes will be lost.

Deleting List Elements

4.32 A request to delete (d) an element or range of elements from the fault code list has the following syntax:

dxxyy

where:

xx = Starting fault code number (01 to 16)

yy = Ending fault code number (01 to 16)

4.33 When requested, all fault codes for fault numbers xx up to and including yy will be deleted from the fault list. If xx equals yy, then only one element will be deleted and if xx is greater than yy, nothing will be deleted.

The input of a deletion command may be aborted any time by entering a bad value (fault number equal to 0 or greater than 16) or a bad character.

Caution: Manual deletion of fault codes via the STEP/CLEAR switch on the CPU Card should not be performed during Maintenance Via RS232. If this is done after a fault code list has been displayed, the displayed fault code list will be incorrect.

5. REMOTE APPLICATIONS CONFIGURATION

5.01 The Remote Applications Configuration allows the operation of the RS232 Interface to be extended to off-site locations via a modem and a remote modem interface. To allow true Remote Applications Configuration of the RS232C Interface (ie: over standard telephone lines), a modem may be connected to the RS232C Interface port. This may be any common type modem capable of automatic answering for incoming calls (see Figure 5-1). Note that the configuration as illustrated may be utilized in the following ways:

(a) **Connection via CAP**

A regular C.O. line call could be established between the remote site and a CAP (or other station, as program allowed), then transferred to the appropriate 500/2500 set interface by normal Call Transfer procedures.

The call would then activate the modem and the data communication could start.

(b) **Auto-answer Connection**

The appropriate 500/2500 set card interface could be connected directly to one of the Vantage 48 C.O. lines (519-1021-210, DP 1009).

An incoming call on that line would automatically activate the modem and the data communication could start.

5.02 To operate via the RS232 Interface in the three modes described previously the procedures detailed in Local Applications Configuration section should be followed.

Since the on-board hardware already incorporates a "null modem" which swaps the positions of the DTR/DSR, TXD/RXD and CTS/RTS signal pairs (as described in Serial Interface), a special cable (Figure 5-2) is needed to connect the modem to the interface and then insure that the CTS jumper on the memory board is set to its default position connecting CTS to pin number 4. Note that the cable is symmetric and it does not matter which end is plugged into the modem.

In order to simplify the RS232C Interface features, the Interface will behave the same whether a modem is present or not. For example:

- At power up, DTR and RTS are both set to TRUE and then left there.
- If the system is equipped with the NT2B11AC Memory card, CTS will be TRUE if nothing is connected to that pin (#4) in the interface.
- DSR is ignored.
- No attempts are made in software to "hang up" or perform other modem oriented operations.
- If during a session the user were to hang up, when the modem is redialed it will (normally) be in the same state that it was left at. Note that during Administration or Maintenance, if no changes have been made for a period of time, the respective mode will be automatically terminated (see Mode Switching).

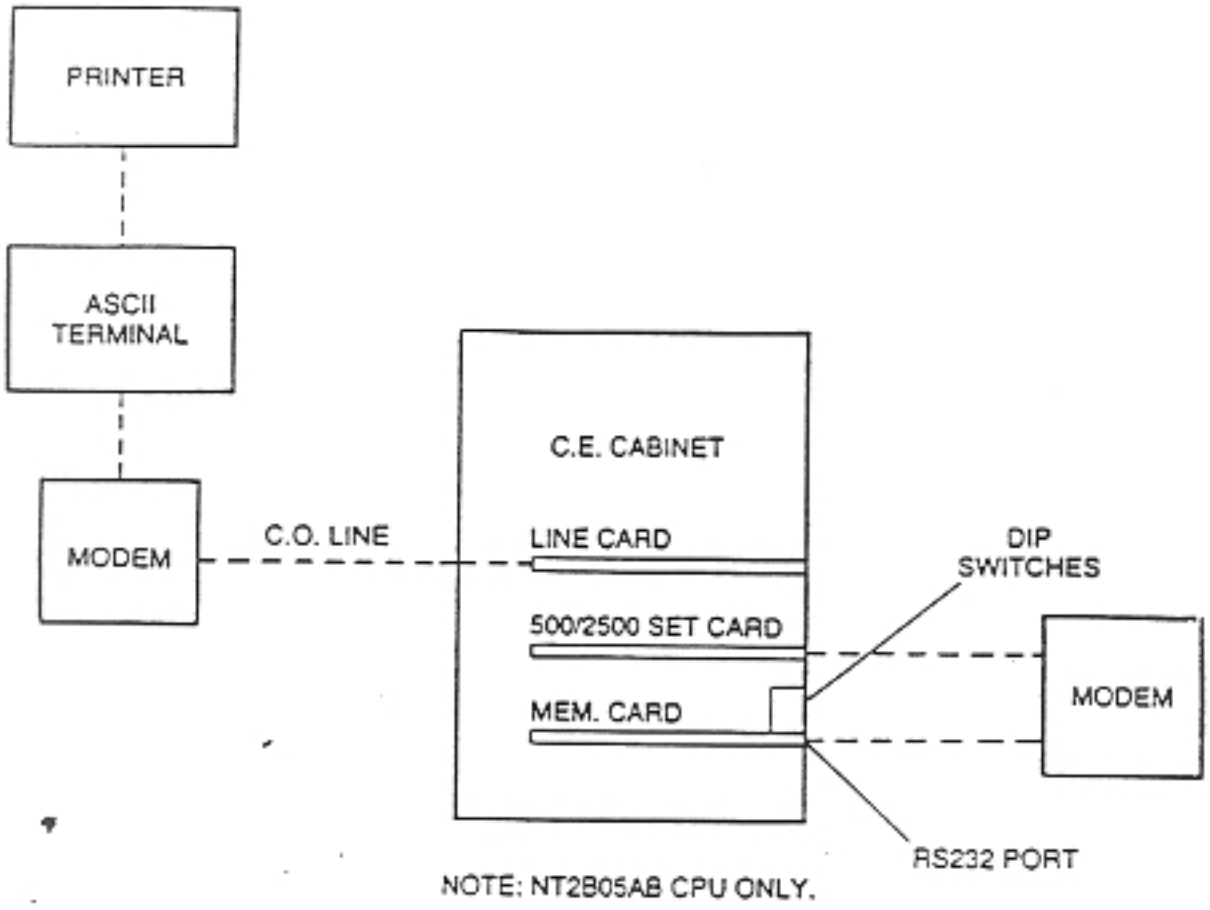


Fig. 5-1
Remote Applications Configuration

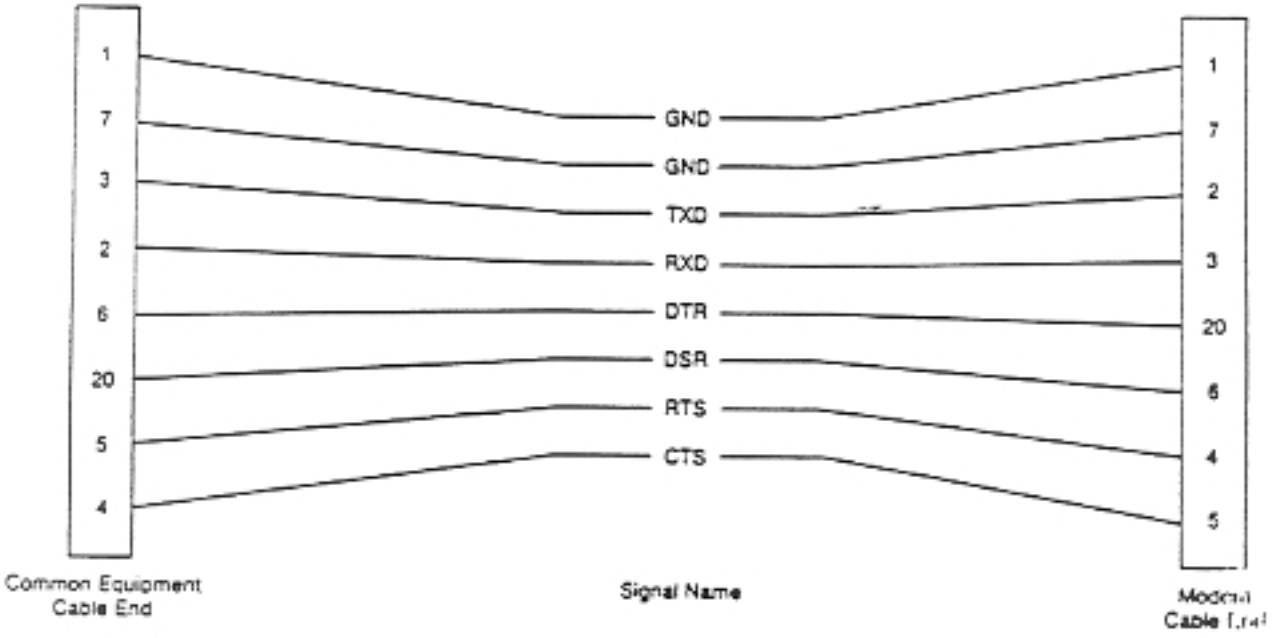


Fig. 5-2
Interface/Modem Cable

6. SUMMARY OF MESSAGES

6.01 The following is a brief summary of all the messages that an external device may receive:

(1) Character echoes

(2) Mode prompts:

- ;DATA RECORDING MODE
- ;REMOTE ADMINISTRATION MODE
- ;REMOTE MAINTENANCE MODE

(3) New line characters (Carriage Return, Line Feed)

(4) SMDR reports

(5) Configuration reports (dumps) for all or any one of:

- System Configurations
- Line Configurations
- Set Configurations

(7) Fault code lists

(8) General Status Messages:

- <ILLEGAL CHARACTER>
- <ILLEGAL VALUE>
- <TIMEOUT>
- <PARITY ERROR>
- <OVERRUN ERROR>
- <FRAMING ERROR>
- <OUTPUT OVERFLOW>

(9) LED Response Messages:

- <Y ON>
- <Y OFF>
- <Y WINK>
- <Y FLUTTER>
- <Y FLASH>
- <RESET>

(10) Tone Response Messages:

- <DISCONNECT>
- <CONFIRM>
- <TIMEOUT>
- <ERR XXX>

6.02 These are all of the outputs from the RS232C Interface that a user supplied device would need to deal with. Normally they would all simply be sent to a printer or a video screen, however they may also be recorded on tape or even translated by the user's peripheral into some other desired form.