

SWAV Interface Packages

Package Description

The SWAV Interface package is available in several configurations for interfacing Order-Wire voice and alarm system data to a the VF ports of a SONET network using NEC SpectralWave terminals.

FDO 1000 Order-Wire Description

With DPS' FDO 1000 Order-Wire terminal, your analog or digital network can become your own private phone system, with links to the public telephone network. The order-wire is an economical party-line system that requires no central switching. An order-wire terminal and telephone are located at each facility in your network. The order-wire system is simple to operate and can significantly reduce your voice communications costs.

DTMF Selective Signaling

The DPS FDO Order-Wire uses the on-board micro-processor to synthesize and decode DTMF signaling tones. The FDO can be programmed for automatic privacy, manual privacy, no privacy and hoot-n-holler operating modes.

LED Indicators

Front panel LEDs indicate order-wire off-hook, incoming call ringing and channel busy. Front panel test points and level controls are provided for calibration.

Addressing

The Order-Wire responds to one, two or three digit addressing. Leading zeroes in the address will set it for one or two digits. Rotary switches on the P.C. Board allow the address to be easily set. The station address is posted on the front panel with stick-on labels (labels are included).

Four-Wire Phone

Voice communications and out-dialing occur at a 4-wire telephone, mounted near the order-wire.

Call Buzzer

A buzzer in the order-wire announces incoming calls. An optional buzzer can be installed in the phone.

External speaker

The FDO 1000 includes a 2-watt speaker amplifier that can be used to drive an external eight ohm speaker. A paging feature can be activated from any calling station to all

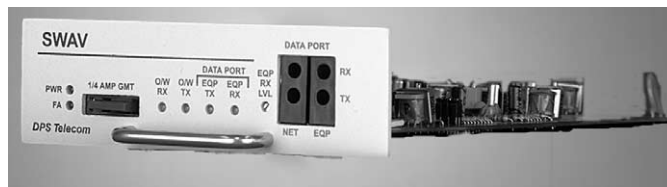


Fig. 1 - FDO 1000 Order-Wire Terminal with SWAV interfaces SONET network via NEC SpectralWave.

low the desired party's name to be announced over the speaker.

Passive Bridge, Optional Active Bridge.

The FDO 1000 is facility-ready, with a built-in 4-Way passive bridge and level matching pads for +7 / -16 dBm channel levels. The bridge can also be bypassed for direct interface at the order-wire's active VF ports. An accessory active bridge can be installed on the order-wire's P.C. board for matching levels other than +7/-16 dBm.

Network Control

In privacy modes, the FDO 1000 uses automatically generated DTMF tones to control access to the order-wire network. An off-hook tone is generated when a caller picks up the phone, which causes other stations on the network to assume a busy state. If any other phone is

picked up during the busy state, a busy signal will sound in the earpiece. Busied stations remain in that state until their station code is dialed from the caller's phone or until the caller hangs up, generating an on-hook tone.

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Change Notice

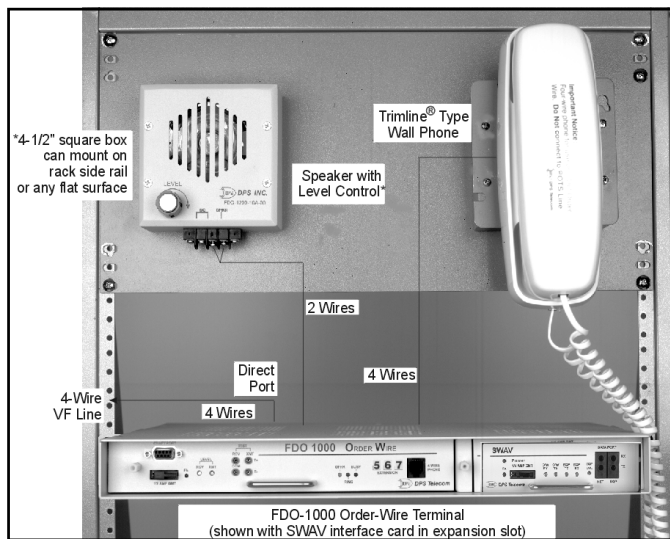


Fig. 2 - Order-wire packages include external speaker, phone, SWAV and rack-mount housing.

Wire-Wrap and Connectorized Back Panel

All network, power and auxiliary connections are made at wire-wrap blocks and connectors on the back panel. An RJ-12 jack is provided for the phone and screw-terminal barriers are provided for the power (office battery), voice input/output, bridge port connections, fuse alarm, external buzzer, speaker and M lead connections are all provided on a 60 pin wire-wrap block.



Fig. 3 - Accessories for Order-Wire include active 4w/4w bridge, 4-wire DTMF phone and speaker.

SWAV

The SWAV Interface card fits in the expansion card slot of the order-wire chassis. It joins the order-wire terminal to the network with an auxiliary port for an off-net connection. It also provides a separate VF channel for alarm system data. The SWAV front panel includes test jacks and level controls to monitor equipment.

Applications

The SWAV Interface is available in application packages that include FDO 1000 Order-Wire with KDA alarm network elements and the FDO 3000 Off-Net.

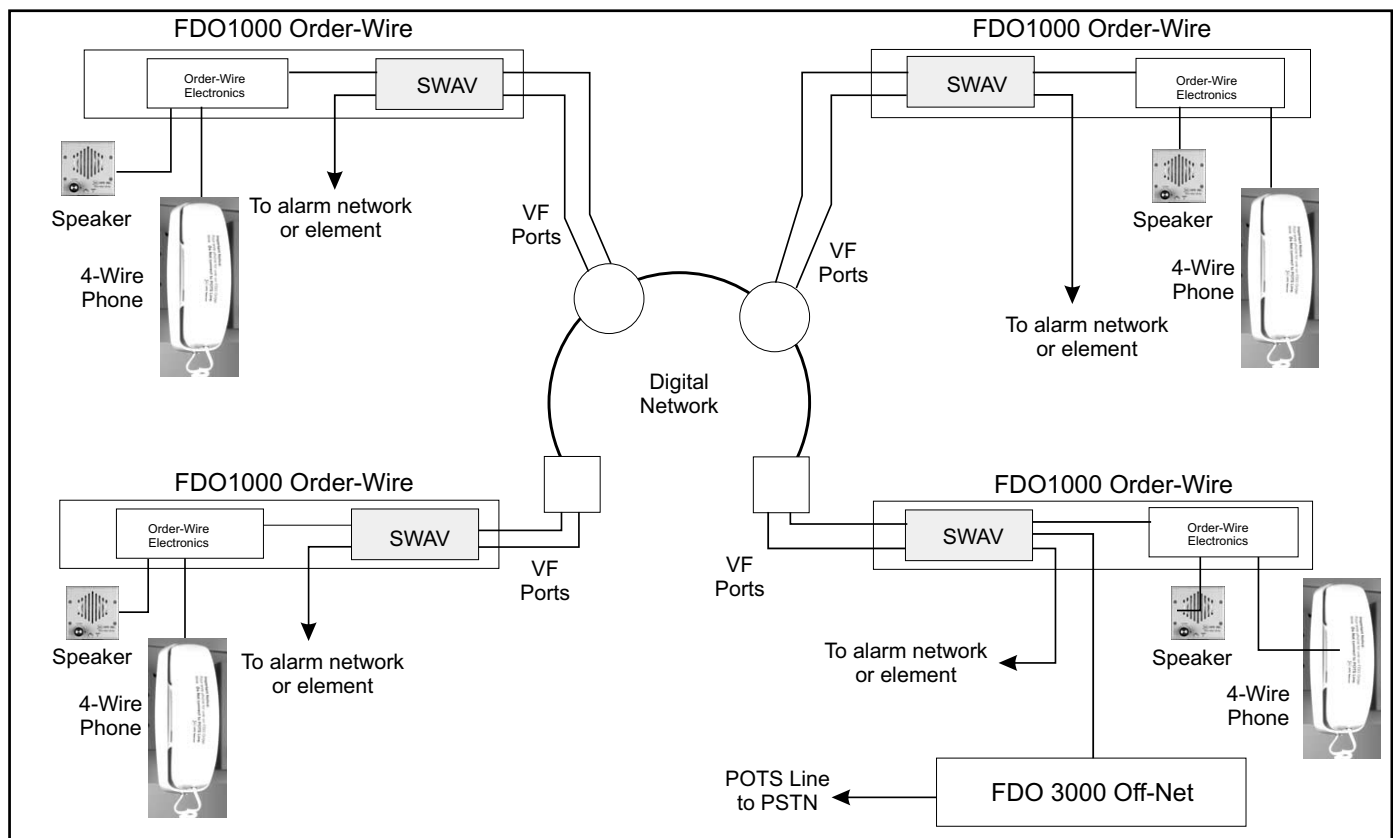


Fig. 4 - A typical analog order-wire network provides voice communications between telecom sites and to the Public Switched Telephone Network (PSTN) via a Plain-Old Telephone Service (POTS) line.

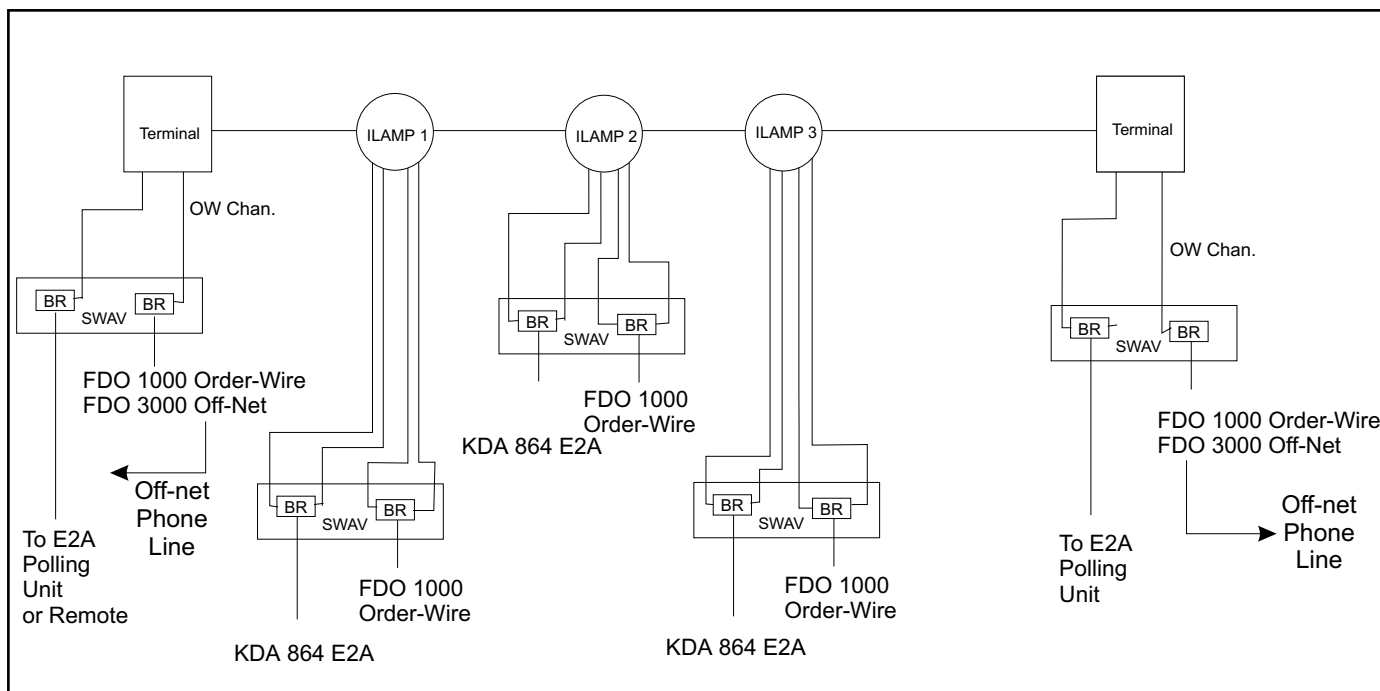


Fig. 5 - SWAV packages equipped with the Order-Wire interface voice and data to the VF supervisory ports of an NEC SpectralWave SONET terminal. (Also see Fig. 21.).

DTMF Selective Signaling

Fig. 2 shows the basic components of the order-wire.

Station call codes are programmed manually with rotary switches on the order-wire P.C. board. Number labels are provided to place on the front panel to indicate the setting.

Each site should be equipped with a 4-Wire DTMF phone and external speaker.

Wire-Wrap Jumpers

To utilize the order-wire's four-way bridge or the SWAV, jumpers must be installed at the wire-wrap block. When the application details are known at the time an order is placed, these jumpers will be factory installed.

In its simplest configuration, the SWAV card is available in an otherwise unpopulated shelf.

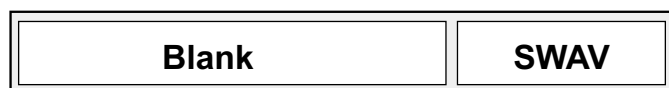


Fig. 6 - Basic SWAV package.

Order-Wire Packages with the SWAV

The FDO 1000 Order-Wire with SWAV can be combined with a DPS KDA 864-E2A network element for alarm applications via SONET. (Figs. 5, 7, 22 and 24)

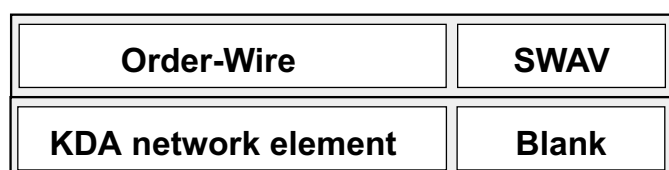


Fig. 7 -SWAV Satellite KDA E2A package.

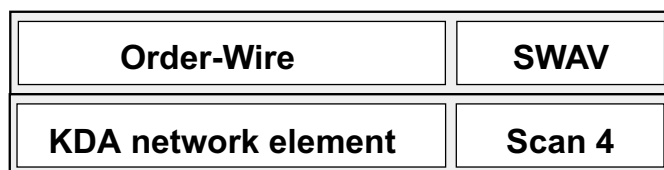


Fig. 8 - SWAV Satellite KDA E2A/Scan 4 package.

The FDO 1000 Order-Wire with SWAV can be combined with a DPS KDA-E2A equipped with a Scan 4 four-port TBOS scanner to make a "satellite terminal" to provide a voice and discrete/TBOS alarm E2A/VF interface to SONET. (Figs. 5, 8, and 23).



Fig. 9 - SWAV Order-Wire expansion package.

An expansion package is available to add an order-wire to a site with an existing KDA network element. (Fig. 9)

The FDO 1000 Order-Wire with SWAV can be combined with an FDO 3000 Off-Net to make a "terminal order-wire



Fig. 10 - SWAV Order-Wire Off-Net package.

with off-net" for interfacing voice and a PSTN connection to SONET. The expansion card is not used in off-net for this application.)

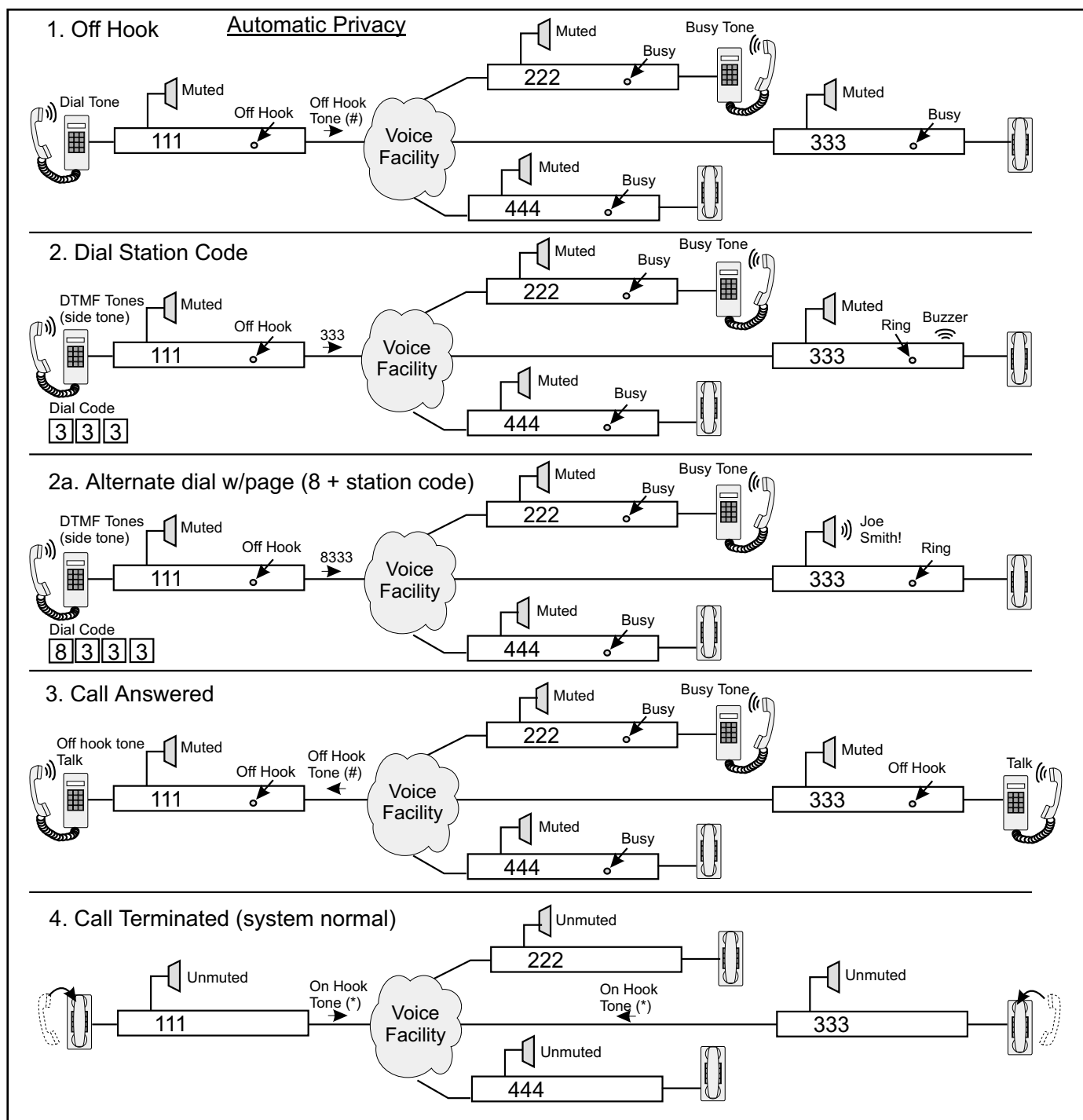


Fig. 11 - Order of operation in the automatic privacy mode.

Operation Modes

Automatic Privacy

Refer to Fig. 11. In the automatic privacy mode the FDO order-wire performs like a normal private line telephone. The caller hears dial tone when the phone is first taken off hook and an "off-hook" tone is broadcast to busy out the network. When the caller dials the three-digit code for a station, the buzzer at that station sounds and the caller hears a ring-back tone. When the called party answers, the ring-back and buzzer are silenced and conversation may proceed. During the conversation all other stations will hear a busy signal in the handset and all monitor

speakers are muted. Either party hanging up generates an "on-hook" tone to clear the busy state.

In this mode the calling party may page the desired party over the called station's speaker by dialing "8" prior to entering the three-digit station code.

NOTE: Avoid using station codes starting with "8."

The busy state may be manually cleared by pressing the "*" button. It can be restored by pressing the "#" button. Other parties can be added to the conversation at any time.

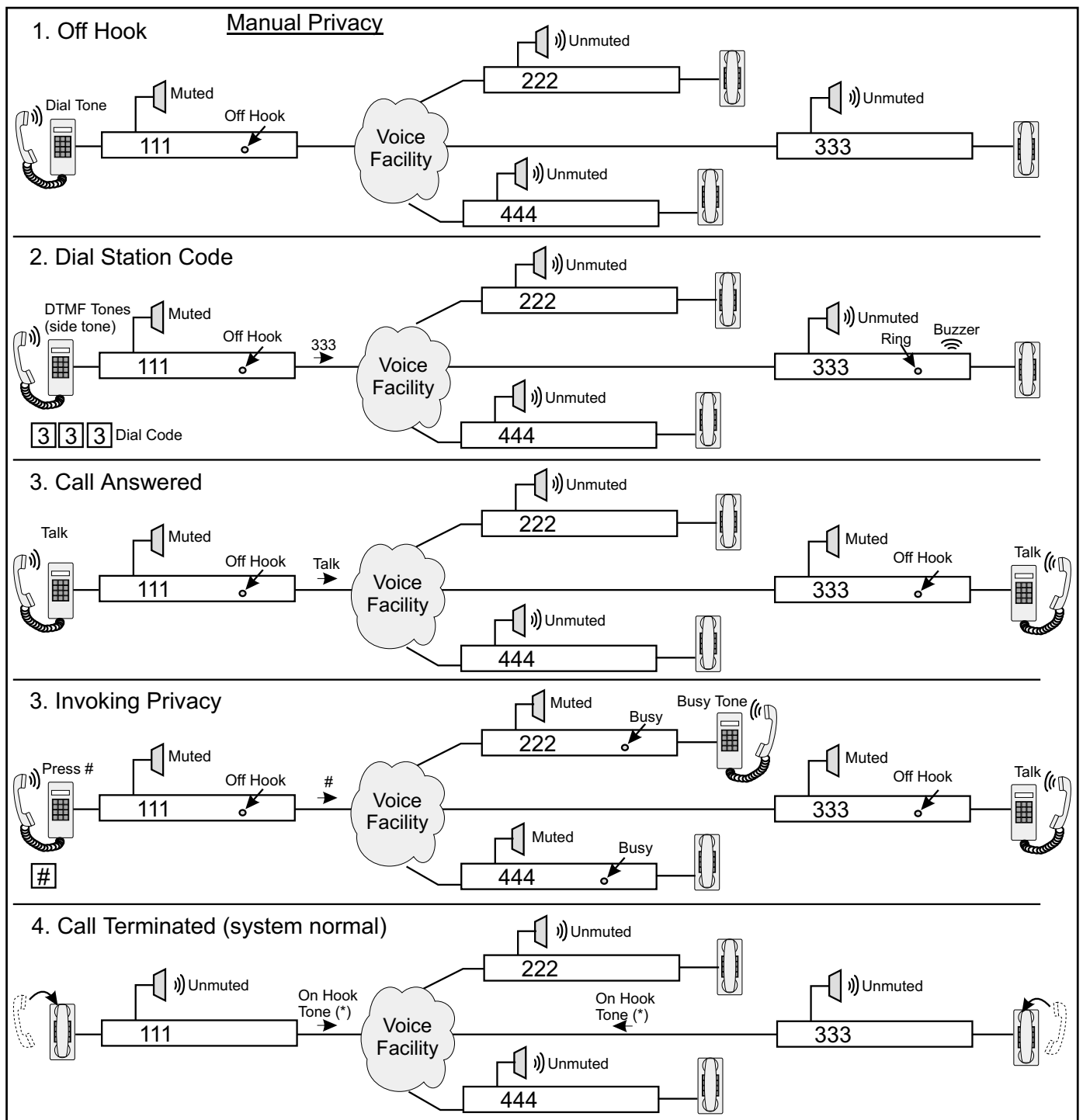


Fig. 12 - Order of operation in the manual privacy mode.

An “all call” code rings all stations. Unanswered stations will time out in 90 seconds.

Manual Privacy

Refer to Fig. 12. The manual privacy mode works like the automatic privacy mode, except that the caller must press the “#” key to establish the busy state. It is released by dialing a “*” or by hanging up the phone.

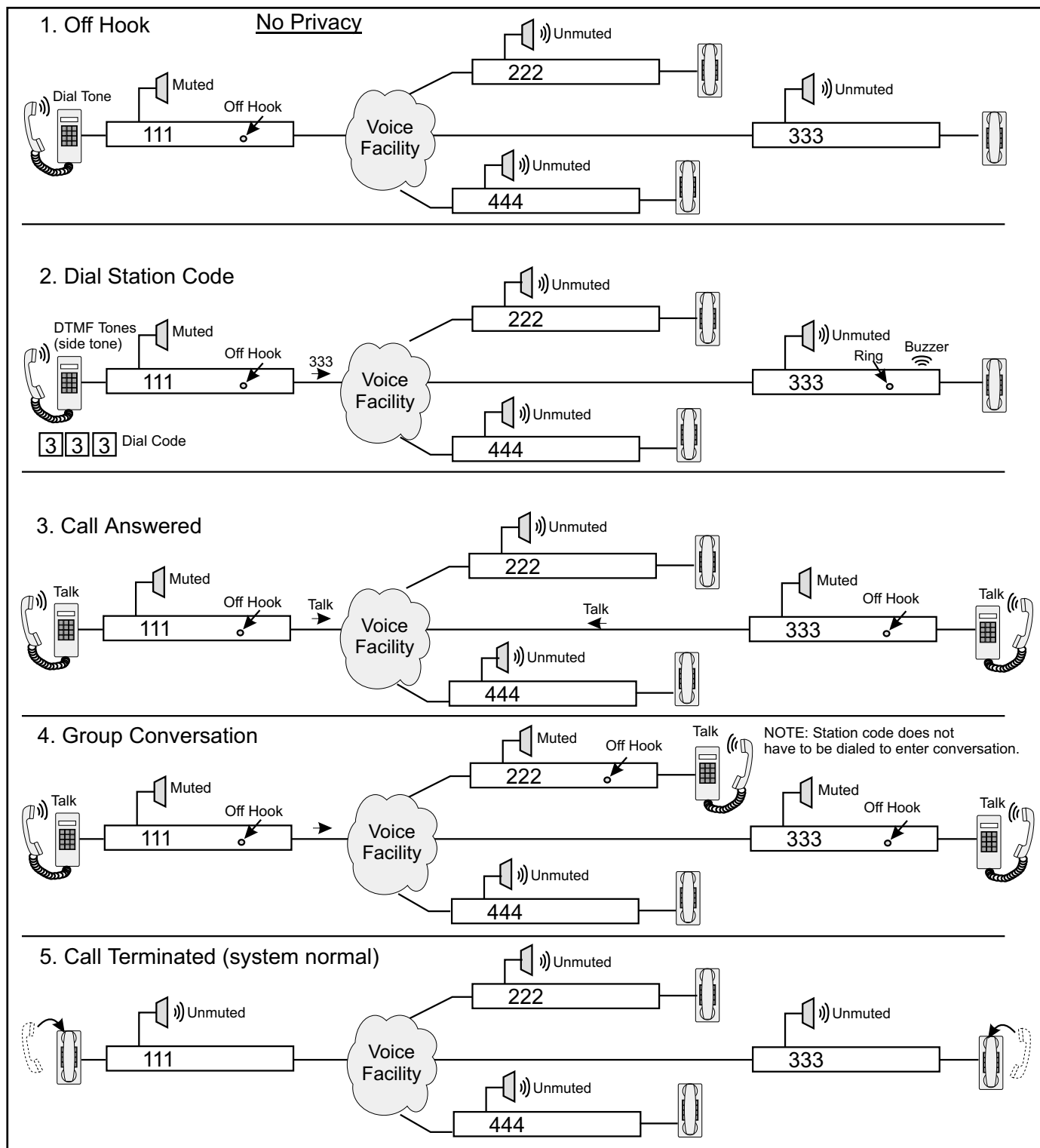


Fig. 13 - Order of operation in the no privacy mode.

No Privacy

Refer to Fig. 13. In the no privacy mode monitor speakers remain on when the system is in use and any station may get on the system at any time. A station's monitor speaker mutes only when the station phone is taken off hook.

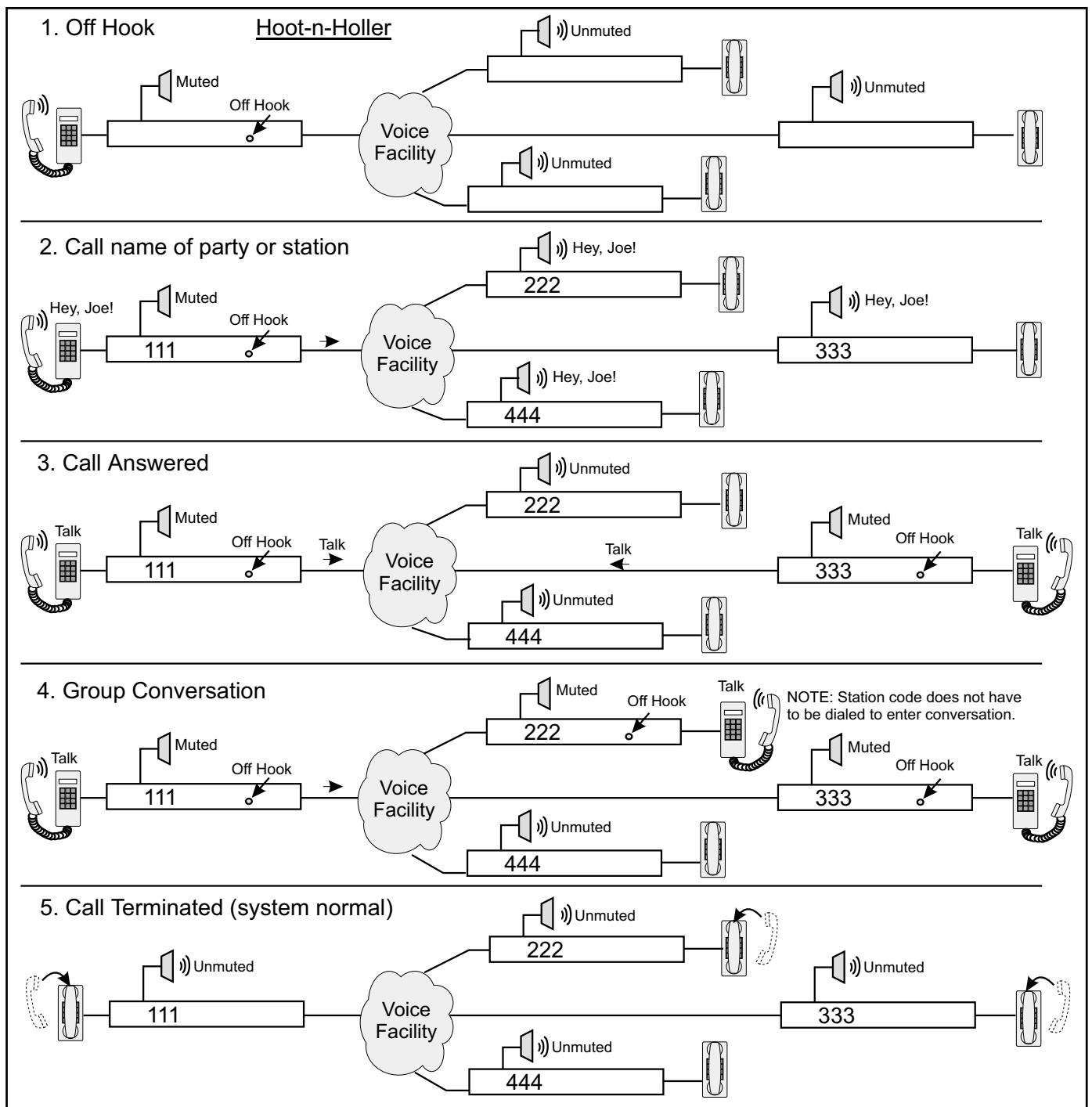


Fig. 14 - Order of operation in the hoot-n-holler mode.

Hoot-n-Holler

Refer to Fig. 14. A 4-wire telephone and an external speaker can turn the FDO 1000 into a classic "hoot-n-holler" order-wire. The speaker should be located where it can be heard by all parties at a facility. The phone is used to announce the desired party over the monitor speakers. When the person answers, the speaker is muted. All other sites continue to monitor the order-wire channel over the speakers. This application can use the FDO-1301 phone and FDO-1200 speaker.

On/Off Hook Function

The factory default uses # and * tones for controlling privacy functions. In cases where these tones are already in use for other functions, switch SW5-3 can be set ON to change control to the fourth column "A" and "C" tones. (The fourth column buttons are not provided on the phone, so manual privacy will not work if SW5-3 is ON.)

Off-Net Function

When an FDO 3000 Off-Net is used in the order-wire network, the automatic privacy mode should be used for best control of off-net access. In the other modes there is limited control. With manual privacy, you must press # to lock out an outside call and * to disconnect an outside caller. (**NOTE: If an outside caller presses *, the call will be terminated.**) With no privacy and hoot-n-holler modes, an outside call can interrupt an on-going conversation and there is no way to force a disconnect.

Shipping List

- ❑ SWAV Interface Card (D-PC-806-11C-04)
- ❑ Shelf (D-CS-KDATYPEV)
- ❑ Mounting Hardware (1-005-0001-00)
- ❑ Fuses
- ❑ Operation Guide (UM119789)
- ❑ Interconnecting cables

Below included with Packages 401-404 only

- ❑ FDO 1000 Order Wire card (D-PC-802-11C-04)
- ❑ Speaker (FDO-1200-10A-00)
- ❑ Telephone (FDO-1301-10A-01)
- ❑ 25-foot Handset Cord (1-675-0010-01)

Installation

1. Unpack the order-wire and all accessories.
2. Install mounting ears for 23" or 19" rack. Position as required per Fig. 15.
3. Mount the order-wire terminal in a rack.

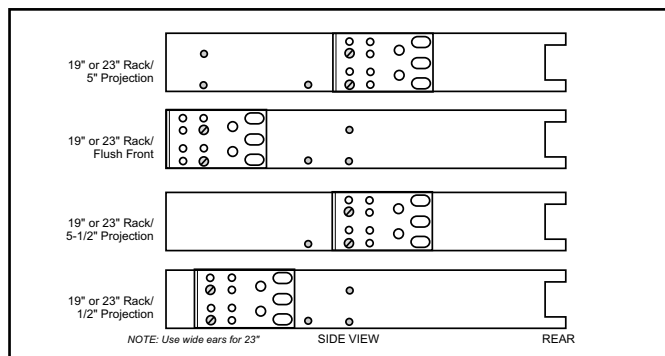


Fig. 15 - Position mounting ears for desired projection.

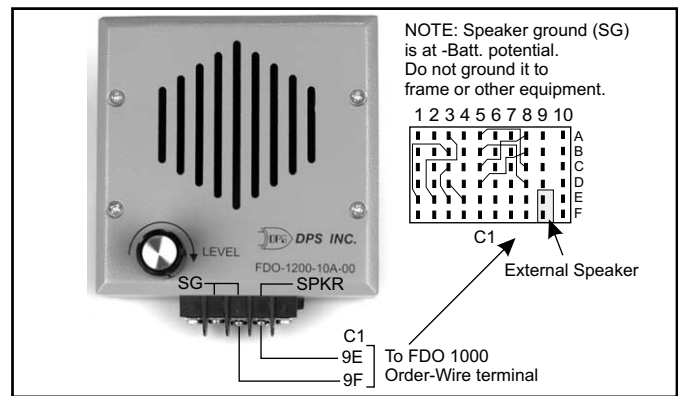


Fig. 16 - Connecting the FDO 1200 Speaker.

4. Mount the external speaker and connect to wire wrap block C1 per Fig. 16.
5. Mount the phone per Fig. 17. Connect to RJ-12 jack on the back of the order-wire.
6. Make sure the fuse is removed from the front panels of both the order-wire and the SWAV.
7. Remove Order-Wire P.C. board from housing.
8. Connect all inputs and outputs per Fig. 18.
9. Connect power per Fig. 18.
10. Set station number on rotary switches per Fig. 19. Use leading zeroes to set for 1 or 2 digit coding. Refer to Table A for code assignments.
11. Apply station code numbers to front panel per Fig. 19.
12. Set DIP switch for operating mode per Fig. 19. (**Factory default is "automatic privacy."**)
13. Set speaker trim pot per Fig. 19.
14. If a package with companion shelves is being installed, add jumper connections per Fig. 20.
15. Re-install P.C. board in housing.
16. Remove SWAV card from shelf.
17. Check jumper settings per Fig. 26.
18. Re-install SWAV card in housing.
19. Insert fuses at order-wire and SWAV front panels.
20. Go to Test and Acceptance on page 17.
21. Installation is complete.

Table A - Dial Code Assignments

Code	Assignment
000 thru 009*	Single digit dialing. Leading zeroes are not dialed.
010 thru 099*	Two digit dialing. Leading zero is not dialed.
100 thru 799; 900 thru 999*	Three digit dialing.
777	All call
8 + three digit code	Page at a station. Not functional with all call.

* Avoid using codes that start with "8."

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Reference Figures

Figs. 22 - 26 show the details of the various SWAV/
order-wire packages offered.

Fig. 21 illustrates the shelf wiring diagram.

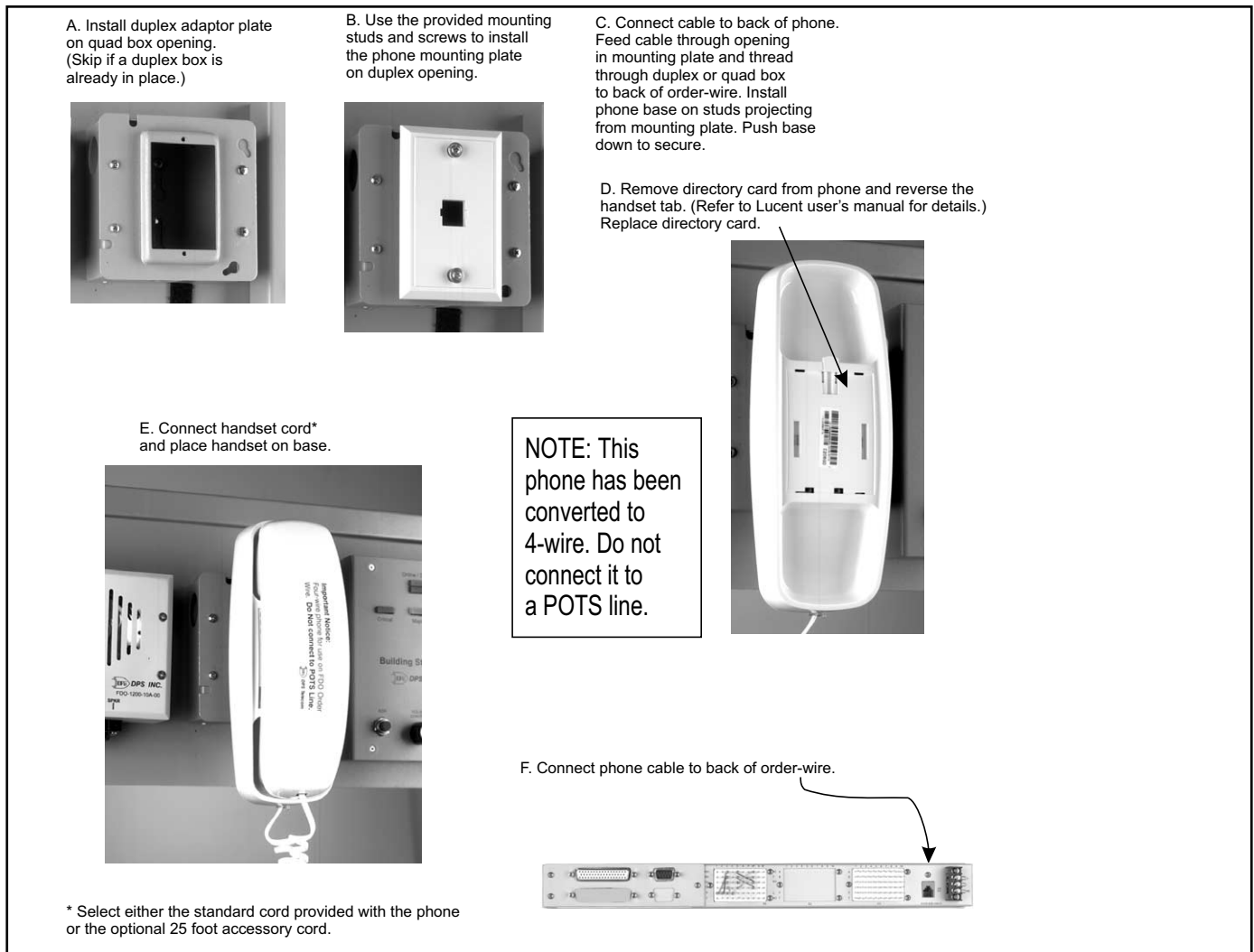


Fig. 17 - Install 4-wire phone on duplex plate near the order-wire.

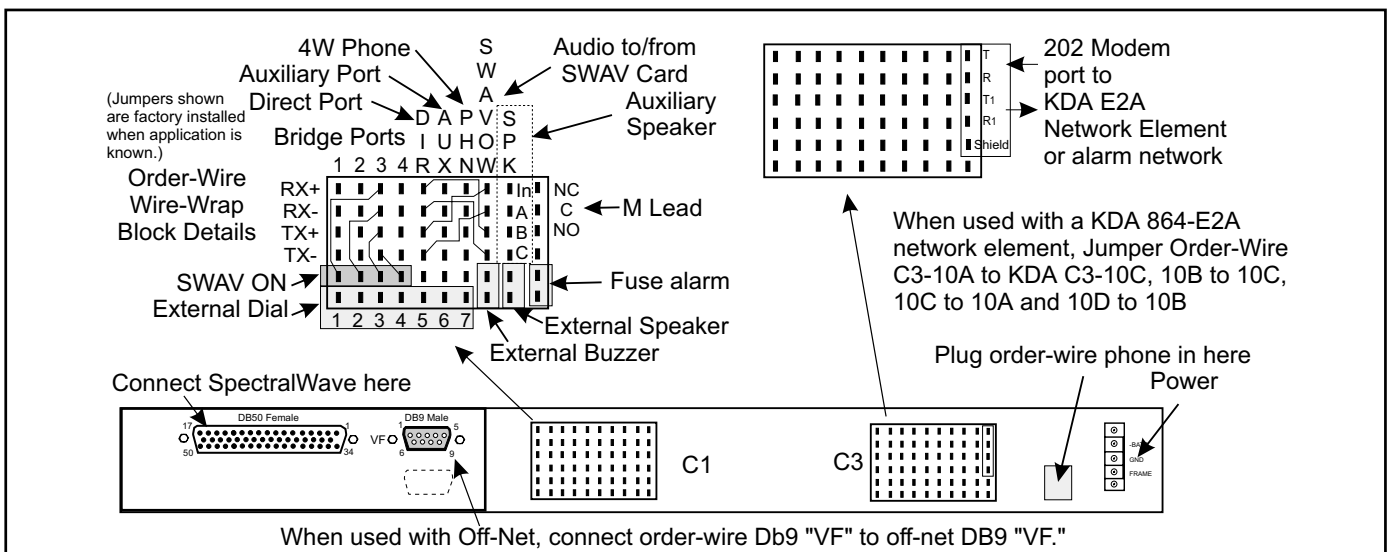


Fig. 18 - Order-wire interfaces network on wire-wrap pins at the rear of the housing.

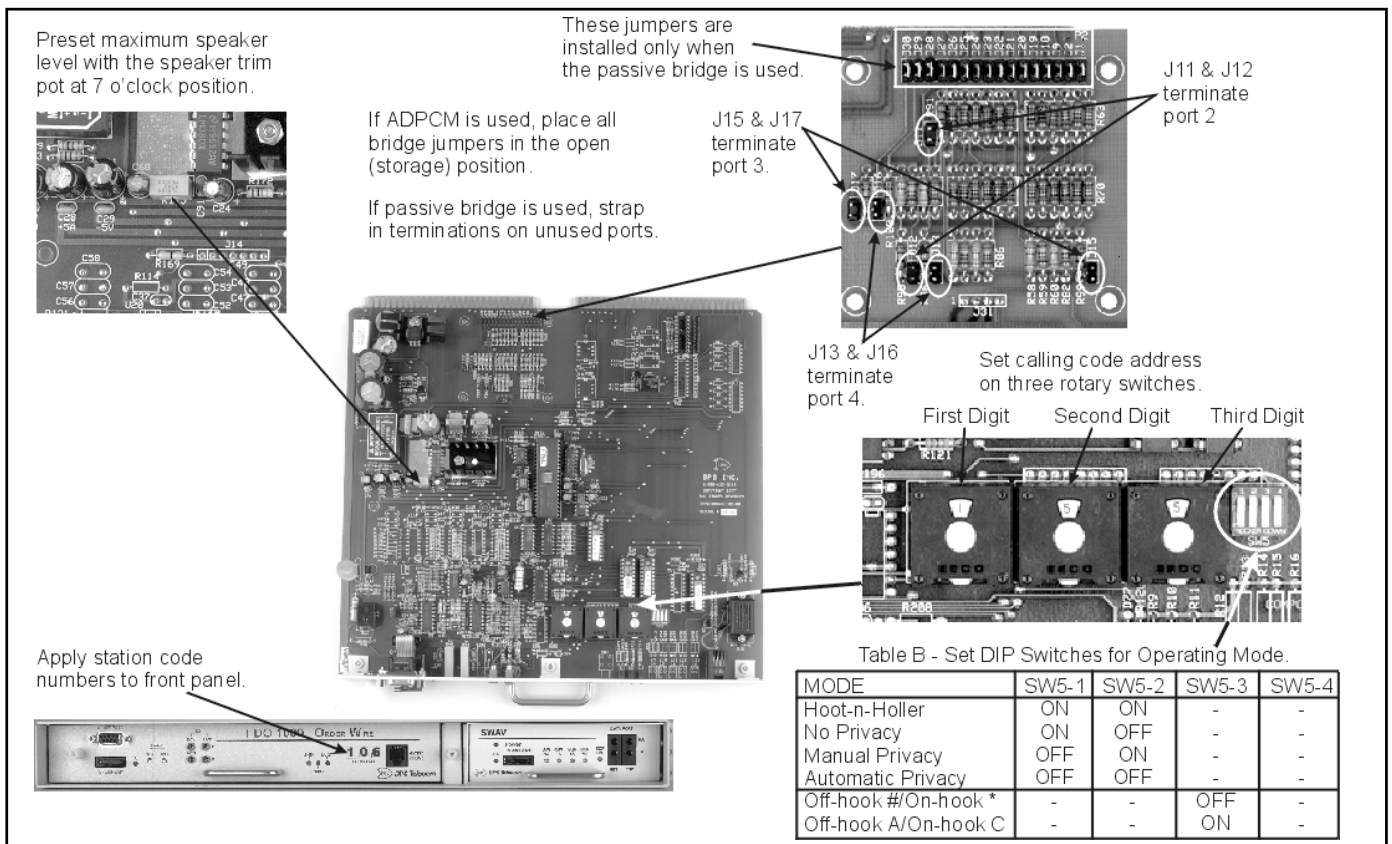


Fig. 19 - Set order-wire options before applying power.

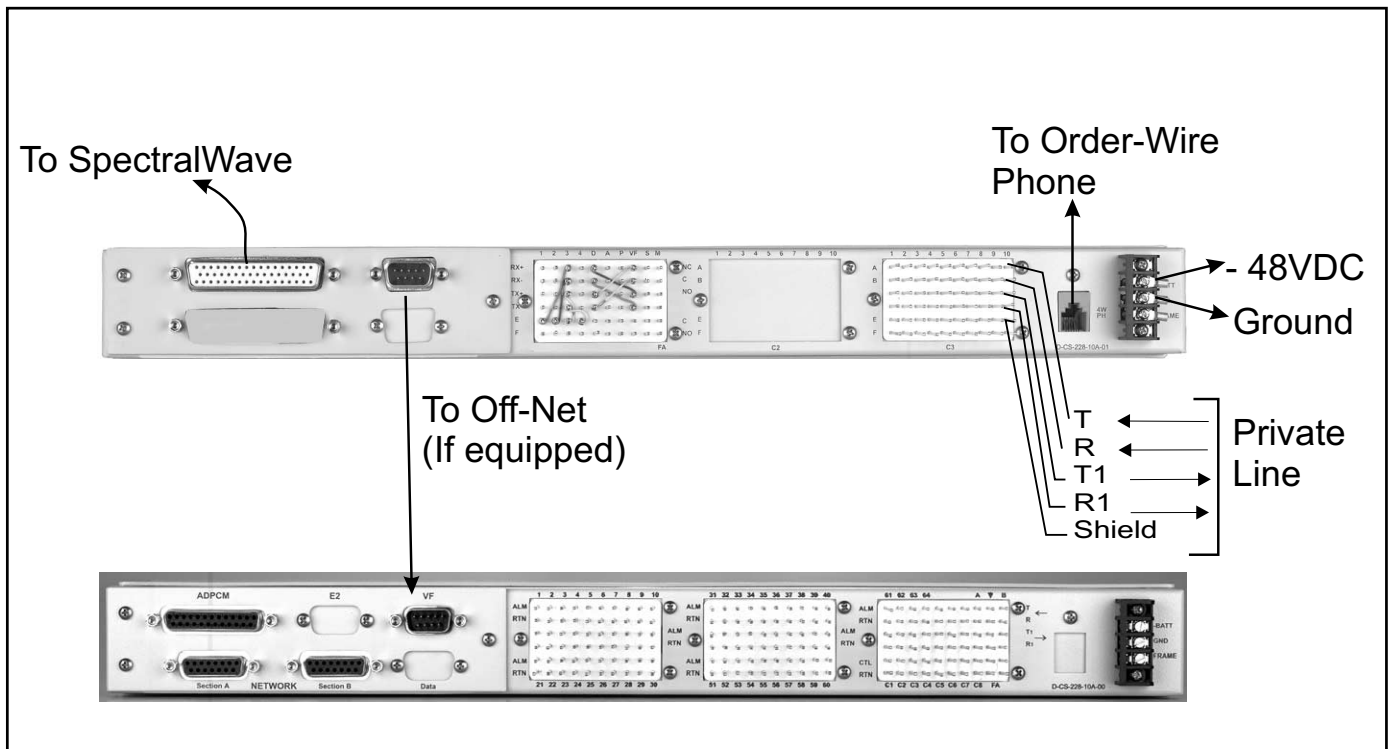


Fig. 20- When installing an order-wire package, connect inter-shelf cables.

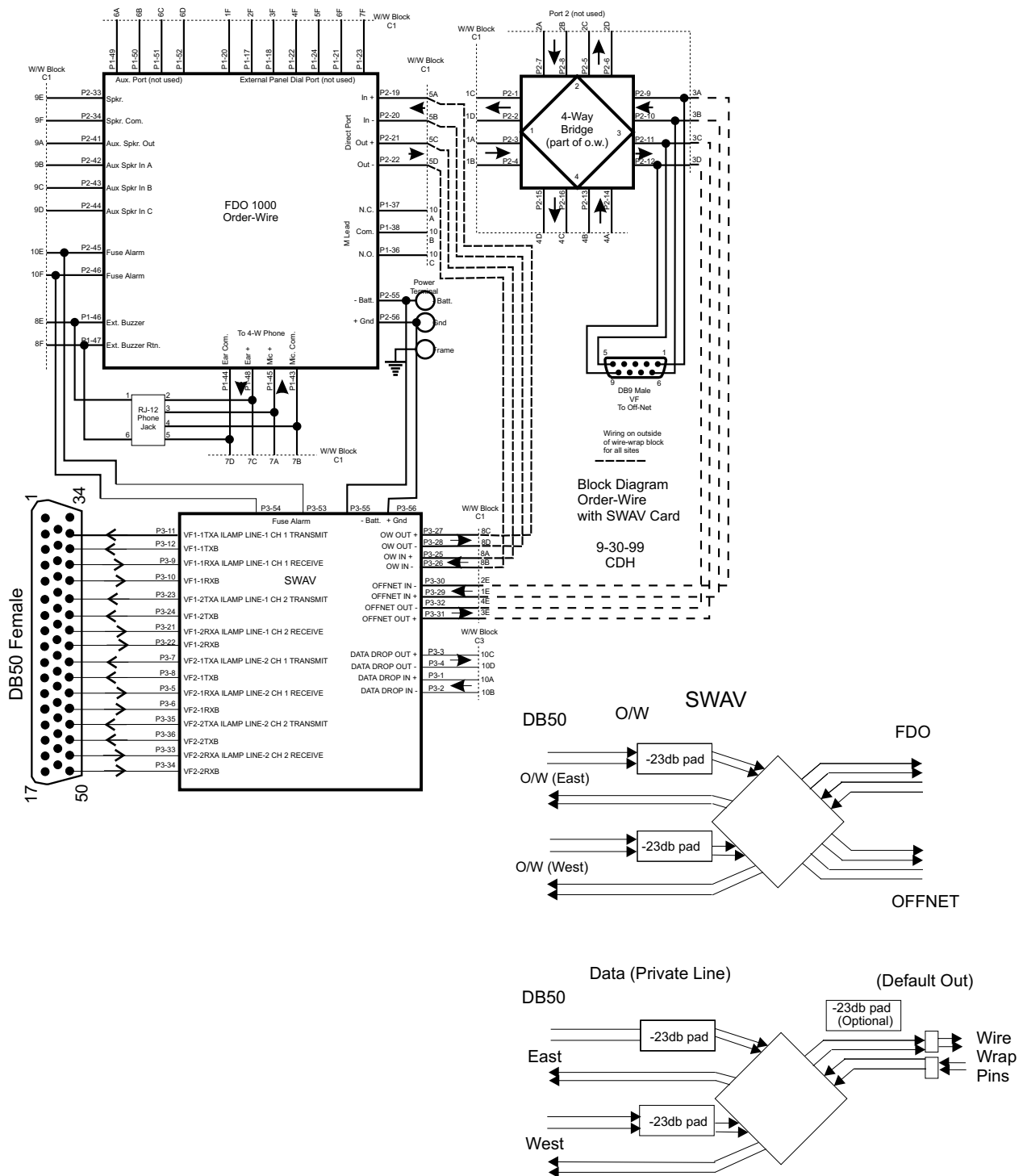


Fig. 21 - Order-wire package is pre-wired for digital application.

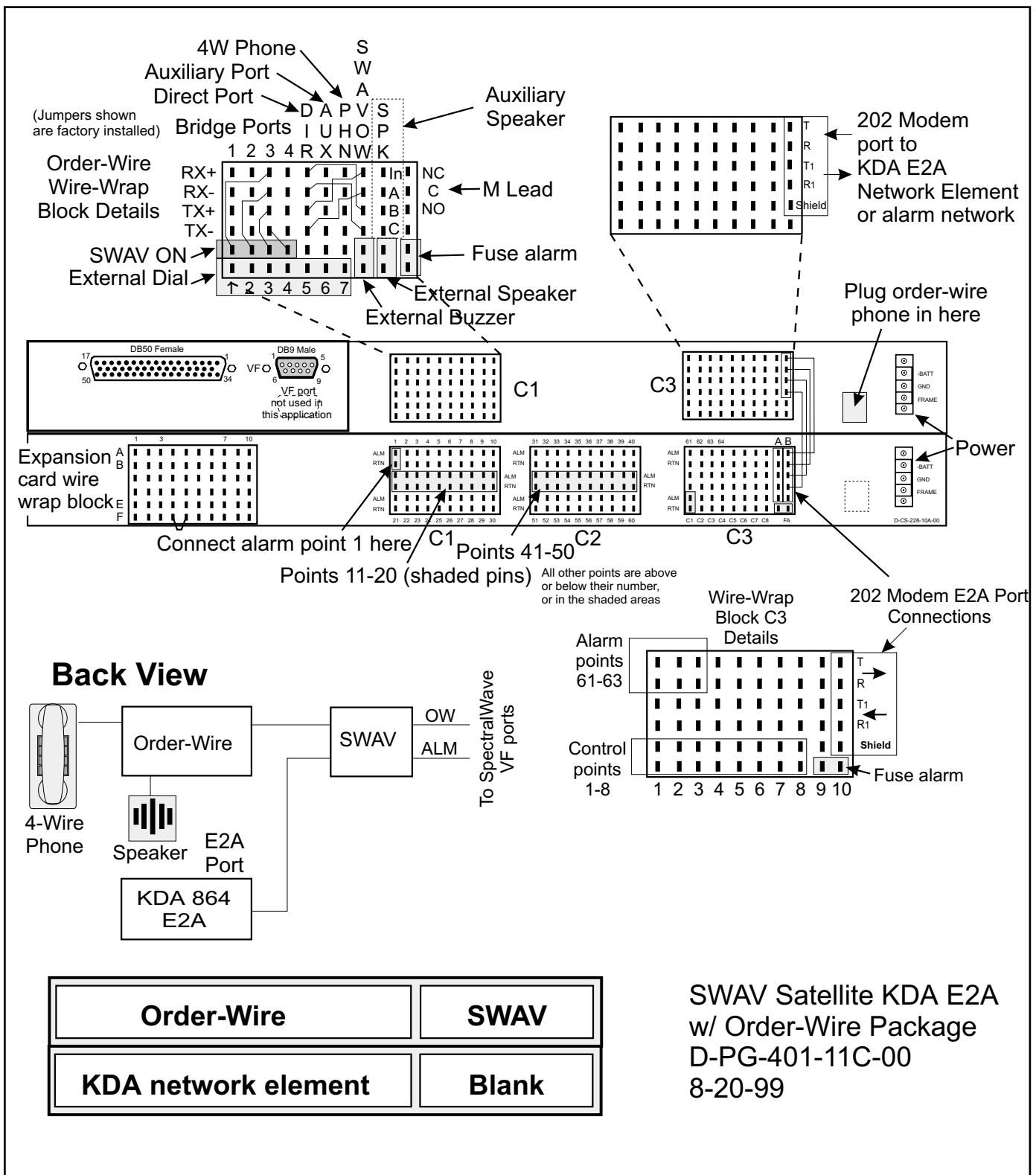


Fig. 22 - 401 package combines order-wire and KDA E2A network element in VF-SONET application.

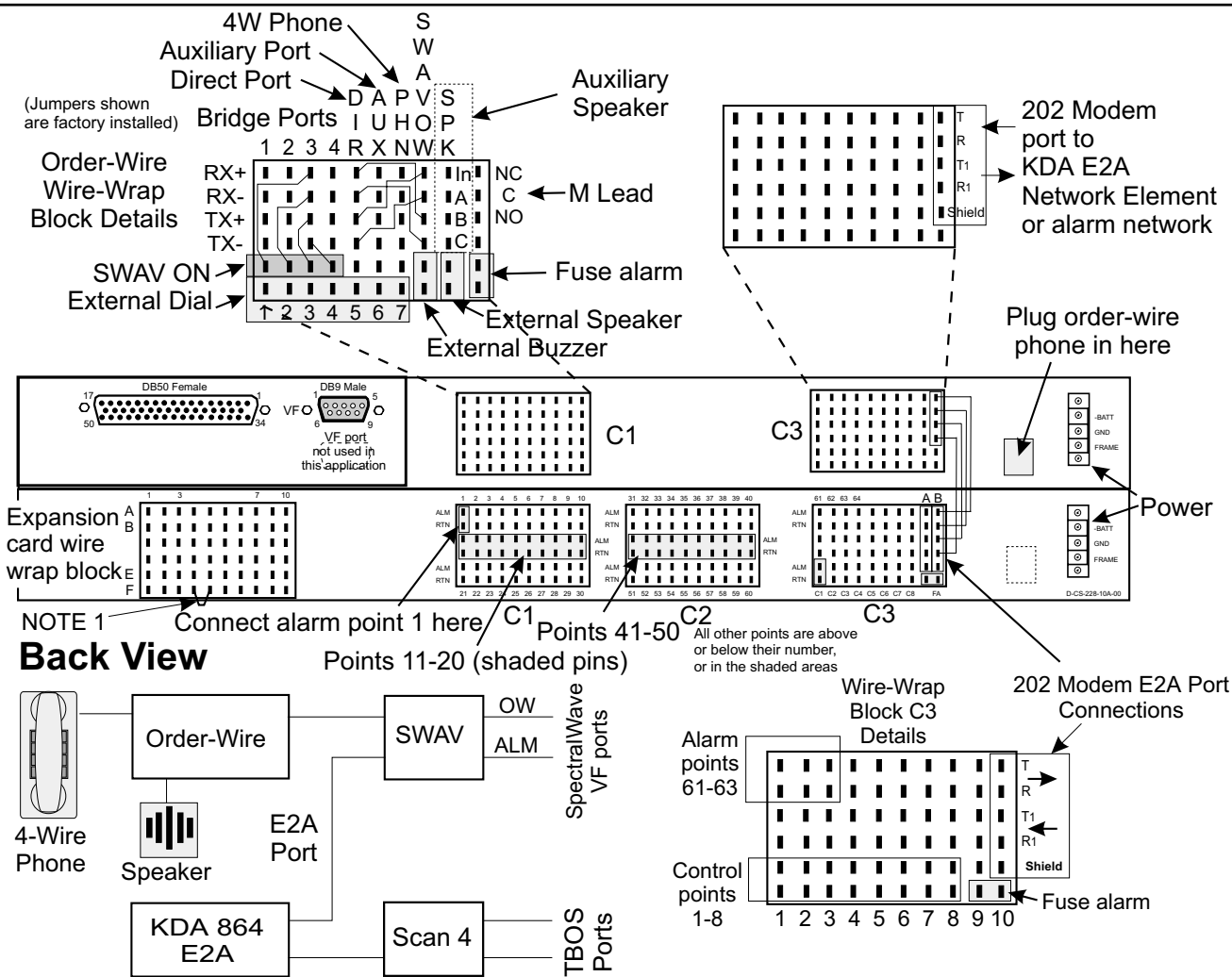
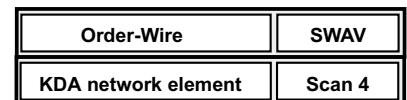


Table B - LR-24/SR-24 and Scan4 Expansion Card Pinouts

PIN	Scan4	LR-24	PIN	Scan4	LR-24	PIN	Scan4	LR-24
A1		Rly 1A	C1		Rly 11A	E1		Rly 21A
B1		Rly 1B	D1		Rly 11B	F1		Rly 21B
A2		Rly 2A	C2		Rly 12A	E2		Rly 22A
B2		Rly 2B	D2		Rly 12B	F2		Rly 22B
A3		Rly 3A	C3		Rly 13A	E3		Rly 23A
B3		Rly 3B	D3		Rly 13B	F3		Rly 23B
A4		Rly 4A	C4		Rly 14A	E4		Rly 24A
B4		Rly 4B	D4		Rly 14B	F4	GND	Rly 24B
A5		Rly 5A	C5	RX1+	Rly 15A	E5		GND
B5		Rly 5B	D5	RX1-	Rly 15B	F5	GND	GND
A6		Rly 6A	C6	TX1+	Rly 16A	E6		GND
B6		Rly 6B	D6	TX1-	Rly 16B	F6		GND
A7		Rly 7A	C7	RX2+	Rly 17A	E7		GND
B7		Rly 7B	D7	RX2-	Rly 17B	F7		GND
A8		Rly 8A	C8	TX2+	Rly 18A	E8		GND
B8		Rly 8B	D8	TX2-	Rly 18B	F8		GND
A9		Rly 9A	C9	RX3+	Rly 19A	E9		GND
B9		Rly 9B	D9	RX3-	Rly 19B	F9		GND
A10		Rly 10A	C10	TX3+	Rly 20A	E10		Fuse Alarm
B10		Rly 10B	D10	TX3-	Rly 20B	F10		Fuse Alarm

NOTE 1:
Install jumper between
F4 and F5 for Scan 4.



SWAV Satellite KDA E2A
plus Scan 4
w/ Order-Wire Package
D-PG-402-11C-00
8-20-99

Fig. 23 - 402 package combines order-wire and KDA E2A network element with Scan 4 in VF-SONET application.

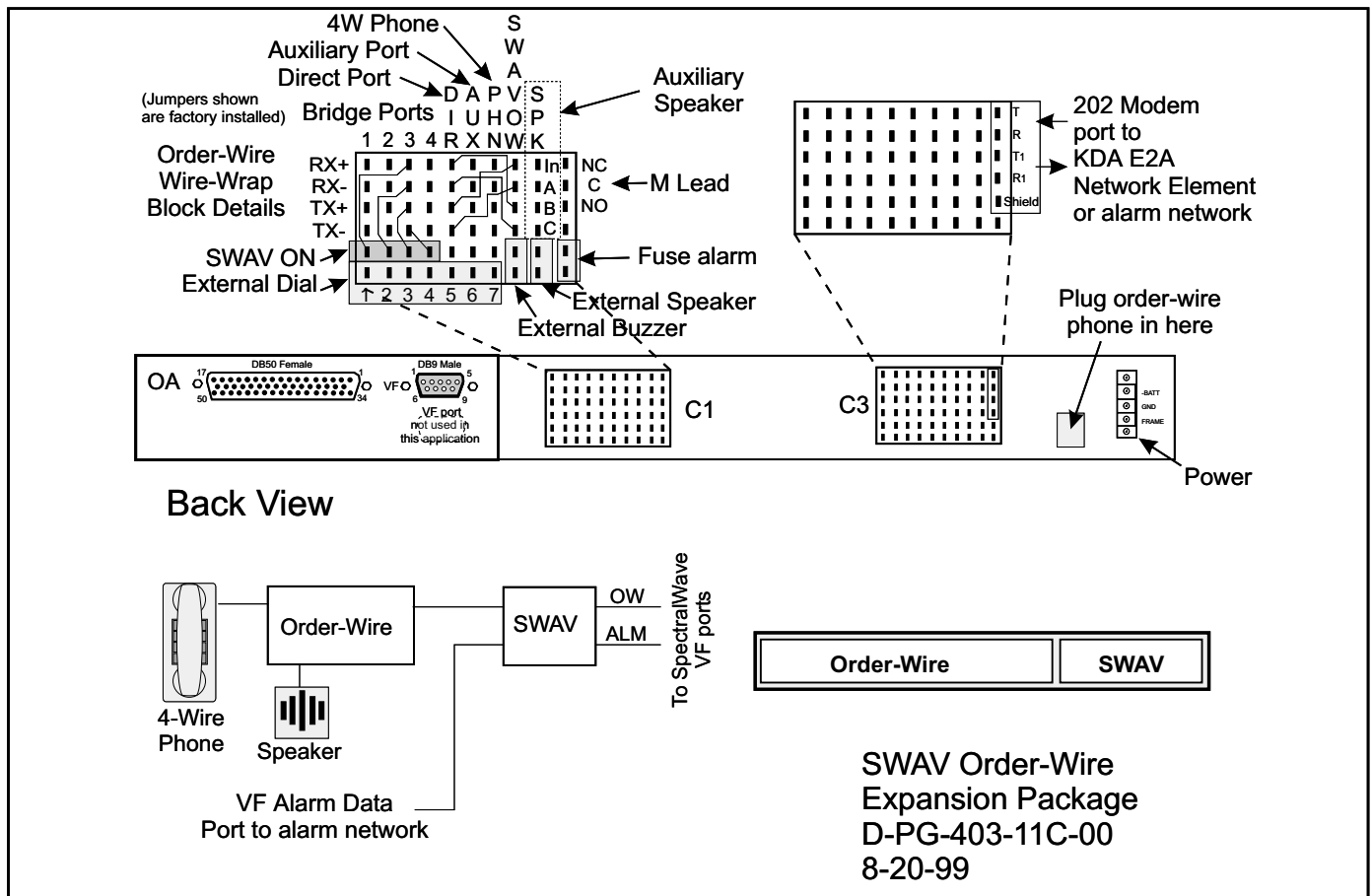


Fig. 24 - 403 package interfaces order-wire to VF-SONET application.

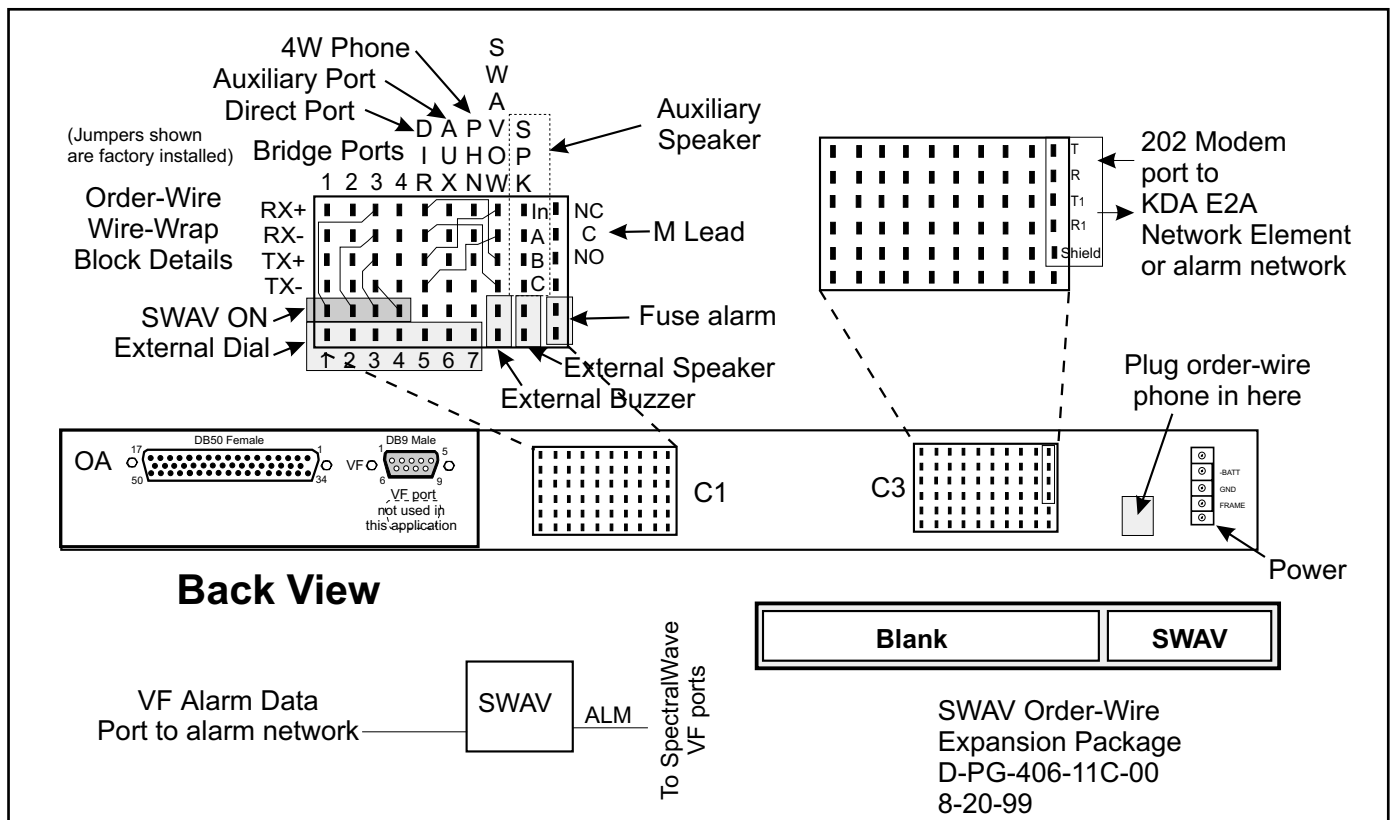
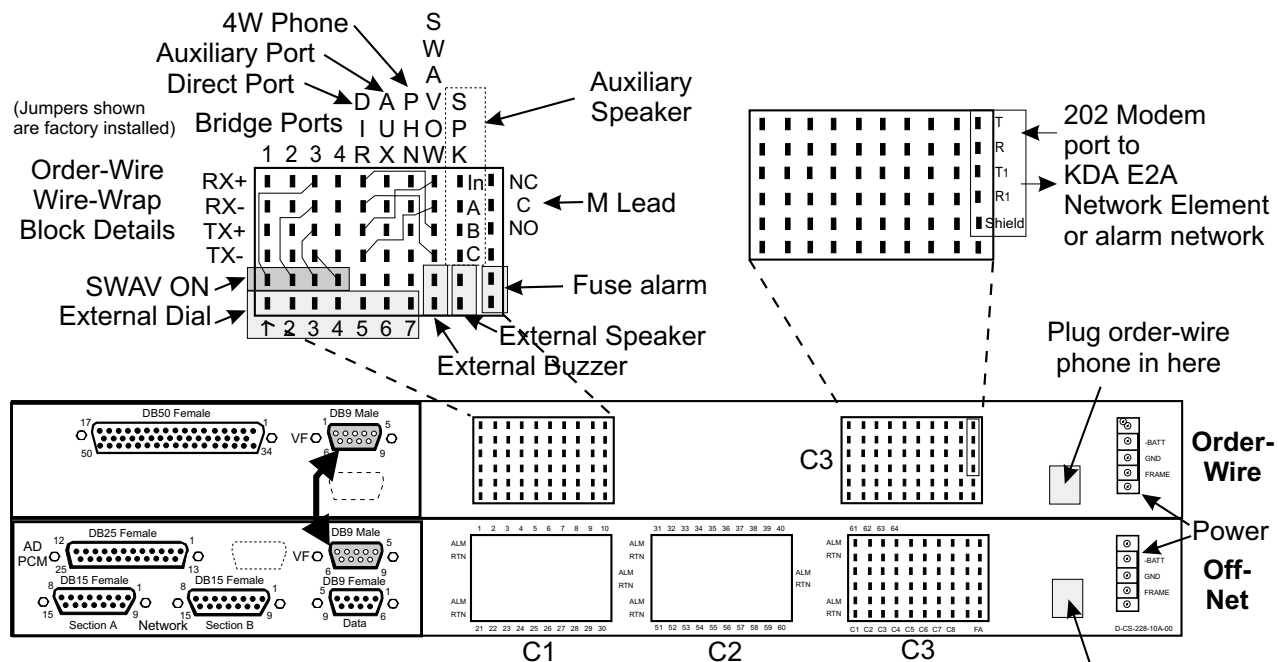
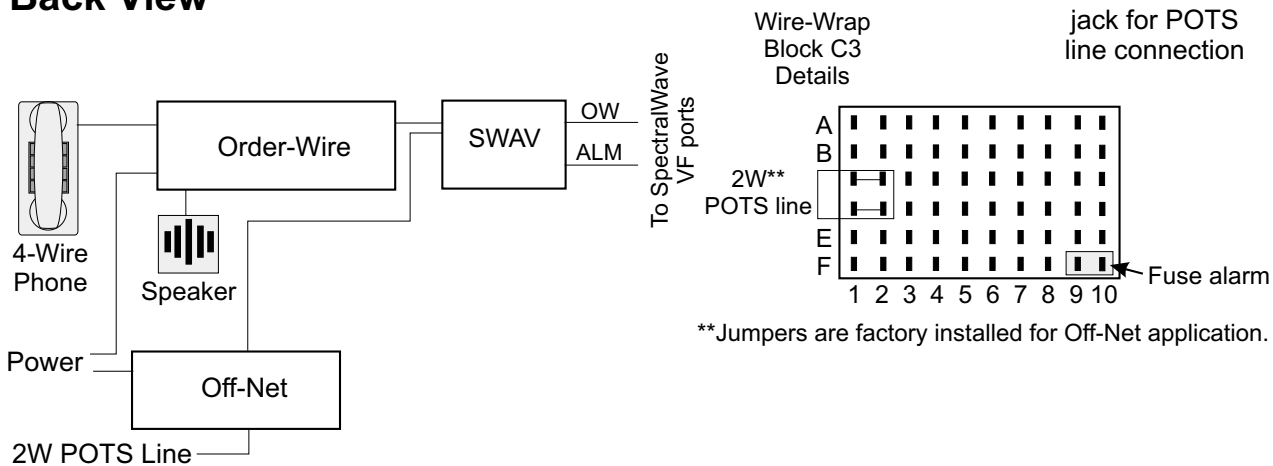


Fig. 25 - 406 package is for use where parallel SWAV systems are already in place.



Back View



Front View

SWAV Order-Wire/
Off-Net Package
D-PG-404-11C-00
8-20-99

Fig. 26 - 404 package combines order-wire and off-net interface in VF-SONET application.

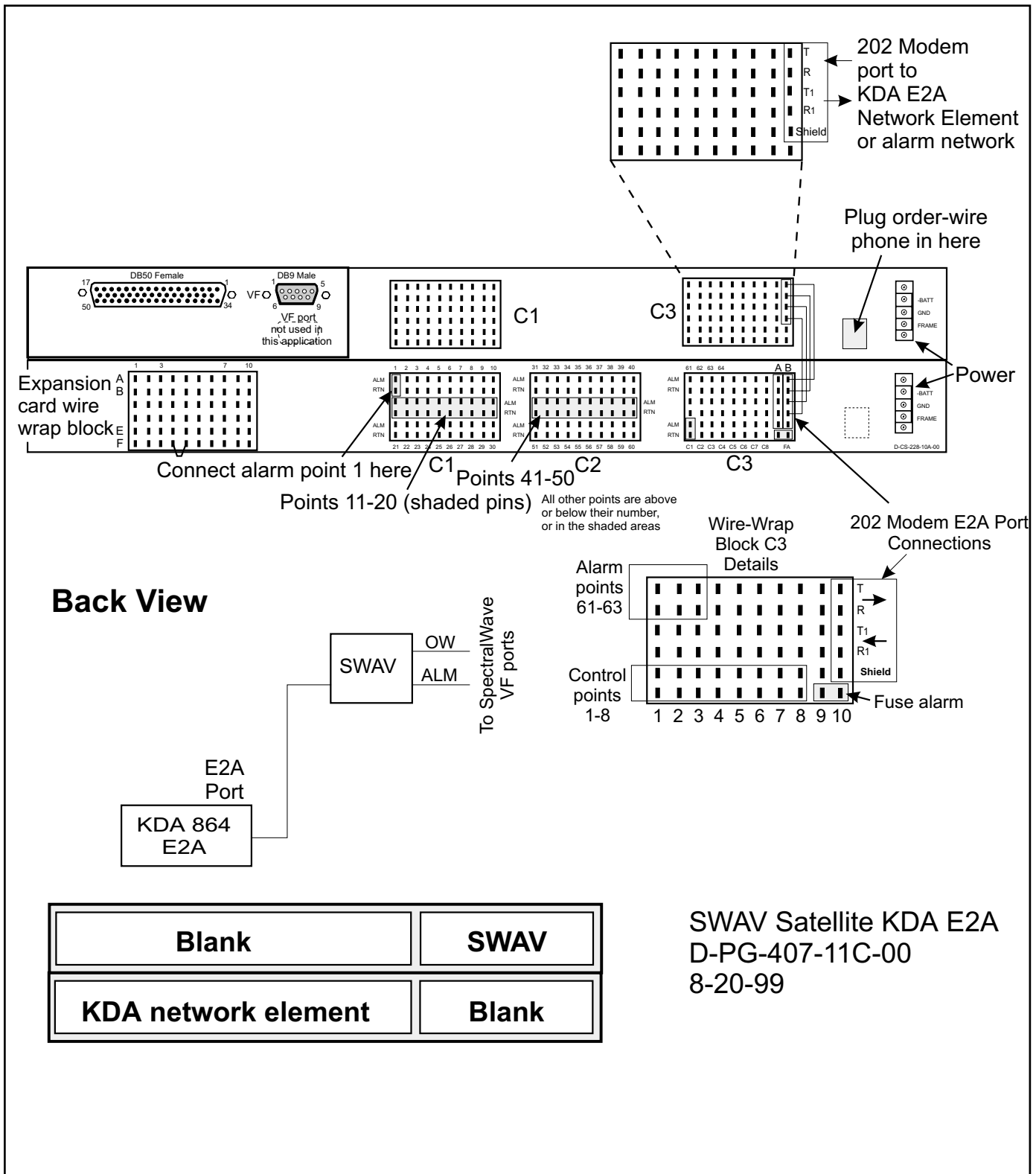
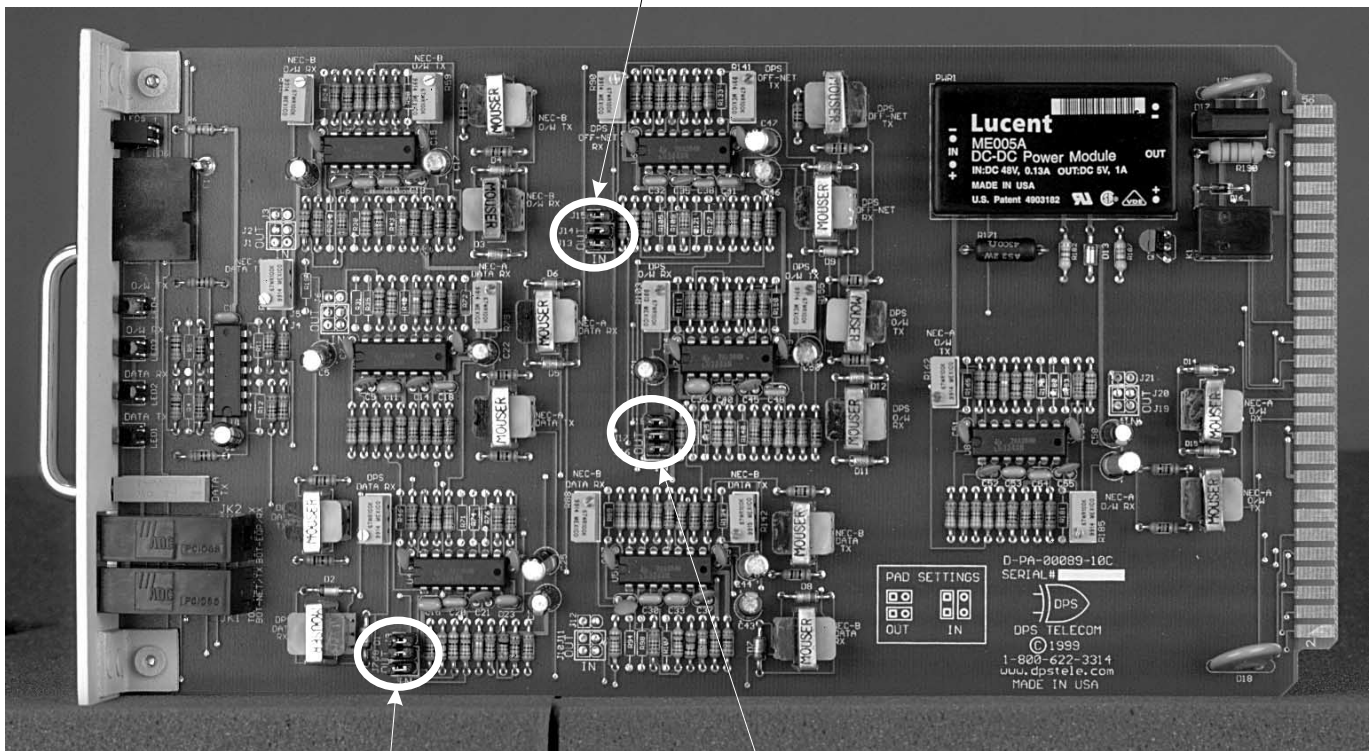


Fig. 27 - 407 package has KDA E2A network element in VF-SONET application.

J14 -23db pad
J13 OffNet
J15 Termination



J7 -23db pad
J8 Data
J9 Termination

J16 -23db pad
J17 DPS O/W
J18 Termination

Note: Factory Setting - pads out and ports terminated.

Fig. 28 - Set option jumpers on the SWAV card.

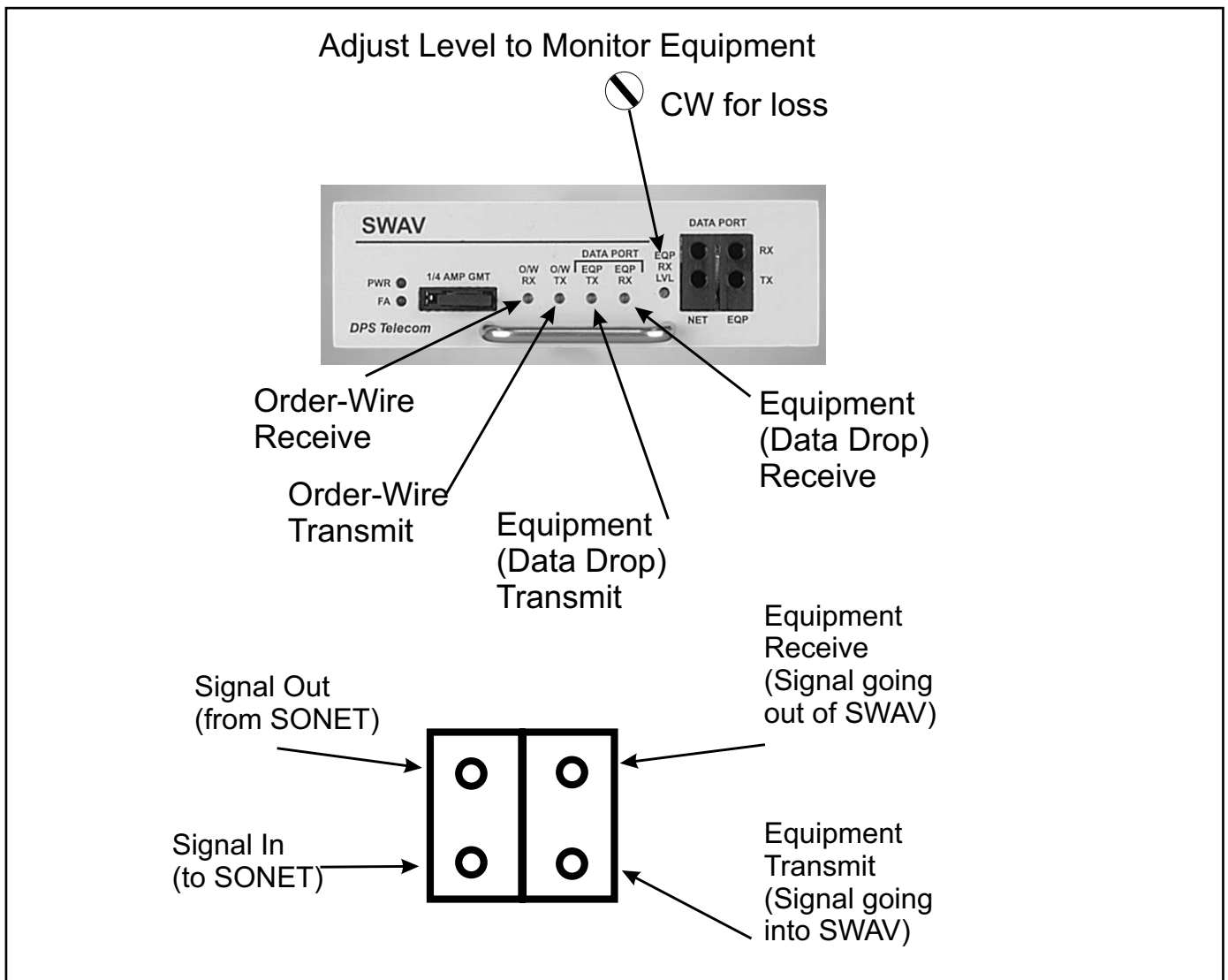


Fig. 29 - LEDs on Order-Wire and ADPCM show device status.

Test and Acceptance

- ❑ Calibrate levels per Table H.
NOTE: If the order-wire is equipped with an ADPCM, the levels will be pre-set at the factory and this step may be skipped.
- ❑ Perform a general test of the order-wire by calling a few stations and having a station call back in to the site you are installing.

Table H - Level set procedure (for automatic privacy mode using the SWAV)

Step	Action	Results
1	Set output level at station A a. Connect meter to the TX test points on the front panel of station A. b. Lift handset and press button '1'. c. Adjust TX level pot on front panel d. Remove meter from test points.	Measure no signal. Measure some level around -10dBm. Read -10dBm
2	Set input level at all other stations a. Connect meter to the RX test points on the front panel of a station. b. At station A press button '1' on the phone (phone is off hook). c. Adjust RX level pot on front panel. d. Proceed with step 3 before moving on to another station.	Measure no signal. Measure some level around -10 dBm. Read -10 dBm.
3	Set output level at all other stations a. Connect meter to the TX test points on the front panel of a station. b. Lift handset and press button '1'. c. Adjust TX level pot on front panel. d. Remove meter from test points.	Measure no signal. Measure some level around -10dBm. Read -10dBm
4	Go on to other stations and perform steps 2 and 3.	As in steps 2 and 3.
5	Return to station A and perform step 2.	As in step 2.

Specifications

VF interface levels, Direct Port: -16 to +7 dBm
VF Interface Levels, Bridge Ports:
-16 dBm Transmit
+7dBm Receive
Bridge Type: 4-Way / 4-Wire, Passive
Bridge Return Loss: >40 dB
Bridge Trans-Hybrid Loss: >56 dB
Frequency Range: 300 to 3000 Hz
Signaling: Standard DTMF
All Call: Programmable option
Station Call: 1, 2 or 3 digit
Physical Size: 1-3/4" X 19" X 12" case
Weight: 3 lbs
Voltage Range: Option 0 = -18 to -72 VDC
Option 2 = -18 to -36 VDC
Option 4 = -36 to -72 VDC
Current: 500 mA
Fuse: 1 Amp
Speaker Amplifier: 2 Watts, 8 Ohms, included

Options and Model Numbers

FDO-1000-10A-0V VF Order Wire (w/o phone)
Options: V:
1=120VAC, 2=-24VDC,
4=-48VDC;
D-PC-802-11C-04 Replacement card, -48 VDC
D-PC-806-11C-04 SWAV card, -48 VDC

Companion Off-Net

FDO-3000-10A-0V Off-Net Interface
for Order-Wire.
D-PC-801-11C-04 Replacement card, -48 VDC

Accessories

FDO-1200-10A-00 External Speaker, Wall Mount
FDO-1301-10A-00 Trimline Phone w/DTMF Dial,
4-wire, beige
FDO-1301-10A-01 Trimline Phone w/DTMF Dial,
4-wire, white
FDO-1501-10A-00 Active 4 way / 4 wire Bridge



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