

# Owner's Manual

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# MODEL FS900

2-Unit Miniframe

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dbx Professional Products

**dbx<sup>®</sup>**

## Introduction

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Congratulations on purchasing the dbx FS900 miniframe. Your new FS900 powered miniframe can hold up to two dbx 900 series modules (as well as those of some other companies).

This owner's manual provides you with the information you need to install the FS900 with 900-series modules and make proper audio connections. For more detailed technical information, a service manual may be ordered from our Spare Parts Department (use the order form in the back of the manual).

This manual also includes important information for completing the warranty card, supporting your FS900 with dbx customer and factory service, and forms for ordering 900 series service manuals and additional dbx binders.

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## Unpacking

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### **1. Unpacking and Inspection**

Your FS900 powered miniframe was carefully packed at the factory in a protective carton. Nonetheless, be sure to examine the unit and the carton for any signs of damage that may have occurred during shipping.

If obvious physical damage is noticed contact the carrier immediately to make a damage claim.

Do not destroy the carton or packing material.

Packed with the FS900 and this owner's manual are:

- 1     Warranty Certificate (includes Registration Card)
- 1     Spare Fuse

### **2. Owner Registration Card**

Please complete the Registration Card and return it. Refer to the following page.

**NOTE:** We do not sell or pass on to other companies information provided on the Registration Card.

## Owner Registration, Warranty, Feedback

### Registration Card

There are two good reasons for returning the Registration Card shipped with this product.

- 1) It enables us to inform you of new applications, performance improvements, and service aids that are developed, and
- 2) It helps us respond promptly to claims under warranty without having to request a copy of your bill of sale or other proof of purchase.

Please fill in the Registration Card, detach it from the Warranty Certificate, and send the card to us today. If it is lost (or you have purchased this unit used), please photocopy the duplicate below, fill it in, and send it to the address on the inside of the front cover.

Registration Card	
Model # _____	Serial # _____ Purchase Date _____
Your name _____	Title _____
Company _____	Telephone _____
Street _____	
City, State, Mail Code (Zip), Country _____	
Purchased from _____	Price _____
Nature of your product application _____	
Please rate the following from 1 to 10 (where 10 is the best possible rating, and 1 is the lowest):	
Performance _____	Ease of use _____ Documentation _____ Cosmetics _____ Serviceability _____
Comments _____	
_____	
Please list the magazines you read most often, in order of priority _____	
_____	
95078-000-01 March 1990	

### Warranty

The warranty, which can be enjoyed only by the first end-user of record, is stated on the separate Warranty Certificate packed with this manual. Save it for future reference. Details on obtaining factory service are provided on page 11.

### User Feedback Form

We are very interested in your comments about this product. Your suggestions for improvement to either the product or the manual will be welcomed. A postpaid User Feedback Form is provided in the back of this manual for your convenience. If it is missing, you can write to us at the address on the inside of the front cover, or call or fax our offices at the number listed. We will be happy to hear from you.

## Installation

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### 1. Inspect Mains Voltage Selector for Correct Values

Ordinarily, your unit will have been shipped with the mains voltage switch set for your country, the plug will be suitable.

- A. Locate the voltage selector switch on the rear panel. See Figure 1.
- B. Check that the voltage selector switch is set correctly. To change the setting, slide the switch so that the indicator on the switch shows the correct voltage (115V or 230V).

The FS900 is shipped ready for 115-volt, 50-60Hz operation (unless a label on the power cord indicates otherwise). Use a 3AG 250V Slow-Blow fuse (1/4-amp for either 115-volt operation or 230-volt operation).

North American 1/4" x 1 1/4" fuses are normally supplied because they are available in almost every country.

### 2. Connect the FS900's power cord to an appropriate AC power source.

The power cord is normally terminated in a 'U-ground' plug (USA standard), unless specially-ordered for your country's standard. The green (or green/yellow) wire from the safety-ground prong is ordinarily connected directly to the FS900 chassis. If it becomes necessary to lift this ground to suppress ground loops, do so with a three-prong to two-prong adapter plug, rather than by damaging the power plug. You should not defeat the ground unless absolutely necessary, because it eliminates the intrinsic safety feature of the three-wire system.

**WARNING:** If you are not thoroughly familiar with the technique for changing the plug, ask a qualified electrical technician to change plugs.



**WARNING:** If the ground is defeated, certain fault conditions in the unit or in the system to which it is connected can result in full line voltage between chassis and earth ground. Severe injury can then result if the chassis and earth ground are touched simultaneously.

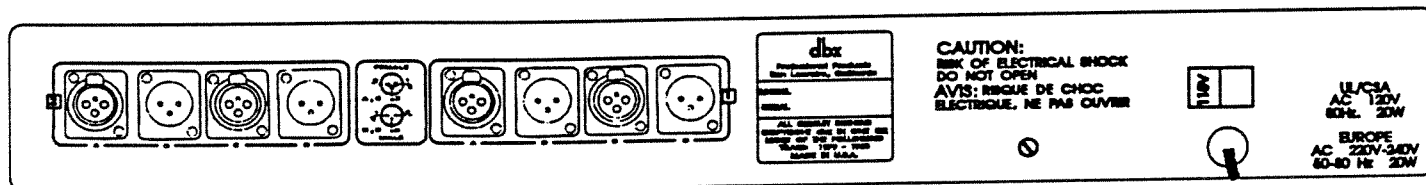


Figure 1: FS900 Rear Panel

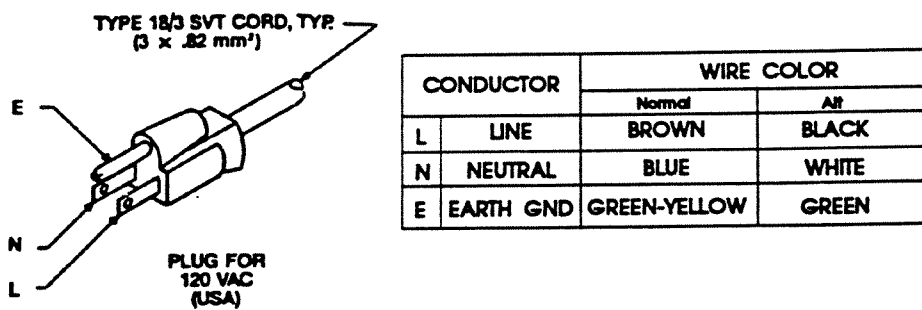


Figure 2: AC Power Cord Color Coding



### 3. Consider the location of the FS900 and Heat Management

A fully loaded frame can produce up to 20 watts of heat. The FS900 frame and its modules have been engineered to be operated in an environment where the air is cooler than 40° C (104° F).

If, for example, you install your frame in a rack above heat-producing equipment (such as vacuum tube amplifiers), you must consider the thermal sources and the air flow characteristics of the installation to avoid creating reliability problems due to overheating.

Be sure that free air is available to every heat-producing unit in the rack. One way to do this is to allow ample airspace between units. Some users install grille panels to permit heated air to escape more easily.

In racks that must be densely packed, it may be necessary to install fans to force air upward rapidly to cool all units, especially the topmost ones.



### 4. Prepare Modules for Installation — Check Supply Current Requirements

Table 1 lists all 900 series modules manufactured prior to the publication of this manual, with corresponding supply currents. Some modules included in this list are no longer being produced.

When installing future dbx modules (as well as third party modules) consult the manual which accompanies each module to be certain you are operating within the capacity of the FS900's power supply.

- A. Check the supply current ratings (+15V, -15V, +24V, -24V) for each module you intend to install.
- B. Verify that the total supply current required for each voltage bus does not exceed capacity.

**NOTE:** +15V bus capacity = 275mA; -15V bus capacity = 275mA; +24V bus capacity = 100mA; -24V bus capacity = 100mA.

**NOTE:** The 15 volt rails are used for processing; the 24 volt rails are used for output drivers in order to obtain +24dBm into 600 ohms.

Table 1: Module Current Requirements

Module #	Product Name	Regulated		Unregulated	
		+15V	-15V	+24V	-24V
902	De-Esser	60mA	60mA	30mA	30mA
903	Compressor/Limiter	60mA	60mA	30mA	30mA
904	Noise Gate	60mA	60mA	30mA	30mA
905	Parametric EQ	100mA	100mA	30mA	30mA
907*	Compressor/Limiter	50mA	50mA	20mA	20mA
911	Type I NR	50mA	50mA	26mA	26mA
929	Hiss Reducer	75mA	75mA	65mA	65mA
933	Distribution Amp/Mixer	60mA	60mA	90mA	90mA
941*	Type II NR Dual Encode	50mA	50mA	30mA	30mA
942*	Type II NR Dual Decode	50mA	50mA	30mA	30mA
941A	Type II NR Dual Encode	50mA	50mA	26mA	26mA
942A	Type II NR Dual Decode	50mA	50mA	26mA	26mA
408*	Type II NR Decode	40mA	40mA	20mA	20mA
409*	Disc Decoder	40mA	40mA	20mA	20mA
410*	Type I NR Encode/Decode	50mA	50mA	30mA	30mA
411*	Type I NR Encode/Decode	50mA	50mA	30mA	30mA

\* Indicates Discontinued Modules

408, 942, replaced by electronically-compatible 942A

410, 411 replaced by electronically-compatible 911 (provides more output headroom than 410)

941 replaced by electronically-compatible 941A



### 5. Install Modules

Modules are simply aligned with the card guides in the FS900 and pushed into the desired slot. The FS900 can support up to two modules.

Both slots are wired identically to the rear panel and to the power supply. (See Table 2)

- A. Turn the power off.
- B. Line up the module card and the guide rails, then gently slide it into place until it seats in the connector. Repeat this procedure for each module you want to install.

### 6. Complete Wire Connections: Inputs, Outputs, Ground, Optional Stereo Coupling

The FS900 has two available module bays, labeled CH 1 and CH 2. Each module bay is connected to XL-type connectors located on the rear of the FS900 (Figure 1) according to Table 2. Pin 1 is circuit ground, pin 2 is the cold (-) lead and pin 3 is the hot (+) lead.

- A. Locate the XL-type connectors on the rear panel. These connectors provide audio and control voltage (CV) connections for each module.
- B. Check Table 2 for each module you have installed and connect inputs and outputs according to each module's connection scheme. We recommend using standard XL-type connectors and 2-conductor shielded cable such as Belden 8451.

**NOTE:** See individual instruction manuals for modules not shown.

Table 2: Hookup Information\*

F-900A Terminals	902 De-Esser	903/907 Comp/Limiter	904 Noise Gate	905 Para- metric	906 Flanger**	929 Hiss Reducer	941/941A 942/942A Type II NR	408 Type II NR	409 Disc Decoder	410/411/911 Type I NR
<div><div><div>+</div><div>]</div><div>A</div><div>-</div><div>]</div></div></div>	Audio Input				N/A	Ch. A Input	Ch. A Input	Input	Decode Input	
<div><div><div><div><div>⏏</div><div>⏏</div><div>⏏</div></div><div><div>+</div><div>]</div><div>B</div><div>-</div><div>]</div></div></div></div></div>	Audio Output*				N/A	Ch. A Output	Ch. B Output	Master Gain	Encode Output	
								Not Used		
<div><div><div><div><div>+</div><div>]</div><div>C</div><div>-</div><div>]</div></div></div></div><div><div><div>⏏</div><div>⏏</div><div>⏏</div></div><div><div>+</div><div>]</div><div>D</div><div>-</div><div>]</div></div></div></div>	Not Used	Detector Input (907: AUX IN)	Key Input	Not Used	N/A	Ch. B Input	Ch. B Input	Not Used	Encode Input	
								Remote Bypass		
<div><div><div><div><div>+</div><div>]</div><div>D</div><div>-</div><div>]</div></div></div></div></div>	Control Voltage Output			Not Used	N/A	Ch. B Output	Ch. A Output	Output	Decode Output	
	Control Voltage Input									

\* Audio Output negative (-) terminals are internally connected to circuit ground.

\*\* The 906 Flanger is a double-width module, so it can't be used in the FS900.

## Troubleshooting

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Whenever you have a problem, the first thing to do is to make sure that the connections into and out of a seemingly defective module are exactly correct. As with any system component, any problem should be carefully localized to that component, to the exclusion of other parts of the system.

If you believe that a module may be defective and you have two of the same type of module, swap the two modules. You can also use two different modules that have similar I/O configurations (Refer to Table 2 on the preceding page). If the problem moves to the other channel, the problem is in the module located in that channel. If the problem does not move to the other channel, the problem is not with the module, but somewhere in the 900 system or somewhere else in that channel.

## Technical Support, Factory Service

### Technical Support

If you require technical support, contact dbx customer service. Be prepared to accurately describe the problem. Know the serial number of your FS900 — this is printed on the rear panel of the unit.

Telephone: (801) 568-7660  
or FAX: (801) 568-7662

or Write:

Customer Service  
dbx Professional Products  
8760 South Sandy Parkway  
Sandy, UT 84070

### Factory Service

Before you return a product to the factory for service, we recommend you refer to the manual. If you are still unable to solve a problem, contact our Customer Service Department for consultation. Often, a problem is relatively simple and can be quickly fixed after telephone consultation.

If you need to return a product to the factory for service, include a letter describing the problem.

Please refer to the terms of your Limited Two-Year Standard Warranty, which extends to the first end-user. After expiration of the warranty, a reasonable charge will be made for parts, labor, and packing if you choose to use the factory service facility. In all cases, you are responsible for transportation charges to the factory. dbx will pay return shipping if the unit is still under warranty.

### Shipping Instructions

Use the original packing material if it is available. If it is not, use a sturdy, double-walled carton no smaller than 24 x 15 x 5 inches (61 x 38 x 13 cm) with a minimum bursting test rating of 100 pounds (45.5 kg). Place the chassis in a plastic bag (or wrap it in plastic) to protect the finish, then pack it in the carton with at least 1.5 inches (4 cm) of cushioning on all sides of the unit. 'Bubble' packing sheets, thick fiber blankets, and the like are acceptable cushioning materials; foam 'popcorn' and crumpled newspaper allow the unit to shift in transit and will *not* protect it adequately. Wrap cushioning materials tightly around the unit and tape them in place to prevent the unit from shifting out of its packing. Close the carton without sealing it and shake vigorously. If you can hear or feel the unit move, use more packing. Seal the carton with 3-inch (8 cm) reinforced fiberglass or polyester sealing tape, top and bottom in an 'H' pattern. Narrower or parcel-post type tapes will not withstand the stresses applied to commercial shipments.

Mark the package with the name of the shipper, and with these words in red:

**DELICATE INSTRUMENT, FRAGILE!**

Insure the package properly. Ship prepaid, not collect. Do not ship parcel post.

## Specifications

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**Power Requirements (Input):** 90-130/280V AC, 50-60Hz, switchable; 20W maximum fully loaded.

**Power-supply Current Capacity (Output):**  $\pm 275\text{mA}$   $\pm 15\text{V}$  DC regulated, 100mA  $\pm 24\text{V}$  DC unregulated

**Operating Temperature Range:** 32-104° F (0-40° C)

**Humidity:** 0-90% RH; non-condensing

**Net Weight:** 8 lbs.

**Shipping Weight:** 13 lbs.

**Dimensions:** 1 $\frac{3}{4}$ "(H) x 19"(W) x 11"(D)

**Warranty:** Two-year, parts and labor: Subject to limitations set forth in our Standard Warranty. Factory assistance and service will be available throughout the life of the product.

**Specifications are subject to change.**

## Schematics

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The FS900 Connector and Power Supply Board Schematic is provided on the following page. Assembly drawings are provided with the FS900 Service Manual. Use the order form located in the back of this manual to purchase the FS900 Service Manual, or any 900 series module Service Manual.

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## Test Procedures

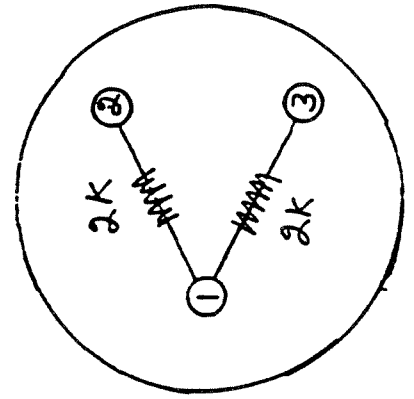
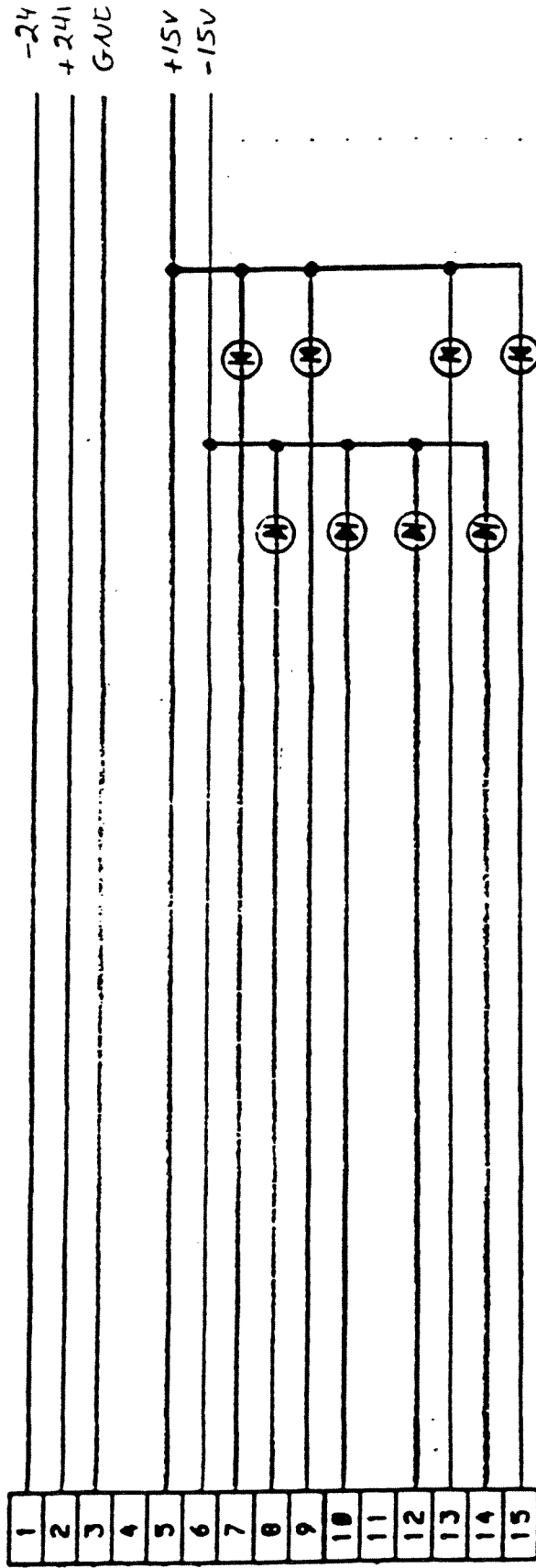
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# FS900 Test Procedure

- 1)
  - a. Set the FS900's voltage switch to 120V.
  - b. Install the test card into channel one's slot.  
Plug the four XLR connectors into channel 1's, A, B, C, and D Rear Panel jacks.
  - c. Check for: -24vdc +/- 10%  
+24vdc +/- 10%  
+15vdc +/- 5%  
-15vdc +/- 5%
  - d. Check that the: A+ and A- LEDS are on.  
B+ and B- LEDS are on.  
C+ and C- LEDS are on.  
D+ and D- LEDS are on.
- 2)
  - a. Install the test card into channel two's slot.  
Plug the four XLR connectors into channel 2's A, B, C, and D Rear Panel jacks.
  - b. Check for: -24vdc +/- 10%  
+24vdc +/- 10%  
+15vdc +/- 5%  
-15vdc +/- 5%
  - c. Check that the: A+ and A- LEDS are on.  
B+ and B- LEDS are on.  
C+ and C- LEDS are on.  
D+ and D- LEDS are on.
3.
  - a. Set the FS900's voltage switch to 240V.
  - b. Repeat step 2b and 2c.
  - c. Test is complete.

FS 900

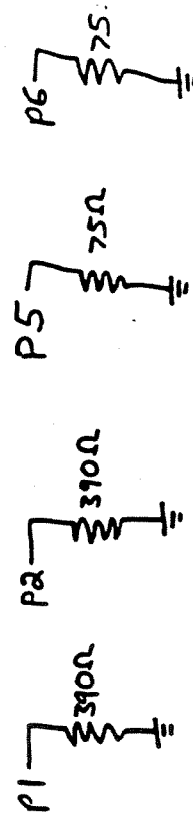
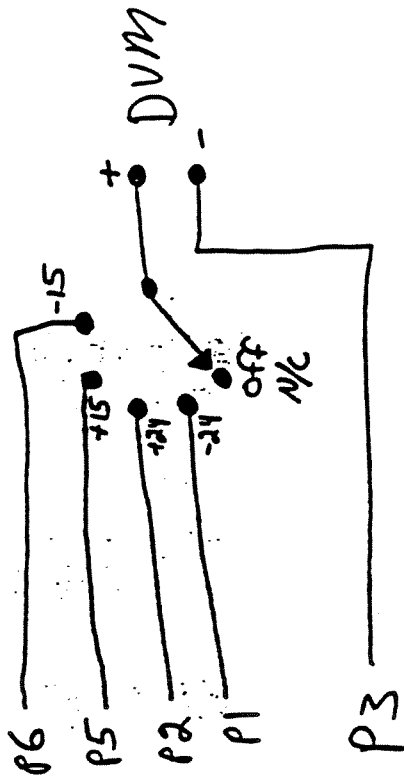
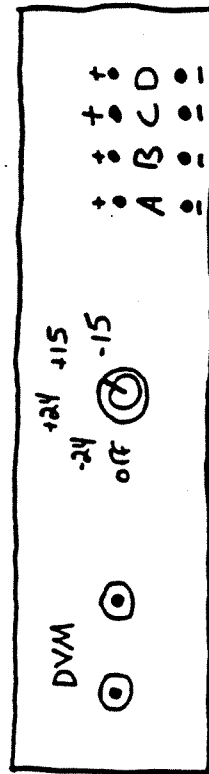
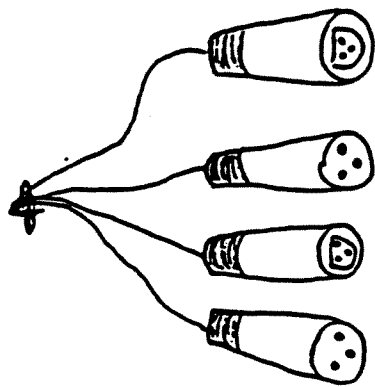
Test card ↓



Connectors  
A, B, C, D



# FS 900 Test card and Test connectors



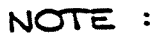
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# Schematics, Assembly Drawings, Parts List

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127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580
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**FEB. 18 1988.**



MANUFACTURER	MFR'S P/N	APPROVALS
		UL FILE NO.
1. BIVAR	FR-550	E44741A
2.		

**USED ON**

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES AND/OR MILLIMETERS (WH)  TOLERANCES ON INCHES JOK +/- .015      JOOK +/- .005  TOLERANCES ON MILLIMETERS (WH) UO +/- .025mm      UOO +/- .12mm  ANGLES +/- 1/2°      FRACTIONS +/- 1/32	APPROVAL				dbx      NEWTON, MA 02195										
	PRELIM	DATE	FINAL	DATE	CARD. GUIDE, NYLON										
	DRAWN H/L	10/2/6													
	CHECKED S/J	10/2/6	CHECKED												
	PROJ ENG B/L	11/3/6	PROJ ENG		SCALE NONE										
	CH ENG L/ST	11/3/6	CH ENG												
	APPROVED FOR PRODUCTION TOOLING				SIZE		NUMBER		REV						
APPROVED		DATE		DFT. MOD		RELEASED		SHT 1 OF 1		A		310759		00A	



645 Bryant Street  
San Francisco, California 94107  
(415) 957-1063

# PARTS LIST

PCA PS & CONNECTOR

TITLE

06085-000

FINAL

TOP ASSEMBLY NO.

DESCRIPTION

FS900

FOR MODEL #

31430-000-01

DWG. NO.

VER

REV

1 OF 4

SHEET

## VERSION INDEX

000 ONE VERSION ONLY

001

002

003

004

## STANDARD ASSEMBLY DETAIL (SAD)

## REFERENCE DRAWINGS

DWG. NO.	SIZE	DESCRIPTION
6111B-000	B	SCHEMATIC
31430-000	B	ASSEMBLY

## NOTES:

SIGNATURES

DRAWN BY

CHECKED BY

APPROVED BY

(at release)

DISTRIBUTION DATE

DATE

2-2-90

2-6-90

2-7-90

STAMP

BOX

## ENGINEERING CHANGES

REV ECO/DCM

DATE

2-90

01 DCO 385

DATE

2-90

01 DCO 385

DATE

2-90

01 DCO 385

DATE

2-90

01 DCO 385

DATE

2-90

01 DCO 385

DATE

2-90

01 DCO 385

DATE

2-90

NATURE OF CHANGE

RELEASE TO PRODUCTION

ITEMS AFFECTED

\*-----\*  
 LIST OF MATERIALS FOR PRODUCTION  
 GENERATED BY: BFONG      DATE: 02/06/90  
 CHECKED BY:              DATE:  
 APPROVED BY:             DATE:  
 \*-----\*

ASSY P/L: 31430

PC4 PS & CONNECTOR; FS900

USED ON: FS900 MODULE FRAME

SEQ	QTY FOR VERSION	U/M	ITEM NUMBER	DWG	NEW	PART	dbx
NO.	1004:003:002:001:000:			TYP	PART	DESCRIPTION	NUMBER
1		EA	43018.000	ASY		CABLE ASSY SOLDER LUG & WIPE	D320273
		1					
2		EA	40107.000	ASY		LED CONNECTOR ASSY; FS900	D380236
		1					
3		EA	31431.000	FAB		PCB PS & CONNECTOR; FS900	D260622
		1					
4		EA	20040.121.01*	SCD		MF, 1/8W, 1% 121 OHM	D011210
		2				R8, R10,	
5		EA	20041.133.01	SCD		MF, 1/8W, 1% 1.33K	D011331
		2				R9, R11,	
6		EA	20001.220.01	SCD		CF, 1/4W, 5% 2.0K	D054202
		1				R7,	
7		EA	20001.124.01*	SCD		CF, 1/4W, 5% 240 OHM	D054241
		2				R1, R4,	
8		EA	20001.130.01*	SCD		CF, 1/4W, 5% 300 OHM	D054301
		2				R2, R5,	
9		EA	20013.910.01*	SCD		CC, 1/2W, 5% 1 OHM	D070055
		2				R3, R6,	
10		EA	LINESTK.050	SCD		RES ZERO OHM	D110085
		1				Y1,	

NOTES:

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LIST OF MATERIALS FOR PRODUCTION			
GENERATED BY: BFONG	DATE: 02/06/90		
CHECKED BY:	DATE:		
APPROVED BY:	DATE:		

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ASSY P/L: 31430

PCA PS & CONNECTOR; FS900

USED ON: FS900 MODULE FRAME

SEQ NO.	QTY FOR VERSION	U/M	ITEM NUMBER	DWG TYP	NEW PART	PART DESCRIPTION	dbx NUMBER
	1004:003:002:001:000:						
11		EA 2		SCD		CERAMIC, 100V, 25U, 20Z; 10NF C1, C2,	D121530
12		EA 2		SCD		ALUM, RAD, 25V; 22UF C5, C8,	D127261
13		EA 2		SCD		ALUM, RAD, 50V; 47UF C4, C6,	D127325
14		EA 2		SCD		ALUM, RAD, 50V; 1000UF C3, C7,	D127525
15		EA 4	22201.400.01	SCD		DIODE 1N4004 CR1, CR2, CR4, CR5,	D140022
16		EA 2	22003.240.01*	SCD		ZENER, 1W, 24V 1N4749 CR3, CR6,	D140151
17		EA 1		SCD		TR SIGNAL, NPN; MPS8098 Q2,	D142387
18		EA 1		SCD		TR SIGNAL, PNP; MPS8598 Q4,	D142392
19		EA 1		SCD		TR POWER, PNP; TIP125 Q3,	D142402
20		EA 1		SCD		TR POWER, NPN; TIP120 Q1,	D142403

NOTES:

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 LIST OF MATERIALS FOR PRODUCTION  
 GENERATED BY: BFONG      DATE: 02/06/90  
 CHECKED BY:              DATE:  
 APPROVED BY:             DATE:  
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ASSY P/L: 31430

PCA PS & CONNECTOR; FS900

USED ON: FS900 MODULE FRAME

SEQ	QTY	FOR	VERSION	U/M	ITEM	DWG	NEW	PART	dbx
NO.	004	003	002	001	000	TYPE	PART	DESCRIPTION	NUMBER
21					EA	SCD		IC DC REG, PLS; LM317T VR1,	D146373
					1				
22					EA	SCD		IC DC REG, PLS; LM337T VR2,	D146374
					1				
23					EA	SCD		CARD EDGE, 15P, PC TAIL J1, J2,	D280055
					2				
24					EA	SCD		INSERT VERT MOUNT 3P M XLR P1, P2, P3, P4,	D280184
					4				
25					EA	SCD		INSERT VERT MOUNT 3P F XLR J3, J4, J5, J6,	D280186
					4				

NOTES: