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**APPLICATION NOTE NO. 8**

**Revised March 2001**

**SBE 28 UNIVERSAL OPTO-ISOLATED JUNCTION BOX  
INSTRUCTIONS FOR APPLICATION AND USE**

The SBE 28 Opto-Isolated Junction Box is a multi-purpose accessory that provides a convenient power and/or data interface between many Sea-Bird instruments and the user's computer serial port. The opto box is AC powered, and configured for either 115 VAC operation (PN 90123) or 230 VAC operation (PN 90124). The interface box provides an optically coupled RS-232C standard interface and supplies an isolated +15 volt DC power supply to permit working without interference from shipboard power circuits and grounds.

The SBE 28 is intended to optically isolate a user's AC-powered computer from an SBE 16, 19, 20, 21, or 26 and provide power, up to 1 ampere, to a CTD or other real-time instrument and associated auxiliary sensors, without relying on internal batteries. The maximum cable length will be limited by the voltage drop due to the cable's resistance and the operating current requirement. SEACATs with the internal opto-isolated line driver option for real-time telemetry over long cables cannot be powered by the SBE 28 opto box due to there being no connection between internal and external ground. Internal opto-isolation is a standard feature in the SBE 25 SEALOGGER CTD.

Instruments not equipped with the internal opto-isolated line driver option can receive external power through a data I/O connector with an external power pin which is diode-OR'd with the internal battery supply. Since the 15 volts from the opto box is greater than the normal battery voltage, the instrument will automatically draw power from the SBE 28, not its internal batteries. The Thermosalinograph does not have batteries, so it is always powered from the opto box.

Four cables are supplied when the SBE 28 is ordered:

- (1) PN 80437, 2.5 m cable with 4-pin MS3106A-14S-2P connector to 4-pin RMG-4FS underwater connector used to connect the instrument directly to the opto box. A 10 m long cable PN 80438 is supplied with the SBE 21. (Drawing 31063B)
- (2) PN 80073, 1.5 m cable with DB-25P to DB-25S for connecting the opto box to the serial interface port of the computer.
- (3) PN 17130, 12" cable with DB-25P to DB9S adapter is supplied for use with 'AT' and laptop computers.
- (4) PN 17015, 2 m AC mains power cable. The AC power cable should be connected white to NEUTRAL, black to LINE, and green to EARTH (ground).

To operate your instrument with the SBE 28, connect the instrument to the opto box using cable PN 80437 or PN 80438. Connect the opto box to the computer serial port using cable PN 80073; use cable PN 17130 if necessary. Connect the AC power cord PN 17150 from the opto box to the power source.

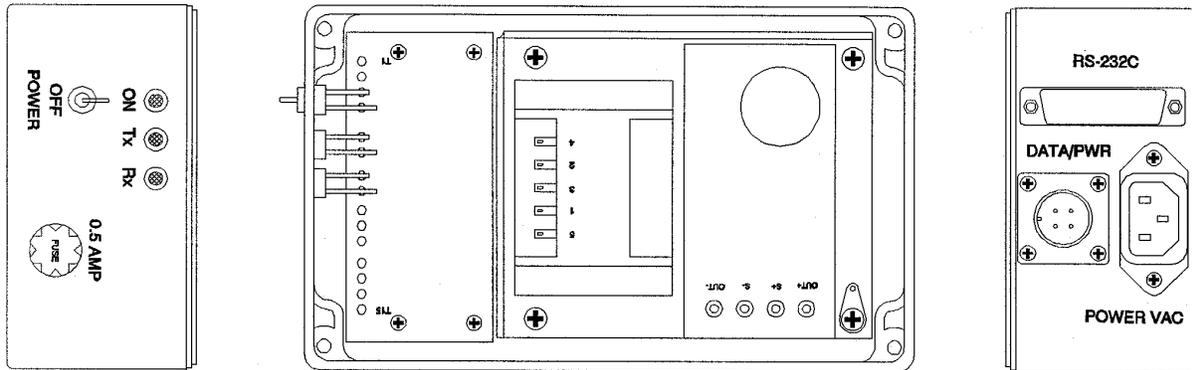
**SBE 28 opto box PN 90123 is configured for a power source of 115 VAC.**

**SBE 28 opto box PN 90124 is configured for a power source of 230 VAC.**

**DO NOT PLUG 230 VAC INTO AN OPTO BOX RATED FOR 115 VAC.**  
**SEVERE DAMAGE WILL OCCUR IF THIS HAPPENS!**

Turn the opto box power ON with the toggle switch. The red LED should light up when the switch is flipped to the 'ON' position. Run the terminal program that is appropriate for your instrument and communicate with the instrument via the computer keyboard. When communication is being received from the CTD, the yellow LED will flash. The green LED will flash when communication from the computer is being sent to the CTD.

### SBE 28 UNIVERSAL OPTO-ISOLATED JUNCTION BOX

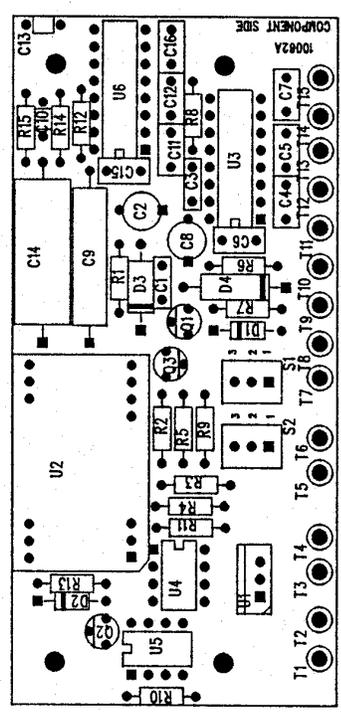


DATE	SYN	REVISION RECORD	APPR.	DR.	CL.
10/14/91	C	12-1410 OUT SEE HIZBEN	KL	BA	KDL

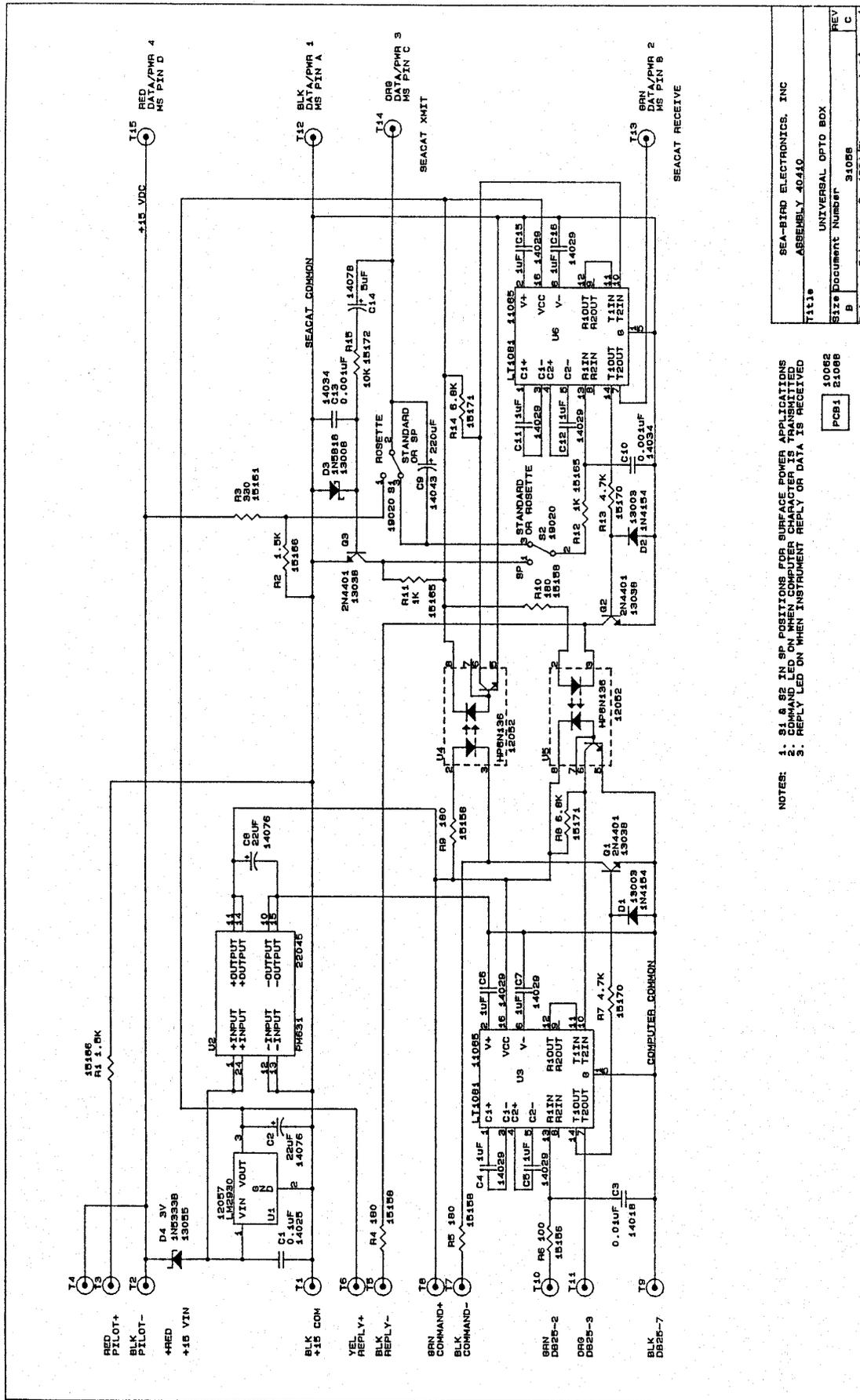
SLA PRINTED ON 15:35:32 15 OCT 1991

PART NUMBER DESCRIPTION..... QPA..... ITN REF DESIG..... NBR

80444	SBE 28 UNIT BOX PCB ASS'Y, /DMG				
40610C	IC, LT1081CN, LINEAR TECH,	2.0000	U3	U6	
RS232	IC, H98N136, OPTO COUPLER	2.0000	U4	U5	
12052	IC, LM2301P-5.0, 5V REG.	1.0000	U1		
12057	DIODE, 1N4148, UNIDIRECTE	2.0000	D1	D2	
12005	DIODE, 1N4148, SCHOTTKY	1.0000	D3		
12008	DIODE, 1N4148, SCHOTTKY	3.0000	D4	Q2	Q3
13038	RES, 10K OHM, 5%, 1/4 W	1.0000	R1		
13055	ZENER DIODE, 1N5113B, MOTOROLA	1.0000	Z1		
14018	GAP, .01 uF, 100V CER.	1.0000	C3		
14025	SR211C103KAA, X7R	1.0000	C1		
14029	SR211C104KAA, X7R	8.0000	C4	C5	C6
14034	GAP, 1 uF, 50V CER.	2.0000	C15	C16	
14034	SR305E105HAA, Z5U	2.0000	C10	C13	
14043	C322C102J2G5CA, NPO	1.0000	C9		
14076	HRT227H015P1C	2.0000	C2	C8	
14078	GAP, 5 uF, 150 V, TVA 1403,	1.0000	C14		
15156	RES, 100 OHM, 5%, 1/4 W	1.0000	R6	R9	R10
15156	RES, 100 OHM, 5%, 1/4 W	4.0000	R4	R5	R10
15161	RES, 100 OHM, 5%, 1/4 W	2.0000	R3		
15161	RES, 100 OHM, 5%, 1/4 W	2.0000	R1	R12	
15166	RES, 1.5K OHM, 5%, 1/4 W	2.0000	R1	R2	
15170	RES, 4.7K OHM, 5%, 1/4 W	2.0000	R7	R13	
15171	RES, 6.8K OHM, 5%, 1/4 W	2.0000	R8	R14	
15172	RES, 10K OHM, 5%, 1/4 W	1.0000	R15		
17236	TERMINAL, PCB, 1/16" FORKED,	15.0000	T1	T2	T3
	USECO 2001B		T8	T9	T10
			T11	T12	
19020	SW, SPDT, PROF. RESET, ALCO	2.0000	S1	S2	
21088	TTL1DG-WA-2T	1.0000	FCB1		
22045	PCB, URIV. OPTO BOX, /DMG	1.0000	PCB1		
	10062A				
	PNR. SPLY, 12V TO 5V, COMP	1.0000	U2		
	PROD PM631				



TOLERANCES		SEA-BIRD ELECTRONICS, INC	
DECIMAL	F/M	SCALE	DRAWN BY
± .010	3:05B	5:2	BA
FRACTIONAL	TITLE SBE 28 UNIT BOX		APPROVED BY
±	PCB ASSY		KDL
ANGULAR	DATE	DRAWING NUMBER	REV
	10/16/91	40410	1



NOTES: 1. S1 & S2 IN SP POSITIONS FOR SURFACE POWER APPLICATIONS  
 2. REPLY LED ON WHEN INSTRUMENT RECEIVES DATA  
 3. REPLY LED ON WHEN INSTRUMENT REPLY OR DATA IS RECEIVED

SEA-BIRD ELECTRONICS, INC  
 ASSEMBLY 40410

UNIVERSAL OPTO BOX

Size Document Number 31088

REV B

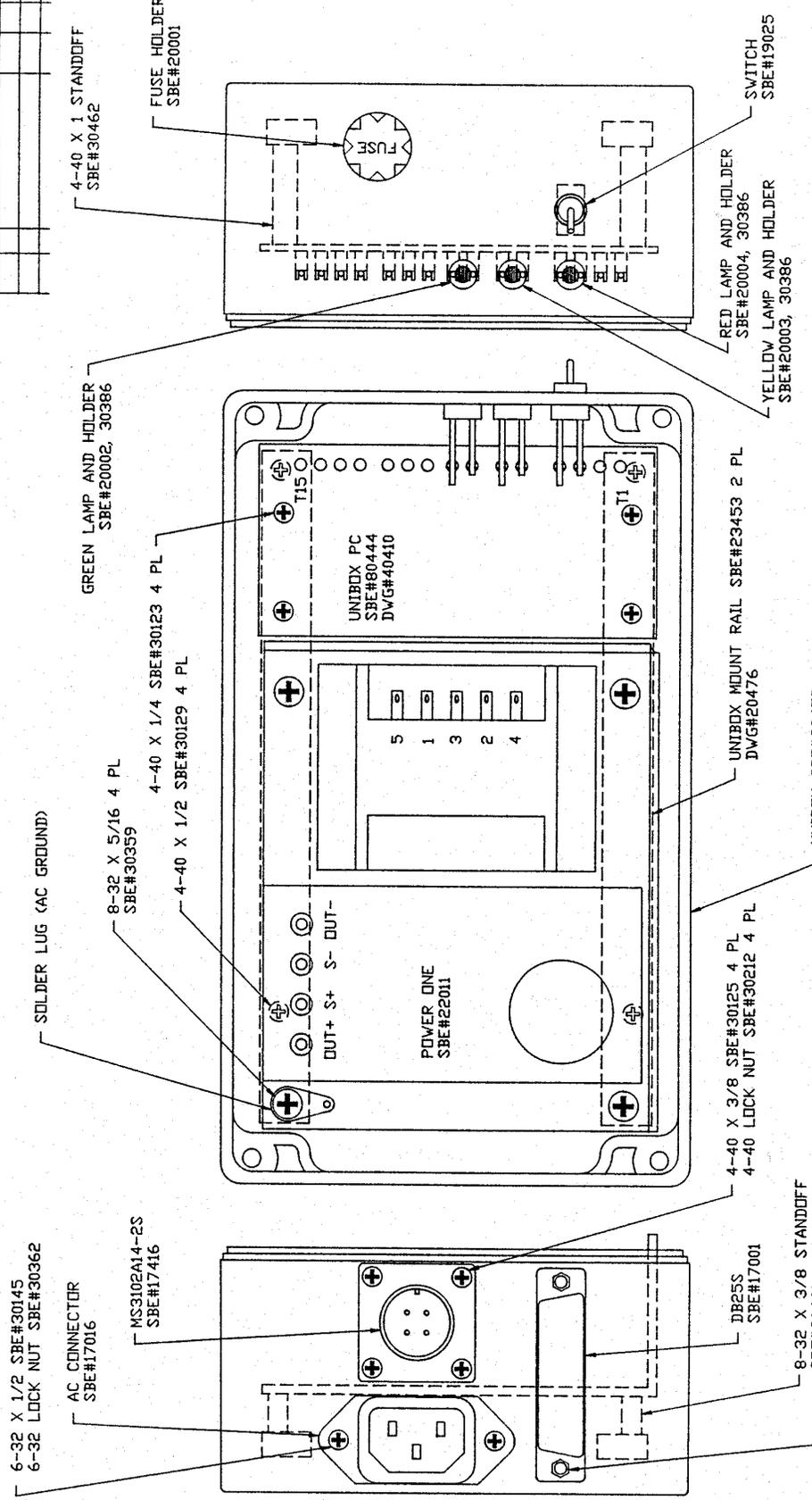
REV C

PCB 21088

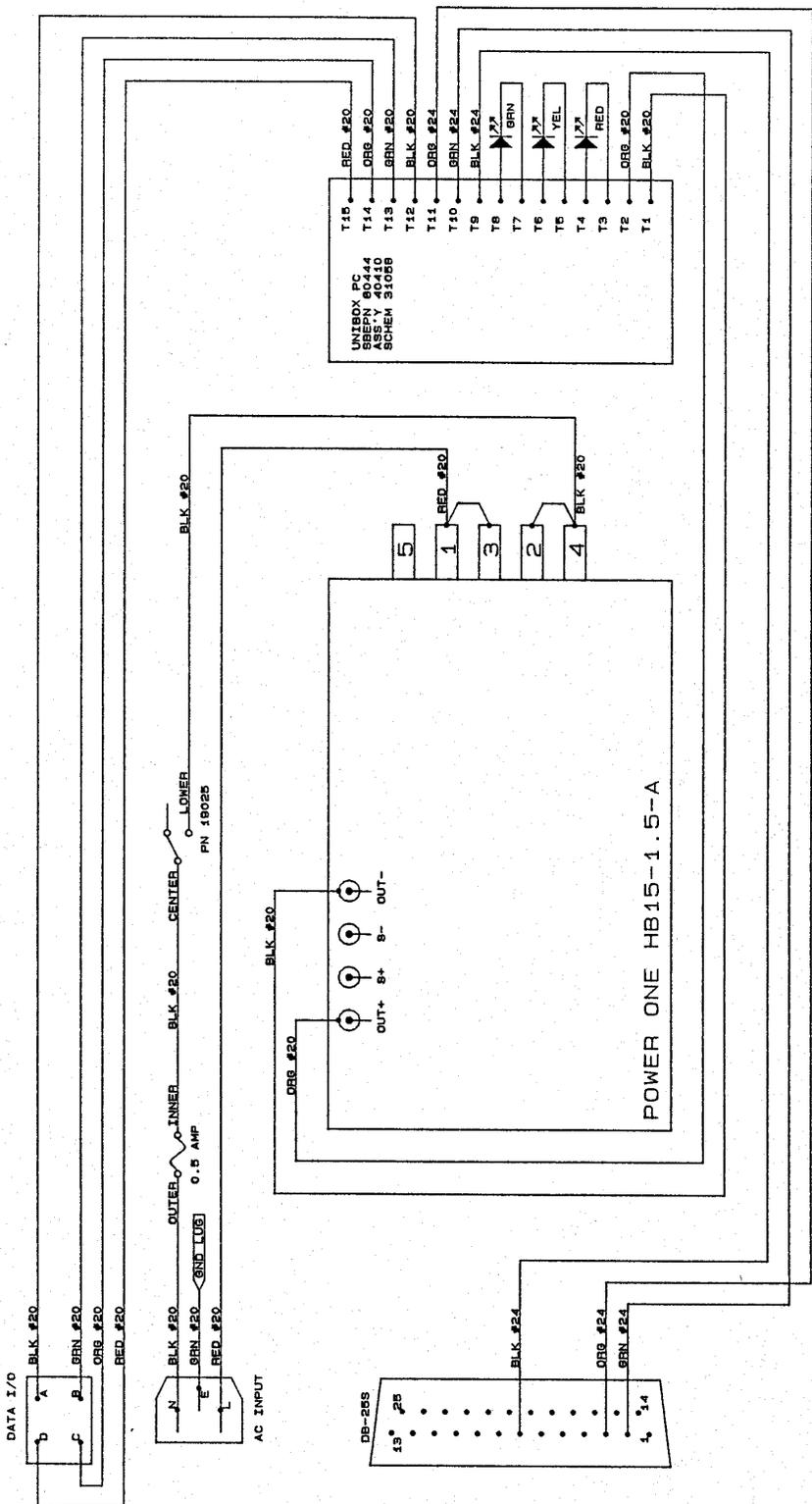
DATE: OCTOBER 3, 1981 BRB:st

1 of 1

DATE	SYN	REVISION RECORD	AUTH.	DR.	CK.

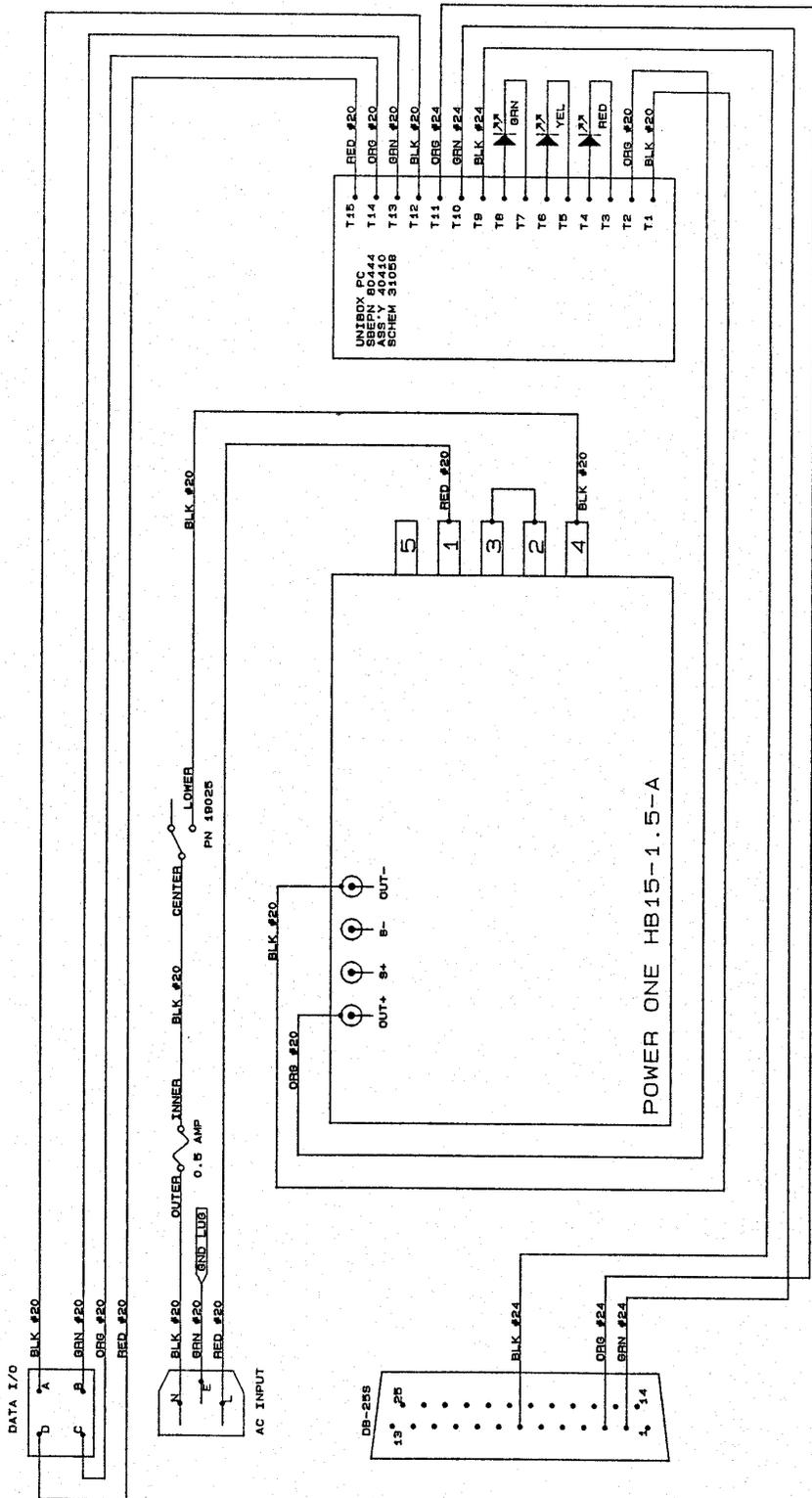


TOLEANCES	SEA-BIRD ELECTRONICS, INC		
FRACTIONAL	P/N	SCALE	ORINAL BY DW
DECIMAL		1"=1"	APPROVED BY
ANGULAR	TITLE	DATE	REV
	UNIBOX ASSEMBLY 230 V AC	3-19-91	
	DRAWING NUMBER	40415	



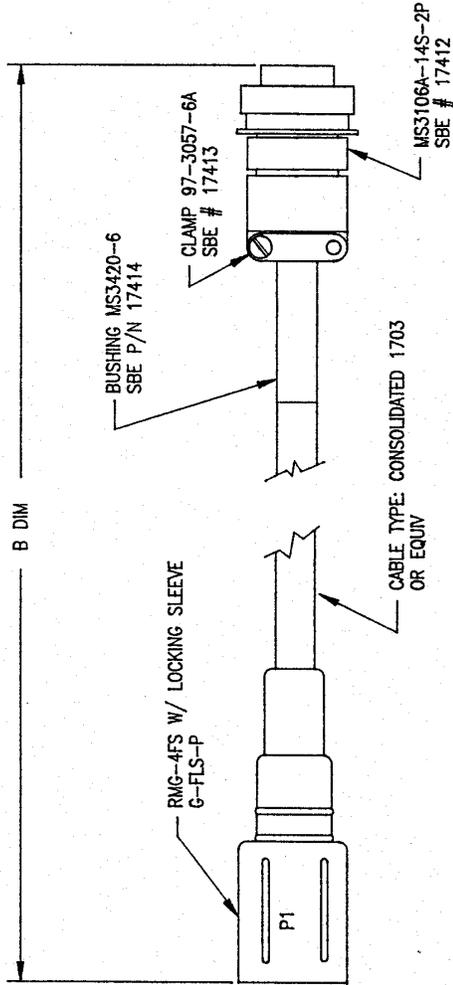
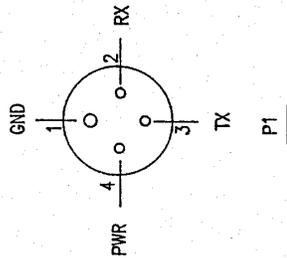
SEA-BIRD ELECTRONICS, INC	
T11.16	ASSEMBLY 40418
UNIBOX WIRING, 116 VAC	
Size	Document Number 31071
B	REV
DATE:	March 20, 1991 Sheet 01

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SEA-BIRD ELECTRONICS, INC  
 ASSEMBLY 40410  
 UNIBOX WIRING, 230 VAC  
 Size Document Number 31088  
 REV B  
 MARCH 20, 1981

DATE	SW	REVISION RECORD	APPR.	DR.	CL.
4/91	A	REDRAWN SEE HISTORY	KL	BMC	
3/93	B	ADDED COLOR 1	KL	BMC	



SHIELDED ASSY P/N	PIGTAIL P/N	LENGTH		KEVLAR ASSY P/N	KEVLAR LENGTH
		'B' (FT)	'B' (m)		
80437 *	17031**	8	2.5		
80438	17204	33	10		
80455	17221	66	20		
80456	17232	100	30	80464	20 M
80457	17350	132	40	80465	30 M
80458	17351	165	50	80466	40 M
80459	17187	200	60	80467	50 M
80460	17148	330	100	80468	90 M
80461	17369	492	150	80469	140 M
80462	17244	660	200	80470	190 M
80463	17216	1500	455	80471	445 M
80693	17696	984	300		
80720	17723	500	152		
80755	17744	820	250		
	17640	363	110	80757	100 M
	17608	250	76	80801	61 M
80823	17614	462	140	80824	130 M
	17890	433	131	80843	121 M / #16 AWG

WIRING CONNECTIONS	
P1	* COLOR 1   COLOR 2   P2
PIN 1	WHITE   SHIELD   A
PIN 2	BLACK   BLACK   B
PIN 3	GREEN   WHITE   C
PIN 4	RED   RED   D

\* COLOR 1: 80437 ONLY  
 COLOR 2: ALL OTHER

PIGTAILS ARE PURCHASED PER DWG 30586  
 KEVLAR COATING PER DWG 20252  
 \*\* P/N 17031 IS NOT SHIELDED AND DOES NOT REQUIRE THE BUSHING (17414)

TITLE		SCALE		DRAWN BY		APPROVED BY	
SEA-BIRD ELECTRONICS, INC		1:1		BMC		KL	
UNIOPTOBOX DATA CABLE ASSY		DRAWING NUMBER		31063		REV. B	