FSI SOLO DIAGNOSTIC MESSAGE (Rev 1.0 27 Dec, 2000)

Every 13th message transmitted by the FSI SOLO is a diagnostic, containing both discrete samples from the FSI and other engineering parameters. The following describes the 64 character message, where column 'Char'=character placement, with '2,3,4' signifying characters 2, 3 and 4 comprise the 12 bits for parameter P1. P1, T1, and the FSI values are taken right before ascent, after allowing electronics to warm up for 120 s. Sequential samples of the FSI are taken at 2 s intervals.

Char.	Name	Description	
1	id	Diagnostic message identifier = 'F'	
2,3,4	P1	Pressure counts before the start of ascent.	
5,6,7,8	T1	Temperature counts at same time as P1	
9,10,11,12	V100	FSI 100% reference voltage	
13,14,15,16	V50	FSI 50% reference voltage	
17,18,19,20	V0	FSI 0% reference voltage	
21,22,23,24	CVAL	FSI conductivity voltage	
25,26	V100	2nd sample of V100 : just the LSB value	
27,28	V50	2nd sample of V50 : just the LSB value	
29,30	CVAL	2nd sample of CVAL : just the LSB value	
31,32	V100	3rd sample of V100 : just the LSB value	
33,34	V50	3rd sample of V50 : just the LSB value	
35,36	CVAL	3rd sample of CVAL : just the LSB value	
37,38	-	'00' : not assigned	
39,40,41	ATE	Air pressure inside of SOLO at end of last surface time	
42,43,44	ATS	Air pressure inside of SOLO at start of last surface time	
45,46,47	TIA	TIA*2 = time (s) if air bladder was refilled at last surface.	
48,49,50	PFE	Pressure counts at the end of the SOLO Fall time	
51,52,53	PSE	Pressure counts at the end the MULTI_SEEK cycle	
54,55,56	TSK	TSK*2 = time (s) piston ran during first SEEK cycle	
57,58,59	PSK	(signed) change in pressure during first SEEK cycle	
60,61,62	TIP	TIP*2 = new time (s) to run piston in to get to SEEK depth	
63	BST	4-bit status of miscellaneous operations (see below)	
64	-	'0' : not assigned	

The 4 bits of BST (bit 0 = lsb, bit 3 = msb) are assigned:

bit 3 = Alow = 1 if the air bladder was refilled during the surface transmit time (not assigned for the first dive cycle, otherwise signifies a potential leaky air valve).

bit 2 = PQUEST = 1 if the pressure counts is questionable at the end of the Fall time, true if P counts puts us deeper than 2000 dBar OR shallower than Ptol, a variable set during final programming. If set, the SOLO does no SEEKing, and pulls the piston all of the way in.

bit 1 = OUT = 1 if the piston OUT limit switch is detected with the SOLO at the surface (normally OUT=1)

bit 0 = IN = 1 if the piston IN limit switch is detected at the start of ascent. This will depend upon profile direction: if profiling on ascent, then normally IN=1.

Converting P and T use the same algorithms as before. To compute conductivity you can use the following Fortran subroutine (i100, i50,i0, ic refer to V100, V50, V0, CVAL respectively, and fsicoef are the coefficients from the FSICOEF line in the LOG file).

```
c .....................................................................
      real function cond3(i100,i50,i0,ic,fsicoef)
c .....................................................................
c     ...computes conductivity using algorithm in the SOLO
            real fsicoef(5)

            a0=fsicoef(1)
            a50=fsicoef(2)
            a100 = fsicoef(3)
            off = fsicoef(4)
            gain = fsicoef(5)

            c0 = a50 + (ic-i50)*(a100-a50)/(i100-i50)
            c = c0*gain + off
            cond3 = c
            return
            end
```