Table 2 (FO20)
Fuji-OSCAR 20 PSK Telemetry

Channel Identification

```
... Header ...
00 01 02 03 04 05 06 07 08 09
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38 39
```

Sample TTY Frame (as received from FO-20)

```
8J1JBS > BEACON:
JAS1b RA 90/03/08 11:02:00
596 375 692 698 750 837 849 831 001 686
618 001 507 510 532 527 530 532 655 001
662 654 666 677 999 647 879 960 199 000
010 111 000 000 111 100 001 110 111 000
```

Frame contents

```
JAS1b FF  YY/MM/DD  HH:MM:SS
xxx xxx xxx xxx xxx xxx xxx xxx xxx xxx
xxx xxx xxx xxx xxx xxx xxx xxx xxx xxx
xxx xxx xxx xxx xxx xxx xxx hhh hhh hhh
jjj jjj jjj jjj jjj jjj jjj jjj jjj jjj
```

FF = Frame identifier
   RA: Real-time TTY (ASCII)
   RB: Real-time TTY (binary)
   SA: Stored TTY (ASCII)
   SB: Stored TTY (binary)
   Mn: Message (n = 0 to 9)

YY/MM/DD   HH:MM:SS = Date & Time (UTC)

Following valid only for RA and SA frames
   xxx   = 3-digit decimal number occurring in
            channels 00 to 26.
            Represented by N in calibration equations.
   hhh   = series of three individual hex numbers
   jjj   = series of three individual binary numbers

Decoding equations for analog channels (00-26)

CH	DESCRIPTION	CALIBRATION
#00	total solar array current	$1.91 \times (N - 4)$mA
#01	battery charge/discharge	$-3.81 \times (N - 508)$mA
#02	battery voltage	$N \times 0.022$ V
#03	battery center voltage	$N \times 0.009961$V
#04	bus voltage	$N \times 0.02021$V
#05	+5 V regulator voltage	$N \times 0.00620$ V
#06	-5 V regulator voltage	$-N \times 0.00620$ V
#07	+10 V regulator voltage	$N \times 0.0126$ V
#08	JTA output power	$5.1 \times (N - 158)$mW
#09	JTD output power	$5.4 \times (N - 116)$mW
#10	calibration voltage #2	N/500 V
#11	offset voltage #1	N/500 V
#12	battery temperature	$0.139 \times (669 - N)$deg. C
#13	JTD temperature	$0.139 \times (669 - N)$deg. C
#14	Temperature #1	$0.139 \times (669 - N)$deg. C
#15	Baseplate Temperature #2	$0.139 \times (669 - N)$deg. C
#16	Baseplate Temperature #3	$0.139 \times (669 - N)$deg. C

Decoding equations for analog channels (00-26, con't)

CH	DESCRIPTION	CALIBRATION
#17	Baseplate Temperature #4	$0.139 \times (669 - N)$deg. C
#18	temperature calibration #1	N/500 V
#19	offset voltage #2	N/500 V
#20	Solar Cell Panel Temp #1	$0.38 \times (N - 685)$deg. C
#21	Solar Cell Panel Temp #2	$0.38 \times (N - 643)$
#22	Solar Cell Panel Temp #3	$0.38 \times (N - 646)$
#23	Solar Cell Panel Temp #4	$0.38 \times (N - 647)$
#24	————————————	
#25	temperature calibration #2	N/500 V
#26	temperature calibration #3	N/500 V

Decoding information for hex status bytes (27-29)

CH	DESCRIPTION
#27a	Spare (TBD)
#27b	Spare (TBD)
#27c	Spare (TBD)
#28a	Spare (TBD)
#28b	Spare (TBD)
#28c	error count of memory unit #0
#29a	error count of memory unit #1
#29b	error count of memory unit #2
#29c	error count of memory unit #3

Decoding information for binary status bytes (30-39)

CH	DESCRIPTION	STATE	
#30a	JTA power	on	off
#30b	JTD power	on	off
#30c	JTA beacon	PSK	CW
#31a	UVC status	on	off
#31b	UVC level	1	2
#31c	main relay	on	off
#32a	eng. data #1	———	
#32b	battery status	tric	full
#32c	battery logic	tric	full
#33a	eng. data #2	———	
#33b	PCU status	bit 1	(LSB)
#33c	PCU status	bit 2	(MSB)
#34a	memory unit #0	on	off
#34b	memory unit #1	on	off
#34c	memory unit #2	on	off
#35a	memory unit #3	on	off
#35b	memory select	bit 1	(LSB)
#35c	memory select	bit 2	(MSB)
#36a	eng. data #3	———	
#36b	eng. data #4	———	
#36c	computer power	on	off
#37a	eng. data #5	———	
#37b	solar panel #1	lit	dark
#37c	solar panel #2	lit	dark
#38a	solar panel #3	lit	dark
#38b	solar panel #4	lit	dark
#38c	solar panel #5	lit	dark
#39a	eng. data #6	———	
#39b	CW beacon source	CPU	TLM
#39c	eng. data #7	———	

Table 1 (FO20)

Fuji-OSCAR 20 CW Telemetry

(Reference: JR1NVU, "The Telemetry Formats of JAS-1B/Fuji-OSCAR 20," *The AMSAT Journal*, Sep 1990, pp 20-21.

Channel identification

HI	1A	1B	1C	1C
	2A	2B	2C	2D
	3A	3B	3C	3D
	4A	4B	4C	4C
	5A	5B	5C	5D	HI

Channel contents

HI	1nn	1nn	1nn	1nn
	2nn	2nn	2nn	2nn
	3nn	3nn	3nn	3nn
	4jj	4jj	4jj	4jj
	5jj	5jj	5jj	5jj	HI

Decoding equations for analog channels (1A-3D)

1A	Total solar panel current	$I = 19(nn + 0.4)$ mA
1B	Batter charge/discharge	$I = -38(nn - 50)$ mA
1C	Battery terminal voltage	$V = 0.22(nn + 4)$ V
1D	Battery center tap	$V = 0.1(nn + 4)$ V
2A	Bus voltage	$V = 0.20(nn + 4)$ V
2B	+5 V regulator output	$V = 0.062(nn + 4)$ V
2C	Mode JA power output	$P = 2.0(nn + 4)^{1.618}$ mW
2D	Calibration voltage #1	$V = (nn + 4)/50$ V
3A	Battery temperature	$T = 1.4(67 - nn)$ °C
3B	Structure temperature #1	$T = 1.4(67 - nn)$ °C
3C	Structure temperature #2	$T = 1.4(67 - nn)$ °C
3D	Structure temperature #3	$T = 1.4(67 - nn)$ °C

Decoding information for status channels (4A-5D)

CH	BIT	DESCRIPTION	STATE 1	0
4A	0	JTA Power	ON	OFF
4A	1	JTD Power	ON	OFF
4A	2	Eng. data #1	—	—
4A	3	Eng. data #3	—	—
4A	4	Beacon	PSK	CW
4B	0	UVC	ON	OFF
4B	1	UVC level	1	2
4B	2	Battery	tric	full
4B	3	Battery logic	tric	full
4B	4	Main relay	ON	OFF

Decoding information for status channels (4A-5D con't)

| CH	BIT	DESCRIPTION	STATE	
4C	0	PCU	bit 1	(LSB)
4C	1	PCU	bit 2	(LSB)
4C	2	PCU	manual	auto
4C	3	Eng. data #3	—	—
4C	4	Eng. data #4	—	—
4D	0	Memory bank #0	ON	OFF
4D	1	Memory bank #1	ON	OFF
4D	2	Memory bank #2	ON	OFF
4D	3	Memory bank #3	ON	OFF
4D	4	Computer power	ON	OFF
5A	0	Memory select	bit 1	(LSB)
5A	1	Memory select	bit 2	(MSB)
5A	2	Eng. data #5	—	—
5A	3	Eng. data #6	—	—
5A	4	Eng. data #7	—	—
5B	0	Solar panel #1	lit	dark
5B	1	Solar panel #2	lit	dark
5B	2	Solar panel #3	lit	dark
5B	3	Solar panel #4	lit	dark
5B	4	Solar panel #5	lit	dark
5C	0	JTA CW beacon	CPU	TLM
5C	1	Eng. data #8	—	—
5C	2	Eng. data #9	—	—
5C	3	Eng. data #10	—	—
5C	4	Eng. data #11	—	—
5D	0	Eng. data #12	—	—
5D	1	Eng. data #13	—	—
5D	2	Eng. data #14	—	—
5D	3	Eng. data #15	—	—
5D	4	Eng. data #16	—	—
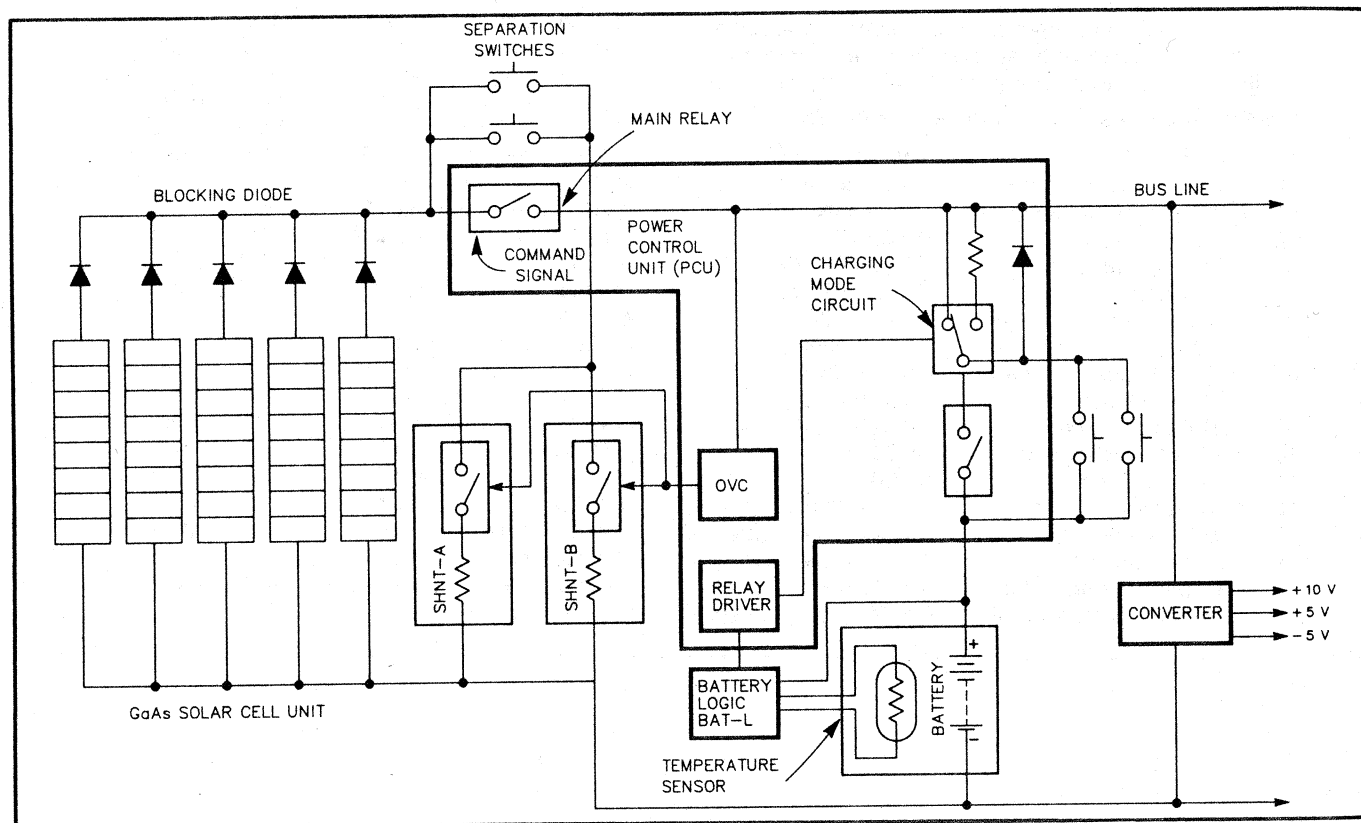
Fig 3 (FO20)—Fuji-OSCAR 20 power subsystem (from *OSCAR News*, June 1989, p 11).