Position Measurements and Baseline Constants, Baseline 5

Table I gives the LO frequency and corrections to B_1 and B_2 for the baseline 5 data. The mean frequency was taken to be 2694.9670 Mc/s.

An initial choice of B_2 and h was made so that the positions of 3C 48 and 3C 147 were, in the average, the same as the optical positions, as in reference 1. The values so obtained were:

$$B_2 = 19993.017$$

$$h = 04^h\ 49^m\ 32^s.585$$

The baseline parameters assumed in the fringe reduction program are given in Table II.

The positions of the remaining sources were evaluated with this choice of baseline constants. Then, in the seventeen cases where there was an accurate optical position for the source, the errors in position were evaluated. These errors in α and δ were fitted by least squares with functions of the form:

$$\Delta\alpha = A_1 + A_2 \tan\delta$$

$$\Delta\delta = A_3 + A_4 \cot\delta$$

simply because the physical interpretation of these quantities is easy, A_1 being an error in h, A_4 an error in B_2, and A_2 and A_3 terms arising from the lack of identity in the pointing of the polar axes of the telescopes. The results of this fitting were:

$$A_1 = 0^s.029 \pm .112$$

$$A_2 = 0^s.031 \pm .156$$

$$A_3 = -0''.05 \pm 2.65$$

$$A_4 = -0''.17 \pm 2.62$$

A_3 corresponds to a misalignment of the polar axes by 4!7 $\pm$ 23. The final, best values of B_2 and h are:

$$B_2 = 19993.035$$

$$h = 04^h\ 49^m\ 32.614$$

The positions were then corrected for these values of the A's and errors computed from the errors in the A's and the internal scatter of the observations and are given, together with the differences from optical values, in Table III.

A diurnal effect in right ascension is fairly clearly present in Table III, in that most errors are negative between right ascensions 8 hours and 20 hours, and positive from 20 hours to 8 hours. The amplitude of this correction is about $0^s.1$ in right ascension.

There are thus problems, probably of calibration, which limit an accuracy, at present, to about 1".

Barry Clark - NRAO

(July 12, 1965)

Table 1

Date, 1965	Type Number	LO Freq. Mc/s	ΔF kc/s	ΔB_2	ΔB_1
03/13-14	74	2694.9715	4.5	-.033	-.014
03/14-15	75	.9714	4.4	-.033	-.013
03/16-17	77	.9697	2.7	-.020	-.008
03/17-18	78	.9697	2.7	-.020	-.008
03/18-19	79	.9692	2.2	-.016	-.007
03/19-20	80	.9695	2.5	-.019	-.008
03/20-21	81	.9693	2.3	-.017	-.007
03/21-22	82	.9693	2.3	-.017	-.007
03/22	83	.9691	2.1	-.016	-.006
03/24-25	84	.9702	3.2	-.024	-.010
03/25-26	85	.9701	3.1	-.023	-.009
03/26-27	86	.9701	3.1	-.023	-.009
03/27-28	87	.9700	3.0	-.022	-.009
03/28-29	88	.9695	2.5	-.019	-.008
03/29-30	89	.9694	2.4	-.018	-.007
03/30-31	90	.9695	2.5	-.019	-.008
03/31-04/01	91	.9696	2.6	-.019	-.008
04/01-02	92	.9696	2.6	-.019	-.008
04/02-03	93	.9694	2.4	-.018	-.007
04/03-04	94	.9693	2.3	-.017	-.007
04/04-05	95	.9689	1.9	-.014	-.006
04/05-06	96	.9685	1.5	-.011	-.005
04/06-07	97	.9684	1.4	-.010	-.004
04/07-08	98	.9685	1.5	-.011	-.005
04/08-09	99	.9681	1.1	-,008	-.003
04/09-10	100	.9682	1.2	-.009	-.004
04/10-11	101	.9679	0.9	-.007	-.003
04/11-12	102	.9777	0.7	-.005	-.002
04/12-13	103	.9677	0.8	-.006	-.002
04/13-14	104	.9677	0.9	-.007	-.003
04/14-15	105	.9675	0.7	-.005	-.002
04/15-16	106	.9673	0.3	-.002	-.001
04/16-17	107	.9674	0.4	-.003	-.001
04/19	108	.9671	0.1	-.001	.000
04/20	109	.9670	0.0	.000	.000
04/20-21	110	.9670	0.0	.000	.000
04/23-24	111	.9664	-0.6	.004	.002
04/24-25	112	.9661	-0.9	.007	.003
04/25-26	113	.9661	-0.9	.007	.003
04/26-27	114	.9661	-0.9	.007	.003
04/27-28	115	.9661	-0.9	.007	.003
04/28-29	116	.9661	-0.9	.007	.003
04/29-30	117	.9660	-1.0	.007	.003
04/30-05/01	118	.9660	-1.0	.007	.003
05/01-02	119	.9657	-1.3	.010	.004
05/02-03	120	.9657	-1.3	.010	.004
05/03	121	.9656	-1.4	.010	.004

Date, 1965	Type Number	LO Freq. Mc/s	ΔF kc/s	ΔB_2	ΔB_1
05/04	122	2694.9656	-1.4	.010	.004
05/05	123	.9655	-1.5	.011	.005
05/06	124	.9651	-1.9	.014	.006
05/07	125	.9650	-2.0	.015	.006
05/08	126	.9648	-2.2	.016	.007
05/09	127	.9648	-2.2	.016	.007
05/10	128	.9647	-2.3	.017	.007
05/11	129	.9647	-2.3	.017	.007
05/12	130	.9646	-2.4	.018	.007
05/13	131	.9645	-2.5	.019	.008
05/14	132	.9645	-2.5	.019	.008
05/15	133	.9642	-2.8	.021	.008
05/16	134	.9642	-2.8	.021	.008
05/17	135	.9640	-3.0	.022	.009
05/18	136	.9640	-3.0	.022	.009
05/19	137	.9639	-3.1	.023	.009
05/20	138	.9637	-3.3	.024	.010
05/21	139	.9635	-3.5	.026	.011
05/22	140	.9635	-3.5	.026	.011

Table II. Baseline Constants Used in Reduction

Tape	B_1	B_2	h
74 -	8115.24	19992.99	04 49 32.84
-91	8107.71	19992.99	04 49 32.84
92-140	8107.71	19993.05	04 49 32.53

Table III. Source Position Measurements

Source	α	δ	Radio Δα	Optical Δδ	No. Obs.
3C 2	$00^h\ 03^m\ 48^s.76 \pm .^s11$		$.06 \pm .^s11$		3
23	00 49 08.77 .09	17° 30' 58".9 ± 3".5			2
48	01 34 49.82 .06	32 54 21.1 1.6	.00 .06	0".9 ± 1".6	25
57	01 59 30.44 .30	-11 47 12.3 15.			1
67	02 21 18.04 .08	27 36 39.3 2.0			3
3C 84	$03^h\ 16^m\ 29^s.58 \pm .^s08$	41° 19' 52".3 ± 1".7	$.^s18 \pm .^s08$	0".3 ± 1".7	3
119	04 29 07.94 .13	41 32 09.6 1.9	.10 .13	0.9 1.9	4
138	05 18 16.65 .10	16 35 28.5 3.5	.14 .10	2.3 3.5	2
147	05 38 43.52 .11	49 49 42.9 1.8	-.01 .11	-0.2 1.8	13
152	06 01 30.30 .14	20 21 35.9 2.7			4
3C161	$06^h\ 24^m\ 43^s.21 \pm .^s13$	-05° 51' 10".2 ± 15"	$.^s20 \pm .^s13$	11".2 ± 15"	2
186	07 40 56.81 .09	38 00 31.6 1.5	.14 .09	-0.3 1.5	3
191	08 02 03.72 .52	10 24 36.1 24	-.06 .52	38.0 24	3
216	09 06 17.30 .11	43 05 56.0 1.7	.04 .11	-3.0 1.7	2
236	10 03 05.40 .08	35 08 43.3 1.8	.01 .08	5.2 1.8	3
3C237	$10^h\ 05^m\ 22^s.02 \pm .^s10$	07° 44' 53".8 ± 10"	$-.^s05 \pm .^s10$	-6".0 ± 10"	2
238	10 08 23.02 .10	06 39 18.2 12			3
241	10 19 07.38 .09	22 14 38.5 2.9			3
245	10 40 06.00 .10	12 19 17.1 5	-.11 .10	2.0 5	2
254	11 11 53.32 .08	40 53 34.4 2.6	-1.10 .08	22.6 2.6	3
3C255	$11^h\ 16^m\ 52^s.14 \pm .^s12$				2
256	11 18 04.71 .13	23° 45' 08".5 ± 4".5	$2^s.52 \pm .^s13$	52".7 ± 4".5	1
268.3	12 03 54.36 .27	64 30 15.2 2.4			4
270.1	12 18 03.93 .15	33 59 43.7 5.0	-0.07 .15	-6.3 5.0	3
273	12 26 33.27 .11		-0.04 .11		2
3C279	$12^h\ 53^m\ 35^s.87 \pm .^s14$	-05° 31' 23".8 ± 22"	$-0^s.07 \pm .^s14$	-15".8 ± 22	3
280	12 54 41.62 .10	47 36 02.1 1.7			3
286	13 28 49.66 .06	30 45 59.0 1.7	-0.08 .06	-0.5 1.7	21
287	13 28 15.96 .08	25 24 38.4 2.2	-.16 .08	1.3 2.2	4
293	13 50 03.20 .14	31 41 30.0 3.5	-.22 .14	-2.2 3.5	2

continued--

Table III (continued)

Source	α		δ		Radio Δα		Optical Δδ		No. Obs.
3C295	$14^h\ 09^m\ 33^s.50$	$\pm\ ^s.12$	52° 26' 13".6	$\pm$ 1".8	$^s.06$	$\pm\ ^s.12$	0".0	$\pm$ 1".8	4
298	14 16 38.68	.15	06 42 21.6	14	.10	.15	40.1	14	2
309.1	14 58 59.27	.17	71 52 12.6	2.3					3
318	15 17 50.96	.26	20 26 51.6	9.3	.22	.26	-1.9	9.3	3
343.1	16 37 55.00	.22	62 40 51.4	2.1					3
3C345	$16^h\ 41^m\ 17^s.62$	$\pm\ ^s.07$	39° 54' 11".5	$\pm$ 1".6	$-^s.08$	$\pm\ ^s.07$	0".4	$\pm$ 1".6	10
360A	17 30 13.62	.15	-13 02 49.1	8					2
380	18 28 13.41	.10	48 42 39.9	1.8	.03	.10	0.6	1.8	12
MSH 19-111	19 38 24.32	.18	-15 31 34.0	7.8					2
3C410	20 18 04.10	.06	29 32 41.7	1.8					2
3C418	$20^h\ 37^m\ 07^s.24$	$\pm\ ^s.12$	51° 08' 36".6	$\pm$ 1".8					6
422	20 44 34.21	.24							1
446	22 23 10.96	.13	-05 12 08.8	25	$^s.09$	$\pm\ ^s.13$	8.2	$\pm$ 25	2
CTA102	22 30 07.76	.09	11 28 19.5	5.5	.05	.09	3.3	5.5	2
3C454.3	22 51 29.54	.16	15 52 54.2	12					2
3C459	$23^h\ 14^m\ 02^s.22$	$\pm\ ^s.20$			$-^s.08$	$\pm\ ^s.20$			3