Table A.4 (1/40)

1

JANUARY 0 SUNSPOT NUMBER 100.0

MACTAN TO TAGBILARAN AZIMUTHS MILES KM.

10.16N - 123.58E 9.38N - 123.53E 183.95 3.93 54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	11.4	23	15	21	25	28	22	23	23	22	23	-	-	9.9	13.0
02	11.0	22	10	17	22	25	28	20	20	20	22	-	-	9.5	12.5
03	10.6	21	7	14	20	24	27	29	18	17	3	-	-	9.1	12.0
04	10.3	2	7	14	20	24	27	29	18	15	-	-	-	8.9	11.6
05	10.2	2	8	15	21	25	27	19	18	16	-	-	-	8.8	11.6
06	10.5	3	16	19	23	26	29	20	20	18	4	-	-	8.9	12.1
07	10.9	14	18	23	26	29	22	23	22	21	15	-	-	9.2	12.5
08	11.0	15	23	28	30	24	24	24	24	23	16	-	-	9.3	12.6
09	10.8	16	31	33	26	26	26	26	26	25	8	-	-	9.1	12.4
10	10.4	8	35	27	28	28	27	27	26	25	9	-	-	8.1	12.8
11	10.0	8	27	27	28	28	27	27	26	23	9	-	-	7.8	12.3
12	9.5	8	27	27	28	28	27	27	26	8	9	-	-	7.4	11.7
13	9.0	8	27	27	28	28	27	27	24	8	-	-	-	7.0	11.1
14	6.6	8	27	28	28	28	28	27	8	8	-	-	-	6.6	10.3
15	8.1	8	28	28	28	28	28	26	8	8	-	-	-	6.2	9.8
16	7.5	8	28	29	29	28	28	8	8	-	-	-	-	5.8	9.1
17	7.0	8	29	29	29	28	8	8	-	-	-	-	-	5.4	8.4
18	6.5	8	29	29	29	28	8	8	-	-	-	-	-	4.5	8.2
19	5.6	8	29	29	28	8	8	-	-	-	-	-	-	3.9	7.1
20	4.6	36	35	36	37	8	-	-	-	-	-	-	-	3.1	5.7
21	4.3	36	35	36	37	37	37	37	-	-	-	-	-	3.0	5.4
22	5.9	37	35	36	36	37	37	37	37	-	-	-	-	5.1	6.7
23	8.6	36	28	31	32	34	35	35	7	7	-	-	-	7.5	9.8
24	10.7	6	21	25	28	31	24	25	25	24	7	-	-	9.3	12.2

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	6.0	7.0	8.0	8.0	7.0	7.0	6.0	5.0	4.0	3.0	6.0	6.0
DBU	26	28	29	29	27	29	29	30	33	35	28	28

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	5.0	5.0	5.0	4.0	4.0	4.0	5.0	8.0	9.0	8.0	6.0
DBU	28	28	28	29	29	29	29	37	37	37	35	31

Table A.4 (2/40)

2

JANUARY 0 SUNSPOT NUMBER 10.0

MACTAN TO TAGBILARAN AZIMUTHS MILES KM.

10.16N - 123.58E 9.38N - 123.53E 183.95 3.93 54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	7.8	4	20	25	28	30	22	4	5	-	-	-	-	6.9	9.2
02	7.4	2	17	22	26	29	18	3	-	-	-	-	-	6.4	8.5
03	7.1	30	15	21	25	28	30	11	-	-	-	-	-	6.1	8.2
04	7.0	30	14	20	24	27	30	11	-	-	-	-	-	6.0	8.1
05	7.2	10	16	21	25	28	16	11	-	-	-	-	-	6.2	8.3
06	7.7	11	18	23	27	21	20	12	13	-	-	-	-	6.7	8.7
07	8.2	13	22	27	29	23	23	21	14	-	-	-	-	7.1	9.3
08	8.4	15	28	30	25	26	26	25	15	-	-	-	-	7.3	9.6
09	8.3	16	33	28	28	28	28	26	16	-	-	-	-	7.2	9.4
10	7.8	16	35	29	30	29	29	16	17	-	-	-	-	6.2	9.4
11	7.2	16	29	29	30	29	28	16	17	-	-	-	-	5.7	8.7
12	6.6	18	29	29	29	29	20	20	-	-	-	-	-	5.2	7.9
13	5.9	19	29	29	29	19	20	-	-	-	-	-	-	4.7	7.1
14	5.2	19	29	29	28	19	-	-	-	-	-	-	-	3.7	6.6
15	4.5	19	29	29	19	-	-	-	-	-	-	-	-	3.2	5.7
16	3.8	18	28	19	19	-	-	-	-	-	-	-	-	2.7	4.8
17	3.4	18	28	19	-	-	-	-	-	-	-	-	-	2.4	4.3
18	3.2	18	28	19	-	-	-	-	-	-	-	-	-	2.2	4.4
19	2.7	18	19	19	-	-	-	-	-	-	-	-	-	1.9	3.8
20	2.1	17	18	-	-	-	-	-	-	-	-	-	-	1.4	2.8
21	2.2	35	35	-	-	-	-	-	-	-	-	-	-	1.5	3.0
22	3.7	36	35	36	-	-	-	-	-	-	-	-	-	3.3	4.4
23	6.0	17	31	33	26	17	18	-	-	-	-	-	-	5.2	7.0
24	7.5	17	25	29	31	24	24	17	18	-	-	-	-	6.6	8.8

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	6.0	6.0	7.0	7.0	6.0	5.0	5.0	4.0	3.0	3.0	5.0	5.0
DBU	30	29	30	30	28	27	29	30	33	35	30	29

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	4.0	4.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	4.0	4.0	5.0
DBU	29	29	29	28	28	28	19	18	35	36	33	31

Table A.4 (3/40)

3

APRIL 0 SUNSPOT NUMBER 100.0

MACTAN	TO TAGBILARAN	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.38N - 123.53E	183.95	3.93	54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	12.0	13	10	17	22	25	28	21	22	22	16	-	-		10.3	13.3
02	11.5	12	4	12	19	23	26	28	19	19	3	-	-		10.2	13.0
03	11.2	2	1	10	17	21	25	27	18	17	2	-	-		10.0	12.7
04	11.2	2	0	9	16	21	25	27	18	17	2	-	-		10.0	12.7
05	11.4	2	2	11	18	22	25	28	19	18	3	-	-		10.1	12.9
06	11.9	3	7	14	20	24	27	20	20	20	3	5	-		10.0	14.3
07	12.6	5	13	19	24	27	29	22	22	22	20	5	-		10.6	15.1
08	13.1	16	20	25	28	30	24	24	24	24	23	16	-		11.0	15.7
09	13.0	16	29	31	33	26	26	26	26	26	24	17	-		11.0	15.6
10	12.5	17	35	36	28	28	28	28	27	27	24	9	-		10.0	15.4
11	11.8	9	35	27	27	28	27	27	27	26	9	9	-		9.4	14.5
12	11.2	9	26	27	27	27	27	27	27	26	9	-	-		9.0	13.8
13	11.2	9	27	27	27	27	27	27	27	26	9	-	-		8.9	13.7
14	11.5	9	27	27	28	28	28	28	28	27	9	-	-		9.1	13.5
15	11.7	9	27	28	28	28	29	28	28	28	9	-	-		9.2	13.8
16	11.3	9	28	29	29	29	29	29	29	28	9	-	-		8.9	13.3
17	10.3	9	29	29	30	30	30	29	29	28	9	-	-		8.1	12.1
18	8.9	8	29	30	30	30	29	29	8	9	9	-	-		6.1	12.4
19	7.4	8	35	29	29	29	28	8	8	9	-	-	-		5.0	10.3
20	6.2	37	35	36	37	37	8	8	8	-	-	-	-		4.2	8.6
21	6.3	37	35	36	37	37	37	20	20	-	-	-	-		4.3	8.7
22	8.1	37	33	34	35	36	36	37	20	-	-	-	-		7.0	9.0
23	10.6	19	25	28	31	32	33	26	26	26	19	-	-		9.1	11.7
24	12.0	18	17	22	26	29	23	24	24	24	20	-	-		10.3	13.3

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	7.0	8.0	8.0	8.0	8.0	7.0	7.0	6.0	5.0	4.0	3.0	6.0
DBU	28	28	27	27	28	27	29	30	33	36	35	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	7.0	7.0	7.0	6.0	5.0	3.0	6.0	7.0	8.0	7.0	6.0
DBU	27	28	29	29	30	30	35	37	37	37	33	29

Table A.4 (4/40)

4

APRIL 0 SUNSPOT NUMBER 10.0

MACTAN	TO TAGBILARAN	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.38N - 123.53E	183.95	3.93	54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	8.2	15	17	22	26	29	21	19	3	-	-	-	-		7.1	9.3
02	8.0	10	13	19	23	27	29	14	11	-	-	-	-		7.2	9.1
03	8.0	10	10	17	22	26	28	13	11	-	-	-	-		7.2	9.1
04	8.0	10	10	17	22	25	28	13	11	-	-	-	-		7.2	9.1
05	8.1	10	11	18	23	26	18	16	11	-	-	-	-		7.2	9.2
06	8.7	11	14	20	24	27	20	20	12	13	-	-	-		7.5	10.3
07	9.6	13	19	24	27	23	23	23	22	5	6	-	-		8.2	11.4
08	10.3	6	25	28	31	25	26	26	25	23	6	-	-		8.9	12.3
09	10.5	7	31	33	27	28	28	28	27	26	7	-	-		9.1	12.6
10	10.2	8	35	29	30	30	30	29	29	27	8	-	-		7.6	11.8
11	9.4	8	35	29	29	29	29	29	28	8	-	-	-		7.0	10.9
12	8.5	8	28	29	29	29	29	28	8	8	-	-	-		6.4	9.8
13	7.9	8	28	28	29	29	28	8	8	-	-	-	-		5.9	9.1
14	7.6	8	28	28	29	28	28	8	8	-	-	-	-		5.7	9.3
15	7.2	7	28	28	29	28	28	8	8	-	-	-	-		5.4	8.8
16	6.6	7	35	29	29	29	7	8	-	-	-	-	-		5.0	8.1
17	6.0	7	35	36	29	27	7	-	-	-	-	-	-		4.6	7.4
18	5.2	37	35	36	37	7	7	-	-	-	-	-	-		3.4	7.3
19	4.0	36	35	36	37	37	-	-	-	-	-	-	-		2.6	5.6
20	3.0	35	35	36	37	37	37	-	-	-	-	-	-		2.0	4.2
21	3.4	36	35	36	37	37	37	-	-	-	-	-	-		2.3	4.8
22	5.4	36	34	35	36	36	37	37	-	-	-	-	-		4.6	6.1
23	7.4	35	28	31	32	34	35	17	-	-	-	-	-		6.4	8.4
24	8.3	15	21	26	29	31	32	23	16	-	-	-	-		7.1	9.4

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	6.0	7.0	7.0	7.0	6.0	6.0	5.0	5.0	4.0	3.0	3.0	6.0
DBU	29	29	28	28	26	27	27	31	33	35	35	29

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	5.0	3.0	4.0	5.0	6.0	7.0	7.0	8.0	7.0	7.0
DBU	29	29	29	35	36	37	37	37	37	37	35	32

Table A.4 (5/40)

5

JULY 0 SUNSPOT NUMBER 100.0

MACTAN TO TAGBILARAN AZIMUTHS MILES KM.

10.16N - 123.58E 9.38N - 123.53E 183.95 3.93 54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	10.2	12	10	17	22	25	28	30	20	18	-	-	-	8.6	11.3
02	10.0	11	5	13	19	23	26	28	30	2	3	-	-	8.5	12.7
03	9.9	1	2	11	17	22	25	28	29	1	3	-	-	8.4	12.7
04	9.9	0	1	10	17	22	25	27	29	1	2	-	-	8.5	12.7
05	10.0	1	3	11	18	22	26	28	17	1	3	-	-	8.5	12.6
06	10.1	2	7	15	20	24	27	29	18	15	4	-	-	8.2	12.9
07	10.4	3	13	19	24	27	29	21	20	18	4	-	-	8.5	13.4
08	10.7	14	20	24	28	30	32	23	22	21	15	-	-	8.7	13.7
09	10.8	16	27	30	32	25	25	25	25	24	16	-	-	8.6	13.6
10	10.6	17	34	35	28	28	28	27	27	25	8	-	-	8.2	12.9
11	10.1	8	35	28	28	28	26	27	27	25	8	-	-	7.8	12.4
12	9.4	8	27	27	26	28	27	27	26	8	8	-	-	7.3	11.5
13	8.8	8	27	27	27	27	27	27	8	8	-	-	-	6.8	10.7
14	8.4	8	27	27	27	27	27	26	8	8	-	-	-	6.7	10.6
15	8.2	8	27	27	28	28	27	26	8	8	-	-	-	6.5	10.3
16	7.8	8	27	28	28	28	28	8	8	8	-	-	-	6.2	9.9
17	7.3	8	28	28	28	28	28	8	8	-	-	-	-	5.8	9.2
18	6.8	7	28	28	29	28	8	8	8	8	-	-	-	4.3	9.8
19	6.1	7	28	29	29	28	8	8	8	-	-	-	-	3.9	8.8
20	5.4	7	35	29	28	7	8	8	-	-	-	-	-	3.4	7.7
21	5.4	18	35	36	37	20	20	20	-	-	-	-	-	3.4	7.7
22	6.8	18	31	33	34	27	19	-	-	-	-	-	-	5.7	7.5
23	8.8	18	24	27	30	24	25	25	18	-	-	-	-	7.4	9.7
24	10.1	17	16	22	26	28	30	23	23	20	-	-	-	8.4	11.2

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	8.0	9.0	9.0	9.0	8.0	8.0	7.0	7.0	5.0	4.0	3.0	6.0
DBU	30	30	29	29	28	29	29	32	32	35	35	28

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	6.0	6.0	6.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	7.0
DBU	27	27	28	28	28	29	29	35	37	34	30	30

Table A.4 (6/40)

6

JULY 0 SUNSPOT NUMBER 10.0

MACTAN TO TAGBILARAN AZIMUTHS MILES KM.

10.16N - 123.58E 9.38N - 123.53E 183.95 3.93 54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	7.1	31	17	22	26	29	30	15	-	-	-	-	-	5.7	8.0
02	6.9	29	13	19	24	27	29	31	11	-	-	-	-	5.7	9.0
03	6.8	28	11	18	22	26	28	30	1	-	-	-	-	5.7	8.9
04	6.8	28	10	17	22	26	28	30	1	-	-	-	-	5.6	8.6
05	6.7	28	12	18	23	26	29	10	11	-	-	-	-	5.6	8.7
06	6.9	30	15	21	25	28	30	11	12	-	-	-	-	5.7	8.8
07	7.3	11	19	24	27	30	31	12	13	-	-	-	-	6.0	9.2
08	7.6	13	24	28	30	32	22	5	5	6	-	-	-	6.3	9.7
09	7.9	6	30	32	34	26	26	6	6	7	-	-	-	6.5	10.1
10	8.0	7	35	36	30	29	29	25	8	-	-	-	-	5.5	9.6
11	7.5	18	35	30	30	30	29	19	19	-	-	-	-	5.2	9.0
12	6.5	19	35	29	29	29	18	19	-	-	-	-	-	4.5	7.8
13	5.4	18	28	29	28	20	-	-	-	-	-	-	-	3.7	6.5
14	4.7	19	28	28	19	-	-	-	-	-	-	-	-	3.5	5.7
15	4.2	19	28	27	19	-	-	-	-	-	-	-	-	3.1	5.1
16	3.8	19	26	10	-	-	-	-	-	-	-	-	-	2.8	4.5
17	3.5	19	28	19	-	-	-	-	-	-	-	-	-	2.6	4.2
18	3.3	19	28	19	-	-	-	-	-	-	-	-	-	2.5	4.5
19	2.8	35	35	36	-	-	-	-	-	-	-	-	-	2.1	3.9
20	2.4	35	35	36	37	37	-	-	-	-	-	-	-	1.8	3.2
21	2.9	35	35	36	37	37	37	-	-	-	-	-	-	2.2	4.0
22	4.6	35	33	34	35	36	36	-	-	-	-	-	-	3.7	5.1
23	6.4	34	27	30	32	33	17	-	-	-	-	-	-	5.1	7.1
24	7.2	16	21	26	29	31	21	16	-	-	-	-	-	5.8	8.1

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	7.0	8.0	8.0	8.0	7.0	7.0	7.0	6.0	5.0	4.0	3.0	3.0
DBU	30	31	30	30	29	30	31	32	34	36	35	35

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	4.0	4.0	3.0	3.0	3.0	3.0	4.0	6.0	7.0	7.0	6.0	6.0
DBU	29	28	28	28	28	28	36	37	37	36	33	31

Table A.4 (7/40)

OCTOBER 0 SUNSPOT NUMBER 100.0

MACTAN	TO TAGBILARAN	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.38N - 123.53E	183.95	3.93	54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 Db
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	12.3	14	13	19	23	27	29	22	23	23	20	-	-		10.5	13.6
02	11.9	13	7	14	20	24	27	29	21	20	4	-	-		10.6	13.4
03	11.5	3	4	12	19	23	26	28	19	19	3	-	-		10.2	13.0
04	11.4	2	4	12	18	23	26	28	19	18	3	-	-		10.1	12.8
05	11.8	3	6	13	19	23	26	29	20	20	3	-	-		10.5	13.3
06	12.7	4	10	17	22	25	28	22	22	22	20	5	-		10.7	15.3
07	13.4	15	16	21	25	28	22	23	24	24	23	15	-		11.3	16.1
08	13.2	16	23	27	29	23	24	25	25	25	23	16	-		11.1	15.9
09	12.5	17	30	32	25	26	26	26	26	26	23	17	-		10.5	15.0
10	11.9	17	35	27	28	28	27	27	27	26	17	17	-		9.5	14.6
11	11.3	17	27	27	27	27	27	27	27	26	9	-	-		9.1	14.0
12	11.0	9	27	27	27	27	27	27	27	26	9	-	-		8.8	13.5
13	10.9	9	27	27	28	28	28	28	27	27	9	-	-		8.7	13.5
14	11.1	9	27	28	28	28	28	28	28	27	9	-	-		8.8	13.1
15	11.1	9	28	29	29	29	29	29	29	28	9	-	-		8.8	13.1
16	10.8	9	29	30	30	30	30	30	29	29	9	-	-		8.5	12.7
17	10.3	9	30	30	30	30	30	30	29	28	9	-	-		8.1	12.1
18	9.2	9	30	30	30	30	30	29	27	9	9	-	-		6.2	12.7
19	7.3	9	29	30	30	29	28	9	9	9	-	-	-		4.9	10.1
20	5.6	8	35	29	28	8	8	9	-	-	-	-	-		3.8	7.7
21	5.8	8	35	36	37	8	8	9	-	-	-	-	-		3.9	8.0
22	8.1	8	34	35	36	36	28	27	8	-	-	-	-		6.9	9.0
23	10.8	7	27	30	32	33	26	27	27	27	8	-	-		9.3	12.0
24	12.2	7	19	24	27	30	24	25	25	25	23	-	-		10.5	13.5

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	7.0	8.0	8.0	8.0	8.0	7.0	6.0	5.0	4.0	3.0	6.0	6.0
DBU	29	29	28	28	29	28	28	29	32	35	27	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	6.0	6.0	6.0	6.0	5.0	4.0	3.0	5.0	6.0	6.0	6.0
DBU	28	28	29	30	30	30	30	35	37	36	33	30

Table A.4 (8/40)

OCTOBER 0 SUNSPOT NUMBER 10.0

MACTAN	TO TAGBILARAN	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.38N - 123.53E	183.95	3.93	54.0 86.9

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 Db
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	8.8	5	19	24	27	29	22	22	4	5	-	-	-		7.6	9.9
02	8.6	12	15	21	25	28	30	19	12	13	-	-	-		7.6	9.7
03	8.4	11	12	19	23	27	29	17	11	-	-	-	-		7.5	9.5
04	8.3	11	12	19	23	26	29	17	11	-	-	-	-		7.4	9.4
05	8.7	11	13	20	24	27	20	20	12	13	-	-	-		7.8	9.9
06	9.6	13	16	22	26	28	22	23	22	4	5	-	-		8.3	11.4
07	10.3	5	26	25	28	24	25	25	24	23	6	-	-		8.8	12.2
08	10.3	6	27	30	25	26	26	26	26	24	7	-	-		8.9	12.3
09	10.1	7	32	34	28	28	28	28	27	24	7	-	-		8.7	12.0
10	9.7	6	35	29	29	29	29	29	27	8	-	-	-		7.3	11.2
11	9.2	8	29	29	29	29	29	28	27	8	-	-	-		6.9	10.6
12	8.6	8	29	29	29	29	29	28	8	8	-	-	-		6.5	10.0
13	8.3	8	29	29	29	29	29	28	8	-	-	-	-		6.3	9.7
14	8.0	8	29	29	29	29	29	27	8	8	-	-	-		6.1	9.9
15	7.3	16	29	30	30	29	28	19	19	-	-	-	-		5.5	8.9
16	6.4	19	29	30	30	29	19	19	-	-	-	-	-		4.9	7.9
17	6.0	19	30	30	30	19	19	-	-	-	-	-	-		4.5	7.3
18	5.4	19	30	30	29	19	19	19	-	-	-	-	-		3.5	7.5
19	4.1	18	29	28	19	19	-	-	-	-	-	-	-		2.7	5.7
20	2.9	17	17	18	-	-	-	-	-	-	-	-	-		1.9	4.1
21	3.5	18	28	18	19	-	-	-	-	-	-	-	-		2.3	4.9
22	5.8	19	35	29	29	19	-	-	-	-	-	-	-		5.0	6.5
23	8.0	18	30	32	27	27	27	17	18	-	-	-	-		6.9	9.0
24	8.9	16	23	28	30	25	25	25	16	17	-	-	-		7.6	10.0

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	6.0	7.0	7.0	7.0	6.0	6.0	5.0	4.0	4.0	3.0	5.0	5.0
DBU	29	30	29	29	27	28	28	30	34	35	29	29

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	5.0	4.0	4.0	4.0	3.0	4.0	3.0	3.0	4.0	5.0
DBU	29	29	30	30	30	30	29	18	28	35	32	30

Table A.4 (9/40)

1

JANUARY 0 SUNSPOT NUMBER 100.0

MACTAN	TO ILOILO	AZIMUTHS	MILES	KM.
10.16N - 123.58E	10.41N - 122.33E	281.60 101.37	86.8	139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	11.5	12	12	18	23	26	22	23	23	23	12	-	-	10.0	13.1
02	11.2	11	6	14	20	24	26	21	21	20	12	-	-	9.7	12.7
03	10.7	10	3	12	18	22	25	27	19	18	-1	-	-	9.2	12.1
04	10.4	-2	2	11	17	22	25	27	18	16	-1	-	-	9.0	11.8
05	10.3	-2	4	13	18	22	25	28	18	17	-1	-	-	8.9	11.7
06	10.6	-1	8	16	21	24	27	21	20	19	0	-	-	9.0	12.2
07	11.0	0	15	20	24	27	22	23	22	22	1	-	-	9.3	12.6
08	11.1	1	24	26	29	24	24	24	24	23	2	-	-	9.4	12.8
09	10.9	2	30	32	26	26	26	26	26	25	3	-	-	9.3	12.5
10	10.5	14	34	35	28	28	28	27	27	25	14	-	-	8.2	13.0
11	10.2	14	34	27	28	28	27	27	27	25	14	-	-	7.9	12.5
12	9.7	14	27	27	28	28	27	27	26	14	14	-	-	7.6	11.9
13	9.2	14	27	27	28	28	28	27	26	14	-	-	-	7.2	11.3
14	8.7	14	27	28	28	28	28	27	14	14	-	-	-	6.7	10.5
15	8.2	24	28	28	28	28	28	27	25	25	-	-	-	6.3	9.9
16	7.6	24	28	28	29	28	28	24	25	-	-	-	-	5.8	9.2
17	7.0	24	28	29	29	28	26	24	-	-	-	-	-	5.4	8.5
18	6.5	24	28	29	29	28	24	24	-	-	-	-	-	4.5	8.2
19	5.7	24	28	29	28	24	24	-	-	-	-	-	-	3.9	7.2
20	4.6	35	34	35	36	36	-	-	-	-	-	-	-	3.2	5.8
21	4.3	35	34	35	36	36	36	37	37	-	-	-	-	3.0	5.4
22	5.8	36	34	35	35	36	36	36	37	37	-	-	-	5.1	6.7
23	8.6	35	27	29	31	33	34	34	35	15	-	-	-	7.5	9.8
24	10.8	14	19	24	27	29	31	25	25	24	14	-	-	9.4	12.3

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	6.0	7.0	8.0	8.0	8.0	7.0	6.0	5.0	4.0	4.0	3.0	6.0
DBU	26	26	27	27	28	27	27	29	32	35	34	28

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	6.0	5.0	5.0	5.0	4.0	4.0	6.0	9.0	10.0	9.0	7.0
DBU	28	28	28	29	29	29	29	36	37	37	35	31

Table A.4 (10/40)

2

JANUARY 0 SUNSPOT NUMBER 10.0

MACTAN	TO ILOILO	AZIMUTHS	MILES	KM.
10.16N - 123.58E	10.41N - 122.33E	281.60 101.37	86.8	139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	7.9	11	18	23	26	29	22	12	12	-	-	-	-	6.9	9.3
02	7.5	10	14	20	24	27	29	11	-	-	-	-	-	6.5	8.6
03	7.2	28	11	18	23	26	28	10	-	-	-	-	-	6.2	8.3
04	7.1	28	11	18	22	25	28	10	-	-	-	-	-	6.1	8.2
05	7.3	9	12	19	23	26	17	10	-	-	-	-	-	6.3	8.4
06	7.7	11	16	21	25	28	20	11	12	-	-	-	-	6.7	8.8
07	8.3	12	21	24	28	23	23	22	13	-	-	-	-	7.2	9.4
08	8.5	21	26	29	25	26	26	25	21	21	-	-	-	7.4	9.7
09	8.4	22	32	27	28	28	28	27	22	-	-	-	-	7.3	9.5
10	7.9	23	34	29	29	29	29	14	15	-	-	-	-	6.2	9.5
11	7.3	14	29	29	29	29	28	14	15	-	-	-	-	5.8	8.8
12	6.7	14	29	29	29	29	14	14	-	-	-	-	-	5.3	8.0
13	6.0	14	29	29	29	14	14	-	-	-	-	-	-	4.7	7.2
14	5.3	14	29	29	29	14	14	-	-	-	-	-	-	3.7	6.7
15	4.5	13	29	28	14	14	-	-	-	-	-	-	-	3.2	5.7
16	3.8	13	28	13	14	-	-	-	-	-	-	-	-	2.7	4.8
17	3.4	13	28	13	-	-	-	-	-	-	-	-	-	2.4	4.3
18	3.2	13	28	13	-	-	-	-	-	-	-	-	-	2.3	4.5
19	2.8	12	13	13	-	-	-	-	-	-	-	-	-	1.9	3.8
20	2.1	12	13	-	-	-	-	-	-	-	-	-	-	1.5	2.9
21	2.1	33	34	-	-	-	-	-	-	-	-	-	-	1.5	2.9
22	3.6	35	34	35	-	-	-	-	-	-	-	-	-	3.2	4.3
23	5.9	12	29	31	26	12	13	-	-	-	-	-	-	5.2	7.0
24	7.5	11	23	27	29	25	24	12	12	-	-	-	-	6.6	8.9

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	6.0	7.0	7.0	7.0	6.0	6.0	5.0	4.0	3.0	3.0	5.0	5.0
DBU	29	29	28	28	26	28	28	29	32	34	29	29

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	4.0	3.0	3.0	3.0	3.0	4.0	3.0	3.0	4.0	4.0	5.0
DBU	29	29	29	28	28	28	13	13	34	35	31	29

Table A.4 (11/40)

3

APRIL 0 SUNSPOT NUMBER 100.0

MACTAN	TO ILOILO	AZIMUTHS	MILES	KM.
10.16N - 123.58E	10.41N - 122.33E	281.60 101.37	86.8	139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	12.1	11	6	14	20	23	26	28	22	22	18	-	-		10.4	13.4
02	11.6	10	0	10	16	21	24	26	19	19	10	-	-		10.3	13.1
03	11.3	9	-4	7	14	19	23	25	27	18	-1	-	-		10.1	12.8
04	11.3	-2	-5	6	13	19	22	25	27	18	-2	-	-		10.1	12.8
05	11.5	-2	-3	8	15	19	23	26	19	18	-1	-	-		10.2	13.0
06	12.0	-1	2	11	17	22	25	27	20	20	-1	1	-		10.1	14.4
07	12.7	0	9	16	21	25	27	22	22	22	21	1	-		10.7	15.3
08	13.2	2	18	23	26	28	24	24	24	24	23	2	-		11.1	15.9
09	13.2	2	26	29	31	25	26	26	26	26	24	3	-		11.1	15.8
10	12.6	3	34	35	26	28	28	28	27	27	25	3	-		10.1	15.5
11	11.9	14	34	27	27	27	27	27	27	26	15	15	-		9.5	14.7
12	11.4	14	26	27	27	27	27	27	27	26	15	-	-		9.1	14.0
13	11.3	15	26	27	27	27	27	27	27	26	15	-	-		9.1	14.0
14	11.7	15	27	27	28	28	28	28	27	27	15	-	-		9.2	13.8
15	11.9	15	27	28	28	28	28	28	28	28	15	-	-		9.4	14.1
16	11.5	15	28	28	29	29	29	29	29	28	15	-	-		9.1	13.6
17	10.5	15	28	29	29	29	29	29	29	28	15	-	-		8.3	12.3
18	9.0	14	29	29	30	30	29	29	27	15	15	-	-		6.2	12.6
19	7.5	15	29	29	29	29	28	15	15	15	-	-	-		5.1	10.4
20	6.3	14	34	35	36	28	14	14	14	-	-	-	-		4.3	8.7
21	6.3	36	34	35	36	36	36	14	14	-	-	-	-		4.3	8.8
22	8.1	36	31	33	34	35	35	36	15	-	-	-	-		7.0	9.0
23	10.5	14	23	27	29	31	32	26	26	26	-	-	-		9.1	11.7
24	12.0	13	14	20	24	27	29	24	24	24	21	-	-		10.3	13.3

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	8.0	8.0	9.0	9.0	8.0	8.0	7.0	6.0	5.0	4.0	3.0	6.0
DBU	28	26	27	27	25	27	27	28	31	35	34	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	7.0	7.0	7.0	6.0	6.0	5.0	5.0	7.0	6.0	7.0	7.0
DBU	27	28	28	29	29	30	29	36	36	36	32	29

Table A.4 (12/40)

4

APRIL 0 SUNSPOT NUMBER 10.0

MACTAN	TO ILOILO	AZIMUTHS	MILES	KM.
10.16N - 123.58E	10.41N - 122.33E	281.60 101.37	86.8	139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	8.2	10	14	20	24	27	29	19	9	-	-	-	-		7.1	9.3
02	8.1	7	9	16	21	25	27	15	8	-	-	-	-		7.2	9.1
03	8.1	6	6	14	20	23	26	14	7	-	-	-	-		7.2	9.2
04	8.1	6	6	14	19	23	26	14	7	-	-	-	-		7.2	9.2
05	8.2	6	7	15	20	24	27	16	7	-	-	-	-		7.3	9.3
06	8.8	8	11	18	22	25	20	20	8	9	-	-	-		7.5	10.4
07	9.6	10	16	21	25	22	23	23	22	10	11	-	-		8.3	11.5
08	10.4	11	22	26	29	25	26	26	25	24	12	-	-		8.9	12.4
09	10.7	22	29	31	27	28	28	28	27	26	22	-	-		9.2	12.7
10	10.3	23	34	35	29	30	29	29	29	27	23	-	-		7.7	12.0
11	9.5	23	34	29	29	29	29	29	28	15	-	-	-		7.1	11.0
12	8.6	15	34	28	29	29	29	28	15	15	-	-	-		6.4	9.9
13	8.0	15	28	28	28	28	28	15	15	-	-	-	-		6.0	9.2
14	7.6	15	28	28	28	28	28	15	15	-	-	-	-		5.8	9.4
15	7.2	15	28	28	28	28	28	15	15	-	-	-	-		5.5	8.9
16	6.7	15	28	29	29	29	15	15	-	-	-	-	-		5.1	8.2
17	6.1	15	34	29	29	28	15	-	-	-	-	-	-		4.6	7.5
18	5.3	15	34	35	29	15	15	15	-	-	-	-	-		3.5	7.4
19	4.1	35	34	35	36	15	-	-	-	-	-	-	-		2.7	5.7
20	3.1	34	34	35	36	36	-	-	-	-	-	-	-		2.0	4.3
21	3.4	35	34	35	36	36	36	-	-	-	-	-	-		2.3	4.8
22	5.3	35	33	34	35	35	36	36	-	-	-	-	-		4.6	6.0
23	7.4	34	26	29	31	32	33	34	-	-	-	-	-		6.3	8.3
24	8.3	19	20	24	27	29	31	23	19	-	-	-	-		7.1	9.4

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	7.0	7.0	7.0	7.0	7.0	6.0	5.0	5.0	4.0	4.0	3.0	3.0
DBU	29	27	26	26	27	25	25	29	31	35	34	34

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	5.0	5.0	3.0	4.0	5.0	6.0	7.0	8.0	8.0	7.0
DBU	28	28	28	29	34	35	36	36	36	36	34	31

Table A.4 (13/40)

5

MACTAN 10.16N - 123.58E TO ILOILO 10.41N - 122.33E JULY 0 SUNSPOT NUMBER 100.0

AZIMUTHS 281.60 101.37 MILES 86.8 KM. 139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	10.2	18	6	14	20	23	26	28	30	18	-	-	-	8.5	11.3
02	9.9	17	0	10	16	21	24	27	28	17	18	-	-	8.4	12.7
03	9.9	29	-3	7	14	19	23	26	28	-3	-1	-	-	8.4	12.6
04	10.0	-3	-4	7	14	19	23	25	27	-3	-2	-	-	8.5	12.8
05	10.0	-3	-2	8	15	20	23	26	28	12	-1	-	-	8.5	12.8
06	10.2	-2	2	11	17	22	25	27	29	15	-1	-	-	8.2	13.0
07	10.5	-1	9	16	21	25	27	29	20	19	0	-	-	8.5	13.4
08	10.8	0	17	22	26	28	30	23	22	21	1	-	-	8.7	13.8
09	10.9	1	25	28	30	32	25	25	25	24	2	-	-	8.8	13.9
10	10.7	13	33	34	35	27	27	27	26	25	14	-	-	8.2	13.1
11	10.2	14	34	28	28	28	28	27	27	25	14	-	-	7.9	12.5
12	9.5	14	27	27	27	27	27	27	26	14	14	-	-	7.3	11.6
13	8.9	14	26	27	27	27	27	27	14	14	-	-	-	6.8	10.8
14	8.5	14	26	27	27	27	27	26	14	14	-	-	-	6.7	10.7
15	8.2	14	27	27	27	27	27	26	14	14	-	-	-	6.5	10.4
16	7.9	14	27	28	28	28	28	14	14	14	-	-	-	6.2	9.9
17	7.4	20	27	28	28	28	28	26	26	-	-	-	-	5.8	9.3
18	6.9	26	28	28	28	28	16	16	16	17	-	-	-	4.3	9.9
19	6.2	16	28	28	28	28	16	16	16	-	-	-	-	3.9	9.0
20	5.5	16	34	28	28	16	16	16	-	-	-	-	-	3.4	7.9
21	5.4	36	34	35	36	16	16	16	-	-	-	-	-	3.4	7.8
22	6.7	14	30	32	33	27	14	-	-	-	-	-	-	5.7	7.5
23	8.7	13	22	26	28	30	25	25	13	-	-	-	-	7.3	9.7
24	10.0	12	14	20	24	27	29	30	22	10	-	-	-	8.4	11.1

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	9.0	9.0	9.0	9.0	9.0	9.0	8.0	7.0	6.0	5.0	3.0	6.0
DBU	30	28	28	27	28	29	29	30	32	35	34	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	6.0	6.0	6.0	6.0	5.0	5.0	3.0	5.0	5.0	6.0	8.0
DBU	27	27	27	28	28	28	28	34	36	33	30	30

Table A.4 (14/40)

6

MACTAN 10.16N - 123.58E TO ILOILO 10.41N - 122.33E JULY 0 SUNSPOT NUMBER 10.0

AZIMUTHS 281.60 101.37 MILES 86.8 KM. 139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	7.1	29	14	20	24	27	29	30	-	-	-	-	-	5.7	8.0
02	6.9	27	10	17	21	25	27	29	8	-	-	-	-	5.7	9.0
03	6.8	26	7	15	20	24	26	28	7	-	-	-	-	5.7	8.9
04	6.8	26	6	14	20	23	26	28	7	-	-	-	-	5.6	8.8
05	6.7	26	8	15	20	24	27	29	8	-	-	-	-	5.6	8.8
06	6.9	28	11	18	22	26	28	7	8	-	-	-	-	5.7	8.8
07	7.3	30	16	21	25	28	30	8	9	-	-	-	-	6.0	9.3
08	7.7	10	21	26	28	30	32	10	10	11	-	-	-	6.3	9.7
09	8.0	11	28	30	32	33	26	22	12	12	-	-	-	6.6	10.2
10	8.1	13	34	35	35	29	29	27	13	13	-	-	-	5.6	9.7
11	7.6	13	34	35	30	29	29	13	13	-	-	-	-	5.3	9.1
12	6.6	13	34	29	29	29	13	13	-	-	-	-	-	4.5	7.9
13	5.5	12	28	29	28	13	-	-	-	-	-	-	-	3.8	6.6
14	4.8	12	28	28	15	-	-	-	-	-	-	-	-	3.5	5.7
15	4.2	15	27	27	16	-	-	-	-	-	-	-	-	3.1	5.1
16	3.8	15	34	15	-	-	-	-	-	-	-	-	-	2.8	4.5
17	3.5	15	34	15	-	-	-	-	-	-	-	-	-	2.6	4.2
18	3.3	15	28	15	-	-	-	-	-	-	-	-	-	2.5	4.5
19	2.8	34	34	35	-	-	-	-	-	-	-	-	-	2.1	3.9
20	2.4	34	34	35	36	36	-	-	-	-	-	-	-	1.8	3.3
21	2.9	34	34	35	36	36	36	-	-	-	-	-	-	2.2	4.0
22	4.6	34	32	33	34	35	35	-	-	-	-	-	-	3.7	5.1
23	6.4	32	26	29	31	32	11	-	-	-	-	-	-	5.1	7.1
24	7.2	10	19	24	27	29	21	10	-	-	-	-	-	5.7	8.0

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	6.0	5.0	4.0	3.0
DBU	30	29	28	28	29	28	30	32	33	35	35	34

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	4.0	4.0	3.0	3.0	3.0	3.0	4.0	6.0	7.0	7.0	6.0	6.0
DBU	29	28	27	34	34	28	35	36	36	35	32	29

Table A.4 (15/40)

7

OCTOBER 0 SUNSPOT NUMBER 100.0

MACTAN TO ILOILO AZIMUTHS MILES KM.

10.16N - 123.58E 10.41N - 122.33E 281.60 101.37 86.8 139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 LB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	12.4	12	9	16	21	25	27	22	23	23	21	-	-		10.7	13.8
02	12.0	11	3	14	18	22	25	27	21	21	14	-	-		10.7	13.6
03	11.6	10	0	9	16	21	24	26	19	19	-1	-	-		10.3	13.1
04	11.4	-2	-1	9	15	20	24	26	28	19	-1	-	-		10.2	12.9
05	11.9	-1	1	10	17	21	24	27	20	20	-1	-	-		10.6	13.4
06	12.8	0	5	14	19	23	26	28	22	22	21	1	-		10.8	15.4
07	13.5	1	12	19	23	26	28	23	24	24	23	2	-		11.3	16.2
08	13.3	2	20	25	28	30	24	25	25	25	24	2	-		11.2	16.0
09	12.7	3	28	31	25	26	26	26	26	26	24	3	-		10.7	15.2
10	12.0	3	34	27	28	28	27	27	27	26	22	3	-		9.6	14.8
11	11.5	14	26	27	27	27	27	27	27	26	14	15	-		9.2	14.2
12	11.2	14	26	27	27	27	27	27	27	26	14	-	-		8.9	13.7
13	11.1	14	27	27	28	28	28	28	27	27	14	-	-		8.9	13.7
14	11.3	14	27	28	28	29	28	28	26	28	14	-	-		9.0	13.4
15	11.4	14	28	28	29	29	29	29	29	28	14	-	-		9.0	13.4
16	11.1	14	34	29	30	30	30	30	29	29	14	-	-		8.7	13.0
17	10.5	14	34	30	30	30	30	30	29	28	15	-	-		8.3	12.4
18	9.4	14	29	30	30	30	30	29	28	14	15	-	-		6.4	13.0
19	7.4	14	29	30	30	29	28	14	14	14	-	-	-		5.0	10.3
20	5.6	14	29	29	28	14	14	15	-	-	-	-	-		3.8	7.6
21	5.8	14	34	35	28	14	14	15	-	-	-	-	-		3.9	8.0
22	8.0	14	33	34	35	35	28	27	16	-	-	-	-		6.9	8.9
23	10.8	15	25	28	30	32	26	27	27	27	15	-	-		9.3	12.0
24	12.2	14	17	22	26	28	24	25	25	25	23	-	-		10.5	13.6

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	7.0	8.0	8.0	9.0	8.0	8.0	7.0	6.0	4.0	3.0	6.0	6.0
DBU	27	27	26	28	27	28	29	30	31	34	27	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	7.0	7.0	3.0	3.0	5.0	5.0	4.0	4.0	6.0	6.0	6.0
DBU	28	28	29	34	34	30	30	29	35	35	32	28

Table A.4 (16/40)

8

OCTOBER 0 SUNSPOT NUMBER 10.0

MACTAN TO ILOILO AZIMUTHS MILES KM.

10.16N - 123.58E 10.41N - 122.33E 281.60 101.37 86.8 139.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 LB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	8.9	12	16	22	25	28	22	22	9	10	-	-	-		7.6	10.0
02	8.7	8	12	18	23	26	28	19	8	9	-	-	-		7.7	9.8
03	8.4	7	9	16	21	25	27	17	8	-	-	-	-		7.5	9.5
04	8.4	7	8	16	21	24	27	17	8	-	-	-	-		7.4	9.4
05	8.8	8	10	17	22	25	27	20	8	9	-	-	-		7.8	9.9
06	9.7	9	13	19	24	27	22	23	22	9	10	-	-		8.3	11.5
07	10.3	10	18	23	26	23	24	25	24	23	11	-	-		8.9	12.3
08	10.4	11	24	28	30	26	26	26	26	25	12	-	-		9.0	12.4
09	10.2	12	31	32	28	28	28	28	27	25	13	-	-		8.7	12.1
10	9.8	23	34	29	29	29	29	29	28	23	-	-	-		7.4	11.4
11	9.3	23	28	29	29	29	29	28	27	23	-	-	-		7.0	10.8
12	8.8	23	28	29	29	29	29	28	23	23	-	-	-		6.6	10.2
13	8.5	23	28	29	29	29	29	28	23	23	-	-	-		6.4	9.8
14	8.1	23	29	29	29	29	29	28	15	15	-	-	-		6.2	10.0
15	7.4	15	29	29	29	29	29	15	15	-	-	-	-		5.6	9.1
16	6.6	15	29	30	30	29	15	15	-	-	-	-	-		5.0	8.1
17	6.1	15	29	30	30	29	15	-	-	-	-	-	-		4.6	7.5
18	5.5	14	29	30	29	15	15	15	-	-	-	-	-		3.6	7.7
19	4.2	14	29	28	14	15	-	-	-	-	-	-	-		2.8	5.8
20	3.0	13	13	14	-	-	-	-	-	-	-	-	-		2.0	4.2
21	3.5	13	28	14	14	-	-	-	-	-	-	-	-		2.3	4.9
22	5.7	14	34	29	29	14	-	-	-	-	-	-	-		4.9	6.5
23	8.0	13	28	31	26	27	27	13	14	-	-	-	-		6.9	9.0
24	8.9	20	22	26	29	30	25	25	20	20	-	-	-		7.7	10.1

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	6.0	7.0	7.0	7.0	7.0	6.0	5.0	5.0	4.0	3.0	5.0	5.0
DBU	28	28	27	27	27	27	26	30	32	34	29	29

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	5.0	5.0	4.0	4.0	3.0	4.0	3.0	3.0	4.0	6.0
DBU	29	29	29	30	30	30	29	14	28	34	31	30

Table A.4 (17/40)

1

JANUARY 0 SUNSPOT NUMBER 100.0

MACTAN TO CUYOTO PRINCESA AZIMUTHS MILES KM.

10.16N - 123.58E 10.50N - 121.02E 277.92 97.46 175.6 282.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	11.7	13	-2	12	16	19	22	25	26	23	14	-	-		10.2	13.3
02	11.4	13	-11	1	13	16	20	22	24	26	3	-	-		9.8	12.8
03	10.8	26	-16	-2	11	15	18	21	23	25	3	-	-		9.3	12.2
04	10.5	25	-18	-4	11	14	17	21	23	25	3	-	-		9.0	11.8
05	10.4	26	-15	-2	12	15	18	21	23	25	3	-	-		8.9	11.7
06	10.7	3	-9	3	14	17	20	23	25	26	3	-	-		9.1	12.2
07	11.0	4	1	13	17	20	23	25	27	22	3	-	-		9.4	12.7
08	11.2	4	12	19	22	25	27	28	24	23	4	-	-		9.5	12.9
09	11.0	5	24	26	28	30	26	26	26	25	5	-	-		9.4	12.7
10	10.7	6	30	31	32	27	27	27	26	26	6	-	-		8.4	13.2
11	10.4	6	30	31	27	27	27	27	26	25	6	-	-		8.1	12.8
12	9.9	6	30	27	27	27	27	27	26	6	6	-	-		7.8	12.2
13	9.4	6	26	27	27	27	27	27	26	6	6	-	-		7.4	11.6
14	9.0	6	26	27	27	27	27	27	26	6	-	-	-		6.9	10.9
15	8.5	17	27	27	28	28	27	27	18	18	-	-	-		6.5	10.2
16	7.8	18	27	28	28	28	28	18	18	-	-	-	-		6.0	9.5
17	7.3	18	30	28	28	28	27	18	18	-	-	-	-		5.6	8.8
18	6.8	18	27	28	28	28	18	18	-	-	-	-	-		4.7	8.5
19	5.9	18	27	28	28	18	18	-	-	-	-	-	-		4.1	7.5
20	4.8	32	30	31	32	33	33	33	-	-	-	-	-		3.3	6.0
21	4.4	32	30	31	32	33	33	33	34	34	34	-	-		3.1	5.6
22	6.0	33	30	31	32	33	33	33	34	34	34	-	-		5.2	6.8
23	8.8	31	20	24	26	28	30	30	31	32	32	-	-		7.6	10.0
24	11.0	16	8	17	20	24	26	27	29	30	16	-	-		9.5	12.5

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	9.0	10.0	10.0	10.0	10.0	10.0	9.0	8.0	6.0	5.0	4.0	3.0
DBU	26	26	25	25	25	26	27	28	30	32	31	30

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	6.0	6.0	6.0	3.0	5.0	4.0	8.0	12.0	12.0	12.0	10.0
DBU	27	27	28	28	30	28	28	33	34	34	32	30

Table A.4 (18/40)

2

JANUARY 0 SUNSPOT NUMBER 10.0

MACTAN TO CUYOTO PRINCESA AZIMUTHS MILES KM.

10.16N - 123.58E 10.50N - 121.02E 277.92 97.46 175.6 282.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	8.0	27	7	16	20	23	25	27	14	-	-	-	-		7.0	9.4
02	7.6	25	1	13	17	20	23	25	27	-	-	-	-		6.6	8.8
03	7.3	23	-3	11	15	19	22	24	26	27	-	-	-		6.2	8.3
04	7.2	22	-4	11	15	19	22	24	26	-	-	-	-		6.2	8.2
05	7.4	23	-3	12	16	19	22	24	26	-	-	-	-		6.3	8.5
06	7.8	25	2	14	18	21	24	26	2	-	-	-	-		6.8	8.9
07	8.4	3	9	18	21	24	26	22	3	-	-	-	-		7.3	9.6
08	8.7	12	19	22	25	27	25	25	15	15	-	-	-		7.6	9.9
09	8.6	16	26	28	30	27	27	27	16	16	-	-	-		7.5	9.8
10	8.2	16	30	31	29	29	28	28	16	16	-	-	-		6.5	9.8
11	7.6	16	30	31	29	29	28	16	16	-	-	-	-		6.0	9.2
12	7.0	16	30	28	28	29	28	16	-	-	-	-	-		5.5	8.4
13	6.3	16	30	28	28	28	16	-	-	-	-	-	-		5.0	7.6
14	5.6	16	30	28	28	16	16	-	-	-	-	-	-		4.0	7.1
15	4.8	15	30	28	16	16	-	-	-	-	-	-	-		3.4	6.0
16	4.0	15	30	27	16	-	-	-	-	-	-	-	-		2.8	5.1
17	3.6	15	30	15	-	-	-	-	-	-	-	-	-		2.6	4.6
18	3.4	15	27	15	16	-	-	-	-	-	-	-	-		2.4	4.7
19	2.9	14	14	15	-	-	-	-	-	-	-	-	-		2.1	4.1
20	2.2	29	14	-	-	-	-	-	-	-	-	-	-		1.5	3.0
21	2.2	29	30	31	32	-	-	-	-	-	-	-	-		1.5	3.0
22	3.7	31	30	31	32	33	33	-	-	-	-	-	-		3.3	4.4
23	6.0	30	24	27	28	30	15	-	-	-	-	-	-		5.3	7.1
24	7.6	13	17	21	24	26	28	14	14	-	-	-	-		6.7	9.0

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	8.0	9.0	10.0	9.0	9.0	8.0	7.0	6.0	5.0	4.0	4.0	3.0
DBU	27	27	27	26	26	26	26	27	30	31	31	30

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	5.0	7.0	6.0	7.0
DBU	30	30	30	30	30	27	15	14	32	33	30	28

Table A.4 (19/40)

3

APRIL 0 SUNSPOT NUMBER 100.0

		AZIMUTHS	MILES	KM.
MACTAN 10.16N - 123.58E	TO CUYOTO PRINCESA 10.50N - 121.02E	277.92 97.46	175.6	282.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	12.2	13	-11	1	13	17	19	22	24	26	20	-	-	10.5	13.5
02	11.6	27	-21	-6	10	14	17	20	22	24	27	-	-	10.4	13.2
03	11.4	25	-26	-10	8	12	15	18	21	23	26	-	-	10.1	12.6
04	11.4	25	-28	-11	7	12	15	18	21	23	26	-	-	10.1	12.9
05	11.6	26	-25	-9	8	13	16	19	21	23	12	-	-	10.3	13.1
06	12.0	12	-18	-4	11	15	17	20	23	25	16	14	-	10.1	14.4
07	12.8	14	-8	4	14	18	21	23	25	27	21	5	-	10.7	15.3
08	13.3	5	5	15	19	22	25	26	26	24	23	5	-	11.2	16.0
09	13.3	5	19	23	26	28	29	26	26	26	24	6	-	11.2	16.0
10	12.8	6	30	31	32	33	27	27	27	27	25	6	-	10.2	15.7
11	12.2	6	30	31	27	27	27	27	27	26	24	6	-	9.7	14.9
12	11.6	6	30	26	27	27	27	27	26	26	6	6	-	9.3	14.3
13	11.6	6	30	26	27	27	27	27	27	26	6	6	-	9.2	14.2
14	11.9	6	26	27	27	27	27	27	27	27	6	-	-	9.4	14.1
15	12.3	6	30	27	27	28	28	28	28	28	27	6	-	9.7	14.5
16	11.9	6	30	27	28	28	28	28	28	28	6	-	-	9.4	14.1
17	10.9	6	30	28	28	29	29	29	29	28	6	-	-	8.6	12.8
18	9.4	6	30	28	29	29	29	29	28	6	6	-	-	6.4	13.0
19	7.8	6	30	28	28	28	28	6	6	6	-	-	-	5.3	10.8
20	6.6	33	30	31	32	33	33	6	6	-	-	-	-	4.5	9.1
21	6.6	33	30	31	32	33	33	33	34	34	-	-	-	4.5	9.2
22	8.4	32	27	29	30	31	32	32	33	33	-	-	-	7.2	9.3
23	10.8	4	15	20	24	26	28	29	30	31	5	-	-	9.3	11.9
24	12.2	4	1	13	17	21	23	25	27	24	23	-	-	10.5	13.5

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	10.0	12.0	12.0	12.0	10.0	10.0	10.0	9.0	7.0	6.0	4.0	3.0
DBU	26	27	26	26	23	25	27	28	29	33	31	30

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	3.0	7.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0	10.0	10.0	9.0
DBU	30	27	30	30	30	30	30	33	34	33	31	27

Table A.4 (20/40)

4

APRIL 0 SUNSPOT NUMBER 10.0

		AZIMUTHS	MILES	KM.
MACTAN 10.16N - 123.58E	TO CUYOTO PRINCESA 10.50N - 121.02E	277.92 97.46	175.6	282.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	8.4	26	0	13	17	20	23	25	27	-	-	-	-	7.2	9.5
02	8.2	24	-7	10	14	17	21	23	25	27	-	-	-	7.3	9.2
03	8.2	23	-11	8	13	16	19	22	24	26	-	-	-	7.3	9.2
04	8.2	22	-12	7	12	15	19	22	24	26	-	-	-	7.3	9.2
05	8.3	23	-10	8	13	16	20	22	25	-	-	-	-	7.4	9.4
06	8.8	25	-5	11	15	18	21	24	1	2	-	-	-	7.6	10.5
07	9.7	3	3	15	18	21	24	26	22	3	4	-	-	8.4	11.6
08	10.6	5	13	19	23	25	27	25	25	24	5	-	-	9.1	12.6
09	10.9	15	23	26	28	29	27	27	27	26	16	-	-	9.4	12.9
10	10.6	17	30	31	32	29	29	29	28	28	17	-	-	8.0	12.3
11	9.9	17	30	31	32	28	29	28	28	17	-	-	-	7.4	11.5
12	9.0	17	30	31	28	28	28	28	27	17	-	-	-	6.7	10.4
13	8.3	17	30	27	28	28	28	27	17	-	-	-	-	6.2	9.6
14	7.9	17	30	27	28	28	28	17	17	17	-	-	-	6.0	9.7
15	7.5	17	30	27	28	28	28	17	17	-	-	-	-	5.7	9.3
16	7.0	16	30	28	28	28	27	17	17	-	-	-	-	5.3	8.6
17	6.4	16	30	31	32	28	16	17	-	-	-	-	-	4.9	7.9
18	5.6	33	30	31	32	33	16	17	-	-	-	-	-	3.7	7.9
19	4.4	32	30	31	32	33	33	33	-	-	-	-	-	2.9	6.1
20	3.3	31	30	31	32	33	33	33	34	-	-	-	-	2.2	4.6
21	3.6	31	30	31	32	33	33	33	34	34	-	-	-	2.4	5.0
22	5.5	32	29	30	31	32	33	33	33	33	-	-	-	4.7	6.2
23	7.6	30	20	24	26	28	29	30	31	32	-	-	-	6.5	8.6
24	8.5	28	10	18	21	24	26	28	29	30	-	-	-	7.3	9.6

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	9.0	10.0	10.0	10.0	9.0	8.0	8.0	7.0	6.0	5.0	5.0	4.0
DBU	27	27	26	26	25	24	26	27	29	32	32	31

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	3.0	3.0	3.0	3.0	5.0	6.0	8.0	9.0	10.0	10.0	10.0	10.0
DBU	30	30	30	30	32	33	33	34	34	33	32	30

Table A.4 (21/40)

5

JULY 0 SUNSPOT NUMBER 100.0

MACTAN TO CUYOTO PRINCESA AZIMUTHS MILES KM.
10.16N - 123.58E 10.50N - 121.02E 277.92 97.46 175.6 282.6
MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	10.3	26	-11	1	13	17	19	22	24	26	28	-	-		8.6	11.4
02	10.0	24	-20	-5	10	14	17	20	22	24	27	-	-		8.5	12.8
03	9.9	23	-25	-9	8	12	15	18	21	23	26	-	-		8.4	12.7
04	10.0	23	-26	-10	7	12	15	18	21	23	26	-	-		8.5	12.8
05	10.1	24	-24	-8	8	13	15	19	22	24	26	-	-		8.6	12.9
06	10.2	25	-17	-3	11	15	17	21	23	25	27	-	-		8.3	13.1
07	10.6	27	-8	4	14	17	20	23	25	27	-6	-	-		8.6	13.5
08	10.9	-3	4	15	18	22	24	26	28	29	4	5	-		8.8	13.9
09	11.0	5	17	22	25	27	28	29	24	24	6	6	-		8.9	14.1
10	10.9	6	28	29	31	31	27	27	26	25	7	-	-		8.4	13.3
11	10.5	7	30	31	32	27	27	27	27	26	7	-	-		8.1	12.8
12	9.8	7	30	31	27	27	27	27	26	7	7	-	-		7.5	12.0
13	9.1	7	30	26	27	27	27	26	26	7	-	-	-		7.0	11.1
14	8.7	7	30	26	27	27	27	26	7	7	-	-	-		6.9	11.0
15	8.5	6	30	27	27	27	27	27	7	7	-	-	-		6.7	10.7
16	8.2	6	30	27	27	27	27	27	7	7	-	-	-		6.5	10.3
17	7.7	19	30	27	27	28	27	20	20	20	-	-	-		6.1	9.7
18	7.2	20	27	27	28	28	27	20	20	20	-	-	-		4.6	10.4
19	6.5	20	27	28	28	28	20	20	20	20	-	-	-		4.1	9.4
20	5.7	19	30	31	32	19	20	20	20	-	-	-	-		3.6	8.3
21	5.7	33	30	31	32	33	33	20	-	-	-	-	-		3.6	8.1
22	6.9	31	25	27	29	30	31	32	-	-	-	-	-		5.8	7.7
23	8.9	17	13	19	23	25	27	28	17	18	-	-	-		7.4	9.8
24	10.1	28	0	13	17	20	23	25	27	28	-	-	-		8.5	11.2

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	12.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	8.0	6.0	5.0	4.0
DBU	28	27	26	26	26	27	27	29	29	31	32	31

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	3.0	3.0	3.0	3.0	3.0	6.0	5.0	5.0	7.0	8.0	8.0	10.0
DBU	30	30	30	30	30	28	28	32	33	32	28	28

Table A.4 (22/40)

6

JULY 0 SUNSPOT NUMBER 10.0

MACTAN TO CUYOTO PRINCESA AZIMUTHS MILES KM.
10.16N - 123.58E 10.50N - 121.02E 277.92 97.46 175.6 282.6
MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	7.2	24	1	13	17	20	23	25	27	28	-	-	-		5.6	8.1
02	7.0	21	-6	10	14	18	21	23	25	27	-	-	-		5.8	9.1
03	6.9	19	-10	8	12	16	20	22	24	26	28	-	-		5.7	8.9
04	6.8	19	-11	7	12	16	19	22	24	26	-	-	-		5.7	8.9
05	6.8	19	-9	8	13	16	20	23	25	26	-	-	-		5.6	8.8
06	7.0	22	-4	11	15	18	22	24	26	27	-	-	-		5.7	8.9
07	7.4	25	3	14	18	21	24	26	27	28	-	-	-		6.0	9.4
08	7.8	23	12	19	22	25	27	28	29	4	-	-	-		6.4	9.9
09	8.2	31	21	25	27	29	30	31	5	5	-	-	-		6.7	10.4
10	8.4	6	29	31	32	32	33	27	6	6	-	-	-		5.8	10.0
11	8.0	6	30	31	32	29	29	28	6	-	-	-	-		5.5	9.6
12	7.0	6	30	31	28	28	28	6	-	-	-	-	-		4.8	8.4
13	5.8	6	30	31	28	6	6	-	-	-	-	-	-		4.0	7.0
14	5.0	5	30	27	27	6	-	-	-	-	-	-	-		3.7	6.0
15	4.4	5	30	31	5	-	-	-	-	-	-	-	-		3.3	5.3
16	4.0	31	30	31	-	-	-	-	-	-	-	-	-		2.9	4.7
17	3.7	31	30	31	-	-	-	-	-	-	-	-	-		2.7	4.4
18	3.5	31	30	5	5	-	-	-	-	-	-	-	-		2.6	4.8
19	3.0	30	30	31	32	33	-	-	-	-	-	-	-		2.3	4.1
20	2.5	30	30	31	32	33	33	33	-	-	-	-	-		1.9	3.5
21	3.0	30	30	31	32	33	33	33	34	34	-	-	-		2.2	4.1
22	4.7	30	27	29	30	31	32	32	33	33	-	-	-		3.8	5.3
23	6.5	28	19	23	26	27	29	30	31	-	-	-	-		5.2	7.3
24	7.3	26	9	17	21	24	26	27	29	-	-	-	-		5.8	8.2

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	10.0	10.0	12.0	10.0	10.0	10.0	10.0	9.0	8.0	7.0	5.0	4.0
DBU	28	27	28	26	26	27	28	29	31	33	32	31

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	4.0	3.0	4.0	4.0	4.0	3.0	6.0	8.0	10.0	10.0	9.0	9.0
DBU	31	30	31	31	31	30	33	33	34	33	31	29

Table A.4 (23/40)

OCTOBER 0 SUNSPOT NUMBER 100.0

MACTAN	TO CUYOTO PRINCESA	AZIMUTHS	MILES	KM.
10.16N - 123.58E	10.50N - 121.02E	277.92 97.46	175.6	282.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	12.5	14	-6	5	15	18	21	23	25	27	21	-	-		10.8	13.9
02	12.1	13	-15	-2	11	15	18	21	23	25	17	-	-		10.8	13.7
03	11.6	26	-21	-6	9	14	16	20	22	24	27	-	-		10.4	13.2
04	11.5	26	-22	-7	9	13	16	19	22	24	27	-	-		10.2	12.9
05	11.9	27	-20	-5	10	14	17	20	22	24	2	-	-		10.6	13.5
06	12.9	3	-13	0	12	16	19	22	24	26	21	4	-		10.8	15.5
07	13.6	4	-3	11	16	19	22	24	26	23	23	5	-		11.4	16.3
08	13.5	5	9	17	21	24	26	28	24	24	24	6	-		11.3	16.1
09	12.8	6	22	25	27	29	25	26	26	25	24	6	-		10.8	15.4
10	12.2	7	30	31	32	27	27	27	27	26	24	7	-		9.8	15.1
11	11.7	7	30	31	27	27	27	27	26	26	7	7	-		9.4	14.4
12	11.4	7	30	26	27	27	27	27	27	26	7	-	-		9.1	14.0
13	11.4	7	30	27	27	27	27	27	27	27	7	-	-		9.1	14.0
14	11.7	7	30	27	27	28	28	28	28	27	7	-	-		9.2	13.8
15	11.8	7	30	28	28	28	28	28	28	28	7	-	-		9.3	13.9
16	11.5	7	30	31	29	29	29	29	29	29	7	-	-		9.1	13.5
17	10.9	7	30	31	29	29	29	29	29	29	7	-	-		8.6	12.8
18	9.7	7	30	31	29	29	29	29	28	7	7	-	-		6.6	13.5
19	7.7	6	30	29	29	29	28	6	6	7	-	-	-		5.3	10.7
20	5.9	6	30	28	28	6	6	6	-	-	-	-	-		4.0	8.2
21	5.9	33	30	31	32	33	6	6	6	-	-	-	-		4.0	8.3
22	6.3	33	29	31	31	32	33	33	33	-	-	-	-		7.1	9.2
23	11.0	5	16	23	25	27	29	30	31	26	6	-	-		9.5	12.2
24	12.4	5	5	15	19	22	25	27	28	25	24	-	-		10.7	13.8

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	10.0	10.0	12.0	12.0	10.0	10.0	9.0	8.0	6.0	5.0	4.0	3.0
DBU	27	25	27	27	24	26	26	28	29	32	31	30

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	3.0	3.0	3.0	4.0	4.0	4.0	3.0	3.0	6.0	9.0	9.0	9.0
DBU	30	30	30	31	31	31	30	30	33	33	31	28

Table A.4 (24/40)

OCTOBER 0 SUNSPOT NUMBER 10.0

MACTAN	TO CUYOTO PRINCESA	AZIMUTHS	MILES	KM.
10.16N - 123.58E	10.50N - 121.02E	277.92 97.46	175.6	282.6

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	-	FOT	HPF
01	9.0	28	4	15	19	22	24	26	28	3	-	-	-		7.8	10.2
02	8.8	26	-3	12	16	19	22	24	26	27	-	-	-		7.8	9.9
03	8.5	24	-7	10	14	17	21	23	25	27	-	-	-		7.6	9.6
04	8.4	24	-8	9	14	17	20	23	25	26	-	-	-		7.5	9.5
05	8.9	25	-6	10	15	18	21	24	25	2	-	-	-		7.9	10.0
06	9.8	3	-1	13	17	20	23	25	27	3	4	-	-		8.4	11.6
07	10.5	4	7	16	20	23	25	27	24	23	4	-	-		9.0	12.5
08	10.6	5	17	21	24	26	28	26	26	25	5	-	-		9.1	12.6
09	10.4	15	25	27	29	27	27	27	27	26	17	-	-		8.9	12.4
10	10.1	17	30	31	28	29	29	28	28	26	17	-	-		7.6	11.7
11	9.6	17	30	31	28	28	28	28	28	17	-	-	-		7.2	11.1
12	9.1	17	30	28	28	28	28	28	27	17	-	-	-		6.8	10.5
13	8.8	17	30	28	28	28	28	28	17	17	-	-	-		6.6	10.2
14	8.5	17	30	28	28	29	28	28	17	17	-	-	-		6.5	10.4
15	7.8	17	30	28	29	29	28	17	17	17	-	-	-		5.9	9.6
16	6.9	17	30	29	29	29	28	17	-	-	-	-	-		5.3	8.5
17	6.5	17	30	29	29	29	17	17	-	-	-	-	-		4.9	7.9
18	5.9	16	30	29	29	16	17	17	-	-	-	-	-		3.9	8.2
19	4.5	16	30	28	16	16	-	-	-	-	-	-	-		3.0	6.3
20	3.2	31	30	16	-	-	-	-	-	-	-	-	-		2.1	4.4
21	3.6	31	30	31	16	-	-	-	-	-	-	-	-		2.4	5.0
22	5.9	16	30	31	32	16	-	-	-	-	-	-	-		5.1	6.7
23	8.2	15	22	25	28	29	27	26	16	-	-	-	-		7.1	9.3
24	9.1	14	13	19	23	25	27	28	24	5	-	-	-		7.8	10.3

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	9.0	10.0	10.0	10.0	9.0	9.0	8.0	7.0	5.0	4.0	4.0	3.0
DBU	28	27	27	26	25	27	27	28	29	31	31	30

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	5.0	6.0	8.0
DBU	30	30	30	30	30	30	30	30	31	32	29	28

Table A.4 (25/40)

1

JANUARY 0 SUNSPOT NUMBER 100.0

MACTAN	TO BUSUANGA RADAR	AZIMUTHS	MILES	KM.
10.16N - 123.58E	12.13N - 119.53E	296.75 115.97	306.5	493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	12.6	3	-25	-10	12	16	18	20	21	22	24	-	-	10.9	14.3
02	12.1	22	-38	-20	9	13	16	18	20	20	22	-	-	10.4	13.6
03	11.3	20	-46	-26	7	11	14	17	18	19	21	24	-	9.7	12.8
04	10.9	19	-48	-28	-13	11	14	16	18	18	20	24	-	9.4	12.3
05	10.8	19	-45	-25	-11	11	15	17	18	18	21	-	-	9.3	12.2
06	11.0	21	-35	-18	9	13	16	18	20	20	22	-	-	9.4	12.7
07	11.6	24	-22	-8	13	16	19	20	21	22	24	-	-	9.9	13.3
08	11.9	16	-5	15	18	20	22	23	23	24	16	-	-	10.1	13.7
09	11.8	17	19	21	23	24	25	26	27	25	17	-	-	10.1	13.6
10	11.6	18	25	26	27	28	29	26	26	26	13	13	-	9.1	14.3
11	11.3	13	25	26	27	28	26	26	26	26	13	-	-	8.8	13.9
12	11.0	13	25	26	26	26	26	26	26	26	13	-	-	8.6	13.5
13	10.5	13	25	26	26	26	26	26	26	26	13	-	-	8.2	13.0
14	10.1	13	25	25	26	26	26	26	26	25	13	-	-	7.7	12.2
15	9.4	13	25	26	26	26	26	26	26	13	-	-	-	7.3	11.4
16	8.7	13	25	26	26	26	27	26	13	13	-	-	-	6.7	10.6
17	8.1	13	25	26	26	27	27	26	13	13	-	-	-	6.3	9.8
18	7.6	13	25	26	26	27	27	13	13	13	-	-	-	5.2	9.5
19	6.6	12	25	26	26	26	13	13	-	-	-	-	-	4.6	8.3
20	5.3	28	25	26	27	28	29	29	30	30	-	-	-	3.6	6.7
21	4.9	27	25	26	27	28	29	29	30	30	30	30	-	3.4	6.1
22	6.5	29	25	26	27	28	29	29	30	30	30	30	-	5.7	7.4
23	9.6	27	17	20	22	23	24	25	26	27	28	29	-	8.3	10.9
24	11.9	26	-8	13	17	19	21	22	23	24	26	-	-	10.4	13.6

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	12.0	16.0	15.0	15.0	12.0	12.0	12.0	10.0	9.0	7.0	6.0	4.0
DBU	24	22	24	24	21	22	24	24	27	29	28	26

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	4.0	8.0	7.0	7.0	7.0	6.0	4.0	10.0	15.0	15.0	15.0	12.0
DBU	26	26	26	27	27	27	26	30	30	30	29	26

Table A.4 (26/40)

2

JANUARY 0 SUNSPOT NUMBER 10.0

MACTAN	TO BUSUANGA RADAR	AZIMUTHS	MILES	KM.
10.16N - 123.58E	12.13N - 119.53E	296.75 115.97	306.5	493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	8.7	21	-11	12	16	19	21	22	22	23	-	-	-	7.6	10.2
02	8.2	18	-21	-7	13	17	19	19	20	22	24	-	-	7.0	9.4
03	7.7	15	-27	-11	12	15	17	16	18	20	23	-	-	6.7	8.9
04	7.6	14	-29	-13	11	15	17	15	18	20	23	-	-	6.9	8.8
05	7.9	16	-26	-11	12	15	18	16	19	21	23	-	-	6.9	9.0
06	8.4	19	-19	-6	14	17	19	20	20	22	-	-	-	7.3	9.6
07	9.1	23	-9	13	17	19	21	22	22	10	-	-	-	7.9	10.4
08	9.6	11	4	18	20	22	23	24	24	11	-	-	-	8.3	10.9
09	9.6	12	21	23	24	25	27	26	26	12	-	-	-	8.4	11.0
10	9.2	13	25	26	27	28	27	27	27	13	-	-	-	7.3	11.1
11	8.7	13	25	26	27	27	27	27	13	13	-	-	-	6.9	10.4
12	8.1	13	25	26	27	27	27	27	13	13	-	-	-	6.4	9.7
13	7.3	13	25	26	27	27	27	13	13	-	-	-	-	5.8	8.8
14	6.5	12	25	26	26	27	13	13	-	-	-	-	-	4.6	8.2
15	5.5	12	25	26	26	12	13	-	-	-	-	-	-	3.9	6.9
16	4.6	12	25	26	12	12	-	-	-	-	-	-	-	3.3	5.6
17	4.1	27	25	26	12	-	-	-	-	-	-	-	-	2.9	5.3
18	4.0	26	25	26	12	-	-	-	-	-	-	-	-	2.8	5.5
19	3.4	26	25	12	12	-	-	-	-	-	-	-	-	2.4	4.7
20	2.6	24	25	-	-	-	-	-	-	-	-	-	-	1.8	3.5
21	2.5	24	25	26	27	28	29	29	-	-	-	-	-	1.7	3.4
22	4.1	27	25	26	27	28	29	29	30	30	-	-	-	3.6	4.8
23	6.6	25	20	22	23	24	26	27	27	28	-	-	-	5.8	7.8
24	8.4	24	2	17	20	22	23	23	25	11	-	-	-	7.4	9.9

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	10.0	12.0	12.0	12.0	12.0	10.0	9.0	9.0	7.0	6.0	5.0	5.0
DBU	23	24	23	23	23	22	22	24	27	28	27	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	7.0	6.0	4.0	4.0	4.0	4.0	3.0	3.0	8.0	10.0	10.0	9.0
DBU	27	27	26	26	26	26	25	25	29	30	28	25

Table A.4 (27/40)

3

APRIL 0 SUNSPOT NUMBER 100.0

MACTAN TO BUSUANGA RADAR AZIMUTHS MILES KM.

10.16N - 123.58E 12.13N - 119.53E 296.75 115.97 306.5 493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	12.7	23	-38	-20	9	13	16	18	20	21	22	25	-	11.0	14.1
02	12.0	20	-53	-31	5	9	13	16	18	19	20	23	-	10.7	13.6
03	11.7	18	-62	-38	2	7	12	15	17	18	19	23	-	10.4	13.2
04	11.8	18	-65	-40	1	7	11	14	16	18	18	22	-	10.5	13.3
05	12.1	19	-61	-37	-19	8	12	15	17	18	19	23	-	10.7	13.6
06	12.5	21	-50	-29	5	10	14	16	18	19	20	24	-	10.5	15.0
07	13.3	24	-35	-18	10	13	16	18	20	21	22	-1	-	11.2	16.0
08	14.0	-1	-16	-3	15	18	20	21	22	23	25	0	-	11.7	16.8
09	14.0	0	5	18	20	22	23	24	25	26	25	0	-	11.8	16.8
10	13.6	1	24	25	27	28	28	29	26	26	25	1	-	10.9	16.8
11	13.1	1	25	26	27	28	26	26	26	26	25	1	-	10.4	16.1
12	12.6	1	25	26	27	26	26	26	26	26	25	1	-	10.1	15.5
13	12.6	12	25	26	25	26	26	26	26	26	25	14	-	10.1	15.5
14	13.2	14	25	26	25	26	26	26	26	26	26	14	-	10.4	15.5
15	13.7	13	25	26	26	26	26	27	27	27	26	14	-	10.9	16.2
16	13.5	13	25	26	27	27	27	27	27	27	27	14	-	10.7	16.0
17	12.3	13	25	26	27	27	27	27	27	27	27	14	-	9.7	14.5
18	10.6	13	25	26	27	27	27	27	27	27	13	14	-	7.2	14.7
19	8.8	13	25	26	27	27	27	27	13	13	13	-	-	6.0	12.2
20	7.5	13	25	26	27	28	29	13	13	13	-	-	-	5.1	10.4
21	7.5	29	25	26	27	28	29	29	30	30	-	-	-	5.1	10.4
22	9.3	29	22	24	25	26	27	28	28	29	29	-	-	8.0	10.4
23	11.7	27	0	17	19	21	23	24	24	25	27	-	-	10.1	13.0
24	12.9	25	-20	-7	14	17	19	21	22	23	24	-	-	11.1	14.4

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	12.0	12.0	10.0	8.0	6.0	5.0
DBU	25	23	23	22	23	24	22	25	26	29	28	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	4.0	4.0	10.0	5.0	5.0	5.0	7.0	7.0	10.0	12.0	12.0	12.0
DBU	26	26	27	27	27	27	27	29	30	29	27	24

Table A.4 (28/40)

4

APRIL 0 SUNSPOT NUMBER 10.0

MACTAN TO BUSUANGA RADAR AZIMUTHS MILES KM.

10.16N - 123.58E 12.13N - 119.53E 296.75 115.97 306.5 493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	8.8	19	-21	-7	13	16	19	20	20	21	24	-	-	7.6	10.0
02	8.5	16	-32	-15	10	14	17	18	17	20	23	-	-	7.6	9.6
03	8.5	14	-39	-19	8	13	15	16	16	18	22	-	-	7.6	9.6
04	8.6	14	-41	-20	8	12	15	16	15	18	21	-	-	7.6	9.7
05	8.8	15	-38	-18	8	13	16	17	16	18	22	-	-	7.8	9.9
06	9.4	19	-30	-13	10	14	17	19	20	20	23	-	-	8.1	11.2
07	10.4	23	-18	-5	14	17	19	21	22	22	9	-	-	9.0	12.4
08	11.4	10	-4	15	18	20	22	23	24	25	10	-	-	9.8	13.6
09	11.9	11	16	21	23	24	25	26	27	26	25	-	-	10.3	14.2
10	11.8	11	25	26	27	28	29	29	27	27	11	-	-	8.9	13.7
11	11.1	11	25	26	27	28	29	27	27	27	11	-	-	8.3	12.9
12	10.0	11	25	26	27	28	27	27	27	26	-	-	-	7.5	11.6
13	9.2	11	25	26	27	28	27	27	26	11	-	-	-	6.9	10.6
14	8.7	11	25	26	27	26	26	26	11	11	-	-	-	6.6	10.7
15	8.4	11	25	26	27	26	26	26	11	11	-	-	-	6.4	10.3
16	8.0	11	25	26	27	27	27	11	11	11	-	-	-	6.0	9.8
17	7.5	11	25	26	27	27	27	11	11	-	-	-	-	5.7	9.2
18	6.6	11	25	26	27	28	11	11	11	11	-	-	-	4.4	9.3
19	5.2	28	25	26	27	28	29	29	-	-	-	-	-	3.4	7.3
20	3.9	26	25	26	27	28	29	29	30	30	-	-	-	2.5	5.4
21	4.1	27	25	26	27	28	29	29	30	30	30	-	-	2.7	5.6
22	6.3	28	24	25	26	27	28	29	29	29	30	-	-	5.4	7.1
23	8.4	25	8	19	22	23	24	25	26	27	28	29	-	7.3	9.5
24	9.1	23	-7	14	17	20	21	22	23	24	26	-	-	7.8	10.3

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	12.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	9.0	8.0	7.0	6.0
DBU	24	23	22	21	22	23	22	25	27	29	29	28

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	5.0	5.0	5.0	7.0	6.0	8.0	10.0	12.0	12.0	15.0	12.0
DBU	28	27	27	27	27	28	29	30	30	30	29	26

Table A.4 (29/40)

5

JULY 0 SUNSPOT NUMBER 100.0

MACTAN TO BUSUANGA RADAR AZIMUTHS MILES KM.

10.16N - 123.58E 12.13N - 119.53E 296.75 115.97 306.5 493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	10.5	19	-39	-19	8	12	16	18	19	19	22	25	-	8.8	11.7
02	10.1	16	-52	-31	5	10	13	16	17	16	20	23	-	8.6	13.0
03	10.1	15	-61	-37	2	8	12	15	16	14	19	23	-	8.5	12.9
04	10.2	15	-63	-39	2	7	11	14	16	15	18	23	-	8.7	13.1
05	10.4	16	-59	-36	3	8	12	15	16	16	19	23	-	8.8	13.3
06	10.5	18	-50	-29	5	10	14	16	18	17	20	24	-	8.5	13.5
07	10.9	21	-36	-17	9	13	16	18	19	19	22	25	-	8.8	13.9
08	11.3	24	-16	-5	14	17	19	21	21	22	24	7	-	9.2	14.5
09	11.6	27	1	17	19	21	22	23	24	25	27	8	-	9.4	14.8
10	11.6	9	22	23	25	26	27	28	28	25	9	-	-	6.9	14.1
11	11.3	12	25	26	27	28	29	26	26	26	13	-	-	8.7	13.8
12	10.6	13	25	26	27	26	26	26	26	25	13	-	-	8.2	13.0
13	9.9	13	25	26	27	26	26	26	26	14	14	-	-	7.6	12.1
14	9.4	14	25	26	27	26	26	26	25	14	14	-	-	7.5	11.9
15	9.3	14	25	26	27	26	26	26	25	14	14	-	-	7.3	11.7
16	9.0	14	25	26	27	26	26	26	25	14	14	-	-	7.1	11.4
17	8.6	14	25	26	27	26	26	26	14	14	-	-	-	6.8	10.9
18	8.2	14	25	26	26	26	26	26	14	14	14	-	-	5.1	11.8
19	7.5	14	25	26	26	26	26	14	14	14	-	-	-	4.7	10.8
20	6.6	29	25	26	27	28	13	14	14	14	-	-	-	4.2	9.5
21	6.5	29	25	26	27	28	29	29	30	30	-	-	-	4.1	9.3
22	7.7	27	20	22	24	25	26	27	28	28	29	-	-	6.5	8.6
23	9.5	24	-3	15	18	20	22	23	24	25	26	-	-	8.0	10.6
24	10.5	22	-22	-8	13	16	19	20	21	22	24	26	-	8.9	11.7

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0	12.0	9.0	7.0	5.0
DBU	25	23	23	23	23	24	25	24	27	28	29	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	5.0	5.0	5.0	7.0	7.0	6.0	10.0	12.0	12.0	15.0
DBU	27	27	27	27	27	26	26	28	30	29	26	26

Table A.4 (30/40)

6

JULY 0 SUNSPOT NUMBER 10.0

MACTAN TO BUSUANGA RADAR AZIMUTHS MILES KM.

10.16N - 123.58E 12.13N - 119.53E 296.75 115.97 306.5 493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	7.5	16	-22	-8	13	16	18	17	20	21	24	26	-	6.3	8.4
02	7.2	12	-32	-14	10	14	15	15	17	20	23	25	-	6.5	9.3
03	7.0	9	-39	-19	9	13	13	13	16	18	22	25	-	6.6	9.1
04	7.0	9	-40	-19	8	12	12	13	16	18	22	25	-	6.7	9.0
05	7.1	11	-37	-18	9	13	13	13	16	19	22	25	-	6.7	9.2
06	7.3	13	-30	-13	11	14	16	15	18	20	23	25	-	6.6	9.3
07	7.7	17	-19	10	14	17	19	18	20	22	24	-	-	6.3	9.8
08	8.2	22	-6	14	18	20	21	21	23	24	26	-	-	6.8	10.5
09	6.8	26	17	20	22	23	24	25	26	27	28	-	-	7.2	11.2
10	9.3	29	24	25	26	27	28	29	29	29	-	-	-	6.4	11.2
11	9.1	17	25	26	27	28	29	29	27	18	-	-	-	6.3	10.9
12	8.0	17	25	26	27	28	27	27	17	-	-	-	-	5.5	9.6
13	6.6	17	25	26	27	26	17	17	-	-	-	-	-	4.5	7.9
14	5.6	28	25	26	27	17	-	-	-	-	-	-	-	4.1	6.7
15	4.9	27	25	26	27	29	-	-	-	-	-	-	-	3.7	5.9
16	4.4	27	25	26	27	28	-	-	-	-	-	-	-	3.3	5.3
17	4.1	27	25	26	27	29	-	-	-	-	-	-	-	3.1	5.0
18	4.0	26	25	26	27	-	-	-	-	-	-	-	-	3.0	5.5
19	3.5	26	25	26	27	28	-	-	-	-	-	-	-	2.6	4.8
20	3.0	25	25	26	27	28	29	29	30	30	-	-	-	2.2	4.1
21	3.5	26	25	26	27	28	29	29	30	30	30	-	-	2.6	4.7
22	5.4	25	22	24	25	26	27	28	28	29	29	-	-	4.3	6.0
23	7.2	23	6	19	21	22	23	24	25	26	28	-	-	5.8	8.1
24	7.8	20	-9	13	17	19	21	21	22	24	26	-	-	6.2	8.7

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	12.0	12.0	12.0	10.0	8.0	6.0
DBU	26	25	25	25	25	25	24	26	28	29	29	28

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	6.0	6.0	6.0	5.0	6.0	10.0	12.0	12.0	12.0	12.0
DBU	27	27	28	28	28	27	28	30	30	29	28	26

Table A.4 (31/40)

7

OCTOBER 0 SUNSPOT NUMBER 100.0

MACTAN	TO BUSUANGA RADAR	AZIMUTHS	MILES	KM.
10.16N - 123.58E	12.13N - 119.53E	296.75 115.97	306.5	493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	13.2	24	-31	-15	11	14	17	19	21	22	23	16	-	11.4	14.7
02	12.6	22	-45	-25	7	11	15	17	19	20	21	24	-	11.2	14.2
03	12.0	20	-53	-31	5	9	13	16	18	19	20	23	-	10.7	13.6
04	11.8	19	-56	-33	-16	9	13	15	17	18	19	23	-	10.5	13.4
05	12.3	20	-52	-31	-15	10	13	16	18	19	20	24	-	10.9	13.9
06	13.4	23	-42	-23	8	12	15	17	19	20	21	16	-	11.3	16.1
07	14.2	17	-27	-12	12	15	18	20	21	22	23	17	-	11.9	17.0
08	14.1	17	-9	13	17	19	21	22	23	24	24	1	-	11.9	16.9
09	13.6	2	17	20	22	23	24	25	26	25	24	2	-	11.4	16.3
10	13.0	2	25	26	27	28	29	26	26	26	25	3	-	10.4	16.0
11	12.6	2	25	26	27	26	26	26	26	26	25	3	-	10.1	15.5
12	12.4	2	25	26	27	26	26	26	26	26	25	3	-	9.9	15.2
13	12.5	12	25	26	27	26	26	26	26	26	25	13	-	10.0	15.4
14	13.0	13	25	26	27	26	26	27	27	27	26	13	-	10.3	15.4
15	13.3	13	25	26	27	28	27	27	27	27	27	13	-	10.5	15.7
16	13.1	13	25	26	27	28	27	27	27	27	27	13	-	10.3	15.5
17	12.5	13	25	26	27	28	28	28	28	28	27	13	-	9.8	14.7
18	11.1	13	25	26	27	28	28	28	28	27	13	13	-	7.5	15.4
19	8.7	13	25	26	27	27	27	27	13	13	13	-	-	5.9	12.1
20	6.6	12	25	26	27	26	12	13	13	-	-	-	-	4.5	9.1
21	6.6	29	25	26	27	28	29	13	13	-	-	-	-	4.5	9.2
22	9.2	29	24	26	27	28	28	29	29	30	-	-	-	7.9	10.2
23	12.1	28	6	19	21	22	24	24	25	26	28	-	-	10.4	13.4
24	13.3	11	-13	-2	15	18	20	22	23	23	25	12	-	11.5	14.8

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	12.0	15.0	15.0	15.0	15.0	12.0	12.0	10.0	9.0	7.0	5.0	5.0
DBU	23	24	23	23	24	21	23	24	26	29	27	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	6.0	6.0	6.0	6.0	5.0	5.0	7.0	10.0	12.0	12.0
DBU	27	27	28	28	28	28	27	27	29	30	28	25

Table A.4 (32/40)

8

OCTOBER 0 SUNSPOT NUMBER 10.0

MACTAN	TO BUSUANGA RADAR	AZIMUTHS	MILES	KM.
10.16N - 123.58E	12.13N - 119.53E	296.75 115.97	306.5	493.2

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	9.7	22	-15	-3	15	18	20	21	22	23	25	-	-	8.3	10.9
02	9.3	19	-26	-11	12	15	18	19	19	21	23	-	-	8.2	10.5
03	9.0	17	-33	-15	10	14	17	18	17	19	23	-	-	8.0	10.1
04	8.9	17	-34	-16	10	14	16	18	17	19	22	-	-	7.9	10.0
05	9.4	19	-32	-14	10	14	17	19	19	20	23	-	-	8.4	10.7
06	10.5	22	-24	-10	12	16	18	20	21	22	24	-	-	9.0	12.5
07	11.3	9	-13	12	15	18	20	22	23	23	9	-	-	9.7	13.5
08	11.5	10	1	17	19	21	23	24	24	25	10	-	-	9.9	13.7
09	11.4	11	20	22	24	25	26	27	26	26	11	-	-	9.8	13.5
10	11.1	11	25	26	27	28	27	27	27	27	11	-	-	8.4	12.9
11	10.7	11	25	26	27	27	27	27	27	27	11	-	-	8.0	12.4
12	10.2	11	25	26	27	27	27	27	27	26	11	-	-	7.6	11.8
13	9.9	11	25	26	27	27	27	27	27	11	-	-	-	7.4	11.5
14	9.6	11	25	26	27	27	27	27	27	11	11	-	-	7.3	11.8
15	9.0	11	25	26	27	27	27	27	26	11	-	-	-	6.8	11.0
16	8.1	11	25	26	27	27	27	27	11	11	-	-	-	6.2	10.0
17	7.7	11	25	26	27	27	27	11	11	-	-	-	-	5.8	9.4
18	6.9	11	25	26	27	27	11	11	11	11	-	-	-	4.6	9.7
19	5.3	10	25	26	26	10	11	11	-	-	-	-	-	3.5	7.4
20	3.7	26	25	26	10	-	-	-	-	-	-	-	-	2.4	5.1
21	4.1	26	25	26	27	10	-	-	-	-	-	-	-	2.7	5.7
22	6.7	29	25	26	27	28	29	-	-	-	-	-	-	5.7	7.6
23	9.2	10	19	21	23	24	25	26	25	10	-	-	-	7.9	10.4
24	10.0	25	-2	16	19	21	22	23	24	25	-	-	-	8.6	11.3

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	12.0	12.0	12.0	12.0	12.0	12.0	10.0	10.0	8.0	6.0	5.0	5.0
DBU	25	23	23	22	23	24	23	25	27	28	27	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	5.0	5.0	5.0	6.0	4.0	4.0	5.0	7.0	8.0	10.0
DBU	27	27	27	27	27	27	26	26	27	29	26	25

Table A.4 (33/40)

1

JANUARY 0 SUNSPOT NUMBER 100.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS		MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56	81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	12.4	22	-33	-12	11	14	17	19	20	21	22	24	-	10.8	14.1
02	11.8	19	-48	-28	7	11	14	17	18	20	20	23	-	10.1	13.3
03	11.1	17	-57	-35	-14	9	13	15	17	18	18	22	-	9.5	12.5
04	10.5	15	-60	-37	-15	9	12	15	17	17	18	22	-	9.0	11.9
05	10.6	16	-56	-34	-13	9	13	16	17	17	19	22	-	9.1	12.0
06	10.9	18	-46	-27	-9	11	15	17	19	19	20	23	-	9.3	12.6
07	11.4	21	-31	-10	11	15	17	19	20	21	22	24	-	9.7	13.2
08	11.7	24	-12	13	16	19	20	21	22	23	24	-	-	10.0	13.5
09	11.7	27	8	19	21	23	23	24	25	26	27	-	-	9.9	13.4
10	11.4	11	23	25	26	27	28	28	28	25	11	-	-	8.9	14.1
11	11.2	10	23	25	26	27	28	25	25	25	11	-	-	8.7	13.7
12	10.8	10	23	25	26	25	25	25	25	25	11	-	-	8.4	13.3
13	10.4	10	24	25	25	25	25	26	25	25	11	-	-	8.1	12.8
14	10.0	10	24	25	25	25	26	26	26	25	11	-	-	7.7	12.1
15	9.5	10	24	25	25	26	26	26	26	10	11	-	-	7.3	11.5
16	8.9	10	24	25	25	26	26	26	10	10	-	-	-	6.9	10.8
17	8.4	10	24	25	26	26	26	26	10	10	-	-	-	6.4	10.1
18	7.8	10	24	25	26	26	26	10	10	10	-	-	-	5.4	9.9
19	6.9	10	24	25	26	26	25	10	10	-	-	-	-	4.8	8.7
20	5.7	27	24	25	26	27	28	28	28	29	29	29	-	3.9	7.1
21	5.2	26	24	25	26	27	28	28	28	29	29	29	-	3.6	6.6
22	6.8	27	24	25	26	27	28	28	28	29	29	29	-	5.9	7.8
23	9.8	25	16	19	21	22	23	24	25	25	27	28	-	8.5	11.1
24	11.9	24	-14	12	15	18	20	21	22	23	24	26	-	10.4	13.6

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0	12.0	9.0	7.0	5.0
DBU	24	23	22	22	22	23	24	24	27	28	28	26

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	8.0	8.0	7.0	7.0	7.0	5.0	15.0	15.0	15.0	15.0	15.0
DBU	26	26	26	26	26	26	26	29	29	29	26	26

Table A.4 (34/40)

2

JANUARY 0 SUNSPOT NUMBER 10.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS		MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56	81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	8.7	19	-17	11	14	17	19	21	20	21	24	-	-	7.7	10.3
02	8.1	15	-29	-9	11	15	17	18	17	19	22	25	-	7.1	9.3
03	7.5	11	-36	-13	10	14	16	13	16	18	21	24	-	7.5	8.7
04	7.7	.	-38	-14	9	13	16	13	15	18	21	24	-	7.7	8.5
05	7.7	12	-35	-13	10	14	16	13	16	18	21	24	-	7.7	8.8
06	8.2	16	-27	-8	12	15	18	19	18	20	22	-	-	7.3	9.4
07	9.0	20	-16	-2	15	18	20	21	21	22	24	-	-	7.8	10.3
08	9.6	24	0	16	19	21	22	23	23	24	-	-	-	8.3	10.9
09	9.7	10	20	22	23	24	25	26	26	10	-	-	-	8.5	11.1
10	9.5	11	24	25	26	27	28	28	26	11	-	-	-	7.5	11.4
11	9.1	11	24	25	26	27	28	26	26	11	-	-	-	7.2	10.9
12	8.6	10	24	25	26	27	26	26	11	11	-	-	-	6.8	10.3
13	7.8	10	24	25	26	26	26	10	11	-	-	-	-	6.1	9.3
14	6.9	10	24	25	26	26	10	10	11	-	-	-	-	4.9	8.7
15	5.9	10	24	25	26	10	10	-	-	-	-	-	-	4.2	7.5
16	5.0	26	24	25	26	10	-	-	-	-	-	-	-	3.5	6.3
17	4.4	25	24	25	26	-	-	-	-	-	-	-	-	3.2	5.6
18	4.2	25	24	25	10	10	-	-	-	-	-	-	-	3.0	5.8
19	3.7	24	24	25	10	-	-	-	-	-	-	-	-	2.6	5.1
20	2.8	23	23	25	26	27	28	-	-	-	-	-	-	1.9	3.8
21	2.7	22	23	25	26	27	28	28	28	29	-	-	-	1.9	3.7
22	4.4	25	24	25	26	27	28	28	28	29	29	-	-	3.8	5.2
23	7.0	24	19	21	22	24	24	25	26	27	27	-	-	6.1	8.2
24	8.6	22	-2	15	18	20	22	23	23	24	25	-	-	7.6	10.1

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	12.0	15.0	15.0	15.0	15.0	12.0	12.0	10.0	9.0	8.0	7.0	6.0
DBU	24	25	24	24	24	22	24	24	26	28	28	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	7.0	6.0	5.0	5.0	5.0	4.0	4.0	7.0	10.0	12.0	12.0	12.0
DBU	26	26	26	26	26	25	25	28	29	29	27	25

Table A.4 (35/40)

3

APRIL 0 SUNSPOT NUMBER 100.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS		MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56	81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	12.9	21	-47	-27	7	11	14	17	19	20	21	23	-	11.1	14.4
02	12.1	18	-63	-39	-16	8	12	15	17	18	18	22	-	10.7	13.6
03	11.6	15	-74	-47	-21	5	10	13	16	17	16	21	-	10.3	13.1
04	11.4	15	-77	-50	-22	5	9	13	15	17	16	20	-	10.2	12.9
05	11.8	16	-73	-46	-20	5	10	13	16	17	16	21	-	10.5	13.3
06	12.3	18	-62	-38	-15	8	12	15	17	18	19	22	-	10.4	14.8
07	13.2	22	-44	-25	8	12	15	17	19	20	21	23	-	11.1	15.8
08	13.8	24	-23	-6	13	16	18	20	21	22	23	25	-	11.6	16.6
09	13.9	15	0	17	19	21	22	23	24	24	26	15	-	11.7	16.7
10	13.5	16	22	24	25	26	27	27	28	28	25	11	-	10.8	16.6
11	13.0	11	23	25	26	27	28	28	25	25	25	11	-	10.4	16.0
12	12.5	11	23	25	26	27	25	25	25	25	25	11	-	10.0	15.4
13	12.4	11	23	25	26	25	25	25	25	25	25	11	-	9.9	15.2
14	12.9	11	23	25	25	25	25	26	26	26	25	11	-	10.2	15.2
15	13.6	11	24	25	25	26	26	26	26	26	26	11	-	10.7	16.0
16	13.6	11	24	25	26	26	26	26	26	26	26	11	-	10.7	16.0
17	12.5	11	24	25	26	26	26	27	27	27	26	11	-	9.9	14.8
18	11.0	11	24	25	26	26	26	27	27	27	11	11	-	7.5	15.2
19	9.2	28	24	25	26	27	28	28	28	11	11	-	-	6.3	12.9
20	7.8	28	24	25	26	27	28	28	28	29	29	29	-	5.3	10.9
21	7.8	28	24	25	26	27	28	28	28	29	29	29	-	5.3	10.8
22	9.7	28	21	23	24	25	26	27	27	28	28	29	-	8.3	10.8
23	12.2	26	-2	16	18	20	22	23	24	24	25	27	-	10.5	13.5
24	13.3	24	-26	-6	12	15	18	20	21	22	23	25	-	11.5	14.8

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0	10.0	8.0	6.0
DBU	23	22	21	20	21	22	23	25	26	26	28	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	9.0	10.0	10.0	10.0	9.0	9.0	15.0	15.0	15.0	15.0	15.0
DBU	26	26	26	26	27	27	28	29	29	29	27	25

Table A.4 (36/40)

4

APRIL 0 SUNSPOT NUMBER 10.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS		MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56	81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	9.1	18	-28	-9	12	15	18	19	20	19	22	25	-	7.8	10.3
02	8.6	14	-40	-16	8	13	16	17	15	17	21	24	-	7.7	9.7
03	8.5	11	-48	-20	6	11	14	16	13	16	20	23	-	7.5	9.6
04	8.5	11	-51	-21	6	10	14	16	13	15	19	23	-	7.5	9.6
05	8.6	12	-48	-20	6	11	14	17	13	16	20	23	-	7.7	9.8
06	9.3	16	-39	-15	8	13	16	18	19	17	21	24	-	8.0	11.0
07	10.3	20	-26	-8	12	15	18	20	21	21	22	-	-	8.9	12.3
08	11.3	24	-10	13	16	19	21	22	23	23	25	-	-	9.7	13.5
09	11.9	9	17	19	21	23	24	24	25	26	24	-	-	10.2	14.2
10	12.0	9	24	25	26	27	28	28	28	29	26	-	-	9.0	13.9
11	11.6	9	24	25	26	27	28	28	27	27	9	-	-	8.7	13.4
12	10.7	9	24	25	26	27	28	26	26	26	9	-	-	8.0	12.4
13	9.8	9	24	25	26	27	26	26	26	9	-	-	-	7.4	11.4
14	9.3	9	24	25	26	26	26	26	26	9	9	-	-	7.1	11.5
15	9.0	9	24	25	26	27	28	26	26	9	-	-	-	6.8	11.1
16	8.5	28	24	25	26	27	28	28	28	29	-	-	-	6.5	10.5
17	7.9	28	24	25	26	27	28	28	28	29	29	-	-	6.0	9.7
18	7.0	28	24	25	26	27	28	28	28	29	29	29	-	4.6	9.8
19	5.5	27	24	25	26	27	28	28	28	29	29	29	-	3.7	7.8
20	4.1	25	24	25	26	27	28	28	28	29	29	29	-	2.7	5.7
21	4.3	25	24	25	26	27	28	28	28	29	29	29	-	2.8	6.0
22	6.6	27	23	24	25	26	27	27	28	28	29	29	-	5.7	7.4
23	8.9	24	5	18	21	22	23	24	24	25	27	28	-	7.7	10.1
24	9.6	22	-12	13	16	18	20	22	22	22	24	26	-	8.3	10.8

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	12.0	12.0	10.0	10.0	8.0	7.0
DBU	25	24	23	23	23	24	22	25	26	29	28	28

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	5.0	7.0	10.0	12.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
DBU	27	26	28	29	29	29	29	29	29	29	28	26

Table A.4 (37/40)

5

JULY 0 SUNSPOT NUMBER 100.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56 81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	11.0	18	-47	-27	7	11	14	17	19	20	20	23	-	9.3	12.2
02	10.5	15	-62	-38	-16	8	12	15	17	17	18	22	-	8.9	13.5
03	10.3	12	-72	-45	-20	6	10	14	16	16	16	21	-	8.8	13.2
04	10.3	12	-75	-48	-21	5	10	13	15	15	16	21	-	8.8	13.2
05	10.4	13	-71	-45	-19	6	10	14	16	16	17	21	-	8.8	13.3
06	10.5	15	-60	-37	-15	8	12	15	17	17	18	22	-	8.5	13.5
07	10.9	18	-45	-25	8	12	15	17	19	19	20	23	-	8.8	14.0
08	11.4	22	-25	-7	13	16	18	20	21	21	23	25	-	9.2	14.5
09	11.6	25	-2	16	18	20	22	23	23	24	25	27	-	9.4	14.9
10	11.7	28	21	22	24	24	25	26	27	27	28	-	-	9.0	14.3
11	11.5	10	24	25	26	27	28	28	28	26	10	-	-	8.9	14.0
12	11.0	10	23	25	26	27	25	26	25	25	10	-	-	8.4	13.4
13	10.3	10	23	25	26	25	25	25	25	25	10	-	-	7.9	12.5
14	9.8	10	23	25	26	25	25	25	25	10	10	-	-	7.8	12.4
15	9.7	10	23	25	26	25	25	26	25	10	10	-	-	7.6	12.2
16	9.5	10	24	25	26	25	26	26	26	10	10	-	-	7.5	11.9
17	9.1	10	24	25	26	26	26	26	26	10	10	-	-	7.2	11.5
18	8.6	10	24	25	25	26	26	26	10	10	10	-	-	5.4	12.3
19	7.8	10	24	25	25	26	26	10	10	10	10	-	-	4.9	11.2
20	6.8	27	24	25	26	27	28	28	28	10	-	-	-	4.3	9.8
21	6.6	27	24	25	26	27	28	28	28	29	29	-	-	4.2	9.5
22	8.0	26	20	22	23	24	25	26	26	27	28	-	-	6.7	8.9
23	10.0	23	-4	14	17	20	21	22	23	23	25	-	-	8.4	11.1
24	11.1	21	-28	-9	12	15	18	19	21	22	22	25	-	9.3	12.3

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0	9.0	6.0
DBU	23	22	21	21	21	22	23	25	27	28	28	27

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	5.0	5.0	5.0	8.0	7.0	9.0	12.0	12.0	12.0	15.0
DBU	26	26	26	26	26	26	26	28	29	28	25	25

Table A.4 (38/40)

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JULY 0 SUNSPOT NUMBER 10.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56 81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB
ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB
FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	7.8	14	-28	-9	12	15	18	15	17	19	22	25	-	6.9	8.7
02	7.4	10	-39	-15	9	13	15	12	15	17	21	24	-	7.2	9.6
03	7.3	7	-47	-19	7	12	14	10	13	16	20	23	-	7.3	9.4
04	7.4	6	-49	-20	7	11	13	10	13	16	19	23	-	7.4	9.3
05	7.4	7	-46	-19	7	12	14	10	14	16	20	23	-	7.4	9.3
06	7.5	10	-38	-14	9	13	16	12	15	18	21	24	-	7.3	9.3
07	7.8	15	-26	-8	12	16	18	15	18	20	22	25	-	6.9	9.9
08	8.3	20	-11	13	16	19	20	21	21	22	24	26	-	6.8	10.5
09	8.9	24	5	18	21	22	23	24	24	25	27	-	-	7.3	11.3
10	9.5	28	23	24	25	26	27	27	28	28	29	-	-	6.6	11.4
11	9.6	28	24	25	26	27	28	28	28	10	-	-	-	6.6	11.5
12	8.6	9	24	25	26	27	28	26	10	10	-	-	-	6.0	10.4
13	7.2	9	24	25	26	27	26	9	-	-	-	-	-	5.0	8.6
14	6.1	27	24	25	26	27	9	-	-	-	-	-	-	4.5	7.4
15	5.4	26	24	25	26	27	-	-	-	-	-	-	-	4.0	6.5
16	4.8	26	24	25	26	27	-	-	-	-	-	-	-	3.6	5.8
17	4.5	25	24	25	26	27	-	-	-	-	-	-	-	3.3	5.4
18	4.3	25	24	25	26	27	28	28	-	-	-	-	-	3.2	5.8
19	3.7	24	24	25	26	27	28	28	28	29	29	-	-	2.8	5.1
20	3.1	23	24	25	26	27	28	28	28	29	29	29	-	2.3	4.2
21	3.5	24	24	25	26	27	28	28	28	29	29	29	-	2.6	4.8
22	5.5	24	22	23	24	25	26	27	27	28	28	29	-	4.4	6.1
23	7.5	22	3	18	20	22	23	23	24	25	26	27	-	6.0	8.4
24	8.1	19	-13	12	15	18	20	21	21	22	24	26	-	6.5	9.1

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0	12.0	9.0	7.0
DBU	25	24	23	23	23	24	25	26	27	29	28	28

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	6.0	6.0	6.0	6.0	6.0	8.0	12.0	15.0	15.0	15.0	15.0	15.0
DBU	27	27	27	27	27	28	29	29	29	29	27	26

Table A.4 (39/40)

7

OCTOBER 0 SUNSPOT NUMBER 100.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56	81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	13.3	22	-39	-21	9	13	16	18	19	21	22	24	-	11.4	14.7
02	12.6	19	-55	-33	-13	9	13	16	18	19	20	22	-	11.2	14.2
03	12.0	17	-65	-41	-17	7	11	14	17	18	17	21	-	10.6	13.5
04	11.7	16	-68	-43	-18	7	11	14	16	18	17	21	-	10.4	13.3
05	12.2	18	-64	-40	-17	7	11	14	17	18	18	21	-	10.9	13.8
06	13.3	21	-53	-32	-12	10	13	16	18	19	21	22	-	11.1	15.9
07	14.1	23	-37	-14	10	13	16	18	20	21	22	24	-	11.8	16.9
08	14.1	25	-17	11	15	18	19	21	22	23	24	-1	-	11.8	16.9
09	13.5	0	16	18	20	22	23	24	24	25	24	0	-	11.4	16.2
10	13.0	10	23	25	26	27	28	28	28	25	25	11	-	10.4	15.9
11	12.5	11	23	25	26	27	25	25	25	25	24	11	-	10.0	15.4
12	12.2	11	23	25	26	25	25	25	25	25	24	11	-	9.8	15.0
13	12.3	11	23	25	26	25	25	26	26	26	25	11	-	9.9	15.2
14	12.9	11	24	25	26	26	26	26	26	26	26	11	-	10.2	15.2
15	13.2	11	24	25	26	27	26	26	26	26	26	11	-	10.5	15.6
16	13.1	11	24	25	26	27	27	27	27	27	27	11	-	10.3	15.4
17	12.5	11	24	25	26	27	27	27	27	27	27	11	-	9.9	14.7
18	11.3	11	24	25	26	27	27	27	27	27	11	11	-	7.7	15.7
19	9.1	11	24	25	26	27	27	27	26	11	11	-	-	6.2	12.7
20	7.0	28	24	25	26	27	28	28	11	11	-	-	-	4.8	9.8
21	7.0	28	24	25	26	27	28	28	28	29	29	-	-	4.8	9.7
22	9.6	28	23	24	26	27	27	28	28	28	29	29	-	8.3	10.7
23	12.5	26	2	17	20	21	23	24	24	25	26	27	-	10.8	13.9
24	13.6	25	-20	-4	14	17	19	21	22	23	24	25	-	11.7	15.1

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	15.0	12.0	10.0	9.0	6.0	5.0
DBU	24	22	21	21	21	22	24	24	25	28	27	26

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	5.0	5.0	6.0	6.0	10.0	9.0	6.0	8.0	12.0	15.0	15.0	15.0
DBU	26	26	27	27	27	27	27	28	29	29	27	25

Table A.4 (40/40)

8

OCTOBER 0 SUNSPOT NUMBER 10.0

MACTAN	TO PUERTO PRINCESA	AZIMUTHS	MILES	KM.
10.16N - 123.58E	9.46N - 118.45E	262.56	81.68	352.6	567.5

MINIMUM ANGLE 0.0 DEGREES POWER = 0.10 KW REQ.SIG. 0.0 DB

ANTENNA GAIN TR. 0.0 DB RE. 0.0 DB

FIELD STRENGTH IN DB FREQUENCIES IN MHZ

UT	MUF	DBU	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	12.0	15.0	-	FOT	HPF
01	9.7	20	-22	-6	13	16	19	20	21	20	23	25	-	8.3	11.0
02	9.2	17	-34	-12	10	14	17	18	19	18	21	24	-	8.2	10.4
03	8.8	14	-42	-18	8	12	15	17	15	17	20	23	-	7.9	10.0
04	8.7	13	-44	-18	8	12	15	17	14	17	20	23	-	7.8	9.9
05	9.3	15	-41	-16	8	12	15	18	19	17	20	24	-	8.2	10.5
06	10.4	19	-33	-11	10	14	17	19	20	21	22	24	-	8.9	12.3
07	11.3	22	-20	-5	13	17	19	21	22	22	23	-	-	9.7	13.4
08	11.5	25	-3	15	18	20	22	23	23	24	25	-	-	9.9	13.7
09	11.4	9	18	21	22	24	24	25	26	26	9	-	-	9.8	13.6
10	11.3	10	24	25	26	27	28	28	26	26	10	-	-	8.5	13.1
11	10.9	10	24	25	26	27	26	26	26	26	10	-	-	8.2	12.6
12	10.4	10	24	25	26	26	26	26	26	26	10	-	-	7.8	12.0
13	10.1	10	24	25	26	26	26	26	26	26	10	-	-	7.6	11.7
14	9.9	9	24	25	26	26	26	26	26	26	10	-	-	7.6	12.2
15	9.3	9	24	25	26	26	26	27	26	9	-	-	-	7.1	11.4
16	8.4	9	24	25	26	26	27	27	9	9	-	-	-	6.4	10.3
17	7.9	9	24	25	26	26	27	26	9	9	-	-	-	6.0	9.7
18	7.3	9	24	25	26	26	26	9	9	9	-	-	-	4.8	10.2
19	5.7	9	24	25	26	9	9	9	-	-	-	-	-	3.7	7.9
20	4.0	25	24	25	26	9	-	-	-	-	-	-	-	2.6	5.6
21	4.3	25	24	25	26	27	-	-	-	-	-	-	-	2.8	6.0
22	7.0	27	24	25	26	27	28	28	-	-	-	-	-	6.0	7.9
23	9.6	26	9	20	22	23	24	25	25	26	-	-	-	8.3	10.9
24	10.2	23	-7	14	17	20	21	22	23	23	25	-	-	8.8	11.5

UT	01	02	03	04	05	06	07	08	09	10	11	12
FREQ	15.0	15.0	15.0	15.0	15.0	15.0	12.0	12.0	10.0	8.0	6.0	8.0
DBU	25	24	23	23	24	24	23	25	26	28	27	26

UT	13	14	15	16	17	18	19	20	21	22	23	24
FREQ	8.0	8.0	8.0	8.0	7.0	7.0	5.0	5.0	6.0	8.0	10.0	12.0
DBU	26	26	27	27	27	26	26	26	27	28	26	25

Appendix B

Appendix B. Preliminary Design of the Project

Appendix B (*1) Teletype, facsimile and radio frequency system

(*1) 1 Comparison between Teletype and Facsimile

	Teletype	Facsimile
1. Operation		
Suitable data type	Digital (such as characters)	Analog (such as line drawing)
Transmission rate	100 characters/ 22 seconds (11 bits/character, 50bps)	A4-size 1 sheet/6 minutes (GII, fine mode)
Noise resistance	Noise resistance to be improved due to ARQ use	Noise causes partial loss of picture but no practical problems in understanding its outline.
2. Cost	₱227.000/set	₱76.000/set
3. Maintenance	Easy	Comparatively complicated

(*1) 2 Comparison among dual radio frequency system

	Dual radio frequency system	Simplex channel	Duplex channel
1. Operation			
Data trans-Mission	Independent of telephone	Switching with telephone	Simultaneous data transmission and telephone, but limited to only one station

		Dual radio frequency system	Simplex channel	Duplex channel
	Action against faults	Quick action possible because of two independent channels	No action possible before recovery	Action possible for faults only with circuits in front of channel filter
	Overall evaluation of operation	Good	Bad	Moderate
2.	Allotment of frequency	Need frequency twice that of simplex channel	Standard	150MHz prohibited due to wide base band
3.	Antenna	Two systems preferable	One system	One system
4.	Complexity of equipment	Complicated allotter (common unit)	Standard	Difficult to obtain standard equipment
5.	Redundancy	High	Standard	Moderate
6.	Cost	High	Standard	High
7.	Maintenance	Almost similar to simplex channel system	Standard	High maintainability because of dual system

Appendix B. (*2) Telecommunication equipment and peripheral facilities in main trunk

(*2) 1 Telecommunication equipment

The constitution, the specification and overall view sketch on a main equipment of the main trunk telecommunication system are described as below;

(*2) 1.1 Telecommunication equipment in each stations

(1) OH multiplex telecommunication equipments

The equipments are shown as below.

Terminal equipments, Relay, Ringer, Compander, PABX includes standard spare parts (Lamp, Fuse and standard tools) and standard accessary (maintenance cord, instruction and engineering tools).

(2) Spare unit

Spare unit keeps in the PFC and DCC

(3) Existing telecommunication equipments of TANAY and NAGA are utilized after remodeled.

(4) A new antenna in TANAY and NAGA for GAPAS will be installed new one, while, the other stations utilized existing antennas.

(5) Arrangement of the measuring equipment required for maintenance.

(6) In order to reduce the wind pressure, a 6.7 GHz band 4.0mϕ plate parabolic antenna must be covered by a ray-dome.

(*2) 1.2 Specification of main equipment

The specification on main equipments used in the main trunk of meteorological telecommunication system is shown as below;

(1) 800 MHz Band SS-PM multiplex radio equipment FD/SD system (PM 6/12/24-800-70 FD/SD)

(i) General

Radio Frequency Band	770 - 960 MHz
Channel Capacity	6/12/24 channels + 1 service channel
T-R Separation	30 - 60 MHz
Type of Modulation	SS-PM
Relay System	Baseband Relay
Diversity System	Frequency or Space Diversity

Baseband Frequency	6 chs : 12 - 36 kHz 12 chs: 12 - 60 kHz 24 chs: 12 - 108 kHz
Service Channel Frequency	0.3 - 8.0 kHz
Power Supply	AC 220V±10% or -24V±10% (Positive-grounded)

(ii) Transmission characteristics

Overall S/N	50 dB or better at modulation index of 2 rad peak and baseband width of 12 to 108 kHz and at receiver input level of -71 dBm

(iii) Transmitter

RF Power Output	70W
Frequency Tolerance	within $\pm 20 \times 10^{-6}$
Modulation Index	6 chs: 0.8 rad rms/ch 12 chs: 0.4 rad rms/ch 24 chs: 0.2 rad rms/ch

(iv) Receiver

Receiving System	Crystal-Controlled Double Super-heterodyne
Noise Figure	3 dB or less
Local Frequency Tolerance	within $\pm 20 \times 10^{-6}$
Intermediate Frequency	70 MHz/10.7 MHz
IF Bandwidth	Approx. 460 kHz at 3dB point

(v) Duplexer loss

Transmitter Side	1.5 dB
Receiver Side	1.5 dB

(vi) Layout — See Fig. B.1

(2) 800 MHz Band SS-PM multiplex radio equipment (PM 6/12-800-5)

(i) General

Radio Frequency Band	770 - 960 MHz
Channel Capacity	6/12/24 channels + 1 service channel

T-R Separation	30 - 60 MHz
Type of Modulation	SS-PM
Relay System	Baseband Relay
Stand-by System	Set stand-by
Baseband Frequency	6 chs: 12 - 36 kHz 12 chs: 12 - 60 kHz
Service Channel Frequency	0.3 - 8.0 kHz
Power Supply	AC. 220V±10% or -24V±10% (Positive-grounded)

(ii) Transmission Characteristics

Overall S/N	50 dB or better at modulation index of 2 rad peak and baseband width of 12 to 108 kHz and at receiver input level of -67 dBm

(iii) Transmitter

RF Power Output	5W
Frequency Tolerance	within $\pm 20 \times 10^{-6}$
Modulation Index	6 chs: 0.8 rad rms/ch 12 chs: 0.4 rad rms/ch

(iv) Receiver

Receiving System	Crystal-controlled Double Super-heterodyne
Noise Figure	7 dB or less
Local Frequency Tolerance	within $\pm 20 \times 10^{-6}$
Intermediate Frequency	70 MHz/10.7 MHz
If Bandwidth	Approx. 460 kHz at 3 dB point

(v) Duplexer loss

Transmitter Side	2.5 dB (including coaxial) relay loss)
Receiver Side	5.5 dB (including HYB loss)

(vi) Layout — See Fig. B.2.

(3) 800 MHz Band SS-FM multiplex radio equipment (FM 60-800-5)

(i) General

Radio Frequency Band	770 - 960 MHz
Channel Capacity	60 channels + 1 service channel
T-R Separation	30 - 60 MHz
Type of Modulation	SS-FM
Relay System	Baseband Relay
Stand-by System	Set Stand-by
Baseband Frequency	60 - 300 kHz or 12 - 252 kHz
Service Channel Frequency	0.3 - 8.0 kHz
Power Supply	AC 220V±10% or -24V±10% (Positive-grounded)

(ii) Transmission characteristics

Basic/Intermodulation Noise Power	Less than 300 pW on the worst channel (weighted)

(iii) Transmitter

RF Power Output	5W
Frequency Tolerance	within $\pm 30 \times 10^{-6}$
Frequency Deviation	50 kHz rms/ch or 100 kHz rms/ch

(iv) Receiver

Receiving System	Crystal-Controlled Sigle Super-heterodyne
Noise Figure	6.5 dB or less
Local Frequency Tolerance	within $\pm 10 \times 10^{-6}$
Intermediate Frequency	70 MHz
If Bandwidth	Approx. 3.5/4.6 MHz at dB point

(v) Duplexer loss

Transmitter Side	2.5 dB (including coaxial relay loss)
Receiver Side	5.5 dB (including HYB loss)

(vi) Layout — See Fig. B.2.

(4) 6700 MHz Band SS-FM multiplex radio equipment (FM 60-6700-1)

(i) General

Radio Frequency Band	6.57 - 6.87 GHz
Channel Capacity	60 channels + 1 service channel
T-R Separation	160 MHz
Type of Modulation	SS-FM
Relay System	Baseband Relay
Stand-by System	Set Stand-by
Baseband Frequency	60 - 300 kHz
Service Channel Frequency	0.3 - 3.4 kHz
Power Supply	AC 220V±10% or -24V±10% (Positive-grounded)

(ii) Transmission characteristics

Overall S/N	More than 70 dB (weighted Value) at saturation input level in noise loading test

(iii) Transmitter

RF Power Output	1W
Frequency Tolerance	within $\pm 30 \times 10^{-6}$
Frequency Deviation	100 kHz rms/ch or 200 kHz rms/ch

(iv) Receiver

Receiving System	Crystal-Controlled Single Superheterodyne
Noise Figure	4 dB or less
Local Frequency Tolerance	within $\pm 20 \times 10^{-6}$
Intermediate Frequency	70 MHz
If Bandwidth	Approx. 4.5/6.0 kHz at 3 dB point

(v) Duplex loss

Transmitter Side	2 dB
Receiver Side	4.5 dB (including HYB loss)

(vi) Layout — See Fig. B.2.

(5) Antenna

Table B.1 shows a standard specification.

(6) Feeder

Table B.2 shows a standard specification.

(7) Dehydrator

(i) General

The dehydrator is used to charge dry air into the RF feeder of SF type and waveguide.

(ii) Specifications

Dry Air Output	3± litters/Min
Pressure to operate	150 g/cm^2 - 250 g/cm^2
Humidity of Output Air	Less than 5% RH (20°C)
Motor	A split phase start, 1 ϕ, induction motor, four poles continuous duty.
Compressor	A centrifugal pump with four vanes, directly driven.

(8) FDM multiplex terminal equipment

(i) General

Channel Capacity in channels	24 chs	60 chs
Baseband	12 - 108 kHz	60 - 300 kHz
Transmission System	Carrier Suppressed Single Side Band System	
Voice FRequency	300 - 3400 Hz	
Frequency Allocation	Conform to the CCITT Rec.	
Attenuation Distortion	do	
Group Delay Distortion	do	

(ii) Specification

Overall Noise/ch	63 dBm OP
Linearity	±3 dB or better

Input/Output Impedance	
Voice Side	600Ω Balanced
Baseband Side	75Ω alanced
Input/Output Level	
Voice Side	2-wire Input O dBr/-8 dBr Output -8 dBr/-4 dBr 4-wire Input -8 dBr/-16 dBr Output o dBr/+4 dBr
Baseband Side	Transmission : -25 dBr Reception : -15 dBr
Carrier Supply	
Master Oscillator	8 MHz 3.72 MHz
Accuracy	$\pm 1 \times 10^{-6}$ $\pm 1 \times 10^{-7}$
Producing Method	Phaselock Loop Harmonics from 4/12 kHz Pulse
Synchronization	Independent synchronization
Power Supply	AC 220V±10% or -24V±10%

(9) Remote supervisory and control equipment

(i) General

Transmission Frequency Band	2.58 - 3.3 kHz
Number of Supervisory item	12 Items/Station
Number of Control item	6 Items/Station
Capacity of Remote Station	10 Stations (7 station for one Route)
Route	3 Routes
Encording	RZ long-short Code
Synchronization	Word Synchronization
Transmission Rate	50 Baud
Modulation Method	Frequency-shift Modulation

(ii) Specifications

Input/Output Impedance	600 Ohms Balanced
Signal Level	-24 dBmo/carrier
Control Contact Condition	Action: Make contact at ground potential during 200 m sec Capacity 100 mA 50V DC
Supervisory Contact Condition	Action: Continuous grounding Capacity 15 mA 50V DC
Frequency Deviation	Mean Carrier Frequency ±30 Hz

Error Detection	Double Transmission Parity Check
Operation S/N Ratio	Unweighted 25 dB or more
Power Supply	AC 220V±10% or DC -24V±10% (Positive ground)

(iii) Layout — See Fig. B.3.

(10) FS Ringer/Compander equipment

(i) General

Compander consists of the compressor and the expander.

(ii) Specifications

FS Ringer Unit

Modulation System	Frequency Shift Modulation
Signal Frequency	3.2 kHz
Frequency Shift width	±100 kHz
Signal Level	-15 dBmo

Compressor Unit

Compressor Ratio	2±20%

Input/Output Level

Input Level	Output Level
-4 dBm	-6±0.5 dBr
-8	-8±0.1
-28	-18±1.0
-48	-28±2.0

Expander

Expansion Ratio	2±20%

Input/Output Level

Input Level	Output Level
+2 dBm	+4±0.5 dBr
0	0±0.1
-10	-20±1.0
-20	-40±2.0

(11) Telephone exchange (Digital switching equipment)

(i) General

Type of Telephone Switching Equipment	Time Division Multiplex (TDM) Type of electronic system controlled by stored program technique

Line Current	36 lines
Numbering Plan	3 digits

(ii) Interface conditions

Dial Speed	10±1 PPS
Make Ratio	33%±3%
Minimum Pause	600 m sec or more
Dial Tone	400±4 Hz (0.25 sec ON - 0.25 sec OFF)
Busy Tone	400±4 Hz (0.5 sec ON - 0.5 sec OFF)
Ringing Tone	400±4 Hz/18 - 24 Hz modulation 1 sec ON, 2 sec OFF, interval
Minimum Loop Resistance of Local Extension	200 ohms or less (including Telephone set)
Minimum Insulation Resistance of Local Cable	100 kilo-ohms minimum
4 Wire Interface Circuit	Dialling signal is received/Transmitted by SR/SS wire Speech wire interface: 4 wire 600Ω±10% balanced

(*2) 2 Telecommunication facility

(*2) 2.1 Existing facility

As for TANAY and NAGA, the existing office buildings and iron towers will be used.

(*2) 2.2 New facility

(1) For economical reasons, the 7 new office buildings shall be of similar specifications. (See Fig. B.4.) Although they are unmanned, a restroom, toilet, utility Kitchen, etc. will be included to meet the needs of maintenance personnel. A room for telecommunication equipment will be equipped with an air conditioner. A fence will be installed around the facilities to prevent unauthorized persons from entering them.

(2) The auxiliary power supply, a generator, will be installed in a separate room. The indoor or outdoor

installation of an auxiliary fuel tank will depend on its size.

(3) Iron towers for radio transmission

A total of 12 iron towers will be constructed in seven sites. The design conditions are illustrated in Table B.3. The iron towers have been classified into three categories based on their height; iron towers of 15 m, 22 m and 40 m have been designed in a general manner. (See Fig. B.5)

(4) Access roads covered by gravel with 3 m width are planned to be constructed for the new stations except for CAPACUAN. They are planned to have some wider portions for vehicles to pass by each other. Since the CAPACUAN Station is too far from the highway, a path, instead of gravel road, will be opened out for peoples to reach the station. The approximate length of access roads are as shown below.

GAPAS	1,350 m
MALABOG	300 m
BALOD	300 m
CAPACUAN	2,000 m
TINAMBACAN	1,350 m
DANAO	400 m
MALASAG	400 m

(*2) 3 Power supply facility

(*2) 3.1 The fundamental configuration

When planning the meteorological telecommunication aspects of the project, improvement of the channel routes and terminal equipment used to collect and allocate meteorological data as well as a power supply equipment supporting the terminal equipment were regarded as very important factors. The quality of power supplied to the equipment is dependent on the power supply equipment specifications.

The optimum power supply equipment for the main trunk telecommunication system are presented in Fig. B.6, the block diagram of power supply equipment for the main trunk telecommunications system, based on the above fundamental factors, and the operation of telecommunications is smoothly made.

(1) While the optimum power supply equipment for the multiplex radio equipment and terminal station equipment (including relay, FS ringers and compander equipment), which form the branches of the channel route appear to be the charger-rectifier and battery-based DC power supply, equipment, which are not subject to power failures, as a result of giving priority to economy and maintainability of the telecommunication network, it was decided that an AC power supply equipment based on AVR will be used.

(2) Commercial power can be utilized in the existing building of TANAY and NAGA stations. However, the other relay stations have to wire the leading wire along side of the access road. The rough distance of leading wire are shown as below;

GAPAS	900 m
MALABOG	80 m
BALOD	160 m
TINAMBACAN	700 m
DANAO	900 m
MALASAG	200 m

Branch wiring must be prepared from an existing distribution line through a transformer. And an electric pole must be set up every 25 m distance. To prevent from the voltage drop a transformer must be installed near the building, and the electric power for every equipment are supplied through a distribution board in the building.

(3) Auxiliary power supply equipment will be installed to cover power failures of the commercial power supply. A diesel-powered generator having the capability of providing stable low and high voltage power will be used as the back-up power supply equipment. For unmanned facilities of the trunk lines which significantly affect operations and require considerable time to get to, diesel-powered generators using the dual stand-by method will be employed to extend the operating time period of the auxiliary power supply equipment as well as to enhance the reliability thereof.

(4) Arrester equipment of devices should be installed to prevent system breakdowns due to lightning or its impact. The installation of a lightning resistant transformer on commercial power supply lines will

effectively eliminate the effects of lightning. The installation and grounding of arrester equipment or devices will be examined in detail at the appropriate stage. A ground-to-air pilot lamp will be installed as shown in the block diagram so that lightning striking the lines will not affect the equipment in the room.

(*2) 3.2 The design condition

The following design condition of the power supply equipment for the main trunk telecommunication system are presented in its block diagram.

(1) Power consumption for each piece of equipment is as shown in Table B.6.

(2) The efficiency and power factors of the automatic voltage regulator are as follows:
Efficiency: 85%
Power factor: 75%

(3) Diesel engine generator

(i) The cooling method of the diesel engine is the air cooling and the water cooling method. For the auxiliary power supply equipments the air cooling method is more advantageous than the water cooling, because the former has a number of positive characteristics in repair and maintenance.

(ii) The diesel engine generator of the dual standby method will be introduced to the GAPAS, MALABOG, BALOD and TINAMBACAN stations, where are important relay stations in main trunk and are located on the peak with a little long approach.

(iii) The period of non-maintenance operating time, which is primarily the time when engine oil is replaced, is as shown below.
Single standby system: 120 hours
Dual standby system: 120 hours x 2

The above non-maintenance operating time period for the single standby system is based on the assumption that power failures of the commercial supply occur 4 times a month, its average time period is 4 hours and the non-maintenance period is not less than 6 months. For the dual stand-by system, the assumption is that power failures of the commercial

supply will occur 6 times a month and the average power failure time period is 6 hours.

(iv) The capacity of the bulk tank allows an operating period twice as long as the above non-maintenance running time period.

(4) Specifications of indoor lamps

General indoor lamp: 320 W (40 W x 8)
Indoor lamp for emergencies: 160 W (40 W x 4)

(5) Specifications of outlet

For measuring instruments: 500 VA
For other miscellaneous power supplies: 2000 VA

(6) Capacity of air conditioner

The required cooling capacity of the air conditioner is determined by the building structure, sunshine condition, temperature difference and equipment's thermal emission. Since the current stage involves a number of undefined factors including building structure, it is extremely difficult to determine the capacity of the air conditioner. The power supply will be designed on the assumption that the required cooling per station is 4500 kcal/hr (input power is 4.5 kVA).

(*2) 3.3 Equipment configuration in each station

The configurations of the equipment covered by the power supply equipment are shown in Table B.5. Table B.5 is based on Table B.6, which presents the power supply equipment capacity figures.

(*2) 3.4 Outline of equipment specifications

(1) Automatic voltage regulator

The AVR is used to regulate AC voltage and supply load with the regulated AC voltage. The following are the major specifications:

(i) Input/output voltage: 220V AC, 60 Hz, single phase
(ii) Output voltage stability: Witin ±2% (Input from +10 to -15%)
(iii) Input frequency range: ±2 Hz
(iv) Efficiency: Higher than 84%

(v) Power factor: Higher than 75%
(vi) Output capacity: 3 kVA/5 kVA/10 kVA

(2) Diesel engine generator (Single stand-by or dual stand-by system)

(i) Output voltage: 220 V AC, 60 Hz, single phase
(ii) Output voltage regulator: Within ±2.5%
(iii) Frequency regulation: Within 4.5% under constant condition
(iv) Power factor: 0.8 (lagging)
(v) Waveform distortion: Less than 10% at no load
(vi) Changeover condition from AC main power to generator: More than ±10%
(vii) Diesel engine: Air-cooled, 4 cycles
(viii) Revolution speed: 1800 rpm
(ix) Generator output capacity: 15 kVA/25 kVA/35 kVA

(3) Lightning transformer

A lightning transformer will be installed on the commercial supply lines to eliminate the effects of thunderbolt. The following are its major specifications:

(i) Input/output voltage: 220V AC, 60 Hz, single phase
(ii) Cooling system: Air-cooled
(iii) Discharge capacity: 15 kVA x 2 element
(iv) Voltage resistance: 2 kV AC
(v) Capacity: 20 kVA/30 kVA/40 kVA

Appendix B (*3) Telecommunication equipment and peripheral facilities in VHF and HF link

(*3) 1 Telecommunication equipment

(*3) 1.1 Equipment configuration

The equipment configurations for each station are shown below:

(1) PFC

An equipment block diagram is shown in Fig. B.7.

(2) DCC and SCIENCE GARDEN

An equipment block diagram is shown in Fig. B.8.

(3) LEGASPI

An equipment block diagram is shown in Fig. B.9.

(4) CARMEN ROSALES and TANAY

An equipment block diagram is shown in Fig. B.10.

(5) DILIMAN

An equipment block diagram is shown in Fig. B.11.

(6) Weather station

An equipment block diagram is shown in Fig. B.12.

(*3) 1.2 Equipment specification

The outline of the main equipment specifications (excluding multiplex communication equipment) is shown below.

(1) VHF radio telephone set

Frequency range:	142 - 174 MHz
Communication method:	Full duplex
Modulation method:	FM
Frequency deviation:	Up to ±5 kHz
High frequency input output impedance:	50 ohm
Transmitting output:	25 W
Receiving method:	Double superheterodyne system
Receiving sensitivity:	1μV or less (Receive input against 20 dB noise suppression)
Frequency tolerance:	Within $\pm 1 \times 10^{-5}$
Voltage supply:	220V AC 50/60 Hz 1φ or 24V DC (negative ground)
	Sending: 5A (24 V DC)
	Receiving: 0.3A (24 V DC)
Temperature and humidity:	-10°C - +50°C, 95% RH at 35°C
Weight:	15 kg

Appearance is shown in Fig. B.13.

(2) HF SSB radio telephone set

Frequency range:	1.6 - 29.9999 MHz
Number of radio channels:	284,000 channels in 100 Hz step (Synthesizer) 40 channels can be preset.
Modulation method:	J3E-USB, J3E-LSB, H3E, A3E, A1A, and F2B
Communication method:	Simplex of half duplex
High frequency impedance:	50 ohm
Transmitting output:	150 W PEP for J3E, A3E, A1A, and F2B 40 W carrier wave for H3E
Receiving method:	Double superheterodyne system
Receiving sensitivity:	1.5 μV or less for J3E, A3E, A1A, and F2B 5 μV or less for H3E
Frequency tolerance:	Within $\pm 1 \times 10^{-6}$
Supply voltage:	24V DC (Negative ground) Sending: 23A Receiving: 2.5A
AC power source:	220V AC for input 24V DC 30 A for output
Temperature and humidity:	-10°C - +50°C, 95% RH at 35°C
Weight:	Approximately 34 Kg (including AC power supply)

Appearance is shown in Fig. B.14, Fig. B.15.

(3) MF, HF all wave receiver

Frequency range:	90 KHz - 29.99999 MHz in 10 kHz step
Receiving method:	Double superheterodyne by phase locked frequency synthesizer
Reception mode:	A1A, A2A, H2A, A3E, R3E, H3E, J3E, F1B, F3C
Frequency display:	LED, 8 digits
Presetting:	62 channels (including 500 kHz and 2182 kHz)

Receiving sensitivity:

	A1A	A3E	J3E
90-200 kHz	20μV or less	60μV or less	-
200-1600 kHz	10μV or less	30μV or less	-
1.6-29.99999 kHz	2μV or less	6μV or less	3μV or less

Conditions:	S/N; 20 dB	Receiving output: 100 mW
	Band width: 3 kHz and 1 kHz (A3E)	
	30% modulation	
Frequency tolerance:		Within $\pm 5 \times 10^{-7}$
BFO Variable Range		±2 kHz in 10 Hz step
Clarifier Variable Rang:		±120 Hz in 1 Hz step
Power source:		220V AC 50/60 Hz 1 ϕ
		70 VA
		24V DC (Negative ground)
		50 W
Temperature and humidity:		-10°C - +50°C, 95%RH at 35°C
Weight:		Approximately 17 Kg

Appearance is shown in Fig. B.16.

(4) Data processor for DCC

The specifications of the data processor for DCC are as follows. Appearance of the equipment is shown in Fig. B.17.

(i) Communication controller

Micro-computer is used for control.

A. Central processing unit
Processor: 16 bits
Memory: 128KB for RAM area
64KB for ROM area

B. Link connections
Weather stations are called and data are collected by operator commands (polling). Input data are stored in the memory and then transferred to the PFC. Data of the PFC are transmitted to weather stations.
Transmitting route: OH, VHF
Telecommunications method: Half duplex
Transmission rate: 200 bps
Synchronization: Frame synchronization

C. ARQ input section
Data from the ARQ device are automatically inputted. Input data are stored in the memory and transferred to the PFC.
Interface: RS 232C
Transmission rate: 50 bps
Code: CCITT NO.5
Synchronization: Start-stop synchronization

(ii) CRT display

A. Peformance
Number of display characters: 80 characters x 24 lines (1920 characters)
Display color: Green against black background
Display character: JIS 128 types
Transmission rate: 1200 bps

B. Conditions for installation
Power source: 220 V AC±10%, 50/60 Hz
Operating temperature: 0 - +40°C
Operating humidity: 35 - 80%

(iii) Serial printer

A. Performance
Number of characters
printed per line: 80 characters
Sign: JIS 8 unit
Printing method: Impact, 9 x 7 dot matrix

B. Conditions for installation
Power source: 220 V AC±10%, 50/60 Hz
Operating temperature: +5 - +40°C
Operating humidity: 90% or less

(5) ARQ equipment at DCC and weather stations (HF)

The overall view of ARQ equipment is shown in Fig. B.18. The components of ARQ are as follows.

(i) ARQ Unit

Operation mode:	ARQ (Automatic Request for Repetition) and FEC (Forward Error Correction)
Telegraphy code:	Local: 7 levels, ASCII Line: 7 levels, constant B/Y ratio
Modulation rate:	Local: 300 baud Line: 100 baud
Modulation method:	1,700 Hz ±85 Hz, according to CCIR recommendation 476-2
Selective call:	Via keyboard
Buffer memory:	2,000 characters
CRT display interface:	EIA RS-232C
Power:	220V AC, 50/60Hz, 1ϕ, 65VA
Temperature:	0 to 55°C
Relative humidity:	90% at 35°C
Weight:	Approx. 10 kg

(ii) CRT display unit

Code:	7 units, ASCII
Display:	9 x 7 dots
Number of characters displayed:	80 characters x 25 lines (2,000 characters)
Storage capacity:	8 screens (13,000 characters)
Line interface:	EIA RS-232C
Printer interface:	Parallel
Power:	220V AC, 50/60Hz, 1ϕ, 100VA
Temperature:	0 to 40°C
Relative humidity:	90% at 35°C
Weight:	Approx. 36 kg

(iii) Printer

Code:	7 units, ASCII
Printing method:	Impact, 9 x 7 dot matrix
Characters/line:	69 characters
Power:	220V AC, 50/60Hz, 80VA (during printing)
Temperature:	5 to 40°C
Relative humidity:	90% at 35°C
Weight:	Approx. 11 kg

(6) Data terminal for weather station (VHF, multiplex)

The data processing equipment at weather stations is as described below. The overall view is illustrated in Fig. B.19.

(i) Data input equipment

Transmit input data to DCC or the PFC.

A. Performance

Processor:	16 bit processor
Telecommunication link:	VHF, multiplex
Telecommunication method:	Half-duplex
Calling method:	Polling method
Transmitting speed:	200 BPS
Synchronization:	Frame synchronization

B. Installation Requirements Power:
220V AC ±10%, 50/60 Hz
Operating temperature:
5 to 35°C
Operating relative humidity:
10 to 80%

(ii) CRT display

Same as that for DCC.

(iii) Serial printer

Same as that for DCC.

(7) Telecommunication control console (PFC)

The control console for voice and FAX telecommunication links. In addition to the three systems of TANAY, CARMEN ROSALES and LEGASPI, which telecommunicate directly with the PFC, 7 multiplex links for telecommunicating with DCC and SCIENCE GARDEN are accommodated in this console.
Simultaneous bracketed instructions and individual calls can be provided through operator switching.
The overall view is given in Fig. B.20.

Number of links accommodated: 10 links max.
Telecommunication method: Simplex and duplex
Connection requirements
Input impedance: 600-ohm balance
Input level (voice): 0 dBm±3 dB
Output level (voice: -8 dBm±3 dB
Power: 220V AC, 1ϕ

(8) Telecommunication control console (DCC)

The control console for voice and FAX telecommunication links. Provided to DCC, this console accommodates weather station VHF links and voice telecommunication multiplex links from the PFC. With operator attendance, voice and FAX telecommunications with the PFC and weather stations are possible.
The overall view is given in Fig. B.21.
Number of links accommodated
Multiplex link: 3 links max.
Terminal link: 3 links max.
Telecommunication method: Simplex and duplex

Connecting requirements
Input impedance: 600-ohm balance
Input level (voice): 0 dBm±3 dB
Output level (voice): -8 dBm±3 dB
Power: 200V AC, 1ϕ

(9) Facsimile

	GI	GII
Paper width:	252 mm (B4)	252 mm (B4)
Scanning line: density	3.521/mm	3.851/mm
Reading method:	CCD solid scanning	CCD solid scanning
Recording: method	Heat-sensing	Heat-sensing
Modulation: method	FS 1,900±400Hz	AM-PM-VSB Carrier 2,100Hz
Transmission: rate (B4)	Approx. 10 min.	Approx. 3 min.
Power:	220V AC Stand-by, 30VA Transmit, 170VA Receive, 300VA	220V AC Stand-by, 30VA Transmit, 250VA Receive, 300VA
Temperature:	0 to 40°C	0 to 40°C
Relative: humidity	40 to 90%	40 to 90%

The overall view is given in Fig. B.22.

(*3) 2 Telecommunication facility

The telecommunication facilities for weather stations in LUZON are to be located in the existing station buildings. In the case a weather station has no backup power supply, a new power station should be provided for telecommunication facilities. A new power station should be constructed apart from the weather station in order not to bother people in the weather station with the noise generated by the power station.
Extra petroleum is to be stored in drums.

(*3) 3 Power facility

(*3) 3.1 Weather station

(1) Fundamental structure

The commercial power supply at a weather station does not always provide the stable power. Therefore, a floating charging power supply consisting of a charger and batteries should be provided to energize the receiver and a MF/HF all-wave receiver. Other equipments are to be energized from a commercial power source. Anti-lightning transformers should be provided in the commercial power circuitry to prevent failures due to lightning.
A gasoline engine generator is to be installed for use in case of a commercial power supply failure.
The block diagram of the power equipment is presented in Fig. B.23.
The power consumption rates at weather stations are listed in Table B.7.

(2) As no commercial power can be available at the ROMBLON relay station, solar cells must be provided to the station. Solar cells must be provided to the AMPUCAO relay station as a back-up power supply. The capacity of the cell will be defined under consideration of the duration of the sunshine in the site.
The block diagram of solar cell is shown in Fig. B.24.

(*3) 3.2 Equipment specification (additional)

(1) Charger

(i) Input voltage: 220V AC, 60 Hz, 1ϕ
(ii) Output voltage, current: 24V DC, 4A
(iii) Cooling method: Air cooling
(iv) Temperature: -10 to 50°C
(v) Relative humidity: 95%
(vi) Weight: Aprox. 35 kg

(2) Gasoline-engine generator

(i)	Engine type	: 4-stroke, gasoline, single cylinder, air cooled
(ii)	Generator type	: Self-excited 2-pole
(iii)	Output	: 220V AC 60 Hz 1ϕ, 3KVA
(iv)	Power factor	: 1.0
(v)	Revolution speed	: 3600 rpm
(vi)	Starting	: Recoil starter
(vii)	Weight	: Approx. 90 kg

(3) Isolation transformer

(i)	Input/Output voltage	: 220V AC, 60 Hz, 1ϕ
(ii)	Capacity	: 3 KVA
(iii)	Discharge capacity	: 15 KVA 2 elements
(iv)	Dielectric strength	: 3 KV AC for 1 minute
(v)	Cooling	: Natural air
(vi)	Weight	: Approx. 50 kg

Appendix B (*4) Telecommunication controlling system at the PFC

(*4) 1 Fundamental system function

To meet the needs of the users of weather data, the system should provide certain basic functions.

(*4) 1.1 Collecting function

Sends weather data obtained at various weather stations to multiple links via DCC or DRS, and store them directly in computers.

(*4) 1.2 Processing function

Relays, edits, converts, or analyzes the obtained weather data to meet the application needs.

(*4) 1.3 Accumulating function

Accumulates weather data required for statistical preparation and other purposes on magnetic disk or tape for retransmission upon request or inquiry.

(*4) 1.4 Disseminating function

Supplies various weather information on a real-time basis for specific applications.

(*4) 2 Data link

The telecommunication volume of the PFC is described by the amount of messages and number of links.

(*4) 2.1 Accommodating link

(1) Domestic link (Multiple link)

(i) Link with DCC
Three links with MACTAN RADAR, CAGAYAN DE ORO and TUGUEGARAO.

(ii) Link with DRS
Three links with CARMEN ROSALES, LEGASPI and TANAY.

(iii) Other link
One link with SCIENCE GARDEN.

(iv) Cord
CCITT NO. 5

(v) Transmitting speed
200 b/s, while HF link is at speed of 50 b/s.

(2) GTS link

CCITT No. 5 code is used for the GTS links.

(i) Link with TOKYO
A link of 200 b/s

(ii) Link with SINGAPORE
A link of 75 b/s

(3) Operation link

(i) System console
Monitors link and systems
One link

(ii) Supervisor
Input/Output operating instructions of an entire system.
One link

(iii) Data operation
Input/Output of various data by man/machine interface.
Three links

(4) Extra link

Extra links are provided for future expansion of business.

(5) Number of link

The total number of links required should be 30 according to the results in paragraphs (1) through (4).

(*4) 2.2 Estimated data volume

(1) Domestic link

The daily volume of telecommunication date is estimated by location, based on the number of observations. 54,760 characters/day
The results are listed in Table B.8.

(2) Link with TOKYO

The transmission volume from TOKYO on July 25, 1984 was 581,978 characters (at a link speed of 75 b/s). Link speed changed to 200 b/s under the date of October 1, 1984. Adding the possible increase, the volume should be 1,000,000 characters/day.

(3) Other link
The information obtained from other links are to be incorporated in the data transmitted from TOKYO.

(4) Daily data telecommunication volume

Domestic: 60,000 characters = 60,000 bytes = 0.06 MB
Overseas: 1,000,000 characters = 1,000,000 bytes = 1 MB
The total data telecommunication volume received at the PFC would therefore be 1.06 MB.

(*4) 3 System configuration

(*4) 3.1 Data processing equipment

Fig. B.25 illustrates the data processing system configuration, and Fig. B.26 the overall view of the system.

(1) Central processing equipment

(i) Control method — Micro program control

(ii) Operation control

Operation method:	32 bits, binary, parallel
Data word length:	1, 8, 16, 32, 64 bits
Basic instructions:	148
External interruption:	4 levels
Calculation rates (fixed-point)	
Add/subtract:	0.45 μs
Multiply/divide:	7.85/10.25 μs
Calculation rates (floating-point)	
Add/subtract:	1.25 μs
Multiply/divide:	1.85/3.85 μs

(iii) Main storage

Cycle time:	500 ns
Storage capacity:	1 MB
Error check:	ECC

(iv) Input/Output control

Transfer rates	
Program control:	387 kB/s max.
DMA control:	8.0 MB/s (Read)
	5.71 MB/s (Write)

(2) Magnetic disk unit

Performance

Capacity:	40 MB
Bytes/sector:	256 B
Average rotation waiting time:	8.3 ms
Average head access time:	35 ms
Recording method:	MFM method
Transfer rate:	806 kB/s

(3) Magnetic tape unit

Performance

Tape driving method:	Single capstan
Tape buffer method:	Tension arm
Recording density:	1600 BPI
Tape speed:	75 IPS
Tape length:	2,400 feet
Recording method:	PE method
Transfer rate:	120 kB/s

(4) Console display

Performance

Number of characters displayed:	80 characters x 24 lines (1920 characters)
Color displayed:	Green
Character types:	JIS 128 types
Data transfer rate:	1,000 characters/s max.

(5) Color CRT display

The overall view is illustrated in Fig. B.27.

Performance

Number of characters displayed:	90 characters x 45 lines (4,050 characters)
Color displayed:	Seven colors
Character types:	JIS 128 types, 64 picture element types 64 special character types
Data transfer rate;	1,200 characters/s max.

(6) Line printer

The overall view is shown in Fig. B.28

Performance

Printing speed:	600 lines/m
Characters/line:	136 characters/line
Character types:	64 character types (ASCII)
Character spacing:	10 characters/inch
Line spacing:	6 lines/inch, 8 lines/inch

(7) Serial printer

The overall view is shown in Fig. B.29

Performance

Printing speed:	160 character/s
Characters/line:	132 characters
Characters types:	JIS 128 types
Character spacing:	10 characters/inch
Line spacing:	6 lines/inch, 8 lines/inch

(8) Floppy disk unit

Performance

Recording capacity:	1 MB
Maximum rotation waiting time:	167 ms
Data transfer rates	
Read:	2 MB/s max.
Write:	667 kB/s max.
Medium used:	Double-side, double density

(9) Bus switch

The device to allow both existing equipment (system in operation) and extra equipment (waiting system) to share (by switching) each peripheral equipment unit.

Switching time:	5 μs max.
Propagation delay time	
Inter-board delay:	500 ns max (go and return)
Inter-cable delay:	12 ns/m
Switching modes:	Manual/auto

(10) Processor connecting unit

Provides data transfer between existing and extra equipment. Should be duplex.

Transfer method:	8 bits, parallel
Transfer rate:	167 kB/x max.
Error check:	Horizontal parity check. Transferred number of bytes check

(*4) 3.2 Telecommunication controlling equipment

Receives data from weather stations (VHF), DCC, and GTS international links, and transfers data to data processing unit. Also transfer data to weather stations (VHF), DCC and GTS international links when the required instruction is given from the data processing unit.

(1) OH link interface

Telecommunication links:	Multiplex links
Telecommunication method:	Half-duplex
Transmitting speed:	200 BPS
Synchronization:	Frame synchronization

(2) GTS link interface

Telecommunication links:	Exclusive links
Telecommunication method:	Half-duplex
Transmitting speed:	200 BPS
Code used:	CCITT No. 5
Synchronization:	Start-stop

(3) System console

The overall view is shown in Fig. B.30
Displays system status, link status, and others.

(4) CRT display

Number of characters displayed:	80 characters x 24 lines (1,920 characters)
Color displayed:	Green with black background
Character types:	JIS 128 types
Transmitting speed:	1,200 BPS

(*4) 3.3 Installing condition

Power	100V AC ±10%, 50/60 Hz
Operating temperature:	10 to 35°C
Operating relative humidity:	35 to 80% (without condensation)

(*4) 4 Data processing

The system functions used in processing the data transferred from weather stations are described below:

(*4) 4.1 Code conversion

Internal data processing code system is provided to convert all the external codes inputted from each link to appropriate machine codes.

(*4) 4.2 Relay processing

Identifies each piece of weather data heading (data type, location, and time observed) and outputs them to the selected link.
Output may be performed on data reception, or via the timer.

(*4) 4.3 Edit processing

(1) Location selection

Selects data associated with the designated location.

(2) Block configuration

A block accommodates one or more locations.

(3) Parameter selection

Analyzes weather data and selects only predetermined parameters.

(*4) 5 System operation

The system usually operates in the master or slave mode together with the stand-by mode.

The CPU in the master mode provides the system monitoring function for monitoring the status of each piece of equipment. The system console displays the monitored status.

For the system to function properly, the following operations are required.

. Monitoring the component equipment of the system
. Operation of input/output equipment for on-line operations
. Monitoring link status
. Monitoring telecommunication status
. Monitoring power and air conditioning

(*4) 6 System relevant facilities

(*4) 6.1 Computer room facility

(1) Area

The minimum room are allowing normal operations and maintenance. It is to be approx. 35 m^2.

(2) Floor

(i) Floor load

The minimum floor load is to be approx. 300 kg/m^2.

(ii) Floor structure

Cables can be placed between the ceiling of the n-th floor room and the floor of the (n+1)-th floor room, and are accessible.

(3) Window

Windows are to be such that the equipment in the room are not exposed to direct sunshine.

(*4) 6.2 Power supply facility

A non-interrupted power supply (CVCF + battery) is required to prevent the systems at the PFC from shutting down.

Block diagram for power supply system is shown in Fig. B.6

(1) Power capacity

20 kVA is required.

(*4) 6.3 Air conditioning facility

The temperature and relative humidity best suited for the calculator room are:

Temperature: 20 to 27°C
Relative humidity: 50 to 70%

To maintain the room under the above conditions, an air conditioning facility is necessary.

(1) Air conditioning capacity

A capacity of 10 HP is required.

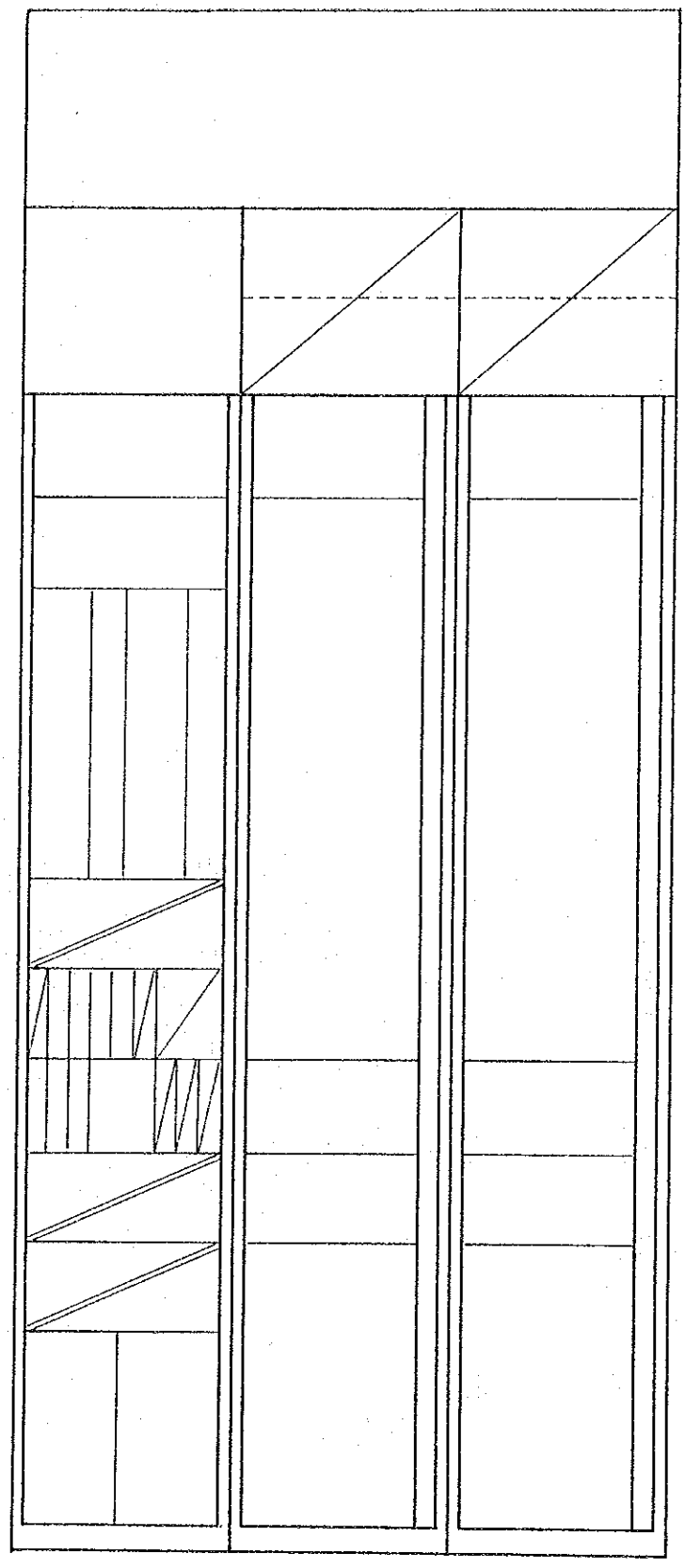


Fig. B. 1 Typical Layout of Driver/Receiver,700w PA Equipment

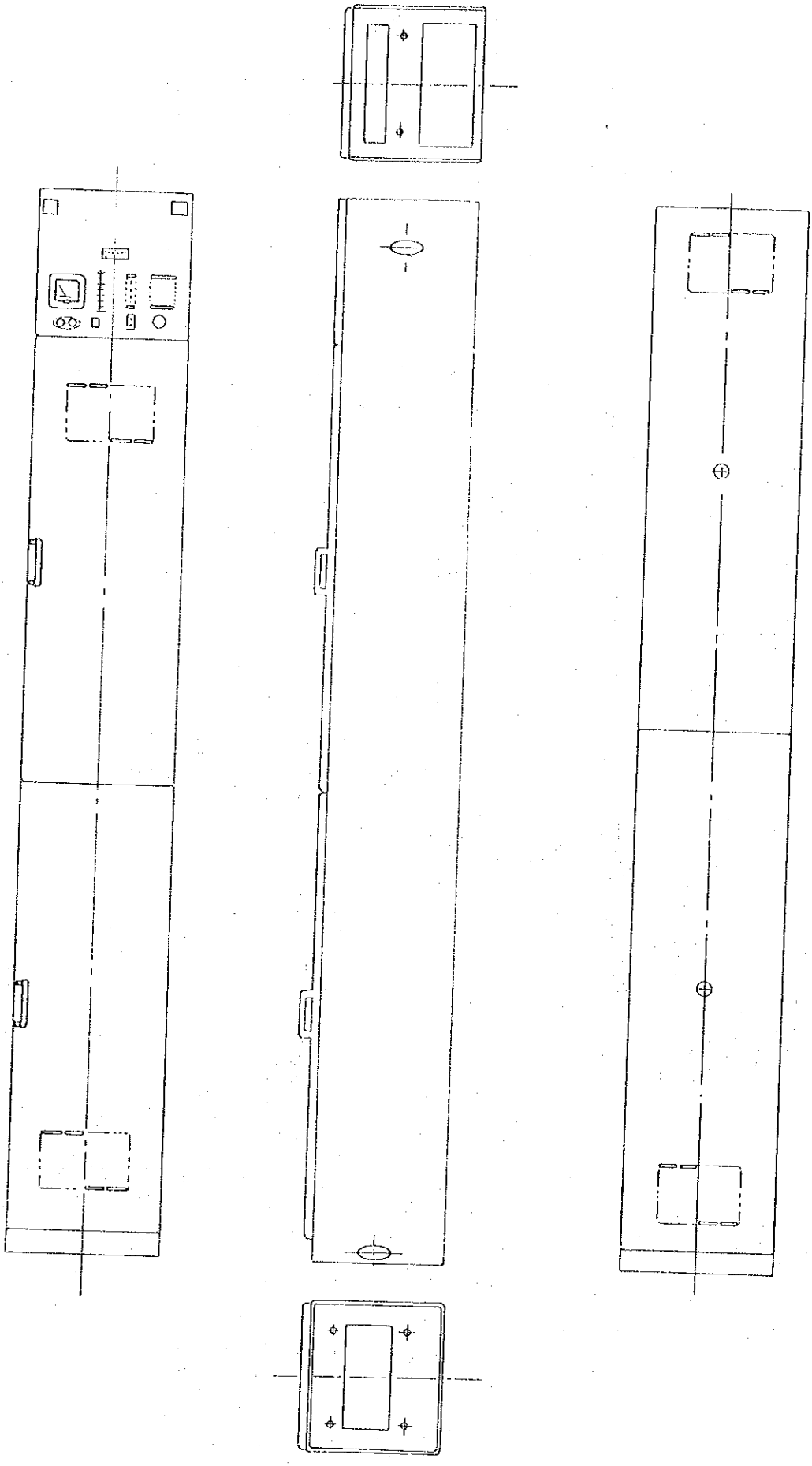


Fig. B. 2 Typical Outline Drawing

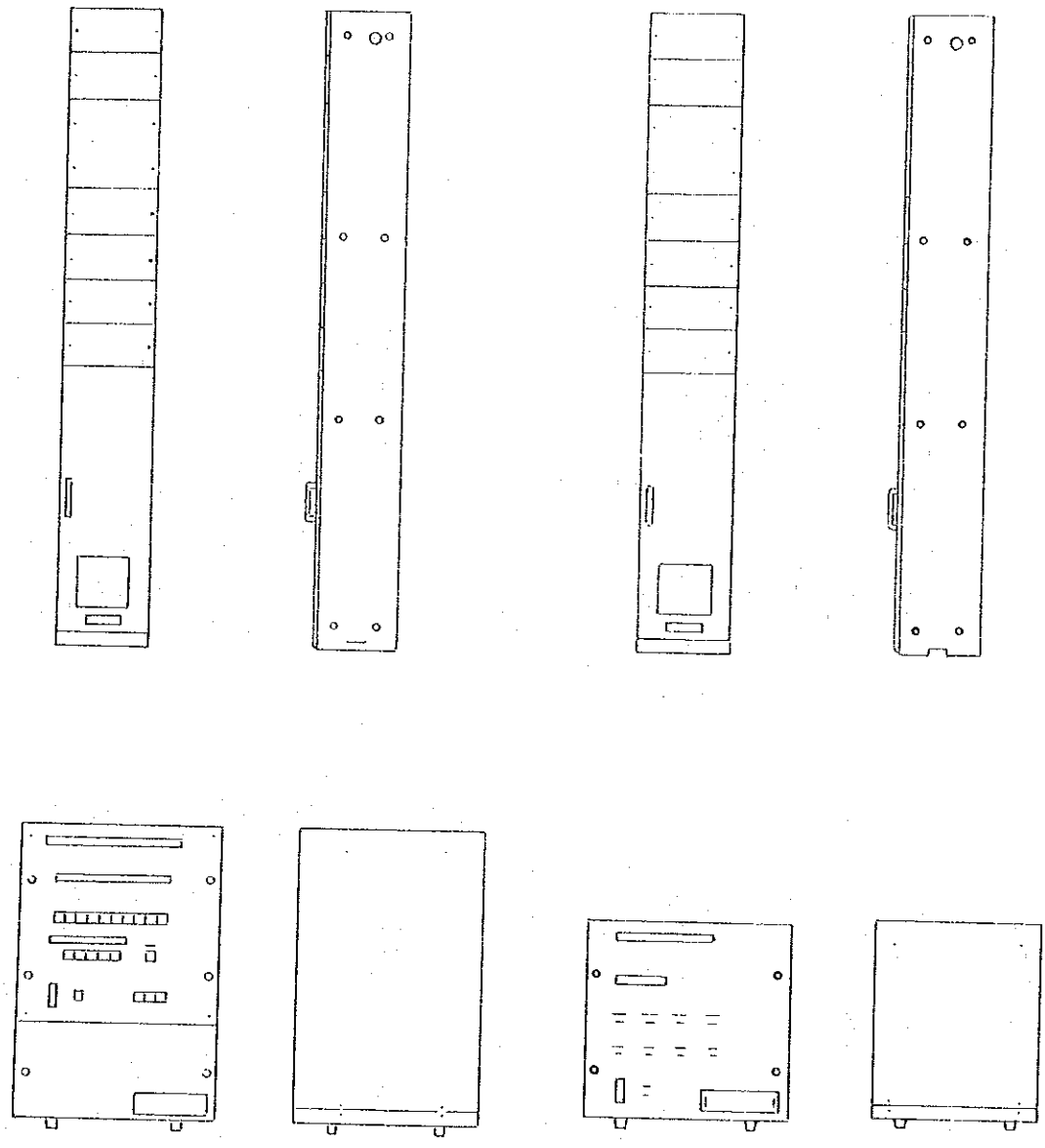
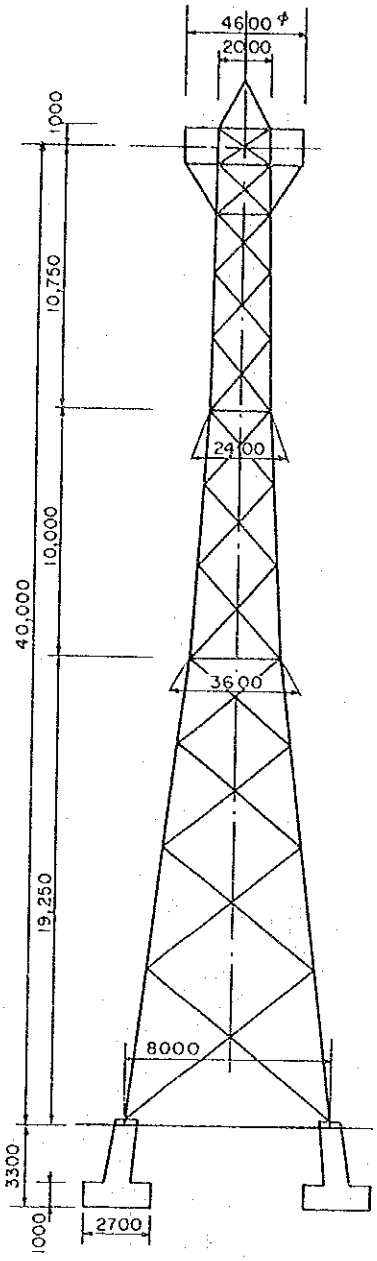


Fig.B.3 Remote Supervisory and Control Equipment

Typical Outline Drawing



Height of Antenna 40m

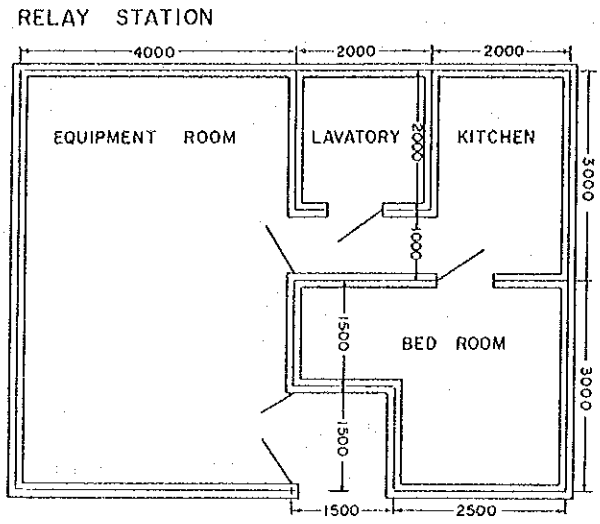
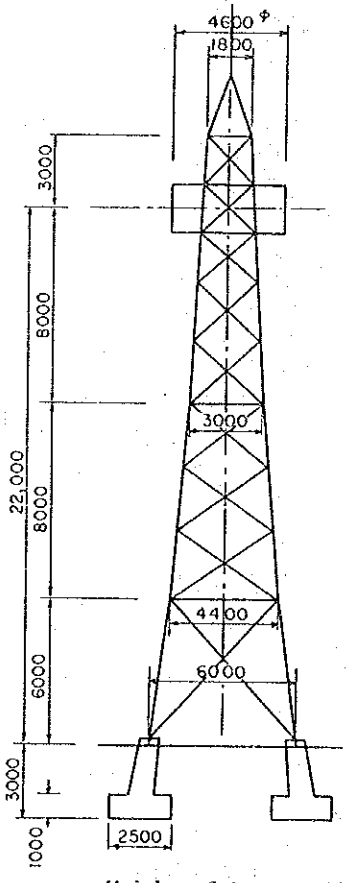
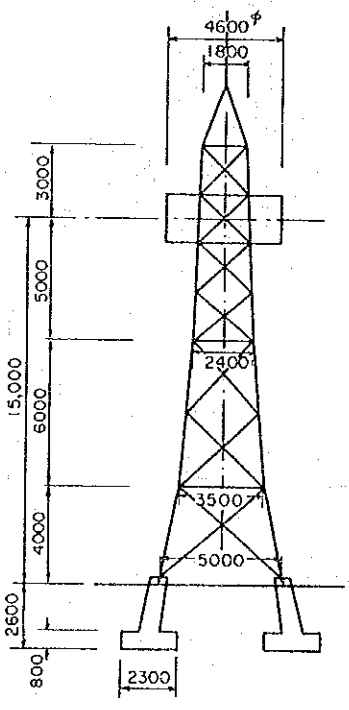


Fig. B.4 Layout of Relay Station



Height of Antenna 22m



Height of Antenna 15m

Fig. B.5 General View of Antenna Tower

* A part of room lights are used for emergency room lights, when a diesel engine generator is operated.

* Outlets for measurement equipment are supplied AC power through on AVR.

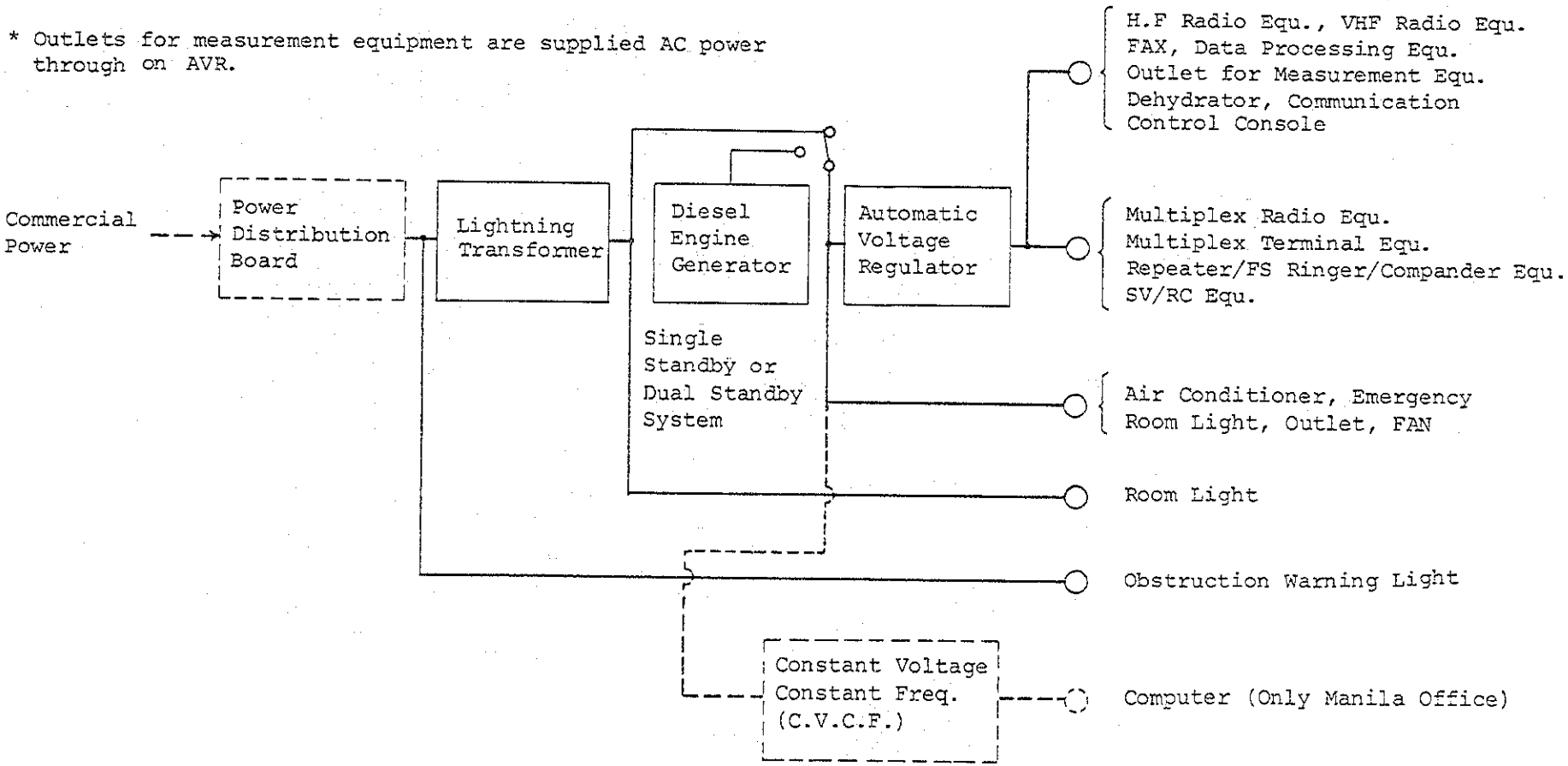


Fig. B.6 Block Diagram for Power Supply System

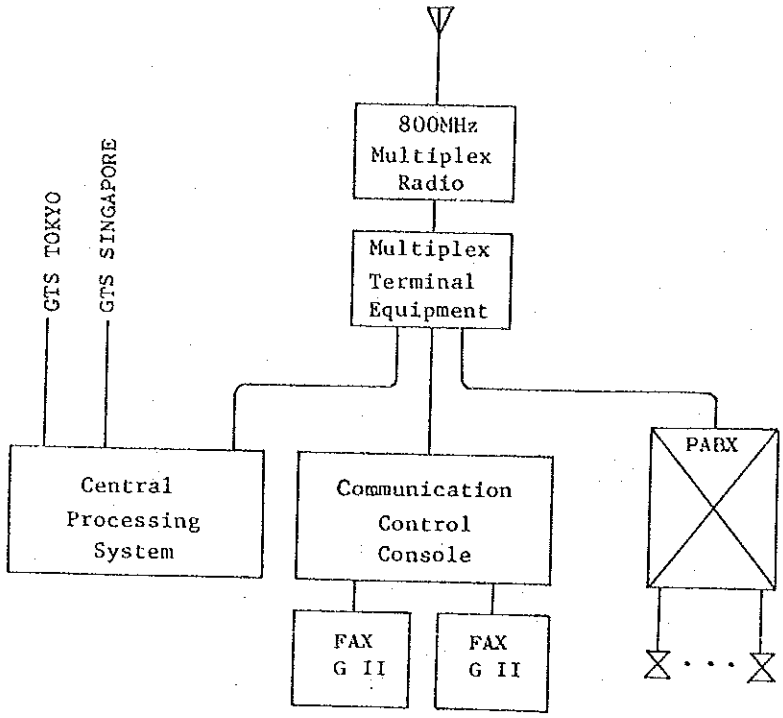


Fig. B.7 Block Diagram of the PFC

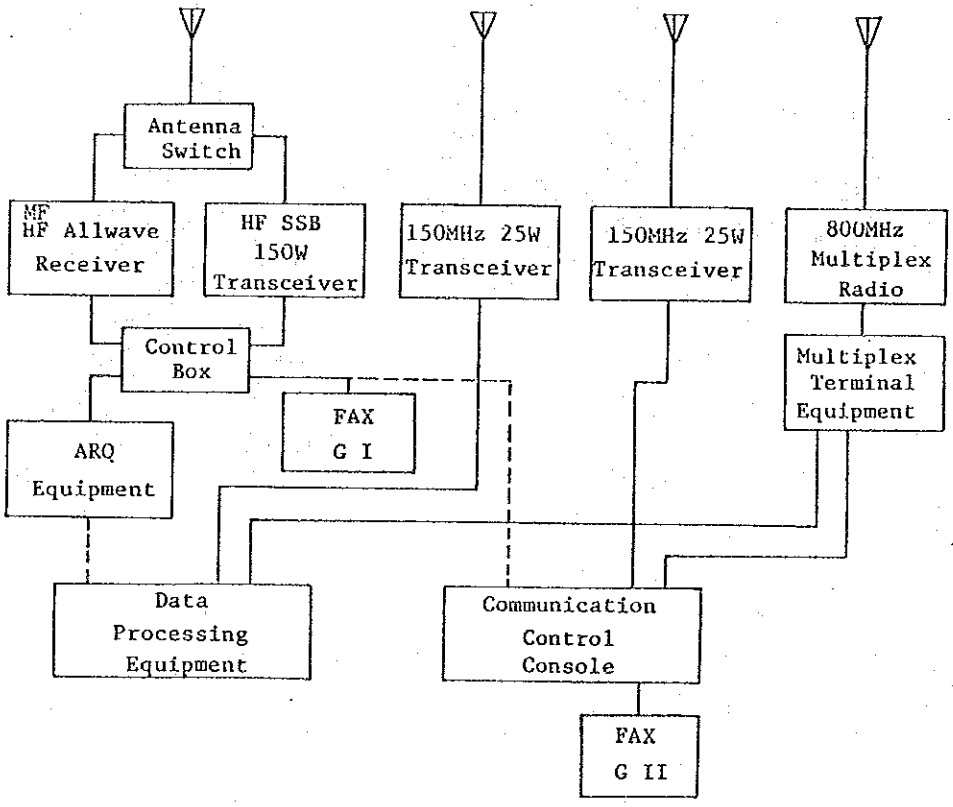


Fig. B.8 Block Diagram of DCC

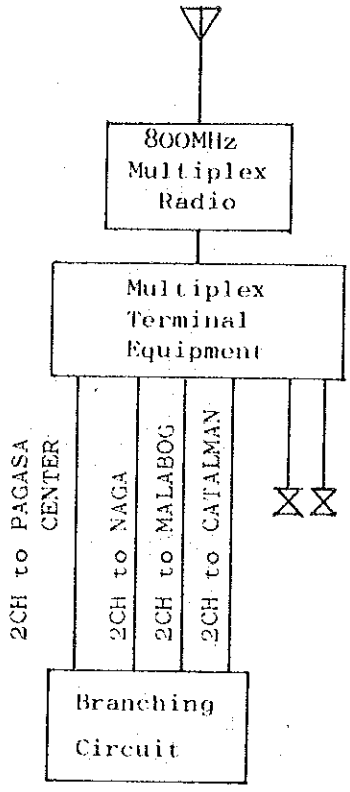


Fig. B.9 Block Diagram of LEGASPI

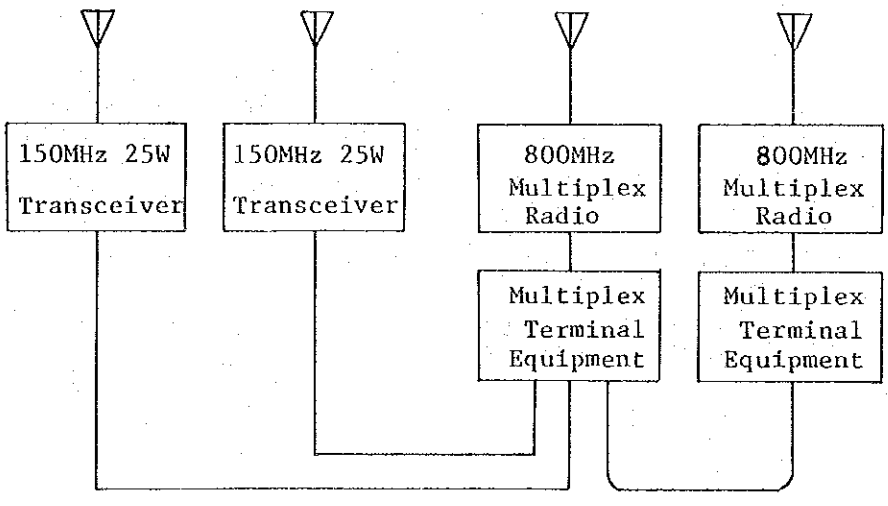


Fig. B.10 Block Diagram of CARMEN ROSARES and TANAY

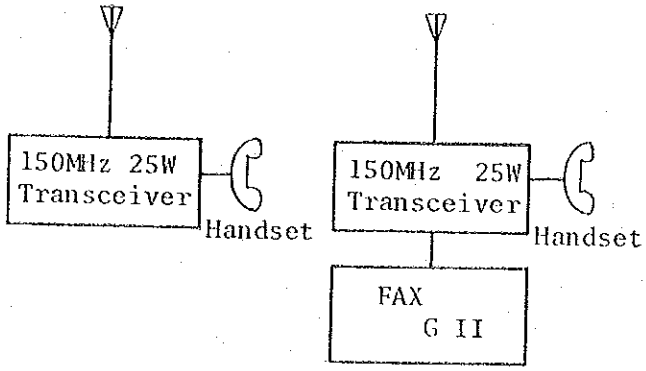
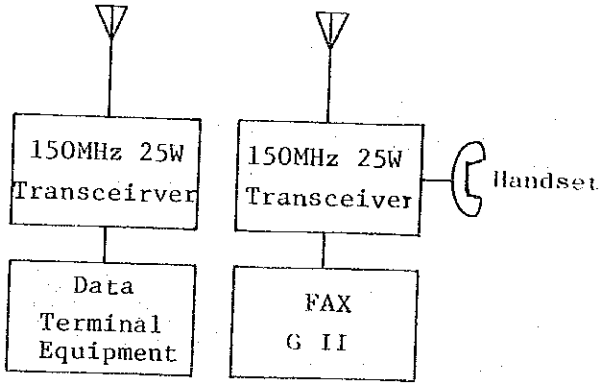
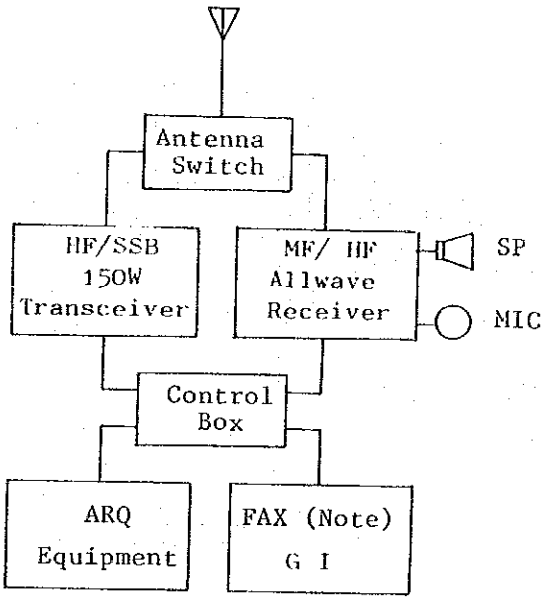


Fig. B.11 Block Diagram of DILIMAN



(1) Observation Station (VHF)



Note, For radar station only

(2) Observation Station (HF)

Fig. B.12 Block Diagram of Observation Station

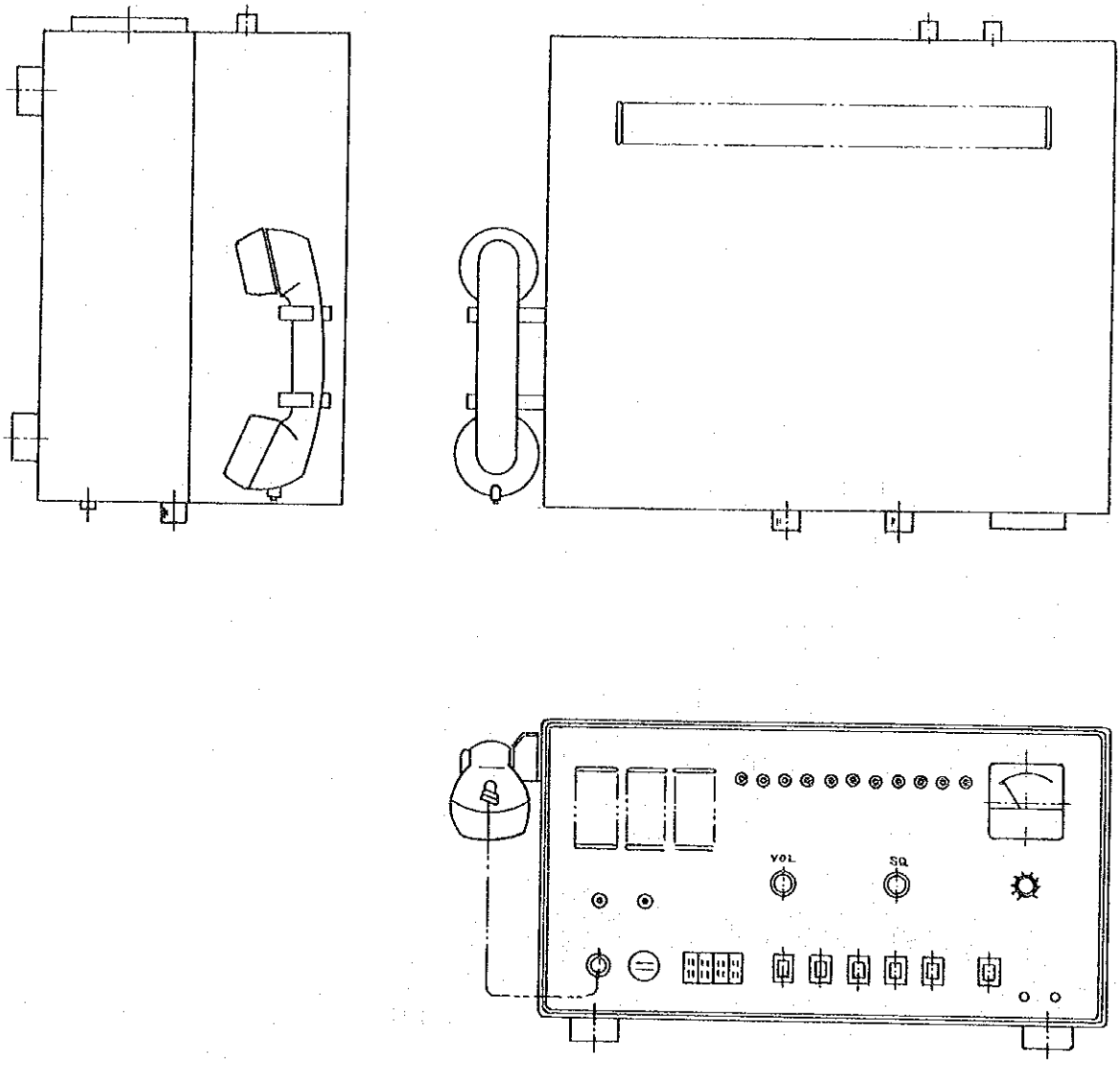


Fig. B. 13 Outside View of VHF Transceiver

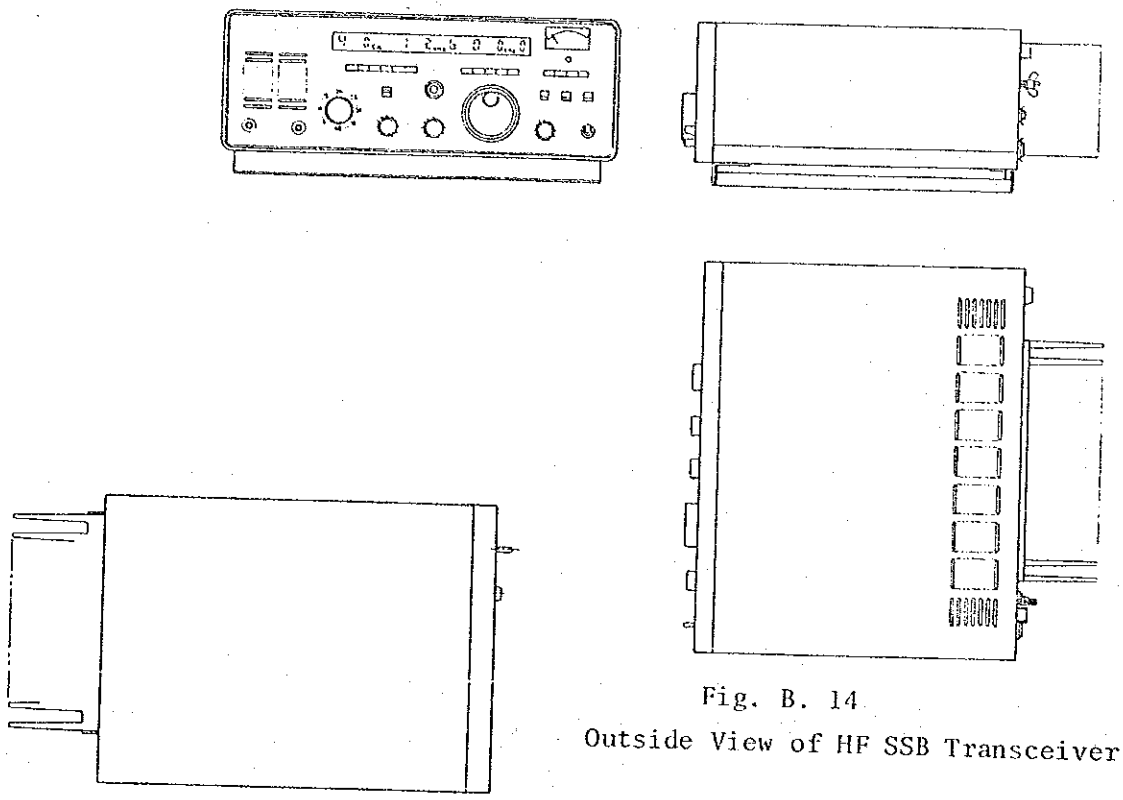


Fig. B. 14
Outside View of HF SSB Transceiver

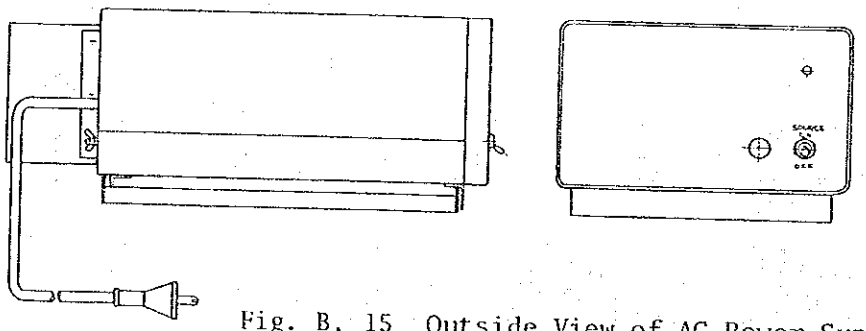


Fig. B. 15 Outside View of AC Power Supply
(for HF SSB Transceiver)

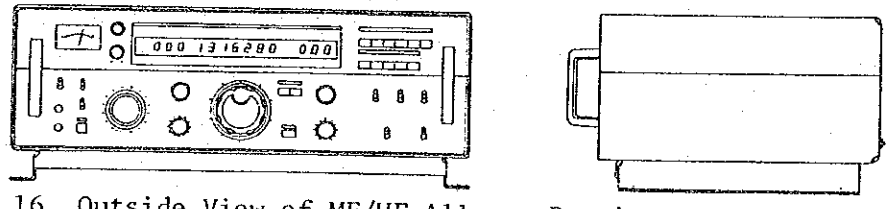


Fig. B. 16 Outside View of MF/HF Allwave Receiver

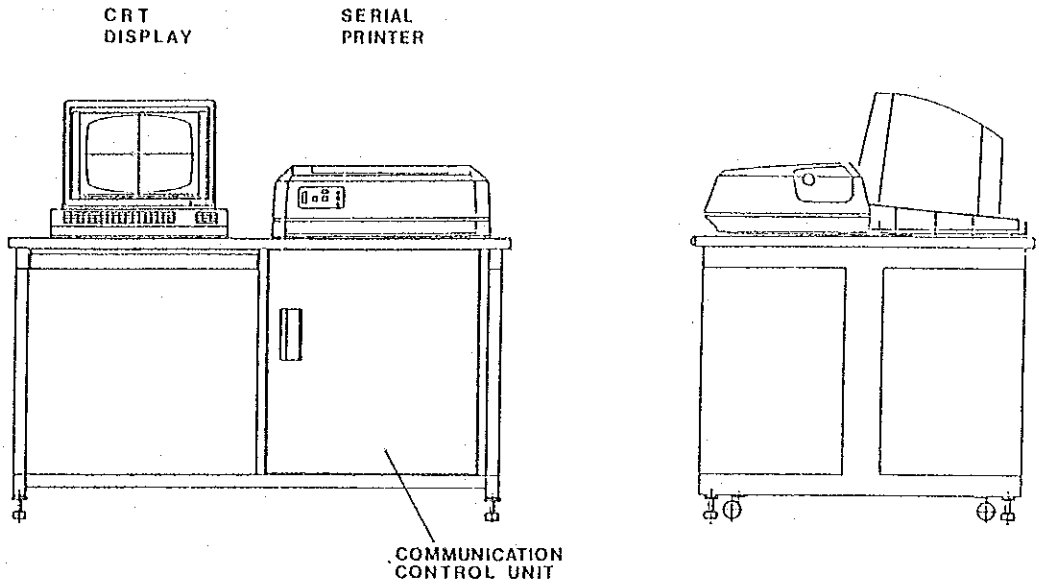


Fig. B. 17 Outside View of Terminal Equipment
(for DCC)

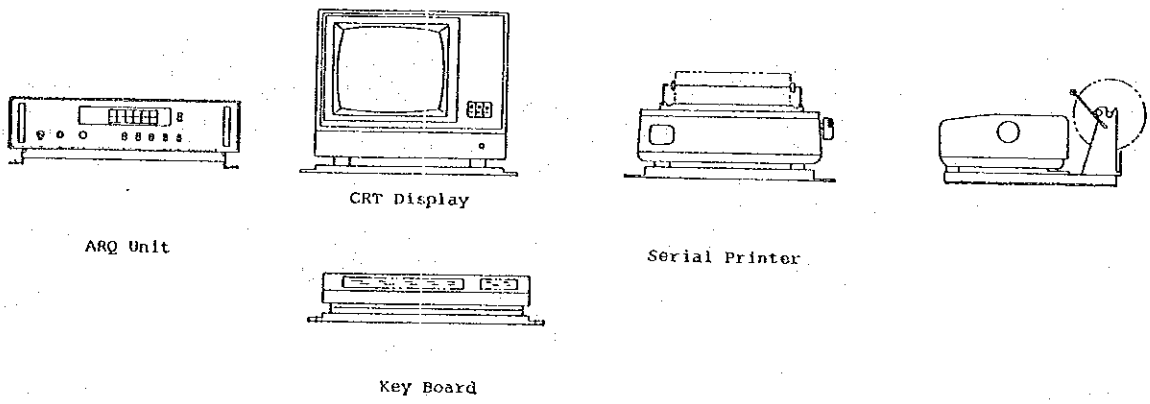


Fig. B. 18 Outside View of ARQ Equipment

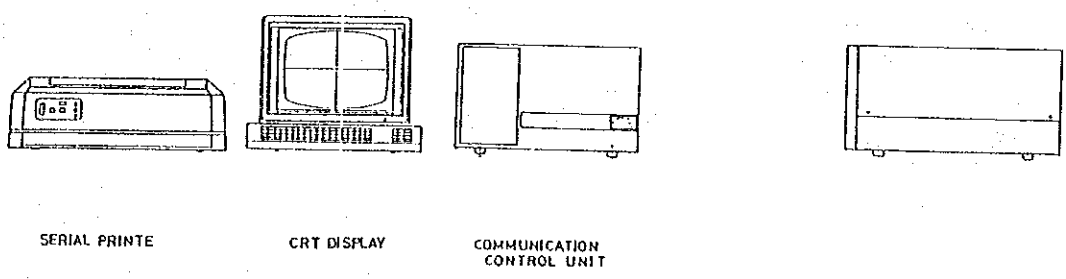


Fig. B. 19 VHF/Cable Link Station

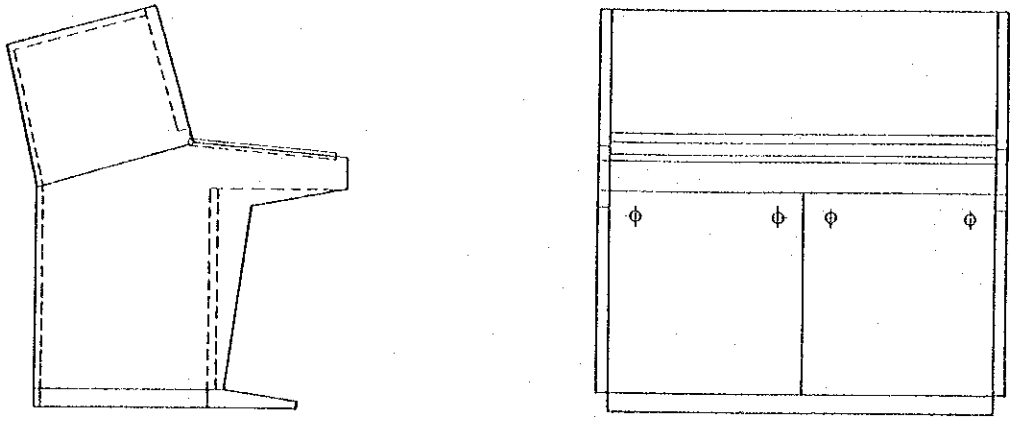


Fig. B. 20 Outside View of Communication Control Console (for PFC)

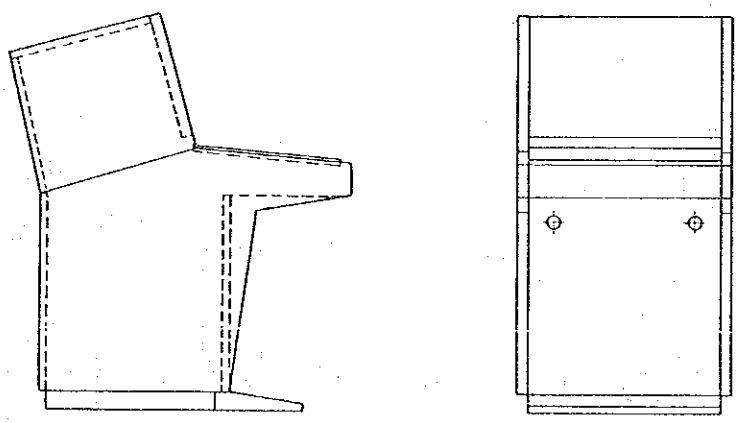


Fig. B. 21 Outside View of Communication Control Console (for DCC)

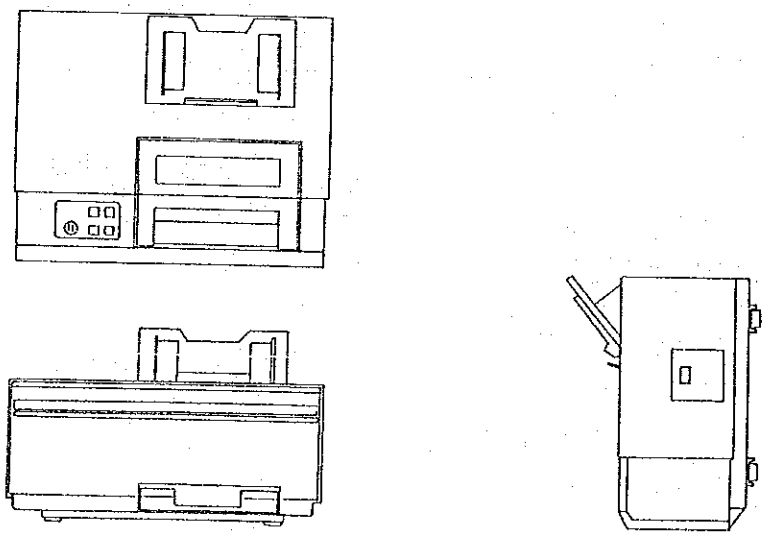


Fig. B. 22 Outside View of Facsimile

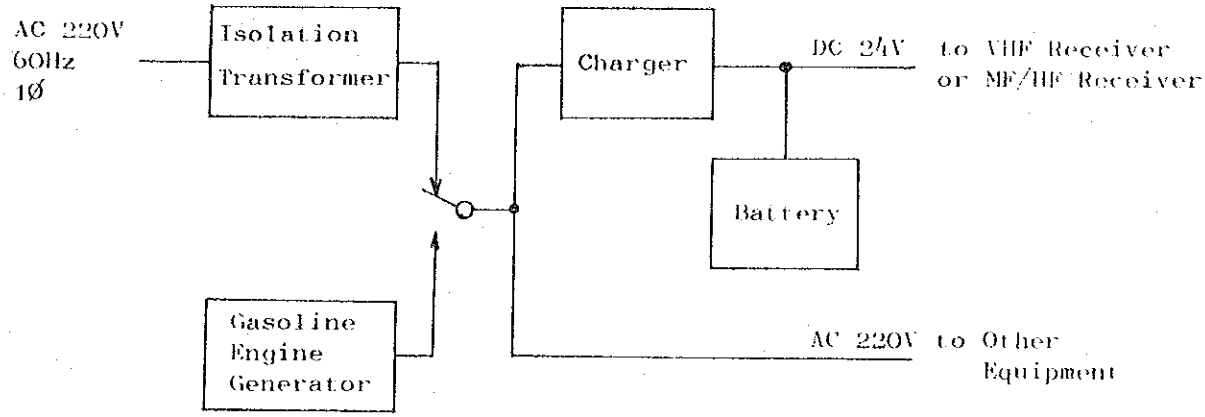


Fig. B. 23 Block Diagram of Power in Observation Station

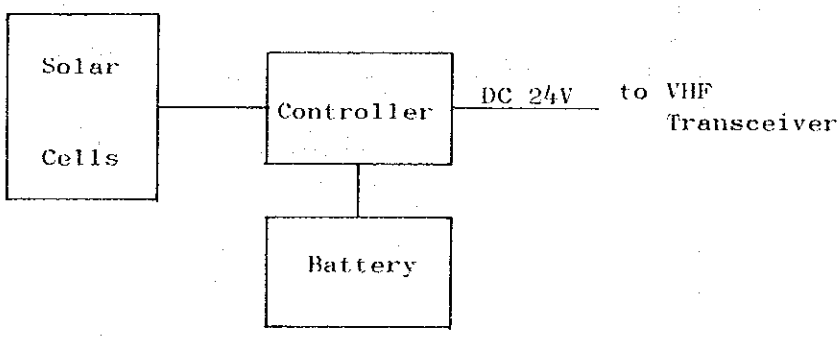


Fig. B. 24 Block Diagram of Solar Cell Power Supply

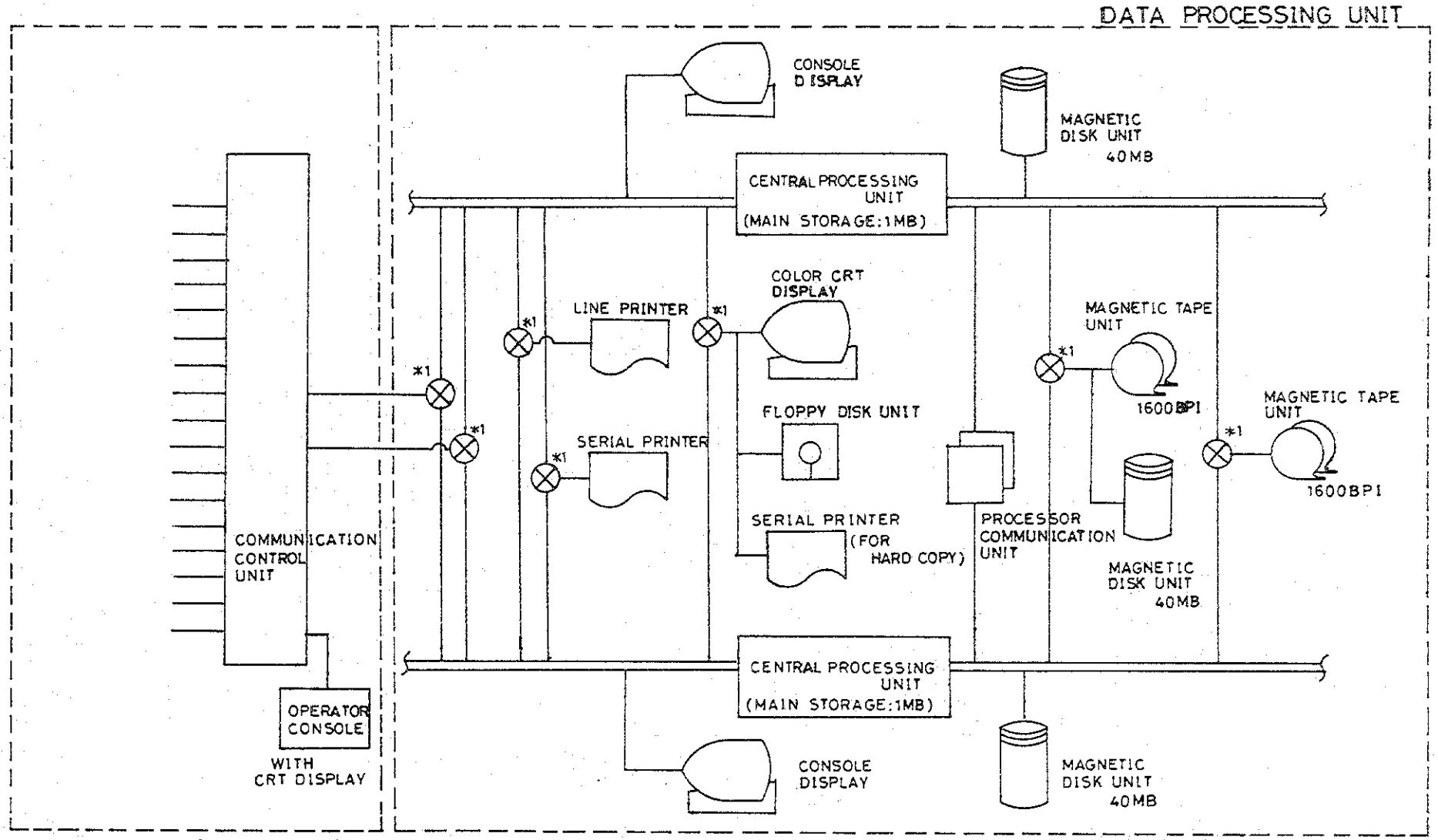


Fig. B. 25 Configuration of Data Processing System

NOTES *1 : COMMON BUS SWITCH (AUTOMATIC/MANUAL)

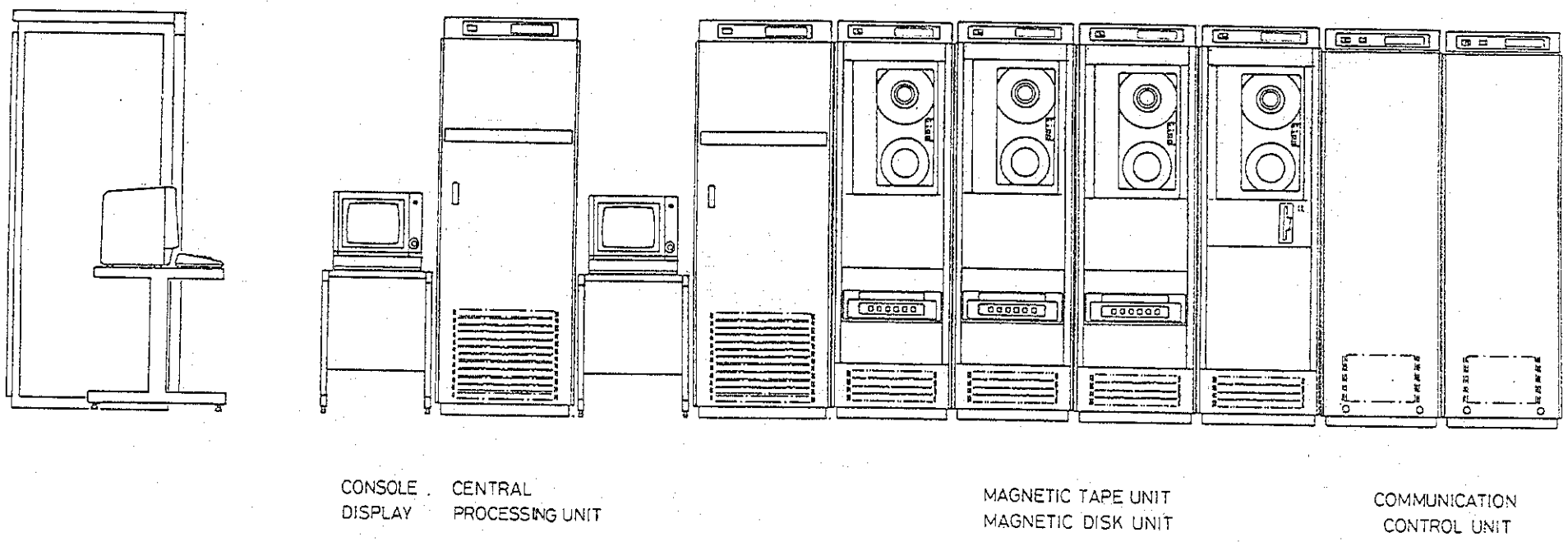


Fig. B. 26 Outside View of Computer System
(for PFC)

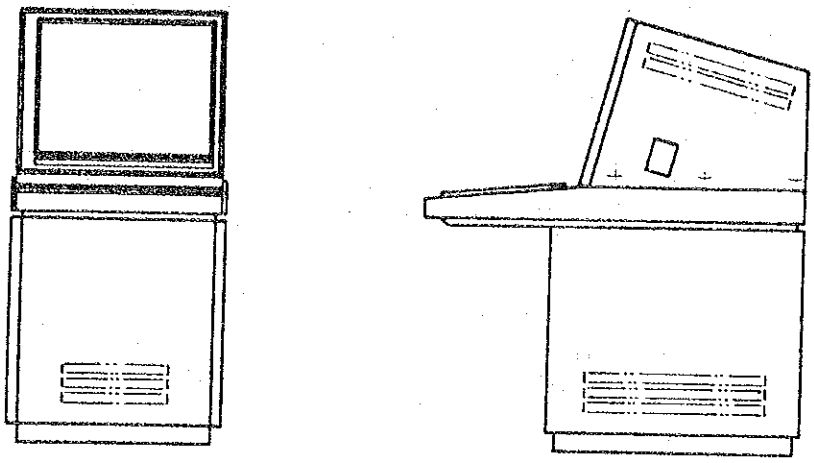


Fig. B. 27 Outside View of Color CRT Display

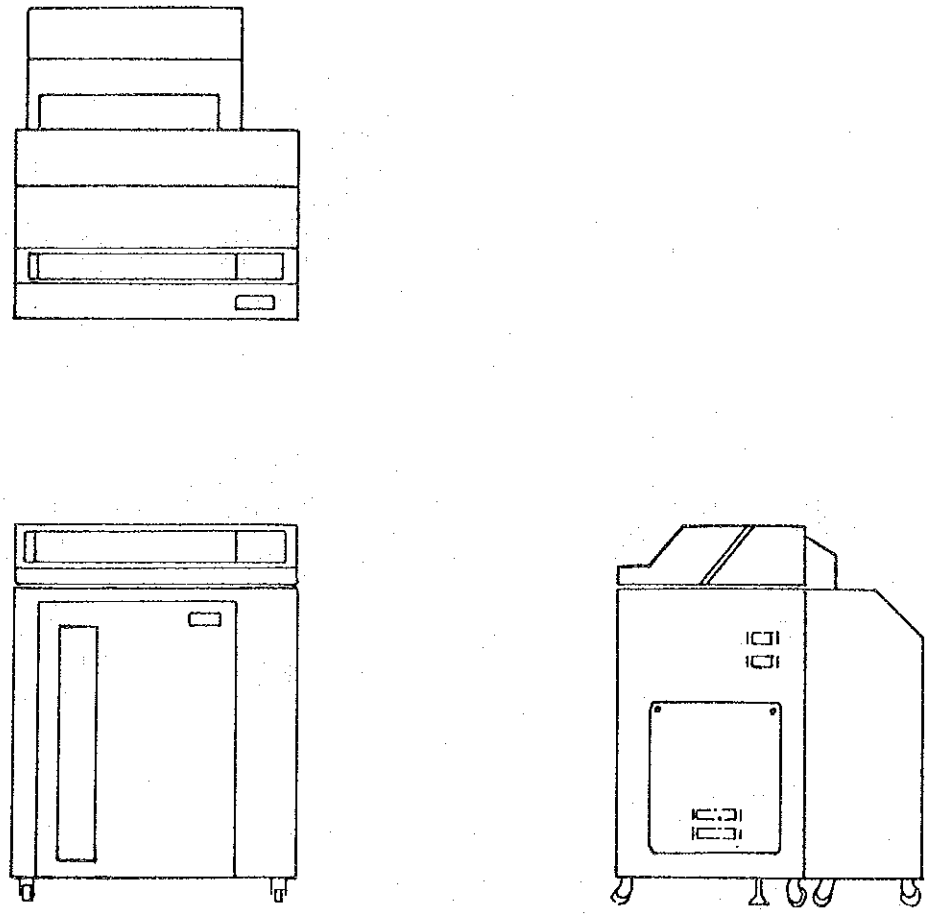


Fig. B. 28 Outside View of Line Printer

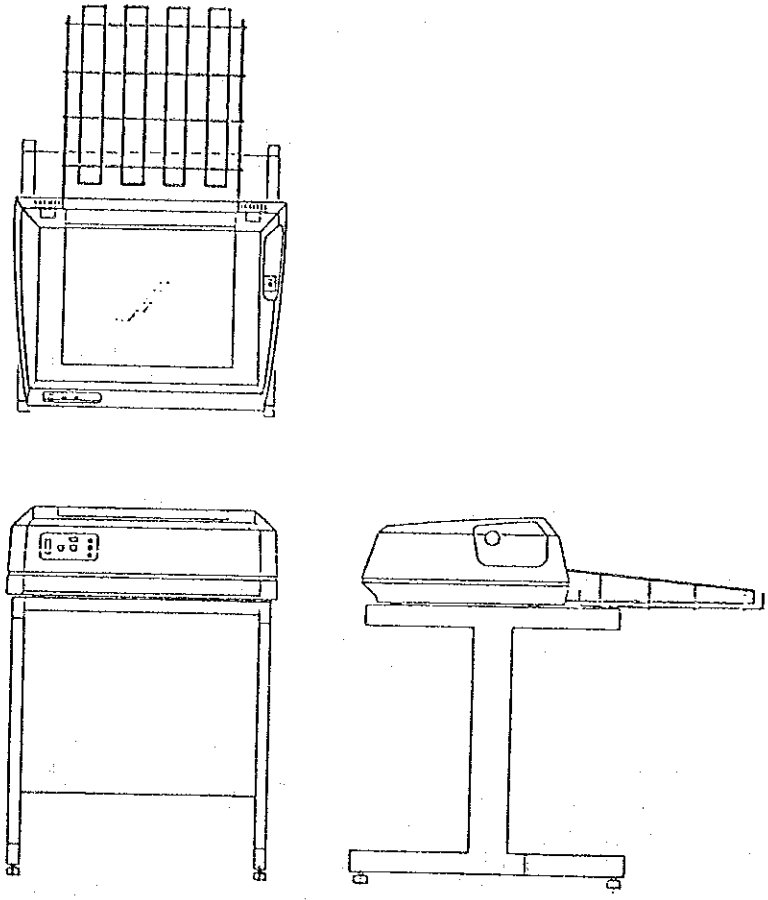


Fig. B. 29 Outside View of Serial Printer

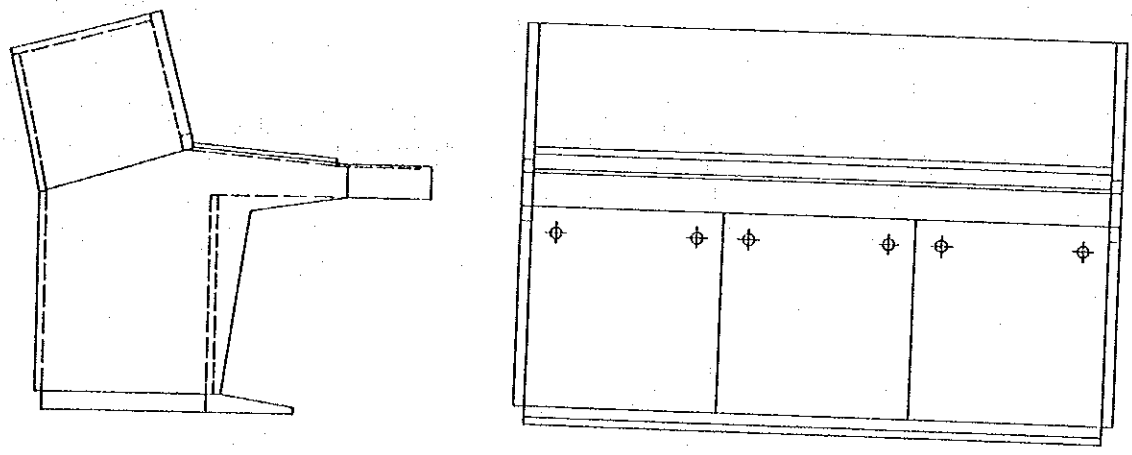
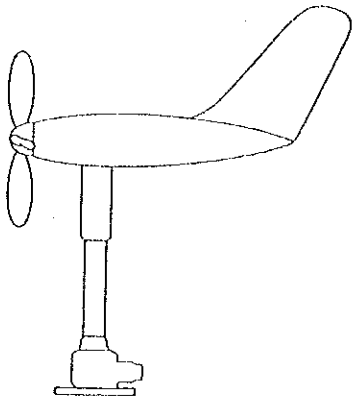
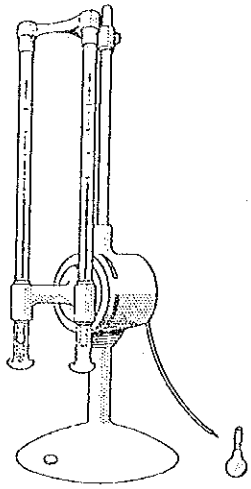


Fig. B. 30 Outside View of Operation Console
(for PFC)

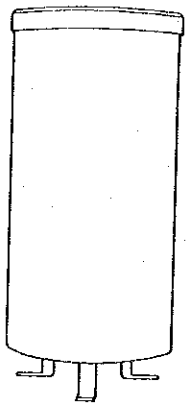


Propeller Type Wind Sensor

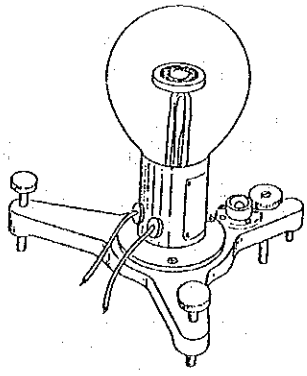


Psychrometer

Fortin Barometer



Rainguage



Pyranometer

Fig.B 31 Exterior View of Observation Instruments

Table B.1 Specification for Antenna

Antenna Type	Frequency Band	T-R Spacing	Isotropic Gain	F/B Ratio	Weight	Apparent Area	Wind Pressure Load at 60m/s	Mounting Type
800MHz Band 12 ele. YAGI Antenna	620-960 MHz	Less than 10% of center freq.	More than 13.0 dB at 800 MHz	More than 20.0 dB	Less than 5 kg	Less than 0.12 m^2	Less than 33 kg	-
800 MHz Band 1.8mø Grid Parabolic Ant.	620-960 MHz	Less than 10% of center freq.	More than 20.0 dB at 800 MHz	More than 22.0 dB	Less than 90 kg	Less than 1.3 m^2	Less than 483 kg	Pole mount
" 3.0mø "	"	"	More than 25.0 dB at 800 MHz	More than 25.0 dB	Less than 140 kg	Less than 2.7 m^2	Less than 1,003 kg	"
" 4.2mø "	"	"	More than 28.0 dB at 800 MHz	More than 25.0 dB	Less than 300 kg	Less than 4.7 m^2	Less than 1,745 kg	"
" 6.0mø "	"	"	More than 31.5 dB at 800 MHz	More than 25.0 dB	Less than 615 kg	Less than 9.4 m^2	Less than 3,491 kg	"
" 10.0mø "	"	"	More than 35.5 dB at 800 MHz	More than 25.0 dB	Less than 1,950 kg	Less than 25.6 m^2	Less than 9,505 kg	Bolt mount
6700 MHz Band 4.0mø Plate Parabolic Ant. (Value marked * is with radom)	6.5-6.9 GHz	-	More than 46.0 dB *45.0 dB at 6.7 GHz	More than 55 dB *53 dB	Less than 415 kg *535 kg	Less than 13.3 m^2	Less than 4,949 kg 3,450 kg	"

Table B.2 Specification for Feeder

Feeder Type	Impedance	Attenuation	V.S.W.R.	Inner Conductor	Insulation	Outer Conductor	Jacket
Coaxial Cable (Typical Model AFZE50-7)	50 ohms	Typical 0.06 dB/m at 800 MHz	Less than 1.2	Copper Tube	Highly Formed Polyethylene	Aluminum Tube	Polyethylene Coloured Black
Coaxial Cable (Typical Model SFZE50-13W)	50 ohms	Typical 0.03 dB/m at 800 MHz	Less than 1.2	Copper Tube	Air & Poly-ethylene Tape	Aluminum Tube	Polyethylene Coloured Black
Rectangular Flexible Wave; de (Typical Model FR-6U)	-	Less than 0.05 dB/m at 6.4 GHz	Less than 1.17	-	-	Corrugated Copper Tube	Polyethylene Coloured Black

Table B.3

Setting Condition of Antenna Tower

Station	Number of tower	Number of antenna	Antenna height (m)	Antenna size
GAPAS	1	2	22	4.2 mϕ G.P 6.0 mϕ G.P
MALABOG	2	2	22	3.0 mϕ G.P 10.0 mϕ G.P
		1	15	10.0 mϕ G.P
BALOD	2	1	22	10.0 mϕ G.P
		2	40	10.0 mϕ G.P 4.0 mϕ P.P
CAPACUAN	1	2	15	4.0 mϕ P.P x 2
TINAMBACAN	2	2	10	4.0 mϕ P.P 10.0 mϕ G.P
		1	10	10.0 mϕ G.P
DANAO	2	4	15	10.0 mϕ G.P x 2 6.0 mϕ G.P x 2
MALASAG	2	2	10	6.0 mϕ G.P x 2

Notes G.P : GRID PARABOLA ANTENNA
P.P : PLATE PARABOLA ANTENNA

Table B.4 Power Consumption of Communication Facilities

Facilities	Specification	Power Consumption (at AC 200V)
Multiplex Radio Equipment	800MHz Band SS-PM 70W FD System	1200 VA
"	800MHz Band SS-PM 70W SD System	700 VA
"	800MHz Band SS-PM 5W System	120 VA
"	800MHz Band SS-FM 5W System	160 VA
"	6.7GHz Band SS-FM 1W	200 VA
Multiplex Terminal Equipment	29 ch (SGI), (GA, GB)	70 VA
"	12 ch (GA)	60 VA
Baseband Dis. Subrack		60 VA
HYB & CB/FXC Rep.	Subrack 12 ch	30 VA
"	" 6 ch	15 VA
"	Rack type 24 ch	60 VA
"	" 12 ch	50 VA
SV/RC Equipment	Master Station	30 VA
"	Remote Station	15 VA
FS/COMP Equipment	24 ch	200 VA
"	12 ch	160 VA
HF Radio Equipment		2000 VA
VHF Radio Equipment		150 VA
ARQ Equipment		250 VA
Facsimile		300 VA
Data Processing Equipment	for DCC, DRS	1000 VA
"	for	900 VA
Communication Control Console	for MANILA	300 VA
"	for DCC, DRS	200 VA
C.V.C.F. for MANILA		60000 VA
Dehydrator		300 VA
Room Light		400 VA
"	for emergency	200 VA
Outlet	for measurement equip.	500 VA
"		2000 VA

Table B.5 List of Power Facilities

Site	Automatic Voltage Regulator	Diesel Engine Generator	Day Tank (litre)	Bulk Tank (litre)	Isolation Transformer
PFC	10.0kVA, 220V, 60Hz, 1ø	-	-	-	-
NAGA	5.0kVA, 220V, 60Hz, 1ø	-	-	-	-
GAPAS	5.0kVA, 220V, 60Hz, 1ø	25kVA Dual Stand-by System 220V, 60Hz, 1ø	300	6,000	30kVA, 220V, 60Hz, 1ø
MALABOG	5.0kVA, 220V, 60Hz, 1ø	25kVA Dual Stand-by System 220V, 60Hz, 1ø	300	6,000	30kVA, 220V, 60Hz, 1ø
BALOD	3.0kVA, 220V, 60Hz, 1ø	15kVA Dual Stand-by System 220V, 60Hz, 1ø	200	4,000	20kVA, 220V, 60Hz, 1ø
TINAMBACAN	3.0kVA, 220V, 60Hz, 1ø	15kVA Dual Stand-by System 220V, 60Hz, 1ø	200	4,000	20kVA, 220V, 60Hz, 1ø
DANAO	5.0kVA, 220V, 60Hz, 1ø	25kVA Single Stand-by System 220V, 60Hz, 1ø	200	2,000	30kVA, 220V, 60Hz, 1ø
MALASAG	3.0kVA, 220V, 60Hz, 1ø	15kVA Single Stand-by System 220V, 60Hz, 1ø	200	2,000	20kVA, 220V, 60Hz, 1ø
LEGASPI	5.0kVA, 220V, 60Hz, 1ø	25kVA Single Stand-by System 200V, 60Hz, 1ø	200	2,000	30kVA, 220V, 60Hz, 1ø
CATARMAN	3.0kVA, 220V, 60Hz, 1ø	15kVA Single Stand-by System 220V, 60Hz, 1ø	200	1,000	20kVA, 220V, 60Hz, 1ø
MACTAN RADAR	10.0kVA, 220V, 60Hz, 1ø	35kVA Single Stand-by System 220V, 60Hz, 1ø	300	4,000	40kVA, 220V, 60Hz, 1ø
CAGAYAN DE ORO	10.0kVA, 220V, 60Hz, 1ø	35kVA Single Stand-by System 220V, 60Hz, 1ø	300	4,000	40kVA, 220V, 60Hz, 1ø

Table B.6

Calculation Sheet of Power Facilities

Site \ Description	Capacity of Automatic Voltage Regulator														Capacity of Diesel Engine Generator									
	AC Power Consumption (kVA)														AC Power Consumption (kVA)								DEG Capacity (kVA, 220V)	Isolation Transformer Capacity (kVA, 220V)
	Multiplex Radio Equipment	Multiplex Terminal Equipment	FS Ringer/Compander Equipment	Supervisory/ Control Equipment	H.F. Radio Equipment	VHF Radio Equipment	AMQ Equipment	Data Processing Equipment	Facsimile Equipment	Dehydrator	Outlet for Measurement Equipment	Communication Control Console	Total (Total x 1.2)	AVR Capacity (kVA, 220V)	Automatic Voltage Regulator	Air Conditioner	C.V.C.F.	FAN	Room Light	Outlet	Exchanger	Total (Total x 1.2)		
PFC	0.16	0.26	0.2	0.03	2.0	-	0.25	-	0.9	-	0.5	0.3	4.6 (5.6)	10.0	15.7	-	60	-	-	-	1.5	77.2 (92.7)	-	-
SCIENCE GARDEN	0.28	0.27	-	-	-	-	-	0.9	0.3	-	-	0.2	2.0 (2.4)	-	-	-	-	-	-	-	-	-	-	-
TANAY		0.81	-	-	-	0.3	-	-	-	-	-	-	1.2 (1.4)	-	-	-	-	-	-	-	-	-	-	-
GAPAS	2.4	-	-	0.02	-	-	-	-	-	0.3	0.5	-	3.3 (3.9)	5.0	7.9	4.5	-	0.3	0.2	2	-	14.9 (17.9)	25.0	30.0
NAGA	1.2	0.21	0.16	-	-	0.3	-	-	-	-	0.5	-	2.4 (2.9)	5.0	7.9	-	-	-	-	-	-	7.9 (9.5)	-	-
LEGASPI	0.12	0.08	0.16	0.03	-	-	-	1.0	0.3	-	0.5	0.2	2.4 (2.9)	5.0	7.9	4.5	-	0.3	0.2	2	-	14.9 (17.9)	25.0	30.0
MALABOG	2.02	0.25	-	0.02	-	0.3	-	-	-	0.3	0.5	-	3.4 (4.1)	5.0	7.9	4.5	-	0.3	0.2	2	-	14.9 (17.9)	25.0	30.0
BALOD	1.02	0.18	-	0.02	-	-	-	-	-	0.3	0.5	-	2.1 (2.5)	3.0	4.7	4.5	-	0.3	0.2	2	-	11.7 (14.0)	15.0	20.0
CATARMAN	0.12	0.08	-	0.03	-	-	-	0.9	0.3	-	0.5	-	2.0 (2.4)	3.0	4.7	4.5	-	0.3	0.2	2	-	11.7 (14.0)	15.0	20.0
TINAMBACAN	0.9	0.12	-	0.02	-	0.3	-	-	-	0.3	0.5	-	2.2 (2.6)	3.0	4.7	4.5	-	0.3	0.2	2	-	11.7 (14.0)	15.0	20.0
DANAO	1.52	0.19	-	0.02	-	0.3	-	-	-	0.3	0.5	-	2.9 (3.4)	5.0	7.9	4.5	-	0.3	0.2	2	-	14.9 (17.9)	25.0	30.0
MACTAN RADAR	0.12	0.08	0.16	0.03	2.0	-	0.25	1.0	0.6	-	0.5	0.2	5.0 (6.0)	10.0	15.7	4.5	-	0.3	0.2	2	-	22.7 (27.3)	35.0	40.0
MALASAG	0.82	-	-	0.02	-	-	-	-	-	0.3	0.5	-	1.7 (2.0)	3.0	4.7	4.5	-	0.3	0.2	2	-	11.7 (14.0)	15.0	20.0
CAGAYAN DE ORO	0.12	0.09	0.16	0.03	2.0	0.3	0.25	1.0	0.6	-	0.5	0.2	5.3 (6.3)	10.0	15.7	4.5	-	0.3	0.2	2	-	22.7 (27.3)	35.0	40.0

AVR Input Power Consumption: $\frac{\text{Output}}{0.75 \times 0.85}$

Table B.7 Power Consumption of Oysservatory

	Battery	Charger		VHF Transmitter (25W)	HF Transmitter (150W)	Data Terminal Equipment	ARQ Equipment	Facsimile	Measuring Equipment	Total Power Consumption	Isolation Transformer	Gasoline Engine Generator
		Output	Input									
Observation Station (VHF 1)	24V 20AH	24V 4A	0.2kVA	0.4kVA (2 Sets)	0.9	0.9kVA		0.3kVA	0.1kVA	1.9kVA	3kVA	3kVA
Observation Station (VHF 2)	24V 20AH	24V 4A	0.2kVA	0.8kVA (4 Sets)		0.9kVA		0.3kVA	0.1kVA	2.3kVA	3kVA	3kVA
Observation Station (HF)	24V 20AH	24V 4A	0.2kVA		1.0kVA		0.25kVA	0.3kVA	0.1kVA	1.85kVA	3kVA	3kVA

Note, The station (VHF 1) is a observating station.
The station (VHF 2) is a observating and repeating station.
(VIGAN, BAGUIO RADAR, MANOS, BALER RADAR, MASBATE and TACLOBAN)

Table B.8

Observing Data (Number of Figure) in each Observing Time

Observing Time / Region	00Z	03Z	06Z	09Z	12Z	15Z	18Z	21Z	Total	Emergency Time	Total
Mindanao	2760	600	1230	600	1530	600	1230	600	9150	1250	10400
Visayas	4390	550	1360	550	3460	550	1360	550	12770	1600	14370
Southern Luzon	3660	590	1490	590	3390	590	1490	590	12390	2000	14390
Northern Luzon	4870	540	1440	540	3940	540	1440	540	13850	1750	15600
Total	15680	2280	5520	2280	12320	2280	5520	2280	48160	6600	54760

Basis of Estimation

SM (Synop)	90 figure/1 report	4 times/day
SI (Synop)	"	"
US (Temp.)	930 figure/1 report	1 time/day
UP (Pilot)	300 figure/1 repott	2 times/day
RA (Radar)	400 figure/1 report	"
SE (Seismic)	50 figure/1 day	Emergency case
BE (Business)	100 figure/1 day	"
Marine	90 figure/1 report	3 times/day

Appendix C

Appendix. C A Questionaire on the Estimated Mitigation of Typhoon Damage by the Propose Meteorological Telecommunication System

1. Objective of the questionaire:

To estimate the economic benefit to be realized by the proposed meteorological telecommunication system.

For the above-mentioned objective, the opinions of the concerned distinguished and experienced personnels are to be collected.

2. Assumptions for the future situations:

(1) The meteorological telecommunication system now under study is assumed to have been completed and operated with its full effects.

(2) Consequently, the weather forecast is much improved in terms of its accuracy and the typhoon track forecast can be disseminated to the general public quickly enough to take all the possible preventive actions for the coming typhoon.

(3) Mitigation of typhoon damage can be fully realized by the aggregated effects of flood control structure such as dams and levees, and non structural measures such as flood forecasting and warning system and meteorological telecommunication system. In this questionaire, please estimate the typhoon damage mitigation assuming the conditions in which structural measures such as dams and levees are constructed and non structural measures such as FFWS and MTS are installed.

3. Filling the "ANSWER SHEET"

Attached hereto is the "ANSWER SHEET", of which last column (utmost right) is that to be filled by you. On the said sheet, the damage data of the typhoon Bebeng in December 1983 is presented to show the breakdown of the typhoon damage. The damage amount and its percentage share shown are for your reference only.

What you are requested is to estimate the future decrease (or increase if any) of typhoon damage assuming that the proposed meteorological telecommunication system is fully operating. The present damage values of each damage item are represented by 100 in the third column and, for example, if you think that "Agricultural Crops" damage can be mitigated and decreased to 60 in the future, then please fill "60" in the right-most column of the "Agricultural Crops".

4. Procedures of aggregating the "Answers"

(1) This questionaire will be replied by the distinguished and experienced personnels of the government agencies concerned to natural disaster mitigation such as OCD, PNRC, MPWH, MOA, NIA, TCS and PAGASA.

(2) The "ANSWER SHEET" filled by you and sent to PAGASA 1/ will be compiled to show the result of "FIRST FILLING", which will be sent back to you later. Then, please make the "SECOND FILLING" by following the same procedures as the first one; but, prior to make the "SECOND FILLING", you are requested to refer and take into consideration the opinions of the other people which are shown in the result of "FIRST FILLING".
Your opinion may or may not be varied and/or adjusted to those of other people.

/1 The officer in charge is Mr. Juan F. Asuncion, Assistant Weather Services Chief, National Weather Office, PAGASA, QCDB Bldg., 1424 Quezon Ave., Quezon City, Metro Manila Tel. No. 968-077

(3) After the "SECOND FILLING", please send the "ANSWER SHEET" to PAGASA, where the result of the "SECOND FILLING" will be compiled and sent back to you again. Please make the "THIRD FILLING" by following the same procedures as the second one; again you are requested to refer and take into consideration the opinions of the other people which are shown in the result of "SECOND FILLING".

(4) After obtaining the "THIRD FILLING" from you, the result will be compiled and reviewed by PAGASA and JICA Study Team.

(5) The above-mentioned procedure is called "Delfi Method". This is one of the ways of future forecast through aggregating the wide areas of knowledge of experienced personnels in various fields. In "Delfi Method", it is expected that, through referring and taking into consideration the opinions of other people, the opinion of each person will become astringent to one point as the time of voting proceeds.

Attachment: "ANSWER SHEET" for "FIRST FILLING" (1 copy)

Prepared by: Mr. K. YANAGISAWA
Project Economist, JICA Study Team
April 2, 1984

Estimated Mitigation of
Typhoon Damage by the Proposed
Meteorological Telecommunication System

		Reference data of Typhoon "Bebeng" in 1983 Number	Estimated Damage Indices in Present	Future
I.	Casualties			
	(1) Dead or Missing	142	100	_____
	(2) Injured	145	100	_____
II.	Houses Destroyed			
	(1) Totally destroyed	29,054	100	_____
	(2) Partially destroyed	76,346	100	_____

		Reference data of Typhoon "Bebeng" in 1983 ₱1,000	%	Estimated Damage Indices in Present	Future
III.	Damage to Properties				
	(1) Agricultural Crops	129,860	27.8	100	_____
	(2) Livestocks	1,633	0.3	100	_____
	(3) Fishponds	214,734	46.0	100	_____
	(4) Government Properties				
	(i) Public Works				
	a) Ports, Piers or Sea Walls	7,650	1.6	100	_____
	b) School Buildings	27,861	6.0	100	_____
	c) Public Buildings	11,457	2.4	100	_____
	d) Flood Control Facilities	8,895	1.9	100	_____
	e) Irrigation Facilities	2,245	0.5	100	_____
	f) Other Public Facilities	2,464	0.5	100	_____
	(ii) Road & Bridge	44,880	9.6	100	_____
	(iii) Others	1,017	0.2	100	_____
	(5) Private Houses	15,136	3.2	100	
	Grand Total	467,832	(100.0)	-	-

Result of First Filling on

Estimated Mitigation of Typhoon Damage

	Future Damage Indices (with Present damage assuming at 100) estimated by: /1						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Casualties (in Number)							
(1) Dead or Missing	80	40	20	80	62	50	30
(2) Injured	80	40	20	80	63	50	50
II. Houses Destroyed (in Number)							
(1) Totally destroyed	100	80	80	90	75	80	90
(2) Partially destroyed	125	90	80	90	74	80	90
III. Damage to Properties (in Peso)							
(1) Agricultural Crops	100	90	85	90	82	80	90
(2) Livestocks	90	50	70	80	67	50	30
(3) Fishponds	90	90	60	80	76	70	80
(4) Government Properties							
(i) Public Works							
a) Ports, Piers or Sea Walls	100	95	95	90	82	90	90
b) School Buildings	100	95	90	90	80	80	90
c) Public Buildings	100	95	90	90	80	80	90
d) Flood Control Facilities	80	95	70	90	78	90	90
e) Irrigation Facilities	80	95	70	90	77	80	90
f) Other Public Facilities	100	95	90	90	81	80	90
(ii) Road & Bridge	100	100	95	90	87	90	90
(iii) Others	100	95	95	90	82	80	90
(5) Private Houses	100	90	80	90	73	80	85

Note; /1 Name of estimater in alphabetical order:

(1) Dr. Generoso C. Caridad; Secretary General, PNRC
(2) Mr. Bienvenido P. Faustino; Senior Vice President, PCIC
(3) Dr. Roman L. Kintanar ; Director General, PAGASA
(4) Mr. Leonardo A. Nuñez; Assistant Director, BOM, MPWH
(5) Col. Victor R. Pagulayan Jr.; Administrator, OCD
(6) Mr. Avelino S. Rivera; Manager, PDD, NIA
(7) Mr. Hideaki Yokouchi; Hydrologist, ESCAP/WMO TCS

Result of Second Filling on
Estimated Mitigation of Typhoon Damage

	Future Damage Indices (with Present damage assuming at 100) estimated by: /1						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Casualties (in Number)							
(1) Dead or Missing	70	40	20	75	80	40	50
(2) Injured	70	40	30	75	85	40	60
II. Houses Destroyes (in Number)							
(1) Totally destroyed	80	80	80	90	80	80	90
(2) Partially destroyed	90	90	80	90	85	80	90
III. Damage to Properties (in Peso)							
(1) Agricultural Crops	85	90	85	90	85	90	90
(2) Livestocks	60	60	70	80	85	50	60
(3) Fishponds	85	90	60	80	85	60	85
(4) Government Properties							
(i) Public Works							
a) Ports, Piers or Sea Walls	95	95	95	90	90	90	90
b) School Buildings	90	90	90	90	85	80	90
c) Public Buildings	90	90	90	90	85	90	90
d) Flood Control Facilities	70	90	75	90	85	70	90
e) Irrigation Facilities	70	90	75	90	85	70	90
f) Other Public Facilities	90	90	90	90	85	70	90
(ii) Road & Bridge	90	100	90	90	90	80	95
(iii) Others	85	95	90	90	85	80	90
(5) Private Houses	85	85	80	90	90	75	85

Note: /1 Name of estimater in alphabetical order:

(1) Dr. Generoso C. Caridad; Secretary General, PNRC
(2) Mr. Bienvenido P. Faustino; Senior Vice President, PCIC
(3) Dr. Roman L. Kintanar; Director General, PAGASA
(4) Mr. Leonardo A. Nuñez; Assistant Director, BOM, MPWH
(5) Col. Victor R. Pagulayan Jr.; Administrator, OCD
(6) Mr. Avelino S. Rivera; Manager, PDD, NIA
(7) Mr. Hideaki Yokouchi; Hydrologist, ESCAP/WMO TCS

Result of Third Filling on
Estimated Mitigation of Typhoon Damage

	Future Damage Indices (with Present damage assuming at 100) estimated by: /1						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Casualties (in Number)							
(1) Dead or Missing	70	40	30	75	75	40	60
(2) Injured	75	40	40	75	80	40	70
II. Houses Destroyes (in Number)							
(1) Totally destroyed	80	80	80	85	80	80	90
(2) Partially destroyed	85	85	80	85	85	80	90
III. Damage to Properties (in Peso)							
(1) Agricultural Crops	85	90	85	90	80	80	90
(2) Livestocks	65	60	70	80	75	50	60
(3) Fishponds	80	85	60	80	80	60	85
(4) Government Properties							
(i) Public Works							
a) Ports, Piers or Sea Walls	90	90	95	90	90	80	90
b) School Buildings	90	90	90	90	85	80	90
c) Public Buildings	90	90	90	90	85	80	90
d) Flood Control Facilities	75	90	75	90	90	70	90
e) Irrigation Facilities	75	90	75	90	85	70	90
f) Other Public Facilities	90	90	90	90	85	80	90
(ii) Road & Bridge	90	95	90	90	90	80	95
(iii) Others	85	95	90	90	85	80	90
(5) Private Houses	85	85	80	85	85	75	90

Note: /1 Name of estimater in alphabetical order:

(1) Dr. Generoso C. Caridad; Secretary General, PNRC
(2) Mr. Bienvenido P. Faustino; Senior Vice President, PCIC
(3) Dr. Roman L. Kintanar; Director General, PAGASA
(4) Mr. Leonardo A. Nuñez; Assistant Director, BOM, MPWH
(5) Col. Victor R. Pagulayan Jr.; Administrator, OCD
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