

**Switching
Systems**



principal office use:

☐	Metropolitan communities with numerous lines and high calling rates	No. 1 ESS (2 wire)
☐	Small to medium size urban or suburban areas	No. 2 ESS
☐	Small to medium size urban or suburban areas. Also areas where the shortened order interval offered by a pre-tested modular system is important	No. 2A ESS
☐	Small to medium size urban or suburban areas	No. 2E ESS
☐	Small to medium size urban, suburban or rural areas	No. 3 ESS
☐	4-wire toll and tandem operation	No. 4 ESS
☐	Metropolitan communities with numerous lines and high calling rates	No. 1 CROSSBAR
☐	Community Dial Office whose maximum growth will not exceed 800 lines	No. 3 CROSSBAR
☐	4-wire toll and tandem operation	No. 4A/ETS CROSSBAR
☐	Small to medium size urban or suburban areas	No. 5 CROSSBAR
☐	Community Dial Office whose maximum growth will not exceed 2000 lines	No. 5A CROSSBAR
☐	Metropolitan communities with numerous lines and high calling rates	No. 1 or 350A SXS
☐	Community Dial Office providing primarily plain-old-telephone service with few new features	No. 355A SXS
☐	Large metropolitan areas with complicated trunking arrangements	Panel Dial

No. 1 ESS (2-wire)

No. 1 ESS
(2 wire)

PRINCIPAL OFFICE USE:

Metropolitan communities with numerous lines and high calling rates

NEW START RANGE:

4,000-10,000 Lines

GROWTH TO:

65,000-110,000 Lines

CALL CAPACITY:

A. BHC: 95,000 average (105,000 after 2Q73)

B. CCS: Variable

ENGINEERING CONTROL:

Indian Hill PECC

INITIAL MANUFACTURE:

1963

ORDER INTERVAL:

64 weeks for a new 235 frame office
(58 weeks after 3Q73)

OFFICE SIZE:

Approximately 150 frames are required for a typical 10,000 line office.

SHIPPING AND HOUSING:

Wired frames are shipped and installed in a conventional building.

SWITCHING NETWORK:

8 stage ferreed network
(Remreed replaced ferreed in 1973).

COMMON CONTROL:

The No. 1 processor
(The No. 1A processor will replace the current processor in 1976).

No. 2 ESS

PRINCIPAL OFFICE USE:

Small to medium size urban or suburban areas.

NEW START RANGE:

1,000-9,000 lines

GROWTH TO:

10,000-20,000 lines

CALL CAPACITY:

A. BHC: 19,000

B. CCS: 110,580

ENGINEERING CONTROL:

Indian Hill PECC

INITIAL MANUFACTURE:

1970

ORDER INTERVAL:

49 weeks in 1973

OFFICE SIZE:

2400 square feet for a minimum office
(approximately 33 frames)

SHIPPING AND HOUSING:

Wired frames are shipped and installed
in a conventional building.

SWITCHING NETWORK:

Folded 4-stage space division network

COMMON CONTROL:

The No. 2 processor (The No. 3A processor
will replace the current processor in 1976)

No. 2A ESS

PRINCIPAL OFFICE USE:

Small to medium size urban or suburban areas. Also areas where the shortened order interval offered by a pre-tested modular system is important.

NEW START RANGE:

1,000-9,000 lines

GROWTH TO:

10,000-20,000 lines

CALL CAPACITY:

A. BHC: 19,000

B. CCS: 110,580

ENGINEERING CONTROL:

Indian Hill PECC

INITIAL MANUFACTURE:

1972

ORDER INTERVAL:

30 weeks objective in 1975

OFFICE SIZE:

1 power service module (12 x 24 ft),
1 equipment receiving module (12 x 12 ft),
1 administration module (12 x 48 ft) optional
2 to 8 equipment modules (12 x 48 ft each).

SHIPPING AND HOUSING:

System tested modules are shipped to the site where a facade is erected around them.

SWITCHING NETWORK:

Folded 4-stage space division network

COMMON CONTROL:

The No. 2 processor (The No. 3A processor will replace the current processor in 1976)

No. 2E ESS

PRINCIPAL OFFICE USE:

Small to medium size urban or suburban areas.

NEW START RANGE:

1000-9000 lines

GROWTH TO:

10,000-20,000 lines

CALL CAPACITY:

A. BHC: 40,000

B. CCS:

ENGINEERING CONTROL:

Indian Hill PECC

INITIAL MANUFACTURE:

Proposed for 1975

ORDER INTERVAL:

Will be the same as No. 2 ESS

OFFICE SIZE:

Same as No. 2 ESS except that the processor frame line ups are approximately $\frac{1}{3}$ as long.

SHIPPING AND HOUSING:

Wired frames are shipped and installed in a conventional building.

SWITCHING NETWORK:

Folded 4-stage space division network.

COMMON CONTROL:

No. 3A Processor.

No. 3 ESS

PRINCIPAL OFFICE USE:

Small to medium size urban, suburban or rural areas.

NEW START RANGE:

300-1500 lines

GROWTH TO:

4,500 lines

CALL CAPACITY:

A. BHC: 8,000

B. CCS: 21,600

ENGINEERING CONTROL:

Columbus PECC

INITIAL MANUFACTURE:

Proposed 1975

ORDER INTERVAL:

Proposed 16 weeks

OFFICE SIZE:

A typical 1800 line office requires a 12 x 30 ft building and 9 or 10 frames.

SHIPPING AND HOUSING:

System tested modules are shipped to the site, or wired frames are installed in a conventional building.

SWITCHING NETWORK:

5-stage folded Remreed network

COMMON CONTROL:

No. 3A processor

No. 4 ESS

PRINCIPAL OFFICE USE:

4-wire toll and tandem operation

NEW START RANGE:

None Specified

GROWTH TO:

70,000 trunks

CALL CAPACITY:

A. BHC: 350,000 busy hour attempts

B. CCS: 1,350,000 (peak level)

ENGINEERING CONTROL:

Indian Hill PECC

INITIAL MANUFACTURE:

Proposed 1976

ORDER INTERVAL:

18-24 months initially (12 months by 1979)

OFFICE SIZE:

10,000 sq ft for 70,000 trunks (600 frames)

SHIPPING AND HOUSING:

Wired frames are system tested, shipped and installed in a conventional building.

SWITCHING NETWORK:

Solid state, time division digital switching network

COMMON CONTROL:

The No. 1A processor

No. 1 Crossbar

PRINCIPAL OFFICE USE:

Metropolitan communities with numerous lines and high calling rates

NEW START RANGE:

4,000-10,000 lines

GROWTH TO:

55,200 lines

CALL CAPACITY:

A. BHC: 27,000
(40,000 with marker speed-up)
B. CCS: Variable

ENGINEERING CONTROL:

Columbus PECC

INITIAL MANUFACTURE:

1936

ORDER INTERVAL:

28 weeks to engineer and furnish a 50 frame office.

OFFICE SIZE:

84 x 102 ft required for a medium traffic office (approximately 40,000 lines)

SHIPPING AND HOUSING:

Wired frames are shipped and installed in a conventional building.

SWITCHING NETWORK:

4-stage crossbar switch network

COMMON CONTROL:

Markers, senders, connectors

No. 1
CROSSBAR

No. 3 Crossbar

PRINCIPAL OFFICE USE:

Community Dial Office whose maximum growth will not exceed 800 lines.

NEW START RANGE:

100-400 lines

GROWTH TO:

800 lines

CALL CAPACITY:

A. BHC: 5000 for a 400 line office

B. CCS: 3168 for a 400 line office

ENGINEERING CONTROL:

Columbus PECC

INITIAL MANUFACTURE:

Proposed 1973

ORDER INTERVAL:

6 months for a 400 line office

OFFICE SIZE:

A minimum building will need 16 x 45 ft of inside dimensions. 17 frames are needed for a 400 line office.

SHIPPING AND HOUSING:

Pretested equipment is transported on a steel platform and installed in a conventional building

SWITCHING NETWORK:

Three-stage crossbar switch network

COMMON CONTROL:

Marker

No. 4A/ETS Crossbar

PRINCIPAL OFFICE USE:

4-wire toll and tandem operation

NEW START RANGE:

2,000-10,000 trunks

GROWTH TO:

16,000-22,000 trunks

CALL CAPACITY:

A. BHC: 130,000 busy hour attempts

B. CCS: 250,000

ENGINEERING CONTROL:

Columbus PECC

INITIAL MANUFACTURE:

1942

ORDER INTERVAL:

38 weeks to engineer and furnish
an 80 frame office with ETS.

OFFICE SIZE:

25,000 sq ft for a fully equipped office
(excluding power and toll equipment),
approximately 1600 frames are required.

SHIPPING AND HOUSING:

Wired frames are shipped and installed
in a conventional building.

SWITCHING NETWORK:

Crossbar switch network

COMMON CONTROL:

Senders, convectors, markers, decoder
channels, Electronic translator system (ETS)

No. 4A/ETS
CROSSBAR

No. 5 Crossbar

PRINCIPAL OFFICE USE:

Small to medium size urban or suburban areas.

NEW START RANGE:

3,000-5,000 lines

GROWTH TO:

unlimited

CALL CAPACITY:

A. BHC: 69,000 per 3,000 lines

B. CCS: 86,500 per 3,000 lines

ENGINEERING CONTROL:

Columbus PECC

INITIAL MANUFACTURE:

1947

ORDER INTERVAL:

7 months for a 3,000 line office

OFFICE SIZE:

40 x 57.5 ft for a 3,000 line office. Average of 68 frames for a 3,000 line office

SHIPPING AND HOUSING:

Wired frames are shipped and installed in a conventional building.

SWITCHING NETWORK:

4-stage crossbar switch network

COMMON CONTROL:

Markers

No. 5A Crossbar

PRINCIPAL OFFICE USE:

Community Dial Office whose maximum growth will not exceed 2000 lines

NEW START RANGE:

980 lines minimum

GROWTH TO:

1960 lines

CALL CAPACITY:

- A. BHC: 12,000 for 1960 lines
- B. CCS: 6,000 for 1960 lines

ENGINEERING CONTROL:

Columbus PECC

INITIAL MANUFACTURE:

1972

ORDER INTERVAL:

6 months for 980 line office

OFFICE SIZE:

First switching equipment module for 980 lines = 10x42 ft. Power module 10x20 ft.
Second switching equipment module for additional 980 lines = 10 x 22 ft.

SHIPPING AND HOUSING:

Pre-tested modules are shipped and installed in a conventional building.

SWITCHING NETWORK:

4-stage small crossbar switch network

COMMON CONTROL:

Marker

No. 5A
CROSSBAR

No. 1 or 350A SXS

PRINCIPAL OFFICE USE:

Metropolitan communities with numerous lines and high calling rates.

NEW START RANGE:

2,000-10,000 lines

GROWTH TO:

60,000 to 70,000 lines (economic limit only)

CALL CAPACITY:

A. BHC: } Not applicable—equipment ordered
B. CCS: } per traffic requirements.

ENGINEERING CONTROL:

Hawthorne PECC

INITIAL MANUFACTURE:

Prior to 1925

ORDER INTERVAL:

26 weeks (engineer and furnish)

OFFICE SIZE:

Multiples of 10,000 lines

SHIPPING AND HOUSING:

Wired frames are shipped and installed in a conventional building.

SWITCHING NETWORK:

Step-by-step switch network

COMMON CONTROL:

Available in two forms:

- (1) for TOUCH-TONE only,
 - (2) For controlled out pulsing, (a) with TOUCH-TONE, and (b) Without TOUCH-TONE.
- TOUCH-TONE: Available in two forms:
- (1) Noncommon control TOUCH-TONE, and
 - (2) Common Control TOUCH-TONE.

No. 355A SXS

PRINCIPAL OFFICE USE:

Community Dial Office providing primarily plain-old-telephone service with few new features.

NEW START RANGE:

100-400 lines

GROWTH TO:

1500-2000 lines (can go to 8000 lines with alarm changes).

CALL CAPACITY:

A. BHC: } Not applicable—equipment ordered
B. CCS: } per traffic requirements.

ENGINEERING CONTROL:

Hawthorne PECC

INITIAL MANUFACTURE:

1939

ORDER INTERVAL:

22 weeks for up to 20 shelves of equipment—26 weeks for over 20 shelves of equipment (engineer and furnish).

OFFICE SIZE:

Standardized layouts for 400, 800, and 1500 lines.

SHIPPING AND HOUSING:

Wired frames are shipped and installed in a conventional building.

SWITCHING NETWORK:

Step-by-step switch network

COMMON CONTROL:

Available in Two forms:

- (1) For TOUCH-TONE only.
 - (2) For Controlled out pulsing. (a) With TOUCH-TONE, and (b) Without TOUCH-TONE.
- TOUCH-TONE: Available in two forms:
- (1) Noncommon control TOUCH-TONE,
 - (2) Common control TOUCH-TONE.

Panel Dial

PRINCIPAL OFFICE USE:

Large metropolitan areas with complicated trunking arrangements.

NEW START RANGE:

4,000-10,000 lines

GROWTH TO:

40,000 lines

CALL CAPACITY:

A. BHC: 1.60 per line

B. CCS: 2.56 per line

ENGINEERING CONTROL:

Hawthorne PECC

INITIAL MANUFACTURE:

1918

ORDER INTERVAL:

22 weeks (engineer and furnish)

OFFICE SIZE:

7,500 square feet for a typical 10,000 line office.

SHIPPING AND HOUSING:

Wired frames are shipped and installed in a conventional building.

SWITCHING NETWORK:

Panel-type selector network.

COMMON CONTROL:

Registers, senders, connectors.

notes

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	S	M	T	W	T	F	S		S	M	T	W	T	F	S
				1	2	3	4	5							1
MAY	6	7	8	9	10	11	12		2	3	4	5	6	7	8
	13	14	15	16	17	18	19		9	10	11	12	13	14	15
	20	21	22	23	24	25	26		16	17	18	19	20	21	22
	27	28	29	30	31			SEP	23	24	25	26	27	28	29
									30						
JUN	3	4	5	6	7	8	9			1	2	3	4	5	6
	10	11	12	13	14	15	16		7	8	9	10	11	12	13
	17	18	19	20	21	22	23		14	15	16	17	18	19	20
	24	25	26	27	28	29	30	OCT	21	22	23	24	25	26	27
									28	29	30	31			
JUL	1	2	3	4	5	6	7							1	2
	8	9	10	11	12	13	14		4	5	6	7	8	9	10
	15	16	17	18	19	20	21		11	12	13	14	15	16	17
	22	23	24	25	26	27	28	NOV	18	19	20	21	22	23	24
	29	30	31						25	26	27	28	29	30	
AUG															1
	5	6	7	8	9	10	11		2	3	4	5	6	7	8
	12	13	14	15	16	17	18		9	10	11	12	13	14	15
	19	20	21	22	23	24	25	DEC	16	17	18	19	20	21	22
	26	27	28	29	30	31			23	24	25	26	27	28	29
									30	31					

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	S	M	T	W	T	F	S		S	M	T	W	T	F	S
				1	2	3	4	5							1
JAN	6	7	8	9	10	11	12		7	8	9	10	11	12	13
	13	14	15	16	17	18	19		14	15	16	17	18	19	20
	20	21	22	23	24	25	26		21	22	23	24	25	26	27
	27	28	29	30	31			JUL	28	29	30	31			
FEB	3	4	5	6	7	8	9			4	5	6	7	8	9
	10	11	12	13	14	15	16		11	12	13	14	15	16	17
	17	18	19	20	21	22	23	AUG	18	19	20	21	22	23	24
	24	25	26	27	28				25	26	27	28	29	30	31
MAR	3	4	5	6	7	8	9			1	2	3	4	5	6
	10	11	12	13	14	15	16		8	9	10	11	12	13	14
	17	18	19	20	21	22	23	SEP	15	16	17	18	19	20	21
	24	25	26	27	28	29	30		22	23	24	25	26	27	28
	31								29	30					
APR		1	2	3	4	5	6			1	2	3	4	5	
	7	8	9	10	11	12	13		6	7	8	9	10	11	12
	14	15	16	17	18	19	20	OCT	13	14	15	16	17	18	19
	21	22	23	24	25	26	27		20	21	22	23	24	25	26
	28	29	30						27	28	29	30	31		
MAY			1	2	3	4								1	2
	5	6	7	8	9	10	11		3	4	5	6	7	8	9
	12	13	14	15	16	17	18	NOV	10	11	12	13	14	15	16
	19	20	21	22	23	24	25		17	18	19	20	21	22	23
	26	27	28	29	30	31			24	25	26	27	28	29	30
JUN	2	3	4	5	6	7	8			1	2	3	4	5	6
	9	10	11	12	13	14	15	DEC	8	9	10	11	12	13	14
	16	17	18	19	20	21	22		15	16	17	18	19	20	21
	23	24	25	26	27	28	29		22	23	24	25	26	27	28
	30								29	30	31				

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	S	M	T	W	T	F	S		S	M	T	W	T	F	S
				1	2	3	4								1
JAN	5	6	7	8	9	10	11		6	7	8	9	10	11	12
	12	13	14	15	16	17	18		13	14	15	16	17	18	19
	19	20	21	22	23	24	25		20	21	22	23	24	25	26
	26	27	28	29	30	31		JUL	27	28	29	30	31		
FEB	2	3	4	5	6	7	8			3	4	5	6	7	8
	9	10	11	12	13	14	15		10	11	12	13	14	15	16
	16	17	18	19	20	21	22	AUG	17	18	19	20	21	22	23
	23	24	25	26	27	28			24	25	26	27	28	29	30
									31						
MAR	2	3	4	5	6	7	8			1	2	3	4	5	6
	9	10	11	12	13	14	15		7	8	9	10	11	12	13
	16	17	18	19	20	21	22	SEP	14	15	16	17	18	19	20
	23	24	25	26	27	28	29		21	22	23	24	25	26	27
	30	31							28	29	30				
APR		1	2	3	4	5				1	2	3	4		
	6	7	8	9	10	11	12		5	6	7	8	9	10	11
	13	14	15	16	17	18	19	OCT	12	13	14	15	16	17	18
	20	21	22	23	24	25	26		19	20	21	22	23	24	25
	27	28	29	30					26	27	28	29	30	31	
MAY			1	2	3									1	
	4	5	6	7	8	9	10		2	3	4	5	6	7	8
	11	12	13	14	15	16	17	NOV	9	10	11	12	13	14	15
	18	19	20	21	22	23	24		16	17	18	19	20	21	22
	25	26	27	28	29	30	31		23	24	25	26	27	28	29
									30						
JUN	1	2	3	4	5	6	7			1	2	3	4	5	6
	8	9	10	11	12	13	14	DEC	7	8	9	10	11	12	13
	15	16	17	18	19	20	21		14	15	16	17	18	19	20
	22	23	24	25	26	27	28		21	22	23	24	25	26	27
	29	30							28	29	30	31			