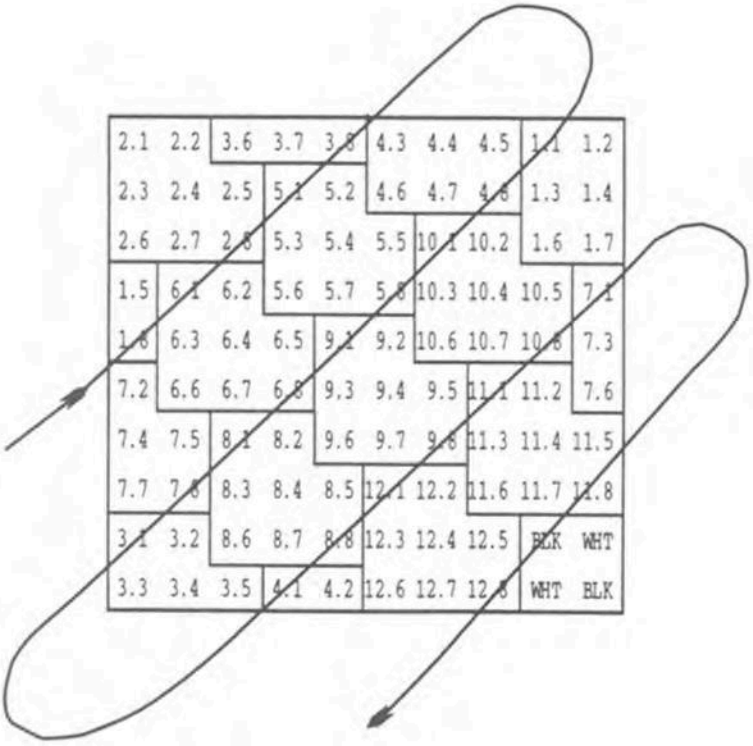


Figure F.8 — Symbol character placement sequence

h) When the placement path encounters a non-standard symbol character shape, which is not completely contained within the boundaries of the mapping matrix, that symbol character is continued on the opposite side of the matrix. This has the effect of numbering the opposite portions of these symbol characters before the placement path crosses that position. For example, in the illustrated mapping matrix (see Figure F.8) the other portions of symbol character 3 and 7 are pre-numbered before the placement path crosses them. Thus the placement path only numbers un-numbered symbol characters. These boundary and corner conditions are specified in Table F.1. This can be seen in Figure F.8 for symbol characters 1, 3, 4, and 7. The corner conditions also affect the numbering sequence. The bottom left corner as illustrated in:

   Figure F.3 is numbered immediately before the symbol character above it (see Figures F.11 and F.18 for examples).

   Figure F.4 is numbered immediately before the symbol character above it (see Figures F.12 and F.19 for examples).

   Figure F.5 is numbered immediately after the symbol character to its right (see Figure F.13 for an example).

   Figure F.6 is numbered immediately before the symbol character above it (see Figure F.15 for an example).

   The remaining modules of the corner are numbered before the placement path crosses them.

i) The placement procedure continues until all symbol characters are placed, and it ends in the lower right of the mapping matrix. Four sizes of mapping matrix (10 x 10, 14 x 14, 18 x 18, and 22 x 22) have a 2 x 2 area remaining in the bottom right hand corner. The top left and bottom right modules of this area are dark (nominally encoding binary 1). This is illustrated in Figure F.8.

Typical mapping matrices conforming to this procedure are illustrated in F.3. Figures F.9 to F.15 cover respective cases 1 to 7 for boundary placement. Figures F.16 to F.19 are another set of examples for cases 1 to 4. F.1 provides a C language program capable of mapping all encoded bits into the appropriate mapping matrix.

F.3 Symbol character placement examples for ECC 200

Figure F.9 — Codeword placement for square mapping matrix of size 8

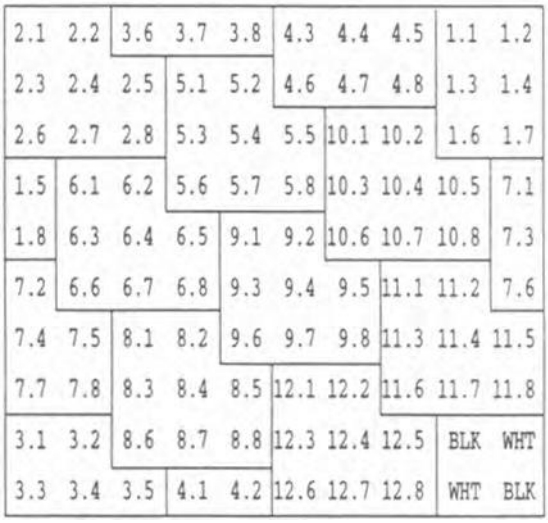


Figure F.10 — Codeword placement for square mapping matrix of size 10

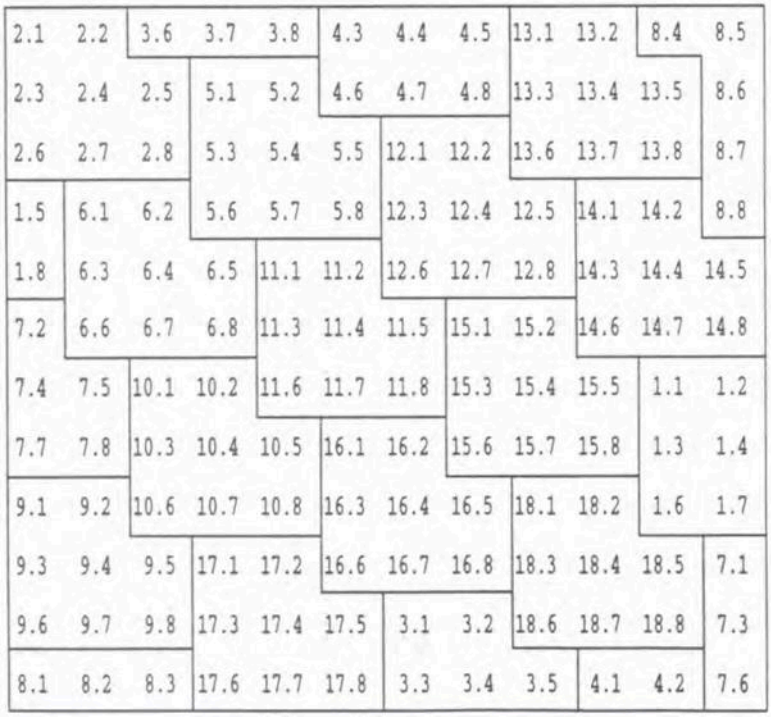


Figure F.11 — Codeword placement for square mapping matrix of size 12

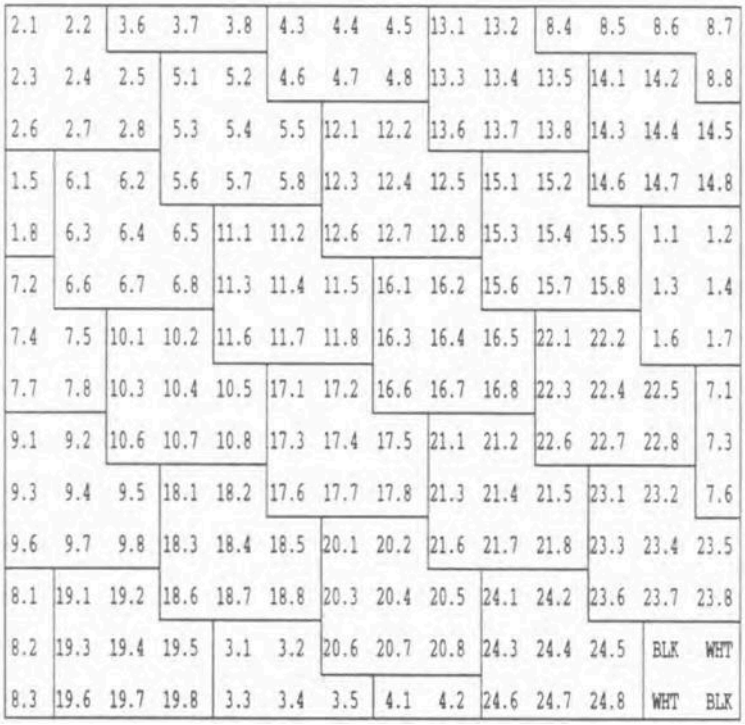


Figure F.12 — Codeword placement for square mapping matrix of size 14

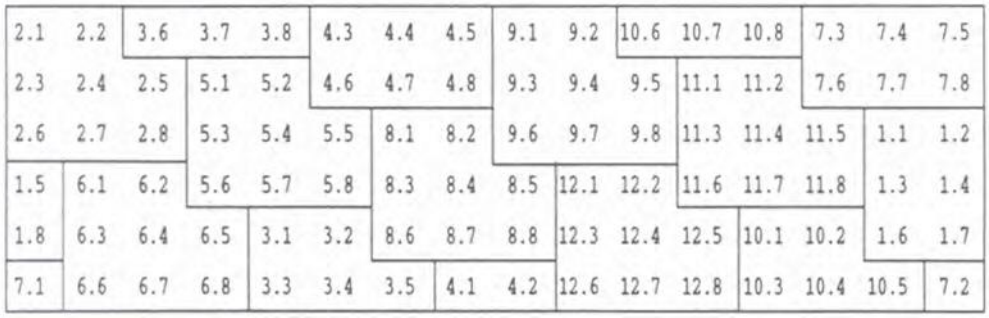


Figure F.13 — Codeword placement for 6 x 16 rectangular mapping matrix

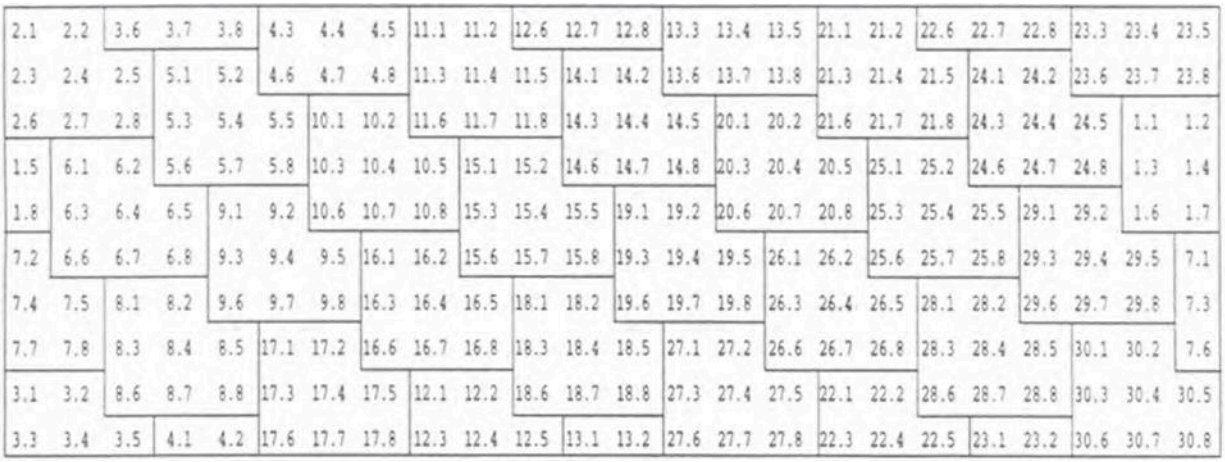


Figure F.14 — Codeword placement for 10 x 24 rectangular mapping matrix

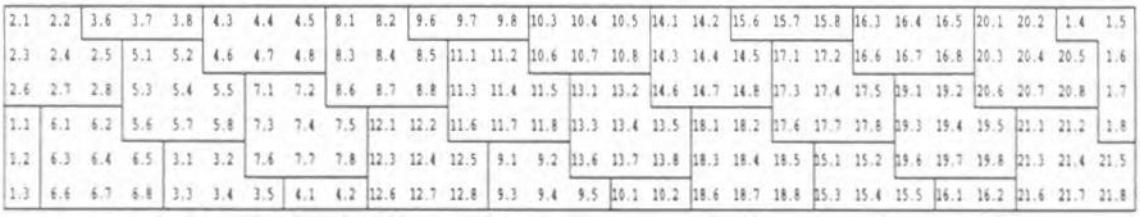
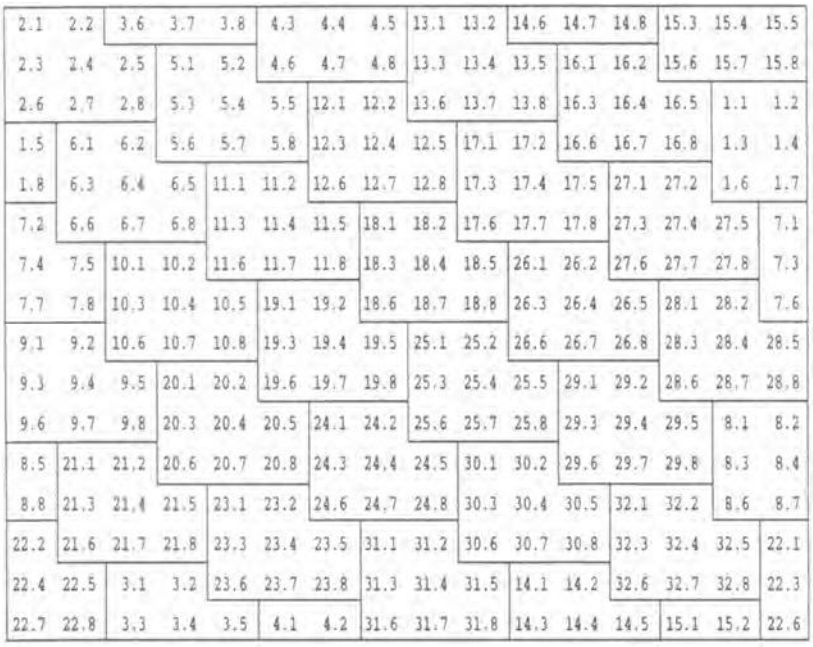
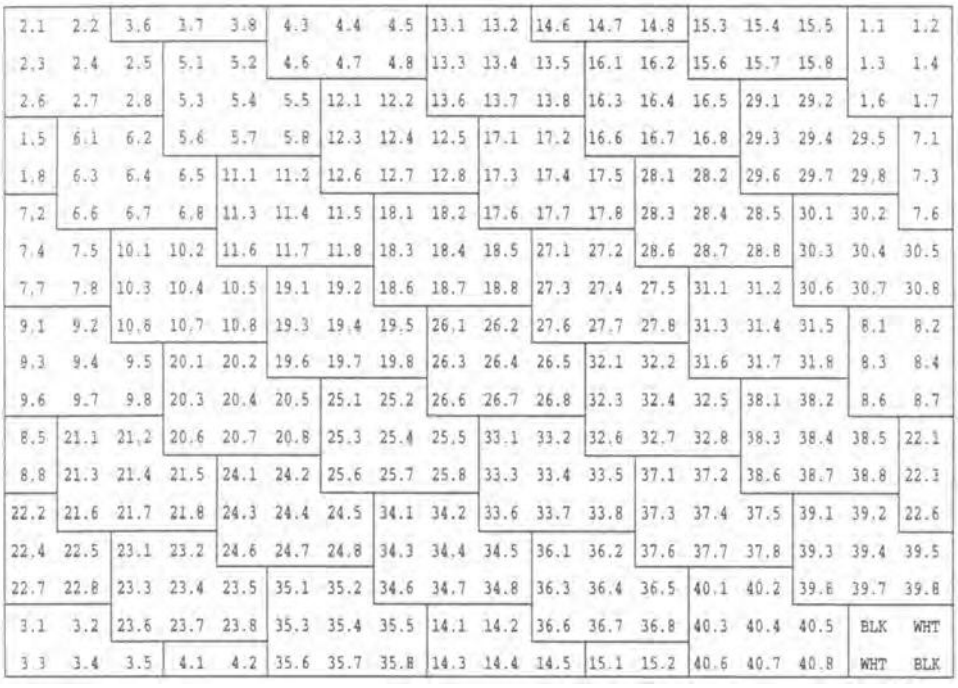


Figure F.15 — Codeword placement for 6 x 28 rectangular mapping matrix



2.1	2.2	3.6	3.7	3.8	4.3	4.4	4.5	13.1	13.2	14.6	14.7	14.8	15.3	15.4	15.5
2.3	2.4	2.5	5.1	5.2	4.6	4.7	4.8	13.3	13.4	13.5	16.1	16.2	15.6	15.7	15.8
2.6	2.7	2.8	5.3	5.4	5.5	12.1	12.2	13.6	13.7	13.8	16.3	16.4	16.5	1.1	1.2
1.5	6.1	6.2	5.6	5.7	5.8	12.3	12.4	12.5	17.1	17.2	16.6	16.7	16.8	1.3	1.4
1.8	6.3	6.4	6.5	11.1	11.2	12.6	12.7	12.8	17.3	17.4	17.5	27.1	27.2	1.6	1.7
7.2	6.6	6.7	6.8	11.3	11.4	11.5	18.1	18.2	17.6	17.7	17.8	27.3	27.4	27.5	7.1
7.4	7.5	10.1	10.2	11.6	11.7	11.8	18.3	18.4	18.5	26.1	26.2	27.6	27.7	27.8	7.3
7.7	7.8	10.3	10.4	10.5	19.1	19.2	18.6	18.7	18.8	26.3	26.4	26.5	28.1	28.2	7.6
9.1	9.2	10.6	10.7	10.8	19.3	19.4	19.5	25.1	25.2	26.6	26.7	26.8	28.3	28.4	28.5
9.3	9.4	9.5	20.1	20.2	19.6	19.7	19.8	25.3	25.4	25.5	29.1	29.2	28.6	28.7	28.8
9.6	9.7	9.8	20.3	20.4	20.5	24.1	24.2	25.6	25.7	25.8	29.3	29.4	29.5	8.1	8.2
8.5	21.1	21.2	20.6	20.7	20.8	24.3	24.4	24.5	30.1	30.2	29.6	29.7	29.8	8.3	8.4
8.8	21.3	21.4	21.5	23.1	23.2	24.6	24.7	24.8	30.3	30.4	30.5	32.1	32.2	8.6	8.7
22.2	21.6	21.7	21.8	23.3	23.4	23.5	31.1	31.2	30.6	30.7	30.8	32.3	32.4	32.5	22.1
22.4	22.5	3.1	3.2	23.6	23.7	23.8	31.3	31.4	31.5	14.1	14.2	32.6	32.7	32.8	22.3
22.7	22.8	3.3	3.4	3.5	4.1	4.2	31.6	31.7	31.8	14.3	14.4	14.5	15.1	15.2	22.6

Figure F.16 — Codeword placement for square mapping matrix of size 16



2.1	2.2	3.6	3.7	3.8	4.3	4.4	4.5	13.1	13.2	14.6	14.7	14.8	15.3	15.4	15.5	1.1	1.2
2.3	2.4	2.5	5.1	5.2	4.6	4.7	4.8	13.3	13.4	13.5	16.1	16.2	15.6	15.7	15.8	1.3	1.4
2.6	2.7	2.8	5.3	5.4	5.5	12.1	12.2	13.6	13.7	13.8	16.3	16.4	16.5	29.1	29.2	1.6	1.7
1.5	6.1	6.2	5.6	5.7	5.8	12.3	12.4	12.5	17.1	17.2	16.6	16.7	16.8	29.3	29.4	29.5	7.1
1.8	6.3	6.4	6.5	11.1	11.2	12.6	12.7	12.8	17.3	17.4	17.5	28.1	28.2	29.6	29.7	29.8	7.3
7.2	6.6	6.7	6.8	11.3	11.4	11.5	18.1	18.2	17.6	17.7	17.8	28.3	28.4	28.5	30.1	30.2	7.6
7.4	7.5	10.1	10.2	11.6	11.7	11.8	18.3	18.4	18.5	27.1	27.2	28.6	28.7	28.8	30.3	30.4	30.5
7.7	7.8	10.3	10.4	10.5	19.1	19.2	18.6	18.7	18.8	27.3	27.4	27.5	31.1	31.2	30.6	30.7	30.8
9.1	9.2	10.6	10.7	10.8	19.3	19.4	19.5	26.1	26.2	27.6	27.7	27.8	31.3	31.4	31.5	8.1	8.2
9.3	9.4	9.5	20.1	20.2	19.6	19.7	19.8	26.3	26.4	26.5	32.1	32.2	31.6	31.7	31.8	8.3	8.4
9.6	9.7	9.8	20.3	20.4	20.5	25.1	25.2	26.6	26.7	26.8	32.3	32.4	32.5	38.1	38.2	8.6	8.7
8.5	21.1	21.2	20.6	20.7	20.8	25.3	25.4	25.5	33.1	33.2	32.6	32.7	32.8	38.3	38.4	38.5	22.1
8.8	21.3	21.4	21.5	24.1	24.2	25.6	25.7	25.8	33.3	33.4	33.5	37.1	37.2	38.6	38.7	38.8	22.3
22.2	21.6	21.7	21.8	24.3	24.4	24.5	34.1	34.2	33.6	33.7	33.8	37.3	37.4	37.5	39.1	39.2	22.6
22.4	22.5	23.1	23.2	24.6	24.7	24.8	34.3	34.4	34.5	36.1	36.2	37.6	37.7	37.8	39.3	39.4	39.5
22.7	22.8	23.3	23.4	23.5	35.1	35.2	34.6	34.7	34.8	36.3	36.4	36.5	40.1	40.2	39.6	39.7	39.8
3.1	3.2	23.6	23.7	23.8	35.3	35.4	35.5	14.1	14.2	36.6	36.7	36.8	40.3	40.4	40.5	BLK	WHT
3.3	3.4	3.5	4.1	4.2	35.6	35.7	35.8	14.3	14.4	14.5	15.1	15.2	40.6	40.7	40.8	WHT	BLK

Figure F.17 — Codeword placement for square mapping matrix of size 18

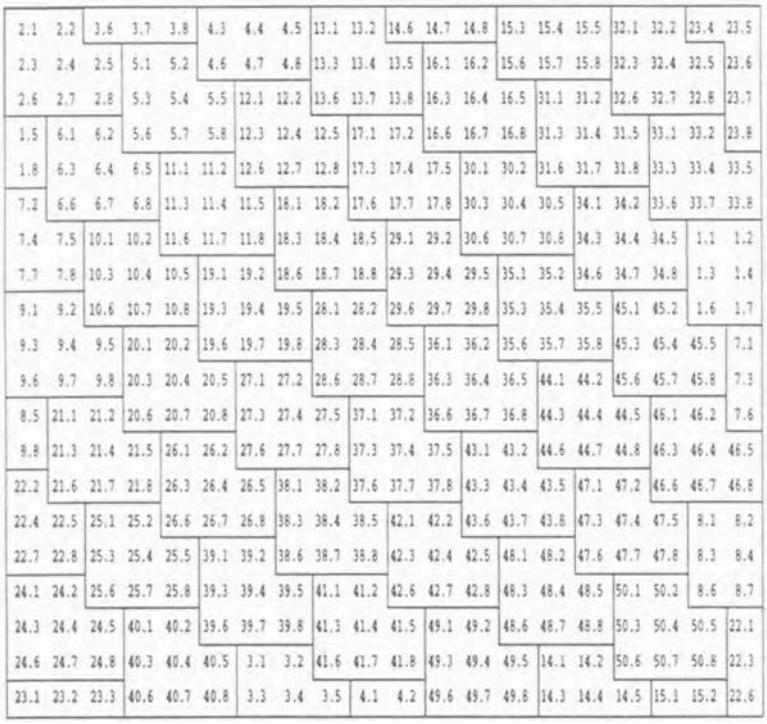


Figure F.18 — Codeword placement for square mapping matrix of size 20

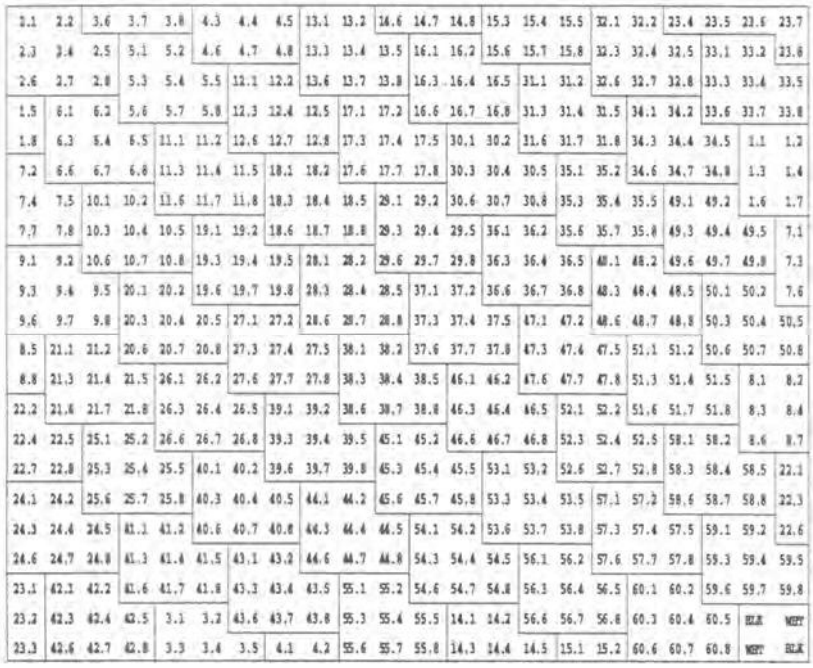


Figure F.19 — Codeword placement for square mapping matrix of size 22

Annex G
(normative)

ECC 000 - 140 symbol attributes

Table G.1 — ECC 000

Symbol size[a]		Data region size		Numeric capacity	Alphanum capacity	8-bit byte capacity	% of codewords used for error correction	% correctable
Row	Col	Row	Col					
9	9	7	7	3	2	1	0,0	0,0
11	11	9	9	12	8	5	0,0	0,0
13	13	11	11	24	16	10	0,0	0,0
15	15	13	13	37	25	16	0,0	0,0
17	17	15	15	53	35	23	0,0	0,0
19	19	17	17	72	48	31	0,0	0,0
21	21	19	19	92	61	40	0,0	0,0
23	23	21	21	115	76	50	0,0	0,0
25	25	23	23	140	93	61	0,0	0,0
27	27	25	25	168	112	73	0,0	0,0
29	29	27	27	197	131	86	0,0	0,0
31	31	29	29	229	153	100	0,0	0,0
33	33	31	31	264	176	115	0,0	0,0
35	35	33	33	300	200	131	0,0	0,0
37	37	35	35	339	226	148	0,0	0,0
39	39	37	37	380	253	166	0,0	0,0
41	41	39	39	424	282	185	0,0	0,0
43	43	41	41	469	313	205	0,0	0,0
45	45	43	43	500	345	226	0,0	0,0
47	47	45	45	560	378	248	0,0	0,0
49	49	47	47	596	413	271	0,0	0,0

[a] excluding quiet zones

Table G.2 — ECC 050

Symbol size[a]		Data region size		Numeric capacity	Alphanum. capacity	8-bit byte capacity	% of codewords used for error correction	% correctable
Row	Col	Row	Col					
11	11	9	9	1	1	0[b]	25,0	2,8
13	13	11	11	10	6	4	25,0	2,8
15	15	13	13	20	13	9	25,0	2,8
17	17	15	15	32	21	14	25,0	2,8
19	19	17	17	46	30	20	25,0	2,8
21	21	19	19	61	41	27	25,0	2,8
23	23	21	21	78	52	34	25,0	2,8
25	25	23	23	97	65	42	25,0	2,8
27	27	25	25	118	78	51	25,0	2,8
29	29	27	27	140	93	61	25,0	2,8
31	31	29	29	164	109	72	25,0	2,8
33	33	31	31	190	126	83	25,0	2,8
35	35	33	33	217	145	95	25,0	2,8
37	37	35	35	246	164	108	25,0	2,8
39	39	37	37	277	185	121	25,0	2,8
41	41	39	39	310	206	135	25,0	2,8
43	43	41	41	344	229	150	25,0	2,8
45	45	43	43	380	253	166	25,0	2,8
47	47	45	45	418	278	183	25,0	2,8
49	49	47	47	457	305	200	25,0	2,8

[a] excluding quiet zone

[b] this combination is not possible

Table G.3 — ECC 080

Symbol size[a]		Data region size		Numeric capacity	Alphanum. capacity	8-bit byte capacity	% of codewords used for error correction	% correctable
Row	Col	Row	Col					
13	13	11	11	4	3	2	33,3	5,5
15	15	13	13	13	9	6	33,3	5,5
17	17	15	15	24	16	10	33,3	5,5
19	19	17	17	36	24	16	33,3	5,5
21	21	19	19	50	33	22	33,3	5,5
23	23	21	21	65	43	28	33,3	5,5
25	25	23	23	82	54	36	33,3	5,5
27	27	25	25	100	67	44	33,3	5,5
29	29	27	27	120	80	52	33,3	5,5
31	31	29	29	141	94	62	33,3	5,5
33	33	31	31	164	109	72	33,3	5,5
35	35	33	33	188	125	82	33,3	5,5
37	37	35	35	214	143	94	33,3	5,5
39	39	37	37	242	161	106	33,3	5,5
41	41	39	39	270	180	118	33,3	5,5
43	43	41	41	301	201	132	33,3	5,5
45	45	43	43	333	222	146	33,3	5,5
47	47	45	45	366	244	160	33,3	5,5
49	49	47	47	402	268	176	33,3	5,5

a excluding quiet zones

Table G.4 — ECC 100

Symbol size[a]		Data region size		Numeric capacity	Alphanum. capacity	8-bit byte capacity	% of codewords used for error correction	% correctable
Row	Col	Row	Col					
13	13	11	11	1	1	0[b]	50,0	12,6
15	15	13	13	8	5	3	50,0	12,6
17	17	15	15	16	11	7	50,0	12,6
19	19	17	17	25	17	11	50,0	12,6
21	21	19	19	36	24	15	50,0	12,6
23	23	21	21	47	31	20	50,0	12,6
25	25	23	23	60	40	26	50,0	12,6
27	27	25	25	73	49	32	50,0	12,6
29	29	27	27	88	59	38	50,0	12,6
31	31	29	29	104	69	45	50,0	12,6
33	33	31	31	121	81	53	50,0	12,6
35	35	33	33	140	93	61	50,0	12,6
37	37	35	35	159	106	69	50,0	12,6
39	39	37	37	180	120	78	50,0	12,6
41	41	39	39	201	134	88	50,0	12,6
43	43	41	41	224	149	98	50,0	12,6
45	45	43	43	248	165	108	50,0	12,6
47	47	45	45	273	182	119	50,0	12,6
49	49	47	47	300	200	131	50,0	12,6

[a] excluding quiet zones

[b] this combination is not possible

Table G.5 — ECC 140

Symbol size[a]		Data region size		Numeric capacity	Alphanum. capacity	8-bit byte capacity	% of codewords used for error correction	% correctable
Row	Col	Row	Col					
17	17	15	15	2	1	1	75,0	25,0
19	19	17	17	6	4	3	75,0	25,0
21	21	19	19	12	8	5	75,0	25,0
23	23	21	21	17	11	7	75,0	25,0
25	25	23	23	24	16	10	75,0	25,0
27	27	25	25	30	20	13	75,0	25,0
29	29	27	27	38	25	16	75,0	25,0
31	31	29	29	46	30	20	75,0	25,0
33	33	31	31	54	36	24	75,0	25,0
35	35	33	33	64	42	28	75,0	25,0
37	37	35	35	73	49	32	75,0	25,0
39	39	37	37	84	56	36	75,0	25,0
41	41	39	39	94	63	41	75,0	25,0
43	43	41	41	106	70	46	75,0	25,0
45	45	43	43	118	78	51	75,0	25,0
47	47	45	45	130	87	57	75,0	25,0
49	49	47	47	144	96	63	75,0	25,0

[a] excluding quiet zones