HP16: ECG Reading Codes

Purpose

The *ECG Reading Codes* record contains the Minnesota Code results from the ECG reading. A detailed description of methods is given in **Section 14.4** of the *Manual of Operations*.

Special Considerations

- The 12-lead ECGs were recorded at the HDFP clinics and shipped to the Coordinating Center, where the recording date was replaced with a coded numeral. The ECG Reading Center, did not know the recording date of the ECG, and the treatment group of the participant was masked. Quality control ECGs were periodically inserted into shipments sent to the University of Minnesota by the Coordinating Center.

- The Minnesota Code can be found in **Section 14.4** of the *Manual of Operations*.

HP16
HDFP ECG READING CODES

1-9-4 and Special Measurements

	Card Column	Code Punched	Minn. Code

1. Program I.D.

3-11

2. Acrostic

(1) 12-17

3. Batch number

(2) 18-25

4. Date

(3) 26-31

5. Type visit

(45) 101-102

01	First Clinic Visit
02	Four Month Clinic Revisit
04	Supplemental Visit
06	One Year Follow-up
07	Two Year Follow-up
08	Three Year Follow-up
09	Four Year Follow-up
10	Five Year Follow-up; Outside Source
11	Five Year Follow-up
12	Five Year Follow-up; Home Visit
13	Six Year Follow-up; Home Visit
14	Six Year Follow-up
33	Incidence Study
77	Two Year Follow-up; Home Visit
88	Three Year Follow-up; Home Visit
99	Four Year Follow-up; Home Visit

6. Sequence Code

(46) 103-104

7. Date Variance Code

(47) 105

1	Date of the ECG matches date of accompanying clinic visit form
0	Date of ECG does not match date of any clinic visit form

8. Q and QS Patterns. Site: I, aVL, V_6

(4) 32-33

11	1-1-1	Q/R amplitude ratio 1/3 or more plus Q duration 0.03 sec. or more in any of leads I, V_6.
12	1-1-2	Q duration 0.04 sec. or more in any of leads I, V_6.
13	1-1-3	Q duration 0.04 sec. or more, plus R amplitude of 3 mm. or more in lead aVL.

Card Column	Code Punched	Minn. Code	
	16	1-1-6	QS pattern when R wave is present in adjacent lead to the right on the chest in any of leads V_6.
	21	1-2-1	Q/R amplutude ratio 1/3 or more plus Q duration at least 0.02 sec. and less than 0.03 sec. in any of leads I, V_6.
	22	1-2-2	Q duration at least 0.03 sec. and less than 0.04 sec. in any of leads I, V_6.
	28	1-2-8	R amplitude decreasing to 2 mm. or less, and absence of codes 3-2, 7-2, or 7-3, between any of leads V_2 and V_3, V_3 and V_4, V_4 and V_5, V_5 and V_6.
	31	1-3-1	Q/R amplitude ratio at least 1/5 and less than 1/3 plus Q duration of at least 0.02 sec. and less than 0.03 sec. in any of leads I, V_6.
	33	1-3-3	Q duration of at least 0.03 sec. and less than 0.04 sec. plus R amplitude of 3 mm. or more in lead aVL.
	00		None of the above.

9. Q and QS Patterns. Site: II, III, aVF.

5 34-35	11	1-1-1	Q/R amplitude ratio 1/3 or more plus Q duration 0.03 sec. or more in lead II.
	12	1-1-2	Q duration 0.04 sec. or more in lead II.
	14	1-1-4	Q duration 0.05 sec. or more in lead III plus any Q wave of at least 1.0 mm. amplitude in aVF.
	15	1-1-5	Q duration 0.05 sec. or more in lead aVF.
	21	1-2-1	Q/R amplitude ratio 1/3 or more, plus Q duration at least 0.02 sec. and less than 0.03 sec. in lead II.
	22	1-2-2	Q duration at least 0.03 sec. and less than 0.04 sec. in lead II.
	23	1-2-3	QS pattern in lead II.
	24	1-2-4	Q duration of at least 0.04 sec. and less than 0.05 sec. in lead III, plus a Q wave of at least 1.0 mm. amplitude in aVF.
	25	1-2-5	Q duration at least 0.04 sec. and less than 0.05 sec. in lead aVF.
	26	1-2-6	Q amplitude of 5.0 mm. or more in either of leads III, aVF.
	31	1-3-1	Q/R amplitude ratio at least 1/5 and less than 1/3 plus Q duration of at least 0.02 sec. and less than 0.03 sec. in lead II.

Card Column	Code Punched	Minn. Code	
	34	1-3-4	Q duration of at least 0.03 sec. and less than 0.04 sec. in lead III, plus any Q wave of at least 1.0 mm. amplitude in lead aVF.
	35	1-3-5	Q duration of at least 0.03 sec. and less than 0.04 sec. in lead aVF.
	36	1-3-6	QS pattern in each of leads III and aVF.
	00		None of the above.

10. Q and QS Patterns. Site: V_1, V_2, V_3, V_4, V_5.

(6) 36-37	11	1-1-1	Q/R amplitude ratio 1/3 or more plus Q duration 0.03 sec. or more in any of leads $V_{2, 3, 4, 5}$.
	12	1-1-2	Q duration 0.04 sec. or more in any of leads $V_{1, 2, 3, 4, 5}$.
	16	1-1-6	QS pattern when R wave is present in adjacent lead to the right on the chest in any of leads $V_{2, 3, 4, 5}$.
	17	1-1-7	QS pattern in all of leads V_1-V_4, V_1-V_5.
	21	1-2-1	Q/R amplitude ratio 1/3 or more, plus Q druation at least 0.02 sec. and less than 0.03 sec. in any of leads $V_{2, 3, 4, 5}$.
	22	1-2-2	Q druation at least 0.03 sec. adn less than 0.04 sec. in any of leads $V_{2, 3, 4, 5}$.
	27	1-2-7	QS pattern in all of leads V_1 through V_3.
	28	1-2-8	R amplitude decreasing to 2.0 mm. or less, and absence of codes 3-2, 7-2, or 7-3, between any of leads V_2 and V_3, V_3 and V_4, or V_4 and V_5.
	31	1-3-1	Q/R amplitude ratio at least 1/5 and less than 1/3 plus Q duration of at least 0.02 sec. and less than 0.03 sec. in any of leads $V_{2, 3, 4, 5}$.
	32	1-3-2	QS pattern in absence of code 3-1, in each of leads V_1, V_2.
	00		None of the above.

11. S-T junction (J) and segment depression. Site: I, aVL, V_6.

(7) 38-39	11	4-1-1	S-T-J depression of 2.0 mm. or more and S-T segment horizontal or downward sloping in any of leads I, aVL, or V_6, (requires a T wave code in column 44).
	12	4-1-2	S-T-J depression at least 1.0 mm. but less than 2.0 mm., and S-T segment horizontal or downward sloping in any of leads I, aVL, V_6 (requires a T wave code in column 44).

Card Column	Code Punched	Minn. Code	
	02	4-2	S-T-J depression at least 0.5 mm. and less than 1.0 mm. and S-T segment horizontal or downward sloping in any of leads I, aVL, V_6 (requires a T wave code in column 44).
	03	4-3	No S-T-J depression as much as 0.5 mm. but S-T segment downward sloping and segment or T wave nadir at least 0.5 mm. below P-R baseline in any of leads I, aVL, V_6 (requires a T wave code in column 44).
	04	4-4	S-T-J depression of 1.0 mm. or more and S-T segment upward sloping or U-shaped, in any lead of I, aVL, V_6.
	00		None of the above.
12	S-T junction (J) and segment depression. Site: II, III, aVF.		
(8) 40-41	11	4-1-1	S-T-J depression of 2.0 mm. or more and S-T segment horizontal or downward sloping in lead II (requires a T wave code in column 45).
	12	4-1-2	S-T-J depression at least 1.0 mm. but less than 2.0 mm. and S-T segment horizontal or downward sloping in any of leads II, aVF (requires a T wave code in column 45).
	02	4-2	S-T-J depression at least 0.5 mm. and less than 1.0 mm. and S-T segment horizontal or downward sloping in any of leads II, aVF (requires a T wave code in column 45).
	03	4-3	No S-T-J depression as much as 0.5 mm., but S-T segment downward sloping and segment or T wave nadir at least 0.5 mm. below P-R baseline in lead II (requires a T wave code in column 45).
	04	4-4	S-T-J depression of 1.0 mm. or more and S-T segment upward sloping, or U-shaped, in lead II.
	00		None of the above.
13	S-T junction (J) and segment depression. Site: $V_{1,2,3,4,5}$.		
(9) 42-43	11	4-1-1	S-T-J depression of 2.0 mm. or more and S-T segment horizontal or downward sloping in any of leads $V_{1,2}$, $V_{3,4,5}$. (requires a T wave code in column 46 except for V_1).
	12	4-1-2	S-T-J depression at least 1.0 mm. but less than 2.0 mm. and S-T segment horizontal or downward sloping in any of leads $V_{1,2,3,4,5}$ (requires a T wave code in column 46 except for V_1).
	02	4-2	S-T-J depression at least 0.5 mm. and less than 1.0 mm. and S-T segment horizontal or downward sloping in any of leads $V_{1,2,3,4,5}$ (requires a T wave code in column 46 except for V_1).

Card Column	Code Punched	Minn. Code	
	03	4-3	No S-T-J depression as much as 0.5 mm., but S-T segment downward sloping and segment or T wave nadir at least 0.5 mm. below P-R baseline in any of leads $V_{2,3,4,5}$ (requires a T wave code in column 46).
	04	4-4	S-T-J depression of 1.0 mm. or more and S-T segment upward sloping, or U-shaped, in any of leads $V_{1,2,3,4,5}$.
	00		None of the above.

14 T wave items. Site: I, aVL, V_6.

(10) 44	1	5-1	T amplitude negative, minus 5.0 mm. or more negative in any of leads I, V_6, or in lead aVL when R amplitude is 5.0 mm. or more.
	2	5-2	T amplitude negative or diphasic (positive-negative or negative-positive type) with negative phase at least minus 1.0 mm. but not as deep as minus 5.0 mm. in any of leads I, V_6, or lead aVL when R amplitude is 5.0 mm. or more.
	3	5-3	T amplitude zero (flat), or negative, or diphasic (negative-positive type) with less than 1.0 mm. negative phase in any of leads I, V_6, or in lead aVL when R amplitude is 5.0 mm. or more.
	4	5-4	T amplitude positive and T/R amplitude ratio less than 1/20 in any of leads I, aVL, V_6; R wave amplitude must be 10.0 mm. or more.
	0		None of the above.

15. T wave items. Site: II, III, aVF.

(11) 45	1	5-1	T amplitude negative -5.0 mm. or more negative in lead II, or in lead aVF when QRS is mainly upright.
	2	5-2	T amplitude negative or diphasic with negative phase at least -1.0 mm. but not as deep as -5.0 mm in lead II, or in lead aVF when QRS is mainly upright.
	3	5-3	T amplitude zero with less than 1.0 mm. negative phase in lead II; not coded in lead aVF.
	4	5-4	T amplitude positive and T/R amplitude ratio less than 1/20 in lead II; R wave amplitude must be 10.0 mm. or more.
	0		None of the above.

	Card Column	Code Punched	Minn. Code	
16	T wave items. Site: $V_{2,3,4,5}$.			
(12)	46	1	5-1	T amplitude negative -5.0 mm. or more negative in any of leads $V_{2,3,4,5}$.
		2	5-2	T amplitude negative or diphasic with negative phase at least -1.0 mm. but not as deep as -5.0 mm. in any of leads $V_{2,3,4,5}$.
		3	5-3	T amplitude zero, or negative, or diphasic with less than 1.0 mm. negative phase in any of leads $V_{3,4,5}$.
		4	5-4	T amplitude positive and T R amplitude ratio less than 1/20 in any of leads $V_{3,4,5}$; R wave amplitude must be 10.0 mm. or more.
		0		None of the above.
17.	S-T segment elevation. Site: I, aVL, V_6.			
(13)	47	2	9.2	S-T segment elevation 1.0 mm. or more in any of leads I, aVL, V_6.
		0		None of the above.
18	S-T segment elevation. Site: II, III, aVF.			
(14)	48	2	9.2	S-T segment elevation 1.0 mm. or more in any of leads I, aVL, V_6.
		0		None of the above.
19.	S-T segment elevation. Site: $V_{1,2,3,4,5}$.			
(15)	49	2	9.2	S-T segment elevation of 1.0 mm. or more in lead V_5 or S-T segment elevation of 2.0 mm. or more in any of leads $V_{1,2,3,4}$.
		0		None of the above.
20.	High amplitude R wave.			
(16)	50	1	3-1	Left: R amplitude greater than 26 mm. in either V_5 or V_6; or R amplitude greater than 20.0 mm. in any of leads I, II, III, aVF, or R amplitude greater than 12.0 mm. in lead aVL.
		2	3-2	Right: R amplitude equal to or greater than 5.0 mm. and R amplitude equal to or greater than S amplitude in lead V_1, when a decreasing R/S amplitude ratio occurs somewhere to the left of V_1 on the chest. (Includes code 7-3, which meets the above criteria).

Card Column	Code Punched	Minn. Code	
	3	3-3	Left (optional code when 3-1 is not present): R amplitude greater than 15.0 mm. but less than 20.0 mm. in lead I, or R amplitude in V_5 or V_6, plus S amplitude in V_1 greater than 35.0 mm.
	4	3-4	Criteria for 3-1 and 3-2 both present.
	0		None of the above.

21 A-V conduction defect.

(17) 51-52	01	6-1	Complete (third degree) A-V block (permanent or intermittent) in any lead. Atrial and ventricular complexes firing independently and atrial rate faster than ventricular rate, with ventricular rate <60.
	21	6-2-1	Mobitz Type II
	22	6-2-2	Partial (second degree) A-V block in any lead. (2:1 or 3:1 block).
	23	6-2-3	Wenckebach
	03	6-3	P-R (P-Q) interval 0.22 sec. or more in the majority of beats in any of leads I, II, III, aVL, aVF.
	41	6-4-1	Wolff-Parkinson-White Syndrome (WPW)--persistent. Normal P wave. P-R interval less than or equal to 0.12 sec. plus QRS duration 0.12 sec. or more plus R peak duration 0.06 sec. or more, coexisting in the same beat and present in the majority of beats in any of leads I, II, aVL, $V_{4,5,6}$.
	42	6-4-2	WPW--Intermittent. WPW pattern in $\leq$50% of beats in appropriate leads.
	05	6-5	Short P-R Interval: P-R interval less than 0.12 sec. in all beats of any two of leads I, II, III, aVL, aVF.
	06	6-6	Intermittent aberrant ventricular conduction: 1. P-R > 0.12 sec. 2. Bizarre QRS complex 3. Normal P wave (Suppressed by 6-4-1, 6-4-2).
	08	6-8	Artificial Pacemaker--a sharp (spiked) amplitude occurring regularly whose deflection is immediately followed by a wide, slurred QRS and a highly regular heart rate.
	00		None of the above.

Card Column	Code Punched	Minn. Code	
22	**Ventricular conduction defect.**		
53-54 (18)	11	7-1-1	Complete left bundle branch block (LBBB)--suppressed by 6-1, 6-4, 6-8, 8-2-1 or 8-2-2. QRS duration $\geq$0.12 sec. in a majority of beats (of the same QRS pattern) in any of leads I, II, III, aVL, aVF PLUS R peak duration $\geq$0.06 sec. in a majority of beats (of the same QRS pattern) in any of leads I, II, aVL, V_5, V_6. 7-1 suppresses 1-2-3, 1-2-7, 1-2-8, 1-3-2, 1-3-6, all 3, 4, 5, 9-2, 9-4, 9-5 codes. If any other Q wave coexists with the LBBB pattern, code the Q and drop the 7-1 code to a 7-4 code.
	12	7-1-2	Intermittent left bundle branch block--same as 7-1-1 but with presence of normally conducted QRS complexes of different shape to the LBBB pattern.
	21	7-2-1	Complete right bundle branch block (RBBB)--suppressed by 6-1, 6-4, 6-8, 8-2-1 or 8-2-2. QRS duration $\geq$0.12 sec. in a majority of beats (of the same QRS pattern) in any of leads I, II, III, aVL, aVF, PLUS R'> R in V_1 or V_2 OR QRS mainly upright plus R peak duration $\geq$0.06 sec. in V_1 or V_2 OR S duration >R duration in all beats of either leads I or II. 7-2 suppresses 1-2-8, all 2, 3, 4 and 5 codes, 9-2, 9-4, 9-
	22	7-2-2	Intermittent right bundle branch block--same as 7-2-1 but with presence of normally conducted QRS complexes of different shape to the RBBB pattern.
	03	7-3	Incomplete right bundle branch block. QRS duration less than 0.12 sec. in each of leads I, II, III, aVL, aVF, and R prime greater than R in either of leads V_1, V_2. Code as 3-2 if those criteria are met. 7-3 suppresses 1-2-8 code.
	04	7-4	Intraventricular block. 7-4 suppresses all 2, 3, 4, 5, 9-2, 9-4, 9-5 codes. QRS duration 0.12 sec. or more in a majority of beats in any of leads I, II, III, aVL, aVF.
	05	7-5	R-R prime pattern in either of leads V_1, V_2 with R prime less than R.
	06	7-6	Incomplete left bundle branch block. QRS duration at least 0.10 sec. and less than 0.12 sec. in majority of beats of each of leads I, aVL, and V_5 or V_6. Do not code in the presence of any codable Q wave.
	07	7-7	LAH (Left Anterior Hemiblock). QRS duration less than 0.12 sec. in the majority of beats in any of leads I, II, III, aVL, aVF, plus a Q wave that is greater than or equal to 1/4 mm. amplitude and less than 0.03 sec. duration in lead I plus axis less than -45 degrees. In presence of 7-2, code 7-8 if axis is less than -45 degrees and Q wave in lead I meets the above criteria.

Card Column	Code Punched	Minn. Code	
	08	7-8	Combination of 7-7 and 7-2.
	00		None of the above.

23. Estes' Code.

55 (19)	7	E7	QRS interval at least 0.09 sec. or more and R peak duration 0.04 sec. or more, coexisting in the second-to-the-last beat in lead V_5 or V_6.
	0		Not present.

24. Arrhythmias.

56 (20)	1	8-1-1	Presence of <u>any</u> atrial or junctional premature beat. 1. Beat occurs prematurely. 2. Different P wave or absent P wave. 3. QRS-T normal or QRS-T absent with a premature abnormal P wave.
	2	8-1-2	Presence of <u>any</u> ventricular premature beat. 1. Beat occurs prematurely 2. Bizarre QRS-T 3. Prolonged QRS 4. P wave absent
	3	8-1-3	Presence of both atrial and/or junctional premature beats and ventricular premature beat.
	4	8-1-4	<u>Wandering atrial pacemaker</u>. 1. Varying normal and different P waves associated with both long and short R-R intervals without premature beats. 2. Varying P-R interval may be present. 3. Varying ventricular rate with one P activity for each QRS. 4. Normal QRS-T (or unchanged QRS).
	5	8-1-5	Presence of 8-1-2 and 8-1-4.
	0		None of the above.

25. Arrhythmias.

57 (21)	1	8-2-1	<u>Ventricular Fibrillation or Ventricular Asystole</u>.
	2	8-2-2	<u>Persistent Ventricular Rhythm</u> 1. Wide QRS (greater than or equal to 0.12 sec.) 2. Absence of preceding P waves

Card Column	Code Punched	Minn. Code	
	3	8-2-3	Intermittent Ventricular Tachycardia 1. 3 or more consecutive ventricular premature beats occurring at a rate greater than or equal to 100
	4	8-2-4	Ventricular Parasystole (should not be coded in presence of 8-3-1) 1. Unifocal ventricular premature beats 2. Coupling intervals (shortest to longest) vary by greater than 0.12 sec.
	0		None of the above.

26. Arrhythmias.

(22) 58	1	8-3-1	Atrial Fibrillation (persistent in all leads) 1. Absent P waves 2. Irregular undulations of the baseline 3. Normal QRS 4. Totally irregular ventricular rate
	2	8-3-2	Atrial Flutter (persistent)
	3	8-3-3	Intermittent Atrial Fibrillation (Code if 3 or more clear-cut, consecutive sinus beats present in any lead)
	4	8-3-4	Intermittent Atrial Flutter (Code if 3 or more clear-cut, consecutive sinus beats present in any lead)
	0		None of the above.

27. Arrhythmias.

59 (23)	1	8-4-1	Persistent Supraventricular Rhythm 1. QRS duration less than 0.12 sec. 2. Absent P waves or presence of abnormal P waves (inverted or flat in aVF) 3. Regular rhythm
	2	8-4-2	Intermittent Supraventricular Tachycardia 1. Three consecutive atrial or junctional premature beats occurring at a rate $\geq$100.
	0		None of the above.

28. Arrhythmias.

(24) 60	1	8-5-1	Sino-atrial Arrest 1. Unexpected absence of P, QRS and T 2. R-R interval fixed multiple of normal interval plus or minus 10%

Card Column	Code Punched	Minn. Code	
	2	8-5-2	Sino-atrial Block
			Unexpected absence of P, QRS, and T preceded by progressive shortening of P-P intervals.
	0		Not present.

29. Arrhythmias.

61 (25)	1	8-6-1	A-V Dissociation with Ventricular Pacemaker Without Capture
			1. P-P and R-R occur at variable rates with ventricular rate as fast or faster than the atrial rate. 2. Variable P-R intervals. 3. No capture beats.
	2	8-6-2	A-V Dissociation with Ventricular Pacemaker with Capture
	3	8-6-3	A-V Dissociation with Atrial Pacemaker and with No Capture Beats
	4	8-6-4	A-V Dissociation with Atrial Pacemaker with Capture Beats
	0		None of the above.

30 Ectopic codes, SVPB.

62-63		Total number of SVPB's on the record.
(26)	00	No SVPB's on the record.

31 Ectopic codes, VPB.

64-65		Total number of VPB's on the record.
(27)	00	No VPB's on the record.

32 Ectopic codes, Runs and Bigeminy.

66	1	No runs, and non-bigeminy, or trigeminy.
(28)	2	SVPB runs.
	3	VPB runs.
	4	Both VPB and SVPB runs.
	5	SVPB bigeminy or trigeminy.
	6	VPB bigeminy or trigeminy.
	7	SVPB bigeminy or trigeminy with SVPB runs.

Card Column	Code Punched	Minn. Code	
	8		VPB bigeminy or trigeminy with VPB runs.
	9		Other combinations of bigeminy or trigeminy with runs.
	0		No ectopic beats on record.

33. Ectopic codes, Multiform Ectopic Beats.

67 (29)	1		Unifocal VPB and/or unifocal SVPB beats.
	2		Multiform SVPB.
	3		Multiform VPB.
	4		Both multiform VPB and multiform SVPB.
	5		Multiform SVPB and unifocal VPB.
	6		Unifocal SVPB and multiform VPB.
	0		No ectopic beats on record.

34. Ectopic codes, T-R' interval.

68-69 (30)			Measurement of the shortest T-R' interval to the nearest whole mm.
	00		No VPB or SVPB on record.
	99		Unmeasurable
			If the T-R' interval is zero, code 88.

35. Miscellaneous items.

70 (31)	1	9-1	Low QRS amplitude: QRS peak-to-peak amplitude less than 5 mm. in all beats in each of leads I, II, III, or less than 10 mm. in all beats in each of leads $V_{1, 2, 3, 4, 5, 6}$. Check calibration before coding.
	0		None of the above.

36. Miscellaneous items.

71-72 (32)	30	9-3	P wave amplitude of 2.5 mm. or more in any of leads II, III, aVF, on a majority of beats.
	05	9-5	T wave amplitude greater than +12 mm. in any of leads I, II, III, aVL, aVF, $V_{1,2,3,4,5,6}$.
	00		None of the above.

37. Miscellaneous items.

73 (33)	1	9-4-1	QRS transition zone at V_3 or to the right of V_3 on the chest.

Card Column	Code Punched	Minn. Code	
	2	9-4-2	QRS transition zone at V_4 or to the left of V_4 on the chest.
	0		None of the above.

38. Heart rate per minute (right hand justify).

74-76 (34) Blank = missing or unmeasurable

39. QRS axis (right hand justify).

(35) Limits -179 to +179

77-80 Blank = missing or unmeasurable

40. Maximum R height in mms. in lead I, II, or III (coded on the second-to-the-last beat).

Limit: +50 ++Note: Should always be a positive number.

(36)

81-82 blank = missing or unmeasurable

41. Maximum R height in mms. in lead V_4, V_5 or V_6 (coded on the second-to-the-last beat).

Limit: +50 ++Note: Should always be a positive number.

(37)

83-84 blank = missing or unmeasurable

42. Maximum S height in mms. in lead I, II, or III (coded on the second-to-the-last beat).

Limit: -50 ++Note: Should always be a negative number.

(38)

85-86 blank = missing or unmeasurable

43. Maximum S height in mms. in lead V_1, V_2 or V_3 (coded on the second-to-the-last beat).

Limit: -50 ++Note: Should always be a negative number

(39)

87-88 blank = missing or unmeasurable

44. T height in mms. in lead V_5 (coded on the second-to-the last beat).

(40) Limit: +20 or -20 ++Note: Assume positive unless (-) sign is given

89-91 blank = missing or unmeasurable

Coded 999 when not measurable.

	Card Column	Code Punched	Minn. Code	
45.	Technical problems.			
	92-93	81	9-8-1	Technical problems present and interferes with coding
	41	82	9-8-2	Technical problems presend but ECG codeable
		00		No technical problem.
46.	QX duration (punched X.XX) - decimal point will be coded.			
	94-96 42			Coded 999 when not measurable.
47.	QT duration (punched X.XX) - decimal will be coded.			
	97-99 43			Coded 999 when not measurable.
48.	100 44	0		Clear record no code 1-9-4