

CRS Report for Congress

Electronic Voting System in the House of Representatives: History and Evolution

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Summary

The Electronic Voting System in the House of Representatives was used for the first time on January 23, 1973, 87 years after the first proposal to use an automated system to record votes was introduced. The concept of automated voting dates even farther back to 1869, when Thomas Edison filed a patent for his vote recorder and demonstrated the system to Congress. Between the first proposal for automated voting in 1886, and the passage of the Legislative Reorganization Act of 1970, which contained language authorizing an electronic voting system, 50 bills and resolutions were introduced to provide for automated, electrical, mechanical or electronic voting.

Following the passage of the Legislative Reorganization Act of 1970, the Committee on House Administration and House Information Systems worked to develop, install, and implement the electronic voting system. The electronic voting system was first used on January 23, 1973, to record a quorum call.

Since its first use, the electronic voting system has gone through numerous updates and upgrades. These modifications have included efforts to improve the retrieval and organization of voting data, the manner in which votes are displayed on closed circuit television and C-SPAN, and have created new procedures for Members changing their votes. On its 35th anniversary, the electronic voting system continues to be a work in progress, with upgrades and updates during almost every Congress.

Contents

History of Electronic Voting Before 1970	1
Creation of Electronic Voting, 1970 to 1973	6
The Legislative Reorganization Act of 1970	6
Designing the Electronic Voting System	7
Initial Use of the Electronic Voting System	10
Operation of Voting Equipment	11
Upgrades and Updates to the Electronic Voting System	13
Retrieval of Voting Information	13
Display of In-Progress Voting on Closed-Circuit Television	14
Changing Votes	14
Conclusion	15
Appendix A. Proposals to Establish Automated Voting in the House of Representatives	17
Appendix B. Chronology of Upgrades to the House Electronic Voting System	20

List of Tables

Table A-1. Electrical, Mechanical, Automated, and Electronic Voting Bills and Resolutions in the House of Representatives Before 1970	17
Table B-1. Upgrades to the House Electronic Voting System	20

Electronic Voting System in the House of Representatives: History and Evolution

After considering the introduction of an automated vote recording system, the House of Representatives adopted an electronic means for recording floor votes as part of the Legislative Reorganization Act of 1970. The first proposal for automated voting was introduced in 1886. Between 1886 and 1970, 50 bills and resolutions were introduced to bring automated, electrical, mechanical, or electronic voting to the House of Representatives. The current electronic voting system was first used on January 23, 1973.

History of Electronic Voting Before 1970

The electric vote recorder was first invented by Thomas Edison in 1869.¹ He designed the system after learning that the Washington, DC city council and the New York state legislature were considering systems to automatically record votes. In Edison's system "each legislator moved a switch to either a yes or no position, thus transmitting a signal to a central recorder that listed the names of the members in two columns of metal type headed 'Yes' and 'No.'"² Edison and his colleague Dewitt Roberts demonstrated the machine to Congress, where Edison recalled:

We got hold of the right man to get the machine adopted, and I enthusiastically set forth its merits to him. Just imagine my feelings when, in a horrified tone, he exclaimed: "Young man, that won't do at all! That is just what we do *not* want. Your invention would destroy the only hope the minority have of influencing legislation. It would deliver them over, bound hand and foot, to the majority. The present system gives them a weapon which is invaluable, and as the ruling majority always know that it may some day become a minority, they will be as much averse to any change as their opponents."³

¹ Thomas A. Edison, "Improvement in Electrographic Vote-Recorder," U.S. Patent 90,646, June 1, 1869 [<http://edison.rutgers.edu/patents/00090646.PDF>], accessed February 4, 2008.

² "Vote Recorder," The Edison Papers [<http://edison.rutgers.edu/vote.htm>], accessed February 4, 2008.

³ George Parsons Lathrop, "Talks with Edison," *Harper's New Monthly Magazine*, vol. 80, no. 477 (February 1890), pp. 431-432. Available at [<http://edison.rutgers.edu/NamesSearch/SingleDoc.php3?DocId=SC90012A>], accessed February 4, 2008, and [<http://cdl.library.cornell.edu/cgi-bin/moa/moa-cgi?notisid=ABK4014-0080-47>], accessed

(continued...)

In 1886, electric and mechanical voting was proposed for the House with the introduction of two separate resolutions. Representative Lewis Beach of New York introduced a resolution in February directing the Committee on Rules to “inquire into the feasibility of a plan for registering votes....”⁴ In June, Representative Benjamin Le Fevre of Ohio submitted a resolution on the electrical recording of the yeas and nays.⁵ The resolutions were referred to the Committee on Rules. No further action was taken on either resolution.

During the 63rd Congress (1913-1914), Representative Allan Walsh of New Jersey introduced H.Res. 513, providing for an electrical and mechanical system of voting for the House of Representatives.⁶ A special subcommittee of the Committee on Accounts held hearings on an automated system where each Member would have a voting box with three or four buttons attached to a desk. Each voting box would have a unique key and each Member would be assigned to a voting box that only their key would operate. The votes would then be transmitted electrically and recorded mechanically by a machine installed on the clerk’s desk, with votes displayed on boards throughout the chamber and in the cloak rooms.⁷ Following the subcommittee’s hearing, no further action was taken on H.Res. 513.

A similar proposal was introduced in the 64th Congress (1915-1916) by Representative William Howard of Georgia (H.Res. 223). Hearings were held by the Committee on Accounts on the proposal where testimony was heard from outside experts, including representatives of the company then installing an electrical voting system in the Wisconsin legislature.⁸ H.Res. 223 was favorably reported by the Committee on Accounts, but was not acted upon by the House.⁹

During the hearings on H.Res. 513 and H.Res. 223, Members’ statements and questions focused on the length of time needed to vote in the House, the accuracy of such roll-call votes, and the cost of developing and implementing an electrical vote

³ (...continued)
February 4, 2008.

⁴ U.S. Congress, House of Representatives, *Plan to Register Votes, Etc.*, 49th Cong., 1st sess., Mis. Doc. 98, Serial Set 2415 (1886), p. 1.

⁵ U. S. Congress, House of Representatives, *Electrical Recording of Yeas and Nays*, 49th Cong., 1st sess., Mis.Doc. 315, Serial Set 2418 (1886), p. 1.

⁶ U.S. Congress, House Committee on Accounts, *Electrical and Mechanical System of Voting*, hearing on H.Res. 513, 63rd Cong., 2nd sess., July 31, 1914 (Washington: GPO, 1914).

⁷ *Ibid*, pp. 4-6. The buttons on the voting box would indicate Yea, Nay, Present, and Paired. When a button was depressed, the appropriate light would come on next to the Member’s name in the appropriate column.

⁸ U.S. Congress, House Committee on Accounts, *Electrical and Mechanical System of Voting*, hearing on H.Res. 223, 64th Cong., 1st sess., May 15, 1916 (Washington: GPO, 1916).

⁹ U.S. Congress, House Committee on Accounts, *Electrical and Mechanical System of Voting*, report to accompany H.Res. 223, 64th Cong., 1st sess., H.Rept. 940 (Washington: GPO, 1916).

recording system. During his testimony on H.Res. 513, Representative Walsh testified that “taking 45 minutes as the average time consumed in a roll call, the time consumed in the Sixty-second Congress in roll calls was 275 hours, or 55 legislative days.”¹⁰ However, members of the Committee on Accounts were concerned that shortening votes could “flood the country with legislation” and disrupt then used delaying tactics, “filibuster by means of roll calls.”¹¹

The hearings also addressed Members’ concerns that voting mistakes could be made using an electrical and mechanical system. In the hearings on H.Res. 513, Representative Walsh testified that the voting system he envisioned would automatically cut off the circuit after a prescribed time to end a vote. In the instance where a Member missed a vote, Representative Walsh left the decision up to the Speaker as to whether the Member would be allowed to vote.¹² Representative Howard’s resolution, H.Res. 223, overcame this perceived deficiency and allowed for vote changes either through the mechanical system or through a more traditional paper method.

During the hearings on H.Res. 513, members of the Committee on Accounts expressed concern about the cost of development and installation of the electric voting system. Representative Walsh testified in the 63rd Congress that his proposed voting system was estimated to cost no more than \$25,000.¹³ However, in the report recommending adoption of Representative Howard’s resolution, in the 64th Congress, the Committee on Accounts estimated that the electrical voting system would cost \$106 per unit, with a total cost of approximately \$125,000.¹⁴

Although the report on H.Res. 223 recommended the resolution’s adoption, there was still division in the Committee on Accounts over the desirability of such a voting system. A majority found that an electrical and mechanical system could help Members save time and avoid the then-practice of reading each name twice for every roll-call vote and quorum call:

From the statements of the experts before the committee it is evident that such a device can be constructed. From a view of the working model of one device, it is evident that a practical voting system can be instituted, and from the statements of various Members of the House, it is evident that there is a very strong desire for some means of saving the time of Members. ...Believing that a system can be adopted which will save time, encourage the regular attendance

¹⁰ U.S. Congress, House Committee on Accounts, *Electrical and Mechanical System of Voting*, hearing on H.Res. 513, 63rd Cong., 2nd sess., July 31, 1914 (Washington: GPO, 1914), p. 9.

¹¹ *Ibid.*

¹² *Ibid.*, pp. 10-11.

¹³ *Ibid.*, p. 12.

¹⁴ U.S. Congress, House Committee on Accounts, *Electrical and Mechanical System of Voting*, report to accompany H.Res. 223, 64th Cong., 1st sess., H.Rept. 940, part 2 (Washington: GPO, 1916), p. 4.

of Members, and insure absolute accuracy in registering and recording the votes of the Members, the adoption of this resolution is recommended.¹⁵

A minority opposed the concept of an electronic system and the potential loss of floor time to review proposals before casting a vote:

It must be frankly admitted that the proposed device, if properly installed in the House, will rapidly record the vote if all Members are present. Voting, however, is the most important function of a Member of Congress, and we seriously question the wisdom of hurrying this branch of the work. It frequently happens under the present system that Members are required to vote before they have fully formed their judgement. The time taken in voting is obviously time of deliberation, of conference, of quiet discussion, and of interchange of views. Often, under the present system, before the voting has closed, Members change their votes. It is not an unreasonable thing to require a half hour or more to take the votes of 435 men who, as frequently happens, have been engaged in debate on an important question for weeks.... Speed is not the most necessary thing in legislation.¹⁶

Proposals to install automatic, electrical, or mechanical vote counting systems were introduced in the years following. With the exception of H.Res. 513 introduced by Representative Walsh in 1915 and H.Res. 223 introduced by Representative Howard in 1916, none of the bills subsequently introduced received committee or floor attention. Each was introduced, referred to committee,¹⁷ and not acted on. **Appendix A** lists each of the proposals to install automatic, electrical, mechanical, or electronic voting in the House of Representatives.¹⁸

¹⁵ U.S. Congress, House Committee on Accounts, *Electrical and Mechanical System of Voting*, report to accompany H.Res. 223, 64th Cong., 1st sess., H.Rept. 940, part 1 (Washington: GPO, 1916), p. 2.

¹⁶ U.S. Congress, House Committee on Accounts, *Electrical and Mechanical System of Voting*, report to accompany H.Res. 223, 64th Cong., 1st sess., H.Rept. 940, part 2 (Washington: GPO, 1916), p. 2.

¹⁷ Bills and resolutions introduced before 1947 were referred to the Committee on Rules or the Committee on Accounts. Beginning in 1947, bills and resolutions were referred to the Committee on Rules or the Committee on House Administration, the successor committee to the Committee on Accounts.

¹⁸ Appendix A includes the Congress in which a bill or resolution was introduced, the date of introduction, the bill or resolution number, and the sponsor. From 1886 to 1969, 21 different Representatives introduced 50 proposals to install some type of automatic, electrical, mechanical, or electronic voting system in the House of Representatives. The sponsors of these bills included 10 Democrats and 11 Republicans. Members who introduced more than one bill or resolution were also evenly divided along party lines. Representative Winfield Denton of Indiana introduced six bills between 1951 and 1965, Representative Glenn Davis of Wisconsin introduced five bills between 1949 and 1969, Representative John Jarman of Oklahoma introduced four bills between 1951 and 1959, Representative Charles Bennett of Florida introduced four bills between 1949 and 1969, and Representative Milton Glenn New Jersey introduced four bills between 1958 and 1963.

Representative Charles Bennett of Florida,¹⁹ a longtime proponent of automated voting, strongly believed that not using modern technology to vote proved how antiquated the House of Representatives was compared with state and foreign legislatures:

There once was a congressman who, when notified that a vote was to be taken, would race to the legislative chamber in time to beat the final rap of the gavel — from his home 19 miles away! He'd usually make it, too, because the taking of a record vote in the House of Representatives requires about 45 minutes the way it is done now.²⁰

During the Democratic Caucus's organizational meeting for the 91st Congress (1969-1970), Representative Charles Price of Illinois introduced a resolution on vote recording procedures in the House of Representatives. The resolution stated:

RESOLVED: That it is the sense of the caucus that the Speaker of the House shall immediately proceed to take such steps as may be necessary to improve the vote recording procedures in the House of Representatives.²¹

The resolution was agreed to and sent to the Speaker of the House. In response to the resolution, Speaker John McCormack of Massachusetts sent a letter to the Committee on House Administration asking it to examine automated voting. In his letter, Speaker McCormack indicated that he was sure, while the resolution was adopted by the Democratic Caucus, "that all of our Republican colleagues would approve of the same."²²

The Committee on House Administration's special subcommittee on electrical and mechanical office equipment held a hearing in April 1969 on electrical and mechanical voting.²³ During the hearing, Representative Frederick Schwengel of Iowa, the ranking member, seemed to sum up the subcommittee's desire for an electronic voting system: "On electronic voting, I think this is something we can do now which will improve the effectiveness and efficiency, particularly the efficiency,

¹⁹ Representative Bennett served in the House of Representatives from the 81st Congress (1949-1950) until the 102nd Congress (1991-1992).

²⁰ Congressman Charles E. Bennett, "Yeas and Nays Waste Time: Today we're in an era of pushbuttons, but Congress is still in the horse-and-buggy age with its voting procedure," *U.S.A. The Magazine of American Affairs*, vol. 1, no. 2 (April 1952), p. 59.

²¹ Meeting, Records of the House Democratic Caucus, Minutes of January 9, 1969, container 2, folder 5, Manuscript Division, Library of Congress.

²² U.S. Congress, Committee on House Administration, Special Subcommittee on Electrical and Mechanical Office Equipment, *Computer System-Vote Recording Procedures*, unpublished hearing, 91st Cong., 1st sess., April 1, 1969, p. 4.

²³ In the 86th Congress (1959-1960) the Committee on House Administration renamed the subcommittee on office equipment as the special subcommittee on electrical and mechanical office equipment. The subcommittee on office equipment had been created during the 84th Congress (1955-1956).

of our operations. So I am all for moving forward as fast as we possibly can to the consideration of the matter.”²⁴

Clerk of the House W. Pat Jennings anticipated approval of an electronic voting system and included a request to support the development and installation of an electrical voting system in his proposed operating budget. Jennings estimated that the system would cost between \$80,000 and \$600,000, with \$500,000 considered adequate to install a comprehensive system.²⁵ The special subcommittee did not report on the Democratic Caucus’s resolution.

Creation of Electronic Voting, 1970 to 1973

The House agreed to development of an electronic voting system as part of the Legislative Reorganization Act of 1970. As design and development of the system neared completion, the House amended its rules to accommodate the system. On January 23, 1973, the House used the electronic voting system for the first time.

The Legislative Reorganization Act of 1970

The Legislative Reorganization Act of 1970, as introduced and reported in the House, did not mention electronic voting.²⁶ Representative Robert McClory of Illinois offered a floor amendment to authorize the development of an electronic voting system and to amend then House Rule XV to allow the system to be used to conduct votes and quorum calls after its development.²⁷ The amendment, agreed to by voice vote, is contained in Section 121 of the act. Section 121 states:

Sec. 121. (a) Rule XV of the Rules of the House of Representatives is amended by adding at the end thereof the following new clause:

“5. In lieu of the calling of the names of Members in the manner provided for under the preceding provisions of this Rule, upon any roll call or quorum call, the names of such Members voting or present may be recorded through the use of appropriate electronic equipment. In any such case, the Clerk shall enter in the Journal and publish in the Congressional Record, in alphabetical order in each category, a list of the names of those Members recorded as voting in the affirmative, of those Members recorded as voting in the negative, and of those Members voting present, as the case may be, as if their names had been called in the manner provided for under such preceding provisions.”

²⁴ U.S. Congress, Committee on House Administration, Special Subcommittee on Electrical and Mechanical Office Equipment, *Computer System-Vote Recording Procedures*, unpublished hearing, 91st Cong., 1st sess., April 1, 1969, p. 7.

²⁵ *Ibid.*

²⁶ U.S. Congress, House Committee on Rules, *Legislative Reorganization Act of 1970*, report to accompany H.R. 17654, 91st Cong., 2nd sess., H.Rept. 91-1215 (Washington: GPO, 1970).

²⁷ Legislative Reorganization Act of 1970, *Congressional Record*, vol. 116, part 19 (July 27, 1970), pp. 25818-25829.

(b) The contingent fund of the House of Representatives shall be available to provide the electronic equipment necessary to carry out the purpose of the amendment made by subsection (a).²⁸

Section 121(b) authorized funding for the design, installation, and implementation of an electronic voting system. Representative McClory's amendment authorized funding from the contingent fund to immediately allow for the creation of the system without an additional funding resolution. A report by the clerk of the House in the same Congress discussed the cost of a voting system and estimated the cost as no more than \$600,000.²⁹ Coupled with later rules changes, the change to Rule XV established the electronic voting system as the primary method for conducting a roll-call vote or quorum call, in the House and in the Committee of the Whole. In his floor speech in support of his amendment, Representative McClory acknowledged the work done on the subject of automated voting by other Members and the Committee on House Administration:

I should like to point out that a report on this subject was made by a member of the original Reorganization Committee, the gentleman from Missouri (Mr. HALL). It is also the subject of legislation at this session introduced by the gentleman from Florida (Mr. BENNETT), and the gentleman from Wisconsin (Mr. DAVIS). I know that the Committee on House Administration has already undertaken studies. I know that the Clerk has made recommendations to the Committee on House Administration, and I feel that this amendment is an expression of support of the House for the work of the Committee on House Administration and perhaps to emphasize the need to bring their recommendations to the floor of the House in the form of a more specific and detailed change at the earliest possible time. It does not specify a particular system.³⁰

President Richard M. Nixon signed the Legislative Reorganization Act of 1970 into law on October 26, 1970 (P.L. 91-510, 84 Stat. 1157).

Designing the Electronic Voting System

In December 1970, the clerk of the House contracted with Informatics Inc. to design the voting system. In addition, the House created House Information Systems (HIS) in 1971 to "satisfy the requirements for information, information technology, and related computer services of the Members, committees and staff of the U.S.

²⁸ P.L. 91-510, 84 Stat. 1157, October 26, 1970.

²⁹ Legislative Reorganization Act of 1970, *Congressional Record*, vol. 116, part 19 (July 27, 1970), pp. 25823-25824.

³⁰ Legislative Reorganization Act of 1970, *Congressional Record*, vol. 116, part 19 (July 27, 1970), p. 25818.

House of Representatives.”³¹ Among its responsibilities, HIS developed, implemented, and maintained the electronic voting system.

Guided by instructions from House Information Systems (HIS) and the House Administration Committee, Informatics set five objectives and guidelines for designing the system. They were as follows:

- The system should significantly reduce the time required to vote and also meet the information needs of system users.
- Each system user, Representative, Tally Clerk, press, etc. should have a simple and consistent interface with the system from both a hardware and software viewpoint.
- The system should have a very high degree of reliability with appropriate levels of automatic testing.
- Hardware should be highly compatible with the Chamber decor so as to be as unobtrusive as possible and still function properly.
- Absolute lowest cost is not a prime consideration when weighed against other design objectives; however, costs should be handled prudently.³²

Informatics estimated that completing these objectives would cost a total of \$900,000.³³

Informatics worked on the preliminary design concept for the electronic voting system until September 1971 when HIS recommended the termination of the contract. HIS took Informatics’ design and continued to refine and develop the electronic voting system. In November 1971, Representative John Dent introduced and the House agreed to H.Res. 601. This resolution authorized funds for the maintenance and improvement of existing computer systems and the creation of a computer systems staff,³⁴ whose primary task was the creation of the electronic voting system.³⁵ Also in November 1971, the Committee on House Administration

³¹ U.S. Congress, Joint Committee on the Organization of Congress, *Organization of Congress*, final report to accompany H.Con.Res. 192 (102nd Congress), 103rd Cong., 1st sess., S.Rept. 103-215, vol. 2, and H.Rept. 103-413, vol. 2 (December 1993), p. 117. These reports provided a summary of the creation of House Information Systems in 1971 as part of a history of information resources and technology in Congress.

³² Informatics, *Electronic Voting System for the House of Representatives*, March 16, 1971, p. 2-1, located at the Center for Legislative Archives, National Archives and Records Administration.

³³ *Ibid.*, pp. 7-6.

³⁴ H.Res. 601 (92nd Congress), agreed to November 9, 1971.

³⁵ U.S. Congress, Committee on House Administration, *Providing Funds for the Expenses of the Committee on House Administration to Provide for Maintenance and Improvement on Ongoing Computer Services for the House of Representatives and for the Investigation of Additional Computer Services for the House of Representatives*, report to accompany H.Res. 601, 92nd Cong., 1st sess., H.Rept. 92-607 (Washington: GPO, 1971), p. 3. See also “Providing Funds for Computer Services for House of Representatives,” *Congressional* (continued...)

approved a contract with Control Data Corporation to “develop a fully operational electronic voting system”³⁶ based on the work of Informatics and HIS.

In October 1972, the cost for designing and installing the electronic voting system was estimated to be \$1,065,000.³⁷ While this was substantially greater than the estimated costs in 1915, 1916, or 1969, Representative Wayne Hays of Ohio, chairman of the Committee on House Administration, justified the additional cost as a consequence of the use of electronic technology.³⁸ Instead of having an electrical and mechanical system, the House chose a fully electronic, computer-based system with electronic display board “which flashes a running tally and records each member’s vote on an overhead scoreboard and a computer printout.”³⁹

The electronic voting system consisted, in part, of voting stations located throughout the House, in contrast to earlier proposals that linked voting to individual voting boxes that were affixed to desks in the House chamber. In this respect, the system was unlike those used in many state and local legislative bodies. Representative Joseph D. Waggoner of Louisiana enumerated the impracticality of returning to the pre-1913 practice of assigning seats⁴⁰ as a function of the number of seats in the House chamber and the imbalance between Democrats and Republicans in a Congress. “How many Democrats are in the House of Representative today? It was 244, I believe.... How many seats are there on this side of the aisle? There are 224. And there are 224 over there.”⁴¹

The electronic voting system became operational in January 1973. In a letter to Control Data Corporation in March 1973, Chairman Hays wrote that final system acceptance would not be completed until a “list of system deficiencies are corrected.”⁴² The deficiencies were divided into two categories, items that had yet to

³⁵ (...continued)

Record, vol. 117, part 31 (November 9, 1971), pp. 40015-40017.

³⁶ U.S. Congress, Committee on House Administration, *The Electronic Voting System for the United States House of Representatives*, committee print, 93rd Cong., 2nd sess., January 31, 1975 (Washington: GPO, 1975), pp. 14-15. This committee print reviews the history of the electronic voting system and explains its operation.

³⁷ “Electronic Voting in the House of Representatives,” *Congressional Record*, vol. 118, part 27 (October 13, 1972), p. 36006.

³⁸ *Ibid.*

³⁹ David S. Broder, “The House: A New Era,” *The Washington Post*, February 18, 1973, p. B6.

⁴⁰ The assigning of seats in the House of Representatives was abolished during the 63rd Congress (1913-1914). Seating of Members, *Congressional Record*, vol. 50, part 1 (April 7, 1913), pp. 68-69.

⁴¹ Legislative Reorganization Act of 1970, *Congressional Record*, vol. 116, part 19 (July 27, 1970), p. 25825.

⁴² Letter from Wayne L. Hays, chairman, House Committee on House Administration, to Melissa L. Hogan, Control Data Corporation contract administrator, March 27, 1973, (continued...)

be completed and items that were unacceptable. The items yet to be completed included hardware maintenance documentation, delivery of card reader machines, creation of an installation plan for the Speaker's CRT monitor, installation of the Speaker's CRT monitor, installation of five additional voting stations, and programmer training.⁴³

The unacceptable items included the need for a preventative maintenance schedule, maintenance personnel not sufficiently familiar with the electronic voting system, the voting stations being highly sensitive to static electricity and to variations in the voting cards, the panels in the chamber warping, the CRT monitor for the minority malfunctioning, an insufficient inventory of maintenance parts, and error messages appearing on CRTs that had not been translated from computer terminology to plain English.⁴⁴ These issues prevented the House Administration Committee from authorizing final payment to Control Data Corporation until October 1974.⁴⁵

Initial Use of the Electronic Voting System

While use of the electronic voting system was expected to begin on January 3, 1973,⁴⁶ Speaker Carl B. Albert of Oklahoma announced that the voting system was not yet operational and that "Members will be given sufficient notice as to when the electronic voting system will be activated."⁴⁷ Between January 3 and January 23, the House used roll-calls to record votes.⁴⁸

The electronic voting system was used for the first time on January 23, 1973, for a quorum call after Representative Wayne Hays made a point of order that a quorum was not present.

Mr. Speaker, I am going to make a point of order that a quorum is not present. It is my understanding we will use the new voting system. I just want to say to the Members that their cards will work if they put in either end or either side out.

⁴² (...continued)

located at the Center for Legislative Activities, National Archives and Records Administration.

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Letter from Wayne L. Hays, chairman, House Committee on House Administration, to O.M. McCall, marketing representative, Control Data Corporation, October 1, 1974, located at the Center for Legislative Activities, National Archives and Records Administration.

⁴⁶ "House to Get Its Electronic Voting System January 3," *The New York Times*, November 19, 1972, p. 32.

⁴⁷ "Announcement by the Speaker Concerning Electronic Voting," *Congressional Record*, vol. 119, part 1 (January 3, 1973), p. 27.

⁴⁸ The House used a roll-call vote with tellers to adopt the rules of the 93rd Congress. "Rules of the House," *Congressional Record*, vol. 119, part 1 (January 3, 1973), p. 26.

Any way the Members can get it into the slot, it will work, either end or either side; it does not matter.⁴⁹

The *Congressional Record* does not indicate any problems with the quorum call. The dialogue between the presiding officer and Representative Hays was conducted as it had been in the past, with the exception that the quorum call was conducted by “electronic device.”

Dr. Frank Ryan, HIS’s first director, worked with the clerk of the House to operate the system and assist the tally clerks responsible for counting votes.⁵⁰

Operation of Voting Equipment

House Members may vote at any station located throughout the chamber.⁵¹ To vote, a Member inserts “... a little plastic card which is punched on either end identically, so you can put it in upside down or backwards...”⁵² into one of the voting stations and presses one of three buttons: Yea, Nay, or Present. A Member’s vote is then displayed in panels above the press gallery seats, directly above the Speaker’s dais. A green light indicates a Member voted Yea, a red light indicates a Member voted Nay, and an amber light indicates a Member voted Present.⁵³ Today, Member voting cards have magnetic strips that contain identification information. To vote a Member follows the same procedure as before.

⁴⁹ “Order of Business,” *Congressional Record*, vol. 119, part 2 (January 23, 1973), p. 1793.

⁵⁰ Frank B. Ryan, “The Electronic Voting System for the United States House of Representatives,” *Computer*, vol. 5, no. 6 (November/December 1972), pp. 32-37.

⁵¹ The number of voting stations in the House of Representatives has been placed at between 44 and 47 by various sources since 1973. In committee prints published in 1972, 1975, 1977, and 1982, the Committee on House Administration listed 44 voting stations. See U.S. Congress, Committee on House Administration, *The Electronic Voting System for the United States House of Representatives*, committee print, 97th Cong. 2nd sess., August 30, 1982 (Washington: GPO, 1982), p. 2. Currently, the clerk of the House reports that there are 46 voting stations. See U.S. Congress, House Select Committee to Investigate the Voting Irregularities of August 2, 2007, *Member Briefing on Voting in the House of Representatives — The Rostrum and the Electronic Voting System: A “Walkthrough” by the Clerk of the House Lorraine C. Miller*, unpublished hearing, 110th Cong., 1st sess., October 18, 2007, p. 7.

⁵² “Electronic Voting in the House of Representatives,” *Congressional Record*, vol. 118, part 27 (October 13, 1972), p. 36006.

⁵³ U.S. Congress, Committee on House Administration, *The Electronic Voting System for the United States House of Representatives*, committee print, 97th Cong., 2nd sess., August 30, 1982 (Washington: GPO, 1982), p. 4.

Two summary displays, on the balconies to the right and left of the Speaker's dais, keep a running total of votes cast and how much time remains for a vote.⁵⁴ Members, in general, today have a minimum of 15 minutes to record a vote.⁵⁵

Once he or she has voted, a Member may check his or her vote by reinserting the card and noting which light is illuminated at the voting station. A Member may also change his or her vote in the same manner by depressing the corresponding button. If a Member wishes to change his or her vote after the first 10 minutes of a 15-minute vote, the Member must use a teller card (well card) in the well of the House.⁵⁶ These teller cards are manually entered into the electronic voting system by a tally clerk. Members' votes so recorded are reflected on the panels above the Speaker's dais (along with the votes of Members who voted at the voting stations), in the running total display boards on either side of the chamber, and as a vote change in the *Congressional Record*.⁵⁷ For a five-minute or two-minute vote, changes may be made electronically throughout the voting process.

Between at least the 93rd and 97th Congresses (1973-1982), House Information Systems staff put the electronic voting system through a daily four-step process to ensure it was working properly.⁵⁸ First, the electronic voting system was initialized each morning of a legislative day and tests were conducted on all chamber equipment, including the main display panels, summary display panels, voting stations, and video consoles. Second, the electronic voting system was placed in production mode and made available for votes. Third, during use, a computer technician monitored the system to ensure the system remained operational. Finally, a member of the clerk's office acted as a floor monitor to assist Members in use of the system and to close down inoperable voting stations as necessary.⁵⁹

⁵⁴ Ibid.

⁵⁵ Pursuant to Rule XX, cl. 2 (a), the minimum time for a recorded vote or quorum call is 15 minutes, except as authorized under Rule XX, cl. 8 or cl. 9, or Rule XVIII, cl. 6, where the Speaker (or chairman in the Committee of the Whole) may reduce to five minutes the minimum time for electronic voting on any question arising without intervening business after an electronic vote on another question if notice of possible five-minute voting for a given series of votes was issued before the preceding electronic vote.

⁵⁶ Pursuant to Speaker's voting policies in effect since 1975, vote changes can be made electronically for the first 10 minutes of a vote. After 10 minutes, changes must be made using a teller card in the well. For votes of fewer than 15 minutes, changes can be made electronically at any time during the vote.

⁵⁷ U.S. Congress, Committee on House Administration, *The Electronic Voting System for the United States House of Representatives*, committee print, 97th Cong. 2nd sess., August 30, 1982 (Washington: GPO, 1982), p. 4.

⁵⁸ The Committee on House Administration printed *The Electronic Voting System for the United States House of Representatives* in the 92nd Congress (September 19, 1972), the 94th Congress (January 31, 1975), the 95th Congress (September 1, 1977), the 96th Congress (April 15, 1979), and in the 97th Congress (August 30, 1982). The committee has not printed this guidebook since the 97th Congress.

⁵⁹ Letter from Wayne L. Hays, chairman, House Committee on House Administration, to Rep. William M. Ketchum, April 18, 1973, located at the Center for Legislative Activities, (continued...)

Upgrades and Updates to the Electronic Voting System

Since 1973, the electronic voting system has been updated and upgraded. These upgrades and updates include changes in voting information retrieval, how votes are displayed on closed-circuit television, how Members may change their votes during a vote, and computer equipment and programming upgrades. Some changes are highlighted here. **Appendix B** contains a chronological list of upgrades and updates, based on reports of the Committee on House Administration.

These upgrades, updates, and changes to the electronic voting system were initially handled by House Information Systems (HIS). During the 104th Congress (1995-1996), the Committee on House Administration, then called the Committee on House Oversight, approved the transfer of legislative operations on the House floor to the clerk of the House.⁶⁰ This action included the transfer of the electronic voting system from HIS to the clerk's Office of Legislative Computer Systems (LCS). LCS continues to operate and maintain the electronic voting system, with the Committee on House Administration providing oversight.

Retrieval of Voting Information

In June 1975, Chairman Wayne Hays of the House Administration Committee announced that the video consoles at the majority and minority tables had been reprogrammed to allow for retrieval of vote information.

Starting today the new feature will permit the Democrats to retrieve information organized by whip zone and by new Members, while the Republicans can retrieve information organized by whip region and new Members. This is an addition to the previous capability for displaying Member voting information organized alphabetically by Member, State, party, and vote preference. These features will be extended significantly in early September to include a more general capability to organize and display in-progress voting information.... This improvement to the system results from a continuing effort by the House Information Systems staff of the Committee on House Administration to provide an operational electronic voting system that best serves the information needs of the Members and the leadership. House Information Systems personnel will be available in the Chamber each morning for the remainder of the week to train the staff of each party in the use of the new feature.⁶¹

In August 1976, the Committee on House Administration again upgraded the display and reporting features of the electronic voting system with the ability to

⁵⁹ (...continued)

National Archives and Records Administration.

⁶⁰ U.S. Congress, Committee on House Oversight, *Report on the Activities of the Committee on House Oversight*, 104th Cong., 2nd sess., H.Rept. 104-885 (Washington: GPO, 1997).

⁶¹ "Improvements to the Electronic Voting System," *Congressional Record*, vol. 121, part 14 (June 12, 1975), p. 18668.

search for a specific roll-call vote by number or through a search feature. Chairman Frank Thompson of the Committee on House Administration announced:

Today the Committee on House Administration is placing in operation a new capability to retrieve voting information from past rollcalls of this session in the same manner that the leadership and Members retrieve rollcall information on the day the rollcall is taken. If the number of the rollcall in question is known, it can be retrieved simply by entering that number on the display terminal keyboard. If the rollcall number is not known, another feature is available to retrieve by bill number or by issue type.⁶²

Display of In-Progress Voting on Closed-Circuit Television

In April 1977, the electronic voting system was updated to be compatible with the installation of closed circuit television in the House chamber. The modification allowed the broadcast of in-progress voting information on the screen of the closed circuit system that was then being tested in the House.⁶³ The addition of in-progress voting information served as the prototype for the current display during votes as shown on C-SPAN.

Changing Votes

Before electronic voting, Members could change their vote during a vote by filling out a card in the well of the House and handing it to a tally clerk. Once the electronic voting system was installed, Members had the freedom to change their votes as many times as they wanted within the 15-minute vote window.⁶⁴ In 1975, at the request of both parties' leadership, Speaker Albert announced that to change votes Members would now have to "come to the well at the conclusion of the 15-minute minimum voting time, seek recognition and announce their vote changes after their names are called by the reading clerk."⁶⁵

In 1976, the process of changing votes during a 15-minute vote was again altered. In consultation with both parties' leadership and the Committee on House Administration, the Speaker announced that:

⁶² "New Vote Recording Features of the Electronic Voting System," *Congressional Record*, vol. 122, part 21 (August 23, 1976), p. 27225.

⁶³ "Modification of the Electronic Voting System," *Congressional Record*, vol. 123, part 9 (April 18, 1977), p. 11024.

⁶⁴ The minimum time for a vote was set at 15 minutes pursuant to Rule XX, cl. 2. The Speaker may reduce recorded votes to five minutes provided that the first vote in a series is a 15-minute vote (Rule XX, cl. 9). This authority was granted as part of the rules changes made at the beginning of the 96th Congress in 1979. See Rule XX in *Constitution, Jefferson's Manual, and Rules of the House of Representatives of the United States 110th Congress* (Washington: GPO, 2007), p. 830, and Ch. 30, § 37 of Lewis Deschler and Wm. Holmes Brown, *Deschler-Brown Precedents of the United States House of Representatives* (Washington: GPO, 1998), p. 450.

⁶⁵ "Announcement by the Speaker," *Congressional Record*, vol. 121, part 22 (September 17, 1975), p. 28903.

it has been decided that it would be a convenience to Members to permit changes in votes cast with the electronic system by reinserting a voting card during the first 10 minutes of the voting period. After 10 minutes, if a Member wishes to change his vote, he must follow the present procedure of doing so by voting card, in the well, following the completion of the 15-minute voting period.⁶⁶

The policy for a five-minute vote was unchanged. A Member could change a vote electronically at any time by reinserting his or her card into a voting station and pressing the corresponding button.⁶⁷ These changes have been reiterated by the Speaker at the beginning of each Congress since the 95th Congress in 1977.⁶⁸

As practiced today, a Member who desires to change his or her vote, after the initial 10 minutes of a 15-minute vote takes the appropriate well card to the “standing” tally clerk. The standing tally clerk then hands the well card to the “seated” tally clerk, who enters the vote change into the electronic voting system.⁶⁹ Members who change their vote before the last five minutes are recorded by the electronic voting system as having changed their vote. Only Members who change their votes during the last 5 minutes are noted in the *Congressional Record*.⁷⁰ During a five-minute or two-minute vote, Members may change their votes using the electronic voting stations throughout the duration of the vote.

Conclusion

The history and development of the electronic voting system frames the process for recording votes and quorum calls in the House of Representatives and the Committee of the Whole. It was 100 years, from the time Thomas Edison invented a vote recording device in 1869, until the House reached a consensus and adopted an automated vote recording system. Over the course of those years, proposals for the system changed from mechanical relays, to electrical switches, to the computer-driven electronic recording systems after electronic voting was approved in 1970.

The electronic voting system, as designed and installed, was forward-looking technology. The electronic voting system fit the House’s traditions and practices.

⁶⁶ “Announcement by the Speaker-Change in Electronic Voting System,” *Congressional Record*, vol. 122, part 6 (March 22, 1976), p. 7394.

⁶⁷ The same policy on changed votes applies to two-minute votes as applies to five-minute votes.

⁶⁸ See, for example, “Announcement by the Speaker,” *Congressional Record*, vol. 123, part 1 (January 4, 1977), pp. 73-74, and Rep. Nancy Pelosi, “Announcement by the Speaker,” remarks in the House, *Congressional Record*, daily edition, vol. 153 (January 5, 2007), pp. H59-H61.

⁶⁹ U.S. Congress, House Select Committee to Investigate the Voting Irregularities of August 2, 2007, *Member Briefing on Voting in the House of Representatives — The Rostrum and the Electronic Voting System: A “Walkthrough” by the Clerk of the House Lorraine C. Miller*, unpublished hearing, 110th Cong., 1st sess., October 18, 2007.

⁷⁰ *Ibid*, pp. 16-17.

Unlike many earlier proposals, the electronic voting system did not use assigned seats as the basis for voting stations. Similarly, instead of requiring all Members to be present on the floor for a vote, the electronic voting system allowed them to come and go from the House floor, so long as they voted during the time frame established by the Speaker under House rules.

On January 23, 2008, the electronic voting system had been used to record votes in the House of Representatives for 35 years. Over the years, the electronic voting system seems to have been adaptable to change and improvement. It evidently continues to meet the needs of the House of Representatives, with the capacity to change based on future requirements.

Appendix A. Proposals to Establish Automated Voting in the House of Representatives

Proposals to establish automated voting in the House of Representatives were first introduced during the 49th Congress (1885-1886), 17 years after Thomas Edison first proposed his electrical voting system to Congress. The table below lists each of the bills and resolutions proposing to use an electrical, mechanical, automated, and electronic voting system in the House of Representatives, and includes the Congress and date the bill or resolution was introduced, bill number, and sponsor of the measure.

Table A-1. Electrical, Mechanical, Automated, and Electronic Voting Bills and Resolutions in the House of Representatives Before 1970

Congress (Years)	Date Introduced	Bill Number	Sponsor (Party-State)
49 th (1885-1886)	Feb. 1, 1886	N/A ^a	Beach (D-NY)
49 th (1885-1886)	Jun. 7, 1886	N/A ^b	Le Fevre (D-OH)
50 th (1887-1888)	Jan. 14, 1889	N/A ^c	Cogswell (R-MA)
51 st (1889-1890)	Jan. 8, 1890	N/A ^d	Cogswell (R-MA)
51 st (1889-1890)	Aug. 14, 1890	N/A ^e	Gifford (R-SD)
52 nd (1891-1892)	Jan. 25, 1892	N/A ^f	Oates (D-AL)
62 nd (1911-1912)	Jan. 23, 1912	H.Res. 385	Copley (R-IL) ^g
62 nd (1911-1912)	Jan. 7, 1913	H.Res. 768	Garrett (D-TN)
63 rd (1913-1914)	Apr. 1, 1913	H.Res. 15	Copley (P-IL)
63 rd (1913-1914)	Jun. 26, 1913	H.Res. 187	Walsh (D-NJ)
63 rd (1913-1914)	Mar. 2, 1915	H.Res. 513	Walsh (D-NJ)
64 th (1915-1916)	Jul. 10, 1916	H.Res. 223	Howard (D-GA)
75 th (1937-1938)	May 25, 1938	H.R. 10756	Hill (D-WA)
77 th (1941-1942)	Jan. 1, 1941	H.R. 984	Hill (D-WA)
79 th (1945-1946)	Oct. 15, 1945	H.Res. 372	Bennett (R-MO)
79 th (1945-1946)	Jan. 29, 1946	H.R. 5263	Buck (R-NY)
80 th (1947-1948)	Jan. 29, 1947	H.R. 1433	Buck (R-NY)
80 th (1947-1948)	Nov. 24, 1947	H.R. 4557	Miller (R-NE)
81 st (1949-1950)	Jan. 2, 1949	H.R. 37	Davis (R-WI)
81 st (1949-1950)	Jun. 7, 1949	H.R. 5030	Bennett (D-FL)
81 st (1949-1950)	Jun. 13, 1949	H.R. 5121	Noland (D-IN)

Congress (Years)	Date Introduced	Bill Number	Sponsor (Party-State)
81 st (1949-1950)	Jun. 21, 1949	H.Res. 261	Bennett (D-FL)
81 st (1949-1950)	Feb. 27, 1950	H.Res. 491	Noland (D-IN)
82 nd (1951-1952)	Jan. 3, 1951	H.R. 171	Davis (R-WI)
82 nd (1951-1952)	Jan. 4, 1951	H.R. 931	Le Compte (R-IA)
82 nd (1951-1952)	Jan. 12, 1951	H.R. 1326	Denton (D-IN)
82 nd (1951-1952)	Jun. 22, 1951	H.R. 4578	Jarman (D-OK)
83 rd (1953-1954)	Jan. 6, 1953	H.R. 988	Bennett (D-FL)
83 rd (1953-1954)	Jan. 6, 1953	H.R. 1039	Johnson (R-CA)
83 rd (1953-1954)	Jan 7, 1953	H.R. 1246	Davis (R-WI)
83 rd (1953-1954)	Jan. 9, 1953	H.R. 1397	Le Compte (R-IA)
83 rd (1953-1954)	Jan. 15, 1953	H.R. 1811	Dawson (R-UT)
83 rd (1953-1954)	Jan. 26, 1953	H.R. 2090	Elliott (D-AL)
83 rd (1953-1954)	Mar. 12, 1953	H.R. 3920	Jarman (D-OK)
84 th (1955-1956)	Jan. 5, 1955	H.R. 92	Denton (D-IN)
84 th (1955-1956)	Jan. 5, 1955	H.R. 128	Le Compte (R-IA)
84 th (1955-1956)	Jan. 5, 1955	H.R. 651	Davis (R-WI)
85 th (1957-1958)	Jan. 28, 1957	H.R. 3758	Denton (D-IN)
85 th (1957-1958)	Feb. 27, 1957	H.R. 5387	Jarman (D-OK)
85 th (1957-1958)	Jan. 3, 1958	H.R. 10436	Glenn (R-NJ)
86 th (1959-1960)	Jan. 7, 1959	H.R. 754	Denton (D-IN)
86 th (1959-1960)	Jan. 7, 1959	H.R. 814	Jarman (D-OK)
86 th (1959-1960)	Jan. 15, 1959	H.R. 2537	Glenn (R-NJ)
87 th (1961-1962)	Jan. 3, 1961	H.R. 954	Glenn (R-NJ)
87 th (1961-1962)	Feb. 7, 1961	H.R. 3966	Denton (D-IN)
87 th (1961-1962)	Jul. 10, 1961	H.R. 8047	Tupper (R-ME)
88 th (1963-1964)	Feb. 27, 1963	H.R. 4311	Glenn (R-NJ)
89 th (1965-1966)	Jan. 14, 1965	H.R. 2805	Denton (D-IN)
91 st (1969-1970)	Jan. 3, 1969	H.R. 397	Bennett (D-FL)
91 st (1969-1970)	Jan. 14, 1969	H.R. 3340	Davis (R-WI)

- a. Representative Beach's resolution was not assigned a number in the 49th Congress. The resolution can be found in Mis. Doc. 98, U.S. Congress, House of Representatives, *Plan to Register Votes, Etc.*, 49th Cong., 1st sess., Mis.Doc. 98, Serial Set 2415 (1886), p. 1, and in the *Congressional Record*, vol. 17, part 1 (Feb. 1, 1886), p. 1037.

- b. Representative Le Fevre's resolution was not assigned a number in the 49th Congress. The resolution can be found in Mis. Doc. 315, U. S. Congress, House of Representatives, *Electrical Recording of Yeas and Nays*, 49th Cong., 1st sess., Mis.Doc. 315, Serial Set 2418 (1886), p. 1, and in the *Congressional Record*, vol. 17, part 5 (Jun. 7, 1886), p. 5365.
- c. Representative Cogswell's resolution was not assigned a number in the 50th Congress. The resolution can be found in the *Congressional Record*, vol. 20, part 1 (Jan. 14, 1889), p. 761.
- d. Representative Cogswell's resolution was not assigned a number in the 51st Congress. The resolution can be found in the *Congressional Record*, vol. 21, part 1 (Jan. 8, 1890), p. 474.
- e. Representative Gifford's resolution was not assigned a number in the 51st Congress. The resolution can be found in the *Congressional Record*, vol. 21, part 9 (Aug. 14, 1890), p. 8585.
- f. Representative Oates's resolution was not assigned a number in the 52nd Congress. The resolution can be found in the *Congressional Record*, vol. 23, part 1 (Jan. 25, 1892), p. 517.
- g. Representative Copley represented an Illinois district from 1911 to 1923 and was a member of the Republican Party during the 62nd, 63rd and 65th through 67th Congresses. During the 64th Congress, Representative Copley represented the Progressive Party.

Appendix B. Chronology of Upgrades to the House Electronic Voting System

Since its implementation in 1973, the electronic voting system has been upgraded and updated many times. Various upgrades and updates were reported by the Committee on House Administration in their activity reports and in reports on funding resolutions, submitted at the end of each Congress. The table below lists those upgrades and updates that were included in the committee activity reports and may not be a complete list of all upgrades and updates as additional clarifying materials were not readily available to the author.

Table B-1. Upgrades to the House Electronic Voting System

Congress	Year	Action
93 rd	1974	- General improvement of the electronic voting system. ^a
94 th	1975-1976	- Capability to establish and use retrieval categories that assist in the analysis of House votes; - Added display terminals in the rear of the chamber; - Capability to retrieve historical vote information on display terminals; - Expansion of the issue information associated with each vote; and - Modifications to permit other systems to operate on the vote recording computers. ^b
95 th	1977	- Provided vote information from the House chamber standard display screens for broadcast on the House closed circuit television facilities; and - Displayed information on issues under debate on display screens. ^c
	1978	- Transferred voting data from the vote recording system immediately after the vote to the summary of proceedings and debates system for immediate dissemination on the Member information network. ^d
96 th	1979-1980	- Initiated the installation of the vote recording software on more modern computer equipment. ^e
	1979	- Improved equipment (both the computers and the chamber displays) to make it more cost-effective to maintain. ^f
	1980	- Conversion of the vote recording software from the CDC 1700 computers to more modern computers. ^g
97 th	1981	- Conversion of all vote recording software to more modern computer equipment to improve the overall capabilities of the voting system; - Speed of tally clerk printer increased; and - Completed program modifications to provide GPO final vote results on magnetic tape for direct photo-composition processing in the Congressional Record. ^h
98 th	1983-1984	- Programming and operational support to the vote recording and vote history system. ⁱ
99 th	1985-1986	- Microcomputer programmed to act as electronic voting system backup. ^j

Congress	Year	Action
100 th	1987-1988	- Programming and operation support for the vote recording and vote history systems. ^k
101 st	1989-1990	No specific mention of upgrades to the electronic voting system. ^l
102 nd	1991-1992	No specific mention of upgrades to the electronic voting system. ^m
103 rd	1993-1994	- Delegates were allowed to vote in the Committee of the Whole. Modifications were made to accommodate the rules changes and produce unique voting records for the Delegates; and - Added the ability to display diacritical marks in Members' surnames. ⁿ
104 th ^o	1995-1996	- No specific mention of upgrades to the electronic voting system. ^p
105 th ^o	1997-1998	- Old vote cards, where each card was physically punched and a reader read the holes in the card, were replaced with digital cards with embedded chips. ^q
106 th	1999-2000	- No specific mention of upgrades to the electronic voting system. ^r
107 th	2001-2002	- No specific mention of upgrades to the electronic voting system. ^s
108 th	2003-2004	- No specific mention of upgrades to the electronic voting system. ^t
109 th	2005-2006	- No specific mention of upgrades to the electronic voting system. ^u

- a. U.S. Congress, Committee on House Administration, *Providing Funds for the Expenses of the Committee on House Administration to Provide for Maintenance and Improvement of Ongoing Computer Services for the House of Representatives and for the Investigation of Additional Computer Services for the House of Representatives*, 93rd Cong., 2nd sess., report to accompany H.Res. 1003, H.Rept. 93-946 (Washington: GPO, 1974), p. 5.
- b. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 94th Cong., 2nd sess., H.Rept. 94-1790 (Washington: GPO, 1977), p. 120.
- c. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 95th Cong., 2nd sess., H.Rept. 95-1836 (Washington: GPO, 1979), p. 203.
- d. *Ibid.*
- e. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 96th Cong., 2nd sess., H.Rept. 96-1558 (Washington: GPO, 1981), p. 18.
- f. U.S. Congress, Committee on House Administration, *Providing Funds for the Expenses of the Committee on House Administration to Provide for Computer Services for the House of Representatives*, report to accompany H.Res. 574, 96th Cong., 1st sess., H.Rept. 96-23 (Washington: GPO, 1980), p. 16.
- g. U.S. Congress, Committee on House Administration, *Providing Funds for the Expenses of the Committee on House Administration to Provide for the Maintenance and Improvement of Ongoing Computer Services for the House of Representatives, for the Investigation of Additional Computer Services for the House of Representatives, and to Provide Computer Support to the Committees of the House of Representatives*, 96th Cong., 2nd sess., H.Rept. 96-813 (Washington: GPO, 1979), p. 11.
- h. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 97th Cong., 2nd sess., H.Rept. 97-990 (Washington: GPO, 1983), pp. 99-100.
- i. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 98th Cong., 2nd Sess., H.Rept. 98-1173 (Washington: GPO, 1984), p. 92.
- j. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 99th Cong., 2nd sess., H.Rept. 99-1028 (Washington: GPO, 1986), p.108.
- k. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 100th Cong., 2nd sess., H.Rept. 100-1112 (Washington: GPO, 1988), p. 101.

- l. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 101st Cong., 2nd sess., H.Rept. 101-1005 (Washington, GPO, 1990).
- m. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 102nd Cong., 2nd sess., H.Rept. 102-1083 (Washington, GPO, 1992).
- n. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 103rd Cong., 2nd sess., H.Rept. 103-893 (Washington: GPO, 1995), pp. 57-58.
- o. In the 104th and 105th Congresses the Committee on House Administration was known as the Committee on House Oversight.
- p. U.S. Congress, House Committee on House Oversight, *Report on the Activities of the Committee on House Oversight*, 104th Cong., 2nd sess., H.Rept. 104-885 (Washington: GPO, 1997).
- q. Rep. William Thomas, "Regarding the House Electronic Voting System," remarks in the House, *Congressional Record*, daily edition, vol. 146 (June 23, 2000), p. H5073.
- r. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 106th Cong., 2nd sess., H.Rept. 106-1056 (Washington: GPO, 2001).
- s. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 107th Cong., 2nd sess., H.Rept. 107-810 (Washington: GPO, 2003).
- t. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 108th Cong., 2nd sess., H.Rept. 108-816 (Washington: GPO, 2005).
- u. U.S. Congress, Committee on House Administration, *Report on the Activities of the Committee on House Administration*, 109th Cong., 2nd sess., H.Rept. 109-752 (Washington: GPO, 2007).