

---

# **SDI-12 SUPPORT GROUP**

---

SERIAL DATA INTERFACE AT 1200 BAUD

Technical Committee  
Minutes  
September 23, 1996 Meeting

The SDI-12 Support Group's technical committee met on 9/23/96 at the American Water Resources annual conference which was held in Fort Lauderdale, Florida. The following committee members attended the meeting:

Jerry Calhoun, Committee Chairman (Sutron Corporation)

Jim Betzhold (South Florida Water Management District)

Terrell Fletcher (Design Analysis Associates, Inc.)

Mike Jablonski (NR Systems, Inc.)

Roy Johnson (U.S. Geological Survey)

Rick Lockyer (Handar, Inc.)

Joe Thurston (Campbell Scientific, Inc.)

Other people at the meeting were:

Brian Wisehart (Hydrolab Corporation)

Nancy Lopez (U.S. Geological Survey)

Chairman Jerry Calhoun called the meeting to session at 9:00 A.M. and reviewed the agenda for the meeting.

## Comments About Version 1.2 of SDI-12

Mike Jablonski reported that he had not received any comments from the Membership about Version 1.2. No other committee members had received comments from the Membership either.

## Vague Points in Version 1.2

Roy Johnson explained that the USGS has tested many SDI-12 devices for compliance with the standard. He said that they have problems in testing for inductive loads and that the specification is vague on this issue. Mr. Johnson said that the USGS would like to have a detailed specification for this rather than the current wording in the specification "sensors connected to the 12-volt line must not have inductive loads." (See Page 5 in the SDI-12 Specification.) Joe Thurston said that we should consider specifying this in terms of noise on the data and power lines, and that we should also consider writing a noise specification.

Roy also said that there is no tolerance on the 200 K off impedance in the SDI-12 specification. A reference to tolerances was found in the original 1988 Specification, Version 1.0, which says: "In the following specifications,

all values not indicating specific limits, have an allowable tolerance of  $\pm 10\%$  of the value." (See page 4 in Version 1.0 of SDI-12.) Mike Jablonski said this statement was omitted from Versions 1.1 and 1.2 by mistake.

As another vague point in the standard, Roy said that they have found that in some sensors a service request collides with a D command. This is because the sensor transmits a service request at the same time the data recorder determines that ttt seconds have elapsed and issues the D command to get the data from the sensor. The problem, Roy said, may be caused because the specification is unclear on when the ttt time period begins.

As action items on these three items (inductive loads, tolerances, and clarifying when ttt seconds begins), the following conclusions were reached.

Specification of Inductive Loads. It was agreed that this requires further review. Terrell Fletcher said that he would work on this and write a draft version of a specification for review by the committee.

Tolerances. The committee agreed to revise the SDI-12 Specification to include the statement on a  $\pm 10\%$  tolerance. This statement was omitted by mistake on Versions 1.1 and 1.2. The committee agreed that this is a correction to the document, not a change to the specification.

Rick Lockyer said that simply specifying a tolerance of  $\pm 10\%$  on a 200 K resistor is not enough to solve the impedance problem. He said the specification should be enhanced to better specify the hardware. He said that he would address this topic in a draft to help better specify SDI-12 circuitry.

ttt seconds. The committee decided that Version 1.2 of SDI-12 does correctly specify when ttt seconds begins, but that the language could be made stronger to clarify this point. It was agreed to revise the document to clearly state that ttt seconds begins immediately after the sensors transmits the <Line Feed> in its response to a command. As specified on page 13 of Version 1.2, the entire service request must be returned to the sensor before ttt seconds have elapsed. The committee also agreed to add a statement to the specification to advise sensor designers to return a ttt value that is greater than the time it takes for the sensor to take the measurement. This will prevent collisions between a service request (from the sensor) and a D command (from the recorder).

## Revision to the Specification

The committee agreed that adding the statement about a  $\pm 10\%$  tolerance and clarification about the ttt value is not a change to the specification, and therefore does not require a change to the version number. The revisions will be made to the specification and the date on the specification will be changed. Appendix D, Revisions, will be revised to explain the corrections. The Version number will remain at 1.2.

## Conformance Testing

During the discussion on the above topics, Roy Johnson explained the test procedures that the USGS uses to test SDI-12 sensors and data recorders for compliance with the standard. He gave all present copies of the USGS procedures. He said that one misconception with vendors of SDI-12 products is that they feel that if their device passes the SDI-12 Verifier that it is in full compliance with the specification. Mike Jablonski pointed out the Verifier was not designed to test hardware characteristics. Mike agreed to write a specific list of things that the SDI-12 Verifier does not test and to add this list to the User's Guide for the Verifier. (Mike also reported that Version 2.0 of the SDI-12 Verifier Software, which tests Version 1.2 of SDI-12, should be ready by the end of October.)

## Government Interest in Groups Like the SDI-12 Support Group

After this discussion, Nancy Lopez of the USGS (Reston, Virginia office) asked who sponsors the SDI-12 Standard. The committee said that the SDI-12 Support Group sponsors it. She referred to an OMB memo 9201, that encourages federal agencies to work together and with the private sector in the sponsorship of standards like SDI-12. This was noted by the committee for future reference.

## European Electromagnetic Compatibility Issues

For the next order of business, Joe Thurston brought up the topic of European Electromagnetic Compatibility issues. He said that if a data recorder stores something other than what a sensor transmits, then this is out of compliance with the European Standard (EN-55022). Joe said that he feels that the standard is weak on error detection of transmitted information. Joe said he would like to see a cyclic redundancy check (CRC) added to the specification. The committee agreed that this has merit, but that it would be a radical change to the SDI-12 specification. Joe Thurston accepted an action item work on a draft to specify an error detection scheme, using a CRC, that would comply with the European standard.

After some discussion on this, we agreed that one way to test the validity of SDI-12 data is to issue a second D command and to compare the data received in response to the first D command with that returned from the second D command. This technique could be used as an error detection scheme using SDI-12.

## Upgrades to SDI-12

The discussion about error detection and the European standard brought up a long discussion on the possibilities of upgrading SDI-12 to use a packetized, radio compatible, communications scheme. All present felt that this had merit, but would be a significant change to SDI-12. We decided that we could not pursue this further without getting feedback from the Membership about this. We therefore decided to solicit feedback about this in our next newsletter. We will solicit for feedback on the following topics:

- the need for a wireless SDI-12
- getting faster data rates
- communication over wires at longer distances

Rick Lockyer suggested the possibility of reaching higher speeds using a 485 interface.

## Posting an Electronic Version of the Specification

For the next order of business we discussed the possibility of creating an SDI-12 web page on the internet. We would post the SDI-12 specification there, receive e-mail responses from the Membership, post newsletters, articles, etc. All committee members felt that we should do so. Mike Jablonski said the Group has the funds to afford this. We therefore agreed to recommend to the Membership that the SDI-12 Support Group should create a web site.

## Statement of SDI-12 Compliance

As the next item of business, Jim Betzhold said that as users of SDI-12 equipment, the South Florida Water Management District would like to see some indication on SDI-12 recorders and sensors to tag them as compliant with the SDI-12 Standard and what version of SDI-12 they comply with. Mike Jablonski pointed out that under our bylaws, the SDI-12 Support Group cannot certify SDI-12 devices for compliance with the standard. Jim agreed with this and said it would still be helpful if the Group could supply a tag, label, or logo of some sort to apply to SDI-12 devices. By putting the tag on a recorder or sensor, he said, the manufacturer would be stating that the device complies with SDI-12. The committee felt that this has possibilities. Jim Betzhold agreed to write a brief proposal about this for the next newsletter.

## Technical Committee Task Assignments

During the meeting several items came up that require further study. The committee selected individual members to be responsible for drafting proposed changes to the specification. The drafts will then become the basis for a technical committee discussion of the topics. A goal of November 1 for the initial drafts was agreed to.

- On and Off impedance of the SDI-12 Data Line - Rick Lockyer
- Inductive Loading of the Supply Line - Terrell Fletcher
- RS-485 Interface/Higher Data Rates/Longer Data Lines - Rick Lockyer
- Improved Communications Reliability (CRC) - Joe Thurston

In addition to the above topics there was the question of whether there is a need for SDI-12 over a wireless link and if there is a need for an SDI-12 logo. The technical committee felt that there was a need for feedback from the users group before these items are pursued. It was decided that the newsletter was the best way to contract the users group and assignments for articles were accepted by:

- Need for SDI-12 Over a Wireless Link - Mike Jablonski
- SDI-12 Logo - Jim Betzhold

## Increasing the Size of the Technical Committee

As the last piece of business, Rick Lockyer said that a representative from Environment Canada, Paul-Emile Bergeron, expressed a desire to serve on the SDI-12 Technical Committee. Under our bylaws this committee is limited to nine people. All present said that they desired to serve another one year term. Both Richard Wern and Terry Dickey (absent from this meeting) indicated by proxy that they too, wanted to serve another term. Therefore, all nine positions are taken. Mike Jablonski said that a two-thirds majority of the SDI-12 Support Group's Membership is required to amend the bylaws. The committee agreed to ask the Membership to amend the bylaws to increase the committee size from nine members to twelve members. Nine members of the committee should represent manufactures of SDI-12 equipment and three members should represent users of SDI-12 equipment. We agreed to make this recommendation to the Membership at the annual meeting.

The meeting then adjourned.

###

Meeting on September 24, 1996

After the SDI-12 Support Group's annual meeting on 9/24/94, the Technical Committee reconvened to elect a chairman for the 1996/97 year. (All members of the Technical Committee were reinstated for another one year term at that meeting). Jerry Calhoun was nominated for and re-elected as Chairman by unanimous consent.

###

---

# SDI-12 SUPPORT GROUP

---

SERIAL DATA INTERFACE AT 1200 BAUD

SDI-12 Support Group  
Minutes  
September 24, 1996 Meeting

The SDI-12 Support Group held its annual meeting on 9/24/96 at the American Water Resources annual conference which was held in Fort Lauderdale, Florida. A list of people that attended the meeting is attached to these minutes.

Mike Jablonski, the Chairman of the SDI-12 Support Group called the meeting to session at 7:30 A.M.

## Technical Committee Report

Jerry Calhoun summarized the meeting of the Technical Committee, which was held on the previous day. He said the two revisions would be made to the Version 1.2 SDI-12 document:

- 1) adding a tolerance of  $\pm 10\%$  for hardware specifications
- 2) clarifying when the second time period begins

Jerry explained that these are a correction to the specification and a clarification to the specification. They are not changes to the specification itself. (A statement about the 10% tolerance is in the original 1988 specification, Version 1.0, but was omitted from Versions 1.1 and 1.2 by mistake.)

Jerry summarized some technical issues that are being considered for future versions of SDI-12:

- a specification for data line impedance
- a specification for allowed inductance
- possible future use of a 485 interface for higher data rates and longer cables
- the use of an error detection scheme (CRC)
- soliciting feedback from the membership about the need and desire for a wireless SDI-12 Specification
- the possibility of placing a logo on SDI-12 equipment as a statement by the manufacture that the device complies with SDI-12 and which version of SDI-12 it complies with

Jerry said that we would solicit information about the last two topics, from the Membership, in the next newsletter.

## Activities in 1995/96

Mike Jablonski then reviewed the activities of the Group over the past year, which included:

- the production of two newsletters
- the release of Version 1.2 in April, 1996

- that the Corporate Charter of the SDI-12 Support Group has been reinstated in the State of Utah (last year it was reported that the Group had lost its corporate charter due to an mistake in failing to submit a corporate report)
- completion of an application for tax exempt status with the Internal Revenue Service

#### Tax Exempt Status

Mike Jablonski explained that the application for tax exempt status with the IRS is still pending. He said that the IRS had requested additional information in request to our application and that the IRS responded by saying that we most likely did not qualify for exemption section 501(c)(3), but may qualify for exemption under 501(c)(6). The difference between the two, Mike reported, is that payment of dues or contributions to a 501(c)(6) organization is not tax exempt. The corporation itself, however, is exempt from federal income tax under section 501(c)(6). Mike said that the group had therefore changed its application from 501(c)(3) to an application for 501(c)(6) status. At this time, the application is still pending with the IRS.

Mike also explained all the steps that had been taken in support of this application. This included the hiring of an accountant to complete the initial application, a modification to our Articles of Incorporation to state that we are organized exclusively for education and scientific purposes, and the answering, in writing, of several detailed questions asked by the IRS. Also, Mike said, a dissolution provision was added to the Article of Incorporation which provide for a method of disposing of all corporate assets if the corporation ceases to exist.

#### Financial Status

Mike Jablonski reported that the SDI-12 Support Group has \$6,889.00 in its checking account.

#### Web Site

Mike Jablonski then reported that the Technical Committee decided to advise the Group to create a web site on the internet. The SDI-12 Specification and newsletters could be posted on a web site, etc. Everyone at the meeting agreed that this would be a good thing to do and instructed us to proceed with the creation of a web page.

#### Dues

Mike Jablonski said the with over \$6,000.00 in the bank, the waving of dues for 1996/97 had been raised. Mike said, however, with the creation of a web page, and the possibility of owing back taxes to the IRS (if the Group is not awarded tax exempt status), that he would prefer not to wave the dues. Mike also reported that the Membership, in our most recent ballot, agreed to pay the travel expenses of the Group's officers to attend the SDI-12 meetings at the AWRA conference. Because of this, he said, some of the money in the account is currently obligated.

All present at the meeting agreed, therefore, to keep membership dues for the group at \$ 120.00 per year. Funds will be used to create and maintain the web page, pay back taxes (if the application for tax exempt status is denied) and to pay for all other expenses over the upcoming year.

#### Selection of a Chairperson and Secretary for 1996/97

For the next order of business, Mike Jablonski expressed his desire to serve a third term as chairperson of the SDI-12 Support Group. All present at the meeting voted to re-elect Mike as Chairperson for the upcoming year.

William P. Thomas, the President of Amass Data Technologies, Inc. expressed his interest to serve as the Secretary for the Group. All present at the meeting voted to elect Mr. Thomas as the Secretary. Mr. Thomas replaces Katier Lockyer, who expressed her desire to not serve another term.

Mr. Jablonski pointed out that the Secretary is also on the Board of Directors for the Corporation and that he would take the necessary steps to have Mr. Thomas listed as such with the state of Utah.

Mr. Thomas accepted the position as Secretary and has volunteered to get the Group's web page up and running.

#### Reinstatement of the Technical Committee

Mr. Jablonski then reported that all nine members of the Technical Committee want to serve another one year term. All present at the meeting agreed to this. All members of Technical Committee, therefore, will serve another term.

#### Increasing the Size of the Technical Committee

Mike Jablonki reported that the Technical Committee had suggested increasing its size from nine to twelve members. This can not, however, be done with a change to the organization's bylaws. A change to the bylaws requires a two-thirds majority of the Membership. All present agreed to query the Membership on increasing the size of the Technical Committee. If a two-thirds majority of the SDI-12 Support Group votes in favor, then the size of the Technical Committee will be increased.

Paul-Emile Bergeron, of Environment Canada, has expressed his desire to join the Technical Committee. He would serve as a representative of SDI-12 users on the committee. The Group agreed to add Mr. Bergeron to the committee, if the Group approves a change to the bylaws to increase the size of the technical committee.

This was the final order of business and the meeting then adjourned.

###