

Introduction to the NCCA ASCII Standard

[editorial staff]

The NCCA ASCII format is a specification that defines a structured file format that all North American polygraph instrument manufacturers were requested to include in all software versions beginning during 2009. The NCCA ASCII text format offers the potential for readability by human or machine, and resolves data access problems for research, development and analysis in contexts that may involve different polygraph instrument software solutions with different proprietary formats. The capability to export data to a common format reduces the likelihood that vendor formats will become known or compromised. A common format also increases the capability to accommodate future changes to proprietary data formats and reduces the likelihood that valuable data will become obsolete or unusable. An ability to access polygraph data in a known data output specification improves options for polygraphic feature extraction and data analysis beyond the visual and manual methods that were the best available technology solutions during the pre-computer epoch. The specification and an example are shown in Appendices.

During 2009 the Threat Assessment and Strategic Support (TASS) branch of the Defense Academy for Credibility Assessment (DACA; now known as the National Center for Credibility Assessment, NCCA) requested all North American manufacturers of polygraph instruments to include a software feature to export the recorded polygraph data to a known ASCII text format, referred to here as the NCCA ASCII specification. The goal was to create a data format that contains all the hardware, software, physiological data, timing, and question information for each chart in an examination.

The specification itself was defined by Dr. Andrew Dollins [now deceased] and Dr. John Kircher. In the 10 years since the definition and implementation of the NCCA ASCII specification, its importance and usefulness have been subtle for most field polygraph examiners but substantial for those interested in accessing polygraph data for scientific study or research. Whereas most field examiners view the displayed or printed chart tracings (a term held over from the days when ink was traced onto a moving paper via capillary action) as the data itself, scientists interested

in studying or advancing our knowledge and field practices in scientific lie detection will view data as a time-series of recorded numerical values – for which computers are unquestionably useful.

Today nearly all computerized polygraph systems include a convenient tool to export the recorded data to the NCCA ASCII format. A well-specified and known data format person permits researchers and developers to import the data into any preferred statistical or analysis environment. Access to the recorded signals permits the study and optimization of signal processing and feature extraction solutions that go well beyond merely drawing a time-series plot for visual inspection, and potentially well beyond the limitations of traditional visual analysis. In addition to data export capabilities, most computerized polygraph systems available today also include the capability to import the data from the NCCA ASCII format – increasing the potential for meaningful evaluation and comparison of similarities and differences in data display and analysis tools available in different software solutions available to polygraph field practitioners. Although perhaps of limited usefulness to many

¹The APA editorial staff is grateful to John Kircher and the late Andy Dollins for their work in creating and coding the NCCA ASCII format. We are also indebted to APA Past President Raymond Nelson for encouraging and helping create this document.



field practitioners, these capabilities are of vital importance to the advancement and future of the polygraph profession.

Appendix A shows the general specification for the dimensions and formatting of the output file, in addition to the naming of the output file. Structured file names clearly identify the series and charts for each examination. All information for each test chart is output to a single file. Header information (Appendix B) describes the instrumentation, test date, and other information about the exam such as the data sampling rate, stimulus events, and event timings. Standards are also provided for how the physiological data is to be structured for output (Appendix C), including data for each of the recording sensors. An example of an NCCA ASCII output file is shown in Appendix D.

The NCCA ASCII text format offers the potential for readability by human or machine, and resolves data access problems for research, development and analysis in contexts that may involve different polygraph instruments with different proprietary formats. The capability to export data to a common format reduces the likelihood that vendor formats will be become known or compromised. A common output format also increases the capability to accommodate future changes to proprietary data formats and reduces the likelihood that valuable data will become obsolete

or unusable. Most importantly, a common and published specification for data output underscores the fact that providing plotted data on a computer display or printed paper is not the same as proving access to the data. Access to the data, for any scientific purpose, requires access to knowledge about the specifications of the data output format. Technology vendors that do not provide easy access to output data in a known and usable format should be requested to prioritize the future and advancement of the polygraph profession by providing access to the polygraph data through the NCCA ASCII specification. Vendors who do not make data available through the NCCA ASCII specification – or other published format – are limiting the future of the polygraph profession by limiting polygraphic feature extraction and data analysis methods to visual and manual calculation methods that were the best available technology solutions prior to the widespread availability of powerful computing platforms.



Appendix A. Output File Structure and Naming Convention

The objective is that all of the hardware, software, physiological data, timing, and question information for one chart shall be contained in one human readable ASCII text file. The ASCII file shall not contain tab characters because tab-character spacing varies among data-viewing programs. The data columns shall be right justified as depicted below.

The specific ASCII text file output will depend on the originating polygraph system, but we ask that the following conventions be followed.

- Use the upper case letter D as the first letter in the file name.
- Use \$, &, %, or # as the second character in the file name as follows:
 - o \$ = Axciton
 - o & = Lafayette
 - o % = Limestone
 - o # = Stoelting
- Use a "-" as the third character in the file name.
- The fourth through Last-2 characters will be the originating examination name (see examples below).
- Use a "-" as the Last-1 character in the file name.
- Use the series/ examination number (in hex) as the last character in the file name follows:
 - o 1 = Series/ Examination 1
 - o 2 = Series/ Examination 2
 - o ...
 - o 9 = Series/ Examination 9
 - o A = Series/ Examination 10
 - o B = Series/ Examination 11
 - o F = Series/ Examination 15
 - o NOTE: Axciton & Stoelting-DOS only – Because Axciton and Stoelting-DOS do not differentiate examination types in the file name structure, please always use an X as the Last-1 character.
- The first and second characters in the file name extension should indicate the chart number such that 01 = chart 1, 02 = chart 2, etc.



- Use the letter “A” as the final character in the file name extension.
- Output file name examples:
 - o D\$-\$\$\$ZG14-X.03A = Axciton, Exam X, Chart 3
 - o D\$-\$\$765TGZ-X.17A = Axciton, Exam X, Chart 17
 - o D&-175-802-20050106 MGQT-2.01A = Lafayette, Exam 2, Chart 1
 - o D&-PF71-2004-03-19-PR1-B ZCT-1.04A = Lafayette, Exam 1, Chart 4
 - o D%-2007-13-1.01A = Limestone, Exam 1, Chart 1
 - o D%-DACA 04 2007-3.02A = Limestone, Exam 3, Chart 2
 - o D#-00001-X.02A = Stoelting, Exam X, Chart 2
 - o D#-01-X.09A = Stoelting, Exam X, Chart 9



Appendix B. Output ASCII Text File Header Information

- The structure of the ASCII Text output file shall be as follows (see examples at the end of this document):
 - o Name of the file being written
 - o Name of the source data file (for Lafayette, Limestone, & Stoelting Windows use the primary subdirectory name)
- Name of the instrument used to collect the data as follows:
 - o Axciton DOS
 - o Axciton Windows
 - o Lafayette Windows
 - o Limestone Windows
 - o Stoelting DOS
 - o Stoelting Windows
- Version of the software used to collect the data, or “No Version Available”
- Date the data was collected in DDMMYY format
- Time data collection began in military format (1000, 1300, 2000 etc)
- Examination number (or “X” for Axciton & Stoelting)
- Number of the chart in the series:
- Number of questions:
- Number of data samples per second (fastest channel)
- Number of data samples per fastest channel
- Number of channels
- Sample rates (in Hertz) for each channel as follows (assuming variable storage rates):
 - o Sample Rate (Hz)- UPneumo: 10
 - o Sample Rate (Hz)- LPneumo: 10
 - o Sample Rate (Hz)- EDA1: 15
 - o Sample Rate (Hz)- Cardio1: 60
 - o Sample Rate (Hz)- Move1: 60
- Event list heading (see examples below)
- Event list as follows:
 - o Columns 01-02 = Event number (01 to 99) Right Justified



- o Columns 03-06 = spaces
- o Columns 07-14 = Event/ Question Label
- o Column 15 = space
- o Column 16-80 = Question or Event Text*

* Allowed 8 spaces for the Event/ Question label. This should allow enough space for all vendors to use the Examiner's original Event or Question Label from the original chart – except for Limestone which may have to truncate Question Labels longer than 8 spaces.

** If the Question field is left blank, duplicate the event label in the Question field.

*** If the question text is more than 66 characters long, continue the question beginning in column 16 of the next line.

- Event location heading (See example below)
- Event locations, right justified, as follows:
 - o Columns 01-02 = Event number (01 to 99 0 right justified)
 - o Columns 03-06 = spaces
 - o Columns 07-14 – Event/ Question Label (right justified)
 - o Columns 15-25 = Sample event began on (right justified integer)
 - o Columns 26-36 = Sample event ended on (right justified integer)
 - o Columns 37-47 = Sample answer occurred on (right justified integer)



Appendix C. Physiological Data

- The physiological data shall be output into the following eight right justified columns, separated by spaces (if no movement sensor was used the Move1 column shall be filled with the value 9999.9):
 - o Columns 01-06 = Data sample number (beginning at 1)
 - o Columns 07 = space
 - o Columns 08-15 = data sample time (beginning at 0) where XX:YY.ZZ where X=minutes, Y=seconds, & Z= 1/100 of a second
 - o Columns 16 space
 - o Columns 17-24 = Event/ Question labels right justified with leading “-“s (accurate to fastest sample rate)
 - o Columns 25-35 = upper respiration channel data (Upneumo)
 - o Columns 36-46 = lower respiration channel data (Lpneumo)
 - o Columns 47-57 = electrodermal channel data (EDA1)
 - o Columns 58-68 = cardiovascular channel (Cardio1)
 - o Columns 69-79 = movement channel (Move1)
 - o Columns 80-90 = additional channel 6
 - o Columns 091-101 = additional channel 7
 - o Columns 102-112 = additional channel 8
 - o Columns 113-123 = additional channel 9
 - o Columns 124-134 = additional channel 10
- Data columns 1 – 8 shall have the following 8 headings:
 - o Sample
 - o Time
 - o Label
 - o Upneumo
 - o Lpneumo
 - o EDA1
 - o Cardio1
 - o Move1
- Use the following headings for additional channel data columns as needed:



- o Cardio2, Cardio3, - additional auscultatory cardiovascular measures
 - o PPG1, PPG2 – cardiovascular activity by photoplethysmography
 - o ECG1, ECG2 – cardiovascular activity by electrocardiography
 - o Voice1, Voice2 – audio recording channels
 - o Move2, Move3 – additional movement sensors
 - o EMG1, EMG2 – electromyographical activity
 - o EDA2, EDA3 – additional electrodermal activity
 - o PLE1, PLE2 – plethysmography at other sites (chest, penis)
 - o TEMP1, TEMP2 – temperature sensors
 - o LPupD, RPupD – left & right pupil diameter
 - o LEyeP, REyeP – left & right eye position
 - o HEOG, VEOG – horizontal & vertical electrooculogram
 - o Other?
- The data shall be written at the actual sample rate. In EXAMPLE 1 below, each channel was sampled, or interpolated, to 60 samples per second.
- NOTE: Limit sample rate to a maximum of 120. To the best available know-ledge the fastest current storage rate is 100 Hz.
- The physiological data shall be written right justified, with 1 decimal place (F11.1). If the raw data range is not between 1.0 and 999999.9, adjust so that all data falls within that range. If no data exist for the data point (e.g., different sample rates, no Move1 channel) write -9.9 as depicted below.
 - Event Labels for Answers shall be “-----Yes”, “-----No”, or “-----Ans”



Appendix D. Example Output File

Name of this file: D&-X20190812-1.01A

Source file: X20190812

Instrument: Lafayette Windows

Software Version: 11.8.3.218

Chart Date: 31Dec69

Time: 19:00

Examination Number: 1

Chart Number: 1

Number of questions: 9

Fastest Sample Rate (Hz): 30

Number of samples: 7907

Number of channels: 7

Sample Rate (Hz)- UPneumo: 30

Sample Rate (Hz)- LPneumo: 30

Sample Rate (Hz)- EDA2: 30

Sample Rate (Hz)- Cardio1: 30

Sample Rate (Hz)- Move1: 30

Sample Rate (Hz)- EDA2: 30

Sample Rate (Hz)- PL: 30

Event Label Statement

01 X This practice test is about to begin. Please sit still. Look straight ahead. Listen carefully to each question and answer just as we have discussed. No other talking, and do not move during this practice test.

02 1 Did you write the number 1?

03 2 Did you write the number 2?

04 3 Did you write the number 3?

05 4K Did you write the number 4?

06 5 Did you write the number 5

07 6 Did you write the number 6?

08 7 Did you write the number 7?

09 XX This practice test is complete. Please sit still until I release the pressure in the cardio sensor. Name of this file: D&-X20190812-1.01A

Source file: X20190812



Event	Label	Statement
01	X	This practice test is about to begin. Please sit still. Look straight ahead. Listen carefully to each question and answer just as we have discussed. No other talking, and do not move during this practice test.
02	1	Did you write the number 1?
03	2	Did you write the number 2?
04	3	Did you write the number 3?
05	4K	Did you write the number 4?
06	5	Did you write the number 5?
07	6	Did you write the number 6?
08	7	Did you write the number 7?
09	XX	This practice test is complete. Please sit still until I release the pressure in the cardio sensor.

Event	Label	Begin	End	Answer
01	X	738	868	
02	1	1623	1678	1703
03	2	2386	2439	2466
04	3	3163	3222	3248
05	4K	3948	4004	4037
06	5	4735	4790	4813
07	6	5513	5568	5593
08	7	6303	6358	6383
09	XX	7081	7155	



Sample	Time	Label	UPneumo	LPneumo	EDA1	Cardio1	Move1	EDA2	PLE1
1	00:00.00	-----	16102.0	43230.0	29783.0	257758.0	463987.0	6794.0	237588.0
2	00:00.03	-----	16451.0	44021.0	29742.0	266777.0	463308.0	6793.0	600591.0
3	00:00.06	-----	17107.0	45612.0	29677.0	267911.0	462805.0	6787.0	871068.0
4	00:00.10	-----	18982.0	47430.0	29637.0	266684.0	463223.0	6777.0	898617.0
5	00:00.13	-----	20173.0	49071.0	29581.0	261089.0	464169.0	6764.0	805945.0
6	00:00.16	-----	21276.0	50545.0	29538.0	253123.0	464788.0	6748.0	709585.0
7	00:00.20	-----	22348.0	51505.0	29503.0	246371.0	464590.0	6729.0	620585.0
8	00:00.23	-----	23370.0	53670.0	29460.0	243706.0	464749.0	6709.0	533106.0
9	00:00.26	-----	24960.0	55452.0	29429.0	245422.0	464473.0	6688.0	477644.0
10	00:00.30	-----	26133.0	56988.0	29381.0	247821.0	464840.0	6665.0	471043.0
11	00:00.33	-----	27073.0	58639.0	29347.0	247632.0	465423.0	6640.0	482089.0
12	00:00.36	-----	28324.0	60031.0	29317.0	244604.0	465981.0	6614.0	470864.0
13	00:00.40	-----	29577.0	61346.0	29270.0	237597.0	466751.0	6588.0	424666.0
14	00:00.43	-----	30845.0	63759.0	29241.0	229131.0	467736.0	6561.0	359372.0
15	00:00.46	-----	32523.0	65201.0	29221.0	219407.0	468025.0	6534.0	292193.0
16	00:00.50	-----	33626.0	66480.0	29195.0	210471.0	468401.0	6507.0	238304.0

DATA OMITTED HERE

7903	04:23.39	-----	68276.0	48981.0	19955.0	109743.0	481490.0	14182.0	421374.0
7904	04:23.43	-----	66294.0	47338.0	19934.0	112466.0	480802.0	14089.0	409459.0
7905	04:23.46	-----	64283.0	44937.0	19919.0	112251.0	479897.0	14002.0	429179.0
7906	04:23.50	-----	63053.0	43162.0	19923.0	109281.0	479256.0	13919.0	436729.0
7907	04:23.53	-----	-9.9	41599.0	-9.9	-9.9	-9.9	-9.9	-9.9

