NICOLET USERS SOCIETY

PROGRAM LIBRARY CATALOG

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THE OFFICIAL ORGANIZATION OF NICOLET DATA SYSTEM USERS
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NICOLET USERS SOCIETY

The Nicolet User Society (NUS) is an organization of all Nicolet 1080, NMR-80, MED-80 and NIC-80 system users. It maintains a collection of user-written programs which are available to all 1080 owners free of charge upon request. In addition, application notes describing the use of the 1080 system are distributed from time to time.

Any user who has developed a program which he feels may be of general interest to other users may notify them by submitting a copy of the program to NUS at Nicolet Instrument Corporation in Madison. NUS will duplicate and distribute these programs to all owners who request them. Be sure to include a program submission form with each program. In order that you may be kept up to date on NUS activities, please fill out the registration form and return it to Nicolet Instrument Corporation.

To order NUS programs, please fill out the attached order form. We ask that you limit your orders to five programs per month to allow most rapid service to all NUS members. Listings of NUS programs may be generated from the supplied source tapes, using the Assembler-Editor. Please do not order ASCII (source) tapes unless you plan to make programming modifications.

Nicolet Instrument Corporation neither guarantees the performance of NUS programs nor provides any support for them. It acts merely as a distribution agent for submitted programs. It will distribute user-reported software malfunctions along with the programs and when sufficiently important, may publish them in application notes.

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*Asterisk indicates program for 1180.

NUS PROGRAM ABSTRACTS

NUS-201 - MEMORY TEST (WORST PATTERN GENERATOR)

This test program generates a worst case memory pattern and reads from it repeatedly attempting to induce an error. All errors along with their addresses are then typed out. Source and Binary - Occupies Ø - 571.

NUS-202 - 1080 JUMP TEST

Direct and indirect jump instructions are executed repeatedly to and from pseudo-random addresses. If a jump fails, the exact location of the failure can be ascertained. Source and Binary - Occupies 300 - 507.

NUS-203 - 1080 OPERATIONS TEST

All GROUP I instructions are executed repeatedly in an attempt to induce equipment failure. If failure does occur, it is possible to localize the hardware trouble. Source and Binary - Occupies Ø - 302.

NUS-204 - HARDWARE MULTIPLY-DIVIDE TEST

This program starts at location zero and types out sequentially the results of hardware and software controlled multiplication, division and bit inversion if they differ. If they agree, the messages MULTIPLY OK, DIVIDE OK, and BIT INVERT OK are typed. Binary - Occupies Ø - 667.

NUS-205 - DESK AND RESISTANCE CALCULATOR

NICALC performs floating point addition, subtraction, multiplication, division, square root, log, and exponentiation functions. Furthermore, it can solve normal voltage divider equations, calculate the effective resistance of two parallel resistors, and determine the decibel relationship between two numbers. Utilizes FPP-1972. Source and Binary - Occupies Ø - 736.

NUS-206 - NICODUPE

This program will duplicate tapes, make additional copies and verify binary tapes with a standard (200) leader and checksum parity. In addition, NICO-LOADEON, which has a non-standard (000) leader and in part no checksum, may be duplicated, copied and verified. Source and Binary - Occupies Ø - 724.

NUS-207 - NICO-DECIN

When called, this program will accept decimal input from the Teletype. Overflow and invalid characters are automatically checked for within the program. Source and Binary - Occupies Ø - 111.

NUS-208 - NICO-TAB

Gives the equivalent of a tabulate instruction to the Teletype, thus allowing neat columns to be easily typed. Source and Binary.

NUS-209 - FLOATING POINT PACKAGE 1972

Now part of the standard Software Package. Source available from NUS.

NUS-210 - MESSAGE

This program allows an output of alphabetic characters along a paper tape. It is an ideal program for permanently labeling paper tapes. Source and Binary - Occupies 41 - 311 and 400 - 432.

NUS-211 - COMPUTER ART

This program generates exponentially decaying Lissajous figures and normalizes the result to drive an x-y plotter. Fascinating moire patterns can be produced, where several constants can be controlled by the artist. Source and Binary - Occupies Ø - 357. Requires FPP, 1972.

NUS-212 - TIMES SQUARE

This program displays the typed text on the scope in a rotating fashion similar to the news signs in Times Square. Source and Binary - Occupies 400 - 553 and 41 - 311.

NUS-213 - DICE GAME

Displays two dice on the scope and "rolls" them on Teletype command. Source and Binary - Occupies Ø - 270.

NUS-214 - NICO-PAGE

Any tape may be converted into a page by page listing. Source and Binary - Occupies Ø - 112.

NUS-215 - NMRCAL 1085 OVERLAY

This overlay causes an entire 4K section to be used for the stick display and another 4K to be used for the Lorentzian display. Requires a 1085 (20K) or larger system. Source and Binary - Occupies no new space.

NUS-216 - MDIAG

This matrix diagonalization routine operates on a packed upper triangular matrix stored in data memory, and produces an N x N matrix of eigenvectors and a diagonalized matrix, where the eigenvalues are contained in the diagonal. It operates in conjunction with Floating Point, 1971. The program also contains useful two dimensional array to single-dimensional array conversion routines and Floating Point Skip subroutines. Source only. Utilized FPP-1971 and Occupies 700 - 1760.

NUS-217 - THREE POINT SMOOTH AND BASELINE SMOOTH

Overlay to FT-Nmr 1972. Upon command SM performs a three point smooth on all displayed data. Upon command BS it picks out major peaks and performs a three point smooth on the baseline between them. The scientific validity of this latter command is roughly equivalent to the initials of the command. Source and Binary - Occupies 5213 - 5312 and 106 - 111.

NUS-218 - FORWARD AND INVERSE COMPLEX FOURIER TRANSFORM

This is the classical Fast Fourier Transform method and will accept both real and imaginary data. The inverse transform can also be taken via this program. Source and Binary - Occupies 600 - 1015 and 1055 - 1161. Overlays FT-Nmr 1972.

NUS-219 - ISOMETRIC PLOT

ISOPLOT produces a two dimensional projection of the three dimensional plot of real data vs. imaginary vs. frequency as viewed at a 45° angle down the frequency axis. It operates as an overlay to the FT-Nmr Program. ISOPLOT operates with an x-y plotter only. Source and Binary - Occupies 5213 - 5400 and 172 - 173.

NUS-220 - DECIMAL-OCTAL CONVERSION TABLE

This program types out a decimal-octal conversion table on the Teletype, modulo 4096. The formatting can be changed to produce more or less significant figures by modifying the source code. Source and Binary - Occupies Ø - 156.

NUS-221 - PUT AND TAKE PROGRAM

This program occupies locations 7600 - 7631 in place of Swap. It copies the 4K area selected by the Readout Buttons into the second 4K of program memory. Upon starting at a second address, it copies the contents of the second 4K of program memory into the area selected by the Readout Buttons. This program requires two stacks of program memory. Source and Binary.

NUS-222 - NORMALIZATION CONSTANT OVERLAY TO FT-NMR 1972

This patch allows the user to access the Normalization Constant used in scaling the FT data upon typing the command NC. This is useful in comparing the relative amplitudes of different transformed spectra. Source and Binary - Occupies 5401 - 5410 and 112 - 113.

NUS-223 - INTENSITY PRINTOUT OVERLAY TO FT-NMR 1972

This patch to FT-Nmr 1972 allows the Peak Printout routine (PP) to list out a fifth column: the intensity of the highest data point in the spectrum. In cases where intensity is more important than integral, this information can be useful. Source and Binary - Occupies 5374 - 5400.

NUS-224 - OVERLAY TO ASSEMBLER

This patch causes the Assembler program to fill the last page of a listing with line feeds to the standard 11 inch length and to punch a Rubout in the trailer section of binary and source tapes. Source and Binary.

NUS-225 - SNOOPY

All the fun of Schulz's character in digital form. Snoopy occupies 1K of data memory and can be Fourier transformed and restored using the inverse transform program in NUS-80/U-7218. Imagine the surprise of your students when the transform of "garbage" produces an old doggy friend. Binary only. Occupies 100000 - 101777.

NUS-226 - FIXED INTEGRAL PATCH TO FT-NMR 1972

The P subcommand under ID (Integrate Display) is replaced with the Command F which fixes the integral in memory. Plotting can then be accomplished with the standard PL routine. Source and Binary. Uses no new memory.

NUS-227 - VARIABLE SCALE INTEGRAL PATCH TO FT-NMR 1972

Withdrawn. Is part of FT-Nmr 1972 Revision I.

NUS-228 - FULL SCALE DIGITAL PLOT PATCH TO FT-NMR 1972

Withdrawn.

NUS-229 - BLOCK AVERAGING PATCH TO FT-NMR 1972

The "Block Averaging" Technique is utilized for signal averaging in the frequency domain. This technique is useful when it is desirable to signal average data having a huge dynamic range, such as when one or more strong solvent lines are present. Data are acquired in the time domain until the strong signals almost overflow memory. The resulting sum is processed and transformed and added to a second block of data memory. The first block can then be zeroed and new time domain data taken until memory is again almost full. The result of this process is that only the strong line will overflow memory in the frequency domain and that a very large dynamic range can be handled efficiently. Source and Binary - Occupies 142 - 143, 74 - 77.

NUS-230 - FIXED BLOCK SIZE FOR MC, PC AND AP

Withdrawn - Part of FT-Nmr 1972 Revision I.

NUS-231 - FAST EM FOR FT NMR

This patch uses an approximation to produce an exponential window in only 1 second per 4K data block. The accuracy is somewhat less than the standard EM near the tail of the exponential. Binary only - Occupies 4714 - 4775.

NUS-232 - INTEGRATE LIMITS PATCH TO FT-Nmr

The new subcommand I under the IR command causes the integral of the intensified (or expanded) region to be printed out in digital form. Occupies 5213 - 5244.

NUS-233 - OVERLAY TO DRIVE JEOL PULSE 3 - RELAY 1 HARDWARE

This patch drives the Nicolet modification to the 1080 which steps JEOL 5400 step recorders. The pen lift is automatically actuated using RELAY 1 and the hardware division network divides the 16,384 pulses into 5400 steps. Source and Binary - Occupies no new space.

NUS-234 - FAST PASS

This program can be used to cross correlate the response of a rapidly scanned cw-nmr spectrum with the response of an (a) theoretical or (b) experimental reference line. The program is written to utilize the method described by J. Dakok et. al. at the 13th Experimental Nmr Conference. Source and Binary.

NUS-235 - MANUAL T_1 MEASUREMENT USING THE JEOL PULSE PROGRAMMER

This patch allows the setting of the interval between the 180° and 90° pulses using the command IN. This sets and resets the interval counter in the JEOL pulse programmer T_1 plug-in. Overlays FT-Nmr 1972. Occupies 5213 - 5337, and 106 - 113.

NUS-236 - FIXED POINT OUTPUT FOR FT-Nmr

Withdrawn - Part of Ft-Nmr 1972 Revision I.

NUS-237 - PROGRAM DECODER

This program is a classical "disassembler," which, given an initial and final memory address, causes the printing of the specified region in either octal or assembler instructions. This has the advantage that unknown pices of code can be decoded during a dump for later analysis. Binary only - Occupies Ø - 1177.

NUS-238 - NIC-293 TIMER TEST

The duration of the 293 Timer may be selected arbitrarily using Teletype input. Source and Binary - Occupies Ø - 265.

NUS-239 - DIGITAL I/O TEST

This program allows an easy test to see if the I/O module of the 293 Controller is making errors. A digital ramp is loaded into the output register and read via the sense-contact lines. If what is read back does not agree with what was loaded into the output register, an error message is printed. Source and Binary - Occupies Ø - 117.

NUS-240 - NIC-293 DAC TEST

Ramp and square waves may be generated under software control to test the operation of the DAC and allow easy calibration. Source and Binary - Occupies Ø - 150.

NUS-241 - NIC-293 ADC TEST

Two alternate inputs are multiplexed under software control, allowing easy calibration of the ADC module. Source and Binary - Occupies Ø - 26.

NUS-242 - SPECTRUM REVERSE PATCH TO FT-Nmr 1972

This causes the left to right reversal of the displayed region upon giving the command SR. This is particularly useful when the rf carrier was placed at the high frequency end of the spectrum instead of the low frequency end. This command is non-destructive of data and can be called twice to restore the spectrum to its original configuration. Source and Binary - Occupies 5213 - 5235 and 174 - 175.

NUS-243 - ASTROCAL

ASTROCAL is a sophisticated desk calculator routine, which allows multiple operations in the same expression, transcendental functions, and 100 special storage locations. It operates in either fixed point or floating point mode and utilizes FPP-1972. Occupies location Ø - 536 and 6000 - 7577, leaving pages 2000 and 4000 free for the Assembler-Editor and Nicobug. Source and Binary

NUS-244 - BUGBOMB

BUGBOMB is a special tape for reloading the Binary Loader after a program "bombs" if Nicobug is intact. It enters and starts Nico-Loadeon at the Teletype keyboard-reader. Nico-Loadeon is attached and reads in automatically. Finally the Binary Loader is started by overlaying the intermediate loader with a jump to 7777. Binary only.

NUS-245 - POWER-OF-2

POWER-OF-2 utilizes a set of special driver subroutines, UTIL1 and UTIL2 and calculates any positive power of 2 having up to 4096 digits. Uses FPP-72. Occupies Ø - 1777 and 6000 - 7577. Uses first data stack for scratch. Source and Binary. Submitted by J. M. Luce, Med Data, Inc.

NUS-246 - UTIL1

UTIL1 is a series of source subroutines for message and text handling. They include:

ASFPM - prints a message, gets a floating point number and stores it
ASKFXM - prints a message gets a number, fixes it and stores it
PRINTM - prints an in-line string of characters
PRNTMS - prints a message
DOLOOP - sets up a do loop
NOLOOP - terminate a do loop
TSTACC - sign test on AC
TSTFAC - sign test on FAC
CMPFX - arithmetic comparison of two integers
CMPFP - arithmetic comparison of two floating point numbers
SHIFTN - variable length shift routine

Source only. Submitted by J. M. Luce, Med Data, Inc.

NUS-247 - UTIL2

UTIL2 is a series of source subroutines for array handling. They are:

ARYDIM - "Dimensions" an array by making a table entry
ARYSET - Sets each work of an array to a given integer
SUB1 - singly subscripted array handling
SUB2 - doubly subscripted array handling
ARYLKP - looks up the table entry for an array

Source only. Submitted by J. M. Luce, Med Data, Inc.

NUS-248 - ASTRO-TEST

Astro-test is a simple minimum length program for testing and diagnosing faults in core memory. Source and Binary - Occupies Ø - 150.

NUS-249 - TTI - CALCULATOR

This program converts the 1080 into a simple desk calculator with iterative capabilities. Strings of commands can be entered and run continuously until interrupted. Source and Binary - Occupies Ø - 526 and 6000 - 7577. Submitted by W. Siebert, Transform Technology, Inc.

NUS-250 - PHASE CORRECTION USING KNOBS

This program replaces the AP command of FT-Nmr 1972 with the PH command which allows adjustment of the phase of the displayed spectrum using two knobs attached to the NIC-293 ADC board channels Ø and 1. A simple schematic for attaching two 10-turn pots to the NIC-293 Controller is provided. Source and Binary - Occupies 5531 - 5655 and 161 - 165. Submitted by W. Siebert, Transform Technology, Inc.

NUS-301 - FT-Nmr OVERLAY FOR 293 PULSE CONTROLLER

Introduces the commands, P1, P2, P3, D1, D2 and D3 referring to three pulses and delays whose values can be entered at the Teletype and used with the NIC-293 Controller. The triggering of the pulse sequence as well as turning it on and off are entirely flexible. Occupies 5127 - 5177, 5213, 5366, 136 - 137, 102 - 103. It overlays the entire user's area and the MC command. Source and Binary.

NUS-302 - ZERO BEYOND CURSOR FT-Nmr OVERLAY

This program causes all address beyond the entered address to be set to Ø. Source and Binary - Occupies 106 - 107 and 5213 - 5247.

NUS-303 - MULTIPLE PULSE PATCH FOR THE MEASUREMENT OF T_2

This patch, in conjunction with NUS-7301 allows the setting and use of 5 timers to produce the sequence P1 - D1 - $(P2\text{-}D2)_n$ - P3, where n is an entered parameter. The sequence can be used for a Carr-Purcell train, where P1 is the initial 90 and P2 the 180° pulse. P3 can then be used to trigger the onset of data acquisition. Source and Binary - Occupies 3141 - 3200, 142-143, 122-123, 146-147. The punch routine is removed.

NUS-304 - NON-NORMALIZED INTEGRAL PATCH TO FT-Nmr

This patch causes the absolute value of the integral to be printed in the PP routine, rather than the normalized integral. The MI command no longer has any effect. Source and Binary - Occupies no new core.

NUS-305 - ASTRO-KALEIDOSCOPE

Astro-Kaleidoscope produces interesting, constantly changing patterns on the oscilloscope. A Fibonacci series is involved in the generation of the patterns; however, the user is invited to speculate as to the exact mode of operation, since the code is entirely uncommented and unintelligible. Source and Binary - Occupies Ø - 76.

NUS-306 - QED-18B

Withdrawn - replaced by DSKED disk editor.

NUS-307 - FORCON

Withdrawn - obsoleted by disk assembler

NUS-308 - TIMES SQUARE - Version 2

This version of Times Square allows all punctuation as well as all integers and alphabetic characters. It also recognizes the rubout for deletion during message entry. At the end of the text, a FORM (CONTROL/L) begins the circulating display. Source and binary - occupies 0-464 and utilizes 1K of data memory for each 17 characters. Submitted by David Dalrymple, University of Delaware.

NUS-309 - XAP - FIXED POINT ARITHMETIC ROUTINES

This is a signed multiply-divide, square and square root routine package which assumes that the binary point lies between bits 18 and 19. Source only - Occupies 113 locations.

NUS-310 - DISASSEMBLER

This program decodes binary instructions stored in memory and prints out an assembly language listing. It recognizes pointers, starts of subroutines and constants as well as all mnemonics. Source and binary - occupies 0-3050. Submitted by W. Kreysch, Institut fur Biophysik der Ruhr-Universitat, Bochum, West Germany.

NUS-311 - DISK VIEW

Disk View operates in Conjunction with DEMON Revision I, to produce a CRT display of 4K of data starting at track 20. The size can easily be changed to 8 or 16K, and the place in core selected using the Readout pushbuttons. This program allows the user to step through the disk in 1 of N track increments, where N is selectable, viewing the contents of the disk. By jumping back to the monitor the user can easily restore a crashed disk. Source and binary.

NUS-312 - FOUR OPERATIONS OF FLOATING POINT ARITHMETIC

This is a collection of routines which simplify the use of the Floating Point Package by allowing the user to perform addition, subtraction, multiplication and division sequentially using successive core locations as pointers. Occupies 5366-5776. Submitted by J. Puskar and Vaige Salem, Institute of Cybernetics of the Estonian Academy of Sciences, Talinn, USSR. Source and binary.

NUS-313 - ASTROGRAPH

Astrograph solves a 4th order polynomial and displays it on the CRT. An intensified point will roll around on the curve, bouncing off the edges of the scope and appearing to operate under the influence of gravity and a variable viscosity term. Submitted by J. Kisslinger, Astro-Digit, Inc. Source and binary.

NUS-314 - LEFT AND RIGHT SHIFT PATCHES TO FT-Nmr 1972

These programs allow the user to shift the displayed area to the left or the right by a preselected number of points. The end is filled with zeroes. This can be used for aligning spectra or for shifting pulse feed-through off the end of the free-induction decay. Source and Binary - Occupies 5245 - 5325 and 114 - 117.

NUS-315 - PSYCHEDELIC BOX DISPLAY

A small box is displayed which grows in diameter rapidly. When it fills the screen, it disappears. A new small box begins immediately, producing the illusion that boxes are being thrown at you. Great for parties and dull meetings. Source and Binary - Occupies Ø - 74.

NUS-316 - KINET

KINET simulates complex first order kinetic reaction systems of two to four compounds, related by any combination of reversible or irreversible, simple, competitive or consecutive reaction pathways. Binary Only - Occupies Ø - 1245. Requires FPP - 1972. Submitted by D. Dalrymple, University of Delaware.

NUS-317 - DIRCOP

DIRCOP is a patch to DEMON Revision I which adds the command COP for making a spare copy of the disk directory on track 17, in case the copy on track 3 is lost. Binary only - Occupies 6060 - 6061, and 7121 - 7135. Submitted by D. Dalrymple, University of Delaware.

NUS-318 - DUMP

DUMP overwrites the Save and Dump routine of Nicobug II and is used to dump only those memory locations which have changed contents. It saves time in debugging long programs by eliminating both the tedious search of memory for the source of error and the necessity of rereading long binary tapes after a program fails. Source and Binary - Occupies 4636 - 4667, 4602 - 4620. Submitted by David A. Wright, Michigan State University.

NUS-319 - PACK

PACK is a patch to DEMON Revision I to pack (sweep) the contents of a disk, deleting empty files and other unused but inaccessible tracks from the directory and disk. Both the directory and the disk tracks are shuffled to accomplish this. Binary only - Occupies 6056 - 6057 and 7102 - 7120 of DEMON Revision I. Submitted by D. Dalyrymple, University of Delaware.

NUS-320 - DIV32 - PATCH TO FT-Nmr 1972

DIV32 patches FT-Nmr 1972 to scale transformed spectra such that the largest peak will be on scale with a vertical display scale setting of 2K rather tha 65K. Source and Binary - Occupies 1147 - 1154. Submitted by D. Dalrymple, University of Delaware.

NUS-321 - ZERO-SET - PATCH TO FT-Nmr

ZERO-SET patches FT-Nmr, 1972 to allow setting the x-offset of the x-y recorder used for plotting spectra, such that a particular peak will come at a desired location on the chart paper (e.g., TMS at Ø Hz). Source and Binary - Occupies 5213 - 5242. Submitted by D. Dalrymple, University of Delaware.

NUS-322 - HALT-QUIT PATCH TO FT-Nmr 1972

This patches FT-Nmr 1972 for temporarily halting or completely aborting a PP or PL operation while in progress. Source and Binary - Occupies 5350 - 5400. Submitted by D. Dalrymple, University of Delaware.

NUS-323 - PEAK-TO-PEAK CURSOR ADVANCE PATCH TO FT-Nmr 1972

A patch to FT-Nmr 1972 to print out the address of each peak in a spectrum and simultaneously display the spectrum with the cursor (intensified dot) on each of the peaks in turn. Source and Binary - Occupies 5313 - 5342. Submitted by D. Dalrymple, University of Delaware.

NUS-324 - AC TWINKLER

This program randomly generates and bit inverts two bits in the AC at a slow enough rate for the eye to follow. The results are entertaining if not mesmerizing. Source and Binary - Occupies 1000 - 1024. Submitted by J. M. Luce, Med Data, Inc.

NUS-325 - 1070 TAPE READER PATCH TO FT-Nmr 1972

This patch introduces the command RD, which reads in a paper tape punched out by a 1070 paper tape punch. It is read into the memory block selected by the Readout starting button. Source and Binary - Occupies 3141 - 3217 and 146 - 147. Replaces the PU command.

NUS-326 - SQUEEZ1

SQUEEZ1 reads in ASCII paper tapes and deletes excess leading spaces in the copy it punches out. This decreases the text storage requirements for assembly. Source and Binary. Submitted by J. M. Luce, Med Data, Inc.

NUS-327 - RAPID SCAN DATA PACKAGE

The Rapid Scan Data Package allows the user to easily acquire and manipulate data from a NORCON rapid scan optical spectrometer.

This spectrometer presents two trigger locked time signals with a one to one correspondence between time and wavelength. The resulting spectrum is that of the light source which was incident on the input of the spectrometer, divided into two subspectra. The characteristics of these two spectra are that they have some wavelength overlap and that each one has an end region where low sensitivity yields unpredictable data. Further, the sensitivity of the two halves from two separate detectors may not be exactly equal.

The Rapid Scan Package accomplishes the following:

1) The spectral wavelengths can be easily established from a known standard source. For instance, a mercury lamp with known peaks can be used to accurately establish the wavelength to time relationship in the visible region. This calibration need only be done once if the experimental parameters remain unchanged.

2) Unequal sensitivities between the two sensors are automatically compensated for.

3) A final spectrum is calculated where the overlap is removed and the bad end regions are deleted. This yields a continuous spectrum over only the valid data regions.

4) For a light source in the visible region, the tristimulus coordinates are calculated.

5) The final spectrum which contains only relative numbers may be easily converted to absolute terms by typing in the average luminous power of the source.

6) A plot routine enables the user to obtain calibrated plots of the final spectra easily.

7) Print and dump routines also produce numerical output.

Binary Only - Occupies Ø - 7577 and stores standard curves in 104000 - 107777.

NUS-328 - MOD 2 PATCH TO FT-Nmr 1972

This program introduces a total acquisition time printout to the SW command, and prints out the digital resolution in Hz. After the TC constant has been entered the total broadening in Hz is printed. The F1 and F2 commands have been modified to print out the address followed by the frequency and value in ppm. A DD (Data Dump) command causes the printing of the digital contents of addresses between F1 and F2. A threshold has been added to the PP command which inhibits peak printout of peaks having an intensity below the threshold. This tape also contains versions of Normalization Constant Overlay (NUS-222), Intensity Printout (NUS-223), Fixed Integration Patch (NUS-226), Integrate Limits (NUS-232), Spectrum Reverse (NUS-242) and Non-normalized Integral Patch (NUS-304). Binary Only. Replaced DW, MC, PU, CC and AP and fills the entire user's area. Submitted by Dr. Robert A. Craig, Indiana University.

NUS-329 - LOG OF SPECTRAL REGION

Patch to FT-Nmr, 1972 to take log of spectral region using command LD and restore using EX for exponentiate. Assumes positive data. Occupies 5213-5251 and 106-111. Source and Binary.

NUS-330 - PHASE CORRECTION AND FT-PHFT

This stand alone program takes the Fourier transform of the displayed block and then allows region expansion and real time knob interactive phase correction using the 293 or NIC-80 knobs. When the zero order correction is completed, the first order correction can be done while holding one peak constant in phase. Occupies 0 - 3000. Source and Binary.

NUS-331 - JEOL PLOTTER OVERLAY TO FT-NMR REVISION II

Overlays FT-Nmr Rev. II with device codes for JEOL plotter pulse stretcher box.

NUS-332 - JEOL PLOTTER OVERLAY TO T1PRGM

Overlays T1PRGM plot routine for JEOL pulse stretcher box.

NUS-333 - OCTAL DEBUGGING PROGRAM

This is a re-written version of Nicobug, which in addition to the usual commands, includes exclusive dump of locations not equal to number added with mask, ability to write all locations between limits equal to a number, copy of locations between F and T into new region, and comparison of two blocks of memory. Occupies 4700 - 5457. Source and Binary. Submitted by A. Heiss, Bruker Physik, A.G.

NUS-334 - NICO-LOADEON FOR HIGH SPEED READER

This version of Nico-Loadeon uses the High speed reader. Two differences exist in the numbers toggles in, as well. Binary Only. Submitted by A. Heiss, Bruker Physik, A.G.

NUS-335 - PATCH TO ASSEMBLER-EDITOR, 1973

This patch causes the line counter to be incremented by the N command. In octal mode all non-executable statements are ignored. The # command prints out the current line number. CTRL/T prints the absolute line number of the last line of the text followed by the last allowed address for text storage. Source and Binary. Submitted by A. Heiss, Bruker Physik, A.G.

NUS-336 - MESSAGE WRITING PROGRAM

Writes all printing characters on tape in high speed punch right side up. The NUS program "Massage" writes them upside down. Source and Binary. Occupies 0-634. Submitted by A. Heiss, Bruker Physik, A.G.

NUC-337 - INTEGRATION PATCH TO BNC-12 FT-NMR PROGRAM

The command C in the IR routine is replaced by I which allows the display of the integral of the expanded region. This integral can be plotted and is to the same relative scale as that of the full display. Source and Binary. Submitted by H. Kellerhals, Spectrospin, A.G.

NUS-338 - MEMORY OVERFLOW PROTECTION PATCH TO BNC-12 FT-NMR PROGRAM

This patches NIC-80/S-7302c to control the digitizer resolution and divide down memory when overflow is immiment. The resolution is then reduced and averaging continues. Removes MC and PU commands. The MI command in PP is activated. Source and Binary. Submitted by H. Kellerhals and A. Heiss, Bruker Physik, A.G.

NUS-339 - T_1 PROGRAM FOR BNC-12 BRUKER MACHINES

This patch causes the FT-NMR program NIC-80/S-7302c to be converted into an automated T_1 program which plots out each spectrum and goes on to the next delay in the list. The pulse programmer is triggered using the Pulse 1 and Pulse 2 outputs of the BNC-12 (NMR-80) computer. Each delay is produced by either dividing the previous one by 2 or by reducing the delay by a constant amount. The spectra are plotted out in a pseudo stacked plot format. Binary Only. Submitted by H. Kellerhals, Spectrospin, A.G.

NUS-340 - RESTORE FT PROGRAM AFTER T_1 PROGRAM

This restores the FT program after using the above T_1 program. Submitted by H. Kellerhals, Spectrospin, A.G.

NUS-341 - GARBAGE COLLECTION

This program moves all disk files up to the beginning of the disk and consolidates all empty space at the end. Requires DEMON/II. Occupies 6000-7577. Source and Binary.

NUS-342 - DISK COPY ROUTINE

This program copies the contents of one disk onto another using DEMON/II. Requires two disk drives, but only one controller. Occupies 6000-7577. Source and Binary.

NUS-343 - YIN-YANG

This program draws the familiar Yang and Yin symbols on the scope. Occupies 0-223 and uses FPP72. Submitted by William Cunningham, University of Alabama Medical Center. Source and Binary.

NUS-344 - TAPE DUMP

Prints out the contents of a binary tape in octal as it reads it. Source and Binary. Occupies 0-347. Submitted by B. Bangerter, University of Illinois-Chicago Circle.

NUS-345 - AXIS

This patch to FT-Nmr 1972 draws a horizontal axis on a plotted spectrum with vertical hatch marks at each ppm (adjustable to other spacings). Occupies 146-147, 1317-1364 and 3141-3221. Destroys PU, AP and CC but not PH, PS or any other patch in the user's area. Source and Binary. Submitted by D. Dalrymple, University of Delaware.

NUS-346 - NIM

Test your mathematical agility by playing this time honoured game. The object of the game is to be the last to remove a number from three columns of numbers. Sounds easy? You'd be surprised. Source and Binary. Occupies 0-655. Submitted by J. E. Pearson, Roche Products Ltd., England

NUS-347 - TEMCAL

This program calculates chemical shift for methanol or ethylene glycol at any temperature, and vice-versa. Source and Binary. Occupies 0-636. Submitted by Leon Huang, University of Chicago.

NUS-348 - ANGLE

Angle calculates alpha=arccos ($e^{-T/T1}$). Source and Binary. Occupies 0 - 137. Submitted by Leon Huang, University of Chicago.

NUS-349 - DISK EDITOR

Withdrawn - available as DSKED disk editor.

NUS-350 - DASM - DISK ASSEMBLER

Withdrawn - obsoleted by IMP disk assembler.

NUS-351-353 - 1070-NIC-80 INTERFACE SOFTWARE

This group of programs consists of a Teletype controlled executive which allows the user to initiate a number of routines. Included are 1, 2 and 4-input variance, Fourier transforms and auto and cross-correlation, as well as display and cursor manipulation. A 1070-NIC-80 interface board is required to execute these programs. Specify only those programs needed. Binary only.

NUS-351 - 1070 - 1080 Single Input
352 - 1070 - NIC-80 Dual Input
353 - 1070 - NIC-80 Four Inputs

NUS-354 - LINE TILT PATCH TO LAB-80 PROGRAM

This program is a patch to the LAB-80 package which moves data up and down and rotates and bends it according to parameters, which can be entered at the Teletype. Occupies 4000-4300. Source and binary. Submitted by Don Ware, Bruker Magnetics, Inc.

NUS-355 - Nth ORDER BINOMIAL SMOOTH

This patch to FT-Nmr 1972 allows a 1, 3, 5, 7... n point binomial smooth of data points. Overlays IR. Occupies 3420-3461. Submitted by Clark Thompson, Nicolet Technology, Inc.

NUS-356 - REINDEER

This program punches out an endless string of reindeer on the low speed punch. Use the red tape at the end of rolls for added jollity at holiday time. Source and binary. Occupies 0-150.

NUS-357 - PING-PONG

Ping Pong for NMR-80 or BNC-12 computers with phase knobs. First person to reach 15 and be two points ahead, is the winner. Source and binary. Occupies 0-622. Submitted by Clark Thompson, Nicolet Technology, Inc.

NUS-401 - DISK VIEW/II

This version of Disk View operates in conjunction with DEMON/II and allows the restoration of crashed disks by viewing their contents in blocks whose size is selected by the Readout push-buttons. Occupies 0-261. Source and binary.

NUS-402 - EXACT SW PATCH TO BNC 1973 FT-NMR PROGRAM

This patch corrects the round-off inaccuracy between the entry of SW and the calculated DW. SW is then recalculated and stored correctly. Occupies 4030-4034. Source and binary.

NUS-403 - PONG FOR NIC-293 PHASE KNOBS

This version of PONG operates using the NIC-293 phase knobs rather than those of the NMR-80 or BNC-12, allowing use with 1080 systems. Submitted by Clark Thompson, Nicolet Technology, Occupies 0-650. Binary only.

NUS-404 - TAPE READ PATCH TO FT-Nmr 1972

This program allows tape to be read in via the TTY or HSR, replacing bit 8 in even parity tapes if HSR is used; replaces the MC command. Allows manual access to individual memory locations. Occupies 5127-5160 and 6453-6462. Submitted by H.W. Akitt, University of Leeds, Leeds, England. Source and binary.

NUS-405 - FELIX

FELIX is a program which solves the Bloch equations by numerical integration. It can be used to simulate the results of pulsed or field-swept cw nmr experiments, generating FID's, absorption signals, etc., as functions of T_1, T_2, H_1 and offset frequency or sweep rate. Submitted by Dr. David Dalrymple, Department of Chemistry, University of Delaware. Occupies 0-1326 plus FPP72. Source and binary.

NUS-406 - HSWEEP PATCH TO FELIX

HSWEEP is a patch to FELIX (NUS-405) to convert it to a program to simulate rapid-passage field or frequency-swept cw nmr experiments. The modified program occupies address 0-1326 and requires FPP72 for operation. Submitted by Dr. David Dalrymple, University of Delaware.

NUS-407 - DISK EDITOR ASSEMBLER FILE CONVERTER

This program converts files created by DSKED to files which can be read by Assembler-Editor, 1973. Occupies 0-362. Binary only. Submitted by Dr. Peter Bachmann, Spectrospin, A.G.

NUS-408 - AUTOMATIC SHIFT PATCH TO FT-Nmr 1972

This patch can be used to perform frequency domain averaging and features an automatic shift routine to correct for field drift (enabling operation without using an nmr lock). It includes a modified version of the block averaging patch (NUS-229). It was originally written to be used with FT-Nmr Revision II but should also be compatible with Revision I. Submitted by David R. Weiler, Department of Chemistry, University of Saskatchewan, Regina Campus. Source and binary. Occupies 5531-5655, 5672-5700, 5245-5317, 162-5 and 115-123. Overlays AP and CC.

NUS-409 - DBLOCK - DISK BLOCK AVERAGER

DBLOCK allows averaging of weak signals in the presence of strong ones to continue beyond the memory overflow point by transforming the data and summing it into a disk file of successive transforms, thus allowing all of memory to be used for signal averaging. This program operates in conjunction with DEMON/II and T1 PROGRAM/II and allows disk based block averaging of data acquired using the NIC-80, BNC-12 or 1080 with or without the NIC-293 Controller. After a specified number of scans, the data are Fourier transformed and phase corrected and added into a frequency domain file accumulating on disk. After the specified number of blocks have been taken, each with the desired number of scans, the file can be further manipulated using the T1 PROGRAM/II. If desired, block averaging can also be performed on a T1 experiment having up to 30 delay values. Source and binary. Occupies 0-1777.

NUS-410 - NORMALIZED INTENSITY OVERLAY TO FT-Nmr 1972

This program prints an additional column of peak printout which is the intensity of the peak normalized to 1000. The MI command set minimum intensity instead of minimum integral. Deletes PU, AP and CC. Binary only. Submitted by Gunther Jaeckel, Nicolet GmbH.

NUS-411 - RESTORE FOR DEMON/II DIRECTOR

This overlay for DEMON/II's SYSGEN allows a user to retype his directory from the information on a full directory listing in the event of a destroyed directory. Binary only.

NUS-412 - BILLIARDS GAME

A simplified version of bank billiards played on the oscilloscope with two balls. Points are scored by banking the cue ball off one or more cushions before striking the target ball. Requires NIC-293 phase knobs. May work with NMR-80 knobs as well. Occupies 0-530. Source and binary. Submitted by Dr. David Dalrymple, University of Delaware.

NUS-413 - PING

A patch to PONG (NUS 403) to convert it to a version in which the game is displayed as if viewed from the side of the table instead of from above; i.e., the ball follows parabolic trajectories. Occupies additional addresses 627-637. Source and binary. Submitted by Dr. David Dalrymple, University of Delaware.

NUS-414 - LEAST SQUARES PLOT IN T_1 PROGRAM/II

A patch to the T1CALC module of T1 PROGRAM/II to generate a plot of the ln $(1-A/A_0)$ vs tau points and the least squares line through them for each peak in the spectrum. Allows deletion of individual points and recalculation of T1. Also includes provision for specifying allowable drift in peak positions. Occupies 3774-5 and 4251-5003 of T1 CALC. Works with xy plotters only. Source and binary. Submitted by David Dalrymple, Department of Chemistry, University of Delaware.

NUS-415 - LEAST SQUARES SUBROUTINE

This subroutine performs a linear least squares analysis on two arrays of floating point data. From these blocks of x and y values, the slope and intercept are calculated. If the output switch is set, the x, y, calculated y, the deviation from the computed y and the standard deviation of y are printed. In addition, the slope, intercept and the average standard deviation of y is printed in the least squares summary. Floating point values are used in this subroutine in order to eliminate overflow that would be associated with integer values. Source only. Occupies 516 locations.

NUS-416 - LABELER

This program permanently labels and duplicates any source or binary program tape. Any of the Keyboard characters may be used in the labels and the characters are punched right side up. Occupies 2000-3777. Source and binary. Submitted by Larry W. Wilson, University of Oklahoma.

NUS-417 - DISASSEMBLER OVERLAY FOR NUS-310

This program makes an internal correction to the disassembler program so that the response N to the query "TYPE (J,N)" restarts the program. Source and binary. Submitted by Larry W. Wilson, University of Oklahoma.

NUS-418 - OCTAL-DECIMAL CONVERTER

By typing the command OD and then a whole octal number between 0 and 3777777 the program responds by typing out the equivalent decimal number. The decimal point must be typed on all but seven digit numbers. Occupies 0-1003. Binary only. Submitted by Alfred J. Temps, Albert Einstein College of Medicine, Department of Biophysics.

NUS-419 - CENTRONICS LIST PROGRAM

This program will list any ASCII file on the Centronics printer and make multiple copies by typing the M option to the DCI. A string of files can be entered for sequential listing as well. Occupies 0-1777. Source and binary.

NUS-421 - TIC TAC TOE

The computer plays a game of tic tac toe with the user on the Teletype. The program is useful in demonstrating programmed decision making and can be used as an interesting computer demonstration for "science day," etc. Occupies 0-1432, Source and Binary. Submitted by Larry W. Wilson, Beckman Instruments Inc.

NUS-422 - BULLETIN

This program types a changeable bulletin to users of your computer system. The bulletin may be used to provide instructions in the use or certain programs, inform your users of experimental procedures, etc. The program occupies 0-7577 for 96 full lines of type. Source and Binary. Submitted by Larry W. Wilson, Beckman Instruments, Inc.

NUS-423 - DIFFERENTIATION OF DISPLAY IN LAB-80

This routine adds to the LAB-80 signal averaging package the capability to calculate the differential of the displayed area using the Newton-Gregory forward interpolating polynomial. Occupies 4000-4112 and 164-5. Source and Binary.

NUS-424 and 425 - QUADRATURE DETECTION NMR PROGRAM

This program is a revision of FT-74 allowing acquisition of data into two inputs which then baseline corrects each of the two free induction decays separately, and performs a complex Fourier transform on them. Commands for entering SW and DW have been modified to calculate the bandwidth available on both sides of the carrier and the dual display is an integral part of the package. Requires a 2-input digitizer in a 1080 or Nmr-80 and phase knobs of a Nmr-80 or a NIC-293. Order NUS-424 for a Nmr-80 or BNC-12 with phase knobs. Order NUS-425 for a 1080 having a NIC-293 with phase knobs. Binary only.

NUS-426 - FIXED INTEGRAL PATCH TO LAB-80

This patch replaces the Plot sub command under integrate with an F command which stores the displayed integral in memory. Source and Binary.

NUS-501 - EXPANSION PLOTTING FOR JEOL PLOTTER

This program takes an arbitrary addressable range of data from a 4K block, transferring it to the start of another 4K data block. It then prints the (octal) dwell time setting required to make the JEOL plotter advance by the length of the selected region in the JEOL 250 second record interval. The start of the data in the second data stack is readily synchronized with the start of the JEOL record command. Source and Binary - occupies 0-423, starts at 0. Submitted by A.J. Temps, Jr., Albert Einstein College of Medicine.

NUS-502 - SIGNAL TO NOISE RATIO CALCULATION

This program computes and prints the RMS noise level of a block of data such as an NMR spectrum. It will then print the signal to noise ratio of operator-selected peak addresses. The data is displayed showing the chosen address intensified. Requires Floating Point Package, 1972. Source and binary - occupies 0-1031, starts at 0. Submitted by A.J. Temps, Jr., Albert Einstein College of Medicine.

NUS-503 - PUNCH EXPANDED REGION PATCH FOR FT74

This is a patch to the Nicolet FT74 program, NIC-32-40620 which alters the "PU" command to punch the region last specified by "EP". Thus, the same region is referenced as for "PL", etc. Source and binary - occupies 1207 and 1211. Submitted by E.H. Williams, University of Adelaide, Australia.

NUS-504 - CAT PATCH FOR FT74

This patch for FT74 enables the use of a 1973 or later model BNC-12 as a CAT on HX90 series spectrometers. Source and binary - occupies 212-213, 6267-6306. Submitted by E.H. Williams, University of Adelaide, Australia.

NUS-505 - 293 PULSE CONTROLLER OVERLAY FOR FT74

This patch provides commands, "P1", "P2", "P3", "D1", "D2", "D3", for the lengths of three pulses and three delays in the 293 controller. Commands "ON" and "OF" are provided to turn the sequence on and off from level LEV5 on pin B6. Source and binary - occupies 6231-6456 and 212-231, overlaying dual display area.

NUS-506 - MAGNITUDE CALCULATION FOR FT74

This patch overlays the imaginary part of a spectrum by the magnitude, defined as the square root of the sum of the squares of the real and imaginary parts. Source and binary - occupies 162-163 and 6132-6342. Original code can be restored using FT74 Restore Patch.

NUS-507 - RS-232 INPUT FOR LAB-80

This patch for the LAB-80 Signal Averaging Package reads signed decimal data in ASCII format from the RS-232 interface and stores it in memory. Source and binary - occupies 166-167 and 5000-5055.

NUS-508 - INVERSE HERMITIAN FOURIER TRANSFORM

This subroutine can be patched into FT74 to provide the capability of inverting a complex spectrum (up to 4K total in size) to recover the original FID signal or the time domain equivalent of the current spectrum. Can be reassembled to a different origin. Source and binary - occupies 110000-110500. Submitted by T. Moran, University of Wisconsin.

NUS-509 - DIRCPY FOR DEMON/II

This program will copy the DEMON/II directory from track 3 onto track 13 in response to the "C" command, or swap the saved directory on track 13 with a damaged directory on track 3 (the "S" command). Note that this does not back up or restore the programs themselves, only the directory. Source and binary. Occupies 0-173, starts at 0.

NUS-510 - RANDOM NUMBER SUBROUTINES

This subroutine package consists of subroutines to generate pseudo-random integers or floating point numbers. Distributions can be uniform, normal (Gaussian), or exponential. Floating point values require the use of Floating Point Package, 1972. Code may be reassembled elsewhere from source tape. Source and binary. Occupies 5000-5213. Unused functions may be deleted.

NUS-511 - DOG

This ASCII tape prints a picture of man's best friend shaking his fist at the Red Baron. Source only, no program.

NUS-512 - PINUP

This ASCII tape produces a beautifully shaded picture of interest primarily to "M.C.P.'s". Source only, no program.

NUS-513 - LPTEST FOR CENTRONICS PRINTER

This program prints sets of 3 pages of character test patterns on the Centronics line printer continually until CTRL-Q is typed on the keyboard. Source and binary. Occupies 0-165, starts at 0.

NUS-514 - DIRECTORY LISTING ON CENTRONICS PRINTER

DIRLST prints the full DEMON/II disk directory on the Centronics line printer. Not for floppy disk systems. Source and binary. Occupies 6700-6777; starts at 6700.

NUS-515 - "GARBAGE COLLECTION" ON FLOPPY DISK

FGARBAGE is designed to move all files on the NIC-298 floppy disk unit A to the beginning of the disk, consolidating all empty files at the end. It works only with the DEMON/F monitor. Source and binary. Occupies 6000-6777; starts at 6000.

NUS-516 - FLOPPY DISKETTE COPY PROGRAM

FCOPY copies the files on the NIC-298 floppy disk drive unit A to unit B, eliminating empty files in the process. For use with DEMON/F monitor only. Source and binary. Occupies 6000-6777; starts at 6000.

NUS-517 - SHIFT, MONITOR, AND RAMP PATCHES FOR LAB-80

This patch implements LS and RS commands to left and right shift the data memory array by one point, the MO command to return to the DEMON monitor, and the VR command to generate a triangle ESR ramp with the 293. It will also configure the plotter for Varian ESR. Source and binary. Occupies 166-175, 666, and 4200-4513.

NUS-518 - JITTER PATCH FOR FT74

This patch removes the jitter in the cursor routine in FT74 by averaging the knob readings 32 times. The SR command is overlaid. Source and binary. Occupies 3147-3171, 3431, and 3436.

NUS-519 - DATA ROUTING PATCH TO SIGNAL ANALYSIS PACKAGE

This patch to SAP allows 2 level routing of data. Uses peripheral interrupts P1 and P2 to determine data destination. Source and binary.

NUS-520 - FIEND, FOR EXAMINATION AND CHANGE OF DEMON/II DIRECTORY

The FIEND is an assistant to the DEMON. FIEND has 11 commands to allow examination of selected directory entries and status or name changes. Any changes are made in core only until user gives a command to update the directory. Source and binary. Occupies 0-1233; starts at 0. Submitted by Lynn H. Wright, Frederick Cancer Research Center.

NUS-521 - PULSE 1 and PULSE 2 PATCH TO FT-Nmr, REV. 2

This patch to FT-NMR Revision II allows software control of the two pulses out of jacks J5 and J6 on the back panel of the 1080. These could be used for triggering rf pulses or homospoil pulses without a 293 pulse controller. Occupies 106-121, 172-175, 5213-5305, and 5371-5377. Source and binary. Submitted by Dave Weiler, University of Regina, Saskatchewan.

NUS-522 - RMS NOISE CALCULATION PATCH TO FT-Nmr, REV. 2

This patch to FT-NMR Revision II adds the subcommand N to the IR routine. This prints the RMS noise value between the limits F1 and F2. Occupies 5213-5306. Source and binary. Submitted by Dave Weiler, University of Regina, Saskatchewan.

NUS-523 & NUS-524 - BLACKJACK CARD GAME

BJACK is a highly conversational game which plays blackjack with the user, with the computer acting as dealer. The disk version (NUS-523) operates with the DEMON/II monitor, updating itself to remember previous players' names and winnings. The non-disk version (NUS-524) should be ordered by those who do not have the NIC-294 Diablo disk system. Occupies 0-5157; starts at 0. Binary only. Submitted by Department of Chemistry, University of Delaware.

NUS-525 - DIGITAL CLOCK DISPLAY

DIGIT-CLOCK will display the time of day in 24-hour format on the display scope. Because of minute to minute timing loop fluctuations, use your own wristwatch to time experiments. Each new hour is paraded in with grand style. Occupies 0-4714, requires FPP-72. Source and binary. Submitted by Andreas Goedde, Xerox Corporation.

NUS-526 - PLOTTING PROGRAM FOR JEOL RECORDER

This program will plot a data block using the JEOL Pen Recorder. The data block size and start may be entered from the TTY or from the pushbuttons. It may also be incorporated as a subroutine into another program. Occupies 0-636, requires FPP-72. Source and binary. Submitted by Alfred J. Temps, Jr., Albert Einstein College of Medicine.

NUS-527 - ARRAY EXPANSION PROGRAM

XPAND will double the size of a spectrum by generating intermediate points by cubic interpolation. This technique is a faster alternative to doing an FFT on 2N points with the last N being zeroes. Occupies 0-151; starts at 0. Source and binary. Submitted by G. A. Pearson, University of Iowa.

NUS-528 - PHASE ERROR CORRECTION FOR QUADRATURE NMR

Given FID's in two adjacent memory blocks which are approximately in quadrature, QUAD90 will add a proportion of block 2 to block 1 to bring them into quadrature. It will also adjust the amplitudes to equality. Occupies 4600-5342; starts at 4600. Requires FPP-72. Source and binary. Submitted by Stephen I. Parks and Rolf B. Johanneson, National Bureau of Standards.

NUS-529 - CONVERTS FLOATING POINT BASIC FILE TO INTEGER

BATRAN converts a floating point file created by BASIC into an integer data file which can be loaded into data memory and displayed or plotted. This file converter works only on the NIC-298 floppy disk DEMON/F monitor. Occupies 0-700; starts at 0. Source and binary.

NUS-530 - CURVE ANALYSIS PROGRAM

This program assists in analyzing spectra consisting of overlapping lines such as are obtained from quadrupolar nuclei or Raman spectroscopy. Manual entry of line parameters is used to obtain a rough fit which can be further refined by an automatic sequential search method. Requires 12K or more. Occupies 0-7577, 100000-103100, and 112000-113777; starts at 0. Disk users should store and load each section separately as CRVAN1, CRVAN2, and CRVAN3. Binary only. Submitted by J. W. Akitt, University of Leeds, England.

NUS-531 - CORE DUMP ON TTY OR CENTRONICS

DUMP will print the octal contents of a specified block, 8 locations per line. The dump may be on the TTY or the Centronics line printer. CTRL-Q will interrupt and return to DEMON at 7600. Occupies 7300-7577 (out of the way of most programs); starting address is 7300. Source and binary.

NUS-532 - FDIRCP, FLOPPY DISK DIRECTORY BACKUP

FDIRCP is similar in operation to DIRCPY (NUS-509) except it operates only with DEMON/F and makes its directory copy on track 231. It also makes a directory file entry called ///DIR. Current directory may be backed up by using the C (copy) option, or a destroyed directory may be swapped with the backup copy using the S (swap) option. Occupies 0-360, starts at 0. Source and binary.

NUS-533 - NERGLR PROGRAM TO LIST FILE NAMES

NERGLR will list all files whose names begin with a specified sequence of 1 to 6 characters. It will also print parameter information stored by the NTCFT program. Requires that FPP-72 be stored on disk with the name "FPP72". Requires DEMON/II monitor. Binary only. Occupies 0 to 1777; starts at 0. Submitted by I.D. Gay, Simon Fraser University, Burnaby, B.C.

NUS-601 - ON-LINE PEAK PICKING OVERLAY FOR MED-80

This overlay to MEDEXC will monitor incoming data, searching for peaks. Peak to peak values as well as baseline changes will be stored into memory. Submitted by G. Jaeckel, Nicolet GMBH.

NUS-602 - DWELL HISTOGRAM WITH VARIANCE FOR MED-80

This program for the MED-80 will take dwell histograms, calculate lines connecting the peaks, and average the resulting curves. It will calculate standard deviations, and has display and plotting features. It will handle up to four inputs. Submitted by G. Jaeckel, Nicolet GMBH.

NUS PROGRAM ABSTRACTS

NUS-603 - STACK PLOTTING OVERLAY TO MEDEXC

This overlay adds a stack plotting capability to the MEDEXC package for the MED-80. Source and binary. Submitted by G. Jaeckel, Nicolet GMBH.

NUS-604 - EEG QUANTIFICATION BY HJORTH'S METHOD

This program will characterize up to 8 EEG input channels in terms of the normalized slope descriptors "activity", "mobility", and "complexity" as proposed by Hjorth. Source and binary. Requires FPP-72. Submitted by G. Jaeckel, Nicolet GMBH.

NUS-605 - MODIFIED MEDEXC FOR NAS-80

This overlay converts the MEDEXC package to run on a NAS system. Several new commands have been added, and others have been deleted. Source and binary. Submitted by G. Jaeckel, Nicolet GMBH.

NUS-606 - STACK PLOTTING OVERLAY FOR NAS-80

This overlay to the NAS-80 software (NUS-607) provides a stack plotting capability. Binary only. Submitted by G. Jaeckel, Nicolet GMBH.

NUS-607 - NAS-80 SOFTWARE PACKAGE

This software package provides averaging and analysis capabilities for NAS systems. Binary only. Submitted by G. Jaeckel, Nicolet GMBH.

NUS-608 - MEDSAV PROGRAM FOR EXTERNAL BINARY TRIGGER

This program is based on the MEDEXC package and provides separate averaged blocks for different stimuli. Requires 8K of memory, NIC-293 controller, and NIC-298 floppy disk, and FPP-72. Binary only. Submitted by T. Lind, Royal Veterinary College, Uppsala, Sweden.

NUS-609 - ALSYS SUBROUTINE PACKAGE

A comprehensive subroutine package for terminal I/O, message handling, and scope displays. This package includes decimal I/O, message I/O and display, and vector display. Data memory is used to generate the display. Binary only; occupies 6000-7370. Submitted by Alan Legatt, Albert Einstein College of Medicine.

NUS-610 - "ACCEPTABLE INPUT" PATCH TO SAP

This patch averages only data from "test" stimuli which are preceded by "conditioning" stimuli. Data resulting from "conditioning" stimuli are not averaged. Source and binary. Submitted by Alan Legatt, Albert Einstein College of Medicine.

NUS-611 - "BRAIN" DISPLAYS LATERAL VIEW OF MONKEY BRAIN

BRAIN displays a lateral section of the brain of a rhesus monkey, with a flashing knob-controlled cursor. The stereotaxic coordinates of the cursor are also displayed. Source and binary. Submitted by Alan Legatt, Albert Einstein Colledge of Medicine.

NUS PROGRAM ABSTRACTS

NUS-612 - "TTT" PROGRAM TO COMPUTE T1, T1-RHO, AND T2

TTT will calculate the T1, T1p, and T2 relaxation times and the percent rigid phase of mixed morphology systems from stored NMR FID's. Requires FPP-72 and NUS-614, as well as NIC-294 disk and Biomation or NIC SD-82 digitizer. Source and binary. Special 16K test data tape is available as NUS-613, if needed. Submitted by Andreas Goedde, Xerox Corporation.

NUS-614 - BASELINE CORRECTION FOR "TTT"

BC corrects baseline offset on stored FID's as a supplementary program to TTT (NUS-612). Requires 16K data memory. Source and binary. Special 6K test data tape is available as NUS-615 if needed. Submitted by Andreas Goedde, Xerox Corporation.

NUS-616 - T1 MEASUREMENTS FOR WH SPECTROMETERS

This is an overlay to the FTNMR 75 program (12500300 CB) from Bruker. It allows T1 measurements by inversion-recovery and/or saturation recovery. It is possible to obtain equilibrium spectra in both cases. Source and binary. Submitted by B. Chin and P. Lalanne, Centre de Recherches Paul Pascal, Domaine Universitaire, Talence, France.

NUS-617 - PEAK PICKING & PRINTER-PLOT OVERLAY TO FT-72

This overlay to FT-72 prints the line position followed by a series of dashes proportional to the peak intensity. The vertical line spacing is proportional to the actual frequency displacements. User may need to change the locations to fit his program. Source and binary. Submitted by J. W. Akitt, University of Leeds, England.

NUS-618 - MODIFICATIONS TO BRUKER MTC ASSEMBLER-EDITOR

This overlay to the Bruker cassettes version of Assembler-Editor 1) suppresses listing prior to a specified address, 2) speeds address searching in editor, 3) allows multiple deletions, and 4) restores use of the HSR. Source only. Submitted by J. W. Akitt, University of Leeds, England.

NUS-619, 620 - CORRELATION SPECTROSCOPY

This is a complete package for performing correlation NMR on a 1080 or BNC-12 system, including data acquisition, processing, and plotting. Please specify NUS-619 for 1080 systems, or NUS-620 for BNC-12's. Occupies Ø-7577. Source and binary. Submitted by Steven L. Patt, Stanford Magnetic Resonance Lab, Stanford University.

NUS-621 - FREQUENCY & INTENSITY LIMITS FOR NMRCAL

This overlay to the NMRCAL program will establish a minimum intensity for transitions as well as upper and lower limits for frequencies to be printed. Source and binary. Submitted by V. J. Kowalewski, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina.

NUS PROGRAM ABSTRACTS

NUS-622 - LIQUID CRYSTAL SPECTRUM SIMULATION OVERLAY

This overlay to NMRCAL will request the direct coupling constants Dij to allow simulation of molecules oriented in the nematic phase (liquid crystals). These may be all set to zeroes if an ordinary isotropic spectrum is to be simulated. Source and binary. Submitted by V. J. Kowalewski, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina.

NUS-623 - NORMALIZATION CONSTANT PATCH TO SAP

This patch to SAP (N36-50626) for the MED-80 allows entry of a constant to be used during the normalization routine. No functions are disabled. Binary only.

NUS-624 - PERTURBATION PULSE PATCH TO FT-NMR, REV 2

This patch to FT-NMR, Revision 2 causes the computer to trigger the perturbation pulse using the PULSE1 command with output on J6. The number of scans and delay can be entered. Data collection can be interrupted and resumed. Source and binary. Submitted by Shaw-Guang Huang, Dept. of Chemistry, Michigan State University.

NUS-625 - PROGRAM TO READ/WRITE SELECTED TRACK OF 294 DISK

TKRW will read a selected track of the 294 Diablo disk into data memory whether the disk is good or not. It will also write that area back to any selected track. Can be very useful in conjunction with NICOBUG. Occupies Ø-144. Source and binary. Submitted by Shaw-Guang Huang, Michigan State University.

NUS-626 - FILE RENAMER FOR DEMON/II (NIC-294)

RENAME requests a track number, prints the current file name associated with that track (including empty files) and allows modification of the name. Binary only. Occupies Ø-446. Requires DEMON/II. Submitted by Shaw-Guang Huang and David A. Wright, Dept. of Chemistry, Michigan State University.

NUS-627 - FLOPPY DISK VIEW FOR NIC-298 DEMON/F

This is a version of NUS-401 for floppy disks. It can aid in restoration of crashed disks by viewing the contents of selected tracks. Uses DEMON/F monitor. Occupies Ø-26Ø. Source and binary.

NUS-628 - DATA TRANSMISSION USING SECOND RS-232 CHANNEL

The DRS232 program will transmit or receive data or data files over the second 1080 RS-232 channel in the same format as binary paper tapes. Requires DEMON/II Diablo disk and second RS-232 channel. Source and binary. Occupies Ø-15ØØ.

NUS PROGRAM ABSTRACTS

NUS-629 - NICOBUG/III

NICOBUG/III is a sophisticated debugging aid which occupies 2000_8 words of memory. It is auto-relocatable to any memory page (i.e. Ø, 2000, 4000, 6000, 100000, 102000 etc.). It accommodates 8 breakpoints, has a trace feature, will display a block of memory, will direct printout to the line printer, and many other features. Initially loads into Ø-1777, but may be relocated. Source and binary.

NUS-630 - 20-BIT DIGITAL I/O TEST FOR NIC-293

This program is a revision of NUS-239 to accommodate 20-bit digital I/O versions of the 293. The test uses the SENSE and LEVEL registers. It occupies Ø-124. Source and binary.

NUS-631 - 3-LETTER WORD GUESSING GAME

This game program will give you ten chances to guess the 3 letters of a computer selected word. Correct guesses are echoed in their correct positions within the word. Occupies Ø-577. Source and binary. Submitted by Shaw-Guang Huang, Michigan State University.

NUS-632 - "LIFE" GAME

This program illustrates random birth, groupings, maneuvering, and death of a colony of cells. It was invented by John Conway and is described in a series of articles in the Mathematical Games section of Scientific American, starting in October, 1970. This version does not allow the user to preset a specific pattern, rather it uses the contents of data memory to generate an initial pattern. Occupies Ø-370. Source and binary. Submitted by Lionel C. Waring, Queen's University of Belfast, N. Ireland.

NUS-633 - FLAPJACK, VERSION OF BLACKJACK FOR FLOPPIES

This is a floppy disk version of the disk Blackjack game (NUS-524). Binary only. Occupies Ø-5157 and is self-storing. Requires DEMON/F, version N49-60202.

NUS-634 - MED PONG

This is a version of PONG (NUS-357) which uses the MED-80 knob controls. Binary only.

*NUS-635 - TEMP11 FOR NIC-1180 INTERCONVERTS SHIFTS & TEMPERATURES

This program interconverts shifts and temperatures for methanol and ethylene glycol at any frequency. Occupies 10000-10343, requires FPP-11 at 6000-7777. Exit assumes presence of DEXTER/2 monitor. Source and binary. Submitted by Steven L. Patt, Stanford Magnetic Resonance Laboratory, Stanford University.

*NUS-636 - CLIST FOR NIC-1180 LISTS FILES ON CENTRONICS

This program for the 1180 uses DEXTER/2 and will list a disk file on the Centronics line printer under interrupt mode, allowing the user to perform any other task which does not use level 5 or the memory page occupied by CLIST. Occupies 15000-15777, S.A. = 15230. Source and binary.

*NOTE: Programs preceded by an asterisk are written for the NIC-1180 system.

NUS-701 - JEOL PLOTTER PATCH FOR T1 STACK-PLOTS

This patch to T1PLOT module of T1PRGM/II allows negative as well as positive Y-axis offsets so that the full range of the JEOL plotter outputs can be utilized in T1 stacked plots. Submitted by Alfred J. Temps, Jr., Albert Einstein College of Medicine. Source and binary.

NUS-702 - PATCH TO NUS-701 TO PREVENT FOLDOVER

This is a patch to be overlaid on NUS-701 to restore the truncated data feature to T1PRGM stacked plots. Submitted by A. J. Temps, Jr. Source and binary.

NUS-703 - PROGRAM TO GENERATE EXPONENTIALLY DAMPED SINE WAVES

The user may specify the amplitude, phase, frequency, and damping factor to generate a damped sine wave in any section of data memory. Occupies Ø-1774, uses FP-72. Submitted by A. J. Temps, Jr. Source and binary.

NUS-704 - TEST SCORE ANALYSIS

This program calculates and prints the average and standard deviation of a set of grades or test scores ranging from 0 to 100. Occupies Ø-1324. Submitted by Eldon Husband and Katherine Cook, University of Houston at Clear Lake City. Source and binary.

NUS-705 - LIFE GAME FOR TTY OR CRT

This program "plays" Conway's game of Life, as described in Scientific American, October, 1970. This version will allow the user to specify an initial pattern from the keyboard, and will display successive generations on either the CRT scope or the TTY terminal. Occupies Ø-1647. Submitted by David A. Coach, University of London, King's College. Source and binary.

NUS-706 - BRUKER LOGO

Animated Bruker logo display which "can be used to pass time while waiting for the Bruker service engineer to fix the instrument." Occupies Ø-5522. Submitted by A. O. Goedde, Xerox Corporation. Source and binary.

NUS-707 - KALEIDOSCOPE

Displays a fascinating changing symmetric pattern on the scope. Start with Vertical Display Scale at 32K, then watch it change as you change the Vertical Scale. Occupies only Ø-34. Source and binary.

NUS-708 - MED BILLIARDS

This is a version of Billiards (NUS-412) which uses the MED-80 knob controls. Occupies Ø-777. Binary only.

NUS-709 - BASELINE-STRAIGHTENING PROGRAM

This program will correct for a sloping or gently curving baseline in a spectrum. Occupies 5136-5777, uses FPP-72. Submitted by G. A. Pearson, University of Iowa. Source and binary.

*NUS-710 - DUPL3 PAPER TAPE DUPLICATOR/VERIFIER FOR 1180

This program for the 1180 combines the functions of a paper tape duplicator, verifier, and binary punch program. Requires a high speed reader/punch. Occupies 20000-21036. Submitted by J. Royston, Bruker Physik AG. Source and binary.

*NUS-711 - ESR2 PROGRAM FOR ESR TIME AVERAGING

This program for the 1180 controls an ESR time averaging experiment. Requires 293A to produce ramps or triangular waveforms to scan magnetic field or fast scan ENDOR radio frequency. Occupies 400-14777 and uses 20000-47777. Requires 24K 1180 with 294A disk and 293A pulse programmer. Submitted by R. Isaacson, S. Patt, and E. Moskowitz. Binary only.

*NUS-712 - PQER PROGRAM FOR GYROCODE DECOUPLER OF XL-100

This program calculates the pushbutton settings for the Gyrocode Decoupler of the Varian XL-100 to obtain a given output frequency. Occupies 400-1416. Requires FPP11. Submitted by the National Research Council, Ottawa, Canada. Binary only.

*NUS-713 - RS-232 DATA TRANSFER PROGRAM

This program for the 1180 uses RS-232 Channel B to transmit or receive data in the form of strings of ASCII characters forming integers. Also allows direct transfer of characters typed on the keyboard. Occupies 400-2056. Submitted by David Dalrymple, NTC. Source and binary.

*NOTE: Programs preceded by an asterisk are written for the NIC-1180 system.