TEK 4041 ROM PACKS

4041R01 Graphics ROM.

4041R02 Plotting ROM.

4041R03 Signal Processing ROM.

4041R04 Utility ROM.

4041 SYSTEM CONTROLLER ROM PACKS

The capabilities of standard 4041 BASIC can be expanded by installing ROM (Read-Only Memory) Packs to extend operational features of the 4041 into a broad range of system applications. The ROM Packs enlarge the already powerful BASIC even further, with functions running faster than equivalent BASIC routines.

The 4041R01 Graphics ROM Pack gives the 4041 the capability to generate graphic commands to interact with peripheral devices that use Tektronix compatible graphic codes. These high level and primitive commands allow users to construct and incorporate graphic images, symbols, charts and diagrams into their system's application. System usability is greatly enhanced when supported with a graphic human interface.

The 4041R02 Plotting ROM Pack gives the 4041 the capacity to generate graphs and to plot data. Designed as an easy-to-use tool to generate scientific graphics automatically, the Plotting ROM Pack requires the 4041R01 Graphics ROM Pack in order to operate. Graphs can be generated and displayed on any graphic peripheral device supported by the 4041R01 ROM Pack.

The automatic plotting commands are the heart of the 4041R02. These commands, given user data, draw axes with appropriate tic marks and plot the desired data. The user needs little experience to program graphics or plotting routines. All the user needs to do is supply the data to be graphed.

The 4041R03 Signal Processing ROM Pack gives the 4041 the ability to support instrumentation system applications requiring waveform processing. Coupled with our programmable digitizers and oscilloscopes, it will produce broader system configurations and effective solutions for signal analysis.

The functions contained in the 4041R03 provides a high level approach to deal with signal processing applications normally solved by lengthy programming requiring extensive knowledge of waveform processing and computer fundamentals. Combined with the Graphics and Plotting ROM Packs, the 4041R03 allows the user to produce, analyze and display waveforms semi-automatically.

The 4041R04 Utility ROM Pack adds still more general-purpose capabilities to your 4041 Controller. These range from such convenience items as one-line descriptions of error codes to capabilities for building PROM files for programming your own EPROMS.

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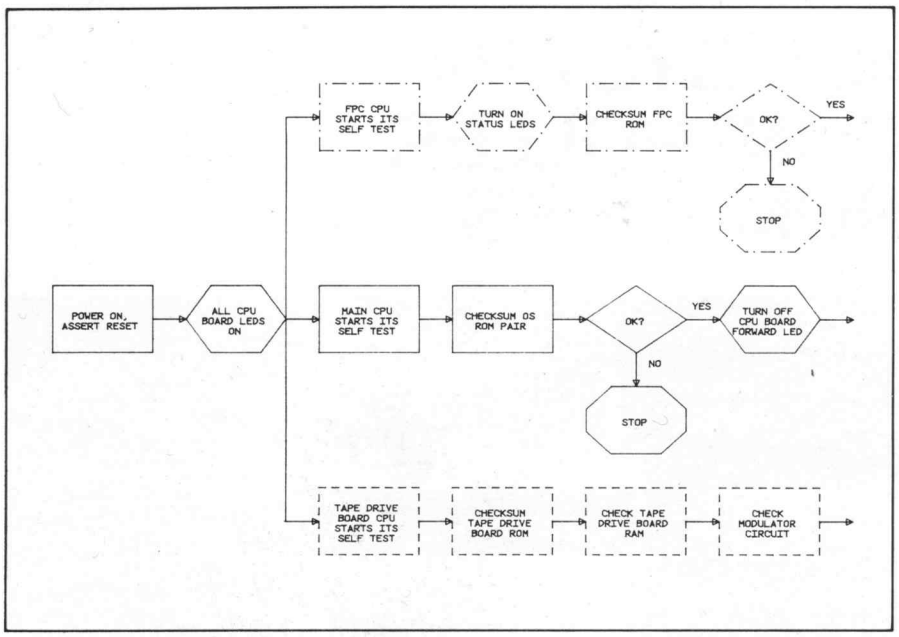


Schematic derived by 4041R01 Graphics ROM Pack.

4041R01

The 4041R01 Graphics ROM Pack gives the 4041 the capability to generate graphics with terminal devices that use Tektronix 4010 Series, 4100 Series, or 4020 Series terminal compatible graphics codes, and 4660 Series plotters compatible graphics codes. This includes manufacturers' equipment that have Tektronix graphic protocol emulators.

Included in the 4041R01 Graphics ROM Pack are system environmental commands, graphic environmental commands, and graphic primitive commands.

System environmental commands set up the 4041 to communicate with a graphic device. The system environmental commands are:

GINIT: used to set up the 4041 to communicate with Tektronix graphic devices.

GDEVICE: used to set up the 4041 to communicate with other graphic devices.

Graphic environmental commands define the graphic environment. The graphic environmental commands are:

COLOR: sets a color or gray scale index (terminals) or chooses which pen will be used for drawing (plotters).

LINESTYLE: selects the style of line to be drawn.

TEXTSIZE: selects the maximum size of text characters.

VIEWPORT: selects the physical area of the graphic device on which to draw.

WINDOW: selects the "window" in user data space to map onto the viewport.

ASK COLOR: returns the latest requested and current color/gray scale index or pen index.

ASK LINESTYLE: returns the current linestyle index.

ASK TEXTSIZE: returns the latest requested and current character sizes.

ASK VIEWPORT: returns the current viewport parameters.

ASK WINDOW: returns the current window parameters.

Graphic primitive commands perform the basic operations required to draw a picture or accept input from a graphic device. The graphic primitive commands are:

DRAW: draws a line from the current position to a specified point.

GIN: records the current position of the terminal cursor or plotter pen.

GTEXT: writes characters into the graphic area.

HARDCOPY: issues a copy command to an attached Hard Copy unit.

HOME: moves the cursor or plotter pen to the "home" position (one character's height below the upper-left hand corner of the graphic device).

MOVE: moves the cursor or plotter pen to a specified point, without drawing a line.

PAGE: moves the cursor or pen to the "home" position. On terminals, clears the screen. On plotters with paper advance, advances the paper.

POINTER: allows the user to move the cursor or plotter pen in order to input its position.

RDRAW: draws a line from the current position to a new position, whose coordinates are given relative to the current position.

RMOVE: moves the cursor or plotter pen to a new position, whose coordinates are given relative to the current position.

User Memory Required:
1500 Bytes

4041R04

The 4041R04 Utility ROM pack gives the 4041 the capability to have english error messages printed, interval/time-of-day Timer Devices, and a Soft ROM pack loader function.

But perhaps the greatest capability is that of being able to create your own PROMs. Often used programs can be put into PROM and loaded into the 4041 much faster than from any other peripheral device. Provided is a PROM file system with I/O for reading files from user developed PROMS. Files can be opened or closed and data or programs read from PROM. Autoload capabilities are also provided so that the 4041 can be powered up into a configured state with your program running.

Included in the 4041R04 are six new commands that are used for a variety of tasks.

These six commands are:

ERRORTXT: returns the ASCII error code for a specific error number. This is automatically called by the R04 when an error occurs.

LOADROMS: used to load from tape soft ROM Pack files. Only Tektronix built files are loadable with this command.

RCALLS: lists all ROM Packs and ROM calls available to the user onto the system console device.

DEGREES: sets the current trigonometric units to degrees; equivalent to the SET ANGLE 1 statement.

GRADS: sets the current trigonometric units to grads; equivalent to the SET ANGLE 2 statement.

RADIANS: sets the current trigonometric units to radians; equivalent to the SET ANGLE 0 statement.

New DRIVERs added

Also included in the 4041R04 are 4 new drivers, three of which are used to set timer interrupts.

TIME0, TIME1, and **TIME2** can be individually set to interrupt 4041 BASIC program execution after a specified number of seconds or at a specific time of day.

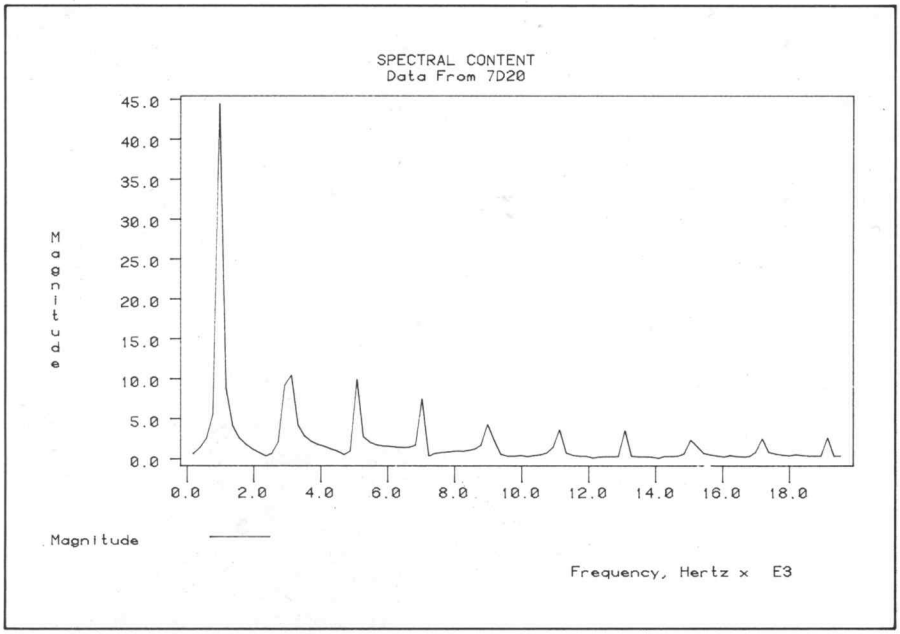
PROM0: provides a file system that reads files from PROMs. This requires that the user have the optional accessory PROM builder kit.

Accessory PROM builder kit

An accessory PROM builder kit allows you to develop the EPROMs to use with the PROM file system. PROM file images are built using the PRMBLD program included in this kit. The PRMBLD program prompts you for the name of the files to be included in the PROM file system. It then sizes the files to determine the number of PROM pairs required, and builds an image of the PROM files on the DC 100 tape as a separate ROM pair. This image can be used by the RMXFER program, to transfer it over one of the 4041's interfaces to the *user's* PROM programmer.

Optional accessory kit 020-0102-00 includes:

1. Manual to interface to the most popular PROM Programmers (i.e. Data I/O) and the documentation on how to use the programs included in this package.
2. DC-100 tape with 2 programs "PRMBLD" and "RMXFER".
3. Adapter socket to allow EPROMs to fit the PROM programmers.
4. ROM Pack parts kit (020-0101-00) which includes 2 socketed EPROMs, Latch bar and blank label. This kit can be ordered separately from the accessory kit to provide additional EPROMs.



FFT calculated by 4041R03 Signal Processing ROM Pack.

4041R03

The 4041R03 Signal Processing ROM Pack provides eighteen mathematical operations that are either essential or convenient for advanced signal processing and data analysis applications.

The 4041R03 allows you to perform the basics of waveform analysis. Some of the more powerful functions provided are; FFT, IFT, CORRelation and CONVoLution.

The 4041R03 has features for doing Pulse Parameter measurements such as: array functions for providing minimum, maximum and finding the crossing point of user specified threshold value. Also array MEAN values can be found and used to compute the RMS value of the array.

Signal Processing commands include:

AMAX: finds the maximum element of an array.

AMIN: finds the minimum element of an array.

CONVL: convolves two input arrays, placing the results in a third array.

CORR: correlates two input arrays, placing the results in a third array.

CROSS: finds the location of a specified level within an array.

DIF2: performs a two-point differentiation of an array.

DIF3: performs a three-point differentiation of an array.

FFT: computes the Fast Fourier Transform of an array, placing the results in the same array.

IFT: computes the Inverse Fourier Transform of an array, placing the results in the same array.

INLEAV: interleaves two arrays, one containing real and one containing imaginary components, into one array of FFT data.

INTEGRAT: integrates an array.

INTERP1: reconstructs the value of an array at a selected location, using a windowed SIN (X)/X time-domain convolution.

MEANSTDV: computes the arithmetic mean and standard deviation of an array.

POLAR: converts an array of FFT data from rectangular form (reals and imaginaries) to polar form (magnitude and phase).

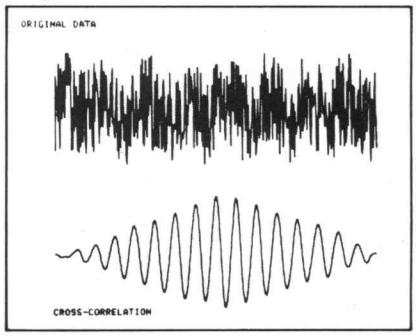
POLAR2: converts two arrays of data from rectangular form (one array of reals, one array of imaginaries) to polar form (one array of magnitude data, one array of phase data).

RECTANG2: converts two arrays of data from polar form (one array of magnitude data, one array of phase data) to rectangular form (one array containing reals, one array containing imaginaries).

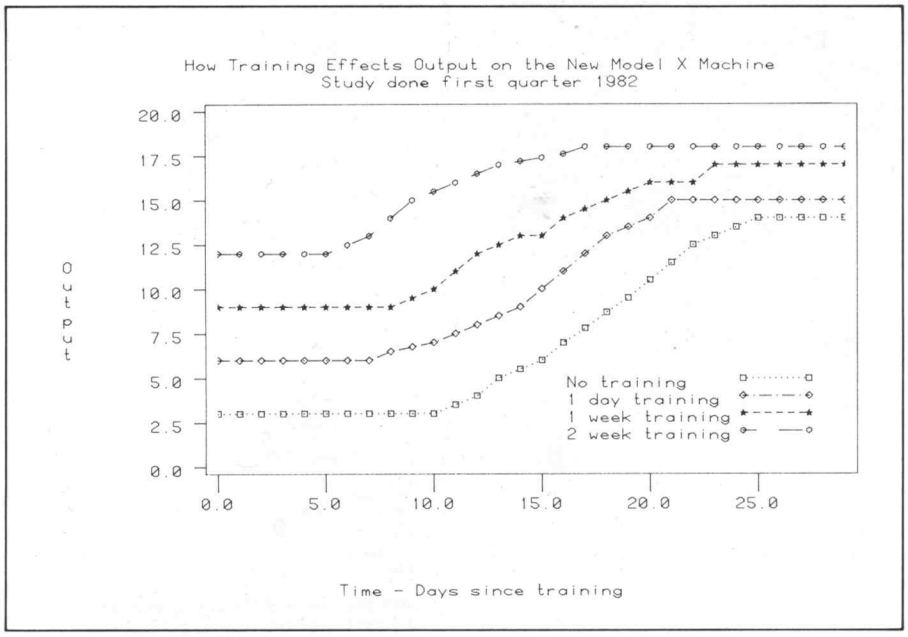
TAPER: multiplies an array by a cosine window of selectable tapering weights. When tapering is selected to be 50%, the TAPER function provides a Hanning window.

UNLEAV: sorts an array of interleaved FFT data into two arrays, one containing real and one containing imaginary components.

User Memory Required:
8 bytes



Correlation results.



Plot derived by 4041R02 Plotting ROM Pack.

4041R02

The 4041R02 Plotting ROM Pack allows you to make graphs and charts of user data.

The 4041R02 Plotting ROM Pack requires that the user have installed the 4041R01 Graphics ROM Pack. Like the 4041R01, the 4041R02 can be used with any terminal that uses Tektronix 4100, 4010 or 4020 Series-compatible graphics codes, or with any plotter that uses Tektronix 4660 Series-compatible graphics codes.

Included in the 4041R02 Plotting ROM Pack are automatic plotting commands, override commands, and annotation commands.

Automatic plotting commands can be divided into two categories: plot commands and add commands.

Plot commands, given a set of data, draw a set of axes and tic marks, plot the data, and write a user-specifiable legend describing the graph. The locations of the tic marks on the axes can be determined by the program or specified by the user.

Plot commands include:

XYPLOT: draws an axis, plots data in one source array (x) against the other source array (y), and optionally labels the resulting graph.

YPLOT: draws an axis, plots data given as a y-array against a constantly increasing or decreasing x-value, and optionally labels the resulting graph.

Add commands add plots to a graph previously drawn using a PLOT command.

Add commands include:

XYADD: plots one source array (x) against the other source array (y) on an existing axis. Optionally labels the new curve on the graph.

YADD: plots data given as a y-array against a constantly increasing or decreasing x-value, and optionally labels the new curve on the graph.

Override commands affect the way the automatic plotting commands plot data. **ALL** override commands may also be questioned as to their current values using the ASK keyword, for example:

ASK_YRAN, YSTART, YSTOP

Override commands include:

XRANGE: specifies the range of x-values to plot.

YRANGE: specifies the range of y-values to plot.

XTIC: specifies the starting value and increment of tic marks on the x-axis.

YTIC: specifies the starting value and increment of tic marks on the y-axis.

XLOG: specifies whether the x-axis should be a linear or a logarithmic scale.

YLOG: specifies whether the y-axis should be a linear or a logarithmic scale.

XGRID: specifies whether tic marks should be extended from the x-axis to form a grid.

YGRID: specifies whether tic marks should be extended from the y-axis to form a grid.

XLABEL: specifies labels to use along x-axis with next XYPLOT or YPLOT command.

YLABEL: specifies labels to use along y-axis with next XYPLOT or YPLOT command.

LEGEND: specifies the location of the upper left-hand corner of the legend box.

SYMBOL: specifies the symbol to use to mark data points on the graph, as well as the frequency with which data points are displayed.

OFFSET: specifies starting x-value and x-increment to use with YPLOT and YADD commands.

GRESET: restores all plotting parameters governed by override commands to their default values.

Annotation commands are used to annotate the graph.

Annotation commands include:

TITLE: writes a title above the graph.

SUBTITLE: writes a title below the main title above the graph.

XTITLE: writes a title below the x-axis.

YTITLE: writes a title to the left of the y-axis, written vertically from top to bottom.

User Memory Required:
0 bytes

4041 ROM packs Common Characteristics

Temperature
Operating: 32 to 130 degrees F (0 to 55 degrees C)
Non-Operating: −40 to 165 degrees F (−40 to 75 degrees C)

Altitude
Operating: 15,000 ft. (4.5 km)
Non-Operating; 50,000 ft. (15 km)

Humidity
Operating: 85% max. non-condensing.
Non-Operating: 95% max. at 150 degrees F (65 degrees C)

Static Immunity
Installed: 15kV
Non-installed: No immunity.

Vibration
Less than 0.025 inch (0.64 mm) p-p amplitude.

Packaged Transportation
Meets NSTA requirements for packaged shock and vibration.

EMI
Meets FCC Part 15, Subpart J, Class A requirements, and VDE 0871, Class B requirements.

Physical Specifications (with latchbar)
Length: 3.5 in. (8.89 cm)
Width: 1.05 in. (2.67 cm)
Height: 0.35 in. (0.89 cm)
Weight: 0.564 oz. (16.1 g)

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