

EPC LABORATORIES MODEL ADS-640
REVISION 2.1 SUPPLEMENT TO MAIN MANUAL P/N 222218

SCOPE:

This document is to detail recent changes made to the ADS-640 Data Acquisition System code that are not covered in the main manual. Where possible, diagrams of menu screens and operational examples will be provided to clarify how this product differs from its predecessor.

GENERAL:

There have been five main changes made to the ADS-640 system software. These enhancements were provided to improve general operation and to make the unit a more effective deep-ocean tool. The general areas where the modifications were made are as follows:

1. **KEY / PRINT PROGRAM** – Added ten-step key and gate function to provide compatibility with EPC 9800 Series and older electrostatic recorders.
2. **10.000 SECOND TIME BASES** – Scan, Key, and Delay ranges increased to 10.000 seconds for deep-water seismic applications.
3. **IMPROVED FILE HANDLING** – Previously, all data files were stored in the root directory of the active drive. A target "DIRECTORY" item was added to provide access to the entire disk and directory system. The software can also run on a regular PC, providing playback of data on standard workstations and across PC networks (in which drive letters are mapped).
4. **ACCESS TO FUTURE FUNCTIONS** – Several menu items were added to provide access to the forthcoming Analog Interface Upgrade. This upgrade, scheduled for April of 1998, will provide a rich set of tools for analog signal processing.
5. **ADDITIONAL SERIAL COMMANDS** - For Scan Rate, Key Rate, Delay and Message Margins.

KEY PRINT PROGRAM FUNCTION:

The Key / Print Programmer was added to provide compatibility with older equipment. This function, sometimes called a Ten Step Program or Key / Gate Program, allows the operator to define an asynchronous series of Key Pulse and Print cycles for correlating multiple signals in the water column. Each step in the series can be one of four possible actions:

1. K – KEY PULSE: On a 'K' step, a key pulse is sent from the KEY OUT jack to the sonar equipment. No data is generated or stored.
2. P – PRINT CYCLE: On a 'P' step, the key pulse that would normally be sent to the sonar equipment is *gated* and only a sweep occurs. The scan line of data is always stored but may or may not be displayed, see the comments in the section below.
3. B – BOTH: On a 'B' step, a key pulse is sent to the sonar equipment and a line of data is generated for storage/display.
4. X – IDLE CYCLE: On an 'X' step, nothing happens. No key pulse is sent, and no line of data is generated.

The period between steps is determined by what the A-KEY RATE control is set to. If the key rate is set for 1.000 seconds each step will occur 1.000 seconds apart. In the following example, assume that the A-KEY RATE control is set to 1.000 seconds, the A-SCAN RATE control is set to 0.500 seconds, and the A-DELAY control is set to 0.000 seconds. The program entered into the 10 STEP PGM field is a six-step program – **KPKKXP**.

TIME	STEP #	ACTION
0.000	1	K CYCLE – FIRST KEY PULSE IS GENERATED – PROGRAM STARTS
1.000	2	P CYCLE – SWEEP OF DATA STARTS
1.500	2	P CYCLE – SWEEP ENDS, LINE IS DISPLAYED AND STORED
2.000	3	K CYCLE – SECOND KEY PULSE IS GENERATED
3.000	4	K CYCLE – THIRD KEY PULSE IS GENERATED
4.000	5	X CYCLE – IDLE CYCLE, NOTHING HAPPENS
5.000	6	P CYCLE – SECOND SWEEP STARTS
5.500	6	P CYCLE – SECOND SWEEP ENDS, LINE IS DISPLAYED / STORED AND PROGRAM IS OVER
6.000	1	K CYCLE – PROGRAM BEGINS AGAIN...

During the sequence of a given program, the progress of that program can be seen in the 10 STEP PGM field. As each step occurs, the character that represents the step is highlighted in reverse video. As each 'P' cycle passes, the line of data that has just been generated may or may not be displayed, depending on other settings in the system. **If you wish to see the data displayed every time a 'P' step occurs, make sure that the DSPLY STEP field is set to 1 and that the SKIP function is set to OFF (SKIP OFF).** In this configuration, the menu may look similar to the illustration below (fig 1):

DATA LOGGING: DISABLED	GPS TIME	PRINTER: 10865 (OFF)
10 STEP PGM: KPKKXP	GPS DATE	ATTRIBUTES: OFF
PING NUMBER: 0/0	LATITUDE	DSPLAY STEP: 1 (SKIP OFF)
CURRENT FIX: 1086	LONGITUDE	LINE REPEAT: 1

The DSPLY STEP control (formerly PLAYBK RATE) sets how many lines of data must be spooled before scrolling the image on the screen. Taking larger steps improves system throughput and playback rate. The SKIP function is a decimation algorithm for maintaining image aspect ratio. Both of these principles are discussed in greater detail in the main manual.

There are thousands of timing possibilities between the key-print programmer, the scan rate, the key rate, and the delay. EPC Labs assumes that the operator understands the use of this function and what constitutes a valid program. There is no mechanism for preventing the operator from entering an invalid set of conditions.

KEY-PRINT PROGRAM OPERATION:

A KEY-PRINT PROGRAM may be entered from the keyboard of the ADS-640, or sent as a remote command over the RS-232 port labeled EXT GPS. Keyboard entry only allows for valid characters to be entered to create a program string no longer than ten steps. The RS-232 command is parsed for invalid steps and invalid length. If an error is found in the string, the update is aborted and the setting is switched to "OFF" (normal B cycle operation).

The Serial Command Protocol for the ADS is covered thoroughly in Section 2.8.5 of the main manual (page 2-35). The explanation of the command below assumes you have read the section in the manual. To implement a KEY-PRINT program over the serial port, send the command using the following syntax:

TSP *program*<CR><LF>

Where ***program*** is a string no more than ten characters (steps) long, only containing the capitalized ASCII characters:

K (0x4B)
P (0x50)
X (0x58)
or
B (0x42).

The *TSP* header stands for Ten Step Program. The program can be disabled by sending an invalid command, such as – **TSP 0<CR><LF>**

FILE HANDLING FUNCTIONS:

Previous versions of the ADS-640 counted on all file handling to occur in the root directory of either the C: or D: drives. This scheme proved to be rather inflexible, especially on surveys generating many short files (lines) of data in a day. For this reason, EPC implemented a DIRECTORY selection from the program screen (fig 2).

DATA INPUT : STANDBY	A-SCAN RATE : 0.500	B-SCAN RATE : 0.100
FILE NAME : DATAFILE	A-KEY RATE : 1.000	B-KEY RATE : 0.125
DIRECTORY : C:\EPC	A-DELAY : 0.000	B-DELAY : 0.000
CHANNEL : A ONLY	A-SWEEP DIR: FORWARD	B-SWEEP DIR: FORWARD

The purpose of this function is to allow the operator to select the drive and directory where data will be acquired to (or played back from). The FILE NAME field still works the same way. Please review sections 2.5.4.1 (pg. 2-16) and 2.6.1 (pg. 2-18) in the main manual for an explanation of the FILE NAME field.

OPERATION OF DIRECTORY CONTROL:

The use of the DIRECTORY control assumes that the operator understands the DOS PATH statement in the AUTOEXEC.BAT file. This file resides in the root directory (C:\) on the C drive and can be edited by typing:

EDIT AUTOEXEC.BAT <ENTER>

In that file, there is a line that could look similar to the following:

PATH=C:\;D:\;C:\;MYFILES;N:\;

All possible file paths separated by a semicolon (;). To add available directories to the scroll list on the ADS menu, simply add paths to the path statement, separating each one by a semicolon. The ADS Program will read up to 20 different paths and ignores any path statement that is longer than 20 paths or 80 characters. If a network drive is mapped in your system, it can be added to the path as well. The ADS does not observe the "REM" statement found in DOS. If a path statement has been "REMed" out prior to the desired path, the wrong path will be loaded. The desired path should always appear first in the AUTOEXEC.BAT file.

After editing the path statement (from the DOS command line), there is no need to reboot. The ADS program reads the AUTOEXEC file each time it is started. As the program starts, it will load the path information into the DIRECTORY

control. As an operator scrolls through the available directories, the ADS code checks to see if the directory and drive are available. If the drive is not ready, or the directory does not exist, that path will be skipped in the scroll list. Once a drive or directory becomes available, the option will then reappear in the scroll list. This is useful if the removable "D" drive spins down into power save mode. Simply ejecting and re-inserting the disk will bring it back onto the DIRECTORY scroll list.

There are only 13 characters available to show the active path on the menu. For directory paths that are longer than 13 characters, the path is abbreviated. The first three characters are displayed (for drive designation), followed by a tilde character ('~'), and the last nine characters show up (for destination directory). At any point, the ALT-L key sequence can be used to display the entire path, with a directory listing, and pertinent version information.

ADDITIONAL SERIAL COMMANDS

There are four new serial commands in software revision 2.1 that were not included in revision 2.0.

SCN x<CR><LF> x= 0.005 – 10000

KEY x<CR><LF> x= 0.030 – 10000

The ADS can accurately put out a 0.030ms Key-Pulse but may not be able to update the display or record the data that fast.

DEL x<CR><LF> x= 0 – 10000

MAR x<CR><LF> x= 0 – 2047

This value represents a pixel count. For example a value of 1024 would place the message in the middle of the display.

SYSTEM REQUIREMENTS:

ON THE ADS HARDWARE, DO NOT DELETE ANY OF THE ORIGINAL FILES IN THE ROOT DIRECTORY (C:\). THESE FILES ARE REQUIRED FOR THE SPECIFIC ELECTRONICS THAT ARE INSTALLED IN THE ADS.

ON SHUTDOWN THE OPERATOR SHOULD ALWAYS EXIT TO THE OPERATING SYSTEM USING THE ALT-X KEY SEQUENCE, PRIOR TO TURNING THE POWER OFF. THIS WILL INSURE PROPER DATA STORAGE AND PRESERVE THE INTEGRITY OF THE FILE SYSTEM. THE ADS CAN BE RE-STARTED FROM THE COMMAND LINE BY SIMPLY TYPING:

ADS<ENTER>

The only platform the ADS software can actually acquire data on is in the ADS hardware. For playback purposes, however, the ADS.EXE program can be run on any modern PC running DOS 6.0+ or WIN95+. **If any analog functions are executed, the program will perform I/O around the address 0x240. This may cause conflicts with peripheral adapters installed on the host system. During such operation, hardware interrupt vectors for IRQ5 and IRQ7 are re-directed. Software interrupt handlers for the PRTSCR key and DOS critical disk errors (Abort, Fail, Retry...) are also redirected. On proper program termination (using the ALT-X) key sequence, all original interrupt vectors are restored.** Because the ADS system code routinely performs register level I/O, it is not a good program to run on a Windows NT platform. This scenario has not been tested, but EPC Labs does not recommend such operation.

FILE SYTEM:

As mentioned in the previous section, the ADS hardware requires that certain device driver files be maintained in the root directory. The original AUTOEXEC.BAT and CONFIG.SYS should not be modified from their original content, with the exception of the PATH statement in the AUTOEXEC file. If the ADS program is being used for playback on a different host system, that system should have a reasonable disk caching mechanism or operation may seem slow.

The ADS program looks for certain support files during operation. These support files control what default configuration gets loaded and from which directory it is loaded from. Generally speaking, the support files are small, less than 200 bytes, and are plain text files. If one or more support files cannot be located on startup, they are created in the current working directory. The following list describes these files:

- DIRECTORY.ADS – Default directory information file. This file stores the name of the last drive and directory that the ADS program accessed. This file is always located in the same directory that the ADS.EXE program is running in.
- STARTUP.ADS – Default configuration file. This file stores the name of the last configuration file that the ADS program used. A configuration file stores the information about how all menu items are configured for a given data set. There can be many STARTUP.ADS files – one is stored in each of the directories that the ADS code accesses. When the ADS program returns to that directory, it loads the last configuration that was used in that directory.
- KEYPRINT.ADS – Default KEY PRINT PROGRAM information file. This file works the same way the STARTUP.ADS file works. It, however, stores the most recently used KEY PRINT PROGRAM for a given directory. This information is general to the directory, and not specific to any configuration file in that directory.

The other files that the ADS works with are described in paragraph 2.6.3 (pg. 2-23) in the main manual.

INACTIVE MENU ITEMS:

In Release 2.1 of the ADS code, there are several inactive menu items. These menu items will become active with the installation of EPC's next generation Analog Interface Board. This will be a purchased upgrade and will be paired with a new release of the ADS code (R3.X). The following controls currently have no effect on the operation of the system.

B-KEY RATE	A-BANDPASS	B-BANDPASS
B-SCAN RATE	A-HIGHPASS	B-HIGHPASS
B-DELAY	A-LOWPASS	B-LOWPASS
B-SWEEP DIR	A-TVG SLOPE	B-TVG SLOPE

EPC apologizes for any confusion generated by these inactive items. Development of these features is in process and an upgrade should be available in April of 1998.