

EPROM PROGRAMMER USERS MANUAL

Manual Revision 1.0

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EQUIPMENT MONITOR AND CONTROL

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PRIMER EPROM PROGRAMMER

INTRODUCTION

The PRIMER EPROM PROGRAMMER can read, burn, and copy 8-bit EPROMs up to 64K bytes. The programmer interfaces to a PC through the RS-232 port which provides a full menu driven interface. The PRIMER EPROM PROGRAMMER can receive and generate standard INTEL hex files for burning and saving EPROM data. Another nice feature of the PRIMER EPROM PROGRAMMER is ZAP. ZAP has the ability to burn a custom PRIMER application and all of the MOS service functions into an EPROM.

SETUP

- 1) The PRIMER must be equipped with standard (E600-10) or deluxe (E600-11) upgrade.
- 2) The PRIMER must be equipped with either MOS ver 2.7 or later or EMOS ver 2.0 or later.
- 3) The OJ3 jumper on the PRIMER must be placed in the A position
- 4) Connect the EPROM PROGRAMMER board to the PRIMER following the diagram provided.
- 5) Connect the PRIMER to a PC running terminal emulator software, using the RS-232 cable provided with the PRIMER
- 6) Configure your communications software for 8 start bits, 1 stop bit, and no parity on the appropriate COM port. Set the appropriate baud rate on the PRIMER and PC terminal program. Refer to the section on PROCOMM for more information.
- 7) Power up the PRIMER
- 8) Press FUNC then 4" on the PRIMER
- 9) The Main program menu should appear on the terminal at this time
- 10) Reset the PRIMER when through running the EPROM PROGRAMMER

DESCRIPTION OF COMMANDS

After entering the EPROM PROGRAMMER function you will see the main menu. The main menu options are described as follows.

AUTO:

The AUTO command does 3 commands in one. It does an ERASE CHECK, a BURN, then a VERIFY. If the device is not erased it will not attempt to burn and a message will be displayed.

BURN:

The BURN command prompts the user for a starting address and the number of bytes to burn to the target EPROM. If the EPROM burns successfully a NO ERRORS DETECTED message will be displayed. If a burn problem was encountered a EPROM ERROR message will be displayed.

CLEAR MEMORY:

The CLEAR MEMORY command writes FF's to RAM, which represents a blank EPROM. Use the CLEAR MEMORY command to clean up the RAM before loading a file or reading an EPROM.

DUMP:

The DUMP command allows you to display the contents of RAM. The user is prompted for a starting address and number of bytes to view. The data is then displayed a page at a time. The address is not the true system RAM address. It is referenced to the addresses of the target EPROM. It is possible to view data outside of the EPROM limits. This data is not valid, therefore, the user must keep in mind the size of EPROM in question. When working with the 64k HI EPROM the valid addresses for viewing

are 8000H to FFFFH.

ERASE CHECK:

The ERASE CHECK command checks the entire EPROM for a blank state. This is even true for a 64k EPROM regardless of the HI or LO type selection. A `DEVICE ERASED` message will be displayed if the device is erased.

LOAD MEMORY:

The LOAD MEMORY command is used to load a file to be burned to an EPROM into RAM. After selecting this command a `READY FOR UPLOAD` message will be displayed. At this time you can download an INTEL HEX file using an ASCII communication format. If an error was encountered during the download a message will be displayed. The messages are `NON-HEX CHARACTER ENCOUNTERED`, `CHECK-SUM ERROR`, or `ESCAPE CHARACTER ENCOUNTERED`. If the download was successful a `UPLOAD COMPLETE` message will be displayed. The type should be selected before a file is loaded. Refer to the section entitled `Communications using Procomm`

MODIFY MEMORY:

The MODIFY MEMORY command allows the user to modify the data in RAM. After selecting this command the user is prompted for a starting address. The selected address and its data are then displayed. The address is not the true system RAM address, it is referenced to the target EPROM address. If this byte needs to be modified, just type in the new hex value otherwise just press ENTER. The next consecutive address and its data will then be displayed for further editing. The cycle continues until the ESC key is pressed.

READ EPROM:

The READ EPROM command allows the user to load the data from EPROM to RAM for editing, viewing, or copying an EPROM. The user is prompted for the starting address and number of bytes to read.

SEND FILE:

The SEND FILE command generates an INTEL hex file from data in RAM and sends it to the terminal using the ASCII format. The user is prompted for the starting address and number of bytes to send. Refer to the section entitled `Communication using Procomm`

TYPE SELECT:

The TYPE SELECT command allows the user to select the size and programming voltage for the target EPROM. This command should be the first command that is executed. The default value is a 32K, 12.5V EPROM.

VERIFY:

The VERIFY command compares what is in EPROM to what is in RAM. The user is prompted for a starting address and number of bytes to verify. If the RAM and EPROM match within the area tested, a `NO ERRORS DETECTED` message will be displayed. If a mismatch occurred then a `EPROM ERROR` message will be displayed.

ZAP:

The ZAP command allows the user to burn a custom program as well as the MOS service calls into an EPROM. A type 2 (32k, 12.5V) EPROM must be selected for ZAP. Refer to the PRIMER self instruction manual for more information on ZAP.

HELP:

The HELP command redraws the main menu.

STEPS FOR BURNING A FILE TO EPROM

- 1) Select the type of EPROM (TYPE SELECT)
- 2) Install the target EPROM
- 3) Load the HEX file to memory (LOAD MEMORY)
- 4) Make sure the EPROM is erased (ERASE CHECK)
- 5) Program the EPROM (BURN)
- 6) Verify the EPROM (VERIFY)

STEPS FOR COPYING AN EPROM

- 1) Select the type of EPROM (TYPE SELECT)
- 2) Clear the memory (CLEAR MEMORY)
- 3) Install the EPROM to be copied
- 4) Read the EPROM (READ)
- 5) Install the target EPROM
- 6) Make sure the EPROM is erased (ERASE CHECK)
- 7) Program the EPROM (BURN)
- 8) Verify the EPROM (VERIFY)

BURNING A 64K EPROM

To burn a 64K EPROM, it must be done in two steps. The PRIMER EPROM PROGRAMMER treats the high half and the low half as two separate EPROMs. The following procedure should be used to split a 64K source file .

- 1) Assemble the source code as normal then examine the listing file.
- 2) find the location where the address is 8000H
- 3) Edit the source code by deleting everything beyond 7FFFH then save the remainder as a .LOW file.
- 4) Edit the original source code again. This time delete everything below 8000H. Place an ORG 8000H statement at the beginning of the remaining source code and save as a .HI file.
- 5) Assemble each file separately

COMMUNICATION USING PROCOMM^(R)

Procomm is a powerful full featured communication software package that is ideally suited for use with the PRIMER. New users of Procomm are granted a temporary license to use the software. If after a period of time you determine that Procomm fills your needs, contact Datastorm Technologies, Inc. P.O. box 1471, Columbia, MO 65205 for ordering information. Procomm runs on IBM PCS and compatibles, using COM ports 1 - 4 at baud rates of up 19,200 baud. As mentioned above Procomm has many features some of which will not be addressed in this document. It is recommended that any user intending on using Procomm read the user manual included on the distribution disk.

SETTING UP PROCOMM FOR USE WITH THE PRIMER

Procomm is distributed on a IBM compatible high density floppy disk. For most efficient use of the program, it is recommended that Procomm be installed on a hard drive if available (see Procomm documentation). If a hard drive is not available Procomm can be run from floppy by typing PROCOMM.

Once Procomm starts running acknowledge the copyright by typing any key. At this point the LINE SETTINGS menu can be accessed by typing <ALT> P at the same time. The line settings menu allows you to configure Procomm to match the settings on the PRIMER. Normally options 11 or 12 would be selected from the LINE SETTINGS menu. These options constitute 9600 or 19200 baud, no parity, and 1 stop bit. NOTE: the baud rate must match the baud rate on the PRIMER system. Next, select which COM port will be used for communication with the PRIMER. Normally option 20 (COM1) would be selected; however, If your PC has a mouse or a modem then it may be necessary to use COM2 for communication with the PRIMER. Remember: the COM port chosen must be the COM port that the PRIMER is connected to. After selecting the COM port, press <ESC> to exit the LINE SETTINGS menu.

The next step is to set up PROCOMM. This can be accomplished by typing <ALT> S at the same time which will display the SETUP menu. Once in the SETUP menu, select option 6 (ASCII TRANSFER SETUP). Selecting option 6 will take you to the ASCII TRANSFER SETUP menu. This menu is correct for PRIMER communication in its default settings. The default settings should be as follows:

- 1) Echo locally..... NO
- 2) Expand blank lines..... YES
- 3) Pace character.....0
- 4) Character pacing..... 15
- 5) Line pacing..... 10
- 6) CR translation..... NONE
- 7) LF translation..... STRIP
- 8) CR translation..... NONE
- 9) LF translation..... NONE

After making the necessary selections press <ESC> to exit to the SETUP menu. At the SETUP menu select option S for Save and Procomm will then save the selected options to disk. Once saved, configuring Procomm will no longer be required for future communication sessions. After saving press <ESC> to exit to the terminal mode of operation.

PROCOMM TERMINAL MODE

In the terminal mode of operation Procomm is acting like a dumb terminal, that is sending keystrokes to the PRIMER and displaying any information from the PRIMER to the display. If your PRIMER is powered up and the communication cable is connected to the correct COM port, the PRIMER should be on-line. Typing <ENTER> should cause the PRIMER to display the system prompt. Procomm is usually in the terminal mode except when setting up or doing some other special operation. These special operations are listed by typing the <ALT> <F10> keys at the same time. To exit the terminal mode, which also exits the program, press the <ALT> X keys at the same time and answer YES to the prompt.

USING INTEL HEX FILES

The PRIMER allows the uploading and downloading of INTEL hex files. An INTEL hex file is an ASCII file that contains all of the memory information from some starting address to some ending address. The address information and the memory information are contained together, along with checksums, to verify each line of the file. INTEL hex files are usually generated by assemblers and some compilers.

If the user has access to an 8080/8085 assembler (available from EMAC) that generates INTEL hex files, it is possible to create an assembly language program, assemble it and upload the resulting INTEL hex file to the PRIMER using Procomm. This eliminates entering each hex code using the Edit command mode. After uploading, the program can be changed using the Edit command and then Downloaded back to the PC, saving the modified INTEL hex file to disk. This program can also be listed to the display in its INTEL hex form.

UPLOADING INTEL HEX FILES

In most cases the user will upload a program that was assembled on a PC or a program that was developed on the PRIMER which was downloaded to the PC to save the program. It is extremely important that the user uploads the program to the address where the program was originally developed. In the case of the assembler, the upload address is determined by the address chosen in the assembler ORG statement. It is highly recommended that all programs start at the same address to avoid confusion.

The steps necessary to upload from the PC to the PRIMER are as follows:

- 1) Choose the "Load memory" command from the PRIMER EPROM PROGRAMMER main menu.
- 2) Press <Pg Up>, this will take you to the UPLOAD menu.
- 3) Choose option 7, ASCII.
- 4) Enter the HEX file name of the file to upload. This will then put you back in Terminal mode.

The hex file will now start to upload and the PC should beep when through. The uploading procedure can be aborted at any time by typing <ESC> <ESC> (the escape key twice).

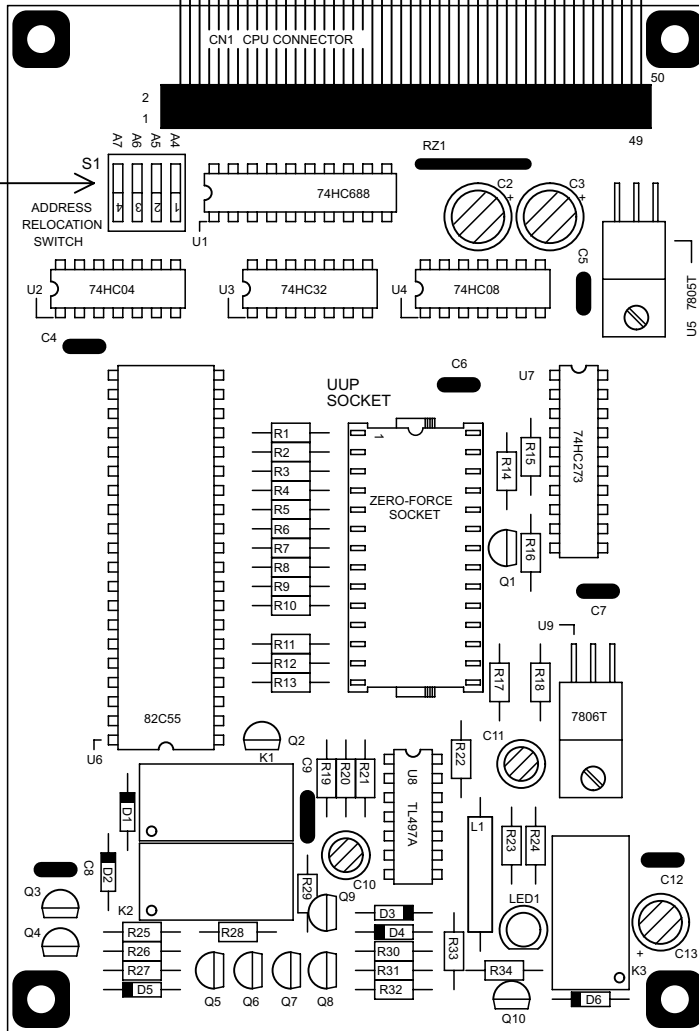
DOWNLOADING INTEL HEX FILES

Downloading an INTEL hex file is usually done in order to save a program that was created or modified on the PRIMER. The act of downloading allows the user to specify a portion of PRIMER memory to be written to a floppy or hard disk on the PC system. Once a program is saved on disk it can be uploaded at any time for executing or modification. The file created as a result of downloading is an ASCII file in INTEL hex file format.

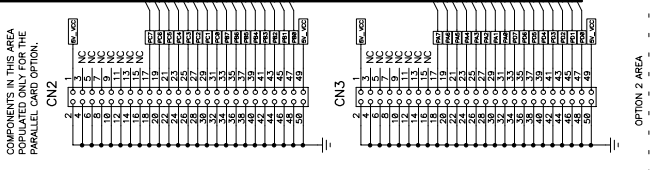
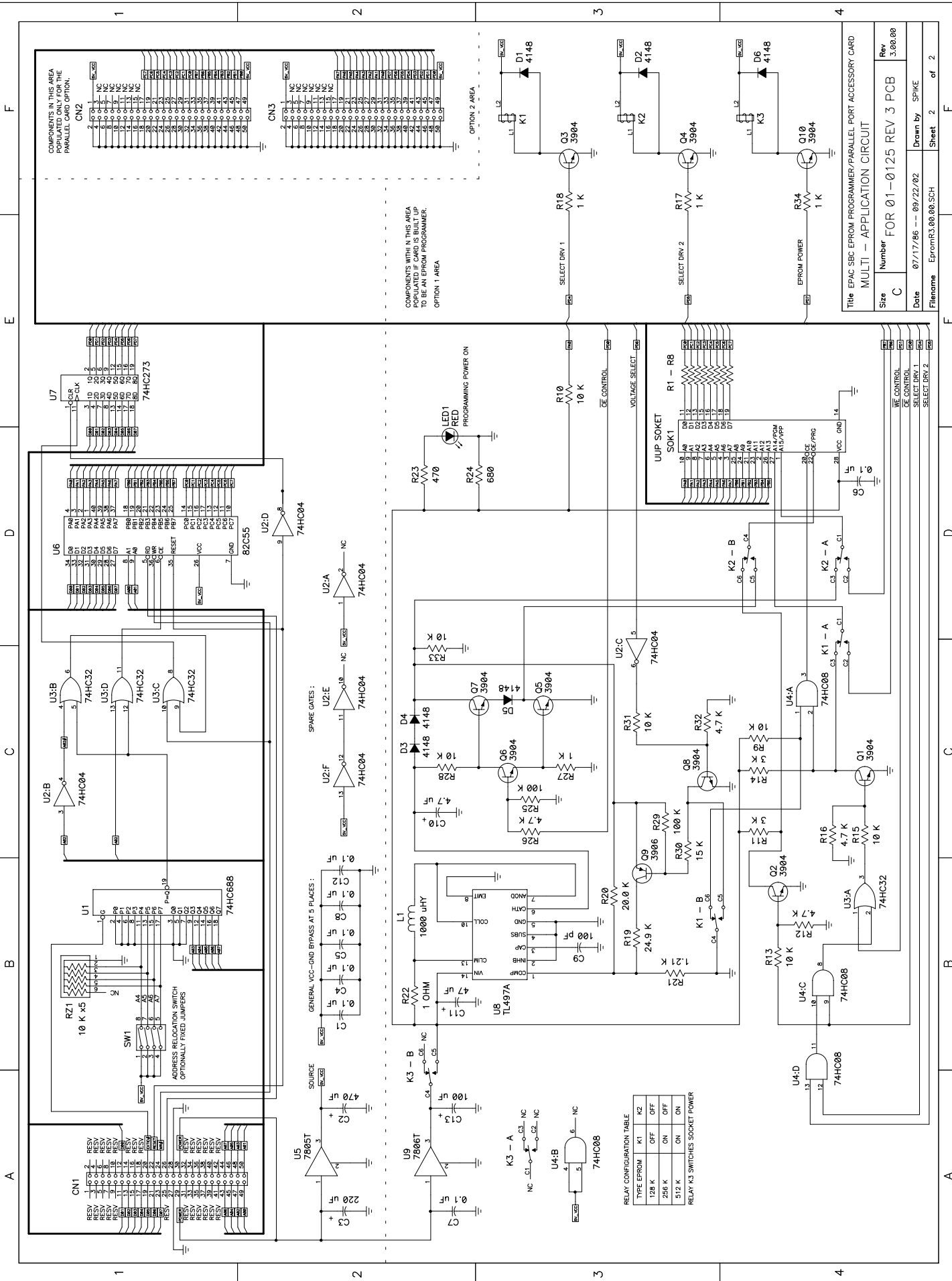
The steps necessary to download from the PRIMER to the PC are as follows:

- 1) Choose the "Send file" command from the PRIMER EPROM PROGRAMMER main menu.
- 2) Enter the STARTING ADDRESS, usually 0000H.
- 3) Enter the NUMBER of BYTES, usually the end of the program.
- 4) Press the <Pg Dn> key, this will take you to the DOWNLOAD menu.
- 5) Choose option 7, ASCII.
- 6) Enter the hex file name of the file that will be created by the download. This will then put you back in the terminal mode.
- 7) Press the <SPACE> key to start the download.
- 8) After the downloading is complete (the prompt returns), press the <ESC> key to signal Procomm that the download is complete. The downloading procedure can be aborted by typing <ESC>.

SET ADDRESS RELOCATION SWITCH S1 TO:
 A7-ON, A6-ON, A5-ON, AND A4-OFF
 FOR USE WITH EMAC'S SOFTWARE DRIVERS.



LED1 INDICATES THAT POWER IS APPLIED TO THE EPROM SOCKET.
 DO NOT INSERT OR REMOVE EPROMS WHEN LED1 IS LIT.



COMPONENTS WITHIN THIS AREA POPULATED IF CARD IS BUILT UP TO BE AN EPROM PROGRAMMER. OPTION 1 AREA

COMPONENTS WITHIN THIS AREA POPULATED IF CARD IS BUILT UP TO BE AN EPROM PROGRAMMER. OPTION 2 AREA

RELAY CONFIGURATION TABLE

TYPE EPROM	K1	K2
128 K	OFF	OFF
256 K	ON	OFF
512 K	ON	ON

RELAY K3 SWITCHES SOCKET POWER

Title EPROM PROGRAMMER/PARALLEL PORT ACCESSORY CARD
MULTI - APPLICATION CIRCUIT

Site C
Number FOR 01-0125 REV 3 PCB
Date 07/17/86 -- 09/22/02
Filename EpromR3.00.SCH

Rev 3.00.00
Drawn by SPIKE
Sheet 2 of 2