Model 9000 User's Manual
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***** READ THIS IF NOTHING ELSE *****

The end of the programming socket marked "bottom" locates the ground pin of the chip. This means that pin 12 on a 24 pin part goes at the bottom. So does pin 14 on a 28 pin part.

Apply AC power before putting devices into the programmer.

Do not attempt to read a masked ROM without checking to see if Vpp is applied during reads (Verify mode) for that part number.

See information about baud rates and cables if the 9000 fails to communicate.

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Chapter 1, Introduction

Congratulations. You now have, what we believe to be, the most cost effective and advanced eprom programmer on the market today. The design philosophy used on the GTEK, Inc. Model 9000 allows for simple future expansion of capabilities. All serial communications with the 9000 is in printable ASCII characters and it supports Intel hex and Motorola hex formats as well as simple block formats. Additionally, the 9000 supports the MCS–86 extended hex format, and Motorola's S record format with features for automatically split programming 2 Eproms for use in a true 16 bit data path. Resident features include facilities for making source to eprom content comparisons, erasure checks, formatted device listings, menu driven device selection, and more.

The 9000's interrupt driven type ahead buffer allows it to program and verify in real time, while data is being sent (transparent to the user, whose sole responsibility is to send and receive data).

Three user selectable algorithms are available, a standard 50ms program cycle with post verification, adaptive algorithms and Quick-Pulse™ algorithms. Adaptive algorithms may be either by Intel (inteligent™) or others such as Fujitsu® (Quick Pro™), Xicor®, Motorola, etc.

Adaptive algorithms typically offer a six fold improvement in programming time over the standard algorithm. QuickPulse algorithms are about 10 times faster on the 9000 over the GTEK, Inc. Model 7228 adaptive algorithms. Extended diagnostics pinpoint the cause of any errors.

Throughput is greatly enhanced by using parts which can be programmed with the QuickPulse algorithm. QuickPulse can program an Intel P27256 in 24 seconds. The adaptive algorithm can program the same part in 164 seconds. The standard algorithm, (if it were available for this part) would take 1638 seconds!

The Model 9000 may be used without handshaking, or with XON/XOFF or hardware CTS/DTR handshake. Baud rate selection is done automatically through your interface program or PGMX. The 9000 default baud rate is presettable for those not using PGMX (see appendix C).

PGMX is an optional interface program that runs on an IBM® PC®, XT®, AT® or PS/2® (all models) and allows you to read and program eproms on the Model 9000 at baud rates up to 57,600. Appendix B contains a cross–reference of Manufacturer versus menu selection to use for the (E)(E)Prom types that may be programmed by the 9000.

All voltages and pin configurations are set up by the onboard microprocessor and no personality modules are required. ROMs may be read safely only with certain eprom selections, such as i27512, i68766, F27C64, F27C256 and 27C32. See Appendix A.

Chapter 2, Getting Started Quickly

Note that when it says to insert a part in any of the below examples, you should put the part in the Textool® socket so that the notch on the part is towards the TOP of the 9000 where the handle is on the socket. The bottom of the socket (where pin 12 and 14 go) is marked “BOT-TOM”. AND close the handle!

Steps

First, apply power to the 9000. Always make sure that there is no chip in the socket on the 9000 before applying power. We suggest you use a power strip on a multiple outlet with an on-off switch to turn the power on to all your equipment at one time. You are less likely to damage any eprom that way. It doesn’t hurt to leave power applied to the 9000 for long periods of time, and it draws little power when idle.

When the 9000 boots for the first time during the day, and you run your interface program PGMX, your default eprom type will be null, and the default prompter will indicate “<xxxx>”. This reminds you to make an eprom type selection on power up. After that, whatever you have set for an eprom type will remain selected until the 9000 loses power or a new eprom type is selected.

Look up the eprom part number of the chip you will be programming in the appendix of this manual, or on the program disk.

The eprom part number will usually be prefixed with a manufacturers symbol or letters, with a number following, usually starting with a “27”, like iP27256 or MBM27C256. There may be a letter after the “27” number like 2764A or 2716B.

This letter will affect what menu selection to make for that eprom type, so always look for that extra letter! It will usually be an A, B or C. Determine the setting that will be used from the part listing in the appendix of this manual or from any lists on the program disk.

At this point, or at any time after you apply power to the 9000 for that matter, you can communicate with the 9000. Use the PGMX program to do this. See the section on PGMX for specific details on initializing PGMX and communications. If you can’t use PGMX on your computer for some reason, you can use any “terminal emulator” or modem program. You lose some convenience when you have to do this, but

all the same commands are available. See the Interfacing and Commands chapter. Also see the PGMX chapter. See Appendix C for default baud rates.

Remember that the menu selection of the part determines what "programming algorithm" is used and the "programming voltage". The programming algorithm is the set of instructions built into the 9000 that determine what voltages to put where, when. The programming voltage is the level of elevated voltage that is to be applied to the pin selected by the programming algorithm.

Remember also that selection of the wrong part number might cause you to destroy your eprom.

Set the eprom menu selection (while communicating with the 9000 with PGMX) by typing the letter M plus the letter indicated by the selection. If you already know what part you are using but forgot what selection to make, type M plus a <cr> to get a menu of parts to select from. Make sure you know what you are selecting if you use the M<cr> method of selecting parts. It is easy to find say a 27128 in the menu, but if you don't know that there are 3 different types of 27128's then you have a 33% chance of making the right selection. As it turns out, there are 3 selections for 27128; the first uses 21 volts. The second uses 12.5 volts, and the third uses the 27256 algorithm and 12.5 volts (National® 27CP128). If you know your part uses 12.5 volts, you can simply make that 12.5 volt 27128 selection (if you know which selection is the 12.5 volt part, selection "2" in the case of a 12.5 volt part and not "F").

Once the menu selection is made, it will stay that way until you lose power or you make another selection.

If the Busy led is off, you may now load the 9000 with your part.

Caution!

If the Busy led is on, power is applied to the socket, and removing or installing an eprom at that time will damage it and/or the 9000. Always make sure the power is on and the Busy led is OFF before removing and installing an eprom.

Now you can check the part to see if it is blank. You don't have to do this, but if an error occurs during programming you will wonder whether or not the part was really erased or not.

To verify through PGMX, type the letter U and then return(<cr>). This will cause the 9000 to check the entire part. If you only want to check part of it, type the letter U and then the starting and ending addresses to check. The Busy led will come on indicating that the 9000 is doing something. After a short period of time, the Busy led will go off. If the eprom is not erased, the 9000 aborts to the command mode with an error message *NE ERR @nnnn, where nnnn is the address that contains data. The 9000 will return to the command state without issuing any error message if the part is blank.

Type Control – F (hold down the control key and press the letter F) and you will get a prompter to enter command line. A minimum command line consists of a <cr>, which will return you to the 9000 commmand prompter. To program a file, the minimum command line would consist of a filename and a <cr>. You can also specify options on the command line, but probably not when you are programming manually like this.

To program from an Intel Hex file from the Control–F "enter command line" prompt, enter the file name (format: filename.HEX). You don't have to specify an extension unless you want to program from a BINARY file (format: filename.ext). In most cases it is probably an Intel Hex file you are using. Remember the interface program PGMX can't handle any other format than Intel Hex or Binary.

After you enter the filename, and you hit <cr>, PGMX will look for a file by the name you specified on the disk and begin sending it to the 9000. It will show only the load address that is being processed (in Ascii–Hex numbers), or the number of bits programmed in the Binary format (decimal numbers).

If an error occurs while programming any particular chip, PGMX will abort sending the file and issue the error message that was sent from the 9000. Control is returned to PGMX or DOS™ (depending on where you started from, in this case from PGMX).

See the Diagnostics section for Overload information.

At this point, you may then reload the 9000 and begin the process again.

Examples

Example to read a 2764 made by Hitachi® (21 volt pgm voltage) and then program an Intel 2764A. Remember that a 2764A is a 12.5 volt part and may as well be considered as a completely different part number even though generically (in operation) they are identical parts. BUT they don't program the same!!!

1. Apply power to the 9000 before you insert any parts.
2. Look for the part number in the appendix. It says to use Menu Selection number "E".
3. Communicate with the 9000 if you are not already (at the DOS prompt type PGMX<cr>). Type "ME" at the PGMX eprom prompt.
4. Insert the Hitachi 2764 into the Textool socket.
5. Press ^F (hold down the control key and press the letter F) to get the "enter command line —>" prompter and type:

```
Enter Command Line ––>FILENAME [R<cr>
```

   FILENAME is what you want the file to be called on the disk. It will automatically have an extension of ".HEX". <cr> means to press the "enter" or "return" (↵)key. "R" means to read the file in the Intel Hex format (OI to the 9000). PGMX will automatically open the disk file (if one exists already, it will not let you destroy it) and cause the 9000 to begin sending the content of the eprom in the Intel Hex format, which is then put into the disk file. When the 9000 has finished sending, PGMX will close the file and return you to the eprom type prompter.

6. Remove the Hitachi part and insert the Intel part.
7. **You must now change the eprom type!** Looking it up in the manual says to use "1" so type "M1" to select "q2764A>". It is ok to use the "q" or "i" (toggles) on any brand part (at the eprom type prompt), but you are more likely to get an error programming using the "q" in the prompter if it is not an Intel part. Since this example uses an Intel part, we won't change it, but if for instance it was a GI® or AMD® part, you might want to type "TI" to select the adaptive programming algorithm (i2764A) rather than the QuickPulse algorithm (q2764A).

8.

This part has to be blank, so press U<cr> to see if it is blank. If the part is not blank, an error message will be issued, like *NE err @00000 Repeat with another part until you find one that is blank.

9. If it is blank, press ^F (as before) to get the "enter command" prompter and type:

```
Enter Command Line -->FILENAME<cr>
```

This will cause PGMX to look for FILENAME.HEX on the disk and begin sending it to the 9000, which programs the part.

10. If the part fails during programming, an error message of what went wrong and the location (like *WP err @0000) will be issued. Otherwise, if programming is completed without any errors, the part is properly programmed AND verified at this point. You could have also issued a command to give you a checksum at the same time from the previous command line or you can type "TN<cr>" right now to get a checksum of the part.

```
Enter Command Line -->FILENAME [TN<cr>
or
<q2764A>TN<cr>
```

EXAMPLE

Example programming chips from within PGMX. When you are through programming from the previous example, you are returned to the 9000 command prompter. We will now program a number of Fujitsu 27C64s.

1. The menu command for the Fujitsu 27C64 is "O" (looking it up in the menu) but you can program that part adaptively (recommended by the appendix) by selecting "E".
2. Enter the following commands after inserting the part to be programmed. Type Control–F to enter the automation mode and enter your commands:

```
<q2764A>^F
Enter Command Line -->FILENAME [tn,u,me<cr>
```

In order, this sends the menu command "ME" and then the "U" command, programs the part from FILENAME, and then calculates a checksum of the part just programmed. The prompter will have changed to **<i2764>**_.

3. Part is now programmed. If there were any errors during the process, PGMX will abort with an error message back to the 9000 command mode. Be sure to look at the checksum to see if it is what it is supposed to be.
4. To repeat the process, insert a new part and type Control–F and then press the “F3” function key, which will give you the previous command line that was issued which was **FILENAME [tn,u,me**. Pressing <cr> now will cause the process to begin again.

You SHOULD read the rest of the manual to get specific details about some of the operations performed above, specifically the COMMANDS chapter, the DIAGNOSTICS chapter and the PGMX chapter.

Chapter 3, Commands

When you use the 9000 with PGMX there are 2 different forms of commands you can issue. One is for PGMX and the other is for the 9000. See the PGMX chapter for commands for PGMX. This chapter explains commands for the Model 9000.

PGMX also has 2 modes— the “interactive” mode and the “automation” mode. Interactive mode allows you to communicate with the 9000 to issue the following commands to the console, and the automation mode allows you to automatically issue some of these same commands in the proper sequence to the 9000 to “read” an eprom to a disk or program an eprom from a disk with various options. All of the commands listed for the 9000 can be issued interactively for PGMX. Commands that are handled automatically by PGMX (in the automation mode) in the paragraphs below, will have the word “automated” at the end of the explanation.

The following are the commands that can be used on the 9000. Most people that use PGMX will not have to use any of these commands except for the “Toggle” and “Menu” commands. All of the commands can be executed from most kinds of terminal emulators or modem programs.

: Intel Hex Program

When the model 9000 is in the command state, receipt of a colon is interpreted as the lead character in an Intel hex record. The 9000 automatically enters the program mode and programs the data contained in the hex record at the address specified in the header of the hex record. The check sum is verified at the end of the hex record and the model 9000 then returns to the command state but does not reissue the command prompter unless the record happened to be the END record. This is done in anticipation of another hex record, i.e., all characters from the hex file, sent to the Model 9000 will be echoed back to the user with no additions or deletions. Power to the programming socket is not turned off until an end record or error occurs.

If a data error, checksum error, or syntax error occurs during the file transfer, the 9000 will issue the appropriate error message and abort back to the command state.

See the section on toggles and hex formats for clarification on how to program two devices for device use on a true 16 bit data bus. The segment base address register, maintained by the 9000, is automatically cleared when the end record is detected, or if any other command is executed other than the Intel Hex command. Remember that you do not have to "split" a hex file if you have a 27210 (16 bit data path). AUTOMATED.

S Motorola Hex Program

This command works the same as the Intel Hex program command under other communication software, except that the format is the Motorola S record format. Records may be of type S0, S1, S2, S3 OR S9.

/ Tektronix Hex Program

This command works the same as the Intel Hex program command under other communication software. When the model 9000 is in the command state, receipt of a forward slash is interpreted as the lead character in a Tektronix hex block. The 9000 automatically enters the program mode and programs the data contained in the hex block at the address specified in the header of the hex block. The checksums are verified at the end of the hex block and the 9000 then returns to the command state but does not reissue the command prompter unless the block happened to be the termination block. This is done in anticipation of another hex block, i.e., all characters from the hex file, sent to the Model 9000 will be echoed back to the user with no additions or deletions.

P Block Program

Sending A "P", followed (optionally) by an ascii–hex address, and a valid delimiter puts the 9000 into the block program mode. Once in this mode, ascii–hex data to be programmed into the eprom is sent. The data may be a continuous stream of characters or groups of 2 characters (2 characters is 1 data byte to the 9000) separated by delimiters (space, comma, return, line–feed or dash).

This mode is terminated when you send the 9000 a dollar sign ($), or if an error occurs. Use this command to program one byte or a block of bytes at any given location. All characters are echoed back to the sender as they are removed from the buffer in the 9000, except for null, Xon and Xoff. As you program locations in order, the address is automatically incremented. The following example programs locations 444h and 445h:

Example:

```
<2716>P444,33 23$
<2716>_
```

This is PGMX's binary program mode. AUTOMATED.

R Block Read

Don't confuse this command with PGMX's "R" command. The R command, followed optionally by beginning and ending addresses, causes the Model 9000 to output a continuous string of ASCII–HEX characters between the specified addresses. If no addresses are specified, the 9000 will output the entire contents of the selected device. The R command may be aborted at any time by sending a dollar sign, "$", to the 9000. The following example uses the eprom programmed in the example of the "P" command. Example:

```
<2716>R444,445<cr>
3323
<2716>_
```

Note: The R command is primarily for automated reading of eproms. The above example will actually appear as the example below. The data output overwrites the command line unless your terminal is in an auto line feed mode. AUTOMATED.

Example:

```
33236>R444,445
<2716>
```

OI Intel Hex File Output

This command "reads" an eprom and sends the data in the Intel Hex format to the computer. The OI command has the same command syntax as the 9000's "R" command. It differs in that the 9000 will output the device contents as an Intel hex file, including the end record, between the specified addresses inclusive or if no addresses are specified, the entire device. Again, the command may be aborted if desired with a dollar sign, "$". AUTOMATED.

OM Motorola Hex File Output

This command functions precisely the same way the OI command does, except that the output is in the Motorola S record format.

OT Tektronix Hex File Output

This commandworks the same way as the OM and OI command does, except that the output is Tektronix hex format.

L List Formatted Output

The L command outputs data between optionally specified addresses, inclusive, in a formatted fashion similar to many dump utilities. If no addresses are specified, the entire contents will be listed and the command may be aborted with the dollar sign, "$". Each line of the listing includes the beginning address in Ascii–hex, sixteen data bytes in Ascii–hex and the Ascii representation of the data. Non printable bytes are replaced with periods in the ASCII representation field.
Example:

```
<2716>L90,AF<cr>
0090 4845 4C4C 4FFF FFFF FFFF FFFF FFFF FFFF HELLO.........
00A0 FFFF FFFF FFFF FFFF FFFF FFFF AA55 AA55 ..............
<2716>_ [prompter indicates end of command]
```

Note: Unlike the R, OI, OT and OM commands, the L command will output a carriage return and line feed at the beginning of the listing. This is because the L command is primarily used when the host is functioning as a terminal and it would be irritating to have the first line of the listing overwrite the command line. AUTOMATED.

U Unerased (Blank) Check

The U command checks an entire part for blank if a starting and ending address is not specified. If a part is not erased, an error message saying *NE err @nnnn will be issued with a return to the command prompter. An empty socket looks like a blank part unless you have one of the MCS-48™ family selected. The command can be aborted with a dollar sign, "$". AUTOMATED.

V Verify Erasure Check

The V command checks the cells between the optionally specified addresses for erasure, FF's or 00's as the device type dictates. If no addresses are specified, the entire device is checked. If a cell is not erased, a non–fatal error message is issued consisting of the data and the address. The process continues until the end address is reached or the command is aborted with a dollar sign, "$". The following example uses the same eprom used in the P and R command examples. AUTOMATED.

Example:

```
<2716>V<cr>
33 @ 0444
23 @ 0445
<2716>_
```

M Menu Selection

You may select the device you will be working with in 2 ways. The current device type always becomes part of the command prompter. Selecting a device establishes the programming algorithm to be used, as well as the device pinout, proper programming voltage and prompter.

1) Type an "M" and then the appropriate code letter. Example:

```
<q27011>ME
<i2764>_
```

2) Type an "M< cr> " to get a menu of parts to select from:

Software Selection Method:—This is an example only!

See the Appendix section on Manufacturer's cross reference to cor-

```
<i2764>M<cr>

EPROM SELECTION MENU —
NMOS      NMOS       CMOS       EEPROM    W/ADAPT
A–2758    G–AM2716B  L–27C16    P–5213    R–874x–1K
B–2716    H–AM2732B  M–27C32    Q–X2816A  S–874x–2K
C–2732    I–2532     N–MC6716   X–48016   T–874xH–1K
D–2732    J–2564     O–F27C64   Y–I2816A  U–874xH–2K
E–2764    K–68766    Ø–I27C64   3–I2817A   V–8751
1–2764A   @–CY7C292  8–F27C256  9–X2864A   $–87C51
F–27128   +–TI2532A  6–I27C256  (–AM9864   W–8755
2–27128A  &–W292/43  5–F27C512  4–X28256    !–874xAH
Z–27256   "–CY7C292A {–27CX321  .(–AM2864B ^–8752AH
7–27512   %–F27256   }–27CX641  .X–NMC9346 ?–87C51FB
#–27513              .&–WS57C49
=–27011              ."–AM27C291

ENTER SELECTION—2<cr>

<q27128A>_
```

relate your part number with the appropriate eprom type selection. AUTOMATED.

TA Toggle IBM type Checksum

The TA command (Beginning with Version 5.24 of the 9000 and Version 9.33 of PGMX) allows you to calculate an 8 bit checksum of "00" to be programmed at a specified location in your eprom. If no location is specified (TAnnnn< cr>) then the byte is programmed at the last location in the eprom. What happens is TA will calculate an 8 bit number to add to the eprom to make the 16 bit checksum "nn00h". The LSB of the checksum is 00. If the checksum is already 00 then no programming is done, otherwise the TA command will attempt to program the specified location in your eprom. All normal programming rules apply.

TC Toggle Compare Mode

The TC toggle command is used to turn the compare mode on and off. When in the compare mode, the command prompter is prefixed by a lower case c. The compare mode is used to compare the contents of a device against that of a source file. Interactively, a TC will cause the compare mode to be set, and the next TC command will reset the compare mode. In the automation mode, a TC on the command line will always cause the compare mode to be set only. To reset compare mode use the TR command.

To use the compare mode, issue a programming command as if you were going to program the device. Instead of programming the device, the 9000 will make a comparison of the source byte to the contents of the device. If they are not the same, the comparison error will cause a *CP err @nnnn error message to be issued. See Diagnostics Section for details. AUTOMATED.

TE Toggle Echo (On/Off)

The TE command allows a person to write their interface software more efficiently so that it does not have to handle receiving any characters during the program process. As soon as the command is issued (TE) nothing is echoed or sent back to the console. As long as valid commands or data are being sent to the 9000, nothing is echoed or sent back. As soon as an error occurs, or any time the "X" command is issued, the 9000 reverts back to sending all characters. AUTOMATED.

TI Toggle Intelligent Algorithm Mode

The TI command turns the intelligent programming algorithm on. Typing TI for a device that does not use the intelligent algorithm will cause an error message *UV err @nnnn to be issued. Some parts default to the intelligent algorithm and will give an error message if TI is issued for that part. AUTOMATED.

TQ Toggle QuickPulse Algorithm Mode

The TQ command selects the "quick" algorithm for the selected part. Some part types default to the QuickPulse algorithm and is the only algorithm supplied for that part, so typing TQ on those will result in a *SN err or a *UV err. AUTOMATED.

TN Toggle Checksum

This command is handled by PGMX during the interactive or automation mode (issued after part is programmed). The TN command is used to generate a 16 bit checksum from the data in the eprom. This is the 16 bit sum of all the (8 bit) Data bytes added together without carry. You can make a checksum between any two addresses by specifying the Hex starting and ending addresses. The checksum is calculated and then output to the user. See examples of this in the PGMX chapter. AUTOMATED.

TR Reset TC and TS Toggles

The TR command resets the compare mode and the split mode toggles. You may also reset these and any other toggles set by reselecting the part type with the Menu command. AUTOMATED.

TS Split Mode

The TS command puts the 9000 into a split mode used for programming 2 eproms whose intended destination is for use in a true 16 bit data path. While in the split mode, the command prompter is prefixed by either a lower case h or l indicating high (odd address) or low (even address) byte respectively. It should be noted, that if a programming error should occur while in the split mode, that the address of the error given by the 9000 will be the address within the eprom being programmed, not the address in the hex file. See also the TB command. AUTOMATED.

TB Byte Toggle

The TB command is used in conjunction with the split mode (TS) to target the selected device for the high (odd) bytes or low (even) bytes from an Intel Hex or Motorola S record source file.

' ' Reissue Command Prompter

Used in PGMX's interactive mode only. Sending a space (ascii 32 char) to the 9000 causes it to reissue the command prompter.

I Identify Serial Device

The Model 9000 will issue data used by PGMX in determining the model and version. AUTOMATED.

X Return Version

The X command is used to issue a Logon message and the prompter. The X command will return the following:

```
<2716>X
GTEK, INC.
MODEL 9000 Vx.xx
COPYRIGHT 1987
<2716>_
```

When ordering accessories from GTEK, please remember to include the version and serial number. AUTOMATED.

$ Abort to Command Prompter

A $ sent to the 9000 will abort most operations to the 9000 command prompter. AUTOMATED.

Chapter 4 Diagnostics

General

Most diagnostics are handled by PGMX. The person that is using PGMX need only be concerned with the meaning of any error message that is issued by PGMX. Other information here is for persons not using PGMX.

1) All error codes to be issued by the 9000 are preceded by an asterisk, (*). This makes error trapping very easy.

2) When a non–fatal error occurs (such as when you are using the V command), no error message is issued and you are returned to the 9000 command prompter when the command completes.

3) FATAL errors are output on a real time basis, that is, they are output as soon as they are detected, and the programmer returns to the command state.

4) Fatal Error codes include the address at which the error occurred.

Fatal Error Codes

***WP ERR @ nnnn Won't Program error:** This error is issued only in the event that the 9000 discovered that it could not change the data in the chip, even though the bits were not already set. When using the QuickPulse algorithm, you will not get any *NE errors, only *WP since the 9000 does not "pre-read" the cells prior to programming.

***NE ERR @ nnnn Needs Erasing error:** This error is issued only in the event the 9000 discovered that it could not change the data in the chips, and the bits were already set. You will never get an NE error with the QuickPulse algorithm, because the 9000 does not pre–read cells to be able to tell that a bit was not set previous to programming with the QP algorithm.

***CP ERR @ nnnn ComParison error:** Issued during comparisons and verifies (U command).

***DT ERR @ nnnn DaTa error:** The character that was sent is not valid hex data. (0–9 or A–F) This error message is issued as soon as it happens.

***CS ERR @ nnnn Check Sum error:** Issued if a checksum error is detected in a hex record. Only applies to Intel, Motorola, and Tektronix hex format program commands. This error message is issued as soon as it happens

***SN ERR @ nnnn SyNtax error:** An invalid command was issued to the programmer. This error message is issued as soon as it happens. See COMMANDS section.

***ST ERR @ nnnn STack error:** FIFO overflow. Reduce baud rate or see the interfacing section for handshaking methods. (The 9000 can take data at 300 bps with no handshake.) PGMX users may not be using the right RS-232 cable. This error message is issued as soon as it happens.

***UV ERR @ nnnn Un-aVailable error:** Issued in the event the user tries to use a function of the programmer that is not available for that particular device. This error message is issued as soon as it happens.

Non-Fatal Errors

These errors are considered non fatal in that the process continues, that is, it makes you aware that there may be a problem, but you don't want to stop right now because it may not be an error. One example is when you are using the V command, and you find some non blank locations. You may have intended that those locations have data, so the 9000 continues, but makes you aware of those locations by issuing a message showing data and address.

Overload Conditions

If a programming voltage overload condition occurs, the 9000 will not say "OVERLOAD"! The 9000 will not be damaged unless the part is shorted to the data bus or address lines and you keep trying the process several times in a row before realizing the part will not program.

The key indication is a *NE error or a *WP error. Do something other than trying to immediately program the part again without checking the menu selection you have made or erasing the part.

Remember that the Textool socket may have programming voltage (Vpp) applied to various pins even during such commands as a List command or Read command. Some algorithms on the 9000 use the eprom “verify read” mode, which means that programming voltage is applied during a “read” of the part. This will usually damage a part such as a 2764A if you have the 2764 algorithm selected! Some selections are always safe to use to just read a part if you are not sure what selection to use. F27C64, F27C256 and 27512 are usually safe (ON READS ONLY!).

You can use a 27512 selection to read any 28 pin part (including ROMS). By noticing what locations within the address range have duplicated data, or where data appears at all, you can usually determine what size the target part is. If you know where certain data is supposed to appear, you can determine if it has masked chip select lines.

PGMX Communications Diagnostics

Please refer also to the chapter on PGMX. PGMX can detect various problems with the serial channel during communication. Error messages usually have a symptom and a diagnosis message, such as “(beep) Framing Error (beep) Overrun error! Reduce baud rate”. Follow the directions specified by the error message.

Persons using PGMX and making their own cable will most likely run into the Framing error and the Overrun error. The cause of this is usually they don’t have their CTS line on the 9000 hooked to the DTR line on the computer. The computer can’t tell the 9000 to stop sending. Stack errors are usually caused by the reverse, CTS on the computer is not hooked to DTR on the programmer. The 9000 can’t tell the computer to stop sending.

The second most frequent problem people run into is the fact they can’t believe their computer can’t receive data at 57,600 baud. It takes a fast computer (8 MHz AT or better) to handle data coming in at that maximum rate. You will usually get framing errors or overrun errors when this happens. The cure is to reduce the baud rate. Most PC’s and XT’s (4.77 MHz) can handle data at 9,600 baud without much difficulty.

The problem is compounded when a person runs programs in the "background". TSR programs like SIDEKICK™ and others steal time during interrupts or key presses. This means you have less time to be able to receive a character.

A poorly designed TSR program running at the same time may prevent interrupts from being serviced and you may even miss characters (which is always fatal) when you are "reading" an eprom. Programming eproms is less critical, since the transmit side of PGMX is not interrupt driven. This means the error message you receive about missed characters is only the echo of what was sent to the 9000. However, if that character was an asterisk (*), you might miss the error message that follows. PGMX will eventually "time out".

Unless you "fix" the problem by reducing the baud rate or running without the TSR programs installed, it might happen again.

Chapter 5, Interfacing Notes

The Model 9000 is surprisingly easy to interface and there are several methods of handshaking which can be utilized if it is desired to operate at the higher baud rates. The following section describes some of the methods. Of course if you are going to use our interface program PGMX, you can skip this chapter.

1. Software handshake. This is perhaps the easiest method of all. When you begin to send data to be programmed, send the first byte but don't wait for it to be echoed. That would effectively cut your communication rate in half. Instead, send the second byte, receive the first, send the third byte, receive the second, etc. This technique will allow you to program as fast as the algorithm in use permits. Some devices program faster, some slower! See an example of this in Fig. 5.1.
2. CTS/DTR hardware handshaking. The Model 9000 is configured as data terminal equipment, which means that the CTS (clear to send) line is an input to the programmmer which when pulled low forces the programmer to stop sending. On the other hand, the DTR (data terminal ready) line is an output from the programmer, which will go low when the buffer is about 50% full and high again when the buffer is about 38% full. If you are using hardware handshake and the DTR line goes low, you should stop sending to the 9000 within about 2 character periods (before XOFF is sent). The RTS line is pulled high whenever the programmer is plugged in. See Specifications for Cable.
3. Xon/Xoff software handshaking. If you do not monitor the DTR line, the 9000 will transmit an Xoff character if the buffer gets to be about 63% full. If an Xoff has been sent, an Xon will be sent when the buffer level drops to about 25% full. Likewise, when the programmer is sending you data, you may send an Xoff character, which will stop the programmer from sending until it receives an Xon character. Xon's and Xoff's, are not put into the buffer, but are processed as soon as they are received. Even if you don't use Xon/Xoff handshaking, you will find it useful when using the L, list command, to stop and start the data flow to your screen. Xon and Xoff are the keyboard equivalents of control–Q and control–S respectively.

4. Please note that the 9000 may communicate at many different baud rates. To initialize at the new baud rate, send the 9000 a break signal (set the output data line on your computer to + 12 volts) for 100 milliseconds, set the break to normal again (–12 volts). Wait for more than 1 millisecond, then send an 80H character to the 9000 at the new baud rate. The 9000 will begin reissuing the prompter in response to the space or return command when locked on again.

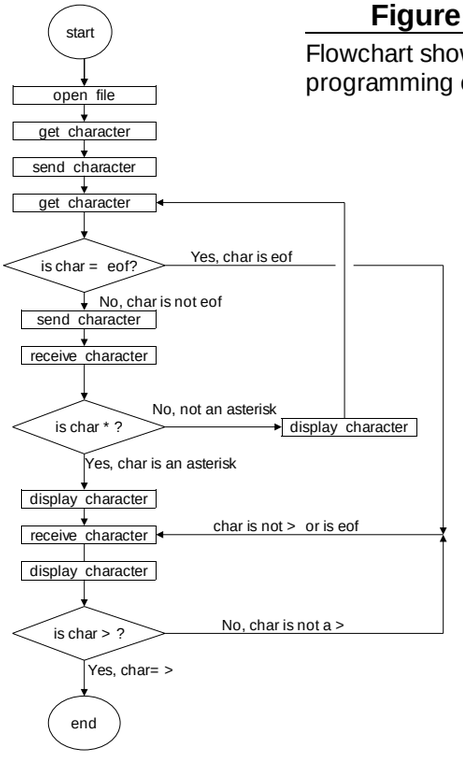


Figure 5.1

Flowchart showing a programming example.

Chapter 6, Specifications

DIMENSIONS: (H x W x D)
3.0" x 5.3" x 6.8"
(77mm x 133mm x 180mm)

POWER:
120VAC, 60HZ, 10 VA (240Vac, 50Hz, option)

INTERFACE:
DB25P - data terminal equipment (see below).
DATA WORD:
1 Start, 8 Data, 1 Stop, No parity

BAUD RATE:
Auto select 300–9600, 19200, 28800, 57600
Jumper Selectable 300, 1200, 2400, 9600, 19,200
(Rates above 9600 depend on your computer being able to keep up)

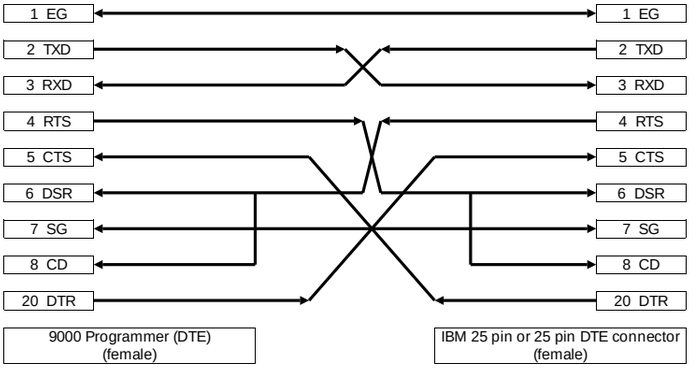
WEIGHT:
3 Pounds (2.4 KG)

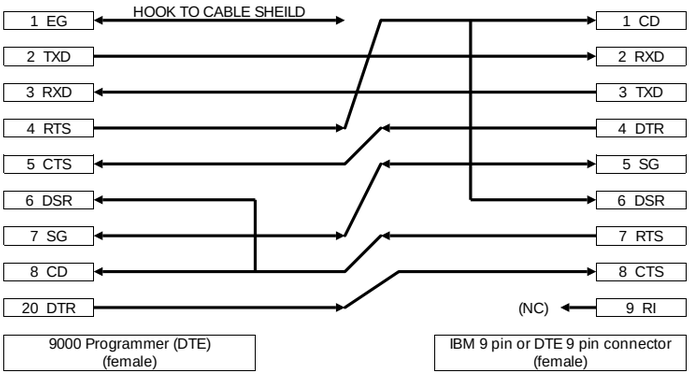
OPERATING ENVIRONMENT:
45 - 95 DEG F. (7 - 35 DEG C.)
5% TO 95% non-condensing relative humidity

Making A Cable

From the model 9000 (> is output from 9000) DTE, to the computer (< is output from computer) DTE or DCE.

9000 DTE	to	DTE	or	DCE
1- Equip Ground (EG)	> <	1 (EG)		1 (EG)
2- Transmit Data (TXD)	>	3 (RXD)		2 (TXD)
3- Receive Data (RXD)	<	2 (TXD)		3 (RXD)
4- Ready To Send (RTS)–not used	>	6 (DSR)		4 (RTS)
5- Clear To Send (CTS)	<	20 (DTR)		5 (CTS)
6- Data Set Rdy (DSR)– not used	>	4 (RTS)		6 (DSR)
7- Signal Ground (SG)	> <	7 (SG)		7 (SG)
8—Carrier Detect (CD)–not used	<	4(RTS)		8 (CD)
20- Data Term Rdy (DTR)	>	5 (CTS)		20 (DTR)





Chapter 7, Hex Formats

Intel Format

Data Record

Byte Number	
1	Colon (:)
2—3	Number of binary data bytes
4—5	Load address, high byte
6—7	Load address, low byte
8—9	Record type
10—x	Data bytes, 2 ascii–hex characters
x+ 1 – x+ 2	Checksum, two ascii–hex characters
x+ 3 – x+ 4	CR,LF

End Record

Byte Number	
1	Colon (:)
2—3	Record length, must be “00"
4—7	Execution address
8—9	Record type
10—11	Check sum
12—13	CR,LF

Extended Address Record (MCS-86 hex format)

Byte Number	
1	Colon (:)
2—3	Record length, should be “02"
4—7	Load address field, should be “0000"
8—9	Record type, must be “02"
10—13	USBA
14—15	Check sum
16—17	CR,LF

Start Address Record (MCS-86 hex format)

Byte Number	
1	Colon (:)
2—3	Record length, “04"
4—7	“0000"
8—9	Record type, “03"
10—13	8086 CS value
14—17	8086 IP value
18—19	Check sum
20—21	CR, LF

The checksum is the **two’s compliment** of the 8-bit sum, without carry, of all the data bytes, the two bytes in the load address, and the byte count.

Example:

:03012300010203D3

In the above example add 3 + 1 + 23h + 0 + 1 + 2 + 3 = 2Dh. The total of the above bytes is 2Dh. If you do a two’s compliment on the number the result is D3h which, you will notice is the checksum. A simple visual way of doing this is to write the number in binary, then invert each bit. After you do that, add 1 to it and that is the checksum:

```
00101101 = 2D
11010010 = D2 (inversion or negation)
      +1 = add 1 for 2’s compliment
11010011 = 2’s compliment checksum.
```

Motorola Format

Comment Record

Byte Number	
1—2	“S0"
3—n	Comment field
x+ 1—x+ 2	CR,LF

Data Records

Byte Number	
1—2	“S1"
3—4	Number of data bytes + 3.
5—6	Load address, high byte.
7—8	Load address, low byte.
9—x	Data bytes, 2 characters each.
x+ 1—x+ 2	Checksum.
x+ 3—x+ 4	CR,LF.

Byte Number	
1—2	“S2"
3—4	Number of data bytes + 4. (2 characters)
5—10	Load address, 24 bits (6 characters)
11—x	Data bytes, 2 characters each.
x+ 1—x+ 2	Checksum (2 characters).
x+ 3—x+ 4	CR,LF.

Byte Number	
1—2	“S3"
3—4	Number of data bytes + 5.
5—12	Load address, 32 bits (8 characters)
13—x	Data bytes, 2 characters each.
x+ 1—x+ 2	Checksum
x+ 3—x+ 4	CR,LF.

End Record

Byte Number	
1—2	“S9"
3—4	CR,LF.

In the above S records, the byte count includes the load address and checksum. Thus the byte count is equal to the number of data bytes plus the following; 3 for S1, 4 for S2 and 5 for S3 type records. The checksum is the **one’s compliment** of the 8-bit sum, without carry, of the byte count, the two bytes of the load address, and the data bytes.

Tektronix Hex Format

Data Blocks

Byte Number	
1	Header (which is a forward slash- /)
2—5	Location counter which is 4 ascii-hex characters representing the load address of the data bytes.
6—7	Byte count which is 2 ascii hex bytes specifying the number of binary data bytes in the data field of the block.
8—9	First Checksum, which is 2 ascii-hex bytes specifying the HEX SUM of the values of the previous six digits. (location counter and the byte count)
10—X	Binary data bytes which are each represented as 2 ascii-hex digits. (in other words 16 binary bytes are represented as 32 ascii-hex bytes.)
X+ 1—X+ 2	Second Checksum. 2 ascii-hex bytes representing the SUM, modulo 256 of the binary values of the ascii data bytes. (8 bit sum without carry.)
X+ n	Always a carriage return. (CR)

Termination Block

Byte Number	
1	Header (forward slash /)
2—5	Transfer address which is the address for execution of code.
6—7	Byte count, always 00 for a termination block.
8—9	Checksum of the six digits that make up the transfer and byte count.
10	Always a carriage return. (CR)

Abort Block

Byte Number	
1	Header forward slash /
2	Header forward slash /
3—X+ 69	Message up to 69 characters for error information etc.
X+ 70	Always a carriage return. (CR)

Example of Data block and 1 Abort block

/0000101001020304050607080 90A0B0C0D0E0F0038
//THIS IS AN ERROR MESSAGE HERE

Note: programmer will issue a *DT error on the second "/" mark and return to the command state without displaying the abort message...

Example... of Data block and 1 Termination block

/0000101001020304050607080 90A0B0C0D0E0F0038
/00000000

NOTE: Most terminals will display Tektronix data only on one line, since the format calls for only a carriage return at the end of a record.

Chapter 8, GHEX™ and STOHEX™

GHEX.EXE is a program provided for you to be able to convert a binary file into an INTEL.HEX file. This capability is built–in to the PGMX.COM program, but you may want to use it for convenience.

General usage is:

C>**GHEX filename.ext<cr>**

OR

C>**GHEX filename.ext offset <cr>**

Offset is an ASCII–HEX number (0–9 and/or A–F) that specifies the load address used on the first hex record.

C>**GHEX filetest.bin<cr>**

Will result in an Intel Hex file being created on your disk by the name filetest.hex. The load addresses begin at 0000H since no offset was specified. GHEX does not destroy the input file.

C>**GHEX filetest.bin AA55<cr>**

Will result in an INTEL.HEX file being created on your disk by the name filetest.hex, just like before except the load addresses start at AA55H.

GHEX is provided as a convenience now , since the PGMX program can handle transferring in Intel Hex or Binary code. PGMX will also handle any offsets into the code too.

One thing you have to remember when using GHEX is that any code that you run GHEX on should be an exact multiple of 128. If your binary file is not an exact multiple, then GHEX will fill out to an even multiple of 128 with nulls.

STOHEX.COM is a program will take a Motorola Hex file and convert it to an Intel Hex file. It takes input from the keyboard and outputs it to the console. To modify whole files, use the DOS redirection commands:

C>**STOHEX <moto.mik >intel.hex**

The above example will take a Motorola mik or ptp file by the name of moto.mik and convert it to an Intel hex file by the name intel.hex on your disk. STOHEX returns the DOS errorlevel set to 0 if the conversion was done with no errors. An errorlevel of 1 is set if some kind of error

occurred during the conversion. STOHEX does not destroy the original file, but it will overwrite an existing file on your disk if you specify that file name.

Chapter, 9, Using DEBUG.COM

You may use DEBUG.COM (supplied with DOS) in conjunction with our GHEX.EXE to modify an INTEL.HEX file without worrying about the checksums in the INTEL.HEX file.

The following is a short tutorial to modify a 4K byte INTEL.HEX file with DEBUG. The procedure is to run DEBUG first.

C>**DEBUG<cr>**

—_

From the – prompter within DEBUG use the N command to specify the name of your INTEL.HEX file.

—**Nfilename.HEX<cr>**

—_

Use the L command to load the hex file with an offset (if it begins at 0000H). You must do this since if it starts loading at 0000H within the segment, it will overwrite your file control block at 5Ch.

—**L 100<cr>**

—_

The CX register now contains the number of bytes read into memory with an offset of 100. You may have to modify the CX register to properly reflect the correct number bytes you must write back to the disk. Remember that this is going to write from CS:CX when you issue the command.

—**RCX<cr>**

CX: **1000<cr>**

—_

Your data is now loaded into the memory of the computer at offset 100H. Use the E command to modify the bytes you need to modify. An example of modifying locations starting at 0A55H with data is shown. Locations A55H through A57H contain FFH.

—**EA55 01 02 03<cr>**

—_

Now specify a new file name to write to the disk with since you can't use an extension of HEX with the file you are writing. You want to call it a BIN or IMG file instead since that is what the data really is anyway.

—**NNEWFILE.BIN<cr>**
—_
Now you can use the Write command to write the new data to the disk. DEBUG will write an exact image of CS:CX bytes to the disk starting at an offset of 0100H bytes.

—**W<cr>**
Writing 1000H bytes
—_
Now use GHEX to make it an INTEL.HEX file, or use PGMX's binary file transfer.

Chapter 9, PGMX

Installation of PGMX

PGMX is a high speed communication program which runs on IBM PC's, XT's, AT's, PS/2 (any model) and most compatibles. It allows flexible manipulation, transmission and reception of Intel HEX files and binary files.

On the PGMX program disk you will have at least 3 programs: PGMX.COM, PINSTALL.COM and GHEX.EXE. PGMX is the program used to communicate with your 9000. PINSTALL is the program that you must run to install the serial drivers in PGMX so that you can communicate with the 9000. Other programs and document files are provided to allow conversion from Motorola format to Intel hex and other programs to split and interleave to and from 8, 16 and 32 bit binary formats.

If you try to run the PGMX program without installing the serial drivers, it will tell you to run the PINSTALL program. Remember that the PGMX license is a single user license.

Insert GTEK program disk in drive A: and copy the programs to your hard disk with:

```
C>COPY A:*.*
```

This will copy all the programs on the GTEK disk over to the subdirectory that you are logged on to on your hard disk. If you don't have a hard disk, use DISKCOPY or COPY to the B: drive. Refer to the DOS manual for specific instructions on using the COPY command. The desired end result is a backing up of the original GTEK copy. Store the original program disk in a safe place.

Now you should insert the backup copy in the drive A: and/or go to the subdirectory where PINSTALL and PGMX are located. You must first run the PINSTALL program to install the serial drivers for PGMX.

```
C>PINSTALL<cr>
```

You are first asked for the name of the program you wish to install. In most cases you would respond by typing `PGMX`. Next, you are asked to select a letter which corresponds to the type of installation you wish to perform.

Most people will probably elect to use 19,200 baud on computer serial port COM1: or the selection for 19,200 baud on COM2:.

IRQ4 is used in conjunction with an interrupt service routine for COM1: when PGMX is invoked if you installed it for COM1:. This is a hardware line on your PC to give the system an interrupt whenever a character is received. If you know that something else in your computer is using this hardware interrupt line, then you should use the other com line, which uses IRQ3 (COM2:).

IRQ3 is also used in the same manner for COM2: when PGMX is invoked if you installed it for COM2:. If you know something in your system uses IRQ3 for interrupts, then you must use the other com port.

The next selection that you have to make is where your line printer is located, on parallel port 1, 2, or 3 (lpt1:, lpt2: or lpt3:). This has to be done so that PGMX knows where to send printed data.

Next you will be asked if you have a "GTEK Super Serial Card". If you do not have one of our PCSS–8 or MCSS–8 cards, answer no. If you do have one, answer yes and respond with the channel you would like to use. After completing this step, you are ready to use PGMX. You should not have to run PINSTALL again unless you want to change the configuration.

See the example for `C>PGMX<cr>` later in the manual.

Operation

PGMX is a "command driven program" as opposed to a "MENU driven program" which means that everything you do is done by entering a "command" on the command line instead of "selecting" the command from a menu. This makes the program very fast when you have learned what the commands are.

In most cases the commands are exactly the same command as what the programmer is expecting, so the selection of the command is somewhat intuitive.

There are 2 ways that commands may be given to PGMX:

1. From the PC or MS DOS command line.
2. From within PGMX.

Commands executed from DOS return to DOS upon completion. Commands executed from within PGMX return to PGMX upon completion. Command lines may be entered from within PGMX by depressing control F.

Examples

`C>PGMX<cr>`

Enter PGMX and establish communication with the programmer (assuming everything is hooked up properly).

`C>PGMX FILENAME<cr>`

Results in communication being established with the programmer and sending FILENAME.HEX (Intel Hex Format) from the disk to the programmer. When PGMX is through, you are returned to the DOS system prompt.

`C>PGMX FILENAME [OPTIONS]<cr>`

Results in PGMX establishing communication with the programmer, and then performing according to selected options.

Programming the eprom in binary or Intel Hex format or Reading the eprom in the same formats may be accomplished by giving the proper options. OPTIONS are always enclosed in square brackets and separated by comma's. Invalid commands result in an appropriate and descriptive ERROR message.

Valid Options

`R`	read file. (default is program mode)
`%ooooo`	binary mode select (default is HEX)
`@sssss-eeeee`	Eprom bounds
`Mx`	menu selection
`Tx`	toggle command
`Vssssss-eeeee`	verify erasure
`D`	display data as it is being received from the 9000

Examples

PGMX< cr> from the DOS command line establishes communication with the 9000, and after log-on displays the 9000 Command Prompter, which is the currently selected eprom type.

(These are examples and your display may not be exactly like this one!)

```
C>pgmx<cr>
High Speed Interface Package Version 9.33
Copyright 1983, 1984, 1986, 1987  GTEK, INC.
All Rights Reserved, worldwide.
I/O Hardware Driver Vers 1.01 - IBM PC/AT
Serial port - COM1, 19,200 bps
Printer port - LPT1:

GTEK, INC.
MODEL  9000 V5.24
COPYRIGHT  1987

<xxxx>_
```

The programmer is ready and waiting for a command at this point. If you want to do a Menu command, pressing an **M** and the code necessary will select an eprom type or press **M< cr>** to get a menu:

```
<i2764>M<cr>

EPROM SELECTION MENU —
NMOS      NMOS      CMOS      EEPROM    W/ADAPT
A–2758    G–AM2716B L–27C16   P–5213    R–874x–1K
B–2716    H–AM2732B M–27C32   Q–X2816A  S–874x–2K
C–2732    I–2532    N–MC6716  X–48016   T–874xH–1K
D–2732    J–2564    O–F27C64  Y–I2816A  U–874xH–2K
E–2764    K–68766   Ø–I27C64  3–I2817A   V–8751
1–2764A   @–CY7C292 8–F27C256 9–X2864A   $–87C51
F–27128   +–TI2532A 6–I27C256 (–AM9864   W–8755
2–27128A  &–W292/43 5–F27C512 4–X28256   !–874xAH
Z–27256   “–CY7C292A{–27CX321 .(–AM2864B ^–8752AH
7–27512   %–F27256  }–27CX641 .X–NMC9346 ?–87C51FB
#–27513             .&–WS57C49
=–27011             ."–AM27C291

ENTER SELECTION—2<cr>

<q27128A>_
```

WARNING! Do not use this **example** to select parts from. Use Appendix B. Parts are removed and added from time to time!

Results in the programmer giving you a menu of parts to select from. Refer to the appendix parts list for help in selecting the correct part. At that time, enter the menu selection number and the prompter will reflect the part number selection that you made.

```
<i27128A>TN<cr>
C000
<i27128A>_
```

Results in the programmer giving you a 16 bit addition of all the 8 bit bytes of all the part, without carry. Blank 27128s give you C000 for the checksum.

`i27128A>`(**control-F**)

Control— generally means to press and hold the CONTROL key on your keyboard and press a command letter. Valid command letters are P, F and C. The ESCape key is also a valid control command key, but you do not hold the control key down to press ESC. The ESC key is a valid control character already. The escape control command may also be obtained by pressing CONTROL [on the IBM keyboard or by holding down the ALT key and entering 027 on the numeric keypad. Pressing and holding the CONTROL - C key for instance is represented by a caret and the letter that must also be pressed, eg. ^ C.

The definitions of the CONTROL commands are:
^ P –start sending / stop sending (toggle) data simultaneously to the printer.
^ F –enter a command line. Examples follow.
^ C –Abort most programmer commands and return to the DOS or PGMX command prompter. This command will work even though you may be in the process of programming, reading, verifying, etc., an eprom in the automated (control-F) mode.

ESC or ^ [- Escape from program. This command is used as an alternative to control–alt–del and is not normally used. This is an EMERGENCY command and the results could be unpredictable.

Using Control–F

```
2716>^F

Enter Command line —->FILENAME [@0-1FF,V,TN<cr>
```

Results in PGMX doing a blank check on the eprom between 0 and 1FF inclusive. Then FILENAME.HEX is opened and any hex data falling between the specified boundaries is sent. During data transfer, PGMX displays the load addresses of the hex records that it is sending. Finally, the checksum is calculated between the specified addresses and displayed.

The options are always set off by an opening square bracket ([) and the ending square bracket (]) is optional. Invalid commands result in an error message and a return to the 9000 command prompter.

Definitions

Please note that the listed commands are generally passed on to the programmer unchanged except for the order in which they appear in the command line. PGMX will send the commands specified to the programmer in the following order:

1. Menu command.
2. Toggle commands (except TN is done last).
3. Blank check or verify erasure
4. Program or read.
5. Checksum (TN)

Some commands, particularly the "R" command, work differently from the 9000 command "R". The "%" and the "@" command are not valid commands for the 9000. They are used to give PGMX information, not the 9000. You may not specify any command more than once inside the brackets except the toggle commands.

sssss = 24 bit starting address, Hex characters (0–9 and A–F).
eeeee = 24 bit ending address, Hex characters.
ooooo = 24 bit offset amount, Hex Characters

A delimiter is a dash (—), a comma (,), a space ( ), a carriage return, or a line feed (ascii characters 2Dh, 2Ch, 20h, 0Dh or 0Ah). Carriage return and line feed are represented by a < cr> or < lf> .

A FILENAME is a valid DOS filename to be used by PGMX to look for a file on the disk. In the case where a percent (%) sign is specified, the filename specified will be taken literally. In other words you must be explicit and give the extension of the filename also. If the percent sign was not specified then PGMX will automatically supply a .HEX extension and look for a .HEX even if you specified an extension.

An EXT is a valid DOS extension for the filename in your directory. You are allowed to use any extension you wish here, (in the binary % mode) and the data will be sent to the programmer UNCHANGED. The EXT will only be valid when you have specified a percent sign (%) within the brackets.

AND REMEMBER!

The effective addressing range of a device is determined by it's size. If a 2K byte device is being used, then it only has 11 significant address lines and only the lowest 11 bits of the address field are significant. Thus, as far as the 9000 is concerned, 000H is equivalent to 800H or F000H in a 2K device.

Valid Commands for PGMX

1. Any valid programmer command except OI, OM, OT, R.
2. @sssss–eeeee. An @ symbol followed by the starting address (ssss) followed by a dash (–) followed by the ending address (eeee) will cause PGMX to search through the specified FILENAME to find the specified locations inclusive to be sent to the 9000. In the case of a binary file (specified by a % on the same command line only), the @ symbol means that the data specified by the % sign (offset), will go to the ssss–eeee specified by the @ sign within the eprom, and eeee less ssss bytes will be sent. In the case of an Intel Hex file (no %), the @ symbol means that PGMX will search the Intel Hex file for data located between the start address (ssss) and the end address (eeee) inclusive, and send that data to the same locations within the eprom.
3. %ooooo. A percent sign (%) followed by an offset (you may omit specifying an offset of 0, but PGMX may warn you that you did not specify it, just in case you forgot) will cause PGMX to treat the EXTension you specified literally (and not add a .HEX extension). Any offset you specify (ooooo) will cause PGMX to scan up to that location in the file before sending any data to the 9000.

Examples

To program 3 2716's from a binary file that contains 1093H bytes:

```
<xxxx>MB
2716>^F
Enter Command line –>TEST.BIN[%0,@0-7FF<cr>
```

Causes PGMX to look for a file called TEST.BIN on the disk, and when found start sending from relative offset location 0 within TEST.BIN to locations 0 through 7FFh within the eprom. The number of bytes sent is the number of bytes between 0 to 7FFh inclusive. If you don't specify boundaries, you will "Wrap Around" to location 000H at location 800H because you are still sending data to the programmer through PGMX.

```
<2716>^F
Enter Command Line––>TEST.BIN [%800,@0–7FF<cr>
```

Causes PGMX to look for a file called TEST.BIN on the disk, and when found start sending from relative offset 800H from within TEST.BIN to locations 0 to 7FFh within the eprom.

```
<2716>^F
Enter Command line––>TEST.BIN [%1000,@0–7FF<cr>
```

Causes PGMX to look for a file called TEST.BIN on the disk and when found start sending from relative offset 1000H from within the TEST.BIN to locations 0 through 7FFh within the eprom. However, the program will terminate when it encounters the end of the file you are sending from, since there are only 94H bytes left in the file TEST.BIN to send.

Reading an eprom to a disk file is accomplished with the 'R' option.

```
C>pgmx filename [r<cr>
```

Results in reading the selected eprom to the Intel hex disk file, FILENAME.HEX.

```
C>pgmx filename [r,%<cr>
```

Results in reading the selected eprom to a binary disk file whose name is FILENAME. (no extension was specified.). Notice an offset value included with the % has no meaning during a read operation. Use the @ command to read between specified locations within an eprom.

```
C>pgmx [tn,ma<cr>
<2716>MA
<2758>
```

```
F800
C>_
```

—or from within PGMX—

```
<lq2716>^F
Enter Command Line —>[tn,ma<cr>
F800
<2758>_
```

Results in selecting 2758 (note menu selection has side effect of resetting all toggles) and calculating the checksum.

Advanced Example

```
C>pgmx filename [mz,ts,u,tn,@20000-2FFFF
```

Results in selecting 27256, split mode, doing a blank check, programming the eprom with hex data residing between the 20 bit addresses of 20000 and 2FFFF inclusive, and calculating it's checksum.

This particular file is big. Don't be afraid that PGMX has hung up. It has to check the load addresses of every record in the file, and it would take a minute before it reached records at load address 20000, unless the file was created with an "exotic" compiler in such a manner that segment records with apparently random addresses are placed at apparently random locations every few records in the file. No joke intended.

The boundaries specified cover a 64k range, but the eprom is only 32k. The reason for this is that in the split mode, the 2 eproms are considered as one eprom of twice the size. However, if an error message is issued during programming in the split mode, the address given by the error message is the physical address in the single eprom.

Batch file automation

Automating the process could be accomplished with a batch file such as this:

TEST.BAT

```
pgmx test.bin[mb,u,@0–7ff,%%0,tn
pause remove eprom, insert new blank
pgmx test.bin[u,@0–7ff,%%800,tn
pause remove eprom, insert new blank
pgmx test.bin[u,@0–7ff,%%1000,tn
echo now you are done.
Rem use 2 percents (%%) in a batch file
```

Error return codes for batch file processing:

These error return codes may be used by a calling batch file or process which drives a chip handler.

Error	Description

1– For any 9000 error messages (like *NE, or *WP)

2– For PGMX aborted by user with Control–C

5– For PGMX aborted by a disk error like “file not found” or “disk full” or any command syntax error like “option error”

6– For PGMX when it was expecting a response from the 9000 and a timeout occured before any response was received.

ERROR.BAT

```
echo off
pgmx %1
if errorlevel 6 goto :lostcom
if errorlevel 5 goto :syssner
if errorlevel 2 goto :abort
if errorlevel 1 goto :badpart
echo This part programmed ok.
goto :enbat

:lostcom
echo You have lost communication with the programmer
```

```
goto :enbat

:syssner
echo There is a disk system error
echo or a syntatical error.
echo Example, PGMX cannot find the file
echo you specified or
echo you are trying to use a command
echo that does not exist
echo or if you are reading a file
echo maybe the disk is full!
goto :enbat

:abort
echo Someone typed a control C while the file
echo was transferring. The program has been aborted.
goto :enbat

:badpart
echo The Eprom programmer issued an error
echo such as *WP or *NE or *DT or
echo any other error which it might issue.
echo In any case you should reject
echo this part.

:enbat 1
echo done
```

The above batch file will allow you to automatically program an eprom and abort if there are any problems. Add to it any other commands or programs nececssary for your specific application.

Other programs available:

STOHEX.COM and GHEX.COM
See Chapter 9.

—Notes—

Chapter Ten, Automation Hints

Persons using PGMX can ignore this chapter! When you automate the transfer of data from your computer to the 9000, you should examine the echoed characters to see if an asterisk, "*" has been sent. If you receive one, it means that an error message will follow and that the 9000 will return to the command state. Any automation software should take this into account.

The effective addressing range of a device is determined by it's size. If a 2K byte device is being used, then it only has 11 significant address lines and only the lowest 11 bits of the address field are significant. Thus, as far as the 9000 is concerned, 000H is equivalent to 800H or F000H in a 2K device.

You don't need to compare the characters that are echoed to what you sent. The characters are echoed to the host as they are removed from the FIFO, and would not reflect a programming error. However, the 9000 will detect any programming error and the host need only trap the error message. The PGX™ utilities for CP/M® and MSDOS® based computers send echoed characters to the screen (console). PGMX, due to its high baud rates, does not attempt to display all the information being transferred unless you specify that with the "d" option on the command line. Error messages are displayed when they occur whether or not the "d" option is specified.

The 9000 is in the command state after the prompter is sent. The prompter always ends with a '>'. You can use this character to let your program know that an R, OI, OM, OT, V, or L command has finished.

You should probably have one mode of operation where you communicate directly with the 9000 (turn your computer into a terminal). This will give you easy use of the L, V, P, and M commands.

—Notes—

Chapter 10, Warranty And Service

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GTEK, INC.
RMA Number #####
399 Highway 90
Bay St. Louis, MS 39520

Be sure to include the RMA on the shipping label and in the package so we will know what to do with it. Out of warranty service charges are determined on an hourly labor plus materials basis.

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GTEK, Inc.
Sales and Service
P. O. Box 2310
Bay St. Louis, MS 39521–2310 U.S.A.

—Notes—

Appendix A- Introduction

Parts in the following list are listed by manufacturer that can be programmed on the 9000. In most cases you probably could use the "generic" selection of that part except for the notable exceptions of the 27256. Notice! On the model 9000, some menu selections are different from the other GTEK eprom programmers.

If you don't see your part on the list, you may send a data sheet to GTEK or try calling GTEK to see if we can tell you about a particular part. BE SURE to have a data sheet handy when calling unless you have not been able to obtain one, in which case we may or may not be able to tell you if it will program or how to program it.

GENERAL RULES

1–"A" and some "B" version parts program at lower voltages than the standard parts. If you try to Program, Verify, or List or Output an "A" or "B" part using a "standard" selection or the incorrect algorithm, the part will probably die within microseconds due to overvoltage on the programming pin. The part will appear to be OK and may even still contain any data that you had previously programmed in it, but the symptom will be *WP ERR @ nnnn. This goes for the MPU's also.

2–CMOS eproms generally use different algorithms to program than the NMOS parts, but if the voltage is the same, you might try the NMOS equivalent if you want to try programming the part adaptively (a lot faster).

3–ROMs are generally readable on the programmer if you take precautions to not use a selection that is going to use the Verify mode to read it. If you're not sure, simply use a spec sheet for the menu selection and part you would like to use and check the Vpp pin during reads (OI or L commands) to see if programming voltage appears there. This is done with NO part in the socket of course. Generally the CMOS part selections and the 27512 and 68766 do not use the Verify mode, only the Read mode. This may not always hold true on the 9000.

ROM equivalents of MPU's may only be read after modification of the programming socket or recalibration of the programmer. You must call GTEK for details of this.

4–ROMs may be masked to use what would be address lines on eproms as chip select lines. This means that they would address or enable the part in a low condition instead of a high condition as with an address line. This means that sections of the data might be swapped as you read it. It could also mean that the part has no eprom equivalent!

5–The QuickPulse algorithm is not for all brands of eproms. If you are having trouble programming a part with QuickPulse, try using the intelligent algorithm (if that algorithm is available for the part– TI). A good example of this is the GI part 27C256. It programs fine with the intelligent algorithm, but not with the QuickPulse algorithm. Type "TI" to select the intelligent algorithm for this part when the "MZ" command is issued. (MZTI)

Appendix B—Manufacturer's Cross Reference vs Menu Selection

GTEK believes that the information contained in this list is correct. However, GTEK assumes no responsibility or liability for the accuracy of this list. Notes, if any, about the particular part are at the end of this section.

The "Menu" column contains the command that you would send to the programmer to select the part in question. A small "m" is the "menu" command for the programmer, which is followed by the letter (or period [.] then letter) to select the part. If a particular algorithm is suggested, a toggle command is issued afterwards. When you type this at the programmer command prompter, do not put the comma! The comma is necessary if you are at the DOS command line. Examples follow:

In the manual an AMD 27512 is shown under the "Menu" selection as `M7,TI`

From Programmer command line after power–up to select AM27512:

```
<xxxx>M7
<q27512>TI
<i27512>_
```

From DOS (or Control–F command line):

```
Enter Command Line –>[M7,TI
<i27512>
```

Please take note that you did not have to hit the "Enter" key for these commands to work. In the first example one could type "`M7TI`" all at one time. Hitting "Enter" does not have any effect other than causing the programmer to re–issue the command prompter in response.

Use the program "SEARCHER.EXE" on the PGMX program disk you may have purchased.

AMD			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
AM2716	25.0	N	MB	2K	
AM2716B	12.5	N	MG	2K	
AM2732	25.0	N	MC	4K	
AM2732A	21.0	N	MD	4K	
AM2732AP	21.0	N	MD	4K	
AM2732B	12.5	N	MH	4K	
AM2764	21.0	N	ME	8K	
AM2764P	21.0	N	ME	8K	
AM2764A	12.5	N	M1,TI	8K	
AM2764APOTP	12.5	N	M1	8K	
AM27C64	12.5	N	M1	8K	
AM27128	21.0	N	MF,TI	16K	
AM27128A	12.5	N	M2,TI	16K	
AM27128AOTP	12.5	N	M2	16K	
AM27C128	12.5	N	M2	16K	
AM27256	12.5	N	MZ,TI	32K	
AM27256OTP	12.5	N	MZ	32K	
AM27C256	12.5	C	MZ	32K	
AM27512	12.5	N	M7,TI	64K	
AM27C512	12.5	C	M7	64K	
AM27C512OTP	12.5	C	M7	64K	
AM27C010	12.5	C	M=	128Kx8	110
AM27C020	12.5	C	M.J	256Kx8	110
AM27C040	12.5	C	M.K	512Kx8	110
AM27C1024	12.5	C	M=	64Kx16	Note 1
AM27C2048	12.5	C	M.J	128Kx16	210
AM27C4096	12.5	C	M.K	256Kx16	210

AMD			EEprom		
Part #	Volts	Type	Menu	Size, notes	
AM2817A	TTL	N	M3	2K	
AM2864A	TTL	N	M9	8K	
AM2864AE/BE	TTL	N	M. (	8K	
AM28C256	TTL	C	M4	32K	
AM9864	TTL	N	M(	8K	

AMD			MPU		
Part #	Volts	Type	Menu	Size, notes	
8741	25.0	N	MR	1K	Note 2
8742H	21.0	N	MU	2K	Note 2
8748	25.0	N	MR	1K	Note 2
8748H	21.0	N	MT	1K	Note 2
8749	21.0	N	MU	2K	Note 2
8749H	21.0	N	MU	2K	Note 2
8752AH	12.5	N	M^	16K	Note 3

AMD			BI-CMOS		
Part #	Volts	Type	Menu	Size, notes	
AM27C291	13.5	C	M."	2K	NARROW
AM27C292	13.5	C	M."	2K	

Atmel®			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
AT27HC64/L	12.5	C	M1	8K	
AT27HC641/2	12.5	C	—-	8K	(TRY M1,TI)
AT27C128	12.5	C	M2,TI	16K	
AT27256	12.5	N	MZ,TI	32K	
AT27C256R	13.0	C	MZ	32K	
AT27HC256/L	12.5	C	MZ,TI	32K	
AT27C256	12.5	C	MZ,TI	32K	
AT27C512	12.5	C	M7,TI	64K	
AT27C512R	13.0	C	M7	64K	
AT27C513	12.5	C	M#,TI	64K	PAGED
AT27C513R	13.0	C	M#	64K	PAGED
AT27C010/L	13.0	C	M=	128Kx8	110
AT27C011	13.0	C	M=	128Kx8	PAGED110
AT27C1024/L	13.0	C	M=	64Kx16	210

Atmel			**EEprom**		
Part #	Volts	Type	Menu	Size, notes	
AT28C16	TTL	C	MY	2K	
AT28HC16/L	TTL	C	MY	2K	
AT28C64	TTL	C	M9	8K	
AT28HC64/L	TTL	C	M9	8K	
AT28PC64	TTL	C	M9	8K	
AT28C256	TTL	C	M4	32K	
AT28HC256/L	TTL	C	M4	32K	

Cypress®	**Bi–Polar Prom Equivalent**			
Part #	Volts	Type	Menu	Size, notes
CY7C281	13.5	C	M@	1K
CY7C282	13.5	C	M@	1K
CY7C291	13.5	C	M@	2K
CY7C292	13.5	C	M@	2K
CY7C292A	13.5	C	M"	2K

Note that you can do nearly the whole series Cypress Prom parts using addressing techniques to fit the part. Verify mode does not work with differential outputs.

Dallas Semiconductor® Non–volatile static ram					
Part #	Volts	Type	Menu	Size, notes	
DS1213/C/D	TTL	N	SOCKET	2/8/32K	MY M9 M4
DS1216/C/D	TTL	N	SOCKET	2/8/32K	MY M9 M4
DS1220	TTL	N	MQ	2K	
DS1225	TTL	N	M9	8K	
DS1230/1235	TTL	N	M4	32K	

Exel®	**EEproms**				
Part #	Volts	Type	Menu	Size, notes	
XL2804	TTL	N	MQ	512	Note 14
XL2816A	TTL	N	MQ	2K	
XL2864A	TTL	N	M9	8K	
XL2865A	TTL	N	M9	8K	Note 4

Fujitsu			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
MBM2732	25.0	N	MC	4K	
MBM2764	21.0	N	ME	8K	
MBM27C64	21.0	C	ME	8K	
MBM27128	21.0	N	MF	16K	
MBM27C128	21.0	C	MF	16K	
MBM27256	12.5	N	M%	32K	Note 5
MBM27C256	21.0	C	M8	32K	
MBM27C256A	12.5	C	M%	32K	Note 5
MBM27C512	12.5	C	M7,TI	64K	
MBM27C1001	12.5	C	M=	128Kx8	Note 6
MBM27C1024	12.5	C	M=	64Kx16	Note 1

Fujitsu			**MPU**		
Part #	Volts	Type	Menu	Size, notes	
8742H	21.0	N	MU	2K	Note 2

General Instrument®			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
27C64	12.5	C	M1,TI	8K	
27HC64	12.5	C	M1,TI	8K	
27C128	12.5	C	M2,TI	16K	
27256	12.5	C	MZ,TI	32K	
27C256	12.5	C	MZ,TI	32K	

Hitachi			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
HN482716G	25.0	N	MB	2K	
HN482732G	25.0	N	MC	4K	
HN482732AG	21.0	N	MD	4K	
HN482764G	21.0	N	ME	8K	
HN482764P	21.0	N	ME	8K	
HN27C64	21.0	C	ME	8K	
HN4827128P	21.0	N	MF	16K	
HN27128AG	12.5	N	M2,TI	16K	
HN27128AP	12.5	N	M2,TI	16K	
HN27256G	12.5	N	MZ,TI	32K	
HN27256P	12.5	N	MZ,TI	32K	
HN27C256G	12.5	C	MZ,TI	32K	
HN27C256FP	12.5	C	MZ,TI	32K	
HN27C256HG	12.5	C	MZ,TI	32K	
HN27512G	12.5	N	M7,TI	64K	
HN27512P	12.5	N	M7,TI	64K	
HN27C101G	12.5	C	M=	128K	Note 6
HN27C101P	12.5	C	M=	128K	Note 6
HN27C301G	12.5	C	M=	128K	Note 7
HN27C301P	12.5	C	M=	128K	Note 7
HN27C1024HG	12.5	C	M=	64Kx8	210
HN27C4096	12.5	C	M.K	256Kx16	210

Hitachi			**EEprom**	
Part #	Volts	Type	Menu	Size, notes
HN48016	TTL	N	MX	2K
HN58064P	TTL	N	M9	8K

ICT	**Bi–Polar Prom Equivalent**			
Part #	Volts	Type	Menu	Size, notes
ICT27CX321	12.5	C	M{	8K
ICT27CX641	12.5	C	M}	8K

Intel			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
2758	25.0	N	MA	1K	
2716	25.0	N	MB	2K	
2732	25.0	N	MC	4K	
2732A	21.0	N	MD	4K	
P2732A	21.0	N	MD	4K	
2764	21.0	N	ME	8K	
2764A	12.5	N	M1,TI	8K	
P2764A	12.5	N	M1,TI	8K	
27C64	12.5	C	M1	8K	
87C64	12.5	C	M1	8K	
27128	21.0	N	MF	16K	
27128A	12.5	N	M2,TI	16K	
27256	12.5	N	MZ,TI	32K	
P27256	12.5	N	MZ	32K	
27C256	12.5	C	MZ	32K	
27C256A	12.5	C	MZ	32K	
87C256	12.5	C	MZ	32K	
27512	12.5	N	M7,TI	64K	
P27512	12.5	N	M7	64K	
27C512	12.5	C	M7	64K	
27513	12.5	N	M#,TI	64K	
27010	12.5	N	M=,TI	128K	Note 6
270C10	12.5	C	M=	128K	Note 6
27011	12.5	N	M=,TI	128K	
27C100	12.5	C	M=	128K	111
27C020	12.5	C	M.J	256K	Note 6
27C040	12.5	C	M.K	512Kx8	110
27210	12.5	N	M=,TI	64Kx16	Note 1
27C220	12.5	C	call	128Kx16	Note 1
27C213	12.5	C	call	64Kx16	Note 8
27C240	12.5	C	call	256Kx16	Note 1

Intel			**EEproms**		
Part #	Volts	Type	Menu	Size, notes	
2816A	TTL	N	MY	2K	
2817A	TTL	N	M3	2K	
2864	TTL	N	M9	8K	

Intel			**FLASH**		
Part #	Volts	Type	Menu	Size, notes	
28F256	12.5	F	M.Z	32K	
28F512	12.5	F	M.=	64K	use M.=
28F010	12.5	F	M.=	128K	

Intel			**MPU**		
Part #	Volts	Type	Menu	Size, notes	
8741	25.0	N	MR	1K	Note 2
8742H	21.0	N	MU	2K	Note 2
8742AH	12.5	N	M!	2K	Note 9
8748	25.0	N	MR	1K	Note 2
8748H	21.0	N	MT	1K	Note 2
8749H	21.0	N	MU	2K	Note 2
8751	21.0	N	MV	4K	Note 10
8751H	21.0	N	MV	4K	Note 10
8751BH	12.5	H	M$	4K	Note 11
87C51	12.5	C	M$	4K	Note 11
87C51FA	12.5	C	M?	8K	Note 11
87C51FB	12.5	C	M?	16K	Note 11
87C51FC	12.5	C	M.?	32K	
8752A/BH	12.5	C	M^	8K	Note 11
8744H	21.0	N	MV	4K	Note 10

Intel			**Other**		
Part #	Volts	Type	Menu	Size, notes	
8755	25.0	N	MW	2K	Note 12

Ict			**BI-CMOS**		
Part #	Volts	Type	Menu	Size, notes	
27CX321/2	13.5	C	M{	4K	(NARROW/WIDE)
27CX641/2	13.5	C	M}	8K	(NARROW/WIDE)

MACRONIX			**EPROMS**		
Part #	Volts	Type	Menu	Size, notes	
MX27C256	12.5	C	MZ	32K	
MX27C512	12.5	C	M7	64K	
MX27C1000	12.5	C	M=	128K	110
MX27C1001	12.5	C	M=	128K	111
MX27C1024	12.5	C	M=	64K	210
MX27C2000	12.5	C	M.J	256K	110
MX27C2048	12.5	C	M.J	128K	210
MX27C4000	12.5	C	M.K	512K	110
MX27C4096	12.5	C	M.K	256K	210

Microchip Technology®			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
27C64	12.5	C	M1,TI	8K	
27HC64	12.5	C	M1,TI	8K	
27C128	12.5	C	M2,TI	16K	
27C256	12.5	C	MZ,TI	32K	
27HC256	12.5	C	MZ	32K	
27C512	12.5	C	M7,TI	64K	
27C512	12.5	C	M7	64K	

Microchip Technology			**EEproms**		
Part #	Volts	Type	Menu	Size, notes	
28C16A	TTL	C	MQ	2K	
28C17A	TTL	C	M3	2K	
28C64A	TTL	C	M9	8K	

Microchip Technology			**(E)Proms**	
Part #	Volts	Type	Menu	Size, notes
27C291	12.5	C	M@	2K
27HC641	12.5	C	M}	8K

Mitsubishi®			**Eproms**	
Part #	Volts	Type	Menu	Size, notes
M5L2716K	25.0	N	MB	2K
M5L2732K	25.0	N	MC	4K
M5L2764K	21.0	N	ME	8K
M5L27128	21.0	N	MF	16K
M5M27C128	21.0	C	MF	16K
M5L27256	12.5	N	MZ,TI	32K
M5M27C256K	12.5	C	MZ,TI	32K
M5L27512	12.5	N	M7,TI	64K
M5M27C101K	12.5	C	M=,TI	128K Note 6
M5M27C102K	12.5	C	M=,TI	64Kx16 Note 1

Motorola			**Eproms**	
Part #	Volts	Type	Menu	Size, notes
MCM2716	25.0	N	MB	2K
MCM2532	25.0	N	MI	4K
MCM68732	25.0	N	MC	4K
MCM68764	25.0	N	MK	8K
MCM68766	25.0	N	MK	8K

Motorola			**EEproms**	
Part #	Volts	Type	Menu	Size, notes
MCM2833	TTL	N	M9	4K
MCM2864	TTL	N	M9	8K

Motorola Part #	Volts	Type	**MPU** Menu	Size, notes	
MC68HC711D3	12.5	C	MZ,TI	4K	711 LS
MC68HC711E9	12.5	C	MZ,TI	12K	711 LS
MC68HC711K4	12.5	C	MZ,TI	K	711 LS
MC68HC711M2	12.5	C	MZ,TI	K	711 LS
MC68HC711N4	12.5	C	MZ,TI	K	711 LS
MC68HC711P2	12.5	C	MZ,TI	K	711 LS
MC68705P3	21.0	N	(note)	1K	Note 13
MC68705P5	21.0	N	(note)	1K	Note 13
MC68705R3	21.0	N	(note)	2K	Note 13
MC68705R5	21.0	N	(note)	2K	Note 13
MC68705U3	21.0	N	(note)	2K	Note 13
MC68705U5	21.0	N	(note)	2K	Note 13

Note: 711 LS indicates to use a Model 711 adapter made by Logical Systems, available from GTEK.

National Eproms					
Part #	Volts	Type	Menu	Size, notes	
MM2716	25.0	N	MB	2K	
NMC27C16	25.0	C	MB	2K	
NMC27C16BQ	12.5	C	MG	2K	
NMC27C32	25.0	C	MC	4K	
NMC27C32BQ	12.5	C	MH	4K	
NMC27C64	12.5	C	M1	8K	
NMC27C128	12.5	C	M2	16K	
NMC27CP128	12.5	C	MZ	16K	
NMC27C256/BQ	12.5	C	MZ	32K	
NMC27C512/AQ	12.5	C	M7	64K	
NMC27C1023Q	12.5	C	M=	128Kx8	110
NMC27C1024Q	12.5	C	M=	64Kx16	210

National EEprom					
Part #	Volts	Type	Menu	Size, notes	
NMC98C64A	TTL	N	M9	8K	
NMC9346	TTL	C	M.X	128	Note 14

National MPU					
Part #	Volts	Type	Menu	Size, notes	
NMC46083MH	12.5	C	M.R	8K	
HPC467064	13.0	C	M.S	16K	

NEC®			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
µPD2716D	25.0	N	MB	2K	
µPD2732D	25.0	N	MC	4K	
µPD2732C	25.0	N	MC	4K	
µPD2732AD	21.0	N	MD	4K	
µPD27C32D	21.0	N	MD	4K	
µPD2764D	21.0	N	ME	8K	
µPD2764C	21.0	N	ME	8K	
µPD27C64D	21.0	C	ME	8K	
µPD27C64C	21.0	C	ME	8K	
µPD27128D	21.0	N	MF	16K	
µPD27128C	21.0	N	MF	16K	
µPD27256D	21.0	N	M8	32K	
µPD27256C	21.0	N	M8	32K	
µPD27C256A	12.5	C	M%	32K	
µPD27C256D	21.0	C	M8	32K	
µPD27C256C	21.0	C	M8	32K	
µPD27C512D	12.5	C	M5	64K	
µD27C1000A	12.5	C	M=	128K	Note 7*
µPD27C1001A	12.5	C	M=	128K	Note 6*
µPD27C1024	12.5	C	M=	64Kx16	Note 1
µPD27C2001	12.5	C	call	256K	Note 6*

*Note NEC µPD27C1001 is same “pinout” as OKI MSM271000 or a Toshiba TC571000. NEC apparently has the 1000 and the 1001 reversed in their part numbers. On an NEC part, the “1000” has a non–standard JEDEC pinout, and the “1001” has the standard JEDEC pinout. Pins 2 and 24 (A16 and –OE on a standard JEDEC part) are reversed.

NEC			EEPROM		
Part #	Volts	Type	Menu	Size, notes	
µPD28C64	TTL	C	9	8K	

NEC			MPU		
Part #	Volts	Type	Menu	Size, notes	
8741	25.0	N	MR	1K	Note 2
8742H	21.0	N	MU	2K	Note 2
8748	25.0	N	MR	1K	Note 2
8748H	21.0	N	MT	1K	Note 2
8749H	21.0	N	MU	2K	Note 2

OKI®			Eproms		
Part #	Volts	Type	Menu	Size	notes
MSM2764	21.0	N	ME	8K	
MSM2764A	12.5	N	M1	8K	
MSM2764AZB	12.5	N	M1	8K	
MSM27128	21.0	N	MF	16K	
MSM27128A/AS	12.5	N	M2,TI	16K	
MSM27128AZB	12.5	N	M2	16K	
MSM27C128AS	12.5	C	M2	16K	
MSM27256/AS	12.5	N	MZ	32K	
MSM27256ZB	12.5	N	MZ	32K	
MSM27C256	12.5	C	MZ	32K	
MSM27C256ZB	12.5	C	MZ	32K	
MSM27C256H	12.5	C	MZ,TI	32K	
MSM27C256HZB	12.5	C	MZ,TI	32K	
MSM27512/AS	12.5	N	M7	64K	
MSM27512ZB	12.5	N	M7	64K	
MSM271000/AS	12.5	N	M=	128K	Note 6
MSM271000ZB	12.5	N	M=	128K	Note 6
MSM271024/AS	12.5	N	M=	64Kx16	Note 1
MSM27C1024/AS	12.5	C	M=	64Kx16	Note 1

OKI® **EEproms**

Part #	Volts	Type	Menu	Size, notes
MSM16811RS	TTL	C	M.X	128 Note 14
MSM16911RS	TTL	C	M.Y	1K Note 14
MSM28C16ARS	TTL	C	MQ	2K
MSM28C64ARS	TTL	C	M9	8K

Rockwell® **Eproms**

Part #	Volts	Type	Menu	Size, notes
87C64	12.5	C	M1,TI	8K

Samsung® **EEproms**

Part #	Volts	Type	Menu	Size, notes
KM2816A	TTL	C	MY	2K
KM28C16	TTL	C	MY	2K
KM2817A	TTL	C	M3	2K
KM28C17	TTL	C	M3	2K
KM2864A/H	TTL	C	M9	8K
KM28C64	TTL	C	M9	8K
KM28C256	TTL	C	M4	32K

Seeq® **Eproms**

Part #	Volts	Type	Menu	Size, notes
5133	21.0	N	ME	8K
5133H	21.0	N	ME	8K
5143	21.0	N	MF	16K
27256	12.5	N	MZ,TI	32K
27C256	12.5	N	MZ,TI	32K

Seeq			**EEproms**	
Part #	Volts	Type	Menu	Size, notes
DQ2816A	TTL	N	MY	2K
DQ2817A	TTL	N	M3	2K
DQ2864	TTL	N	M9	8K
DQ28C64	TTL	C	M9	8K
DQ28C256	TTL	C	M4	32K
5212	TTL	N	MP	1K
5213	TTL	N	MP	2K
52B13	TTL	N	MP	2K
52B23	TTL	N	M9	4K
52B33	TTL	N	M9	8K
52B13H	TTL	N	M9	2K
52B23H	TTL	N	M9	4K
52B33H	TTL	N	M9	8K

Signetics®			**Eproms**	
Part #	Volts	Type	Menu	Size, notes
27C64	12.5	C	M1,TI	8K
87C64	12.5	C	M1,TI	8K
27C256	12.5	C	MZ,TI	32K
87C256	12.5	C	MZ,TI	32K

SGS®			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
M2716	25.0	N	MB	2K	
M2716P	25.0	N	MB	2K	
M2732A	21.0	N	MD	4K	
M2732AP	21.0	N	MD	4K	
M2764	21.0	N	ME	8K	
M2764P	21.0	N	ME	8K	
M2764A	12.5	N	M1,TI	8K	
M2764AP	12.5	N	M1,TI	8K	
M27128A	12.5	N	M2,TI	16K	
M27256	12.5	N	MZ,TI	32K	
M27C256B	12.5	C	MZ	32K	
M87C257	12.5	C	MZ	32K	
M27512	12.5	N	M7,TI	64K	
M27C512	12.5	C	M7	64K	
M27C513	12.5	C	M#	64K	(PAGED)
M27C516	12.5	C	M=	32K	(PAGED)
M87C512	12.5	C	M7	64K	
M27C1000	12.5	C	M=	128K	111
M27C1001	12.5	C	M=	128K	110
M27C1011	12.5	C	M=	128K	(PAGED)
M27C1024	12.5	C	M=	64K	210
M27C2001	12.5	C	M.J	256K	110
M27C4001	12.5	C	M.K	512K	110
M27C4002	12.5	C	M.K	256K	210

SMOS®			**Eproms**	
Part #	Volts	Type	Menu	Size, notes
27C64	21.0	C	ME	8K
27128	21.0	N	MF	16K
27C256	12.5	C	MZ,TI	32K

SMOS			**EEproms**		
Part #	Volts	Type	Menu	Size, notes	
2864	TTL	N	M9	8K	

TexasInstruments®			**Eproms**		
Part #	Volts	Type	Menu	Size, notes	
TMS2516	25.0	N	MB	2K	
TMS2532	25.0	N	MI	4K	
TMS2532A	21.0	N	M+	4K	
TMS2732	25.0	N	MC	4K	Note 15
TMS2732A	21.0	N	MD	4K	Note 15
TMS27C32	21.0	N	MH,TQ	4K	
TMS27PC32	21.0	N	MH,TQ	4K	
TMS27P32A	21.0	N	MD	4K	Note 15
TMS2564	25.0	N	MJ	8K	Note 15
TMS2764	21.0	N	ME	8K	Note 15
TMS27P64	21.0	N	ME	8K	Note 15
TMS27C64	12.5	C	M1	8K	
TMS27PC64	12.5	C	M1	8K	
TMS27C128	12.5	C	M2	16K	
TMX27PC128	12.5	C	M2	16K	
TMS27C256	12.5	C	MZ	32K	
TMX27PC256	12.5	C	MZ	32K	
TMS27C512	12.5	C	M7,TI	64K	
TMS27PC512	12.5	C	M7,TI	64K	
TMS27C010	12.5	C	M=	128K	Note 6
TMX27PC010	12.5	C	M=	128K	Note 6
TMS27C210	12.5	C	M=	64Kx16	Note 1
TMX27PC210	12.5	C	M=	64Kx16	Note 1

TexasInstruments			**EEprom**	
Part #	Volts	Type	Menu	Size, notes
TMS28C64	TTL	C	M9	8K

TexasInstruments (E)Prom (Prom equiv)

Part #	Volts	Type	Menu	Size, notes
TMS27C49	13.5	C	call	2K
TMS27C291	13.5	C	M@	2K
TMS27C292	13.5	C	M@	2K
TMS27PC291	13.5	C	M@	2K

Thomson–Mostek® Eproms

Part #	Volts	Type	Menu	Size, notes	
ET2716	25	N	MB,TI	2K	
ETC2716	25	C	MB,TI	2K	
ETC2732	25	C	MD	4K	
TS27C64	12.5	C	M1,TI	8K	
TS27C64P	12.5	C	M1,TI	8K	
TS27C256	12.5	C	MZ,TI	32K	
TS27C256P	12.5	C	MZ,TI	32K	
TS27C1001	12.5	C	M=,TI	128K	Note 6
TS27C1024	12.5	C	M=	64Kx16	Note 1

Thomson Mostek EEproms

Part #	Volts	Type	Menu	Size, notes
TS93C46P/C	TTL	C	M.X	1K
TS28C16A/P/C	TTL	C	MY	2K
TS28C17A/P/C	TTL	C	M3	2K
TS28C64	TTL	C	M9	8K

Toshiba®			**Eproms**	
Part #	Volts	Type	Menu	Size, notes
TMM2464AP	12.5	N	M1,TI	8K
TMM2764D	21.0	N	ME	8K
TMM2764DI	21.0	N	ME	8K
TMM2764AD	12.5	N	M1,TI	8K
TMM24128AP	12.5	N	M2,TI	16K
TMM27128D	21.0	N	MF	16K
TMM27128DI	21.0	N	MF	16K
TMM27128AD	12.5	N	M2,TI	16K
TMM24256AP/F	12.5	N	MZ	32K
TMM24256BP/F	12.5	N	MZ	32K
TMM27256D	21.0	N	M8	32K
TMM27256DI	21.0	N	M8	32K
TC54256AP/AF	12.5	C	MZ	32K
TC57256D	21.0	C	M8	32K
TC57256AD	12.5	C	NOTE*	32K
TC57H256D	12.5	C	MZ	32K
TMM27256BD	12.5	N	MZ	32K
TMM27256BDI	12.5	N	MZ	32K

* NOTE: TC57C256 parts with –120, –12 and –150 use MZ (QuickPulse). Parts with –15 or –20 use MZ, TI (intelligent).

Toshiba® **Eproms (Continued)**

Part #	Volts	Type	Menu	Size, notes
TMM24512AP/AF	12.5	N	M7	64K
TMM27512D	12.5	N	M7,TI	64K
TMM27512AD	12.5	N	M7	64K
TMM27512ADI	12.5	N	M7	64K
TC54512AP/AF	12.5	C	M7	64K
TC57512AD	12.5	C	M7	64K
TC541000P/F	12.5	C	M=	128K Note 6
TC541001P/F	12.5	C	M=	128K Note 7
TC571000D	12.5	C	M=	128K Note 6
TC571001D	12.5	C	M=	128K Note 7
TC571024D	12.5	C	M=	64Kx16 Note 1
TC57H1024D	12.5	C	M=	64Kx16 Note 1
TC574000D	12.5	C	call	512Kx8 Call (4Mb)
TC58257	12.5	C	call	32K Flashtype–Call

VLSI® **Eproms**

Part #	Volts	Type	Menu	Size	notes
VT27C64	12.5	C	M1,TI	8K	
VT27C128	12.5	C	M2,TI	16K	
VT27256	12.5	C	MZ,TI	32K	

WaferScale®			**Rproms™**		
Part #	Volts	Type	Menu	Size	notes
WS57C191/291	13.5	C	M&	2K	Note 16
WS27C292	13.5	C	M&	2K	
WS57C43	13.5	C	M&	2K	
WS57C49	13.5	C	M.&	2K	
WS27C64F	12.5	C	M1,TI	8K	
WS57C64F	12.5	C	M1	8K	
WS27C128F/B	12.5	C	M2,TI	16K	
WS57C128F	12.5	C	M2	16K	
WS27C256F	12.5	C	MZ,TI	16K	
WS57C256F	12.5	C	MZ	16K	

Xicor			**EEproms**		
Part #	Volts	Type	Menu	Size	notes
X2816A	TTL	N	MQ	2K	
X2864A	TTL	N	M9	8K	
X28C64	TTL	C	M9	8K	
X28256	TTL	N	M4	32K	
X28C256	TTL	C	M4	32K	
X28HC256	TTL	C	M.%	32K	
X28C010	TTL	C	Call	128K	Call

GTEK believes that the information contained in this list is correct. However, GTEK assumes no responsibility or liability for the accuracy of this list.

NOTES ON NEXT PAGE

These Notes are beside the Eprom selections on the Previous pages:

1– Use the Model 210 adapter with this 40 pin Eprom.

2– Use the Model 481 adapter with this 40 pin MPU.

3– Use the Model 514 adapter with this part and the Model 9000 **Versions 5.31 and later. See Note 11 for 5.30 and earlier.**

0000–0FFFH	Code area (87C51– can also use 511 Rev D)
0000–1FFFH	Code Area (87C51FA or 8752AH, 514 only)
0000–3FFFH	Code Area (87C51FB, 514 only.)
0000–7FFFH	Code Area (87C51FC, 514 only.)
8030H	Signature byte. Manufacturer
8031H	Signature byte. Part type
8800–881FH	Encryption data. Key bytes go here.
	Lock bit 3. NOT SUPPORTED
C000H	Lock bit 2. Program FFH here for Lock 2.
CC00H	Lock bit 1. Program FFH here for Lock 1.

It's not possible to read the encryption table. You can verify it by reading the programmed code and massage it with your original code that you programmed the part with. If Lock bit 2 is set, you will not be able to read or program the part at all, until you erase it. If Lock bit 1 is set, then you can still read the part, byt you can not program it any more until you erase it.

If you're using a model 511 adapter (to program 87C51— not FA or FB versions) purchased before July of 1986, make sure that it is modified to be a REV–D for use with the Model 9000. If it is not modified you will not be able to program the encryption or lock bits. The modification does not affect the operation of the 511 with other GTEK programmers. You can use a 514 (any revision) adapter in place of a 511 adapter.

4– Pin 1 on this part should be isolated from the programmer pin 1. Use a wire wrap socket with pin 1 cut off the socket so it can not reach the programmer's socket.

5– This Fujitsu 12.5 volt algorithm selection (Quick Pro) is different from the Intel selection by the use of the –CE pin.

6– Use Model 110 adapter to program this 32 pin standard JEDEC eprom.

7– Use Model 111 adapter or make adapter for the Model 110 to program this 32 pin eprom. Adapter can be made to use Model 110 by swapping pins 2 and 24 **of the 32 pin site**. Jedec pin 2 = A16, pin 24 = –OE; Non–Jedec pin 2 = –OE, pin 24 = A16.

8– The Model 210 adapter can not program this part in the synchronous mode.

9– Use Model 483 adapter with this part and selection. Uses Adaptive algorithm only. Programming the security byte on the 8742AH chip is accomplished by programming data 0FFh at location 0FF1Fh.

10– Use Model 511 (or 514) adapter with this part and selection. Uses Standard algorithm only. Programming the security byte on the 8751 or 8744 chip is accomplished by programming data 00h at location 0FFFFh. The data in location 0FFFh in the 8751 may be anything but zero, or else the security byte will not program.

11– To program an **87C51** (does **NOT** apply to **FA** or **FB** versions) on a Model 9000 **Versions 5.09 through 5.30 with a 511 (rev–D) or 514** adapter uses this chart for security programming. An **8752AH or 87C51FA** on a Model 9000 **Versions 5.26 through 5.30 with a 514** adapter use this chart. Any others refer to note 3.

0000H–0FFFH	Code Area. 87C51 (9000 V5.09 thru V5.30)
0000H–1FFFH	Code Area, 8752AH (9000 V5.26 thru V5.30)
2000H–201FH	Encryption Area for KEY bytes.
6000H	Signature Byte 1. 89H = Intel
6001H	Signature Byte 2. 57 = 87C51
8000H	Lock Bit 1. Program FFH for Lock 1
E000H	Lock Bit 2. Program FFH for Lock 2
	Lock Bit 3. Not Supported.

It's not possible to read the encryption table. You can verify it by reading the programmed code and massage it with your original code that you programmed the part with. If Lock bit 2 is set, you will not be able to read or program the part at all, until you erase it. If Lock bit 1 is set, then you can still read the part, but you can not program it any more until you erase it.

If you're using a model 511 adapter (to program 87C51— not FA or FB versions) purchased before July of 1986, make sure that it is modified to be a REV–D for use with the Model 9000. If it is not modified you will not be able to program the encryption or lock

bits. The modification does not affect the operation of the 511 with other GTEK programmers. You can use a 514 (any revision) adapter in place of a 511 adapter.

12– Use Model 755 adapter with this part and selection. Uses Standard algorithm only.

13– These parts are programmed using a 705 programmer. Program a 2732, 2732A, 2732B or on special models a 2764 or 2764A with program code, then put into program eprom socket of Model 705.

14– Use the Model 346 adapter to program this 8 pin serial EEprom.

15– These parts may REQUIRE the Adaptive algorithm. TI started producing chips using a fast algorithm without changing their part numbers. You may not be able to determine which algorithm to use with these parts. To be safe, always use the Adaptive algorithm with these parts. Programming with the dumb algorithm might damage the part.

—Notes—

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Appendix C

Changing the Default Baud Rate on the Model 9000 Version 5.24 and later	
Desired Default Baud Rate	**Jumper the DB25 site on the PC board as follows**
300	**21 and 23 to 24**
1200	**23 to 21**
2400	**open (default)**
9600	**21 to 24**
19200	**23 to 24**

—Notes—

Appendix D

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