BYTEK® EZ-WRITER-K3/C3 MULTIPROGRAMMER®

OPERATOR'S MANUAL

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Safety Summary

Information necessary for personal operating safety is contained in this section. Additional safety **CAUTION** and **WARNING** statements, where needed, can be found within the various manual sections.

Definitions

WARNING

Points to procedures or circumstances that could result in personal injury or loss of life.

CAUTION

Points to procedures or circumstances that could lead to equipment or other property damage.

SAFETY SYMBOLS

~ VAC - This symbol specifies that the indicated voltage is ALTERNATING CURRENT.

Power Source

Check the voltage lable (found on the rear of the unit) to insure that the unit is configured for the proper line voltage.

Grounding The EZ-WRITER System

The EZ-WRITER is grounded via the third (round) prong of the power cord. To avoid potential electric shock, operate the EZ-WRITER using a properly wired and grounded receptacle.

WARNING:

Removal or circumvention of the ground pin in the power cord constitutes a safety hazard.

Power Cord

Use only the power cord supplied with your unit. In the event of power cord damage or fraying, discontinue use and contact BYTEK for service.

Fuse Replacement

The fuse in the EZ-WRITER is located in the internal power supply and is to provide protection against fire in the event of a failure. For continued protection, replace fuse only with the same type and rating.

Obtaining Service

To obtain service for your unit, contact BYTEK at (407) 994-3520 or your nearest Factory Representative.

Introduction

The EZ-WRITER MULTIPROGRAMMER® is a completely stand-alone device programmer capable of programming 24, 28, 32-pin and 40-pin NMOS and CMOS EPROMs and EEPROMs.

The EZ-WRITER basic system requires no modules or adapters to support all (E)EPROM devices listed in the back of this manual. However, the optional modules listed below expand the basic capabilities of the EZ-WRITER MULTIPROGRAMMER to support other programmable device technologies. For example: with the SETCel-32 connected to the UNIPORT up to four (4) 32-pin devices can be programmed in the GANG or SET Mode. With the MICROCel Module attached to the UNIPORT, you can program microcomputer devices such as INTEL 8700 family.

Basic System Options and Accessories:

TECHNOLOGY	ACCESSORIES
Micro Computers	MICROCel-2 x 1
Additional (E)EPROM Support	SETCel32-4 (4 devices)
40-Pin EPROMs	SETCel40-4 (4 devices)

Contact Your Sales Representative For Latest Available Accessories

The EZ-WRITER MULTIPROGRAMMER operates in Local Mode only. In LOCAL mode, the EZ-WRITER MULTIPROGRAMMER is operated from the front panel keyboard along with the 40 character LCD display. In Remote mode, the EZ-WRITER is controlled via the RS-232 compatible interface, standard in each unit.

The EZ-WRITERs comprehensive device and data management features include SET programming, and when operated under Computer Remote Mode complete RAM editing capabilities are available.

In the data management area, the EZ-WRITER supports fifteen (15) different Data Translation Formats for file transfer to and from the most popular software development systems.

About This Manual

This manual explains the EZ-WRITER MULTIPROGRAMMER operation in both control modes, LOCAL and REMOTE. Installation information can be found in the SYSTEM SET-UP section while more detailed operating instructions are given in the separate LOCAL and REMOTE Operation sections which follow.

Please read this manual carefully before proceeding to gain an overview of the entire system.

We would like to thank you for selecting a BYTEK Product. Remember that we stand by our products and remain available to you for service.

EZ-WRITER Features

- ❑ Data RAM (bytes): 256K, 512K, 1 MEG (EZ-K3)
- ❑ Data RAM (bytes): 64K, 256K, 512K, 1 MEG (EZ-C3)

- ❑ Data Translation Formats: DATA I/O Binary, BYTEK Binary, ASCII Space HEX, ASCII HEX % STX, ASCII HEX % SOH, Farichild F8, MOSTEK, Motorola Exorciser (S1), INTEL Intellect MDS 8Bit, Signetics, Tektronix Hexadecimal, Motorola Exormax (S2), INTEL MCS-86 HEX, Motorola 32Bit

- ❑ Input/Output: 9-pin male connection RS-232 compatible Asynchronous Serial

- ❑ Baud Rates: 110 - 19,200

- ❑ Remote Control Interface: Computer Remote Mode (CRM)
  Terminal Remote Mode (TRM)

- ❑ LOCAL keyboard: 3 key

- ❑ LOCAL display: 20 x 2 character alphanumeric Liquid Crystal Display (LCD)

- ❑ Sockets: One (1) 32-pin and One (1) 40-pin Zero Insertion Force (ZIF) Socket (EZ-K3)
- ❑ Sockets: One (1) 32-pin Zero Insertion Force (ZIF) Socket (EZ-C3)

- ❑ 2 Bicolor LEDs (Green/Red) (EZ-K3)
- ❑ 1 Bicolor LED (Green/Red) (EZ-C3)

- ❑ UNIPORT
  One (1) 64-pin Female Connector

Power Source

- ❑ Operating Voltage: 100 - 130 VAC or 200 - 240 VAC
- ❑ Frequency Range: 48 - 62 Hz.
- ❑ Power Consumption: 50 Watts
- ❑ Power Protection: 1AMP 250Volt Fuse located in internal power supply

Physical and Environmental

- ❑ Dimensions: 4.5" x 11" x 17" (11.5cm x 28cm x 43cm) (K3)
  2.5" x 11" x 6.5" (6.5cm x 28cm x 16cm) (C3)
- ❑ Weight: 6 lbs. (K3)
  5 lbs. (C3)
- ❑ Temperature: Operating Range: 41° to 113° F (5° to 45° C)
  Storage Range: -40° to 158° F (-40° to 70° C)
- ❑ Humidity: Up to 90% (noncondensing)

EZ-WRITER Device Capability Updates

BYTEK will offer firmware upgrades for the EZ-WRITER MULTIPROGRAMMER periodically in response to device market expansions. Contact BYTEK or your sales representative for further information on expanding the capabilities of your EZ-WRITER.

About Your Warranty

BYTEK warrants the EZ-WRITER MULTIPROGRAMMER against defects in materials and workmanship for a period of one year beginning when you receive the unit, unless otherwise specified. For complete terms and conditions of your EZ-WRITER warranty, consult the warranty card found within the EZ-WRITER shipping package. In the event that warranty service should become necessary, contact BYTEK directly for return authorization and specific instructions. When contacting BYTEK for service you will need to know the release level of the installed firmware and the serial number of your equipment. Consult the SYSTEM SET-UP section for information on obtaining this release level.

BYTEK's Customer Service Department can be reached Monday thru Friday (8:00am to 5:00pm Eastern Standard Time) at 1-407-994-3520 or for after hours correspondence you may FAX BYTEK at 407-994-3615.

Manual Contents

Introduction

- This section offers a general overview of the EZ-WRITER MULTIPROGRAMMER, including features, options, and general warranty information.

1. System Set-up

- This section provides set-up information designed to get the first time user up to speed with basic EZ-WRITER installation and initial power up. A brief procedure for duplicating a Master EPROM is also provided.

2. Local Panel Operation

- This section offers a command by command description of all EZ-WRITER operations in the LOCAL control mode using the front panel keyboard and LCD.

3. I/O Port

- Device operations are covered along with Data Management functions such as file upload and download. How to interconnect and set-up the serial RS-232 port .

4. Section 4 has been Intentionally Omitted.

5. Computer Remote Mode

- This section describes the Operation of the EZ-WRITER using the Computer Remote Mode command language via the RS-232 port. This language is designed for the purpose of driving the EZ-WRITER using a host computer. Specifications for the fifteen (15) data translation formats supported are provided in this section.

6. Section 6 has been Intentionally Omitted.

7. UNIPORT

- This section includes information required to operate all Cels attached to the UNIPORT connector.

8.Others

- This section is provided for information on user notes.

9. Help

- This section provides system accurary control, including stand-alone diagnostic features and a complete error message explanation.

10. Device/Index

- The Device List of supported devices is kept in this section and an alphabetical index to this manual.

1. System Set-Up

This section includes information on how to set up the EZ-WRITER unit including power connection and system grounding.

Installing A Programming Cel

The EZ-WRITER does not require any modules or personality features for its basic (E)EPROM related operations. However, if your unit includes an optional Cel, such as a SETCel, MICROCel, then refer to the optional Accessory Section for instructions. Do not attempt to install a programming Cel until the basic system is fully operational.

Grounding The EZ-WRITER MULTIPROGRAMMER

The EZ-WRITER is shipped with a three-wire grounded power cord. This cord provides a ground path from the EZ-WRITER to earth ground when the EZ-WRITER is plugged into a properly installed three-wire receptacle.

WARNING:

Operation of the EZ-WRITER MULTIPROGRAMMER in the absence of a proper ground connection could result in electric shock.

Connecting Power To The EZ-WRITER

CAUTION:

The EZ-WRITER halts with ALL LEDs flashing RED if a device is installed during SELFTEST. Remove ALL devices from the programming sockets prior to applying or removing DC power.

If your power source is 220VAC, make sure that the 220volt option has been installed as indicated by a label affixed to the side of the unit next to the power switch.

A. Position the AC power switch on the side of the unit to "OFF".

B. Connect the system power cord to 115/220 Volts AC, 50 or 60 Hz.

C. Position the AC power switch to "ON". Power on causes the initiation of the SELFTEST routine.

Power Off

A. Wait for current command to terminate or abort command.

B. Remove all devices from programming sockets.

C. Position the AC power switch on the side of the unit to "OFF".

Initial Power-On Diagnostic

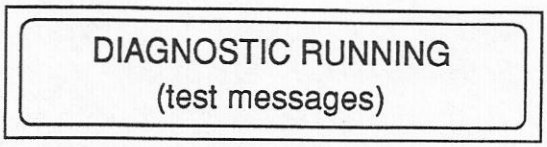
When power is turned on, the "DIAGNOSTIC" sequence begins. The DIAGNOSTIC checks all functional units listed below.

TEST
Microprocessor
Read Only Control Storage
Utility RAM
Liquid Crystal Display
Writeable Control Storage
User RAM
Keyboard
Programming Sockets
Data Paths
I/O Port
Programming Power Source (Pin Drivers)
Status LEDs

If one or more of the first four tests fail, the system is halted in a Fatal Error State. Refer to the Help Section for more details.

Power-On Diagnostic Execution

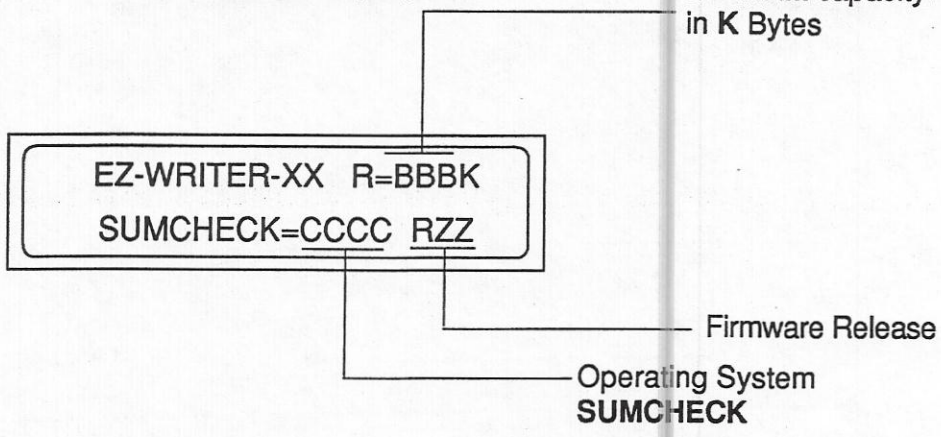
Example LCD:

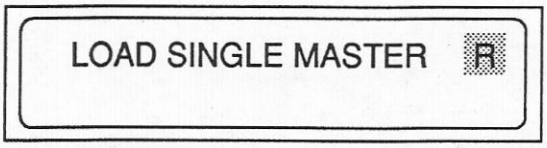


Normal Termination

Programming socket LEDs are ALL OFF and the LCD display is as follows:

NOTE
5 Second Display





NOTE
Refer to the Help Section for detailed explanation on Abnormal Terminations.

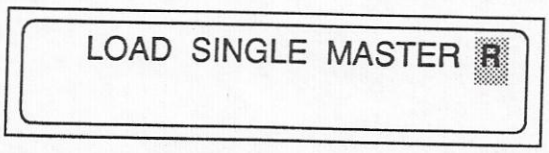
Introduction To Programming with Your EZ-WRITER MULTIPROGRAMMER

The following information represents a simplified procedure for a quickly getting up-to-speed with the operation of your new system.

The following procedure describes how to duplicate a Master device. A Master device consists of an EPROM that has been previously programmed and stores information to be programmed into a blank "Target" device.

Assumptions:

1. The Master device is an INTEL 27256.
2. The blank Target device is an INTEL 27256.
3. Device type selection is from the Manufacturers Menu.
4. Power has been turned on and the LCD shows the following message:



For full details on the EZ-WRITER Operations, refer the the Local Panel Operation section of this manual.

For a quicker method of getting started follow this procedure:

Step	Key	Example LCD Display	Remark
1		LOAD SINGLE MASTER (DDDD) (MMM)	Using the "Λ" key to scroll to Load Single Master Operation and press the EXECUTE key. D=Last device type. M=Last Manufacturer.
2		SELECT (E)EPROM MFG. ELECTRONIC ID	The lower line of the LCD displays the current (E)EPROM manufacturer or the Electronic ID selection.
3		SELECT (E)EPROM MFG. INTEL	Scroll to desired manufacturer.

NOTE: If you scroll past desired selection use the  **key to move backwards through the menu.**

Introduction To Programming with Your EZ-WRITER MULTIPROGRAMMER

(continued)

Step	Key	Example LCD Display	Remark
4	EXECUTE	SELECT DEVICE TYPE INTEL 2764	Press EXECUTE to select INTEL as manufacturer.
5	Λ	SELECT DEVICE TYPE INTEL 27256	Scroll to device type 27256.
6	EXECUTE	INSTALL MSTER IN SK0 27256 INTEL	Install Master device in socket 0. Make sure pin 1 is toward the top of the socket (see illustration on the face of the EZ-WRITER Local Panel). Push lever down to lock device in place.
7	EXECUTE	LOAD SINGLE MASTER 27256 AAAAAA	Press EXECUTE to initiate Load Operation. Advancing addresses on the lower portion of the display indicate that the Load Operation is in progress.
8		SUMCHECK RAM 27256 XXXXX	During this portion of the Load Operation the SUMCHECK is calculated on device data in RAM.If the execution time is short the action display may not appear.
9		LOAD MASTER DONE CHK-CCCCCC XXXX	X="OK" If no Load RAM error is detected. X="ERR63" If Load RAM error is detected. C=SUMCHECK. Make note of the SUMCHECK for future reference. Remove master device from socket 0.
10	EXECUTE	PROGRAM 27256 INTEL	Press "Λ" key and scroll to Program Operation then press the EXECUTE key. Observe that the display shows 27256 device as the default device type.
11	EXECUTE	INSTALL DEVICE 27256 INTEL	Press EXECUTE key and installl a blank 27256 Target device in any of the eight (8) programming sockets.

Introduction To Programming with Your EZ-WRITER MULTIPROGRAMMER

(continued)

Step	Key	Example LCD Display	Remark
12	EXECUTE	ILLEGAL BIT TEST 27256 AAAAAA	Press EXECUTE to initiate the Program Operation. The Program Operation initially tests the Target device to insure that every bit in the Target device is programmable.
13		PROGRAM 27256 AAAAAA	"A" represents programming is in progress.
14		VER. AT 5.0V PASS 1 27256 AAAAAA	Data programmed in the Target device is being checked to data in RAM.
15		SUMCHECK RAM 27256 AAAAAA	SUMCHECK calculation is taking place. If the execution time is short the action display may not appear.
16		PROGRAM DONE R CHK=CCCCCC XXXX	Normal termination. X="OK" If Program Operation was successful you may remove and compare SUMCHECK to the value noted in step #9. X = "ER22" If installed device failed.
17		PROGRAM DONE R ILLEGAL BIT ER21	Abnormal termination. ER21= ILLEGAL BIT found.

NOTE:
For Other Terminations See Error Section

2. Local Panel Operation

This section offers a step by step description of all EZ-WRITER Operations in the Stand-Alone Mode using the Local Panel Keyboard and LCD. All device oriented operations are covered in this section. The section is subdivided into the following parts:

- **GENERAL OPERATING GUIDELINES.** This section provides standard procedures common to all operational key sequences. This section must be read before proceeding to use the EZ-WRITER .
- **EZ-WRITER LOCAL PANEL.** Defines the function of each key.
- **EZ-WRITER MENU SYSTEM.** Describes the organization of the EZ-WRITER menu system.
- **CLASSIFICATION OF THE EZ-WRITER OPERATIONS.** Explains how the various Operations are classified.
- **ABORTING AN OPERATION SEQUENCE.** Shows the procedure to follow for early termination of an Operation.
- **DEVICE TYPE SELECTION.** Describes in detail the two (2) methods available in the selection of a device type.
- **PROGRAMMING.** Shows how to LOAD, PROGRAM and VERIFY Devices.
- **EDITING.** Describes operations to modify contents of the EZ-WRITER RAM.

General Operating Notes

Installing A Device

Device installation should be done only when the EZ-WRITER prompts you to do so. Take note of the illustration provided on the face of the Local Panel. Observe that bottom pins of the device are bottom justified and pin 1 is toward the top of the socket. Push the lever down to lock the device in place.

CAUTION

1. Never power-on or power-off the EZ-WRITER if a device is installed.
2. Whenever possible, for maximum device protection, operate the system with both ELECTRONIC ID and UPSIDE-DOWN test enabled.
3. Shorting two pins of a device with a scope probe or other conductor may cause permanent damage to pin driver circuitry.

Action Display

The EZ-WRITER MULTIPROGRAMMER generally keeps the operator informed as to the progress in Operation execution by displaying a count in the lower portion of the LCD unit. However, this display may not appear if Operation execution time is short.

Socket LED Indicators

These indicators generally provide the following information:

1. A GREEN LED indicates that the Operation on the installed device is successful.
2. A RED LED indicates that the Operation on the installed device failed.
3. LEDs are turned OFF for empty sockets. A socket with a device installed but not locked in place appears as an empty socket.
4. Pressing a scroll key to enter the First Level Menu causes all LEDs to be turned OFF.

NOTE

Refer to operation key sequence section for more detailed information.

Operation Termination

The completion message for a successful execution of any Operation is shown at the end of each Operation sequence within the Local Panel Operation section.. If the Operation is successful a pass signal of two (2) slow beeps sounds and the appropriate LED(s) below the installed device(s) light green. However, if execution is unsuccessful for any installed device, a failure signal of three (3) quick beeps sounds, the LED(s) below the failing device(s) light red and a failure error code message appears in the LCD (refer to the HELP Section for detailed description of each error code).

General Operating Notes

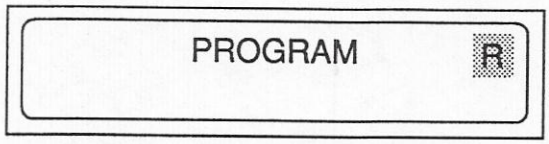
Aborting Operation Execution

The execution of any Operation can be prematurely terminated by activating the EZ-WRITER Abort function.

To execute the Abort function follow this procedure:

The execution of any Operation can be prematurely terminated by pressing either "V" or "Λ" scroll keys or pressing the "EXECUTE" key.

When the Operation is terminated in this manner, the EZ-WRITER reverts to the currently selected menu;i.e. if a scroll key is pressed during a PROGRAM Operation the GANGSITE display will return to:



Cancelling A Menu Key Sequence

Any Menu key sequence can be cancelled by activating the CANCEL function:

Step	Key	Example LCD Display	Remark
1	V Λ	CANCEL ACKNOWLEDGE PLEASE RELEASE KEYS	At any time, after power has been turned on, you can Execute the CANCEL function by pressing simultaneously both scroll keys
		(X X X X X X X) R	X = Last Operation in First Operation Out

Local Panel Keyboard Operation

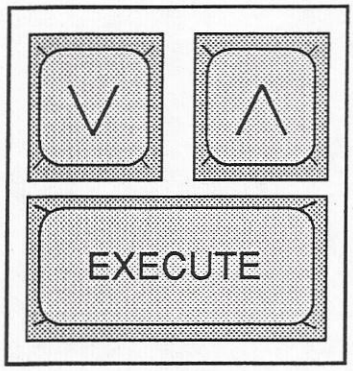
Introduction

Local operation of the EZ-WRITER MULTIPROGRAMMER is controlled by the Local Panel keypad and LCD unit. For ease in operation the EZ-WRITER MULTIPROGRAMMER can be viewed as having a two (2) Level Menu System. Level One offers classification of Operations into different categories that can be directly accessed by the scroll keys. For example, the PROGRAM Operation can be initiated by pressing either up or down scroll key until the Program Operation is displayed in the LCD, then press the EXECUTE key. The following is a simple example of the basic approach to follow in order to execute any of the basic EZ-WRITER Operations.

First, Press "V" or "Λ" key to scroll thru the level of menus.

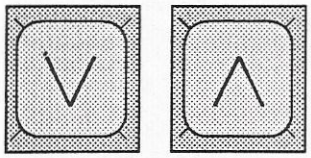
Second, Press "**EXECUTE**" to enter the Second Level of Menus, then scroll to desired Operation.

Third, Press "**EXECUTE**" to initiate the selected Operation.



The Scroll Keys

The scroll keys are used for scrolling through the Operation Menu.

DOWN-SCROLL  UP-SCROLL

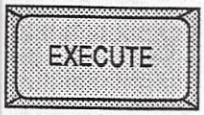
The Execute Key

This key is used to accept a selected Operation and also initiates EXECUTION of "ALL" Operations.

- ❑ Accepts Menu Selections
- ❑ Initiates Command EXECUTION

First-Level Menu

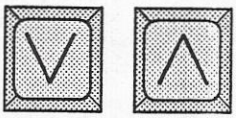
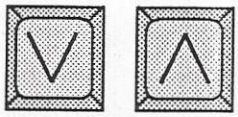
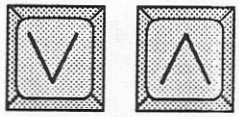
The following keys provide access to the First-Level Menu. The type of prompt by the LCD, in response to pressing a key, is based on the Last-In-First-Out (LIFO) concept. In other words; whenever a key is depressed, first Operation to "pop-up" in the LCD is the last Operation previously selected for that menu. The keys and respective menus are listed below:

The generalized procedure to enter the First-Level Menu is as follows: First PRESS desired scroll key and scroll down/up with the  or  keys, then press 

to enter the First-Level Menu.

Walk thru the First-Level Menu using either scroll key until the desired Operation is displayed, then press the EXECUTE key.

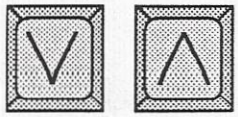
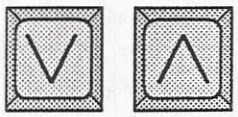
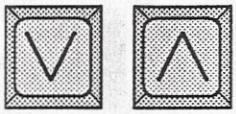
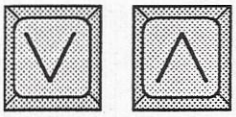
The following Operations are displayed by the First-Level Menu:

Key	Example LCD Display	Remark
	LOAD MASTER R	
	PROGRAM R	
	EDIT OPERATIONS R	

NOTE
SET Operations can be disabled. See Edit System Options.

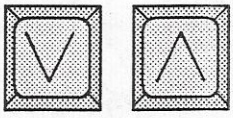
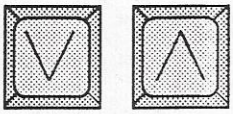
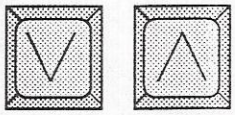
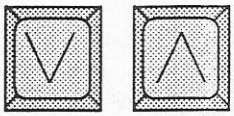
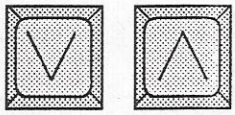
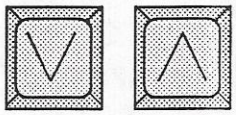
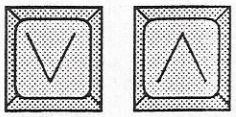
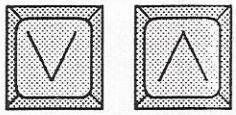
First-Level Menu (continued)

The following Operations are displayed by the First-Level Menu:

Key	Example LCD Display	Remark
	CHECK OPERATIONS R	
	RS-232 PORT R	
	DIAGNOSTIC MODE R	
	TECHNOLOGY SELECT R	

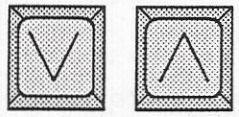
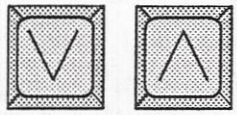
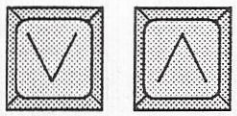
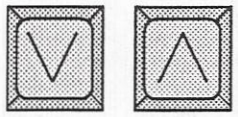
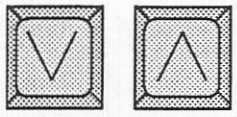
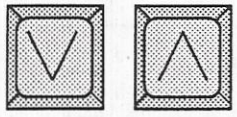
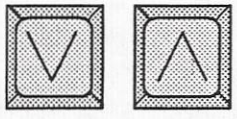
Second-Level Menu

The following Operations are displayed by the Second-Level Menu:

Key	Example LCD Display	Remark
	BLANK CHECK	CHECK OPERATIONS (Section 2)
	VERIFY	
	EDIT SYSTEM OPTIONS	EDIT OPERATIONS (Section 2)
	FILL RAM BLOCK	
	SWAP RAM BYTES	
	DIAGNOSTIC MODE SET DIAGNOSTIC FLAGS	DIAGNOSTIC MODE (Section 9)
	DIAGNOSTIC MODE GO-NO-GO	
	DIAGNOSTIC MODE FIELD DIAGNOSTICS	

Second-Level Menu (continued...)

The following Operations are displayed by the Second-Level Menu:

Key	Example LCD Display	Remark
	RS-232 SERIAL PORT SET-UP	RS-232 PORT (Section 3)
	RS-232 SERIAL PORT DOWNLOAD DATA	
	RS-232 SERIAL PORT UPLOAD DATA	
	TERMINAL REMOTE MODE	
	COMPUTER REMOTE MODE	
	TECHNOLOGY SELECTION (E)EPROM TECHNOLOGY	TECHNOLOGY SELECTION (Section 2)
	TECHNOLOGY SELECTION MICROCOMPUTER TECH. *	

NOTE*

Optional Cel must be installed in UNIPORT or display will not be assecced.

Device Technology Selection

If your EZ-WRITER is equiped with any of the optional CEL modules, you must read this section to become familiar with the required procedures for selecting the additional device support.

To switch device technology follow this procedure:

Step	Key	Example LCD Display	Remark
1	EXECUTE	TECHNOLOGY SELECTION (E)EPROM TECHNOLOGY	Scroll to Technology Selection and press EXECUTE.
2	∧	---- (E)EPROM TECHNOLOGY	Scroll to desired Device Technology (assume EPROM Technology).
	∧	---- MICROCOMPUTER TECH*. **NOTE*** **This menu is not displayed if the MICROCel module is not installed.**	
3	EXECUTE	SELECT (E)EPROM MFG. (MMM)	The lower line of the LCD displays the current (E)EPROM manufacturer (MMM) or the Electronic ID option.
4	∨ ∧	Scroll to desired manufacturer and press **EXECUTE**	
5	EXECUTE	SELECT DEVICE TYPE INTEL 2764	
6	∨ ∧	SELECT DEVICE TYPE INTEL 27256	Scroll to desired device type and press EXECUTE.
7	EXECUTE	TECHNOLOGY SELECTION R 27256 INTEL	

NOTE
To ABORT this procedure press BOTH Scroll keys.

Device Type Selection

The EZ-WRITER Operations are organized into two (2) general classifications, Device-Oriented Operations and System-Oriented Operations. It is important to note that prior to initiating execution of a Device-Oriented Operation a device type must be specified to the EZ-WRITER system.

The GANGSITE incorporates two (2) methods for selecting a supported device type:

- ❑ AUTO ELECTRONIC ID
- ❑ MFG/ DEVICE MENU

Auto Electronic ID Device Selection

The EZ-WRITER MULTIPROGRAMMER is equipped with an Electronic Device Identification (EID) feature which can function in two different modes.

Mode One - Works with all devices which have an EID, (you specify device type, the EZ-WRITER verifies installed device(s) is the correct type). While the EZ-WRITER is in this mode, an error will occur if the tag of the device found by the EZ-WRITER does not match that of the device specified. For example, selecting device 2764A and executing a device Operation for a 27128A will cause a WRONG DEVICE code error. Older devices which may not include an EID are automatically permitted to program. ***This mode can be disabled - See Editing System Options section.***

Mode Two - Is specified by selecting Electonic ID instead of a device type. In this mode, the operator is not required to make any other selection. Instead, device selection is done automatically by the EZ-WRITER. An error will occur if an older device without an EID Tag is installed, or the EID is defective, or if the specified device ID is not yet supported by your EZ-WRITER. An error will also occur if mixed devices are placed in the programming sockets, or no devices are found.
This mode CAN NOT be disabled.

To enter the Auto Electronic ID Mode execute the procedure shown on following page.

Selecting Auto Electronic ID Mode

To select Auto EID Mode from an Operation key sequence use this procedure.

NOTE*

This procedure uses "LOAD MASTER" ONLY as an example. You may use the same procedure at initiation of any device oriented Operation.

Step	Key	Example LCD Display	Remark
1	EXECUTE	LOAD MASTER * 27256 INTEL	Using either "V" or "Λ" keys walk thru the First-Level Menu until Operation Load Master is displayed in the LCD, then press the EXECUTE key.
2	V Λ	SELECT (E)EPROM MFG. (MMM)	Press either scroll key to enter Manufacturers Menu. The lower line of the LCD displays the current (E)EPROM Manufacturer (MMM).
3	V Λ	SELECT (E)EPROM MFG. ELECTRONIC ID	Scroll to Electronic ID and go to step 4.
4	EXECUTE	INSTALL MSTER IN SK0 ELECT. ID FFF/FFF	Pressing the EXECUTE key allows return to Load Master Operation key sequence. FFF/FFF = Special device code to indicate EZ-WRITER is in Auto Electronic ID selection mode.

Device Type Selection from Manufacturers Menu

The Menu Selection Mode allows a Manufacturer (Mfg) and a device to be selected from the Manufacturers Menu. This menu can be accessed by pressing either scroll key during a Device-Oriented Operation.

To select a device from the Manufacturers Menu execute the following procedure:

NOTE*
This procedure uses "LOAD MASTER" ONLY as an example. You may use the same procedure at initiation of any device oriented Operation.

Step	Key	Example LCD Display	Remark
1	EXECUTE	LOAD MASTER* 2764 AMD	Scroll to Load Master Operation and press EXECUTE. Assume current device is AMD 2764 and the desired device type is INTEL 27256.
2	V Λ	SELECT (E)EPROM MFG. AMD	The lower line of the LCD displays the current (E)EPROM Manufacturer AMD.
3	V Λ	SELECT (E)EPROM MFG. INTEL	Scroll to desired (E)EPROM Manufacturer. Assume INTEL.
4	EXECUTE	SELECT DEVICE TYPE INTEL 2764	Press EXECUTE to select INTEL as the new manufacutrer.
5	V Λ	SELECT DEVICE TYPE INTEL 27256	Scroll to INTEL 27256
6	EXECUTE	INSTALL DEVICE 27256 INTEL	Press EXECUTE to select INTEL 27256 and to return to Load Master Operation key sequence.

Load Master

This Section describes all Local Panel Load Operations. Basically a load Operation performs the following three (3) functions:

- ❑ Transfers device data to the EZ-WRITER RAM.
- ❑ Calculates the SUMCHECK on both, the data transferred to RAM and directly from device data.
- ❑ Compares both SUMCHECKs and displays the Operation termination screen in the LCD.

When a MASTER device is used as the source of data to be programmed, the MASTER device is first loaded into the EZ-WRITER memory. This Operation reads the data from the MASTER device using rules of the algorithms for the currently selected device type and stores this data in the EZ-WRITER memory. The EZ-WRITER then calculates the six (6) digit HEX SUMCHECK of the loaded data and displays this number as part of the Operation termination screen in the LCD.

Take note of the SUMCHECK value to compare it with the SUMCHECK display later at the termination of the Program Operation.

To execute a Load Single Operation follow this procedure:

Step	Key	Example LCD Display	Remark
1	EXECUTE	LOAD MASTER 27256 INTEL	Scroll to Load Master Operation and press EXECUTE. Select new device type as explained earlier or go to step 2.
2	EXECUTE	INSTALL MSTER IN SK0 27256 INTEL	LED for Socket 0 (SK0) should turn GREEN.
		NOTE **When a 40-pin EPROM is selected and the SETCel-40-4 is installed LED should turn GREEN.**	
3	EXECUTE	LOAD MASTER 27256 AAAAAA	A=Action display.
4		SUMCHECK RAM 27256 AAAAAA	Action display may not appear if Operation execution time is short.
5		LOAD MASTER DONE R CHK=CCCCCC XXXX	X="OK" If no Load RAM error is detected. X="ER63" If Load RAM error is detected.

Program Device

Once the MASTER data has been loaded (or downloaded) into the EZ-WRITER memory, the data can be used to program one or multiple Target devices. If the Target device type is different than the MASTER device from which data was loaded to RAM, the device type is displayed by the EZ-WRITER must be modified prior to the programming Operation or device damage may result. Prior to applying the programming voltage to a device, the ILLEGAL BIT TEST is executed to determine if all bits within the device can be programmed. If RAM contains data which requires that in a device a "ZERO" bit be changed to a "ONE", the Operation is halted and the ILLEGAL BIT Error is displayed in the LCD. The ILLEGAL BIT TEST may be disabled using the procedure shown in the Edit System Options Section. After programming the Target device(s), the EZ-WRITER performs a verification of the data programmed in the Target device(s) against the data in RAM; calculates the six (6) digit HEX SUMCHECK of the data in RAM and displays the result as part of the Operation termination screen in the LCD.

To execute a Programming Operation follow this procedure:

Step	Key	Example LCD Display	Remark
1	EXECUTE	PROGRAM 27256 INTEL	Scroll to Program Operation and then press the EXECUTE key. Select device type or go to step 2.
2	EXECUTE	INSTALL DEVICE 27256 INTEL	Install device in SK0.
3	EXECUTE	ILLEGAL BIT TEST 27256 AAAAAA	This test can be skipped. (See EDIT SYSTEM OPTIONS.)

Program Device

(continued)

Step	Example LCD Display	Remark
4	PROGRAM 27256 AAAAAA	
5	VER. AT 5.00V PASS1 27256 AAAAAA	
6	SUMCHECK RAM 27256 AAAAAA	
7	PROGRAM DONE R CHK=CCCCCC XXXX	X = "OK" If Device Passed. or X = "ER22" If installed device failed. C = Sumcheck
8	PROGRAM DONE R ILLEGAL BIT ER21	ER21 = ILLEGAL BIT found.

NOTE

For Other Terminations See HELP Section.

Verify Programmed Devices

The VERIFY Operation employs the use of high and low VCC power supply voltage levels to power the Target devices. This practice results in a given device being tested at least twice (possibly more if manufacturer specs dictate) during the verification process and provides a test of the device performance throughout its recommended power supply range.

To execute a Verify Operation follow the procedure below:

Scroll to Check Operations - Press the EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	VERIFY 27256 INTEL	Scroll to Verify Operation. Press EXECUTE key. Select device type or go to step 2.
2	EXECUTE	INSTALL DEVICE 27256 INTEL	Install device in SK0.
3	EXECUTE	VER. AT XXXX PASS# 27256 AAAAAA	#=Pass count. X=VCC level. First pass = 4.75V Second pass = 5.25V
4		SUMCHECK RAM 27256 AAAAAA	
5		VERIFY DONE R CHK=CCCCCC XXXX	X = "OK" If device verified. X = "ER29" If installed device failed.

NOTE
For Other Terminations See HELP Section.

Blank Device Checking

This section describes the procedure to ensure that a device contains NO data at any address. A device in this state can then be programmed with any possible data pattern.

To execute a Blank Check follow this procedure:

Scroll to Check Operations - Press the EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	BLANK CHECK 27256 INTEL	Scroll to Blank Check. Press EXECUTE key. Select device type or go to step 2..
2	EXECUTE	INSTALL DEVICE 27256 INTEL	IInstall device in SK0.
3	EXECUTE	BLANK CHECK 27256 SK#XX	X=Socket under check.
4		BLANK CHECK DONE R 27256 OK	"OK"= Normal termination. If all devices pass. LED "0" glows GREEN.
5		BLANK CHECK DONE R 27256 ER20	ER20=NONBLANK device found . LED "0" glows RED. Blank device.

NOTE
For Other Terminations See HELP Section.

Changing Special System Features or Options

If your EZ-WRITER includes a device oriented special feature you can use the Edit System Options to enable or disable this feature. It is also possible by means of setting an option, to enable or disable a system feature which can effect an Operation for any selected device type. For instance, use this Operation to enable or disable the following Options:

NAME	FUNCTION
ELECTRONIC ID	Enabling this option allows automatic electronic device identification (EID). When this option is enabled, devices with an EID tag can be automatically identified by the EZ-WRITER MULTIPROGRAMMER. While in this Mode the EZ-WRITER reads the identifier from the designated device and uses it to verify proper programming voltages. If a wrong device type is specified, the EZ-WRITER will return an error code. Older devices which have NO EIDs are automatically permitted to program without any attempt to read the electronic ID. You can disable the electronic device identification feature to prevent a device with a distorted electronic ID from confusing the EID recognition network.

Caution

For maximum protection always keep this option enabled.

ILLEGAL BIT	When this option is enabled the EZ-WRITER will perform the ILLEGAL BIT TEST prior to programming. If device fails the ILLEGAL BIT TEST, the system halts the programming Operation and all failing devices are indicated by the associated socket LEDs glowing "RED". Failing devices can be replaced and the programming Operation restarted. Disabling the ILLEGAL BIT TEST improves the execution time, particularly when programming a full load of Megabit devices.
UPSIDE-DOWN	When this feature is enabled a test for a device installed UPSIDE DOWN is performed before each Operation which applies power to programming sockets. This testing will usually protect a device from being damaged. If a device is reported UPSIDE-DOWN but is in fact not UPSIDE-DOWN, it can still be read by disabling the UPSIDE-DOWN feature.

Caution

Operating the EZ-WRITER with this option disabled may result in damage to a device which indeed was installed UPSIDE-DOWN.

SET OPERATIONS	When this feature is disabled SET Operations can not be accessed from the Operation menu. SET Operation is used with options SETCel-32-4 and SETCel-40-4. (See section 7 if your system includes these options).

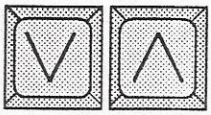
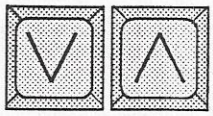
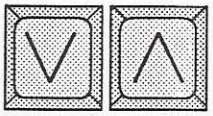
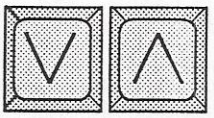
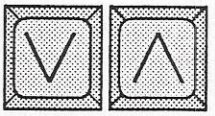
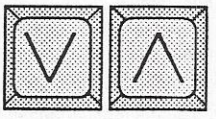
Editing System Options

To EXECUTE Edit System Options follow this procedure:

Scroll to Edit Operations - Press the EXECUTE key.

NOTE

You can scroll forward with "Λ" key and use the "V" key if you pass desired optiom. Press the EXECUTE key to enable or disable and exit by scrolling with the "Λ" key.

Step	Key	Example LCD Display	Remark
1		EDIT	Scroll to Edit Operations.
2		EDIT SYSTEM OPTIONS	Scroll to Edit System Options. Press EXECUTE to enter Options Menu.
3		SYSTEM OPTIONS ELECT. ID = ENABLED	Press EXECUTE to enable or disable. Scroll to next option.
4		SYSTEM OPTIONS SET OPER. = DISABLED	Press EXECUTE to enable or disable. Scroll to next option.
5		SYSTEM OPTIONS ILLEGAL BIT = ENABLED	Press EXECUTE to enable or disable. Scroll to next option.
6		SYSTEM OPTIONS UNSIDE-DOWN = ENABLED	Press EXECUTE to enable or disable. Scroll to next option.
7		EDIT OPERATIONS R	

Swap RAM Bytes

The Swap RAM Bytes Operation allows data in adjacent RAM bytes pairs to be swapped. This Operation is provided specially to support 16Bit-Wide devices for properly assigning the Low/High order in the 16Bit-Wide format.

To execute a Swap RAM Bytes Operation follow the procedure below:

Scroll to Edit Operation - Press the EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	SWAP RAM BYTES	Scroll to Swap RAM Bytes. Press EXECUTE.
2		SWAP RAM BYTES SWAPPING AAAAAA	
3		EDIT OPERATIONS R	

Fill RAM Block

The Fill RAM Block Operation is used to store a single value into every location in the EZ-WRITERs RAM. The existing contents of the Target RAM blocks are overwritten by the fillI value.

To execute a Fill RAM Block Operation follow the procedure below:

Scroll to Edit Operation - Press the EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	FILL RAM BLOCK	Scrol to Fill RAM Block. Press EXECUTE.
2	V ^	FILL RAM BLOCK DATA BYTE = XX	Scroll data value = X = 00 ot FF.
3	EXECUTE	FILL RAM BLOCK FILLING RAM AAAAAA	A = Action Display.
4		EDIT OPERATIONS R	

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3. I/O Ports

This section provides instructions for installing and setting up the RS-232 Serial Port and Parallel Port. Also included in this section are detailed operating procedures to perform Download and Upload Operations. The information in this section is divided into the following sub sections:

- **INTRODUCTION**
- **INTERFACING THE EZ-WRITER TO YOUR PC VIA THE RS-232 PORT.**
- **SETTING COMMUNICATION PROTOCOLS** - Describes how to select formats, BAUD rates and other parameters required for RS-232 Operations.
- **DOWNLOADING DATA USING THE RS-232 PORT** - Describes in detail downloading data from the Host System to the EZ-WRITER RAM.
- **UPLOADING DATA USING THE RS-232 PORT** - Describes the uploading data from the EZ-WRITER RAM to the Host System.

RS-232 Port - Introduction

The BYTEK EZ-WRITER MULTIPROGRAMMER may be used in a program development environment where transfer of larger blocks of data is a common requirement. The MULTIPROGRAMMER communicates with all popular development systems via numerous data transfer formats. After developing a program or generating data, such a program or data may be transferred through the RS-232 (Serial-IN) port to the MULTIPROGRAMMER for copying into a memory device. In addition, a memory device may be read and the data transferred (Serial-OUT) to a computer for analysis.

Interfacing The BYTEK EZ-WRITER MULTIPROGRAMMER To Your Microcomputer

It is possible to interface the MULTIPROGRAMMER to your microcomputer yourself. To accomplish this you will need the cabling configuration to physically connect the MULTIPROGRAMMER to the Serial Interface of your computer. You will also need to know how to set up the communication parameters between the two devices. **However, PROMsoft_C IS NOT required to upload or download a file.**

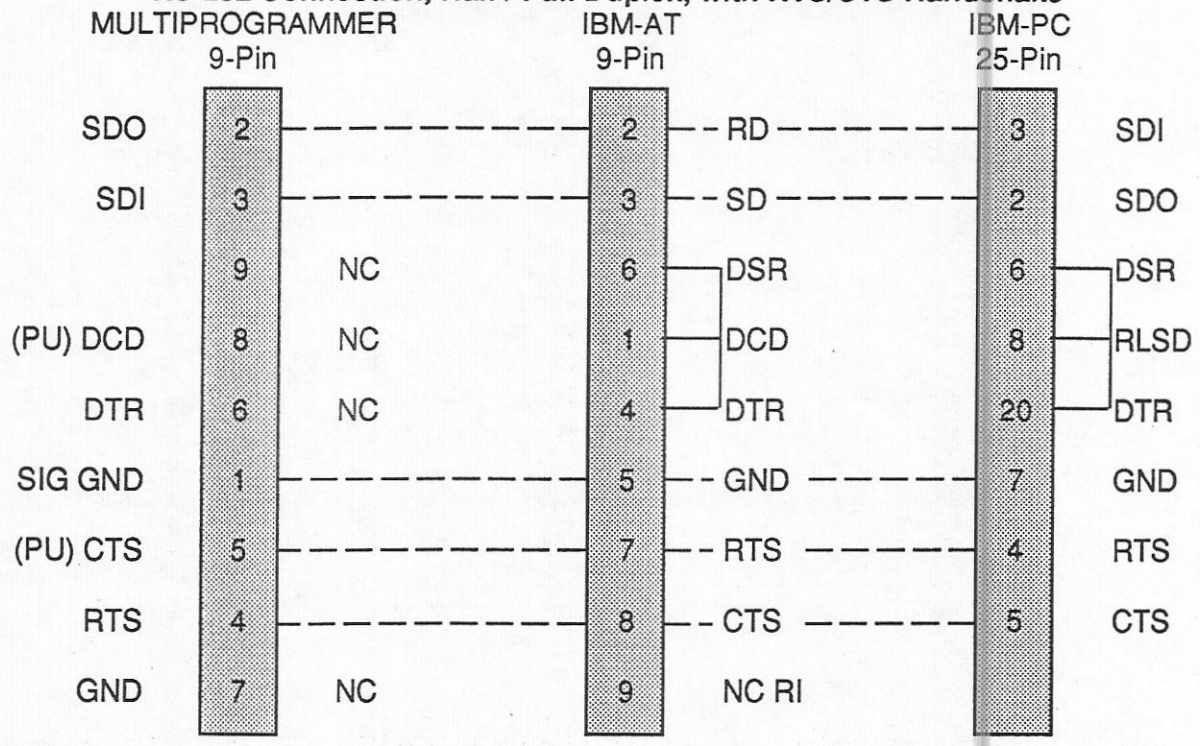
BYTEK offers the following cable options to simpifly the task of interfacing the EZ-WRITER MULTIPROGRAMMER to your PC system:

CABLE MODEL	DESCRIPTION
9-9AT-H	9 to 9-pin Serial cable with handshaking for AT host systems
9-25PC-H	9 to 25-pin Serial cable with handshaking for PC/XT host systems
9-25PS-H	9 to 25-pin Serial with handshaking cable for PS/2 host system

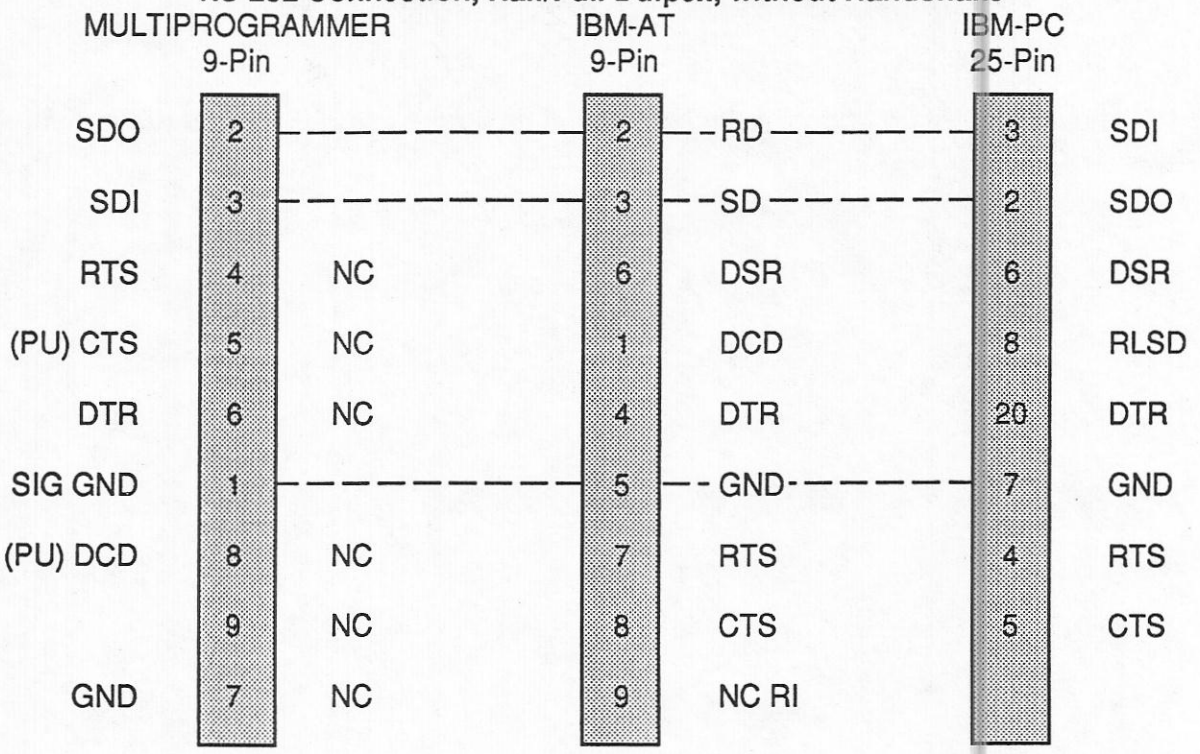
You can also build your own cable by observing the RS-232 connection requirements on the next page.

RS-232 IBM PC, XT and AT Sample Interconnection

RS-232 Connection, Half / Full Duplex, with RTS/CTS Handshake



RS-232 Connection, Half/Full Dulpex, without Handshake



RS-232 Connector Pin Assignment

Pin Number	Signal	Function
1	Signal Ground	This provides the signal return path and provides the safety ground connection to the RS-232 host system.
2	Send Data	Transmits data voltage levels (±12V)
3	Receive Data	Accepts RS-232 data voltage levels (±12V)
4	Request To Send	This line is normally held high by the MULTIPROGRAMMER. It is dropped to inhibit data transmission from a remote source. (RTS/CTS Handshake)
5	* Clear To Send	A high level on this line allows (CTS) the MULTIPROGRAMMER to transfer data. A low level inhibits data transfer. (RTS/CTS Handshake)
6	Data Terminal Ready	A high level on this pin indicates the MULTIPROGRAMMER is powered ON and READY to transfer data. DTR is dropped to inhibit data transmission from a remote source. DTR/DCD Handshake)
7	Ground	Ground Return.
8	* Carrier Detect	A high level on this line allows the MULTIPROGRAMMER to transfer data. A low level inhibits data transfer. (DTR/DCD Handshake)

NOTE

Pins 5 & 8 have internal pull-ups. In the absence of an applied signal, the default condition of the line is TRUE.

RS-232 Set-Up

In addition to the need for correct wiring connection for RS-232 Serial I/O, there are various Serial Communication parameters that must be set in the EZ-WRITER MULTIPROGRAMMER and host system to support Serial I/O communication. A given set of parameters is not necessarily better or worse than another, the important thing is that BOTH SIDES of the Serial Communication link AGREE on the parameters used. Surley the worst disadvantage to Serial I/O would be if the parameters could not be adjusted to match the other end of the link. To promote complete connectivity, the EZ-WRITER supports user set-up of the following communication parameters:

- ❑ BAUD RATE
- ❑ NUMBER OF DATA BITS
- ❑ NUMBER OF STOP BITS
- ❑ PARITY OPTION

Serial I/O Handshaking

Once Serial Communication is established between the EZ-WRITER and a terminal, host computer, or development system, data will flow from one end to another during either a DOWNLOAD or an UPLOAD command. Often, during the transfer, the unit on the receiving end can't "digest" the data as fast as the sender can transmit it. To compensate for this condition the GANGSITE supports two general ways of handshaking: Hardware Protocol and XON/XOFF Protocol. In the Hardware Protocol, there are signal pins dedicated to controlling the information flow between the EZ-WRITER and the other unit. In the XON/XOFF Protocol, "start" and "stop" MESSAGES are sent from the receiving end to the transmitting end to control the flow.

RS-232 Port Set-Up

To SET-UP the RS-232 communication parameters follow this procedure:

Scroll to RS-232 Port - Press the EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	RS-232 SERIAL PORT SETUP	Scroll to RS-232 Set-Up Operation. Press EXECUTE.
2	EXECUTE	RS-232 PORT SET-UP BAUD RATE= 9600	Scroll to desired Baud Rate.
		NOTE **Baud rates above 9600 not yet implemented.**	
3	EXECUTE	RS-232 PORT SET-UP PARITY CHECK=EVEN	Scroll to desired Parity Type.
4	EXECUTE	RS-232 PORT SET-UP DATA BITS=1	Scroll to desired Number of Data Bits.
5	EXECUTE	RS-232 PORT SET-UP STOP BITS=1	Scroll to desired Number of Stop Bits.
6	EXECUTE	RS-232 PORT SET-UP HANDSHAKE=NONE	Scroll to desired Handshake condition: = NONE = XON/XOFF = HARDWARE
7	EXECUTE	RS-232 PORT SET-UP DUPLEX=HALF	Scroll to Half or Full Duplex.
8	EXECUTE	RS-232 PORT R	

Download Data Thru The RS-232 Port

When device data is created or stored using a host computer or development system, the data is transmitted to the EZ-WRITER using the DOWNLOAD Operation. This Operation accepts properly formatted data from the RS-232 Serial I/O port and stores that data in the EZ-WRITER memory (RAM). The data can then be programmed into the Target device.

The desired data translation format as selected by the host computer or development system are listed below and the EZ-WRITER is set up to match the translation format. The 15 different data translation formats supported in the EZ-WRITER system. Format specifications are included in back of this section.

Format	Codes	Format	Codes
DATA I/O Binary	10	Motorola Exorciser (S1)	82
DEC Binary	11	INTEL Intellect MDS 8Bit	83
BYTEK Binary	20	Signetics	85
ASCII Space HEX	50	Tektronix Hexadecimal	86
ASCII HEX % STX	51	Motorola Exormax (S2)	87
ASCII HEX % SOH	56	INTEL MCS-86 HEX	88
Fairchild F8	80	Motorola 32Bit (S3)	95
MOSTEK	81		

When executing a DOWNLOAD Operation, the EZ-WRITER uses three (3) parameters to direct the incoming data to the correct address in memory (RAM):

- ❑ BEGINNING ADDRESS = 0
- ❑ BLOCK SIZE = 0
- ❑ OFFSET ADDRESS = FFFFFFFF

It is helpful to understand the effect each of these parameters has on the storage of incoming data.

The BEGINNING ADDRESS specifies the first address where incoming data will be stored. The default address for storage of incoming data is 0000H (hexadecimal).

Downloading Data Thru The RS-232 Port

(continued)

The BLOCK SIZE specifies how many bytes of data will be accepted for storage into EZ-WRITER memory (RAM). The default BLOCK SIZE is 0000H. This special size means that the EZ-WRITER will accept incoming data for storage until one of the following occurs:

1. GANGSITE Memory (RAM) is full.
   or
2. The entire incoming file has been received.

Each Data Translation Format supported by the EZ-WRITER contains embedded address information which specifies the intended memory address where the bytes of data are to be stored. The address information is embedded by the host computer or development system when the data file is created. In doing so, each data byte in the incoming file has an implied storage address.

The default OFFSET ADDRESS is FFFFFFFFH. Like the BLOCK SIZE this is a special case. When the OFFSET ADDRESS=FFFFFFFFH, the first incoming data byte is stored in RAM embedded address information.

Let's consider the following Operation:

BEGINNING ADDRESS	=	0000H
BLOCK SIZE	=	0000H
OFFSET ADDRESS	=	FFFFFFFFH

In this case, incoming data is received and stored starting with the first byte received. Bytes are stored in memory (RAM) starting at address 0000H and storage continues sequentially until the entire file is received or until EZ-WRITER RAM is full, whichever comes first.

Once the data is downloaded and in RAM, the EZ-WRITER can be set to program the data into the Target device.

RS-232 Port Download Data

To execute a RS-232 Download Operation follow this procedure:

Scroll to RS-232 Port - Press EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	RS-232 SERIAL PORT DOWNLOAD DATA	Scroll to RS-232 Download Operation. Press EXECUTE
2	EXECUTE	DOWNLOAD FORMAT INTEL MDS 8BIT 83	Scroll to desired format.
3	EXECUTE	DOWNLD INTEL-8 83 RECEIVING=AAAAAA	Press EXECUTE to initiate Download Operation.
4		DOWNLOAD DONE R SUMCHECK=CCCCCC OK	

Uploading Data Thru The RS-232 Port

The UPLOAD Operation is used to transmit data from the EZ-WRITER memory (RAM) to a host computer or development system via the RS-232 Serial I/O port. This capability is often used for long term host data storage where library of device data files are kept on the host and DOWNLOADed when needed to program devices OR WHEN MASTER DEVICE DATA IS TO BE EDITED AND REPROGRAMMED INTO A BLANK TARGET DEVICE..

As with DOWNLOADing, the EZ-WRITER supports 15 different Data Translation Formats listed below and will UPLOAD the desired data in the currently selected format. For format specifications, refer to the Computer Remote Mode section.

Format	Codes	Format	Codes
DATA I/O Binary	10	Motorola Exorciser (S1)	82
DEC Binary	11	INTEL Intellect MDS 8Bit	83
BYTEK Binary	20	Signetics	85
ASCII Space HEX	50	Tektronix Hexadecimal	86
ASCII HEX % STX	51	Motorola Exormax (S2)	87
ASCII HEX % SOH	56	INTEL MCS-86 HEX	88
Fairchild F8	80	Motorola 32Bit (S3)	95
MOSTEK	81		

When executing an UPLOAD Operation, the EZ-WRITER uses three (3) parameters to determine which memory (RAM) data will be transmitted:

- ❑ BEGINNING ADDRESS = 0
- ❑ BLOCK SIZE = Device Size
- ❑ OFFSET ADDRESS = FFFFFFFF

It is helpful to understand the effect each of these parameters has on the RAM locations transmitted.

The BEGINNING ADDRESS specifies the first address that will be sent. The default BEGINNING ADDRESS is 0000H (hexadecimal).

The BLOCK SIZE specifies how many bytes of data will be transmitted from EZ-WRITER memory (RAM). The default BLOCK SIZE is device size. This special size means that the EZ-WRITER will send data (starting at the beginning address) until the device size is satisfied.

The OFFSET ADDRESS specifies the address that will be assigned to the first data byte transmitted within the currently selected Data Translation Format.

If OFFSET ADDRESS = FFFFFFFF then the first address assigned to the data is 0000H.

Uploading Data Thru The RS-232 Port

(continued)

Each Data Translation Format supported by the EZ-WRITER contains embedded address information which specifies the intended memory address of the data. During an UPLOAD Operation the address information is embedded by the EZ-WRITER as it creats the data file for transmission. In so doing, each data byte in the outgoing file has an implied storage address.

The default OFFSET ADDRESS is FFFFFFFFH. Like the BLOCK SIZE this is a special case. The default OFFSET ADDRESS of FFFFFFFFF is the same as setting it to 00000000.

Lastly, let's consider the default case:

BEGINNING ADDRESS	=	0000H
BLOCK SIZE	=	Device Size
OFFSET ADDRESS	=	FFFFFFFFH

In this case, data is transmitted from EZ-WRITER RAM starting at address 0000. An embedded address of 0000H is assigned to the first byte transmitted. The UPLOAD continues until device size bytes are transmitted.

RS-232 Port Upload Data

To execute an UPLOAD Operation follow these steps:

Scroll to RS-232 Port - Press EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	RS-232 SERIAL PORT UPLOAD DATA	Scroll to RS-232 Upload Operation. Press EXECUTE.
2	EXECUTE	SELECT UPLD FORMAT INTEL MDS 8BIT 83	Scroll to desired format (i.e. INTEL)
3	EXECUTE	UPLOAD INTEL-8 83 SENDING=AAAAAA	Press EXECUTE to initialize Upload. A=Action display.
4	EXECUTE	UPLOAD DONE R SUMCHECK=CCCCCC OK	Normal termination.

5. Computer Remote Mode (CRM)

Introduction

In Computer Remote Mode (CRM) the user communicates with the EZ-WRITER by transmitting commands to the MULTIPROGRAMMER via the RS-232C port (Refer to Section 3 to attach the EZ-WRITER to the Host System). The EZ-KF will respond by executing the requested command and will report the completion status of the command by sending characters back to the computer.

The command syntax of Computer Remote Mode (CRM) makes it ideal for use with a computer driven interface as its logical command syntax varies little between different commands. For a terminal (human) driven interface, Terminal Remote Mode is a more likely candidate with its more flexible structure.

Information contained in this section is explained in the following subsections.

- **ENTERING AND EXITING COMPUTER REMOTE MODE.** The procedures to enter Computer Remote Mode of the EZ-WRITER are presented here and how to exit the CRM is also explained.
- **VERIFYING PROPER COMMUNICATION.** Defines the commands to establish a proper communication linkage between the EZ-WRITER and the Host System.
- **DEVICE-ORIENTED OPERATIONS.** Defines and explains all commands available to initiate execution of Operations such as: Load Data to the EZ-WRITER RAM, Blank Check, Program and Verify that devices are correctly programmed.
- **DATA TRANSFER.** Shows how to UPLOAD or DOWNLOAD data to or from the Host System.
- **OPERATING PARAMETERS AND FINAL STATUS.** Defines the commands required to obtain from the Host System the EZ-WRITER desired parameters or status.
- **DATA TRANSLATION FORMATS.** Defines the fifteen (15) data translation formats supported by the EZ-WRITER for transferring data to and from the Host System through the RS-232 or parallel port.

Entering Computer Remote Mode

CRM is accessed on the EZ-WRITER through the Local Operation Panel. Once CRM is active, the EZ-WRITER will respond to commands received via the RS-232C serial I/O port until CRM is terminated.

To enter Computer Remote Mode execute this procedure:

Step	Key	Example LCD Display	Remark
1	EXECUTE	COMPUTER REMOTE MODE	Scroll to Computer Remote Mode. Press EXECUTE.
2	EXECUTE	COMPUTER REMOTE MODE ENABLED	Scroll to enable or disable. Press EXECUTE key to enable or disable.

NOTE
Press any key to exit Computer Remote Mode.
(See Next page)

Exiting Computer Remote Mode

You can exit Computer Remote Mode from the Local Panel by pressing any key.

To exit Computer Remote Mode execute the following procedure:

Step	Key	Example LCD Display	Remark
1		EZ-WRITER-XX 256K R 27256 093/032	Press "ANY" Local Panel key.

Command Completion Characters

Each command supported within Computer Remote mode (except 'Z') returns a Command Completion Character to the computer. The EZ-WRITER follows a Command Completion Character with a carriage return/linefeed (hex 0D, hex 0A). There are three Command Completion Characters returned by CRM.

CHARACTER	MEANING
>	The '>' character is sent by the EZ-WRITER on entering Computer Remote Mode, when an ESCAPE or BREAK stop a command, and when a command is completed without error.
F	The 'F' (for failure) character indicates that the last command terminated due to an error. The 'X' command may be used to query the EZ-WRITER as to the exact nature of the error condition(s).
?	The '?' character indicates that the last command, or its parameter, was invalid. Note that a "null" command (carriage return only) is considered invalid and is a convenient way of testing your RS-232 interfacing with Computer Remote.

Command Format

All commands in Computer Remote Mode follow the same general command format:

PPPPC <CR>

where:

PPPP = the command's parameter portion. Note that this portion may contain 1, 2, 4, or 8 characters, depending on the command involved, and that some commands require no parameter. All parameters are interpreted as HEX values.

C = the command character itself. See the following sections for descriptions of the various commands.

<cr> = the required carriage return (hex 0D).

There should be no space characters inserted between the three command parts described above.

Command Control

The following characters control CRM command execution:

CHARACTER	MEANING
<cr>	Carriage return (hex 0D) initiates the execution of the command just entered. No command will execute until the <cr> is received.
<esc>	Escape (hex 1B) aborts any partially entered command when received PRIOR to the carriage return.

Computer Remote Command Description

The following describes each Computer Remote command currently supported. The command descriptions are grouped according to general function.

Parameter Commands

The following commands deal with setting or checking EZ-KF parameters.

COMMAND	NAME	DESCRIPTION
hhhhhh<	Set RAM start address	Stores the six digit HEX parameter (hhhhhh) as the RAM base. The RAM base defines the RAM starting address in device related Operations, the RAM offset (additive) in upload download Operations, and the RAM source addresss in RAM-RAM block moves. The default value is 0000.
hhhhhh;	Set Block Size	Stores the six digit HEX parameter as the block size. The block size defines the number of bytes operated on by a given command. Block size defaults to the device size for device related Operations; RAM end minus RAM base for upload/ download. There is no default for RAM-RAM block moves.
hhhhhh:	Set Device start address	Stores the six digit HEX parameter as the device start address. The device start address defines the first device address in device related Operations and the RAM destination address in RAM-RAM block moves. The default value is 0000.
FFFPPP@	Select Family and Pinout Code	Stores the six (6) digit family/pinout code defining the currently selected device for all device related commands.
[	FFPP Inquiry	The EZ-WRITER responds by sending the family/pinout code (FFFPPP) of the currently selected device.

Computer Remote Command Description (continued)

COMMAND	NAME	DESCRIPTION
R	Respond	The EZ-WRITER sends information about the currently selected device in the form of HHHHHH/WS/n or HHHHHH/WL/n where: HHHHHH is the highest address (HEX) in the device, WL = Word length (2764=2000); WL = 4, 8, 16 or 32 Bit; n = program "0" or "1".

Input/output Commands

The following commands deal with RS-232C serial data input/output.

COMMAND	NAME	DESCRIPTION
*M	Auto Configure	The EZ-WRITER will automatically configure the RS-232 serial communications parameters when the 'M' command is received as the first command after entering CRM.
*HHU	Set Nulls/LF	Enables the transmission of 'HH' null characters (00 Hex) and the sending of a linefeed (0A Hex) after each Carriage Return (0D Hex). 'HH' may fall in the range 0...FE. 'HH' = FF is the default (no nulls, no LF).
*HHHHW	Set I/O Offset Addr.	Stores the HEX parameter (up to six digits) as the Offset Address. The offset address is used to control the storage of incoming data in EZ-WRITER RAM via address information derived from the incoming data during a serial download opera tion. For a more detailed explanation of the offset address, reference "Downloading Data" in the LOCAL control section.

*** = NOT YET IMPLEMENTED.**

Computer Remote Command Description (continued)

COMMAND	NAME	DESCRIPTION
nnA	Set Data Format	Selects the two digit data translation format code (HH) for all Input data and output data operations.
*HHM	Set I/O Record	Sets the hex parameter as the I/O record size. The default power-up record size is 10 (16 decimal).
I	Input Data	Initiates a serial download of data. Once initialized, the EZ-WRITER waits for incoming data encoded in the current data translation format set up by the "A" command (see above). When the transfer is complete (see the detailed specs on the data format in question for details on termination), the EZ-WRITER returns to Computer Remote Mode and outputs the command completion character reflecting the success or failure of the download.
O	Output Data	Initiates a serial upload of data to the computer. See "Uploading Data" in the LOCAL control section for a detailed explanation of the address parameters that affect the uploading of RAM.
C	Compare Data	Identical to the I (Input data) command except that the incoming data is merely compared to the current contents of EZ-WRITER RAM. The success or failure of the compare is reflected in the command completion character.

*** = NOT YET IMPLEMENTED.**

Device Related Commands

The following commands deal with device operations.

COMMAND	NAME	DESCRIPTION
L	Load Device(s)	Data read from the device in the socket are stored in EZ-WRITER RAM. Data are loaded sequentially starting with the device start address and continuing until the block size is satisfied. The bytes are stored in EZ-WRITER RAM starting at the RAM base address.
nP	Program a SET of 'n' Devices	Data read from EZ-WRITER RAM starting at the RAM base address are programmed sequentially into the target device starting at the device start address until the block size is satisfied.
V	Verify Device	Data read from EZ-WRITER RAM starting at the RAM base address are compared sequentially with the target device starting at the device start address until the block size is satisfied.
nT	Illegal Bit Test of 'n' devices	A programmability test is performed and the result is returned via the command completion character based on the following test criteria: Data read from the target device starting with the device start address is tested against data read from EZ-WRITER RAM starting with the RAM base address until either the block size is satisfied or a location fails the test. A location passes the test as long as there is no bit in the EZ-WRITER RAM byte which is in the BLANK state while its corresponding bit in the device byte is in the PROGRAMMED state.
B	Blank Check	The device in the socket is verified to be completely blank.

* = NOT YET IMPLEMENTED.

Other Computer Remote Commands

The following are special purpose Computer Remote commands.

COMMAND	NAME	DESCRIPTION
nS	RAM Sumcheck	The EZ-WRITER calculates the RAM sumcheck and outputs the 6 digit HEX result. The RAM sumcheck operation starts at RAM base and continues until the the block size is satisfied. The device size is used instead of the BLOCK size, if no BLOCK size has been specified.
*=	Enable/Disable	Disables the 25 second I/O timeout Timeout in effect during serial DATA UPLOAD and DOWN LOAD.
H	No Operation	Does nothing. Returns a '>' for the Command Completion Character.
Z	Exit	Exits Computer Remote mode. Restores default values for the Ram Base, Device Start, and Block Size for the EZ-WRITER keypad control mode.
*G	135H Config.	The EZ-WRITER sends the 4 digit HEX Firmware Release Level.
^	Clear RAM	Clears all RAM to 00H

*** = NOT YET IMPLEMENTED.**

Computer Remote Command Description

COMMAND	NAME	DESCRIPTION
*B8]	Output FFPP	Lists ALL FFPP codes supported by the EZ-WRITER MULTIPROGRAMMER.
CC]	Query EID FFPP	Sends the FFPP code most recently read from the Electronic I.D. of a device in AUTO ID mode (after FFFF@).
*CD]	Query EID Code	Sends the EID hex bytes of the device in the socket.
*\	RAM-RAM Move	A RAM block defined by block size (;) and RAM base (<), is copied to the RAM block starting at the device start address. This is not a swap. The source and destination areas may be any where in EZ-WRITER RAM and may overlap if desired. The source block is left intact unless an overlap condition causes it to be overwritten.

*** = NOT YET IMPLEMENTED.**

Computer Remote Control Command Summary

Command Format	Description	Command Format	Description
M	RS-232 Set-up	nV	Verify a set of n devices
Z	Exit CRC Mode	nnA	Select control code (c); data translation
<CR>	Execute command	I	RS-232 Download
<ESC>	Abort Operation	O	RS-232 Upload
H	No Operation	C	Compare data transfer
FFFPPP@	Select family and pinout code	[	View family and pinout code
hhhhhh<	Set RAM start address	CD]	View current electronic ID code
hhhhhh;	Set block size	R	Respond with device parameters
hhhhhh:	Set device start address	/	Display Pass/Fail count
hhhhhhW	Set I/O address offset	X	View last 16 error codes
L	Load master device(s) (All models set to 8Bit=822)	G	View firmware configuration
nn22]	Set to 8, 16, 32Bit Mode	\	RAM to RAM
nP	Program a set of n devices	S	Sumcheck RAM block
hh^	Clear RAM with data "hh"		
nT	Illegal Bit Test of 'n' devices		
B	Blank check		
nS	Sumcheck RAM set		

Hardware Handshaking

The EZ-WRITER MULTIPROGRAMMER also supports hardware handshaking. In this scheme, the EZ-WRITER and the host indicate to each other the 'Receiver Ready' status by the voltage level on the Request to Send and Clear to Send pins of the RS-232 interface. See the System Setup section for a cable pinout diagram.

Leaders and Null output

Whenever the EZ-WRITER outputs data, either during an UPLOAD or during command response (TRM or CRM), nulls may be enabled. Nulls are hexadecimal 00 bytes sent to allow the other end of the RS-232 link ample time to process the data coming from the EZ-WRITER. At power-up, nulls are disabled. They may be enabled and their number (1-254) may be specified when in CRM mode using the 'U' command.

In addition, a leader of 50 nulls will be output before and after the data file during an UPLOAD command, ONLY IF NULLS HAVE BEEN ENABLED.

Data Translation Format Specification

This section defines, in detail, the fifteen Data Translation Formats supported and recognized by the EZ-WRITER MULTIPROGRAMMER during UPLOAD and DOWNLOAD operations.' Most microprocessor development systems use one of the formats supported. Consult the documentation of your system to determine which format that that is appropriate.

Each of the 15 formats described below is assigned a unique code used to specify to the EZ-WRITER which of the 15 formats to use when UPLOADing and DOWNLOADing. Each control mode (LOCAL, TRM and CRM) provides a command to specify the Data Translation Format to the EZ-WRITER.

Here is a summary of the 15 formats:

Format	Codes	Format	Codes
DATA I/O Binary	10	Motorola Exorciser (S1)	82
DEC Binary	11	INTEL Intellect MDS 8Bit	83
BYTEK Binary	20	Signetics	85
ASCII Space HEX	50	Tektronix Hexadecimal	86
ASCII HEX % STX	51	Motorola Exormax (S2)	87
ASCII HEX % SOH	56	INTEL MCS-86 HEX	88
Fairchild F8	80	Motorola 32Bit (S3)	95
MOSTEK	81		

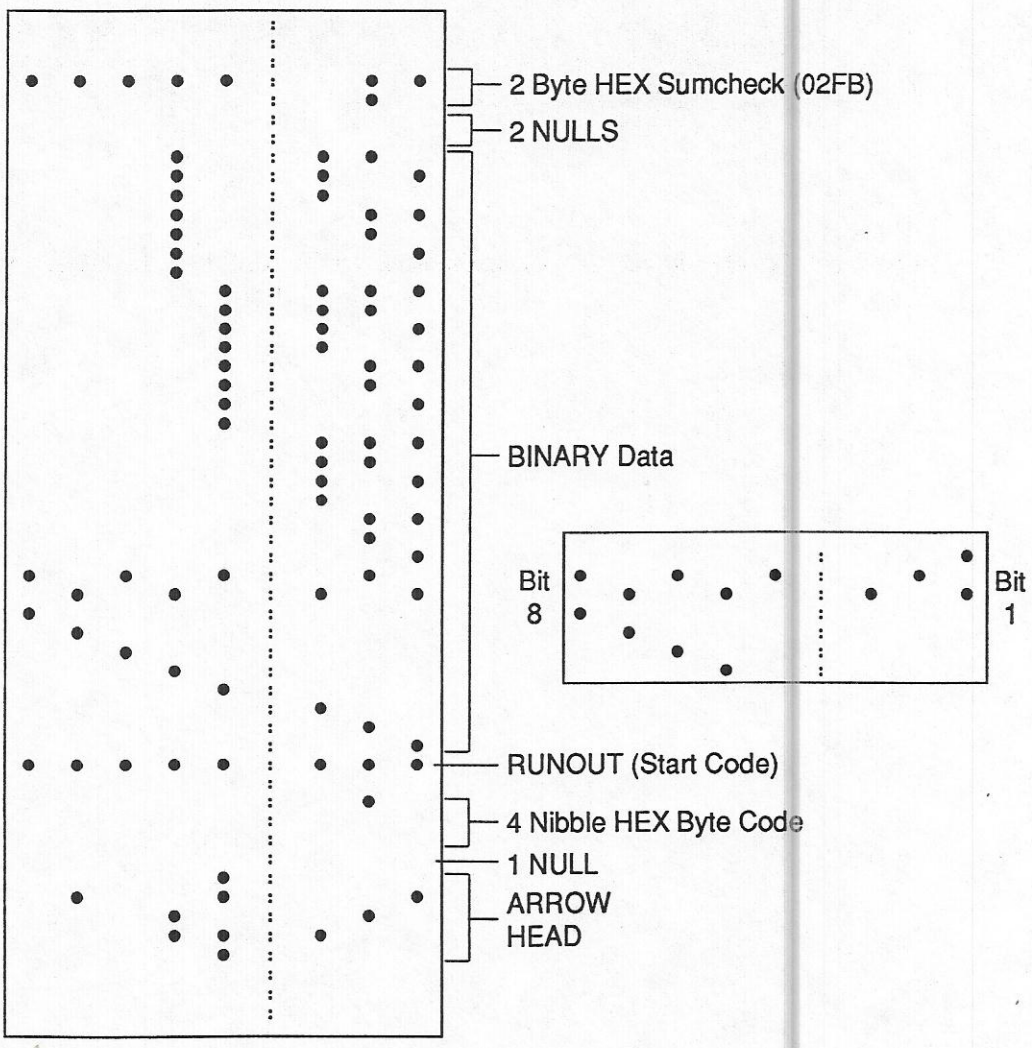
DATA I/O* Binary Code 10

Data transfer in Binary 10 format consists of a stream of 8-bit data words preceded by a byte count and followed by a sumcheck. The Binary format does not have addresses.

A paper tape generated by a programmer will contain a 5-byte, arrow- shaped header followed by a null and a 4-nibble byte count. The start code, an 8-bit rubout, follows the byte count. End of data is signalled by 2 nulls and a 2-byte sumcheck of the data field.

The programmer stores incoming binary data upon receipt of the start character. Data is stored in RAM starting at the first RAM address and ending at the last incoming data byte.

The standard Binary Transfer format (with the arrow header, byte count and sumcheck) can only be used for data in block sizes of 64K or less since a larger byte count would not fit into the 4-nibble byte count field.



* DATA I/O is a registered trademark of DATA I/O Corporation.

DEC Binary Code 11

Data transmission in DEC Binary format is a stream of 8 Bit data words with no control characters except the start code. The start code is one null preceded by at least one rubout. A tape output from the programmer will contain 32 rubouts on the leader. DEC binary format does not have addresses.

BYTEK Binary Code 20

Data transfer in binary format 20 consists of a stream of 8 bit data words proceeded by a byte count and followed by a sumcheck. The word size for this format MUST be 8 bits.

The first two bytes sent should be the byte count (HIGH/LOW) of the DATA portion of the transmission. The next three bytes are the starting address (24 bits HIGH/MID/LOW) where the data storage should begin in the EZ-WRITER. The data should follow. You must fulfill the byte count specified or the transmission will not terminate. Last, the sumcheck (HIGH/LOW) is sent. The sumcheck is the 16 bit sum of all DATA bytes sent with carries from bit 15 dropped. The EZ-WRITER stores incoming binary data after receipt of the byte count and address fields. Data is stored in RAM starting at the specified RAM address and ending at the last incoming data byte. Transmission is terminated by sending two bytes of 00 after the last sumcheck.

ASCII Space HEX
Code 50

ASCII Space HEX, Code 50 allows hex data to be entered from a host computer or from a terminal attached to the system. The starting address of the data is entered into the OFFSET field. Data transmission is ended by entering a Control C (Hex 03) character.

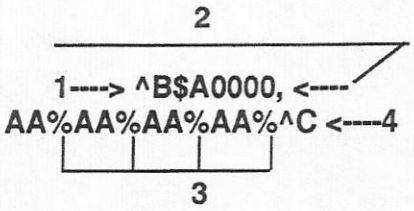
HH HH HH HH HH HH (CR)(LF)
HH HH HH HH HH HH (^C) - Signals end

Data in this format is organized in sequential bytes separated by the execute "space" character. Characters immediately preceding the execute character are interpreted as data. This format can be expressed in 8 bit data by 1 or 2 hex characters. Line feeds, carriage returns and other characters may be included in the data stream as long as a data byte directly proceeds each execute character. Data bytes will be addressed sequentially starting at the address entered at the OFFSET prompt.

ASCII HEX % STX
Code 51

Format 51 has a start and end code, and similar address and sumcheck specifications. Illustrations below show 4 data bytes coded in the ASCII Hex Format. Data in this format is organized in sequential bytes separated by the execute character. Characters immediately preceding the execute character are interpreted as data. ASCII HEX expresses 8-bit data by 2 hex characters. Line feeds, carriage returns and other characters may be included in the data stream as long as a data byte directly precedes the execute character.

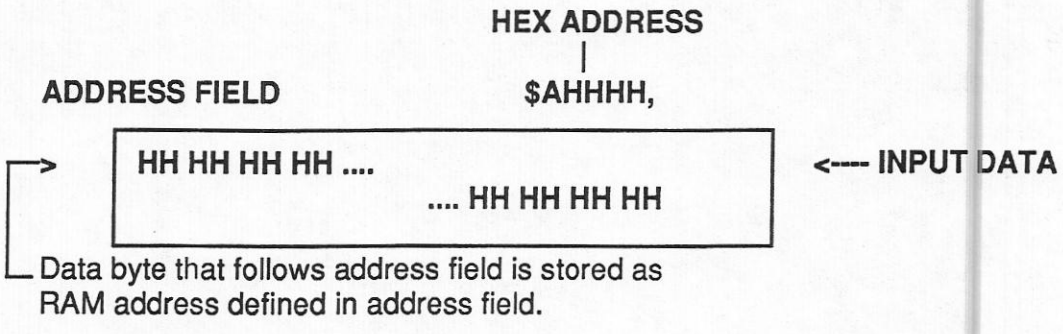
ASCII Hex % STX Format Code 51



1. **Start code is non-printable STX** - CTRL B.
2. Optional address code may precede any data byte, up to four in hex followed by a comma.
3. Execute code = % (2 characters).
4. End code is a non-printable ETX - CTRL C.

Although each data byte has an address, most are implied. Data bytes are addressed sequentially unless an explicit address is included in the data stream. This address is preceded by a "$" and an "A", must contain 2 to 4 hex characters, and must be followed by a comma. The programmer skips to the new address to store the next data byte; succeeding bytes are again stored sequentially.

Optional Address Field in ASCII % STX Format



NOTES

1. **H = hex character.**
2. **Address must be preceded by "$A" and followed by ",".**
3. **Line feed and carriage returns are optional.**

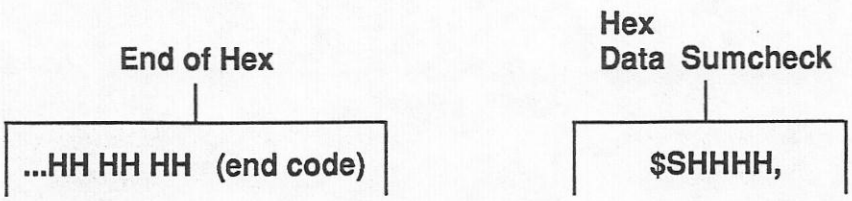
ASCII HEX % STX
Code 51

Continued

This format has an end code, which terminates input operations.

After receiving the final end code following an input operation, the programmer calculates a sumcheck of all incoming data. Optionally, a sumcheck can also be entered in the input data stream. The programmer compares this sumcheck with its own calculated sumcheck. If they do not match, a sumcheck error will be displayed. Specifications for the optional sumcheck are illustrated below.

Syntax of the Sumcheck Field in I/O Operations



NOTES

1. **Sumcheck field consists of 2-4 hex digits sandwiched between "$S" and ",".**
2. **Sumcheck field immediately follows end code.**
3. **Sumcheck field is optional in the input mode and always included in the output mode.**

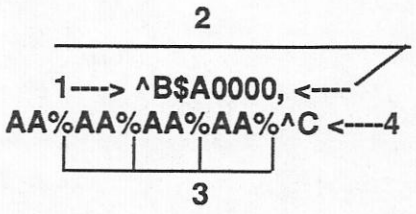
Output begins by invoking the Output command. The programmer divides the output data into 8-line blocks.

Data transmission begins with the start code and a non-printable STX. Data blocks follow, each one prefaced by an address of the first data byte in the block. End of transmission is signalled by the end code, a non-printable ETX. Directly following the end code is a sumcheck of the transferred data. The transmission is preceded and followed by 50 null characters.

ASCII HEX % SOH
Code 56

Format 56 has a start and end code, and similar address and sumcheck specifications. Illustrations below show 4 data bytes coded in the ASCII Hex Format. Data in this format is organized in sequential bytes separated by the execute character. Characters immediately preceding the execute character are interpreted as data. ASCII HEX expresses 8-bit data by 2 hex characters. Line feeds, carriage returns and other characters may be included in the data stream as long as a data byte directly precedes the execute character.

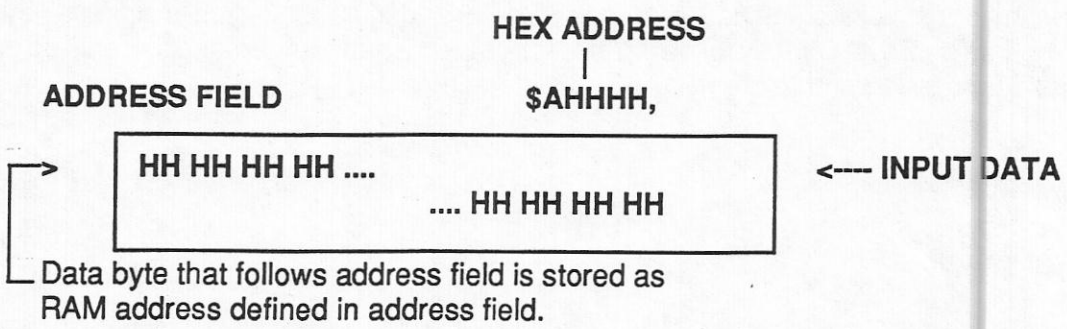
ASCII Hex % SOH Format Code 56



1. **Start code is non-printable SOH** - CTRL A.
2. Optional address code may precede any data byte, up to four in hex followed by a comma.
3. Execute code = % (2 characters).
4. End code is a non-printable ETX - CTRL C.

Although each data byte has an address, most are implied. Data bytes are addressed sequentially unless an explicit address is included in the data stream. This address is preceded by a "$" and an "A", must contain 2 to 4 hex characters, and must be followed by a comma. The programmer skips to the new address to store the next data byte; succeeding bytes are again stored sequentially.

Optional Address Field in ASCII % SOH Format



NOTES

1. **H = hex character.**
2. **Address must be preceded by "$A" and followed by ",".**
3. **Line feed and carriage returns are optional.**

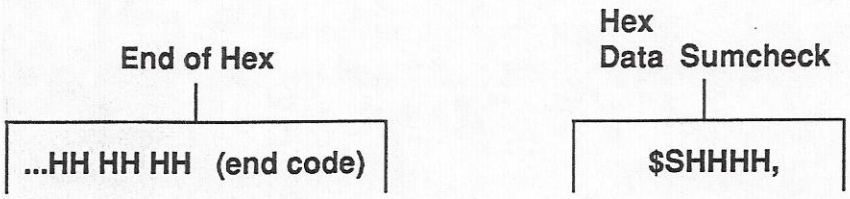
ASCII HEX % SOH
Code 56

Continued

This format has an end code, which terminates input operations.

After receiving the final end code following an input operation, the programmer calculates a sumcheck of all incoming data. Optionally, a sumcheck can also be entered in the input data stream. The programmer compares this sumcheck with its own calculated sumcheck. If they do not match, a sumcheck error will be displayed. Specifications for the optional sumcheck are illustrated below.

Syntax of the Sumcheck Field in I/O Operations



NOTES

1. **Sumcheck field consists of 2-4 hex digits sandwiched between "$S" and ",".**
2. **Sumcheck field immediately follows end code.**
3. **Sumcheck field is optional in the input mode and always included in the output mode.**

Output begins by invoking the Output command. The programmer divides the output data into 8-line blocks.

Data transmission begins with the start code and a non-printable SOH. Data blocks follow, each one prefaced by an address of the first data byte in the block. End of transmission is signalled by the end code, a non-printable ETX. Directly following the end code is a sumcheck of the transferred data. The transmission is preceded and followed by 50 null characters.

Fairchild F8
Code 80

In the Fairchild F8 format, input and output requirements are identical; both have 8-byte records and identical control characters. Illustration below describes a Fairbug data file format. A file begins with a five character prefix and ends with a one character suffix. The start of file character is an "S", followed by the address of the first data byte. Each data byte is represented by 2 hex characters.

NOTE: Address specification is optional in this format; a record with no address directly follows the previous record.

A one digit hex checksum follows the data in each data record. The checksum represents, in hexadecimal notation, the sum of the binary equivalents of the 16 digits in the record; the half carry from the fourth bit is ignored. The MultiProgrammer ignores any character (except for address characters) between a checksum and the start character of the next data record. These spaces can be used for comments. The last record consists of an asterisk only, which indicates the end of data transmission.

DATA RECORD:

start character

XHHHH....HC

One digit checksum

input data

START OF FILE RECORD:

start character

SAAAA

address

END OF FILE RECORD:

*

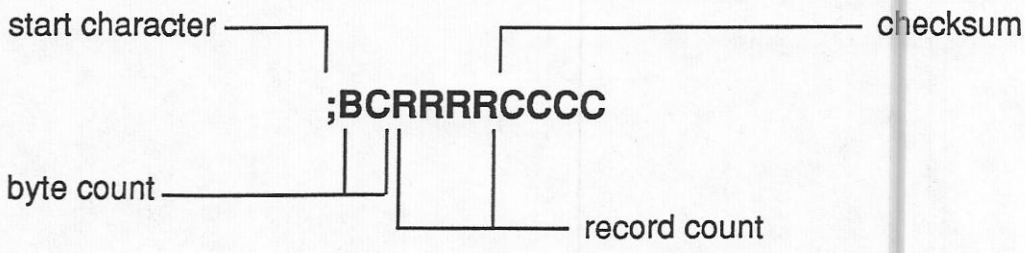
MOSTEK
Code 81

Data in a record is sandwiched between a 7-character prefix and a 4-character suffix. The number of data bytes in each record must be indicated by the byte count in the prefix. The input file can be divided into records of various length.

The illustration below describes a series of valid data records. Each data record begins with a semicolon. The Multiprogrammer will ignore all characters received prior to the first semicolon. All other characters in a valid record must be valid hex digits (0-9, A-F). A 2-digit byte count follows the start character. The byte count, expressed in hex digits, must equal the number of data bytes in the record. The next four digits make up the address of the first data byte in the record. Data bytes follow, each represented by 2 hex digits.

DATA RECORD:

END OF FILE RECORD:

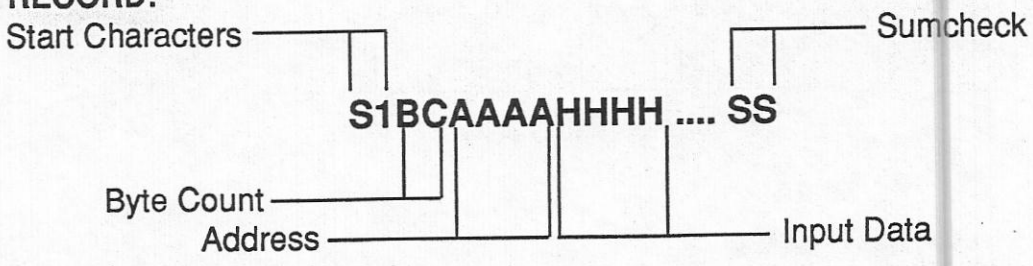


Motorola Exorciser (S1) Code 82

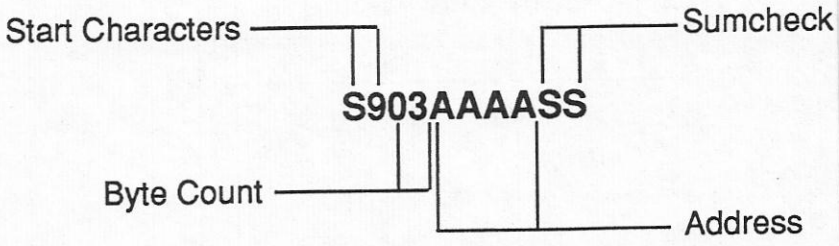
Motorola data files begin with an optional sign-on record, which is identified by the start bytes 'S0'. If the sign-on record is present, all characters up to and including the first <cr> character are discarded during DOWNLOAD.

Data records start with an 8 character prefix and end with a 2 character suffix. Each data record begins with the start characters 'S1'. The EZ-WRITER will ignore all previous characters. The third and fourth characters represent the byte count, which expresses the number of data, address and sumcheck bytes in the record. The address of the first data byte in the record is expressed by the last 4 characters of the prefix. Data bytes follow, each represented by 2 hex characters. The number of data bytes occurring must be 3 less than the byte count. The suffix is a 2 character sumcheck.

DATA RECORD:



END OF FILE RECORD:

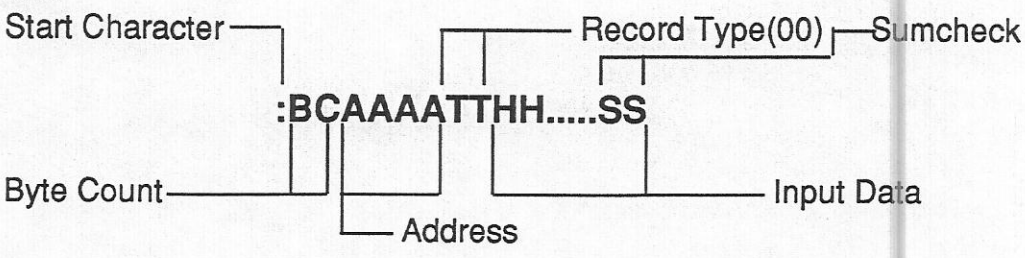


INTEL Intellect 8/MDS 8Bit Code 83

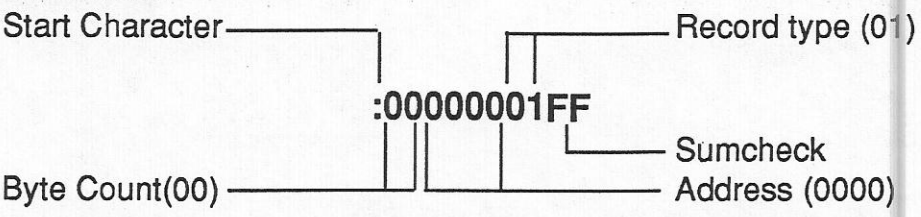
Intel data records start with a 9 character prefix and end with a 2 character suffix. The byte count must equal the number of data bytes in the record. Each record begins with a colon, which is followed by a 2 character byte count. The 4 digits following the byte count give the address of the first data byte.

Each data byte is represented by 2 hex digits; the number of data bytes in each record must equal the byte count.

DATA RECORD:



END OF FILE RECORD:

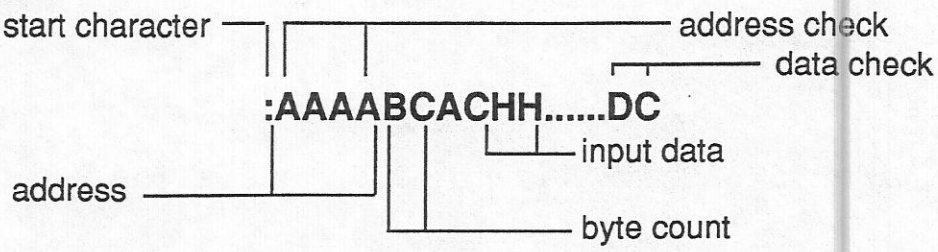


Signetics Code 85

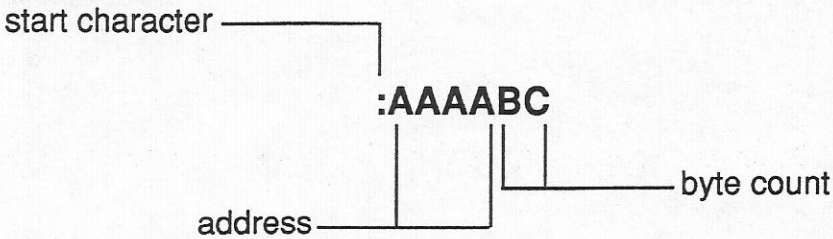
The illustration below shows the specifications of a Signetics format files. Data in each record begins with a 9-character prefix and ends with a 2-character suffix.

The start character is a colon. This is followed by the address of the first data byte, the byte count, and a 2-digit address check. Data is represented by pairs of hex characters. The byte count must equal the number of data bytes in the record. The suffix is a 2-character data check.

DATA RECORD:



END OF FILE RECORD:



Tektronix Hexadecimal Code 86

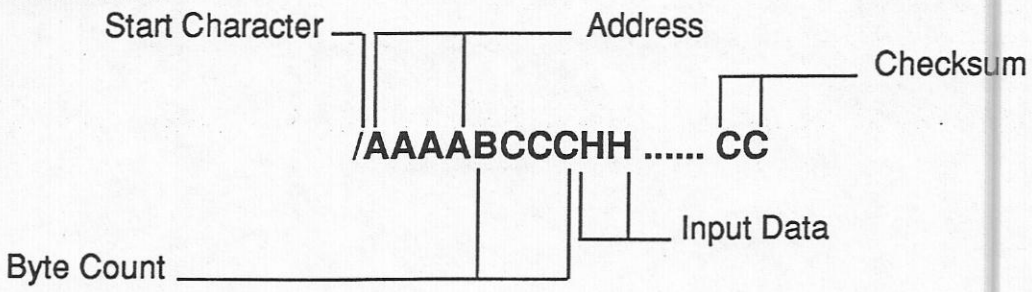
Data in each record begins with a start character (a slash) and ends with a 2 character sumcheck. Following the start character, the next 4 characters of the prefix express the address of the first data byte. The address is followed by a byte count, which represents the number of data bytes in the record, and by a sumcheck of the address and byte count.

Data bytes follow, represented by pairs of hex characters and succeeded by a sumcheck of the data bytes.

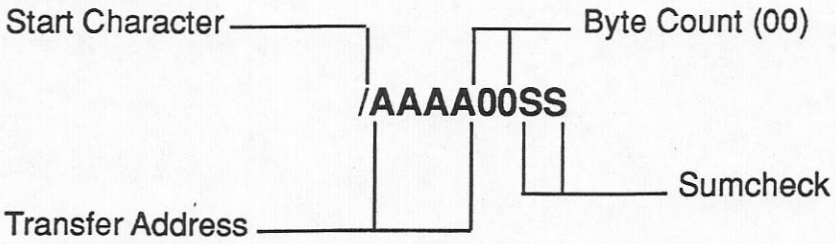
The End of File record contains the start character ('/'), the 4 byte data trasfer address, the special byte count (=00) and the sumcheck of the record.

During an UPLOAD, data is output from the EZ-WRITER starting at the first RAM address and continuing until the number of bytes in the specified block has been transmitted. The EZ-WRITER divides output data into records prefaced by a start character and an address field for the first byte in the record.

DATA RECORD:



END OF FILE RECORD:



Motorola Exormax (S2) Code 87

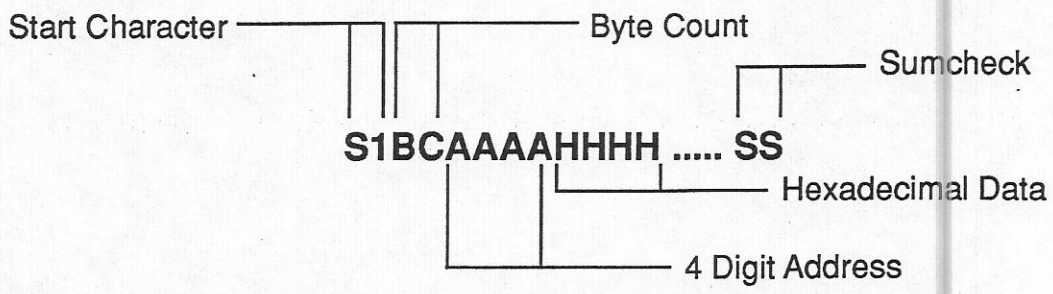
Motorola data files may begin with a sign-on record, identified by the start bytes 'S0'. If the sign-on record is present, all characters up to and including the first <cr> character are discarded during a DOWNLOAD.

Data records start with an 8 or 10 character prefix and end with a 2 character suffix. Each data record begins with the start characters S1 or S2:

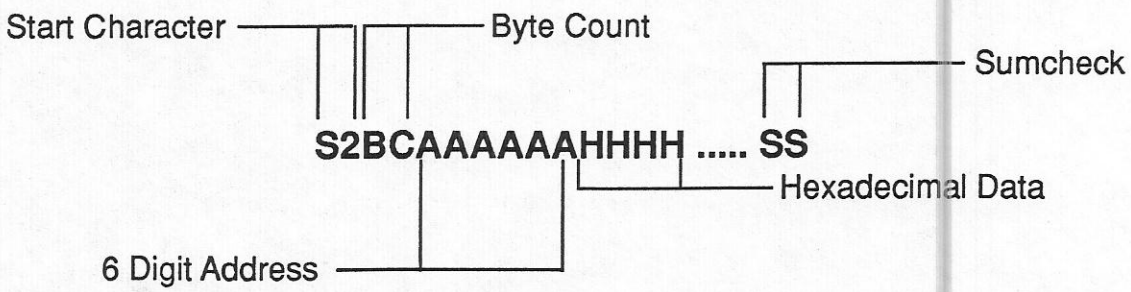
S1 - if the following address field has 4 characters
S2 - if the following address field has 6 characters

The third and fourth characters represent the byte count, which gives the number of data, address and sumcheck bytes in the record. The address of the first data byte in the record is expressed by the last 4 characters of the prefix (6 characters for S2 records). Data bytes follow, each represented by 2 hex characters. The number of data bytes occurring must be 3 (S1 record) or 4 (S2 record) less than the byte count. The suffix is a 2 character sumcheck.

DATA RECORD:



OR

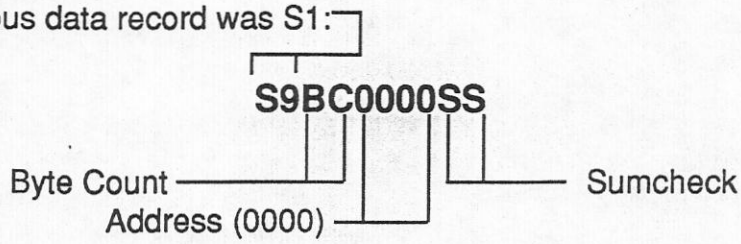


Motorola Exormax (S2) Code 87

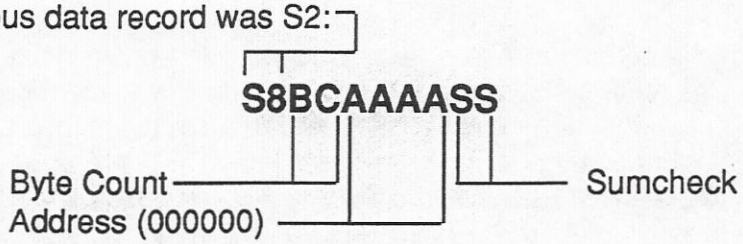
(continued)

END OF FILE RECORD:

End record if previous data record was S1:



End record if previous data record was S2:



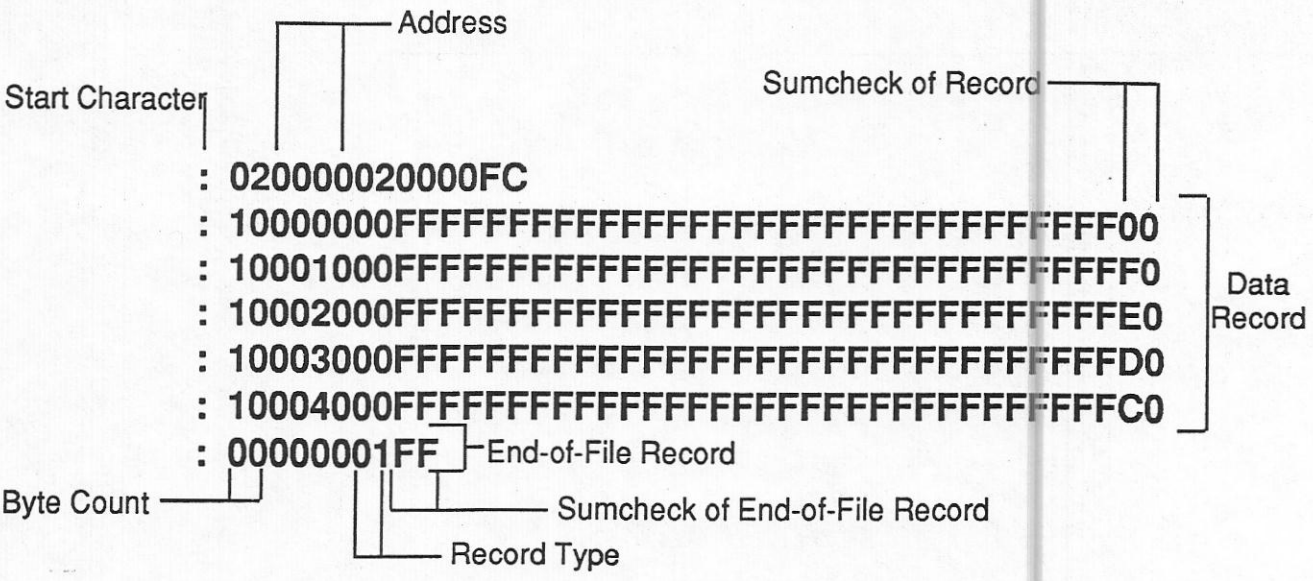
INTEL MCS-86 Hex Code 88

The Intel 16-Bit Hexadecimal Object file record format is basically the same as the Intel Intellec 8/MDS (Code 83). It starts with nine characters (four fields) that define the start of record, byte count, load address, and record type. It ends with a 2 character sumcheck.

There are four record types:

00= data record
01= end record (signals end of file)
02= extended address record (added to the OFFSET to determine the destination address)
03= start record (ignored)

Record type 02, the extended address record, defines bits 4 to 19 of the segment base address. It can appear randomly anywhere within the object file and in any order; i.e., data can be formatted such that the data bytes at high addresses appear before the bytes at lower addresses.



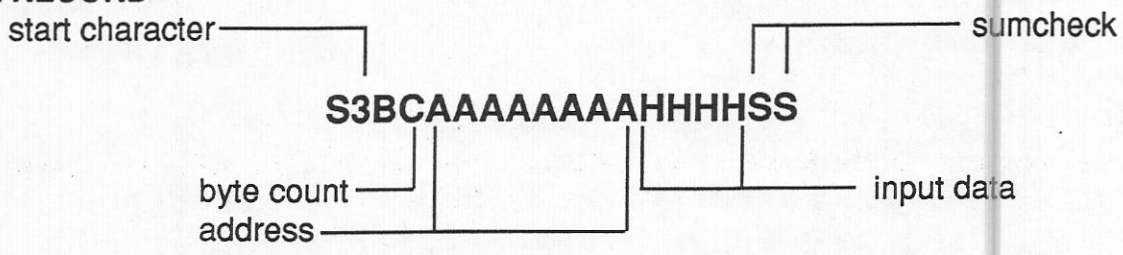
Motorola 32Bit (S3) Code 95

The Motorola 32Bit (S3) format closely resembles the Motorola Exormax format; the main difference being the addition of the S3 and S7 start characters. Motorola data files may begin with an optional start character record, initiated by the start characters S0. S1 and S2 record types are allowed in this format. The following paragraphs describe the S3 format.

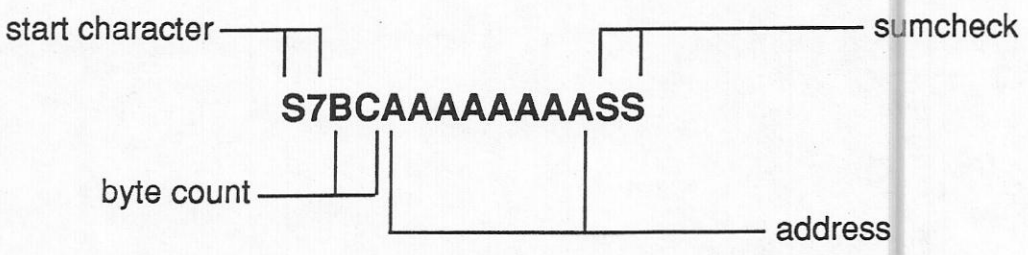
The S3 character is used to start a data record containing a 4 byte address. The third and fourth characters of the record represent the byte count (which expresses the number of data bytes plus 5), followed by the address and data bytes in the record. The address of the first data byte in the record is expressed by the last 8 characters. The number of data bytes occuring must be 5 less than the byte count. The suffix is a 2 character SUMCHECK; the one's complement (in binary) of the preceding bytes in the record, including the byte count, address, and data bytes.

The S7 character starts a termination record for a block S3 records. The address field for an S7 record may optionally contain the 4 bytes instruction address that identifies where control is to be passed.

DATA RECORD



END OF FILE RECORD



9. HELP

System Hardware Diagnostic Routines

These Routines are designed to test the functionality of your EZ-WRITER System. Errors are isolated to the failing Functional Unit or to the component level, whenever possible.

The EZ-WRITER Diagnostics are organized into two classifications:

1. Hardcore Test
2. Softcore Test

Hardcore Test

The Basic system hardware which is required to be operational in order to execute SOFTCORE routines is viewed as system HARDCORE. It comprises the following functional units:

1. CPU - 64180 Microprocessor
2. ROCS - Read Only Storage (System EPROM)
3. UTY-RAM - System utility static RAM
4. Liquid Crystal Display Unit

Softcore Test

These Routines assume a level of communication, via the LCD unit, exists between the operator and the EZ-WRITER.

Softcore Tests check the following functional units:

1. Keyboard
2. Writeable Control Storage (E^2RAM)
3. User RAM
4. Programming Sockets
5. Power Source
6. LED Drivers

Power-On Diagnostics

Tests 00 thru 08 assume the LCD unit is functional and attempts to display each test as it is executed to establish an operational level which reassures the user of the functional integrity of the EZ-WRITER system. For corrective action please contact your local BYTEK Service Center locations listed in the acknowledge section..

Functional Unit	Test	Remarks
CPU	Hardcore Test	Basic Tests
EPROM	Hardcore Test	
Utility RAM	Hardcore Test	
Liquid Crystal Display	Hardcore Test	
Keyboard	Test 00	Diagnostics
Writeable Control Storage (E^2 RAM)	Test 01	
User RAM	Test 02/03	
(Spare)	Test 05	
Programming Sockets	Test 06	
Pin Driver Power Source	Test 07	
LED Drivers	Test 08	Visual and Audible Test

Diagnostic Mode (Set System Flags)

The EZ-WRITER provides diagnostic features to facilitate the isolation and correction of system failures. However, it is recommended that ONLY properly trained personnal make use of these features. Certain diagnostic features can cause permanent damage to installed devices if these feature are activated and used during normal Operation.

To execute the EZ-WRITER Diagnostic Mode follow the procedure below:

NOTE
You can scroll forward with "Λ" key and use the "V" key if you pass desired option. Press the execute key to enable or disable and exit with the "Λ" key.

Scroll to Diagnostic Mode - Press the EXECUTE key.

Step	Key	Example LCD Display	Remark
1	EXECUTE	DIAGNOSTIC MODE SET SYSTEM FLAGS	Scroll to Diagnostic Mode then press EXECUTE
2	EXECUTE	SET SYSTEM FLAGS DIAG LOOP=DISABLE	Press EXECUTE to enable or disable diagnostic flag. When this flag is enabled the current Operation is continously repeated. Reset during power off. Press "Λ" to scroll to next flag.
3	EXECUTE	SET SYSTEM FLAGS HLT ON ERROR=DISABLE	Press EXECUTE to enable or disable halt on error flag. Scroll to next option or to exit.
4		DIAGNOSTIC MODE R	

Diagnostic Mode (Diagnostic Routines)

Diagnostic Routines normally executed during Power-On can also be initiated from the Operator's Panel.

There are three (3) routines:

1. **GO-NO-GO** -- The same routine exercised during initial Power-On.
2. **SIGN-ON** -- The same as Go-No-Go without the user RAM test.
3. **FIELD DIAGNOSTIC** -- This feature allows the user to run field support diagnostic routines which can be downloaded into user RAM via RS-232 port or from a MASTER device and execute from the Local Panel.

Scroll to Diagnostic Mode - Press EXECUTE key.

Step	Key	Example LCD Display	Remark
1	V Λ	DIAGNOSTIC MODE GO-NO-GO	Scroll to Sign-On or press EXECUTE key to initiate the GO-NO-GO routines.
2	V Λ or EXECUTE	DIAGNOSTIC MODE SIGN-ON	Scroll to Field diagnostics or press EXECUTE to initiate Sign-On routines.
3	V Λ or EXECUTE	DIAGNOSTIC MODE FIELD DIAGNOSTICS	Press EXECUTE to initiate Field diagnostics routines.
4		FIELD DIAGNOSTIC (XXXXX)	X = Messages provided by Field Diagnostic documentation.
5		DIAGNOSTIC MODE R	

Error Word Format

The HF/PF/CF error word encodes all Hardware Failures (HF), all Power Failures (PF), and all Cel Failures (CF). This section lists and defines all hardware and power failure error codes. Cel error codes are found in the Error Section of each of the Cel Accessory Manuals.

The LCD display for a hardware error is as follows:

HRDWARE ER HHH/PP/CC (ERROR MESSAGE)

The HH Code is a HEX sum of any or all hardware errors listed. The PP Code represents any power source error code number from 01 to 16. The CC Code is assigned to errors in the Cel Accessory Section.

Hardware Error Codes

Test	HF Code	Functional Unit
00	004	Keyboard
01	001	E^2RAM
02	002	RAM Bank Switching
03	002	RAM Data Test
05		(Spare)
06	020	Programming Sockets
07	004/01-16	Pin Driver Power Source
08		LED Drivers & Speaker

The LCD error message display for each HF Code is shown in the following Sections.

Keyboard

(Test 00, Code 004)

The keyboard is implemented by using a Driver-Sensing network in a X - Y configuration. Both X - Y lines are attached to GANGSITE I/O port #1.

The Error display is shown below:

HRDWARE ER 004/PP/CC KEYBOARD FAILED

Writeable Control Storage

(Test 01, Code 001)

Code 001 indicates the Writeable Control Storage failed the system diagnostic test. The LCD error message display is:

```
HRDWARE ER 001/PP/CC
WCS FAILED
```

RAM Bank Switching

(Test 02, Code 002)

The address space in the user RAM is organized in 16K bytes banks. During power up each bank is filled with a unique data pattern. Each bank is tested for possible bank data "OVERFLOW".

The RAM Bank Switching Error display is shown below:

```
HRDWARE ER 004/PP/CC
PAGE=XX FOUND=YY
```

XX=Desired Page
YY=Machine Page

RAM Data Integrity

(Test 03, Code 002)

After successful execution of the RAM Switching Test, a data integrity test is performed on the entire user RAM.

Data Error display is shown below:

```
RAM-D ER 002/PP/CC
AD=AAAAAA DATA=DD
```

A=Failing address.
DD=Failing data bit:

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
80	40	20	10	08	04	02	01

Programming Sockets

(Test 06, Code 020)

This test checks the ability of the system to write and read from each ZIF socket 0 thru 7. If either a write latch or a read buffer is defective, a Data Echo Check will be detected and the Error Code will be posted as follows:

```
HRDWARE ER 020/PP/CC
ZIF SOCKET FAILURE
```

The failing socket(s) will be flagged by the associated LED(s) glowing RED.

Pin-Driver Power Source

(Test 07, Code 01-16)

This test checks the Power Sources for all device Oriented Operations. VPP, VCC and VRR are tested for the required level range.

The LCD Error display is shown below:

```
HRDWARE ER HHH/PP/CC
XXXX      FAILED
```

HHH=(Error #)
XXX=VPP, VCC OR VRR

LED Drivers

(Test 08)

Test 08 is a visual check on LEDs associated with programming sockets. Test 08 operates as follows:

1. Turns OFF all LEDs.
2. Turns ON all LEDs GREEN.
3. Walks a RED LED on a bed of GREEN (left to right).
4. Turns OFF all LEDs.
5. Turns ON all LEDs RED.
6. Walks a GREEN LED on a bed of RED (right to left).
7. Turns OFF all LEDs.

NOTE: In steps 3 & 6 the speaker beeps for each LED.

Normal Termination

```
EZ-WRITER        RRRK R
SUMCHECK=CCCC RZZ
```

Operational Errors

Operational Errors comprise all system abnormal conditions such as: hardware, software and operator errors encountered during the execution of an Operation. The LCD messages and descriptions of the error conditions are listed below:

Example LCD Display	Remarks
DEVICE CODE ERROR R UNSUPPORTED ER25	Selected code is Illegal/Unsupported.
DEVICE CODE ERROR R WRONG DEV IN ER82	Code selected does not coincide with code of the device in the socket.
ILLEGL COMMAND R RAM EXCEEDED ER27	Specified ending address is larger than installed memory, or not enough RAM available to support multiword mode selected.
ILLEGL COMMAND R INVALID ADDRESS ER27	Specified address is invalid/Illegal.
OPERATOR ERROR R START>END ADDR ER27	Specified beginning address is larger than specified ending address.
OPERATOR ERROR R RAM EXCEEDED ER27	Specified ending address is too large.
OPERATOR ERROR R WRONG FORMAT ER51	Illegal/Wrong format code.
DEVICE CODE ERROR R MIXED DEV TYPES ER82	Electronic ID has determined that there is more than one type of device in the programming sockets.
DEVICE CODE ERROR R NO ID FOUND ER81	The installed device has no Electronic ID.

Operational Errors (continued)

Example LCD Display	Remarks
POWER FAILURE R VCC VOLTG ERROR ER18	The installed device is causing VCC to drop out of specifications.
OPERATOR ERROR R BAD INSERTION ER36	Device Inserted Upside down, or contaminated Data Bus. Associated LED(s) glow RED.
HI-CURRENT OR R BAD INSERTION ER36	Device Upside down, or Address Bus shorted. All LEDs glow RED.
OPERATOR ERROR R WRONG SOCKET ER26	Master device inserted in wrong socket.
OPERATOR ERROR R DEV NOT ENABLED ER32	Empty ZIF socket for the intended Operation or device is faulty.
PROGRAM DONE R ILLEGAL BIT ER21	Installed device has bits which can not be reprogrammed.
BLANK CHECK DONE R NONBLANK ER20	Installed device is nonblank.
VERIFY DONE R CHK=CCCCCC ER29	The programmed device failed to verify against data in RAM.
VERIFY ERROR R AAAAA RAM = DD DEV = DD	Data none compare error and halt flag set. A = Address RAM = Data DEV = Device Data Press EXECUTE to continue.
POWER FAILURE R VCC OVERCURRENT ER38	The installed device(s) is drawing too much current.

Operational Errors (continued)

Example LCD Display	Remarks
PROGRAM DONE R CHK=CCCCCC ER22	The device failed to program successfully.
RS-232 FAILURE R FRAME ERROR ER41	The serial interface detected a start bit but the stop bit was in the wrong position.
RS-232 FAILURE R DATA OVERRUN ER42	The EZ-WRITER received characters which can not process.
RS-232 FAILURE R PARITY ERROR ER81	The incoming data has incorrect parity.
RS-232 FAILURE R I/O CHECK ER82	The sumcheck character received does not match the sumcheck calculated.
RS-232 FAILURE R INVALID FORMAT ER90	Unsupported I/O format has been specified in Computer Remote Mode.
RS-232 FAILURE R INVALID ADDRESS ER91	Invalid address field received by the EZ-WRITER.

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