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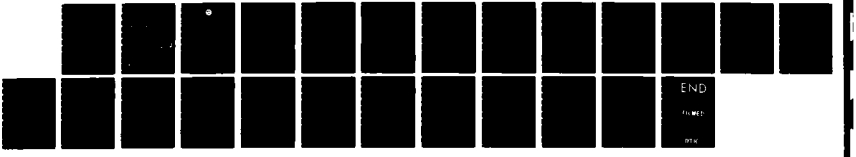

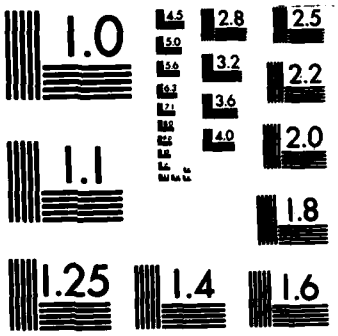

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INTERACTIVE GRAPHICS UTILITY FOR ARMY NEC AUTOMATION (IGUANA)

Computer Program Package

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ADMINISTRATIVE INFORMATION

This document was prepared to develop and aid the NEC input preparation and output display. The work was done under the direction of Code 822, J. C. Logan of the Naval Ocean Systems Center.

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19 ABSTRACT (Continue on reverse if necessary and identify by block number)

The Interactive Graphics Utility for Army NEC Automation (IGUANA) is a system designed to reduce the time required for antenna model evaluation by providing partial automation to both the data entry and the data display processes.

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Other system functions include utilities for archiving model data and card images (subdecks) on floppy disk, restoring archived model data and card images to the system disk, and translating NEC input decks created on other computers (sequential files) into Formatted data sets such that they can then be read and edited via IGUANA.

The above represents the scope of the IGUANA programs. In addition to these features, three stand-alone packages have been included and can be accessed through the IGUANA Master Menu. These are:

1. CROSSTALK-XVI - a smart terminal/file transfer program used in conjunction with a modem for communication with a selected NEC host computer

2. PLOT UTILITIES - a set of plot and display utility programs

3. AUXILIARY PROGRAMS - user written/acquired programs accessible from a sub-menu. Included with the system are MININEC, a MININEC pre-processor, a MININEC post-processor, and an Antenna Matching program.

These programs have been included with the IGUANA system to provide the user with additional tools for antenna modeling and evaluation. They are not, formally, a part of the IGUANA program package and, with the exception of the Plot Utilities, are not included in IGUANA documentation. (Refer to Section 2 - Applicable Documents.)

IGUANA has been developed on an IBM-PC/XT using IBM's Advanced BASIC, Version 2.0 to run under IBM's PCDOS. It has also been successfully tested and run on the Leading Edge (IBM compatible) PC.

In support of this system, the IGUANA Program Package consists of:

- The executable Digital Processor Program, delivered installed on the PC's fixed disk. Each site will also receive four floppy diskettes holding a backup version of IGUANA and the three stand-alone packages.

- A brief description of each of the IGUANA programs

- An installation guide to be used in the event the fixed disk is erased (or otherwise damaged) to guide the user in the procedures required to rebuild the system from the backup diskettes provided with the system delivery (included in Appendix A).

* * * * * I M P O R T A N T * * * * *

The backup diskettes are to be used only in the event that the original system on the fixed disk is no longer functional. The only data that can be recovered once the system is backed up are those subdecks and models which have been archived via the IGUANA archive function. All other data are not recoverable.

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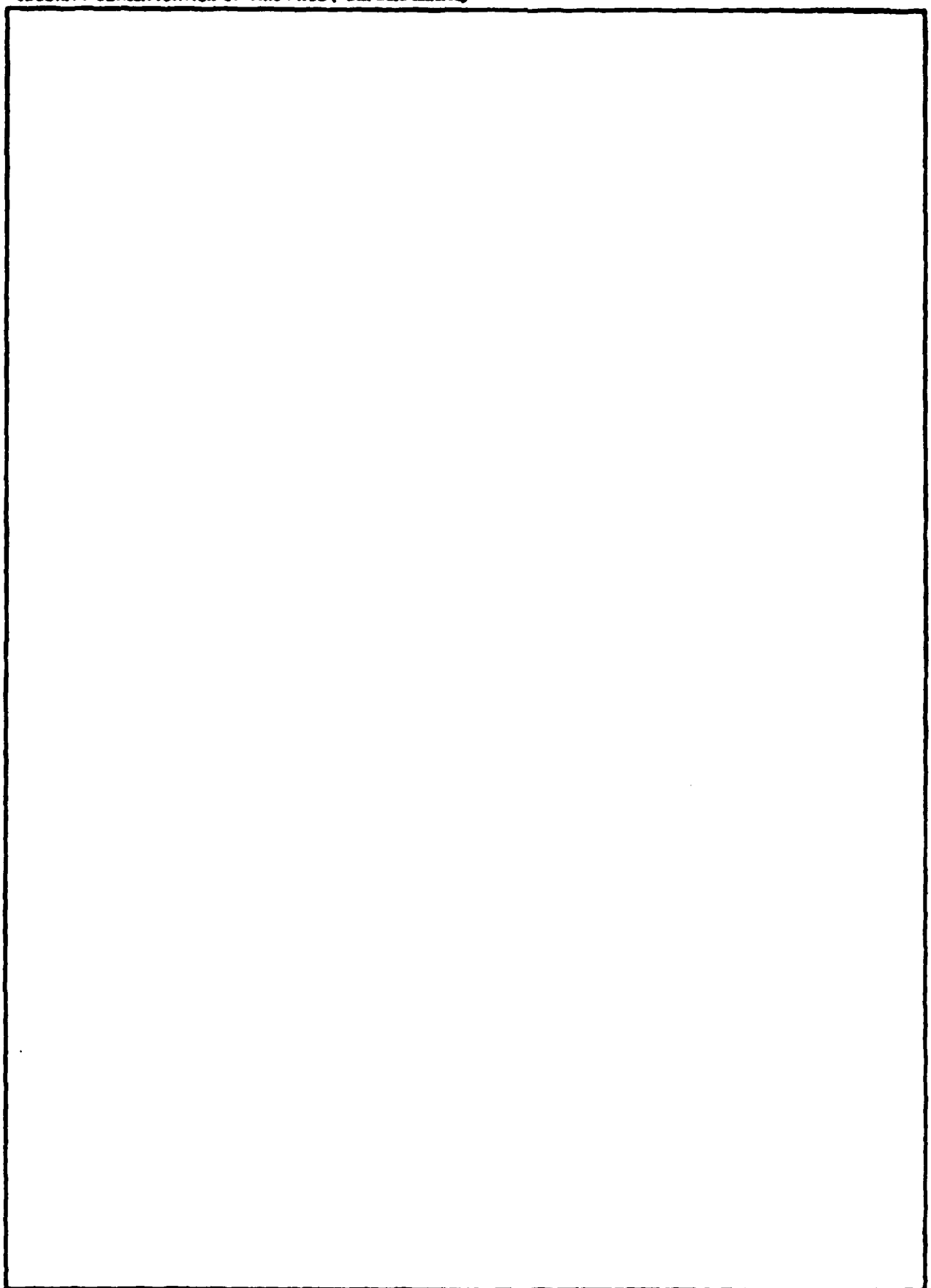

TABLE OF CONTENTS

IGUANA Program Package Document

SECTION 1 - INTRODUCTION

1.1 PURPOSE

The Interactive Graphics Utility for Army NEC Automation (IGUANA) is a system designed to reduce the time required for antenna model evaluation by providing partial automation to both the data entry and the data display processes.

Previous to this system, the use of existing Numerical Electromagnetics Code (NEC) for antenna evaluation required a lengthy, tedious, and error-prone process involving manual measurement of three-dimensional coordinates of each significant point of the desired input structure from scale drawings (generally, only top and side views are available), and manual entry via keyboard. The input structures are in the form of 'wire' models. The NEC code requires that each wire be specified individually by defining the x, y, and z coordinates of both end points, the wire radius, and the segmentation for each wire. Complex models often required several weeks of effort to specify, check, and to correct measurement and keyboard errors.

IGUANA has been developed as an aid to NEC input preparation and output display - it performs no antenna evaluations itself. This version of IGUANA produces input acceptable only for the NEC Method of Moments code.

1.2 SCOPE

IGUANA is to provide automated aids for:

a. Creation of a three-dimensional wire model, consisting of

   1. Structure definition - user input via sonic digitizer of Top and Side View of a structure

   2. Program editing of input data for consistency

   3. System generation/user definition of sections along the long axis of the structure

   4. System generation/user refinement of End Views for each specified section of the structure

5. Program generation of a three-dimensional structure for each specified section and combination of all sections into a completed three-dimensional wire model

6. Display of the entire structure with the capability of rotation, plotting and magnification of the completed model

7. User editing (using a mouse) to remove erroneous points and wires and/or to add missing wires

b. Generation of a set of "wire cards" acceptable for input to NEC which represents the three-dimensional model created as described above. The wire cards are saved as a Geometry Subdeck and can be edited by the user and combined with the appropriate Comment and Program Control Subdecks to be used as input to NEC on a host computer (see c, below).

c. User entry and maintenance of other required NEC input data:

1. Creation of Comment Subdecks

2. Creation of Program Control Subdecks

3. Stand-alone creation of Geometry Subdecks

4. Editing, printing and deletion (upon user request) of any existing subdecks

5. Formatting of subdecks (combining of same-named subdecks with or without a comma separating the card code on each card from the other NEC parameters) to create a full NEC "Formatted" data set

6. Combining of one or more data sets (append function) to create a multiple data set for input to NEC

7. Editing, printing and deletion (upon user request) of formatted data sets

8. Preparation of "Transmit" data sets (conversion to sequential file format) for transfer to the NEC host computer

9. Deletion of NEC input decks when no longer needed

d. Transmission of Transmit data sets to the selected NEC host computer (see f., below).

e. Capture and display of NEC results (see f., below).

f. Creation and maintenance of a NEC Host Table to interface with the file transfer program to enable automation of computer dial-up and logon procedures required for transfering data sets to a selected NEC host computer and capturing NEC results from the NEC host.

SECTION 2 - APPLICABLE DOCUMENTS

The following documents are required reading for the understanding and the operation of IGUANA. Additionally, all documentation provided by IBM or Leading Edge and other vendors with the purchase of the system components should be kept on hand for reference.

CROSSTALK-XVI Data Communications Software System; MICROSTUF, Inc., 1983

Graphical Plotting System (GRAPS); NOSC TD ___ (to be published)

IGUANA Installation Guide; Naval Ocean Systems Center, San Diego, California, 92152, 31 May 1985

MININEC: A Mini-Numerical Electromagnetics Code*; NOSC TD 516, 6 September 1982

NEC Engineering Work Station User's Manual; AGL, Inc., Pacific Grove, California, 1984

NUMERICAL ELECTRONAGNETICS CODE (NEC) - METHOD OF MOMENTS; NOSC TD 116, Volumes 1 and 2, January 1981

USER'S GUIDE for the INTERACTIVE GRAPHICS UTILITY FOR ARMY NEC AUTOMATION (IGUANA) Version 2.0; Naval Ocean Systems Center, San Diego, California, 92152, 31 May 1985

NOTE: The installation instructions provided with CROSSTALK should be ignored; installation of this package is performed during IGUANA installation.

* This document will be superseded at a later date with an updated manual for MININEC II.

SECTION 3 - SOURCE DIGITAL PROCESSOR PROGRAM

The Source Digital Processor Program exists on floppy disks retained at the Model Range (Building T-382) at NOSC, San Diego, California.

SECTION 4 - OBJECT PROGRAM TAPE

The IGUANA system programs and the stand-alone program packages described in paragraph 1.2 are delivered installed on the fixed disk. Included with each site's system package are four floppy diskettes containing all programs and data originally installed on the fixed disk (to be used to restore the system programs in the event the fixed disk is accidentally erased, formatted, or otherwise destroyed). These diskettes hold the following:

LABEL	CONTENTS
IGUANA1	SETCLOCK, MOUSE, and LOAD programs used to reboot and display user prompts for the completion of system installation, as well as many of the IGUANA program files
IGUANA2	The remainder of the IGUANA program files, batch files, and BASIC Runtime Libraries
IGUANA3	The CROSSTALK-XVI program files and auxiliary program and data files
IGUANA4	The Graphical Plotting System (GRAPS) program and data files and IGUANA sample data files

Copies of these diskettes are available via the Model Range, Building T-382, NOSC, San Diego, California.

SECTION 5 - SOURCE PROGRAM LISTING

Listings of the IGUANA programs are available upon request in Building T-382 at NOSC. Briefly, these programs are:

NAME	DESCRIPTION
IGSTART.EXE	IGUANA Startup Program. Displays IGUANA Master Menu and requests user selection of the function to be invoked (CARD EDITOR, MODEL MAKER, SET DEFAULT VALUES, CROSSTALK, PLOT UTILITIES,

NAME	DESCRIPTION
IGSTART.EXE (cont'd)	AUXILIARY PROGRAMS, EXIT TO DOS). The IGUANA functions handled by IGSTART are the setting of the default values and the adding and deleting of structure files.
IGNOBLE.EXE	2-View Input/Edit Program. Invoked to input and edit Top and Side View scale drawings and to define section boundaries in the Side View of a structure.
IGINSECT.EXE	Section Generation/Edit Program. Called to generate sections (End Views) and receive user input and edits for a structure's sections.
IGMAKE01.EXE	3-D Section Generator Program. Constructs the three-dimensional sections from the Top, Side and End Views.
IGEDIT3D.EXE	3-D Section Edit Program. Accepts user edits to the generated three-dimensional section views.
IGGLUE1.EXE	3-D Model Generator Program. Invoked to assemble three-dimensional sections into a model. Applies symmetry as specified by the user during digitizer initialization and puts the resulting model into the positive octant.
IGMODEDT.EXE	3-D Model Edit Program. Called to edit a three-dimensional model (includes rotation, zoom, and plot features). Editing capabilities are addition of wires and deletion of points and wires, rescaling along any axis, and reflection of the model.
IGSORTS.EXE	Wire Sort Program. Used to sort the wires of a model up or down the x, y, or z, axis as specified by the user.
IGLOOK03.EXE	3-D Model Display Program. Called to inspect a model on the screen (includes rotation and zoom) and to output to the plotter.
IGGLUE2.EXE	3-D Model Assembly Program. Used to assemble separate structures along the x, y, or z axis (as specified by the user) to create a single, larger model.
IGWIRES.EXE	Geometry Deck Generator Program. Invoked to generate a Geometry subdeck consisting of "GW" card for each wire in a model. Also allows model translation parallel to the x, y, or z axis.

NAME	DESCRIPTION
IGMAST.EXE	Mast Input/Edit Program. Called to allow the input and edit of wires describing one side of a tower-like structure. Allows the user to specify the number of identical sides in the tower and generates a three-dimensional model based on this information.
IGPOLE.EXE	Pole Input/Edit Program. Invoked to allow input and edit of wires to describe a pole-like structure. Allows the user to specify a center pole with one or more wires in one or more single plane(s). The planes are then reflected in other planes around the center pole. A three-dimensional pole model is thus generated.
IGMAINT.EXE	CARD EDITOR Function Driver. Displays the CARD EDITOR Option Menu and appropriate sub-option menus to direct the user in the use of the CARD EDITOR function. Handles all CARD EDITOR capabilities except deck creation, deck editing, and deck archiving/restoring.
IGMAKEC.EXE	Comment Subdeck Input Program. Accepts user input for the creation of Comment Card subdecks.
IGMAKEG.EXE	Geometry Deck Input Program. Called to accept and verify user input for the stand-alone creation of Geometry Card subdecks in the prompted mode.
IGMAKEP.EXE	Program Control Deck Input Program. Accepts and verifies user input for the creation of Program Control Card subdecks in the prompted mode.
IGEDIT.EXE	Deck Input/Edit Program. Allows user editing of Comment, Geometry, Program Control, and Formatted subdecks. Also used to accept user input for the creation of Geometry and Program Control subdecks in the non-prompted mode.
IGXTALK.EXE	NEC Host Interface Program. Allows the user to select from a list of user-maintained NEC host computers, each of which can have an associated CROSSTALK command file which can be used to automate computer-to-computer communications.
IGARCH.EXE	Deck Archive/Restore Program. Archives selected subdecks on a formatted floppy diskette and restores archived subdecks onto the fixed disk.

NAME	DESCRIPTION
IGMARCH.EXE	Model Archive/Restore Program. Archives selected models on a formatted floppy diskette and restores archived models onto the fixed disk.
IGBUILD1.EXE	Convert NEC Geometry Cards to Model Program 1. Called to convert NEC input data set Geometry Cards to intermediate file for building IGUANA model.
IGBUILD2.EXE	Convert NEC Geometry Cards to Model Program 2. Called by Model Program 1 to convert intermediate file into IGUANA model.
IGMENU.EXE	Build Auxiliary Menu Program. Called to control sub-menu of auxiliary user programs.
IGNOMINI.EXE	MININEC Pre-Processor Program. Called to convert NEC input data set Geometry Cards to intermediate file to be used for MININEC input.
MINIOUT.EXE	MININEC Post-Processor Program. Called to interface MININEC output to the Graphical Plotting System (GRAPS).
PLOTDG.EXE	Plot NEC Geometry Cards Program 1. Called to convert NEC input data set Geometry Cards to intermediate sequential file.
DGEN.EXE	Plot NEC Geometry Cards Program 2. Called by Program 1 to convert intermediate sequential file to random file, scaled for plotting and display.
DPLOT.EXE	Plot NEC Geometry Cards Program 3. Called by Program 2 to display and plot the converted NEC input Geometry Cards.
BASRUN.EXE	BASIC Run-time Library. Supports compiled BASIC programs.
87BRUN.EXE	8087 BASIC Run-time Library. Supports compiled BASIC programs which use the 8087 Numerical Data Processor.

SECTION 6 - SOURCE/OBJECT LISTING

Since the BASIC compiler produces no source/object listing, the only listings available are those described in section 5 of this document.

SECTION 7 - CROSS-REFERENCE LISTING

No cross-reference list capability was available with BASICA at the time this document was prepared.

SECTION 8 - MISCELLANEOUS LISTINGS

A Batch File (named "IGUANA.BAT") is used to direct program control transfer, both within the IGUANA system and between IGUANA programs and the stand-alone program packages included on the IGUANA Master Menu. Another Batch File ("AUTOEXEC.BAT"), is invoked when the system is booted, to initialize the system. These listings are included in Appendix B.

APPENDIX A

SYSTEM INSTALLATION GUIDE

APPENDIX A

SYSTEM INSTALLATION GUIDE

The IGUANA system is delivered to each site pre-installed on the fixed disk. This installation guide is to be used ONLY in the event the fixed disk is accidentally destroyed and is no longer useable. The floppy diskettes provided with the system contain all IGUANA, CROSSTALK, UTILITY, and AUXILIARY programs. These diskettes are labeled:

- o IGUANA1
- o IGUANA2
- o IGUANA3
- o IGUANA4

The only data files included on these backup diskettes are the same sample files installed on the fixed disk when the system is delivered. **ALL MODELS AND DATA SETS (DECKS) CREATED ON THE FIXED DISK WILL NOT BE RECOVERABLE !** The only exception is that any subdecks and models archived on a floppy diskette via the IGUANA archive function can be restored onto the fixed disk after the system is re-installed as described below.

* * * * * DO NOT CONTINUE UNTIL READING THE ABOVE * * * * *

To reinstall the system, follow the steps below:

1. Install DOS on the fixed disk (drive C:) according to the instructions in the DOS Reference Manual.

2. Place the floppy labeled "IGUANA1" in the floppy disk drive (drive A:)

3. Type: **COPY A:LOAD**
   (Press Return Key)

4. Load the diskettes labelled IGUANA2, IGUANA3, and IGUANA4 when prompted.

5. When the preceding procedures have been completed, remove the IGUANA4 diskette from the A: drive and reboot the system: simultaneously press <Ctrl>, <Alt>, and <Del>. You are now ready to use your system.

NOTE: If NEC datasets (subdecks) and models have been archived on floppy diskettes via the system Archive function, this data can be restored to the fixed disk with the

system's Restore function. Refer to the IGUANA Users' Guide for procedures.

APPENDIX B

IGUANA BATCH FILES

AUTOEXEC.BAT

The batch file AUTOEXEC.BAT is automatically loaded and executed when the system is first booted up. This file sets the system clock, initializes the RAM disk (drive B:), initializes the Mouse, and loads and starts the IGUANA batch file.

```
SETCLOCK
MOUSE
CD \IGUANA
PATH C:\
IGUANA
```

IGUANA.BAT

IGUANA.BAT is the batch file automatically executed at the completion of AUTOEXEC.BAT, CROSSTALK, MININEC II, and the NEWS subsystem. IGUANA.BAT checks for and erases the temporary batch file created to direct entry into the above listed programs and loads the IGUANA system option driver program, IGSTART.BAS. Otherwise, IGUANA.BAT executes the temporary batch file, IGBAT.BAT, automatically executing the instructions stored in that file when the user requested CROSSTALK, MININEC II, or NEWS subsystem functions.

```
ECHO OFF
CLS
ECHO                    . . . LOADING INITIAL OPTION MENU . . .
:LOOP
IF EXIST IGBAT.BAT ERASE IGBAT.BAT
IGSTART
IF NOT EXIST IGBAT.BAT GOTO END
IGBAT
GOTO LOOP
:END
```

END

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