

15:52:47

OCA PAD AMENDMENT - PROJECT HEADER INFORMATION

07/19/94

Active

Project #: B-16-604

Cost share #:

Rev #: 1

Center #: 10/24-6-R8090-0A0

Center shr #:

OCA file #:

Contract#: LETTER AGMT DTD 3/14/94

Mod #: 1

Work type : RES

Prime #:

Document : OTH

Contract entity: GTRC

Subprojects ? : N

CFDA: NA

Main project #:

PE #: NA

Project unit:

MULTIMEDIA

Unit code: 03.010.216

Project director(s):

PRICE W E

MULTIMEDIA

(404)894-3547

Sponsor/division names: ANDERSEN CONSULTING

/ ATLANTA, GA

Sponsor/division codes: 250

/ 054

Award period: 940314 to 940714 (performance) 940714 (reports)

Sponsor amount

New this change

Total to date

Contract value

315.45

14,221.45

Funded

315.45

14,221.45

Cost sharing amount

0.00

Does subcontracting plan apply ? : N

Title: LOGISTICS 2020 - OPERATIONS DESIGN CENTER

PROJECT ADMINISTRATION DATA

OCA contact: William F. Brown

894-4820

Sponsor technical contact

response

Sponsor issuing office

TARA DEAGUSTINIS

(404)221-6241

TARA DEAGUSTINIS

(404)221-6241

ANDERSEN CONSULTING

SUITE 2400

250 WILLIAMS STREET

ATLANTA, GA 30303

ANDERSEN CONSULTING

SUITE 2400

250 WILLIAMS STREET

ATLANTA, GA 30303

Security class (U,C,S,TS) : U

ONR resident rep. is ACO (Y/N): N

Defense priority rating : NONE

NA supplemental sheet

Equipment title vests with: Sponsor X

GIT

NONE PROPOSED

Administrative comments -

MOD. 1 INCREASES AMOUNT OF AGREEMENT.

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Closeout Notice Date 07/25/94

Project No. B-16-604_____ Center No. 10/24-6-R8090-OAO_

Project Director PRICE W E_____ School/Lab MULTIMEDIA_____

Sponsor ANDERSEN CONSULTING/ATLANTA, GA_____

Contract/Grant No. LETTER AGMT DTD 3/14/94_____ Contract Entity GTRC

Prime Contract No. _____

Title LOGISTICS 2020 - OPERATIONS DESIGN CENTER_____

Effective Completion Date 940714 (Performance) 940714 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	N	_____
Final Report of Inventions and/or Subcontracts	N	_____
Government Property Inventory & Related Certificate	N	_____
Classified Material Certificate	N	_____
Release and Assignment	N	_____
Other _____	N	_____
Comments_____		

Subproject Under Main Project No. _____

Continues Project No. _____

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Management	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	Y
Project File	Y
Other _____	N
_____	N

1
2
2
512.740

Documentation for Videodisc Catalog System (DOS program andersen.exe)

Version 1.0

May 1994

W. Edward Price, Research Engineer
Andrew M. Quay, Research Scientist
Multimedia Technology Lab
Georgia Institute of Technology
400 10th St., N.W.
Atlanta, Georgia 30332-0130

Table of Contents

- 1. Overview**
- 2. Requirements**
- 3. Using the Program**
- 4. Data File Formats**
- 5. Initialization File Format**
- 6. Hardware**
- 7. Software**

1. Overview

This documentation covers the hardware and software installation for the program ***andersen.exe***. The hardware and software design was contracted to the Multimedia Technology Lab at Georgia Tech by Andersen Consulting for the Logistics 2020 - Operations Design Center. The program polls push-buttons connected to 1..n digital I/O boards and plays a video segment on a videodisc player based on the button pressed. If a button is pressed while a video segment is playing, the current video is canceled and the new choice is played. When a video segment is finished playing, the video freezes on the last (end) frame for that segment. Button assignments are in ascii text files (*.vdc). File ***andersen.ini*** contains some initialization parameters.

2. Requirements

The program was tested on the following platform:

- IBM PS/2 Model 80, 2 Meg RAM
- Microsoft/IBM DOS 5.0
- (2) Keithley MetraByte Corp, uCPIO-12 for MCA bus
- Pioneer 8000 videodisc player
- Pioneer supplied RS-232 serial cable
- Modified Keithley I/O screw connector panel, part #fSTA-U
 - 32 resistors added
 - routing of ground lines
- 26 Radio Shack push-buttons

3. Using the Program

Run the program by typing **andersen** at the DOS prompt. Any data file may be automatically loaded by typing **andersen filename.vdc** at the DOS prompt. If a data file was not specified as an argument when loading the program, then an open file dialog box will display first for the user to choose a data file. Data files have the DOS extension **VDC**. Once a data file is loaded, pressing the hardware push-buttons will play a video segment on the videodisc player as defined in the data file. If the data file does not have an entry for a push-button, nothing happens when the button is pressed. Pressing a button while video is playing will cancel the current video and play the new video segment.

Status/Main Screen

The main screen or status screen displays information about the selected button and video segment, loading a new data file, jumping to a video segment without pushing a hardware button, quitting the program, and an about box for the program.

Status Information

The status screen displays the currently loaded data file name, the number of the last button pressed, the name of the last or current played video segment and its start and stop frames.

Status Buttons

Open - Loading a New Data File

Clicking this button will display a file open dialog box to load a new data file. Shortcut key: *Alt-O*.

Goto Video Segment

Clicking this button allows jumping directly to a video segment by choosing it from a list instead of by pressing a push-button Shortcut key: *Alt-G*.

About - Information About Program

An about box that tells the name of the program, serial port used by the videodisc player, and I/O addresses of the digital I/O boards. Shortcut key: *Alt-A*.

Quit

Quits the program. Shortcut key: *Alt-Q* or *ESC* key.

```

                                Status
File: |Filename|
+-----+
+ Status -----+
|Button      Name                                Start      End|
+-----+ +-----+ +-----+ +-----+
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
+-----+ +-----+ +-----+ +-----+
+-----+
+-----+
|About...| [X] Read Push Buttons
+-----+
+-----+
|Open File...| |Goto Segment...| |Quit [ESC]|
+-----+ +-----+ +-----+

```

Open File Screen

Use the mouse or tab keys to navigate this screen. Choose a new data file to be loaded. If *Cancel* button is pressed or *Esc* key pressed, no new data is loaded and current file remains in memory.

Open what file?		
File Name:		OK
C:\		Cancel
filOpenList	[drvOpenList]v	
	dirOpenList	

List Screen

When Goto segment is chosen from the Status screen, a list of video segments for the current file is presented. Use the mouse or up and down arrow keys to select the video segment to be played. Click *OK* or press the *Return* key to choose selected name. If *Cancel* button is clicked or *Esc* key pressed, the choice is canceled.

Choose from the list	
listItems	
Cancel [Esc]	OK [Enter]

About Screen

The about screen is accessed from the Status screen and provides the following information: program name, serial port number being used to talk to videodisc player, I/O addresses of digital I/O boards. Click *OK* or press the *Return* key or press the *Esc* key when finished.

About This Program	
+-----+	
Logistics 2020 - Operations Design Center	
Version 1.0	
+-----+	
Multimedia Technology Lab	
Georgia Institute of Technology	
Atlanta, Georgia 30332-0130	
(404) 894-4195	
Copyright 1994	
+-----+	
Pioneer 8000 VDP at serial port:	
Com1:9600,N,8,1	
Keithley MetraByte Corp. uCPIO-12 at I/O Base(s):	
0300,0400	
+-----+	
+-----+	
OK	
+-----+	

4. Data File Format

The program associates push-buttons with video segments defined in a user loadable data file. The file extension is **VDC** (VideoDisc Catalog). These files are ASCII text. We recommend editing them with the DOS program **EDIT** (type **EDIT** at the DOS prompt). Any other word processor can be used (make sure files are saved as text only). The program allows loading of any data file at any time.

Data Fields

The fields (separated by commas) for a line of data are:

button_number, name_of_video_segment, video_start_frame, video_end_frame

button_number

Defined: Push-button number.
Type: Integer
Valid Values: 1..200

name_of_video_segment

Defined: A name to identify a video segment.
Type: String
Valid Values: A text description up to 32,000 characters. 5-20 characters suggested. DO NOT USE COMMAS IN NAME.

video_start_frame

Defined: Start frame number for video segment on videodisc.
Type: Integer
Valid Values: 1..54000

video_end_frame

Defined: End (stop) frame number for video segment on videodisc.
Type: Integer
Valid Values: 1..54000

Comment

A comment can occur on any line that starts with the character -. Comments are not allowed within data fields but comments are allowed at the end of a data line.

End of Line

Every line in the file ends with a carriage return & line feed (ASCII 13, ASCII 10) (ie pressing return in most word processors and text editors).

Errors

If there are any errors in the data file, the program will report the first error with a dialog box displaying the line in error. The loading of the file is then aborted. If a button is defined more than once (i.e. two lines start with the number 6), the last defined button is used. Quit the program and edit the data file when an error occurs.

Example Data File (.VDC)

This example file starts out with the first line being a comment. If button #1 is pressed, the segment named *Pallet Jack Misc* will play on the videodisc from frames 2599 to 2795. There are 6 buttons defined.

```
- CPR - Main -Andersen Logistics 2020 Operations Design
1,Pallet Jack MISC,02599,02795
2,Walkie MISC,42063,42742
3,Tow Tractor MISC,42772,43307
4,Reach Truck MISC,28838,29942
5,Turret Truck MISC,35231,35735
6,Order Picker MISC,29972,30954
```

5. Initialization File Format

The program loads an initialization file when first executed. It is very unlikely this file will need to be changed. The file will probably have to be updated if the current computer is replaced/repared or any of the digital I/O boards are replaced or added. The file is ASCII text. We recommend editing with the DOS program **EDIT** (type **EDIT** at the DOS prompt). Any other word processor can be used (make sure file is saved as text only). The initialization file defines three parameters for the application: PC serial port connected to the videodisc player, number of digital I/O boards installed, and port addresses of I/O boards. Entering a 0 for any of the entries tells the program the device is not installed (i.e. running the program on a home machine with no I/O boards and no vdp).

The base I/O addresses for the uCPIO-12 boards are in hexadecimal. If using an IBM PS/2, the numbers can be found by booting with the IBM reference diskette and viewing the configuration. There should be a number for every board. If using a non PS/2 machine, there are probably jumpers on each I/O board.

Initialization File Lines

There are three sections in the file:

Line #1:	PC serial port number connected to videodisc player
Line #2:	number of Keithley digital I/O boards installed
Line #3-n:	list of I/O addresses for digital I/O boards

VDP Serial Port Number

Defined:	PC serial port number for videodisc player
Type:	Integer
Valid Values:	0..4
Special Value:	0 means no videodisc player hooked up

I/O Board Count

Defined:	Number of Keithley digital I/O boards installed.
Type:	Integer
Valid Values:	0..10
Special Value:	0 means no I/O boards installed.

I/O Addresses

Defined:	List of I/O addresses for digital I/O boards. There must be a number for every board.
Type:	Integer (Hexadecimal)
Valid Values:	depends on PC, example is 0300
Special Value:	None.

Comment

A comment can occur on any line that starts with the character -. Comments are not allowed on lines of data.

End of Line

Every line in the file ends with a carriage return & line feed (ASCII 13, ASCII 10).

Errors

If there are any errors in the initialization file, the program will report the error with a dialog box. Quit the program and edit the file when an error occurs.

Example

This example file defines a videodisc player at serial port #1. There are 2 digital I/O boards installed at address 300 and 400 hexadecimal.

- This is the initialization file for andersen.exe.
- The next line is the serial port number for the Pioneer 8000 VDP.
- An entry of 0 means no player.

1

- This is the number of Keithley Data Acquisition uCPIO-12 boards installed.
- An entry of 0 means no boards installed or ignore them.

2

- The next list of numbers are base I/O addresses for the uCPIO-12 boards.
- If using a PS/2, the numbers can be found by booting with the IBM reference diskette and viewing the configuration.
- The numbers are in hexadecimal.
- There should be a number for every board.

0300
0400

6. Hardware

IBM PS/2

Any PC compatible computer should work. Currently an IBM PS/2 Model 80 is in use. The I/O boards purchased are for Microchannel. A computer as slow as the original AT series should work but has not been tested.

Pioneer 8000

A Pioneer 8000 videodisc player is attached to the PC serial port. The player should be set to 9600 baud, no parity, 8 data bits, and one stop bit. The player should also be set to autoplay, auto-repeat and mute video to black. All of these items are set by turning on the player while depressing its front panel button called *display*. The player will have on-screen instructions. The following table outlines the software settings for the videodisc player.

Page 1	Instructions	
Page 2	Side Repeat	On
	Load Start	On
	Power On Start	On
	Audio Default	Auto Digital
	Test Mode Select	Off
Page 3	Still Mode	2 Field
	Squelch	Black Background
	DOC Control	On
	AUX1 Default	Video Indicator
	AUX2 Default	High Level Output
Page 4	Input Device	Device 1 (Serial)
	LEVEL II Auto Start	Off
Page 5	Baud Rate	9600 Baud
	Parity	No Parity
	Stop Bit	1 Stop Bit
	Data Length	8 Bit
Page 6	TxD Terminator	<CR> <LF>
	RS-232C Function	Controller
Page 7	Don't Care	
Page 8	Bit 15	Off
	Bit 14	Off
	Bit 13	Off
	Bit 12	Off
Page 9	Bit 11	Off
	Bit 10	Off
	Bit 9	Off
	Bit 8	Off
Page 10	Bit 7	Off
	Bit 6	Off
	Bit 5	Off
	Bit 4	Off
Page 11	Bit 3	Off
	Bit 2	Off
	Bit 1	Off
	Bit 0	Off
Page 12	SW. 1 =	00010111
	SW. 2 =	01000000
	SW. 3 =	00000000
	SW. 4 =	00000000
	SW. 5 =	00000000
	SW. 6 =	01000000
	SW. 7 =	00000011

The RS-232 serial cable was purchased with the player. It is a special DB-25 pin to DB-15 pin cable.

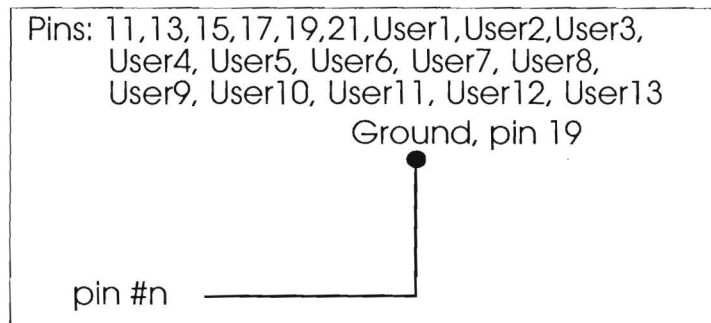
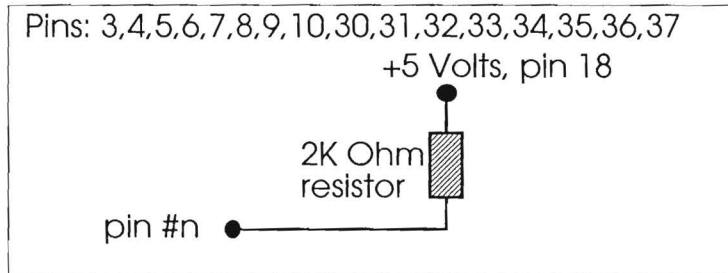
A Pioneer 2000 or 4000 series player should also function, but has not been tested. Response times will be significantly slower using one of the other models, however.

Keithley MetraByte Corp., uCPIO-12 for MCA bus, C-1800 Flat Cable, and STA-U Screw Connector Panel

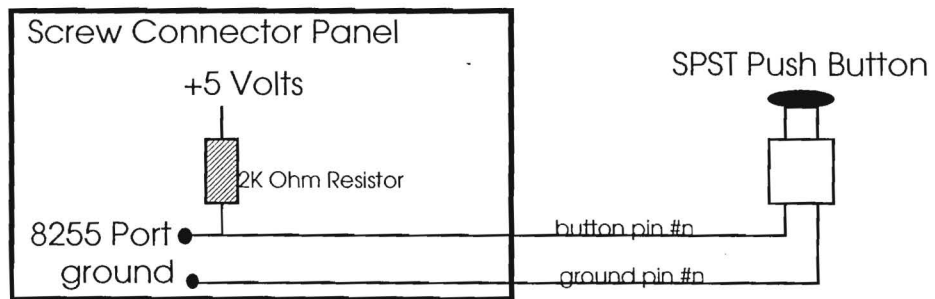
Two digital I/O boards are used for polling the push-buttons. The first board reads buttons 1 to 16 and the second board reads buttons 17 to 32. These boards contain PC bus interface logic and an Intel 8255 3 port, 8-bit I/O chip. We are using ports A and B on each board in input mode. Port C is not used. By modifying the screw connector panel for these board, we have added 5 volt pull-up resistors to each of the inputs. The SPST push-buttons have one connection to a input line and the other connection to ground. Thus, when a button is not pressed, the input line is 5 volts. When the button is pressed, the input line is pulled low. The I/O ports thus are normally binary one; zero when a button is pressed.

System Diagram

Modified Screw Connector Panel Diagram



Push-button Diagram



External Connections to Screw Connector Panel

Screw Connector Panel Terminal Number	Box #1	Box #2
1	No Connection	No Connection
2	No Connection	No Connection
3	Button #16	Button #32
4	Button #15	Button #31
5	Button #14	Button #30
6	Button #13	Button #29
7	Button #12	Button #28
8	Button #11	Button #27
9	Button #10	Button #26
10	Button #09	Button #25
11	Ground	Ground
12	No Connection	No Connection
13	Ground	Ground
14	No Connection	No Connection
15	Ground	Ground
16	No Connection	No Connection
17	Ground	Ground
18	No Connection	No Connection
19	Ground	Ground
20	No Connection	No Connection
21	Ground	Ground
22	No Connection	No Connection
23	No Connection	No Connection
24	No Connection	No Connection
25	No Connection	No Connection
26	No Connection	No Connection
27	No Connection	No Connection
28	No Connection	No Connection
29	No Connection	No Connection
30	Button #08	Button #24
31	Button #07	Button #23
32	Button #06	Button #22
33	Button #05	Button #21
34	Button #04	Button #20
35	Button #03	Button #19
36	Button #02	Button #18
37	Button #01	Button #17
User #1	Ground	Ground
User #2	Ground	Ground
User #3	Ground	Ground
User #4	Ground	Ground
User #5	Ground	Ground
User #6	Ground	Ground
User #7	Ground	Ground
User #8	Ground	Ground
User #9	Ground	Ground
User #10	Ground	Ground
User #11	Ground	Ground

7. Software

The program was written in Microsoft *VisualBasic 1.0 for DOS Professional Version*. It was compiled as a stand alone executable for a x386 or higher Intel PC. The program basically handles the loading of data files, polling of push-buttons, and control of the videodisc player.

Files:

ANDERSEN.EXE

Executable program.

ANDERSEN.INI

Initialization file for program. Serial port number for videodisc player.
I/O board count and I/O addresses.

***.VDC**

Data files with extension *VDC*.

ANDERSEN.MAK

VisualBasic make file.

MAIN.BAS

Main basic code.

STATUS.FRM

Form displaying status information. Also provides buttons for loading of data, jumping to a video segment without pressing a push-button, displaying an about this program dialog box, and quitting program.

CMNDLG.BAS

CMNDLG.BI

CMNDLGF.FRM

Microsoft supplied files for doing common dialog boxes. Used for choosing a data file.

LIST.FRM

Form with list box for choosing a video segment to jump to.

ABOUT.FRM

Form to display information about program.

File Listings:

File ANDERSEN.MAK

MAIN.BAS
CMNDLG.BAS
CMNDLGF.FRM
STATUS.FRM
LIST.FRM
ABOUT.FRM

File MAIN.BAS

```
' Client:
'       Logistics Center 2000
'       Andersen Consulting
' Program written by:
'       Multimedia Technology Lab
'       Georgia Institute of Technology
'       Atlanta, GA 30332-0130
'       Copyright 1994
'
' This program polls pushbuttons connected to 1..n
' digital I/O boards, and plays a video segment
' on a videodisc player based on the button
' pressed. Button assignments are in ascii text
' files *.vdc. File andersen.ini contains some
' initialization parameters.
'
' Videodisc player: Pioneer 8000
' I/O boards: Keithley Metrabyte Corp, uCPIO-12 for MCA bus
'
'$FORM frmAbout
DECLARE SUB ReadIniFile ()
DECLARE SUB ClearVariables ()
DECLARE SUB MainLoop ()
DECLARE FUNCTION CheckForButton! ()
'$FORM frmChooseFromList
DECLARE FUNCTION ChooseFile! ()
DECLARE SUB LoadFile ()
DECLARE SUB EventLoop ()
DECLARE SUB FileOpen (Filename AS STRING, Pathname AS STRING, DefaultExt AS STRING, DialogTitle AS STRING, ForeColor AS
INTEGER, BackColor AS INTEGER, flags AS INTEGER, Cancel AS INTEGER)
'$FORM frmCmdDlg
'$FORM frmStatus

' Booleans
CONST TRUE = -1
CONST FALSE = 0

DIM SHARED MAXENTRIES AS INTEGER
DIM SHARED IOBOARDS AS INTEGER
DIM SHARED IOBase() AS LONG
DIM SHARED SerialPortNumber AS INTEGER

COMMON SHARED QuitProgram AS INTEGER
COMMON SHARED GotoSegmentFlag AS INTEGER
COMMON SHARED OpenFileFlag AS INTEGER
COMMON SHARED ButtonsOn AS INTEGER

DIM SHARED Filename AS STRING
DIM SHARED Pathname AS STRING
DIM SHARED segmentname() AS STRING 'define array of videodisc start frames
DIM SHARED startframe() AS STRING * 5 'define array of videodisc start frames
DIM SHARED endframe() AS STRING * 5 'define array of videodisc end frames

' Start Program
-----
  ReadIniFile
  Pathname = CURDIR$
  ClearVariables
  LOAD frmStatus
  ' check command line for a file
  IF COMMAND$ <> "" THEN
    Filename = COMMAND$
    LoadFile
  ELSE
    IF ChooseFile() = TRUE THEN
      LoadFile
    END IF
  END IF

  MainLoop
-----
END

FUNCTION CheckForButton ()
' Check to see if an I/O board sees a button down.
' Return 0 if none.
  DIM n AS INTEGER, choice AS INTEGER
  DIM b AS INTEGER, p AS INTEGER
  DIM f AS INTEGER

  choice = 0
  FOR b = 1 TO IOBOARDS 'cycle through boards
    FOR p = 0 TO 1 'port number A..B (0..1)
      f = INP(IOBase(b) + p)
      ' frmStatus.lblTemp(((b - 1) * 2) + p).caption = HEX$(f)
    
```

```

        IF NOT (f EQV &HFF) THEN
            n = 0
            IF (f AND &H1) = &H0 THEN n = 1
            IF (f AND &H2) = &H0 THEN n = 2
            IF (f AND &H4) = &H0 THEN n = 3
            IF (f AND &H8) = &H0 THEN n = 4
            IF (f AND &H10) = &H0 THEN n = 5
            IF (f AND &H20) = &H0 THEN n = 6
            IF (f AND &H40) = &H0 THEN n = 7
            IF (f AND &H80) = &H0 THEN n = 8
            choice = n + (p * 8) + ((b - 1) * 16)
        END IF
    NEXT p
NEXT b
CheckForButton = choice
END FUNCTION

FUNCTION ChooseFile! ()
    ' open file dialog box
    ' pass previous filename and path
    CALL FileOpen(Filename, Pathname, "*.vdc", "Load what file?", 0, 7, 0, Cancel%)
    ' Determine if user canceled dialog
    ChooseFile = NOT Cancel%
END FUNCTION

SUB ClearVariables ()
    ' clear previous file from memory
    FOR I = 1 TO MAXENTRIES
        segmentname(I) = ""
        startframe(I) = "none"
        endframe(I) = "none"
    NEXT I
END SUB

SUB LoadFile ()
    ' Load file into memory
    ON LOCAL ERROR GOTO OPENERERROR

    OPEN Pathname + "\" + Filename FOR INPUT AS #1 'Open the file
    frmStatus.lblFilename.caption = Pathname + "\" + Filename
    DO
        'loop that loads/parses vdc file
        LINE INPUT #1, temp$ 'Read a line in from file
        ON LOCAL ERROR GOTO PARSEERROR
        IF LEFT$(LTRIM$(temp$), 1) = "-" OR LEN(temp$) < 2 THEN
            ' If the line is a comment, ignore it
            ' if the line is too short, ignore it
        ELSE
            'It is not, load into arrays
            ' solve for button number
            s = 1
            e = INSTR(s, temp$, ",")
            IF s <> 0 AND e <> 0 THEN
                numtemp = VAL(MID$(temp$, s, e - s))
                IF numtemp > MAXENTRIES THEN MSGBOX "ERROR: button numbers cannot be greater than " + STR$(MAXENTRIES)
                s = e + 1
            END IF
            ' load name of segment
            e = INSTR(s, temp$, ",")
            IF s <> 0 AND e <> 0 THEN
                segmentname(numtemp) = MID$(temp$, s, e - s)
                s = e + 1
            END IF
            'Load frame numbers into the 2 array locations
            e = INSTR(s, temp$, ",")
            IF s <> 0 AND e <> 0 THEN
                startframe(numtemp) = STRING$(5 - (e - s), "0") + MID$(temp$, s, e - s)
                s = e + 1
            END IF
            e = LEN(temp$) + 1
            IF s <> 0 AND e <> 0 THEN
                endframe(numtemp) = STRING$(5 - (e - s), "0") + MID$(temp$, s, e - s)
                s = e + 1
            END IF
        END IF
    LOOP UNTIL EOF(1) 'Loop until end of file is reached

    CLOSE #1 'Close vdc file
    EXIT SUB

OPENERERROR:
    CLOSE #1 'Close vdc file
    MSGBOX "Error trying to open file."
    EXIT SUB

PARSEERROR:
    CLOSE #1 'Close vdc file
    MSGBOX "Error in line of file." + CHR$(13) + CHR$(10) + "Line is: '" + temp$ + "'" + CHR$(13) + CHR$(10) + "Line
format is: button,name,startframe,endframe."
    EXIT SUB
END SUB

SUB MainLoop ()
    ' This is the program's main loop.
    ' Any buttons that get clicked on the status form
    ' set global variables that they've been selected.
    ' The main loop checks those flags every loop.
    ' Inits I/O boards.
    ' Calls function that polls I/O boards.
    ' Opens/closes serial port & sends VDP commands.
    QuitProgram = FALSE
    GotoSegmentFlag = FALSE
    OpenFileFlag = FALSE
    ButtonsOn = 1
    frmStatus.SHOW
    LOAD frmAbout

    ' InitIOBoards for input
    FOR I = 1 TO IOBOARDS
        OUT IOBase(I) + 3, &H9B
        frmAbout.lblIOPorts.caption = frmAbout.lblIOPorts.caption + " " + HEX$(IOBase(I))
    NEXT I

```



```

END IF
IF IOBOARDS <> 0 THEN
    REDIM IOBase(1 TO IOBOARDS) AS LONG
END IF
' Hardcoded to 200 entries.
' Wanted to be able to load entire
' video disc catalog for testing.
' MAXENTRIES = IOBOARDS * 16
' REDIM segmentname(1 TO MAXENTRIES) AS STRING
' REDIM startframe(1 TO MAXENTRIES) AS STRING * 5
' REDIM endframe(1 TO MAXENTRIES) AS STRING * 5
CASE 1, 2
    ' read hex I/O base and convert
    ' to base 10
    IOBase(I) = 0
    FOR j = 1 TO LEN(s)
        IOBase(I) = IOBase(I) * 16
        SELECT CASE MID$(s, j, 1)
            CASE "A", "a"
                IOBase(I) = 10 + IOBase(I)
            CASE "B", "b"
                IOBase(I) = 11 + IOBase(I)
            CASE "C", "c"
                IOBase(I) = 12 + IOBase(I)
            CASE "D", "d"
                IOBase(I) = 13 + IOBase(I)
            CASE "E", "e"
                IOBase(I) = 14 + IOBase(I)
            CASE "F", "f"
                IOBase(I) = 15 + IOBase(I)
            CASE ELSE
                IOBase(I) = VAL(MID$(s, j, 1)) + IOBase(I)
        END SELECT
    NEXT j
END SELECT
I = I + 1
END IF
LOOP UNTIL EOF(3) 'Loop until end of file is reached
CLOSE #3
EXIT SUB
INIFILEERROR:
MSGBOX "Error reading file andersen.ini"
CLOSE #3
EXIT SUB
END SUB

```

File STATUS.FRM

Version 1.00

```
BEGIN Form frmStatus
  AutoRedraw      = 0
  BackColor       = QBColor(7)
  BorderStyle     = 2
  Caption         = "Status"
  ControlBox      = 0
  Enabled         = -1
  ForeColor       = QBColor(0)
  Height          = Char(17)
  Left            = Char(5)
  MaxButton       = 0
  MinButton       = 0
  MousePointer    = 0
  Tag             = ""
  Top             = Char(3)
  Visible         = -1
  Width           = Char(69)
  WindowState     = 0
  BEGIN Label Label2
    Alignment      = 0
    AutoSize       = 0
    BackColor      = QBColor(7)
    BorderStyle    = 0
    Caption        = ""
    DragMode       = 0
    Enabled        = -1
    ForeColor      = QBColor(0)
    Height         = Char(1)
    Left           = Char(24)
    MousePointer   = 0
    TabIndex       = 7
    Tag            = ""
    Top            = Char(7)
    Visible        = -1
    Width          = Char(12)
  END
  BEGIN Frame Frame1
    BackColor      = QBColor(7)
    Caption        = "Status"
    DragMode       = 0
    Enabled        = -1
    ForeColor      = QBColor(0)
    Height         = Char(6)
    Left           = Char(1)
    MousePointer   = 0
    TabIndex       = 0
    Tag            = ""
    Top            = Char(3)
    Visible        = -1
    Width          = Char(65)
    BEGIN Label lblButton
      Alignment     = 1
      AutoSize      = 0
      BackColor     = QBColor(7)
      BorderStyle   = 1
      Caption       = ""
      DragMode      = 0
      Enabled       = -1
      ForeColor     = QBColor(0)
      Height        = Char(3)
      Left          = Char(0)
      MousePointer  = 0
      TabIndex      = 1
      Tag           = ""
      Top           = Char(1)
      Visible       = -1
      Width         = Char(6)
    END
    BEGIN Label lblStartFrame
      Alignment     = 1
      AutoSize      = 0
      BackColor     = QBColor(7)
      BorderStyle   = 1
      Caption       = ""
      DragMode      = 0
      Enabled       = -1
      ForeColor     = QBColor(0)
      Height        = Char(3)
      Left          = Char(47)
      MousePointer  = 0
      TabIndex      = 2
      Tag           = ""
      Top           = Char(1)
      Visible       = -1
      Width         = Char(7)
    END
    BEGIN Label lblEndFrame
      Alignment     = 1
      AutoSize      = 0
      BackColor     = QBColor(7)
      BorderStyle   = 1
      Caption       = ""
      DragMode      = 0
      Enabled       = -1
      ForeColor     = QBColor(0)
      Height        = Char(3)
      Left          = Char(55)
      MousePointer  = 0
      TabIndex      = 3
      Tag           = ""
      Top           = Char(1)
      Visible       = -1
      Width         = Char(7)
    END
  END
END
```

```

BEGIN Label Label3
    Alignment = 0
    AutoSize = 0
    BackColor = QBColor(7)
    BorderStyle = 0
    Caption = "Button" Name
    DragMode = 0
    Enabled = -1
    ForeColor = QBColor(0)
    Height = Char(1)
    Left = Char(0)
    MousePointer = 0
    TabIndex = 8
    Tag = ""
    Top = Char(0)
    Visible = -1
    Width = Char(62)
END
BEGIN Label lblName
    Alignment = 1
    AutoSize = 0
    BackColor = QBColor(7)
    BorderStyle = 1
    Caption = ""
    DragMode = 0
    Enabled = -1
    ForeColor = QBColor(0)
    Height = Char(3)
    Left = Char(8)
    MousePointer = 0
    TabIndex = 9
    Tag = ""
    Top = Char(1)
    Visible = -1
    Width = Char(37)
END
END
BEGIN CommandButton cmdCancel
    BackColor = QBColor(7)
    Cancel = -1
    Caption = "&Quit [ESC]"
    Default = 0
    DragMode = 0
    Enabled = -1
    Height = Char(3)
    Left = Char(49)
    MousePointer = 0
    TabIndex = 4
    TabStop = -1
    Tag = ""
    Top = Char(12)
    Visible = -1
    Width = Char(16)
END
END
BEGIN Label lblFileName
    Alignment = 0
    AutoSize = -1
    BackColor = QBColor(7)
    BorderStyle = 1
    Caption = "Filename"
    DragMode = 0
    Enabled = -1
    ForeColor = QBColor(0)
    Height = Char(3)
    Left = Char(8)
    MousePointer = 0
    TabIndex = 5
    Tag = ""
    Top = Char(0)
    Visible = -1
    Width = Char(10)
END
END
BEGIN Label Label1
    Alignment = 0
    AutoSize = 0
    BackColor = QBColor(7)
    BorderStyle = 0
    Caption = "File:"
    DragMode = 0
    Enabled = -1
    ForeColor = QBColor(0)
    Height = Char(1)
    Left = Char(2)
    MousePointer = 0
    TabIndex = 6
    Tag = ""
    Top = Char(1)
    Visible = -1
    Width = Char(6)
END
END
BEGIN CommandButton cmdGotoSegment
    BackColor = QBColor(7)
    Cancel = 0
    Caption = "&Goto Segment"
    Default = 0
    DragMode = 0
    Enabled = -1
    Height = Char(3)
    Left = Char(27)
    MousePointer = 0
    TabIndex = 10
    TabStop = -1
    Tag = ""
    Top = Char(12)
    Visible = -1
    Width = Char(16)
END
END
BEGIN CommandButton cmdOpenFile

```

```

        BackColor      = QBColor(7)
        Cancel         = 0
        Caption        = "%Open File"
        Default        = 0
        DragMode       = 0
        Enabled        = -1
        Height         = Char(3)
        Left           = Char(3)
        MousePointer   = 0
        TabIndex       = 11
        TabStop        = -1
        Tag            = ""
        Top            = Char(12)
        Visible        = -1
        Width          = Char(18)
END
BEGIN CheckBox chkButtonsOn
        BackColor      = QBColor(7)
        Caption        = "Read Push-buttons"
        DragMode       = 0
        Enabled        = -1
        ForeColor      = QBColor(0)
        Height         = Char(1)
        Left           = Char(27)
        MousePointer   = 0
        TabIndex       = 12
        TabStop        = -1
        Tag            = ""
        Top            = Char(10)
        Value          = 1
        Visible        = -1
        Width          = Char(21)
END
BEGIN Label lblTemp
        Alignment      = 0
        AutoSize       = 0
        BackColor      = QBColor(7)
        BorderStyle    = 0
        Caption        = ""
        DragMode       = 0
        Enabled        = -1
        ForeColor      = QBColor(0)
        Height         = Char(1)
        Index          = 0
        Left           = Char(53)
        MousePointer   = 0
        TabIndex       = 13
        Tag            = ""
        Top            = Char(9)
        Visible        = -1
        Width          = Char(7)
END
BEGIN Label lblTemp
        Alignment      = 0
        AutoSize       = 0
        BackColor      = QBColor(7)
        BorderStyle    = 0
        Caption        = ""
        DragMode       = 0
        Enabled        = -1
        ForeColor      = QBColor(0)
        Height         = Char(1)
        Index          = 1
        Left           = Char(53)
        MousePointer   = 0
        TabIndex       = 14
        Tag            = ""
        Top            = Char(10)
        Visible        = -1
        Width          = Char(7)
END
BEGIN Label lblTemp
        Alignment      = 0
        AutoSize       = 0
        BackColor      = QBColor(7)
        BorderStyle    = 0
        Caption        = ""
        DragMode       = 0
        Enabled        = -1
        ForeColor      = QBColor(0)
        Height         = Char(1)
        Index          = 2
        Left           = Char(61)
        MousePointer   = 0
        TabIndex       = 15
        Tag            = ""
        Top            = Char(9)
        Visible        = -1
        Width          = Char(6)
END
BEGIN Label lblTemp
        Alignment      = 0
        AutoSize       = 0
        BackColor      = QBColor(7)
        BorderStyle    = 0
        Caption        = ""
        DragMode       = 0
        Enabled        = -1
        ForeColor      = QBColor(0)
        Height         = Char(1)
        Index          = 3
        Left           = Char(61)
        MousePointer   = 0
        TabIndex       = 17
        Tag            = ""
        Top            = Char(10)
        Visible        = -1
        Width          = Char(6)

```

```

END
BEGIN CommandButton cmdAbout
    BackColor = QBColor(7)
    Cancel = 0
    Caption = "&About"
    Default = 0
    DragMode = 0
    Enabled = -1
    Height = Char(3)
    Left = Char(3)
    MousePointer = 0
    TabIndex = 16
    TabStop = -1
    Tag = ""
    Top = Char(9)
    Visible = -1
    Width = Char(18)
END

END
'$FORM frmAbout
COMMON SHARED QuitProgram AS INTEGER
COMMON SHARED GotoSegmentFlag AS INTEGER
COMMON SHARED OpenFileFlag AS INTEGER
COMMON SHARED ButtonsOn AS INTEGER

' Booleans
CONST TRUE = -1
CONST FALSE = 0

SUB chkButtonsOn_Click ()
    ButtonsOn = chkButtonsOn.value
END SUB

SUB cmdAbout_Click ()
    frmAbout.SHOW 1
END SUB

SUB cmdCancel_Click ()
    QuitProgram = TRUE
END SUB

SUB cmdGotoSegment_Click ()
    GotoSegmentFlag = TRUE
END SUB

SUB cmdOpenFile_Click ()
    OpenFileFlag = TRUE
END SUB

```

File LIST.FRM

```

Version 1.00
BEGIN Form frmChooseFromList
    AutoRedraw = 0
    BackColor = QBColor(7)
    BorderStyle = 2
    Caption = "Choose from the list"
    ControlBox = 0
    Enabled = -1
    ForeColor = QBColor(0)
    Height = Char(19)
    Left = Char(15)
    MaxButton = 0
    MinButton = 0
    MousePointer = 0
    Tag = ""
    Top = Char(2)
    Visible = -1
    Width = Char(52)
    WindowState = 0
    BEGIN ListBox listItems
        BackColor = QBColor(7)
        DragMode = 0
        Enabled = -1
        ForeColor = QBColor(0)
        Height = Char(14)
        Left = Char(0)
        MousePointer = 0
        Sorted = 0
        TabIndex = 0
        TabStop = -1
        Tag = ""
        Top = Char(0)
        Visible = -1
        Width = Char(49)
    END
    BEGIN CommandButton cmdOK
        BackColor = QBColor(7)
        Cancel = 0
        Caption = "OK [Enter]"
        Default = -1
        DragMode = 0
        Enabled = -1
        Height = Char(3)
        Left = Char(26)
        MousePointer = 0
        TabIndex = 1
        TabStop = -1
        Tag = ""
        Top = Char(14)
        Visible = -1
        Width = Char(19)
    END
    BEGIN CommandButton cmdCancel
        BackColor = QBColor(7)
        Cancel = -1
    END

```

```

Caption      = "Cancel [Esc]"
Default      = 0
DragMode     = 0
Enabled      = -1
Height       = Char(3)
Left         = Char(5)
MousePointer = 0
TabIndex     = 2
TabStop      = -1
Tag          = ""
Top          = Char(14)
Visible      = -1
Width        = Char(18)

END

SUB cmdCancel_Click ()
listItems.listindex = -1
HIDE
END SUB

SUB cmdOK_Click ()
HIDE
END SUB

```

File ABOUT.FRM

```

Version 1.00
BEGIN Form frmAbout
  AutoRedraw = 0
  BackColor = QBColor(7)
  BorderStyle = 2
  Caption = "About This Program"
  ControlBox = 0
  Enabled = -1
  ForeColor = QBColor(0)
  Height = Char(23)
  Left = Char(9)
  MaxButton = 0
  MinButton = 0
  MousePointer = 0
  Tag = ""
  Top = Char(1)
  Visible = -1
  Width = Char(61)
  WindowState = 0
  BEGIN CommandButton cmdOK
    BackColor = QBColor(7)
    Cancel = 0
    Caption = "OK"
    Default = 0
    DragMode = 0
    Enabled = -1
    Height = Char(3)
    Left = Char(26)
    MousePointer = 0
    TabIndex = 0
    TabStop = -1
    Tag = ""
    Top = Char(18)
    Visible = -1
    Width = Char(12)
  END
  BEGIN Frame Frame1
    BackColor = QBColor(7)
    Caption = ""
    DragMode = 0
    Enabled = -1
    ForeColor = QBColor(2)
    Height = Char(7)
    Left = Char(3)
    MousePointer = 0
    TabIndex = 1
    Tag = ""
    Top = Char(5)
    Visible = -1
    Width = Char(54)
    BEGIN Label Label1
      Alignment = 2
      AutoSize = 0
      BackColor = QBColor(7)
      BorderStyle = 0
      Caption = "Multimedia Technology Lab"
      DragMode = 0
      Enabled = -1
      ForeColor = QBColor(0)
      Height = Char(1)
      Left = Char(10)
      MousePointer = 0
      TabIndex = 2
      Tag = ""
      Top = Char(0)
      Visible = -1
      Width = Char(34)
    END
    BEGIN Label Label2
      Alignment = 2
      AutoSize = 0
      BackColor = QBColor(7)
      BorderStyle = 0
      Caption = "Georgia Institute of Technology"
      DragMode = 0
      Enabled = -1
      ForeColor = QBColor(0)
      Height = Char(1)
    END
  END
END

```

```

        Left      = Char(9)
        MousePointer = 0
        TabIndex   = 3
        Tag        = ""
        Top        = Char(1)
        Visible    = -1
        Width      = Char(34)
END
BEGIN Label Label3
        Alignment = 2
        AutoSize  = 0
        BackColor = QBColor(7)
        BorderStyle = 0
        Caption   = "Atlanta, Georgia 30332-0130"
        DragMode  = 0
        Enabled   = -1
        ForeColor = QBColor(0)
        Height    = Char(1)
        Left      = Char(9)
        MousePointer = 0
        TabIndex  = 4
        Tag       = ""
        Top       = Char(2)
        Visible   = -1
        Width     = Char(34)
END
BEGIN Label Label4
        Alignment = 2
        AutoSize  = 0
        BackColor = QBColor(7)
        BorderStyle = 0
        Caption   = "(404) 894-4195"
        DragMode  = 0
        Enabled   = -1
        ForeColor = QBColor(0)
        Height    = Char(1)
        Left      = Char(9)
        MousePointer = 0
        TabIndex  = 5
        Tag       = ""
        Top       = Char(3)
        Visible   = -1
        Width     = Char(34)
END
BEGIN Label Label5
        Alignment = 2
        AutoSize  = 0
        BackColor = QBColor(7)
        BorderStyle = 0
        Caption   = "Copyright 1994"
        DragMode  = 0
        Enabled   = -1
        ForeColor = QBColor(0)
        Height    = Char(1)
        Left      = Char(9)
        MousePointer = 0
        TabIndex  = 6
        Tag       = ""
        Top       = Char(4)
        Visible   = -1
        Width     = Char(34)
END
END
BEGIN Frame Frame2
        BackColor = QBColor(7)
        Caption   = ""
        DragMode  = 0
        Enabled   = -1
        ForeColor = QBColor(0)
        Height    = Char(5)
        Left      = Char(3)
        MousePointer = 0
        TabIndex  = 7
        Tag       = ""
        Top       = Char(0)
        Visible   = -1
        Width     = Char(54)
        BEGIN Label Label6
                Alignment = 2
                AutoSize  = 0
                BackColor = QBColor(7)
                BorderStyle = 0
                Caption   = "Logistics 2020 - Operations Design Center"
                DragMode  = 0
                Enabled   = -1
                ForeColor = QBColor(0)
                Height    = Char(1)
                Left      = Char(3)
                MousePointer = 0
                TabIndex  = 8
                Tag       = ""
                Top       = Char(1)
                Visible   = -1
                Width     = Char(47)
        END
END
BEGIN Frame Frame3
        BackColor = QBColor(7)
        Caption   = ""
        DragMode  = 0
        Enabled   = -1
        ForeColor = QBColor(0)
        Height    = Char(6)
        Left      = Char(2)
        MousePointer = 0
        TabIndex  = 9
        Tag       = ""
        Top       = Char(12)

```

```

Visible      = -1
Width        = Char(56)
BEGIN Label lblSerialPort
    Alignment = 0
    AutoSize  = 0
    BackColor = QBColor(7)
    BorderStyle = 0
    Caption   = ""
    DragMode  = 0
    Enabled   = -1
    ForeColor = QBColor(0)
    Height    = Char(1)
    Left      = Char(5)
    MousePointer = 0
    TabIndex  = 10
    Tag       = ""
    Top       = Char(1)
    Visible   = -1
    Width     = Char(45)
END
BEGIN Label Label8
    Alignment = 0
    AutoSize  = 0
    BackColor = QBColor(7)
    BorderStyle = 0
    Caption   = "Keithley MetraByte Corp. uCPIO-12 at I/O Base(s):"
    DragMode  = 0
    Enabled   = -1
    ForeColor = QBColor(0)
    Height    = Char(1)
    Left      = Char(1)
    MousePointer = 0
    TabIndex  = 11
    Tag       = ""
    Top       = Char(2)
    Visible   = -1
    Width     = Char(55)
END
BEGIN Label lblIOPorts
    Alignment = 0
    AutoSize  = 0
    BackColor = QBColor(7)
    BorderStyle = 0
    Caption   = ""
    DragMode  = 0
    Enabled   = -1
    ForeColor = QBColor(0)
    Height    = Char(1)
    Left      = Char(5)
    MousePointer = 0
    TabIndex  = 12
    Tag       = ""
    Top       = Char(3)
    Visible   = -1
    Width     = Char(51)
END
BEGIN Label Label7
    Alignment = 0
    AutoSize  = 0
    BackColor = QBColor(7)
    BorderStyle = 0
    Caption   = "Pioneer 8000 VDP at serial port:"
    DragMode  = 0
    Enabled   = -1
    ForeColor = QBColor(0)
    Height    = Char(1)
    Left      = Char(1)
    MousePointer = 0
    TabIndex  = 13
    Tag       = ""
    Top       = Char(0)
    Visible   = -1
    Width     = Char(49)
END
END
END
END
SUB cmdOK_Click ()
    frmAbout.HIDE
END SUB

```