



CTI VT2100 Reverse Engineering Notes

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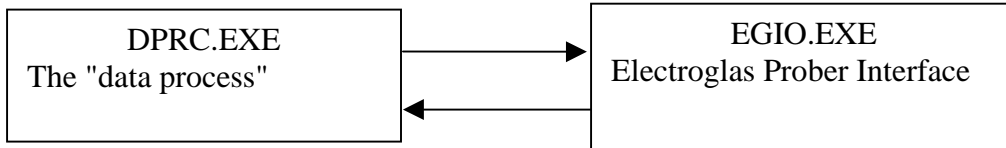
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Purpose

The purpose of this reverse engineering effort was a first step towards duplicating CMI's "auto retest" feature on their VT3300s, on our VT2100s.

Auto Retest automatically retests a bad die to make sure that it is bad, if it was good in an original sort1 map.

According to AMS, this feature was implemented by changing the following two modules:

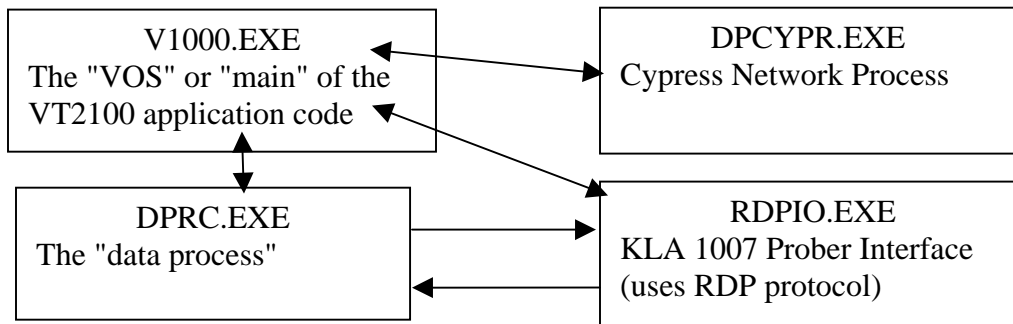


When a bad die is detected, the probe is raised, moved somewhere else, and then brought back to retest that die.

AMS also said that there were state flags in the design, to determine when auto retest was and was not necessary (based on some number of previous die having been confirmed good or bad)

CMI VT 3300s	CTI VT2100s
The CMI VT3300s run under Windows NT.	The CTI VT2100s run under DOS with DESQview providing a multitasking shell
The auto retest feature was implemented by Agilent under contract, for about \$65K	Agilent did not want to quote retrofitting auto retest functionality to VT2100 testers.

The first step in approaching this project, was to get the VT2100 source code from CMI and rebuild it at CTI.



For more extensive debugging and PC hardware upgrade (speed) reasons, it was also desirable to port the VT2100 software from a DOS system using DESQview for multitasking, to Windows NT multitasking.

Unfortunately, at this time only the DPRC.EXE source code is available, and that is missing a few components.

CMI Source Code Source

The bulk of the source code was obtained from the server:

bitmap4.cmi.cypress.com (*logon under the summary account*)

directory:

/home/testeng/eng/ams/prog/verstest

VT Framework

The CTI VT2102 and VT2104 testers use KLA 1007 probers using rdp protocol.

DESQview provides a multitasking environment on top of DOS. It uses a ".dvp" file (created under desqview via the "add program" option) with information to point to an exe to start. These are the executables available from the DESQVIEW dos multitasking shell when the tool is running:

DESQVIEW Shell

config.sys: (where n: is c:\v1000pcm.300)

```
SET STATION_PATH=N:\cypress.007
SET STATION_CFG=N:\cypress.007\CYPRESS.CFG
SET PCMDIR=V1000PCM.300
SET HARDWARE_PATH=N:\V2100C.285
SET HARDWARE_CFG=N:\V2100C.285\50P1.CFG
```

autoexec.bat:

```
c:\dv\xdv c:\dv\s9-pif.dvp /ms=110
```

```
---> c:\v1000pcm.300\bin\v1000.exe
```

%STATION_CFG%=N:\cypress.007\CYPRESS.CFG

```

////////////////////////////////////
// Auto Start Programs. Any programs specified here will //
// be loaded when the V1000.EXE program first runs. //
////////////////////////////////////
AUTO_START $S:\dd-pif.dvp // Cypress data process (dprc.exe)
AUTO_START $S:\ll-pif.dvp // Cypress lot sum program (lotlist.exe)
#if (( %setup% != SETUP ) && ( %setup% != PRODUCTION ))
{ AUTO_START n:\bin\do-pif.dvp (doskey.exe) }

////////////////////////////////////
// External menu interface programs. The programs specified //
// here can be selected and run from the RUN PROGRAM menu //
// selection in the V1000.EXE main menu. //
////////////////////////////////////
EXTERNAL_PROGRAM n:\bin\vl-pif.dvp (viewdl.exe)
EXTERNAL_PROGRAM n:\bin\pi-pif.dvp (pinerr.exe)

#if (%prober% == KLA_RDP)
IOP_PIF_FILE $S:\rd-pif.dvp (rdpio.exe)

#if (%prober% == EG_Standard)
IOP_PIF_FILE $S:\eg-pif.dvp // PIF file for I/O Process (egio.exe)

#if (%prober% == EG_Multi)
IOP_PIF_FILE $S:\eg-pif.dvp // use EGIO from cypress dir. (egio.exe)

////////////////////////////////////
// Data process User exit routines. These routines will be //
// called after the normal processing whenever the //
// corresponding command message is received by the data //
// process. //
////////////////////////////////////
//D_WAFER_START_PIF ws-pif.dvp
//D_AFTER_COPY_PIF ac-pif.dvp
//D_NEW_LOT_PIF nl-pif.dvp
//D_LOT_DONE_PIF ld-pif.dvp
//D_IOALARM_PIF al-pif.dvp
//D_LOCAL_COPY_PIF $S:\lc-pif.dvp // call localcp.bat to unzip
D_WAFER_DONE_PIF $S:\ls-pif.dvp // enable lot summary program.
```

Use the "alt" key to get the DESQVIEW menu when the software is running, switching windows gives:

DESQview switch windows title		Source
(dd) Data Process	1	\v1000pcm.300\bin\dd-pif.dvp refers to: n:\bin\dprc.exe
(rd) RDP IO Process	2	\v1000pcm.300\cypress.007\rd-pdf.dvp refers to: \$\$:\rdpio.exe
(??) Cypress Network Data Process	3	\v1000pcm.300\cypress.007\dd-pif.dvp refers to: \$\$:\dpcypr.exe
(ll) LotList	4	\v1000pcm.300\cypress.007\ll-pif.dvp refers to: \$\$:\lotlist.exe

Disk Substitutes/Mounts

Source File	Symbols
c:\config.sys <i>(some of this replicated in c:\setups\cypress.dat)</i>	SET PCMDIR=V1000PCM.300 SET STATION_PATH=N:\cypress.007 SET STATION_CFG=N:\cypress.007\CYPRESS.CFG SET HARDWARE_PATH=N:\V2100C.285 SET HARDWARE_CFG=N:\V2100C.285\50P1.CFG SET PROBER=KLA_RDP
c:\Recon.bat	n: c:\%pcmdir% subst p: c:\PROGRAM subst o: c:\d-drive subst d: c:\d-drive

```
autoexec.bat:      c:\dv\xdv c:\dv\s9-pif.dvp /ms=110 (n:\bin\v1000.exe V1000 Monitor)
```

```
----- n: -----
c:\v1000pcm.300\bin\
s9-pif.dvp
dd-pif.dvp  n:\bin\dprc.exe    V1000 DATA PROCESS
do-pif.dvp  c:\dos\doskey.com         WDOS
pi-pif.dvp  n:\bin\pinerr.exe        UPin Error Display
vl-pif.dvp  n:\bin\viewdl.exe        DView DataLog
sd-pif.exe  n:\bin\superd.exe        V1000 SuperD Interface
```

These are added to the multitasking DESQVIEW shell directly in c:\dv

%STATION CFG%

```
-----n: -----
c:\v1000pcm.300\cypress.007\cypress.cfg
dd-pif.dvp  $$:\dpcypr.exe  Cypress Network data process
rd-pif.dvp  $$:\rdpio.exe  V1000 RDP IO Process
bc-pif.dvp  $$:\bitcat.exe  Bitmap Concat
lc-pif.dvp  $$:\localcp.bat  Cypress Local Zip file copy
ll-pif.dvp  $$:\lotlist.exe  LotList
ls-pif.dvp  $$:\lotsum.exe  Cypress Lot Summary
```

These are loaded by v1000.exe based on information in: c:\v1000pcm.300\cypress.007\cypress.cfg

Changes to Config.sys

```
SET PLAN_PATH   = G:\VTONLINE\PLANS\*
SET PLAN_PATH1  = PRODUCTION G:\VTONLINE\PLANS\*
SET PLAN_PATH2  = ENGINEERING G:\VTONLINE\ENG\*
SET PLAN_PATH3  = LOCAL       P:\PLN\*
```

(not *.* or else ftp will only pick up files with extensions)

Changes to Autoexec.bat

```
path ... c:\ncsaftp;c:\tc30\bin;c:\tasm\bin
set DPMIMEM=MAXMEM 10240 or else turboC grabs all the ems memory
```

User Exits

User exits are executable programs which are defined either

- at the end of c:\v1000pcm.300\cypress.007\cypress.cfg
- in the plan file
-

for invocation upon certain test events; e.g.:

cypress.cfg

```

////////////////////////////////////
// Data process User exit routines.  These routines will be //
// called after the normal processing whenever the          //
// corresponding command message is received by the data    //
// process.                                                  //
////////////////////////////////////

//D_WAFER_START_PIF ws-pif.dvp
//D_AFTER_COPY_PIF ac-pif.dvp
//D_NEW_LOT_PIF nl-pif.dvp
//D_LOT_DONE_PIF ld-pif.dvp
//D_IOALARM_PIF al-pif.dvp
//D_LOCAL_COPY_PIF $$:\lc-pif.dvp // call localcp.bat to unzip
D_WAFER_DONE_PIF $$:\ls-pif.dvp // enable lot summary program.

```

plan file (overrides cypress.cfg):

```

D_DATA_AVAIL_PIF $$:\BC-PIF.DVP
D_WAFER_DONE_PROG N:\BIN\WAFDONE.BAT \TS.\TN

```

In the above (plan file) example,

\$\$ is c:\v1000pcm.300\cypress.007 (as defined in config.sys set station_cfg)

bc-pif.dvp refers to bitcat.exe

The command line arguments passed are:

```

lot sort_flow_character wafer_number output_file
\ln      \fl              \wn      \wf      (see next page)

```


The full set of exits (as taken from dprc.c) that can be defined is

```
D_IOINIT_PIF
D_IOSTOP_PIF
D_NEW_LOT_PIF
D_WAFER_START_PIF
D_WAFER_DONE_PIF
D_AFTER_COPY_PIF
D_DATA_AVAIL_PIF
D_TEST_START_PIF
D_TEST_DONE_PIF
D_LOT_DONE_PIF
D_IOALARM_PIF
D_TPMSG_PIF
D_IODATA_PIF
D_TSCDATA_PIF
D_LOCK_RSP_PIF
D_REGEN_PIF
D_ERROR_PIF
MAX_FILE_AGE
PROCESSED_FILE_AGE
```

Command Line Arguments

e.g. bc-pif.dvp was defined with command line arguments: \ln \fl \wn \wf

\a1x	alternate 1 bin site x
\a2x	alternate 2 bin site x
\a3x	alternate 3 bin site x
\a4x	alternate 4 bin site x
\an	actual tester number
\ai	actual station id.
\cn	command number
\cs	command string
\dbx	data bin x
\df	data log file name
\dt	device type
\fl	sort flow (number)
\id	station id (from map)
\ln	lot number (string)
\of	option file name
\op	operator id
\pf	plan file name
\rbx	reject bin site x
\sf	summary file name
\tn	tester number (from map)
\tf	test program name
\ts	time stamp (from map name)
\wa	wafseq address (%8.8LX)
\wf	wafer map file name
\wn	wafer number
\ws	wafer string name
\wt	wafer type

The following three switches will not be expanded, but can be used to control the initial conditions of the program

\hi	start hidden.
\to	start on top.
\bo	start on bottom.

Event Program Summary

Event	DESQview shortcut defined in cypress.cfg	Notes
D_IOINIT_PIF		
D_IOSTOP_PIF		
D_NEW_LOT_PIF	nl_pif.dvp	commented out - no code
D_WAFER_START_PIF	ws_pif.dvp	commented out - no code
D_WAFER_DONE_PIF	ls_pif.dvp	lotsum.exe \wf - no source code
D_AFTER_COPY_PIF	ac_pif.dvp	commented out - no code
D_DATA_AVAIL_PIF	bc-pif.dvp	bitcat.exe \ln \f1 \wn \wf - source code in 007 dir
D_TEST_START_PIF		
D_TEST_DONE_PIF		
D_LOT_DONE_PIF	ld_pif.dvp	commented out - no code
D_IOALARM_PIF	al_pif.dvp	commented out - no code
D_TPMSG_PIF		
D_IODATA_PIF		
D_TSCDATA_PIF		
D_LOCK_RSP_PIF		
D_REGEN_PIF		
D_ERROR_PIF		

External Menu Programs

(available from V1000 Monitor Menu - defined in cypress.cfg)

Menu Option	DESQview shortcut (defined in cypress.cfg)	Notes
pin error display	pi_pif.dvp	n:\bin\pinerr.exe
view datalog	vl_pif.dvp	n:\bin\viewdl.exe

Code Internals

Upon initialization (i.e., dprc.exe receives a D_IOINIT command/mail msg from V1000.exe), the plan file is parsed

within subroutine LoadDprcControls:

```

/* Set up user exit routines */
IOINIT_pif[0] = '\0';
if (GetOption ("D_IOINIT_PIF", IOINIT_pif, section) == RO_SUCCESS)
{
    if (debug_dprc && IOINIT_pif [0])
        printf("Found IOINIT_pif: %s\n", IOINIT_pif);
}

... etc

```

and these variables are searched for. If they are found, the "user exit" program is stored in the data area within userexit.h:

```

extern char ERROR_pif [OPTION_LINE_LENGTH];
extern char IOINIT_pif[OPTION_LINE_LENGTH];
extern char IOSTOP_pif[OPTION_LINE_LENGTH];
extern char NEW_LOT_pif[OPTION_LINE_LENGTH];
extern char WAFER_START_pif[OPTION_LINE_LENGTH];
extern char WAFER_DONE_pif[OPTION_LINE_LENGTH];
extern char AFTER_COPY_pif[OPTION_LINE_LENGTH];
extern char DATA_AVAIL_pif[OPTION_LINE_LENGTH];
extern char TEST_START_pif[OPTION_LINE_LENGTH];
extern char TEST_DONE_pif[OPTION_LINE_LENGTH];
extern char LOT_DONE_pif[OPTION_LINE_LENGTH];
extern char IOALARM_pif[OPTION_LINE_LENGTH];
extern char TPMSG_pif[OPTION_LINE_LENGTH];
extern char IODATA_pif[OPTION_LINE_LENGTH];
extern char TSCDATA_pif[OPTION_LINE_LENGTH];
extern char LOCK_RSP_pif[OPTION_LINE_LENGTH];
extern char REGEN_pif[OPTION_LINE_LENGTH];
extern char LOCAL_COPY_pif[OPTION_LINE_LENGTH];

```

At the END of processing for each mailbox command, there is:

```

case D_IOINIT:
    ... processing, then

    if (IOINIT_pif[0])
        UserExit(IOINIT_pif);

    break;

```

DPRC mail messages (events)
with user exits:

```

case D_IOINIT:
    if (IOINIT_pif[0])
        UserExit(IOINIT_pif);
    }
break;

case D_IOSTOP:
    if (IOSTOP_pif[0])
        UserExit(IOSTOP_pif);
    /* Now shut down */
break;

case D_NEW_LOT:
    if (NEW_LOT_pif[0])
        UserExit(NEW_LOT_pif);
break;

case D_WAFER_START:
    if (WAFER_START_pif[0])
        UserExit(WAFER_START_pif);
break;

case D_WAFER_DONE:
    if (WAFER_DONE_pif[0])
        UserExit(WAFER_DONE_pif);
break;

case D_DATA_AVAIL:
    if (DATA_AVAIL_pif[0])
        UserExit(DATA_AVAIL_pif);
break;

case D_TEST_START:
    if (TEST_START_pif[0])
        UserExit(TEST_START_pif);
break;

case D_TEST_DONE:
    if (TEST_DONE_pif[0])
        UserExit(TEST_DONE_pif);
break;

case D_LOT_DONE:
    if (LOT_DONE_pif[0])
        UserExit(LOT_DONE_pif);
break;

case D_IOALARM:
    if (IOALARM_pif[0])
        UserExit(IOALARM_pif);
break;

case D_TPMSG:
    if (TPMSG_pif[0])
        UserExit(TPMSG_pif);
break;

case D_REGEN:
    if (REGEN_pif[0])
        UserExit(REGEN_pif);
break;

case D_IFUN:
    /* init enter lot
    selected */
break;

```

without user exits

```

case D_EFUN:
break;

case D_RFUN:
    /* init restore
    wafer */
break;

case D_CFUN:
    /* init custom
    load path selected */
break;

case D_LFUN:
    /*
    init load new wafer selected */
break;

case D_NEEDPLAN:
    /*
    init enter with force plan */
break;

```

State Information Files

Vos gets initial status info upon bootup from:

where: p: = c:\program

program:	p:\tpg\testtape.cof
option:	p:\opt\testtape.opt
plan:	p:\pln\testtape.pln
vector:	p:\vec\testtape.vec

Files hold the results of the last test are located under

where o: = c:\d-drive

o:\log\lotsum.bin
o:\log\wafermap.bin
o:\log\datalog.bin

completed wafers are in the same directory with hashed filenames; e.g.:

o:\log\wmqsfni.173	wm* = wafer map
o:\log\plqsfni.173	pl* = plan file
o:\log\dlqsfni.173	dl* = datalog
o:\log\mpqsfni.173	mp* = mospro binary file (this is what gets sent to the summary system)

Directory Structure

Directory PATH listing for Volume VT-14

Volume Serial Number is 234A-1201

C:.

```

|---BITMAP
|   |---PARTS
|   +---BIN
|---CEC      GPIB interface w/Capital Equipment Corp (CEC) Boards
|   |---C
|   |---CECDRIVE
|   |---CECHP
|   |---DOC
|   |---INT
|   |---UTILITY
|   +---WINDOWS
|---COMP      for compiling test programs
|---COMP.301  redunant with COMP
|   +---COMP
|---CYP
|---D-DRIVE   subst o: c:\d-drive      subst d: c:\d-drive
|   |---LOG   summary files that HAVE been sent to the server
|   |---CAL
|   |   |---V2100E
|   |   +---V2100G3
|   |---BMTEMP
|   |---PENDING  summary files that failed send to server
|   |---7B923
|   |---C37K
|   +---BRT
|---DOS
|---DV        DESQVIEW dos multitasker
|   +---OLD
|---EDT       editor
|---INSTALL
|---LAN       David McDonald did changes in here AppleTops->TCPIP
|---MPTEMP
|---NETWORK   David McDonald did changes in here AppleTops->TCPIP
|   +---OLD
|---PCM
|---PROGRAM
|   |---MFG
|   |   |---DOCS
|   |   |   |---CAL
|   |   |   |---DIAGS
|   |   |   +---MISC
|   |   |---SETUPS
|   |   |---TOOLS
|   |   |   |---LCADEBUG
|   |   |   +---SCOPESET
|   |---SRC
|   |   |---28F010DS
|   |   |---BOARDCFG
|   |   |---BOARDINF
|   |   |---C010
|   |   |---FBIN

```

```

| | | ---MISC
| | | ---SHELL
| | | ---7C201AT
| | +---CURRENT
| | ---CURRENT
| +---VTONLINE      load programs, might be p: drive ?
| | | ---LOADDIR
| | | ---WORK
| | +---LRN
---QEMM             Quarterdeck memory expander
| ---TECHNOTE
+---Q_BACKUP
---SETUP
| ---AMI50
| ---AMI50A
| ---DV
| ---INTELP90
| ---LOG
| ---MICR66
| ---MICR66A
| ---MICR66G
| ---MICR66GA
| ---OAMI
| ---OAMIA
| ---REVDOC
| ---ROOT
+---SETUP
---SETUPS
---TMP
---TOOL
| ---REVDOC
+---LIST90
---UTIL
---V1000PCM.300    n: drive This is the VOS layer executables
| ---BIN           dprc.exe is in here
| ---COMP          some VOS compile stuff, but incomplete
| ---COMP.301
| ---V2100E.295
| ---V2000C.285
| ---V2100C.285    SET HARDWARE_PATH=N:\V2100C.285 (config.sys)
| ---V2000A.285
| ---V2100A.285
| ---V2000A.244
| ---V2100E.301
| ---V2100G3.394
+---V2100G8.402
| ---CYPRESS.005
| | | ---CURRENT
| | | ---VTONLINE
| | | | ---LOADDIR
| | | | +---WORK
| | | +---OLD
| | ---CYPRESS.007 SET STATION_PATH=N:\cypress.007 (config.sys)
---VTBITMAP
| ---PARTS
+---BIN
+---NET

```


Network Setup

```
cd c:\net
```

```
net use
```

Status	Local name	Remote name
OK	G:	\\CTI\CHECKOUT
OK	F:	\\CTI\SUMMARY

The command completed successfully.

These drives are mounted via a manual

net use G: \\CTI\CHECKOUT /PERSISTENT:YES

command

```
net config
```

Computer name	\\TXPC88
User name	SUMMARY
Software version	3.11
Redirector version	1.01
Workstation root directory	C:\NET
Workgroup	TXSORT

The command completed successfully.

c:\net\system.ini

```
autologon=yes
computername=TXVT14
lanroot=C:\NET
username=SUMMARY
workgroup=TXSORT
[network drivers]
netcard=eInk3.dos
transport=ndishlp.sys,*netbeui,tcdrv.dos,nemm.dos
devdir=C:\NET
[Password Lists]
SUMMARY=C:\NET\SUMMARY.PWL
```

c:\config.sys

```
SET STATION_ID=VT14 (TX)
SET NETBIOS_NAME=VT14
SET NETWORK_COPY_PATH=G:\VTONLINE

SET PLAN_PATH=G:\VTONLINE\PLANS2\*.*
```

c:\net\protocol.ini

```
transport=tcip,TCPIP
Iana0=ms$eInk3,1,tcip
Iana1=ms$eInk3,1,ms$netbeui
[TCPIP]
DefaultGateway0=157 95 44 250
NBSessions=6
SubNetMask0=255 255 255 0
IPAddress0=157 95 45 114
DisableDHCP=1
[MSSNETBEUI]
DriverName=netbeui$
```

DOS PC DPRC.EXE Build Using MSC7

DPRC Command Line Build Invocation

```

set path=c:\dos;c:\msc7bld\msc7\bin
set include=c:\msc7bld\msc7\lib
cd \msc7bld\dprc
nmake
Run File [dprc.exe]:
List File:
Libraries [.lib]: ..\dprclib\dprclib.lib
LINK: Warning L4051: LLLIBCE.lib Cannot find library
Enter new file spec: ..\msc7\lib\llibce.lib
LINK: Warning L4051: OLDNAMES.lib Cannot find library
Enter new file spec: ..\msc7\lib\oldnames.lib

```

DPRC Command Line Build Invocation

```

cd \msc7bld\dprclib
nmake

```

Makefile Options

Option	Description
/Zi	generate debugger info for CodeView
/c	compile to object but do not link
/Ge	check for stack overflow
/Gy	link only functions referenced in the the object rather than entire contents
/Gt1024	/Gt[number] creates far variables automatically, size or number is the threshold
/AL	large memory model
/D_DPRC	a define
/NOI	treat case a significant in globals
/M	create mapfile with public symbol globals

Building DPRCLIB.LIB

Note: When we built this lib and used it for the main dprc.exe build, we got unresolved external mal_* references

Note: There are two summary.c files, one for dprc.exe and another for dprclib.lib

DPRC Makefile changes:

```
DPRCINCLUDE=..\dprclib
```

```
link $(STACK) /NOI /M dprc summary fileproc lotmenu wafinit waflist mospro custpan
extern heap
```

was:

```
link $(STACK) /NOI /M @dprc.lnk
```

DPRC Unbuildable Object Files

```
PLB_TO_OBJ=c:\temp\dv-pdt\creatobj We don't have this
```

```
custpan.obj: cust.plb $(PLB_TO_OBJ)
cust.plb,custpan.obj,_custdprpan,_custdprclen,DATA,DGROUP;
```

Unbuildable DPRCLIB.LIB Object Files

```
api1.obj no source code build in the makefile
api2.obj no source code build in the makefile
dprcpan.obj
```

```
PLB_TO_OBJ=C:\temp\dv-pdt\creatobj we don't have this
```

```
dprcpan.obj: dprc.plb $(PLB_TO_OBJ)
dprc.plb,dprcpan.obj,_dprcpan,_dprclen,PLB_DATA,FAR_DATA;
lib dprclib.lib -+$.obj ,,
```

DESQVIEW Modules

The DESQVIEW API software is available from: <http://www.chsoft.com/dv.html>

DV API Disk 1:

Contains: DVAPI.INC
KEY
Not sure what this is used for

DV API Disk 2:

Contains: Panel stuff, and has an install.bat file
creatobj.exe which is referenced/used in the dprc build

This installs to directory:
c:\dvc\pdt\ custpan.obj
dprclib.obj
api1.obj
api2.obj

The installation software also requires an a: drive floppy, where it places another copy of these files.

Not sure why. Note however, that these files are included in the dprc build.

DV API Disk 3:

Contains: An API debugger, and an install.bat file.
This installs to directory:

c:\dvc\dvapidbg

but the software flashed a quick error msg, and would not install

DESQVIEW 2.8 This disk duplicates that of the c:\dv directory from versatest.
Note that it installs a "sample.plb" file.
(the build makes reference to plb files, but can't quite determine what they are)

DV Companions Some .plb and other files in here. Not sure how to use these files.

DPRC.EXE Main Loop Internals

A stubbed out TurboC build was completed to be able to trace dprc.exe logic

Main Loop: Four types of messages are received from the DESQview queue

1) A mailbox message to dprc

```

/*-----*/
/* Messages the data process receives from the DPRC_MAIL mailbox */
/*-----*/
/* 0=D_IOINIT          data = 32 bit wafseq address      */
/* 1=D_IOSTOP          data = 32 bit wafseq address      */
/* 2=D_NEW_LOT         data = lot name                   */
/* 3=D_WAFER_START     no data                           */
/* 4=D_WAFER_DONE      no data                           */
/* 5=D_DATA_AVAIL      data = sequence name             */
/* 6=D_TEST_START      no data                           */
/* 7=D_TEST_DONE       no data                           */
/* 8=D_LOT_DONE        no data                           */
/* 9=D_IOALARM         data = message                   */
/* 10=D_TPMSG          data = message                   */
/* 11=D_IFUN           init enter lot selected          */
/* 12=D_EFUN           init edit wafer sequence         */
/* 13=D_RFUN           init restore wafer               */
/* 14=D_REGEN          data = name, controls            */
/* 15=D_CFUN           init custom load path selected   */
/* 16=D_LFUN           init load new wafer selected     */
/* 17=D_NEEDPLAN       init lot with forced plan selection */
/* 18=D_SEND_FILES     try to send network files again   */
/*-----*/

```

2) A mailbox message from main mail

```

/*-----*/
/* Something from the mail */
/* (main task tells us the tester is down) */
/*-----*/

```

3) Something from the keyboard Requesting Diagnostics

```

/*-----*/
/* Something from the keyboard */
/*-----*/
/* print memory info */      OR
/* print heap info */

```

4) Something from the network

```

/*-----*/
/* Something from the network */
/*-----*/
/* See if we received a netbios datagram. */

```

5)

```

/*-----*/
/* dont know what we have just gotten off */
/* of the DESQview queue */
/*-----*/
printf("Programming error -- unknown object on que\n");

```

RDPIO.EXE

When you move the chuck around, you may need to call the req_xy() function afterward so that the Data Process knows the new coordinate for your test datalog.

In this version of RDPIO I implemented two changes. First of all, IOPEOW will be executed at the beginning of the next CheckForNextDie(). This behavior is same as slezia2.zip. Secondly, since you will be moving the chuck to different location, and if the test datalog and wafermap info mean something to you, you need to reset the new coordinate in both the IO process and Data Process. To achieve this, I implemented another IOP function. It is "@ IOPLOC", which stands for IOP location. When you move to another coordinate, you need to printf("@ IOPLOC\n") before the actual execution of test code. Obviously if this function does not work, you may have to wait till I come back from ITC. As a side note, you have both the AEC0 and AEC1 commands, one of which would bring you back to the original coordinate. So for the scope of this project, you may not need IOPLOC.

I tested this rev. of RDPIO with the following example. I actually turned on software emulation so that I could typed in the prober response through the keyboard. With this rev. I did not need to hit <return> at the V1000 monitor or launch a DOS window for the prober to send a string back to your c-program. If you still see any problem with this, please e-mail us your source code so I can run your program here to verify your finding.

Regards,
Sam Wong

```
-----  
    printf("@ IOPRES\n");  
    console_gets(resbuf);  
//      make sure you don't put any printf() between this two lines  
    sscanf(resbuf,"%d",&inkdot);  
    printf("inkdot=%d\n",inkdot);
```

Installation Procedure for RDP IO Process:

Copy the files RDPIO.EXE and RD-PIF.DVP to N:\BIN. Modify the file C:\CFG\V1000.CFG.

Locate the section of the file used for the prober switches, and modify it to look like:

```
#if (%prober% == KLA_RDP)
{
    IOP_PIF_FILE           N:\BIN\RD-PIF.DVP
    RDPIO_PROBER_SITES    2
    RDPIO_COMMAND_TIMEOUT 500
    RDPIO_ACK_TIMEOUT     100
    RDPIO_WAFER_TIMEOUT   6000
    RDPIO_BIN_TYPE        BIN
    RDPIO_INKER_TYPE       SITE
    RDPIO_WAFER_ID_SOURCE PROBER
    RDPIO_WAFER_ID_STRING  LLLLLLLLLLLL-TT-WW
    RDPIO_Z_JOG           OFF

    MAP_YORIGIN           BOTTOM
    MAP_YINCR              DOWN
    MAP_XINCR              LEFT
}

```

You will find a description of the RDPIO switches in the header comments of SERIO.C, and a description of the wafer map switches in the Technical Reference Manual, on page 3.35.

You may need to tweak some of these switches to match your specific prober configuration. In particular, you will want to set MAP_YORIGIN so that the wafer map generated by the tester is oriented correctly. You may also find it convenient to set MAP_YINCR and MAP_XINCR so that the cursor keys will move you around the tester wafer map screen the same way as the prober joystick moves you around the actual wafer.

Finally, please confirm that your AUTOEXEC.BAT file sets the DOS environment variable prober to "KLA_RDP". If it is set improperly then RDPIO.EXE will not even be executed. Reboot the PC. This completes the installation.

Verifying Proper Operation:

In the V1000 monitor, power up the test head using the F1 - Init Lot - Enter Lot Info window. In this window you will need to select the correct plan file and then hit OK. When the tester is ready and the first wafer is in position to begin wafer sort at the first die location, commence wafer probing by selecting F1 - Utilities - Send I/O Command -

Begin Wafer Probing. From that point the system should sort the entire wafer lot automatically, without operator intervention.

The I/O process window can be configured to display ALL prober-tester communication, even during wafer sort. Modify AUTOEXEC.BAT to set the DOS environment variable debug to "ON" and reboot the PC. This mode is useful for debugging the I/O process, but it has the disadvantage of slowing down wafer sort substantially. To get a truer measure of the sort time, you will need to disable debug mode, by setting the environment variable debug to nothing or setting it to "debug".

Configuration Files Switches.

RDPIO_PROBER_SITES

Number of test sites prober thinks it is using.

RDPIO_COMMAND_TIMEOUT

Time in 1/100ths of seconds that the tester waits for the prober to answer a request.

RDPIO_ACK_TIMEOUT

Time in 1/100ths of seconds that the tester waits for the prober to send an ack after an enquire.

RDPIO_WAFER_TIMEOUT

Time in 1/100ths of seconds that the tester waits between the time one wafer is unloaded and the time the next one is ready.

RDPIO_BIN_TYPE

Type of bin to send in appropriate field of BA:

INK	Interface bin.
IFC	Interface bin.
REJ	Reject bin.
BIN	Data bin.

RDPIO_INKER_TYPE

Inker code to send in appropriate field of BA (for single site this is ignored):

SITE	0 or site #, depending on interface bin.
IFC	Interface bin.
REJ	Reject bin.

RDPIO_WAFER_ID_SOURCE

Get the wafer numbers/lot id from tester or prober?

TESTER	Input in F1-Init Lot- Enter Lot Info window.
PROBER	Request from prober and fill in the wafer sequence accordingly.

RPDIO_WAFER_ID_STRING

This matters only if above is PROBER. It specifies how the 18 character wafer id string is to be parsed into lot id, wafer id, and wafer type (= cassette id).

L or l Use character for lot id.

W or w Use character for wafer id.

T or t Use character for waf type.

- or / Ignore character.

Ex: LLLLLLLLLLLL-TT-WW should be used with OCR disabled.

RDPIO_FLUSH_COUNT

Number of consecutive no character available results to complete flush.

DESQview Setup**v1000.exe**

Standard Options	
Program Name: [V1000 Monitor]	
Keys to Use on Open Menu [S9]	Memory Size (in K):[275]
Program ...: [n:\bin\v1000.exe]	
Parameters : []	
Directory : [c:\]	
Options:	
Writes text directly to screen	[N]
Displays graphics information	[N]
Virtualize text/graphics (Y,N,T)	[N]
Uses serial ports (Y,N,1,2)	[N]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[55]	Maximum Program Memory Size(in K)[275]
Script Buffer Size [256]	Maximum EMS/XMS/VCPI/DPMI (in K) []
Text Pages [1]	Graphics Pages [0]
Initial Video Mode []	
Window Position	
Maximum Height [10]	Starting Height [10]
Maximum Width [40]	Starting Width [40]
Starting Row [10]	Starting Column [15]
Shared Program	
Pathname [*]	
Data []	
Close on exit (Y,N,blank):	[Y] Uses its own colors [Y]
Allow Window Close command	[Y] Can be run in background [Y]
Uses math coprocessor	[N] Keyboard conflict (0-F) [0]
Share CPU when foreground	[Y] Share EGA when zoomed [Y]
Can be swapped out (Y,N,blank)	[N] Protection level (0-3) [0]

Panel Design Tool

Standard Options	
Program Name: [Panel Design Tool]	
Keys to Use on Open Menu [PD]	Memory Size (in K):[170]
Program ...: [pdt.exe]	
Parameters : []	
Directory : [c:\dvc\pdt]	
Options:	
Writes text directly to screen	[N]
Displays graphics information	[N]
Virtualize text/graphics (Y,N,T)	[N]
Uses serial ports (Y,N,1,2)	[N]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[64]	Maximum Program Memory Size(in K) []
Script Buffer Size [1000]	Maximum EMS/XMS/VCPI/DPMI (in K)[]
Text Pages [1]	Graphics Pages [0] Initial Video Mode []
Window Position	
Maximum Height [25]	Starting Height [7] Starting Row [6]
Maximum Width [80]	Starting Width [54] Starting Column [13]
Shared Program	
Pathname []	
Data []	
Close on exit (Y,N,blank):	[] Uses its own colors [Y]
Allow Window Close command	[Y] Can be run in background []
Uses math coprocessor	[Y] Keyboard conflict (0-F) [0]
Share CPU when foreground	[Y] Share EGA when zoomed [Y]
Can be swapped out (Y,N,blank)[]	Protection level (0-3) [0]

rdpio.exe

Standard Options	
Program Name	[V1000 RDP IO Process]
Keys to Use on Open Menu [RD]	Memory Size (in K):[300]
Program ...:	[\$S:\rdpio.exe]
Parameters :	[]
Directory :	[c:\]
Options:	
Writes text directly to screen	[N]
Displays graphics information	[N]
Virtualize text/graphics (Y,N,T)	[N]
Uses serial ports (Y,N,1,2)	[1]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[35]	Maximum Program Memory Size(in K)[]
Script Buffer Size [0]	Maximum EMS/XMS/VCPI/DPMI (in K) []
Text Pages [1]	Graphics Pages [0] Initial Video Mode []
Window Position	
Maximum Height [20]	Starting Height [] Starting Row []
Maximum Width [80]	Starting Width [] Starting Column []
Shared Program	
Pathname [*]	
Data []	
Close on exit (Y,N,blank):	[] Uses its own colors [Y]
Allow Window Close command	[Y] Can be run in background [Y]
Uses math coprocessor	[N] Keyboard conflict (0-F) [0]
Share CPU when foreground	[Y] Share EGA when zoomed [Y]
Can be swapped out (Y,N,blank)	[N] Protection level (0-3) [0]

dprc.exe

Standard Options	
Program Name: [V1000 Data Process]	
Keys to Use on Open Menu [DD]	Memory Size (in K):[275]
Program ...: [n:\bin\dprc.exe]	
Parameters : []	
Directory : [n:\bin]	
Options:	
Writes text directly to screen	[N]
Displays graphics information	[N]
Virtualize text/graphics (Y,N,T)	[N]
Uses serial ports (Y,N,1,2)	[N]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[10]	Maximum Program Memory Size(in K)[275]
Script Buffer Size [256]	Maximum EMS/XMS/VCPI/DPMI (in K) []
Text Pages [1] Graphics Pages [0] Initial Video Mode []	
Window Position	
Maximum Height [60]	Starting Height [10] Starting Row [20]
Maximum Width [80]	Starting Width [40] Starting Column [20]
Shared Program	
Pathname [*]	
Data []	
Close on exit (Y,N,blank):	[] Uses its own colors [Y]
Allow Window Close command	[Y] Can be run in background [Y]
Uses math coprocessor	[Y] Keyboard conflict (0-F) [0]
Share CPU when foreground	[Y] Share EGA when zoomed [Y]
Can be swapped out (Y,N,blank)	[N] Protection level (0-3) [0]

dprc cmd (dprccmd.bat)

Standard Options	
Program Name	[dprc cmd (dprccmd.bat)]
Keys to Use on Open Menu [DC]	Memory Size (in K):[325]
Program ...:	[c:\dprccmd.bat]
Parameters :	[]
Directory :	[c:\]
Options:	
Writes text directly to screen	[N]
Displays graphics information	[N]
Virtualize text/graphics (Y,N,T)	[N]
Uses serial ports (Y,N,1,2)	[N]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[0]	Maximum Program Memory Size(in K)[350]
Script Buffer Size [128]	Maximum EMS/XMS/VCPI/DPMI (in K)[]
Text Pages [1]	Graphics Pages [0] Initial Video Mode [4]
Window Position	
Maximum Height [12]	Starting Height [12] Starting Row [1]
Maximum Width [60]	Starting Width [60] Starting Column [1]
Shared Program	
Pathname []	
Data []	
Close on exit (Y,N,blank):	[Y] Uses its own colors [Y]
Allow Window Close command	[N] Can be run in background [N]
Uses math coprocessor	[N] Keyboard conflict (0-F) [0]
Share CPU when foreground	[N] Share EGA when zoomed [N]
Can be swapped out (Y,N,blank)	[N] Protection level (0-3) [0]

ftp directory listing

Standard Options	
Program Name	[ftp ls]
Keys to Use on Open Menu [FT]	Memory Size (in K):[325]
Program ...: [ftp.bat]	
Parameters : [-i -f ftpcmd.txt 157.95.4.3]	
Directory : [c:\ncaftp]	
Options:	
Writes text directly to screen	[N]
Displays graphics information	[N]
Virtualize text/graphics (Y,N,T)	[Y]
Uses serial ports (Y,N,1,2)	[N]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[0]	Maximum Program Memory Size(in K)[800]
Script Buffer Size [256]	Maximum EMS/XMS/VCPI/DPMI (in K)[]
Text Pages [1] Graphics Pages [0] Initial Video Mode [4]	
Window Position	
Maximum Height [12]	Starting Height [12] Starting Row [5]
Maximum Width [60]	Starting Width [60] Starting Column [5]
Shared Program	
Pathname []	
Data []	
Close on exit (Y,N,blank):	[Y] Uses its own colors [Y]
Allow Window Close command	[N] Can be run in background [N]
Uses math coprocessor	[N] Keyboard conflict (0-F) [0]
Share CPU when foreground	[N] Share EGA when zoomed [N]
Can be swapped out (Y,N,blank)	[N] Protection level (0-3) [0]

lotsum.exe

Standard Options	
Program Name	[Cypress Lot Summary]
Keys to Use on Open Menu [LS]	Memory Size (in K):[200]
Program ...: [\$S:\lotsum.exe]	
Parameters : [\wf o:\\log\\lotsum.bin]	
Directory : [o:\log]	
Options:	
Writes text directly to screen	[N]
Displays graphics information	[N]
Virtualize text/graphics (Y,N,T)	[T]
Uses serial ports (Y,N,1,2)	[N]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[0]	Maximum Program Memory Size(in K)[800]
Script Buffer Size [256]	Maximum EMS/XMS/VCPI/DPMI (in K)[]
Text Pages [1]	Graphics Pages [0] Initial Video Mode [4]
Window Position	
Maximum Height [25]	Starting Height [25] Starting Row [1]
Maximum Width [80]	Starting Width [80] Starting Column [1]
Shared Program	
Pathname []	
Data []	
Close on exit (Y,N,blank):	[Y] Uses its own colors [Y]
Allow Window Close command	[Y] Can be run in background [Y]
Uses math coprocessor	[Y] Keyboard conflict (0-F) [0]
Share CPU when foreground	[Y] Share EGA when zoomed [Y]
Can be swapped out (Y,N,blank)	[Y] Protection level (0-3) [0]

TurboC

Standard Options	
Program Name	[turboC]
Keys to Use on Open Menu [TC]	Memory Size (in K):[325]
Program ...:	[c:\tc\bin\tc\tc.exe]
Parameters :	[]
Directory :	[c:\tcbld\dprc]
Options:	
Writes text directly to screen	[Y]
Displays graphics information	[Y]
Virtualize text/graphics (Y,N,T)	[N]
Uses serial ports (Y,N,1,2)	[N]
Requires floppy diskette	[N]
Advanced Options	
System Memory(in K)[10]	Maximum Program Memory Size(in K)[]
Script Buffer Size [256]	Maximum EMS/XMS/VCPI/DPMI (in K)[8192]
Text Pages [1]	Graphics Pages [2] Initial Video Mode []
Window Position	
Maximum Height [25]	Starting Height [25] Starting Row [0]
Maximum Width [80]	Starting Width [80] Starting Column [0]
Shared Program	
Pathname [*]	
Data []	
Close on exit (Y,N,blank):	[N] Uses its own colors [Y]
Allow Window Close command	[Y] Can be run in background [Y]
Uses math coprocessor	[Y] Keyboard conflict (0-F) [0]
Share CPU when foreground	[Y] Share EGA when zoomed [Y]
Can be swapped out (Y,N,blank)	[Y] Protection level (0-3) [0]

Setup

via program c:\dv\setup.exe

Task Processing Time (in clock ticks):

foreground:	6
background:	4
memory usage:	25
dos for ems:	4
optimize com:	Y
manage printer contention:	N

