Market Data Base Video/Audio

A Marketing Information System based upon SAS and ISPF

Winfried D. Jakob, BASF AG, Ludwigshafen
Werner Wolf, ISS GmbH, Heidelberg

Overview

The marketing information system 'Market Data Base Video/Audio' has recently been installed in the marketing department of the BASF in Germany.

The System has been developed to provide menu-guided data retrieval and reporting functions which are:

- standardized or flexible,
- specific or general
- to be used in
- the systematic planning of marketing decisions,
- continuous market observation
- and the solution of specific problems.
The information in the data base includes:
- bimonthly wholesale and retail sales for video and audio cassettes,
- monthly consumer spending on cassettes,
- and the monthly advertising spending of the major cassette manufacturers.

These data are supplied on tapes by market research institutes and are loaded into the system data files by the system administrator.

For user convenience the system is divided into several functions:

- Function 1 has been designed as a quick and easy-to-use function for inexperienced users. Its purpose is the production of predefined reports and graphs that are already stored in the system. This function covers the routine information needs of the marketing department.
- The functions 2 and 3 help the experienced user in defining his own custom tailored reports or graphs, which may also be stored for later use under function 1. These two functions are also the tools of the system administrator when storing the routine reports and graphs in function 1.
- Function 4 provides an interface with the SAS-System.
- Function 5 provides the necessary technical functions to store taped data into the system to update the system tables, compress data files and so on.

After being called by the TSO-command 'VIA' the system presents its main menu screen, where you can see the list of functions:
By entering a '1' the user is shown a catalogue of all predefined reports and graphs, complete with names, contents and definition dates. These reports and graphs can easily be produced by entering the appropriate line commands shown in the upper third of the function 1 display screen. The user can choose between bar charts, plots and reports.

VIA/IT --------------------- Standardauswertungen ---------------ZEILE 4 VON 000028
Funktion >>> L - Liste am Schirm
Gh - Histogramm am Schirm
GP - Liniendiagramm am Schirm
P - Drucken der Liste
ZH - Histogramm auf dem Plotter
ZP - Liniendiagramm auf dem Plotter

Durch LM,GHM,GPM,ZHM,ZPM,SM werden manuell eingegbenen Daten beruecksichtigt

Name: BUTHGI Quelle: GFK VIDEO-CASSETTEN manuelle Eingabe:
ABSATZMENGE BASF HG UND TDK HG
Erstellt: 12/02/86 von: YHAST71 VIA/MMF Update: 12/02/86 09:17 YHAST71

Name: CRSC90 Quelle: GFK AUDIO-CASSETTEN manuelle Eingabe:
ABSATZMENGE BASF CR-S UND TDK SA C90
Erstellt: 13/02/86 von: YHAST73 VIA/MMF Update:

Name: CRSKAN Quelle: GFK AUDIO-CASSETTEN manuelle Eingabe:
KANAEL: ABSATZMENGE BASF / TDK
Erstellt: 13/02/86 von: YHAST73 VIA/MMF Update:
A typical example of a bar chart is shown here:

![Bar chart image]

This bar chart was produced by using GCHART together with the ANNOTATE facility.

The following plot was produced by using a simple GPLOT statement. The numbers at the right end of the curves were generated once more with the ANNOTATE facility.
The portfolio was produced by using G PLOT with a BUBBLE statement:
And here an example of a report generated by a SAS datastep:

```
VIA/ LIST ------------------ Liste am Schirm ------------------
Funktion ====> _

AUDIO
WERBEAUSGABEN 1986 IN TDM

<table>
<thead>
<tr>
<th></th>
<th>JAN</th>
<th>FEB</th>
<th>MRZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDK PZ</td>
<td>244.00</td>
<td>184.00</td>
<td>115.00</td>
</tr>
<tr>
<td>TDK FZ</td>
<td>17.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>TDK TZ</td>
<td>4.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>TDK TV</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>TDK HF</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>TDK TOTAL</td>
<td>265.00</td>
<td>191.00</td>
<td>123.00</td>
</tr>
<tr>
<td>MAXELL PZ</td>
<td>64.00</td>
<td>17.00</td>
<td>0.00</td>
</tr>
<tr>
<td>MAXELL FZ</td>
<td>0.00</td>
<td>0.00</td>
<td>17.00</td>
</tr>
<tr>
<td>MAXELL TZ</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>MAXELL TV</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>MAXELL HF</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>MAXELL TOTAL</td>
<td>64.00</td>
<td>17.00</td>
<td>23.00</td>
</tr>
<tr>
<td>SONY PZ</td>
<td>17.00</td>
<td>108.00</td>
<td>36.00</td>
</tr>
<tr>
<td>SONY FZ</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>SONY TZ</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>SONY TV</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>SONY HF</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

PF3 - Ende
PF7/8 - Blättern nach Oben/Unten
PF12 - Bildschirm-Split definieren
PF10/11 - Blättern nach links/rechts
```

**Defining an Analysis**

The basic steps executed by the system when an analysis is stored permanently in the function 1 catalogue are:

- data selection
- data aggregation
- computing functions (for example to calculate totals)
- definition of the report structure

The necessary specifications for the selection, aggregation and structuring of the data step have to be provided by the user by means of function 2 and 3 screens.
Starting with function 2, the user has to fill in the following query screen:

```
VIA/2.1 -------------- Datenauswahl: GfK-Compact-Cassetten ------- Auswahl: 1
Funktion ==> _
Marke      ==> ?
Qualitaet  ==> ?
Laenge     ==> ?
Einzelprodukt ==> ?
Handelskanal ==> ?
Land       ==> BRD
Zeitraum  von ==> VJAHR  bis ==> W
Zeitperiode ==> 2M
Daten      ==> ?

PF3 - Ende der Auswahl
PF7 - Vorhergehende Auswahl
PF4 - Abbruch der Auswahl
PF8 - Naechste Auswahl
```

Here he can state cassette brands, cassette qualities, cassette lengths, time periods and so on. Typically, the user fills in abbreviations that are known to him through frequent use of the system. The inexperienced or forgetful user can fill the question marks and will receive tables of admissible values, where he can mark his choices:
VIA/TAB · Auswahltabelle: GFK/CC - MARKEN
Funktion ===>

S - Auswahl einer Zeile

<table>
<thead>
<tr>
<th>Code</th>
<th>Kurztext</th>
<th>Langtext</th>
<th>verfuegbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>GESAMT</td>
<td>Gesamt</td>
<td>GESAMT</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>REST</td>
<td>Rest</td>
<td>REST</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>AGFA</td>
<td>AGFA</td>
<td>AGFA</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>AMPE</td>
<td>AMPEX</td>
<td>AMPEX</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>BASF</td>
<td>BASF</td>
<td>BASF</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>DAIM</td>
<td>DAIMON</td>
<td>DAIMON</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>DENO</td>
<td>DENON</td>
<td>DENON</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>FUJI</td>
<td>FUJI</td>
<td>FUJI</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>GRUN</td>
<td>GRUNDIG</td>
<td>GRUNDIG</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>MAXE</td>
<td>MAXELL</td>
<td>MAXELL</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>MEMO</td>
<td>MEMOREX</td>
<td>MEMOREX</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>PDMA</td>
<td>PD-MAGNETICS</td>
<td>PDMA</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>PERM</td>
<td>PERMATION</td>
<td>PERM</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>PHIL</td>
<td>PHILIPS</td>
<td>PHILIPS</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>ROTI</td>
<td>ROTICET</td>
<td>ROTICET</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>SAWA</td>
<td>SAWA</td>
<td>SAWA</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>SCOT</td>
<td>SCOTCH 3M</td>
<td>SCOTCH 3M</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>SONY</td>
<td>SONY</td>
<td>SONY</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>TDK</td>
<td>TDK</td>
<td>TDK</td>
<td>80/02 bis 80/02</td>
</tr>
<tr>
<td>SONST</td>
<td>Sonstige</td>
<td>Sonstige</td>
<td>80/02 bis 80/02</td>
</tr>
</tbody>
</table>

In return the system automatically fills in the query screen:

VIA/2.1 · Datenauswahl: GfK-Compact-Cassetteen
Funktion ===>

Marke ===>
Qualitaet ===>
Laenge ===>
Einzelprodukt ===>
Handelskanal ===>
Land ===>
Zeitraum von ===>
Datum ===>

PF3 - Ende der Auswahl
PF7 - Vorhergehende Auswahl
PF4 - Abbruch der Auswahl
PF8 - Naechste Auswahl
The final layout of the graphs or reports is then defined using function 3:

VIA/3.0 -------------- Definition von Listen und Graphiken --------------
Funktion ===> _ Datei ===> ORIGINAL (Original/Umgeordnet)

Es können folgende Operationen ausgeführt werden:

U - Umordnen der Datenmatrix
T - Überschriften, Fußnoten
S - SAS-Datei speichern
PP - SAS-Datei am Schirm listen

L - Tabelle am Schirm
P - Drucken der Tabelle

Spezielle Listenform ===> (Name / ?)

HIST - Histogramm am Schirm
PLOT - Liniendiagramm am Schirm

Spezielle Graphik ===> (Name / ?)

PF3 - Ende der Funktion
PF4 - Abbruch der Funktion

DAT FREIG - Ausführung des Befehls

The user can choose between bar charts, plots and reports. As an example we show the definition screen of a bar chart:

VIA/3.HIST -------------- Histogramm --------------
Funktion ===> 

Verfügbare Schlüssel Felder: MARKE PERIODE JAHR

Verfügbare Datenfelder: WG

Schlüssel Felder für X-Achse ===> PERIODE
Säulen unterteilt nach ===> MARKE
Säulen gruppiert nach ===> JAHR
Darzustellendes Datenfeld ===> WG
Form der Darstellung ===> SUMME (SUMME MITTEL)

Drücken Sie DAT FREIG zur Ausführung, oder PF3 zum Abbruch
The result is shown here:

If the user wants to produce a report he can define page, row and column variables and texts as well as titles and footnotes:

VIA/3.U ----------------- Umordnen der Datenmatrix

Verfügbare Schlüsselfelder: MARKE PERIODE JAHR

Dimensionen der Tabelle:

Seite  ===> JAHR
Spalten ===> PERIODE
Zeilen  ===> MARKE

Drucken Sie DAT FREIG zur Ausfuehrung oder PF3 zum Abbruch
After all these definitions the user can store the complete analysis in the function 1 catalogue if he wishes so. Then he will be guided back to the main menu screen.

Finally the function 4 provides an interface with the SAS system. Normally the experienced user will work here with SAS datasets created by the function 2 data retrieval:

VIA/4.0 ----------------- Schnittstelle MDB/VIA - SAS -------------------
Funktion ===>

Unter dem DD-Namen 'MYSAS' steht Ihre Bibliothek mit SAS-Dateien zur Verfuegung

1 - SAS interaktiv (SAS Display Manager)
    Optionen:
2 - PROC DATASETS
3 - PROC CONTENTS
4 -
The Main Programming Tools of MDB/VIA

MDB/VIA is running under TSO using the following tools:
- SAS
- ISPF
- PL/1
- CLIST

Usage of SAS

The SAS System has a central position in our information system. All data are stored in SAS datasets. That means that all programs for

- data management
- input of external data
- data verification
- data selection
- graphics (Annotate)
- report generation
- interface for free programming

written in SAS, using extensively the MACRO language and for the graphics the ANNOTATE facility.

Usage of PL/1

The programming language PL/1 was used for

- **SAS Procedures**
  General SAS-ISPF interfaces (PUTSPF, GETSPF, ISPSAS), special procedures for data input, variable info etc.

- **Table Editor**
  for general table management

- **Table Print**
  for general table output

- **BROWSE**
  for general report output

- **Special programs**
  for verification, table handling etc.
The MDB/VIA system uses a lot of ISPF tables. The communication between SAS and the dialog is based on these tables.

There are two procedures to simplify the conversion from SAS to ISPF and vice versa.

The first one, PROC PUTSPF, is able to copy a SAS dataset to an ISPF table.

**Syntax of PROC PUTSPF:**

```
PROC PUTSPF TAB = spf-table
   DATA = sas-dsn
   LIB = spf-output-library
   LINE = nnnn
   TEMP
   REPLACE
   INSERT
   ;
   VAR variables;
   KEY variables;
```

You can choose specific variables in the VAR statement and keys for the table in the KEY statement.

In the following specification a SAS dataset is created, which will be copied to an ISPF table called TAB001. This is the easiest way to use PROC PUTSPF.

```
125 DATA TABSET;
126   TYPE = 21;
127   MARK = 'BASF';
128   QUALITY = 'LOW NOISE';
129   OUTPUT;
130   TYPE = 22;
131   MARK = 'SONY';
132   QUALITY = 'LOW NOISE';
133   OUTPUT;
NOTE: DATA WORK.TABSET HAS 2 OBSERVATIONS AND 3 VARIABLES.
```

```
134 PROC PUTSPF DATA = TABSET TAB = TAB001;
NOTE: PROC PUTSPF VERSION 3.0 ISS HEIDELBERG
NOTE: SPF TABLE TAB001 HAS 2 OBSERVATIONS AND 3 VARIABLES.
```

The other way from ISPF to SAS is done by PROC GETSPF.
Syntax of PROC GETSPF:

PROC GETSPF TAB = spf-table
    OUT = sas-dsn
    VAR = spf-variables
    LIB = spf-input-library
    TEMP
    ;

The following example fetches an ISPF table to SAS:

135 PROC GETSPF TAB = TAB001
136 OUT = SASTAB;

NOTE: PROC GETSPF VERSION 1.0 ISS HEIDELBERG
NOTE: DATA WORK.SASTAB HAS 2 OBSERVATIONS AND 3 VARIABLES.

The procedures PUTSPF and GETSPF are only able to manage ISPF tables. But sometimes all ISPF services are needed in the SAS datastep. So ISPSAS was created as a general SAS-ISPF-interface function in SAS datasteps. The ISPSAS function has the same purpose as SAS/DMI.

Syntax of ISPSAS:

RC = ISPSAS ('ISPF service', additional parameters);

150 DATA _NULL_;
151     LENGTH CMD $ 8;
152     RC1 = ISPSAS ('DISPLAY', 'MENU01');
153     RC2 = ISPSAS ('VCOPY', 'ZCMD', '8', CMD, 'MOVE');
154     IF CMD = 'EDIT' THEN
155         RC3 = ISPSAS ('SELECT', '12', 'PGM(TABEDIT)');
156     IF CMD = 'DISPL' THEN
157         RC4 = ISPSAS ('DISPLAY', 'PAN02');

Datastep to display an ISPF panel and call a selected function.

All ISPF tables in the dialog are managed by a general program called TABLE EDITOR. It has a set of line commands like the SAS program editor and also a set of global commands like FIND, SORT etc.
There are a lot of line commands described in the head of the panel which have other meanings or are not included in the standard. These special line commands like GH for GCHART can be defined per user exits. Special global commands and profile tables can be defined in the same way.

**DS/DB Enhancements**

To get a better performance at the data retrieval we used the INFOTECH data base enhancement with the procedures DBUILD and DBSEARCH. Using these procedures a direct access on SAS datasets with keys is possible.

**ISPF versus SAS/AF**

SAS/AF is a good tool for a simple dialog and for users who want to use SAS only.

But for a complex system like MDB/VIA you need things like table handling, a good test facility, high flexibility, performance in menus and input verification.

These are some of the criteria why we used ISPF and not SAS/AF for the MDB/VIA dialog.