

CROMEMCO

DATA BASE MANAGEMENT SYSTEM

User's Manual

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Part No. 023-0063

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THE CROMEMCO DATA BASE MANAGEMENT SYSTEM

INTRODUCTION

One of the most wide spread applications of computers is for storing, sorting, sifting, and retrieving information from a data base. In industry, the data base may take the form of mailing lists, personnel records, inventory and purchasing records, customer lists, accounts receivable entries, or a general ledger chart of accounts. In the professions, important data bases may include patient histories, client information, journal references, or student records. In personal use, the data base may consist of a Christmas card mailing list, birth dates of relatives, or stamp or coin collection information. In all these instances quick access to specific information in the data base can be very important.

The Cromemco Data Base Management System (DBMS) is unique in that it is both an easy to use and yet extremely powerful system for both storing and retrieving information from your Cromemco computer system. Technically speaking, the Cromemco DBMS uses a powerful multi-keyed indexed sequential access method for organizing the data base. What this means is that precisely the information you need can be extracted from the data base quickly and conveniently.

For example, consider the case of company personnel records stored on a Cromemco computer system. The DBMS allows you quickly to obtain any of the following information:

- 1) An alphabetical listing of employees with their phone numbers;
- 2) A list of employees hired after January 1, 1978;
- 3) A list of minority employees;
- 4) The name of the employee whose license plate number is 475 DXW;
- 5) A list of employees by date of hire;
- 6) A list of employees in the Sales Department.

There are three new terms with which you must be familiar when working with the Cromemco DBMS. These are data file, record, and field. Continuing with personnel records as an example, the entire set of information about all employees is called the data file. All information about any specific employee is called a record. Each element of a record (e.g., date of hire) is called a field. These terms are illustrated on the following page:

Data File

Record

Field { Name	Arthur Aardvark
Street	2300 El Camino Real
City, State	Palo Alto, CA
Phone	279-8763
License No.	749STJ
Starting Date (yymmdd)	780117
Department No.	741
Minority (y/n)	y
Name	Barry Bingham
Street	4700 Elm
City, State	Mountain View, CA
Phone	479-8237
License No.	476JBE
Starting Date (yymmdd)	720715
Department No.	796
Minority (y/n)	n
.	
.	
Name	Zila Zongfield
Street	2745 Deadwood
City, State	Los Altos, CA
Phone	376-2784
License No.	760ABC
Starting Date (yymmdd)	780509
Department No.	796
Minority (y/n)	n

There are nine operations that can be carried out by the Cromemco DBMS. These are:

- 1) To create a new data base system;
- 2) To examine a system layout;
- 3) To enter new data into the data base;
- 4) To create sort files;
- 5) To display, change, and delete records;
- 6) To do a data base inquiry;
- 7) To make modifications to the master;
- 8) To change master file & drive assignment;
- 9) To print mailing labels.

Each of these operations is described in the following chapters.

CHAPTER 1

<u>FUNCTION</u>	<u>OPERATION</u>
→ 1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

To begin using the Cromemco DBMS software: (1) reset your computer, (2) load the DBMS diskette into drive A, and (3) depress carriage-return on your terminal. Since your DBMS diskette is supplied with a STARTUP file, the DBMS software will automatically boot up and display the list of nine DBMS functions on your CRT screen.

To use the Cromemco DBMS for your own data base management use you must first create the structure of your system. The structure of the data base is stored on what is called a MASTER file on one of your computer diskettes. This master file contains the following information:

- 1) A description of each field of data;
- 2) Whether the data is numerical or alphabetical;
- 3) The number of characters in each field;
- 4) The ways that you will want to order or "sort" the data.

Of the nine Cromemco DBMS functions, the first is used to create the structure of a new data base as a MASTER file on your computer diskette. Type the number "1" in response to the DBMS prompt "FUNCTION DESIRED:" in order to use this function.

Before creating your MASTER file you should first define the structure of your data base by filling out a Data Base Definition Worksheet. A copy of such a worksheet is included as an Appendix to this manual. On this worksheet fill out the description of each data field, note whether each field contains numeric data (type N) or alphabetical data (type A), and specify the width of each field (i.e., the maximum number of characters of data in each field). The only distinction made by the computer between type N data and type A data is that type A data is left justified while type N data is right justified. Also on the worksheet fill out the ways that you will want to sort the data. The records in your data base may be sorted in alphabetical order of any type A field or numerical order of any type N field. Note that multiple fields may also be used to specify a sort. This allows, for example, a mailing list to be arranged alphabetically by

state, and within each state alphabetically by city, and within each city alphabetically by customer name.

You are now ready to use FUNCTION 1 to transfer the information from your worksheet to the computer MASTER file. First the computer prompts you to specify which disk drive (A, B, C, or D) the MASTER file is to reside on:

DISK DRIVE TO CREATE SYSTEM ON:

You respond by typing A, B, C, or D. Note that there must be a diskette inserted into the drive that you specify and the diskette must not be write protected. For an 8" diskette with a write-protect notch, write protection is disabled by covering this notch with a piece of opaque tape. For a 5" disk just the opposite holds. Write protection on a 5" diskette is disabled by removing the opaque tape covering the write-enable notch on the diskette jacket.

After selecting the disk drive for the MASTER file you must make up a name for the file using a maximum of 8 characters. DBMS prompts you for this information as so:

ENTER THE NEW MASTER FILE NAME (8 CHARACTERS MAX)

The computer will automatically append the extension .MST to the file name that you provide.

Next you will be prompted to enter from your worksheet the description of each data field followed by a comma, the

type of field (A or N), and the field width. Type END after you have completed providing this information.

Finally the system will prompt you for names for the disk files that hold the actual data base and the sort keys. The system will automatically append the extension .DAT to the name you enter for the data base file name. The extension .SRT is appended to the sort file names.

You have now finished laying the ground work for your data base system. The computer will now display the function selection list so that you can select the next operation. Function 2, for example, will let you examine the system layout that you have just entered into the computer. Function 3 will let you enter data into your data base.

CHAPTER 2

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
→ 2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

Selecting Function 2 lets you examine the structure of a data base system as specified in a MASTER file. The system will prompt you for the name of the MASTER file that you want to examine. Do not include the extension ".MST" when specifying this file, as this will automatically be appended by the system. An example of a system layout for a personnel data base is shown below:

SYSTEM SPECIFICATIONS FOR SYSTEM --MG.MST
DATA FILE : MG.DAT

<u>FIELD #</u>	<u>DESCRIPTION</u>	<u>TYPE</u>
1	NAME	A40
2	ADDRESS1	A30
3	ADDRESS2	A30
4	PHONE	N12
5	SDATE	N6
6	TITLE	A25
7	DEPT	N3
8	EMPLOYEE NO	N4
9	TDATE	N6

<u>SORT #</u>	<u>FIELDS</u>	<u>FILE NAME</u>
1	NAME	MG1.SRT
2	SDATE	MG2.SRT
3	DEPT BY NAME	MG3.SRT
4	TITLE BY NAME	MG4.SRT

As another example of a system layout, here is one for an inventory system:

SYSTEM SPECIFICATIONS FOR SYSTEM -- INVEN.MST
DATA FILE : INVEN.DAT

<u>FIELD #</u>	<u>DESCRIPTION</u>	<u>TYPE</u>
1	PART NUMBER	A9
2	DESCRIPTION	A25
3	UNIT COST	N8
4	SELLING PRICE	N8
5	QUANTITY ON HAND	N6
6	QUANTITY ON ORDER	N6
7	REORDER POINT	N6
8	REORDER QUANTITY	N6
9	PRIMARY VENDOR	A15
10	SECOND SOURCE VENDOR	A15
11	QTY USED CURRENT PERIOD	N6
12	QTY USED YEAR-TO-DATE	N6
13	LOCATION (SHELF NUMBER)	N3

<u>SORT #</u>	<u>FIELDS</u>	<u>FILE NAME</u>
1	PART NUMBER	INV1.SRT
2	DESCRIPTION	INV2.SRT
3	PRIMARY VENDOR BY PART NUMBER	INV3.SRT
4	LOCATION (SHELF NUMBER) BY PART NUMBER	INV4.SRT

After the system specifications are displayed you can return to the function selection list by depressing RETURN on your terminal keyboard. If, however, you wish to examine the system specifications of another data base, depress ESCAPE to be prompted as so:

MASTER FILE LAYOUT SPECIFICATIONS
VERSION- 00.02

MASTER FILE NAME :

If the master file is on a different disk drive you can specify the drive that you wish to search, for example:

MASTER FILE NAME : B:MG

will search for the file MG.MST on drive B.

CHAPTER 3

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
→ 3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

Function 3 is used to enter new data into your data base. You will automatically be prompted, one field at a time, when entering data as shown below:

PART NUMBER	A9	:? 746352987
DESCRIPTION	A25	:? RESISTOR, 250 OHMS
UNIT COST	N8	:? .04
SELLING PRICE	N8	:? .12
QUANTITY ON HAND	N6	:? 1500
QUANTITY ON ORDER	N6	:? 2000
REORDER POINT	N6	:? 1600
REORDER QUANTITY	N6	:? 2000
PRIMARY VENDOR	A15	:? ELMAR
SECOND SOURCE VENDOR	A15	:? HAMILTON-AVNET
QTY USED CURRENT PERIOD	N6	:? 500
QTY USED YEAR-TO-DATE	N6	:? 8700
LOCATION (SHELF NUMBER)	N3	:? 279

If you make a typing error while entering data you may back up within a record to correct the error by typing END instead of data following a question mark. This will cause the system to back up by one field and prompt you again. Once you have finished entering your data you can return to the function selection list by typing END following the

prompt for the first field of a record.

As you enter new data into the data base this data is stored in your ".DAT" data file and sort keys are automatically ordered and stored in your ".SRT" files. These files are updated after every new record of data is entered. As more and more data is entered the system will become increasingly sluggish in prompting you for a new record, since it takes increasingly longer to reorder the sort files. If you are entering much data into the system and the time delay between successive record entries becomes objectionable, there are two ways the delay can be greatly shortened. One way is to occasionally recreate the sort files using Function 4. When sort files are recreated in this way gaps are automatically inserted in the sort files to speed the rearrangement of these files after each new data entry (see Chapter 4 for more details). The second way is to use Function 7 to delete your sort files. There is then no sort file management overhead while entering new data. After the data is entered you can recreate your sort files by using Function 7 followed by Function 4.

CHAPTER 4

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
→ 4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

A powerful feature of the Cromemco DBMS software is that the multi-keyed sort files are automatically maintained as data is added, deleted, or changed. However if new sort files are added to the MASTER using Function 7 or if a large number of changes, deletions, or additions have been made to the data base and you wish to clean up the sort files, then sort files can be recreated using Function 4.

After selecting Function 4 the system will remind you of the current disk drive and MASTER file as shown below:

```
STANDARD FULL SORT MODULE
MASTER FILE -- A:INVEN.MST
```

In this case the MASTER file named INVEN on drive A is the current MASTER. If you wish to recreate the sort files for some different MASTER you must first run Function 8 to change the default MASTER file.

After letting you know the name of the current MASTER the system will ask you if you want to continue with Function 4 by asking:

CONTINUE?

In response to this question you may respond NO if you wish to abort Function 4 and return to the function selection list. The other two possible answers to this question are BLOCK or YES.

When sort files are created, the sort keys are grouped in blocks with gaps between blocks. These gaps allow the sort files to be updated much more quickly when changes are made to the data base than if there were no gaps. The gaps do, however, require disk storage space. If you respond to the "CONTINUE?" question with a YES the sort files will automatically be created with groups of five records per block and a space of one record between blocks. If you want a different arrangement, or if you want to change the disk drive that is used for scratch files during the course of sort file creation, then you should respond BLOCK to the question to continue.

If you respond BLOCK you will be asked by the system how many records per block and how many spare records per block you desire. For fast system update time you will want to choose fewer records per block and more spare records per block. On the other hand if you want to conserve on disk

memory storage requirements you will want to choose a large number of records per block with few or no spares. You will also be asked which disk drive to use for scratch files. If the current disk is full this lets you store these temporary files on some other diskette. Be sure that the diskette used is not write-protected.

Whether you respond YES or BLOCK you will next be asked what sort files you wish to create, as so:

WHICH SORT :

If you wish to update all the sort files respond ALL. To update only one particular sort file, simply respond with the number of that sort.

CHAPTER 5

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
→ 5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

If you ever want to change, delete, or display the records in your data file, use Function 5.

After selecting Function 5 you will be prompted:

SORT DESIRED :

You may respond with just the sort number if you wish to list the entire data base in sorted order. However if you are not interested in listing every record in the data base, you can follow the sort number by delimiters. Suppose, for example, that sort 2 is ordered by a six-digit data field (yyymmdd). To list all records in chronological order you would respond:

SORT DESIRED : 2

If, on the other hand, you wanted to list all records data since January 1, 1978 you would respond:

SORT DESIRED : 2,780101

And if you wanted to list all records dated between January 15, 1973 and November 25, 1978 you would type:

SORT DESIRED : 2,730115*781125

In other words a sort may be specified either without delimiters, or with only a lower bound, or with both a lower bound and an upper bound.

Once you have selected the desired sort, the data base records will be displayed, one at a time, on your CRT display. After each record is displayed you will be prompted:

CONTINUE?:

to which there are a number of different responses you can make. If you do wish to continue to see the next record of data in sequence, simply depress the RETURN key on your terminal. (Alternately you could type the response YES followed by the carriage-return). If instead of seeing the next record you wish to see the previous record of the sort, type B followed by a carriage return. The B can be followed by the number of records you wish to back up; B17 for example will back up 17 records. To go forward a number of records use the letter F; F7 for example will go forward 7 records. You can also type C to change a record or D to delete a record from a data base. Type M to select a new MASTER file. Type NO if you want a different sort, and type END if you

want to return to the function selection list. These options are summarized below:

In response to the prompt CONTINUE?:

Carriage return	Displays the next sequential record.
B	Displays the previous record.
Bnn	Backs up nn records and displays the record.
Fnn	Goes forward nn records and displays the record.
C	Allows you to change the record.
D	Deletes the record currently being displayed.
NO	Lets you select a different sort.
END	Terminates Function 5 and displays the function selection list.
M	To change Master Files.

CHAPTER 6

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
→ 6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

Function 6 allows you to specify a sort and display records in a manner similar to that of Function 5, but with two important new options:

- 1) You can specify that only certain fields of the records be displayed, and
- 2) You can specify rejection criteria to exclude certain records from display.

Suppose, for example, that you wish to display only fields 1 and 3 of each record. Furthermore you do not want to display these fields of a record if the number in field 3 is greater than 600. This can be specified as shown below:

ENTER THE NUMBER OF SORT YOU WANT : 1

GIVE FIELD NUMBERS OF THOSE FIELDS YOU WANT TO SEE
TYPE Ø WHEN NO MORE FIELDS DESIRED

FIELD ? 1
FIELD ? 3
FIELD ? Ø

DO YOU WANT TO SPECIFY REJECTION CRITERIA (Y/N) ?Y

REJECTION CRITERIA (TYPE /END/ TO STOP).

YOU MAY REJECT CERTAIN RECORDS (I.E. THEY WON'T BE PRINTED
HERE), BY SPECIFYING THE FIELD YOU WANT CHECKED AS A BASIS
FOR REJECTION, A RELATIONAL OPERATOR (>, <, =, <>, <=, >=),
AND THE VALUE TO BE USED AS A BASIS FOR REJECTION. YOU MAY
SPECIFY UP TO FIVE SETS OF REJECTION CRITERIA.

ENTER THE FIELD (BY FIELD NUMBER IN MASTER FILE) : 3

ENTER THE RELATIONAL OPERATOR (<, >, =, <> , <=, >=) : >

ENTER THE COMPARISON QUANTITY : 600

ENTER THE FIELD (BY THE FIELD NUMBER IN MASTER FILE) : END

At this point the data specified above will be displayed. Be
sure to depress CNTRL-P on your keyboard if you want the
output to go to the printer. CNTRL-S can be used to stop
listing at any time.

Once all data is listed the following message will be
displayed:

OUT OF DATA

CONTINUE?:

In response to the prompt type YES for another data base
inquiry or NO to return to the function selection list.

CHAPTER 7

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
→ 7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

Function 7 is simply used to change MASTER file. After selecting Function 7 you may choose what modification you wish to make as shown below:

THE CURRENT MASTER FILE IS : A:MG.MST

YOU MAY MAKE THE FOLLOWING MODIFICATIONS (TYPE /END/ TO STOP):

0	TO RETURN TO THE MONITOR
1	CHANGE THE DESCRIPTION OF AN EXISTING FIELD
2	ADD A NEW SORT (UP TO 20 SORTS ALLOWED)
3	CHANGE AN EXISTING SORT
4	DELETE AN EXISTING SORT
5	CHANGE DATA FILE DRIVE ASSIGNMENT

WHICH MODIFICATION DO YOU WISH TO MAKE?

To return to the function selection list type 0 in response to this prompt or type END after the modification has been made.

CHAPTER 8

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
→ 8	TO CHANGE MASTER FILE & ASSIGN DRIVE
9	TO PRINT MAILING LABELS

If at any time while you are using the Cromemco DBMS package you wish to switch from one MASTER file to another, perhaps on a different disk, this can be accomplished by selecting Function 8.

Function 8 prompts you for the MASTER file name you desire and the disk drive (A, B, C, or D). After answering these questions DBMS automatically returns to the function list.

CHAPTER 9

<u>FUNCTION</u>	<u>OPERATION</u>
1	TO CREATE A NEW DATA BASE SYSTEM
2	TO EXAMINE A SYSTEM LAYOUT
3	TO ENTER NEW DATA INTO THE DATA BASE
4	TO CREATE SORT FILES
5	TO DISPLAY, CHANGE, & DELETE RECORDS
6	TO DO A DATA BASE INQUIRY
7	TO MAKE MODIFICATIONS TO THE MASTER
8	TO CHANGE MASTER FILE & ASSIGN DRIVE
→ 9	TO PRINT MAILING LABELS

Since the printing of mailing labels from a customer list or membership list is one important use of a data base system, this special facility is included in the Cromemco DBMS system. To use Function 9 for this purpose the first seven fields and each record of data base must contain the following information:

Field 1	NAME
Field 2	ADDRESS LINE 1
Field 3	ADDRESS LINE 2
Field 4	CITY
Field 5	STATE (TWO CHARACTERS)
Field 6	ZIP CODE
Field 7	COUNTRY

Once Function 9 is selected you will be prompted to provide information on the labels you wish to print in order to accomodate any of a variety of standard self-adhesive mailing label forms. If you wish to type directly on envelopes, you have the option of pausing after each label is printed so that a new envelope can be inserted into the printer.

CAVEAT

No computer system yet designed can be guaranteed free of failure. Failure can be caused by:

- 1) Hardware failure;
- 2) Software failure; or
- 3) Operator error.

When you are using a computerized data base management system to maintain data bases that are important to you, it is essential that you keep back up copies of the data base. These back up copies should be maintained both on write-protected diskettes and on printed (hard-copy) listings. To make a backup diskette you can type END after the function selection list is displayed in order to return to CDOS. From CDOS you can use the XFER command to transfer your data files to a backup diskette.

APPENDIX

DATA BASE DEFINITION WORKSHEET

MASTER FILE _____ .MST

DATA FILE _____ .DAT

<u>FIELD</u>		<u>TYPE</u> A or N	<u>WIDTH</u>
1.	-----	'	-----
2.	-----	'	-----
3.	-----	'	-----
4.	-----	'	-----
5.	-----	'	-----
6.	-----	'	-----
7.	-----	'	-----
8.	-----	'	-----
9.	-----	'	-----
10.	-----	'	-----
11.	-----	'	-----
12.	-----	'	-----
13.	-----	'	-----
14.	-----	'	-----
15.	-----	'	-----
16.	-----	'	-----
17.	-----	'	-----
18.	-----	'	-----
19.	-----	'	-----
20.	-----	'	-----
21.	-----	'	-----
22.	-----	'	-----
23.	-----	'	-----
24.	-----	'	-----
25.	-----	'	-----

SORTS DESIRED

FIELDS (IN ORDER)

SORT FILE NAME

1.	_____'_____'_____'_____	_____ .SRT
2.	_____'_____'_____'_____	_____ .SRT
3.	_____'_____'_____'_____	_____ .SRT
4.	_____'_____'_____'_____	_____ .SRT
5.	_____'_____'_____'_____	_____ .SRT