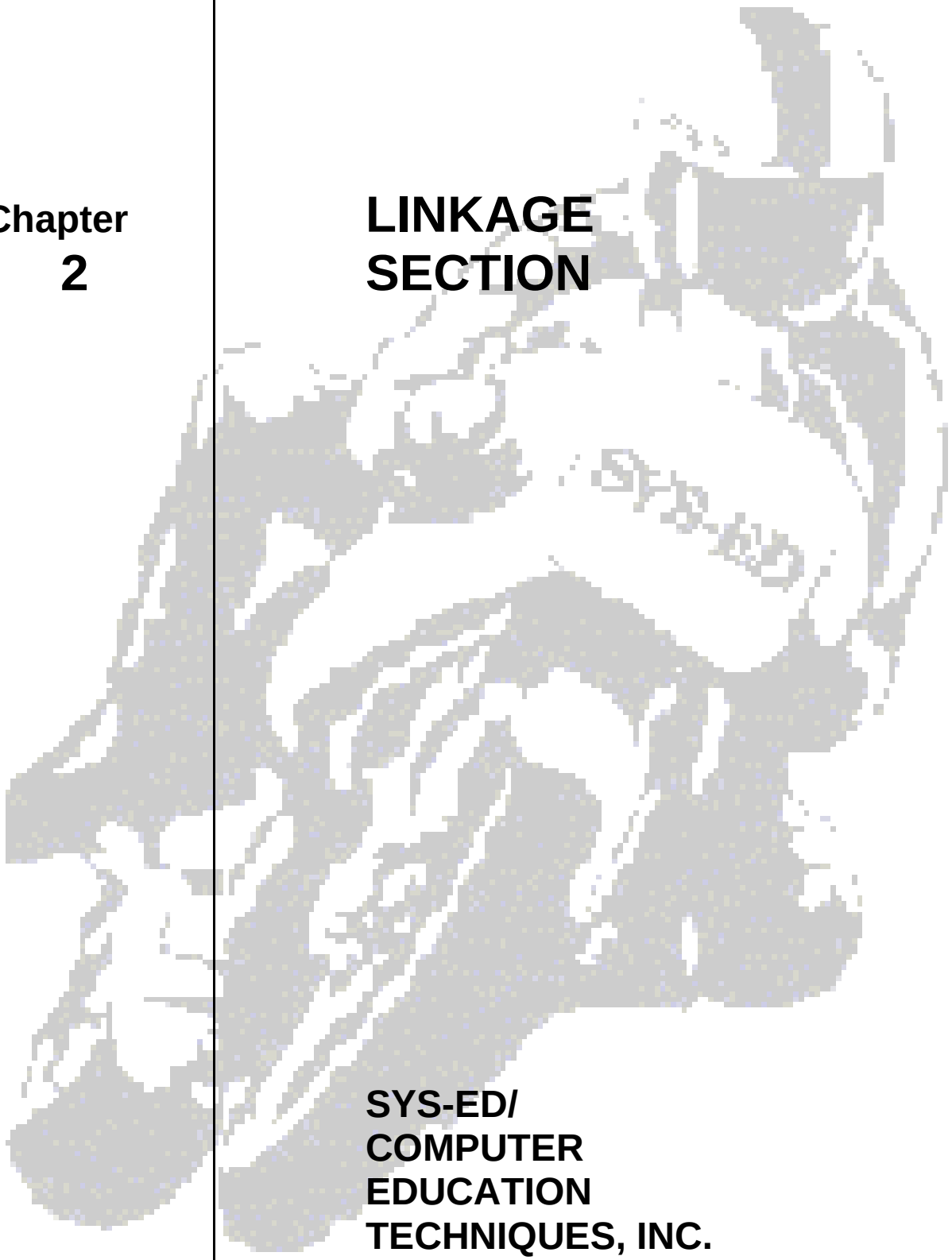
Chapter
2

LINKAGE SECTION



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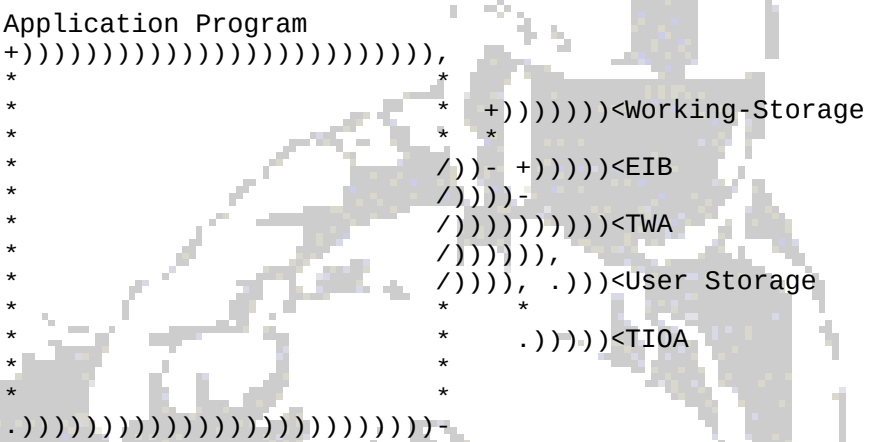
Objectives

You will learn:

- How to pass the DFHCOMMAREA to a COBOL program.
- The differences between VS COBOL and VS COBOL II.
- Addressability issues.

1 Use of Linkage Section

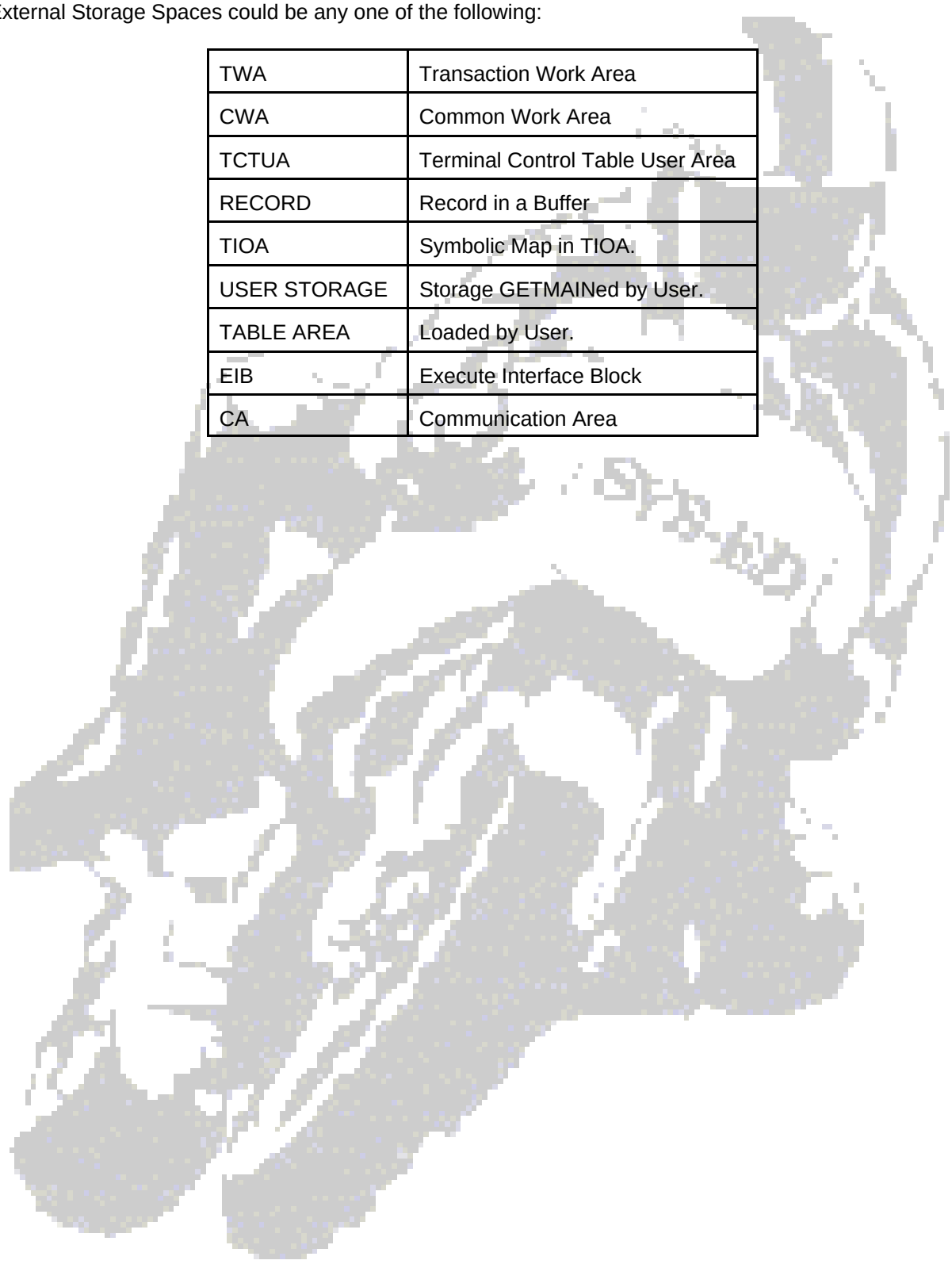
Linkage section is used to establish the addressability to the external storage spaces.



2 External Storage Spaces

External Storage Spaces could be any one of the following:

TWA	Transaction Work Area
CWA	Common Work Area
TCTUA	Terminal Control Table User Area
RECORD	Record in a Buffer
TIOA	Symbolic Map in TIOA.
USER STORAGE	Storage GETMAINed by User.
TABLE AREA	Loaded by User.
EIB	Execute Interface Block
CA	Communication Area



3 Prior to VS COBOL II

```
LINKAGE SECTION.

01 DFHEIBLK.
      .
      .
01 DFHCOMMAREA.
      .
      .
01 BLL-CELLS.

      02    REQ-PTR     PIC S9(8) COMP.
      02    T-PTR       PIC S9(8) COMP.
      02    C-PTR       PIC S9(8) COMP.
      02    TC-PTR      PIC S9(8) COMP.
      02    R-PTR       PIC S9(8) COMP.
      02    M-PTR       PIC S9(8) COMP.
      02    U-PTR       PIC S9(8) COMP.

01 TWA-DESC.
      .
      .
01 CWA-DESC.
      .
      .
01 TCTUA-DESC.
      .
      .
01 REC-AREA.
      .
      .
COPY MAPSETX.
      .
      .
01 USER-AREA.
      .
      .
      .
```

4 VS COBOL II

No pointer definitions are required in the Linkage Section.

Instead the Address special register will contain the address.

```
LINKAGE SECTION.

01 TWA-DESC.
      .
      .
01 CWA-DESC.
      .
      .
01 TCTUA-DESC.
      .
      .
01 REC-AREA.
      .
      .
COPY MAPSETX.
      .
      .
      .
01 USER-AREA.

      .
      .
      .
```

Storage spaces do not have to be in special order.

5 Establishing Addressability

Addressability to the external storage must be established before the storage can be used in the program.

Addressability to the external storages is established:

- By using ADDRESS and ASSIGN commands.
- By using the SET option of READ, LOAD, RECEIVE, READQ and GETMAIN commands.

5.1 Addressability

Addressability to the CWA, TWA, and TCTUA is established by use of the ADDRESS command.

```
EXEC CICS ADDRESS
      CWA(C-PTR)
      TWA(T-PTR)
      TCTUA(TC-PTR)
END-EXEC.
```

However, make sure that the CWA, TWA, and TCTUA exist and that they have been defined to the required lengths, by the ASSIGN command.

```
EXEC CICS ASSIGN
      CWALENG(C-LENG)
      TWALENG(T-LENG)
      TCTUALENG(TC-LENG)
END-EXEC.
```

5.2 Addressability Using the Set Option

Record Area	READ command.
Symbolic Map Area	RECEIVE command.
Queue Area	READQ command.
User Storage	GETMAIN command.
Loaded Table	LOAD command.

5.3 Addressability Examples

Example: VS COBOL II

```
       WORKING-STORAGE SECTION.

       01 C-LENG          PIC S9(4) COMP.
       01 T-LENG          PIC S9(4) COMP.
       01 TC-LENG         PIC S9(4) COMP.

       LINKAGE SECTION.

       01 DFH-BLL-CELLS.

             05 FILLER          PIC S9(8) COMP.
             05 C-PTR           PIC S9(8) COMP.
             05 REC-PTR         PIC S9(8) COMP.

       01 CWA-AREA.

             05 C-SSNO ...
             05 C-CDRATE ...
                   .
                   .
                   .
```

```
01 REC-AREA.

      05 CUST-NO ...
      05 FILLER ...
      05 CUST-NAME ...
      05 FILLER ...
      05 CUST-ADDRESS ...

PROCEDURE DIVISION.
      .
      .
      .
      EXECUTE CICS HANDLE ... END-EXEC.

      EXECUTE CICS ASSIGN
                  CWALENG(C-LENG)
      END-EXEC.

      IF C-LENG NOT = 100 PERFORM WRONG-CWA.

      EXECUTE CICS ADDRESS
                        CWA(C-PTR)
      END-EXEC.
            .
            .
            .
      EXEC CICS READ
                        DATASET('SEDFILE')
                        SET(REC-PTR)
                        .
                        .
                        .
      END-EXEC.
```

```
WORKING-STORAGE SECTION.

      .
      .
      .

LINKAGE SECTION.



01 REC-AREA.

      04 CUST-NO ...
      04 FILLER  ...
      04 CUST-NAME ...
      04 FILLER  ...
      04 CUST-ADDRESS ...

01 CWA-AREA.

      04 C-SSNO  ...
      04 C-CDRATE ...
           .
           .
           .

PROCEDURE DIVISION.

      EXEC CICS ADDRESS
            CWA(ADDRESS OF CWA-AREA)
      END-EXEC.

      EXEC CICS READ
            DATASET('SEDFILE')
            SET(ADDRESS OF REC-AREA)
      END-EXEC.
```

6 Service Reload Statement

In OS/COBOL or VS/COBOL, using optimizer options, every time an address is stored in a BLL cell, the SERVICE RELOAD COBOL statement must be executed to reestablish the addressability.

SERVICE RELOAD statement is not required in VS/COBOL II.

For example:

```
           EXEC CICS HANDLE
                       LENGERR (RLEN-ERR)
           END EXEC.


           EXEC CICS READ
                       DATASET ('SEDFILE')
                       SET(REC-AREA)
                       .
                       .
           END EXEC.
           SERVICE RELOAD REC-AREA.
                       .
                       .
                       .
     RLEN-ERR.

           SERVICE RELOAD REC-AREA
```