PC BASED INFORMATION RETRIEVAL SYSTEM FOR REMOTE SENSING LITERATURE AND DATA

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ABSTRACT

The need for improved information systems in recent years has become critical because of the rapid growth in size and complexity of knowledge as a whole and remote sensing in particular.

At the Center of Studies in Resources Engineering,I.I.T Bombay, a PC based information system is being developed to facilitate easy storage and retrieval of literature and data products related to area of remote sensing. This paper describes the present status of the work.

This paper describes the present status of the two systems that are being developed.

Keywords : Data base ,Data dissemination , Literature , Remote sensing , Retrieval

1. INTRODUCTION

In many respects, remote sensing can be thought as a reading process. Remotely sensed data is collected from sensors onboard satellites, aircrafts etc and is analyzed to obtain information about objects, areas, or phenomenon being investigated. This can be compared to our ability to recognise letters forming words on a printed page. Beyond this, we can recognize words from sentences, and interpret the information that the sentence conveys. Thus, Data, when processed by human interpreter's brain becomes useable information.

The basic information requirements for all those involved in the use of remote sensing technology are

a) Literature on remote sensing and the area of study in perticular.
b) Remotely sensed data products available for study.

An information system for rapid retrieval of relevant data is absolutely essential for all intrested in using remote sensing techniques.

At the CSRE Reference Library, IIT, Bombay an information retrieval system for this purpose is being developed. It has two main components viz:

LIRS - Literature Information Retrieval System related to the literature on remote sensing availabe in CSRE Reference Library in printed form like books, reports, proceedings etc.

NRDIS - Natural Resources Data Information System related to the retrieval of information from remotely sensed data products like satellite imageries,computer compatible tapes, aerial photographs, toposheets and radar data etc.

2. OVERVIEW OF THE SYSTEM

The software is being developed under the FoxBase environment,a standard RDBMS package.

2.1 Software requirements of the system

Following are the miinimum software requirments of the system

a) MSDOS operating system version 3.xx or higher

b) As stated earlier, The software has been written under Foxbase Environment. So Foxbase compiler must be present on the PC and should be placed in the PATH so that it can be accessed by the system.

c) Number of files specified in CONFIG.SYS file should be atleast 36.

2,2 Minimum hardware requirement

Following are the minimum hardware requirments of the system.

a) PC XT/AT with atleast 640 KB RAM.
b) Hard disk drive.
c) One floppy drive.
d) Color/Monochrome monitor.

3. ORGANISATION OF THE SYSTEM

As stated earlier the system has two major components viz NRDIS and LIRS for maintaining information regarding dara products and literature respectively. Each component has again been subdivided into modules. Schema of the system is reffered to in fig. 1.

NRDIS has four modules to update following databases.

a) Aerial Photo database
b) Imagery database
c) Topsheet database
d) Digital products database

LIRS has five modules to update following databases

a) Books database
b) Reports database
c) Periodicals database
d) Proceedings database
e) Reprint of Papers database

Each module is provideed with four functions to update and retrive data stored in the databases. The functions are

a) Append - Add new records to the database
b) Change - Edit/Modify data stored in the database
c) Delete - Delete records from the database
d) Browse - View / Print data from the database.

Specimens of the Screens used for these modules are attached alongwith in following pages.

3.1 Natural Resources Data Information System

As stated above this component updates four databases. The structures of these databases are described in Table 1. Proper care has been taken to lable the fields so that the field names are self explainetory.

3.2 Literature Information Retrieval System (LIRS)

Literature has been classified in to five classes and data pertaing to each class,as described earlier is stored in to seperate databases. Structures of these databases are described in Table 2.

4. SCREENS

Screen 0.0 This is the opening screen of the system.

Screen 1.0 This screen lets user select the Component.

Screen 2.0 This screen Displays Main Menu of the NRDIS component.

Screen 2.1 This screen displays menu of functions for updating a selected database and is same for all databases.

Screen 2.2 This screen is used to Append/Edit/Delete records in Aerial Photo database.

screen 2.3 This screen is used to generate a query on data present in Aerial Photo database.

Screen 2.4 This screen is used to Append/Edit/Delete records in Image database.

screen 2.5 This screen is used to generate a query on data present in Image database.

Screen 2.6 This screen is used to Append/Edit/Delete records in Toposheet database.

screen 2.7 This screen is used to generate a query on data present in Toposheet database.

Screen 2.8 This screen is used to Append/Edit/Delete records in Digital Products database.

screen 2.9 This screen is used to generate a query on data present in Digital products database.

Screen 3.0 This screen Displays Main Menu of the LIRS component.

Screen 3.1 This screen displays menu of functions for updating a selected database and is same for all databases.

Screen 3.2 This screen is used to Append/Edit/Delete records in Book database.

screen 3.3 This screen is used to generate a query on data present in Book Photo database.

Screen 3.4 This screen is used to Append/Edit/Delete records in Report database.

screen 3.5 This screen is used to generate a query on data present in Report database.

Screen 3.6 This screen is used to Append/Edit/Delete records in Journals database.

screen 3.7 This screen is used to generate a query on data present in Journals database.

Screen 3.8 This screen is used to Append/Edit/Delete records in Proceedings database.

screen 3.9 This screen is used to generate a query on data present in Proceedings database.

Screen 3.10 This screen is used to Append/Edit/Delete records in Reprints database. screen 3.11 This screen is used to generate a query on data present in Reprints database.

Browse function provided in all databases allows user to build his own query condition by selecting the field,its value for comparison and connectors to bulid complex conditions. Subsequent to browsing thru the data meeting the conditions, user can optionally take hard copy of the data. A print options menu is provided for this purpose which allows user the facility of direct printing, spooling and printing or viewing spooled data.

5. APPLICATIONS

The basic aim of the sytem is to provide an interface between the information requirements of users and the availibility of data in any organisation. It also serves as an inventory of our resources. The option to print the queries has also been provided, so that they can be refered at any time. The system thus provides for a speedy , accurate and convenient retrieval of information.

The system also provides librarian an effective aid in selective dissemination of information (SDI services), one of the major objectives of today's libraries. Subject bibliographies can also be made using the system. The system also enables preparation of on-line catalogues. Various queries can be satisfied quickly without much loss of time.

6. SUMMARY

A PC based information system to facilitate storage and retrieval of remotely sensed and allied data products and lierature has been developed. The system has been in use for over a year and has been found to be user friendly and highly convenient by regular users of the system.

7. REFERENCES

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Table 1. Structure of Various Databases Used by NRDIS

Structure of Aerial Photo Database

Field Name	Type	Width
Task No	Character	8
Run No	Character	6
Date	Date	8
Lattitude	Character	20
Longitude	Character	20
Type	Character	5
Scale	Character	8
Total	Numeric	3
States	Character	60
Districts	Character	60
Towns	Character	60
Rivers	Character	60
Owner	Character	10
Issued To	Character	15

Structure of Image Database

Field Name	Type	Width
Satellite	Character	10
Path Row	Character	10
Sensor	Character	10
Product	Character	10
Date	Date	8
Time	Character	8
Bands	Character	10
Scale	Character	8
Sun Elev	Numeric	3
Sun Azi	Numeric	3
Lattitude	Character	20
Longitude	Character	20
States	Character	60
Districts	Character	60
Towns	Character	60
Rivers	Character	60
Owner	Character	10
Issued To	Character	15

Structure of Toposheet Database

Field Name	Type	Width
Sheet No	Character	8
Lattitude	Character	20
Longitude	Character	20
Restricted	Character	1
Scale	Character	8
Year	Numeric	4
States	Character	60
Districts	Character	60
Towns	Character	60

Rivers	Character	60
Owner	Character	10
Issued To	Character	15

Structure of Digital Products Database

Field Name	Type	Width
Product	Character	1
Path Row	Character	10
Platform	Character	10
Sensor	Character	10
Lattitude	Character	20
Longitude	Character	20
Geocorrect	Character	10
Density	Character	7
Capacity	Numeric	7
Total	Numeric	2
No of Files	Numeric	3
Restricted	Character	1
States	Character	60
Districts	Character	60
Towns	Character	60
Rivers	Character	60
Owner	Character	10
Issued To	Character	15

Table 2. Structure of Various Databases Used by LIRS

Structure of Book Database

Field Name	Type	Width
Access No	Character	008
Title	Character	060
Author	Character	120
Pub Place	Character	025
Pub Name	Character	040
Pub Year	Numeric	004
No Pages	Numeric	004
Rel Accno	Character	035
Notes	Character	050

Structure of Reports Database

Field Name	Type	Width
Access No	Character	008
Report No	Character	015
Title	Character	120
Author	Character	120
Corp Body	Character	120
Pub Place	Character	025
Pub Name	Character	040
Pub Year	Numeric	004
No Pages	Character	008
Rel Accno	Character	035
Notes	Character	050

Structure of Journals Database

Field Name	Type	Width
Access No	Character	008
Title	Character	120
Volume	Character	020
Pub Place	Character	025
Pub Name	Character	040
Frequency	Character	008
No Pages	Character	008
Rel Accno	Character	035
Notes	Character	050

Structure of Proceedings Database

Field Name	Type	Width
Access No	Character	008
Title	Character	120
Corp Body	Character	120
Conf Loca	Character	035
Date	Character	020
Volume No	Character	010
Pub Place	Character	025
Pub Name	Character	040
Pub Year	Numeric	004
No Pages	Character	007
Rel Accno	Character	035
Notes	Character	050

Structure of Reprints Database

Field Name	Type	Width
Access No	Character	008
Title	Character	180
Author	Character	180
Auth Orgn	Character	180
Notes	Character	050

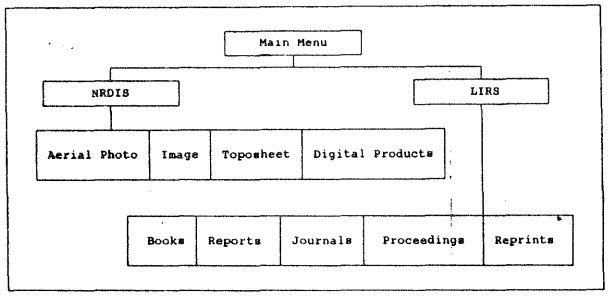
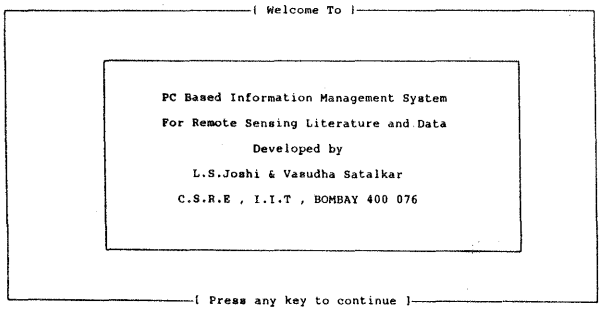


Fig.1 - Schema of the System



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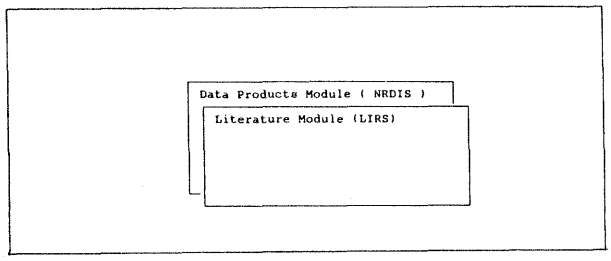

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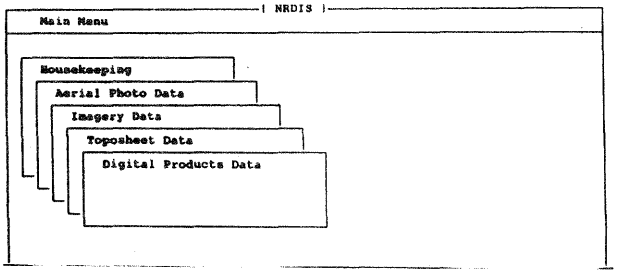

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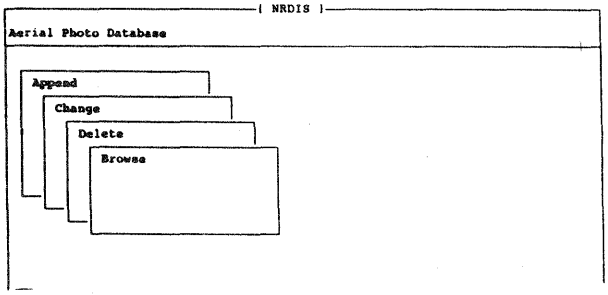

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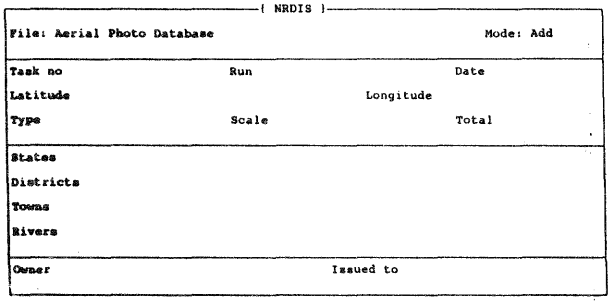

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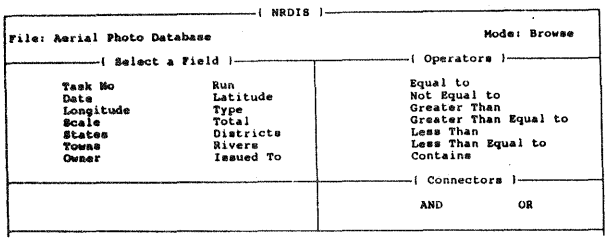

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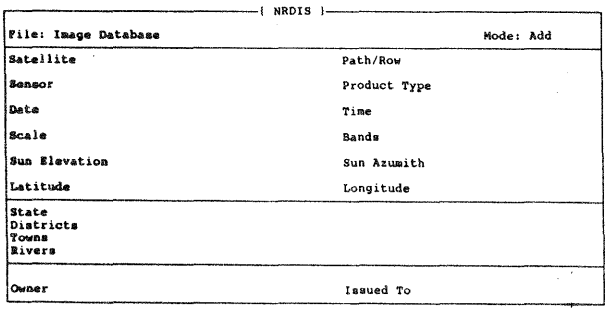

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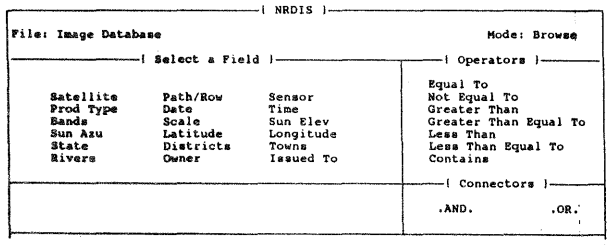

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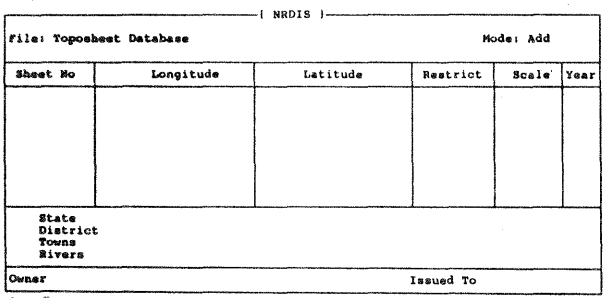

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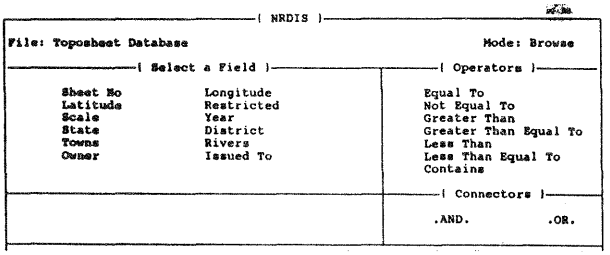

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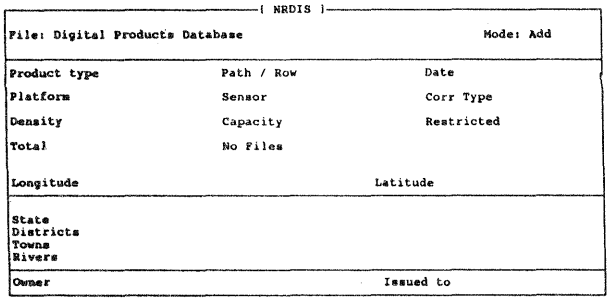

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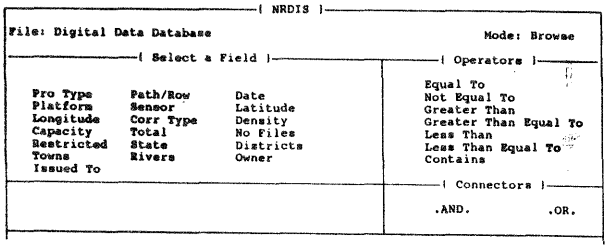

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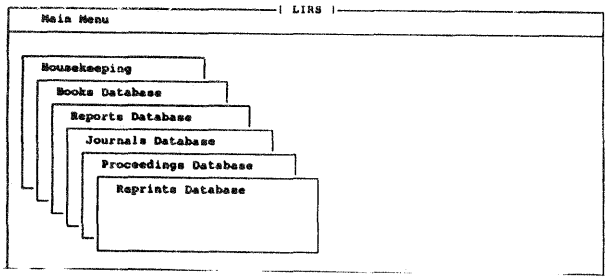

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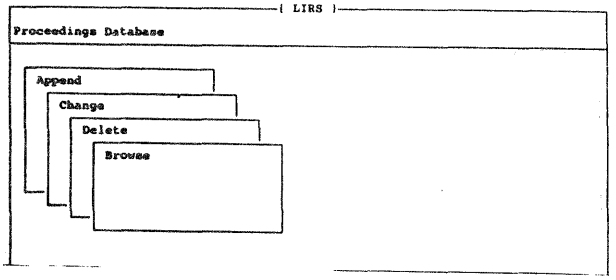

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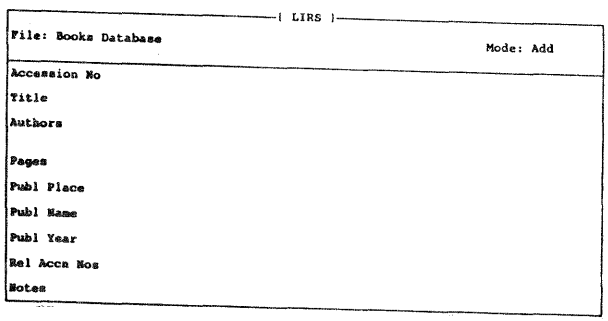

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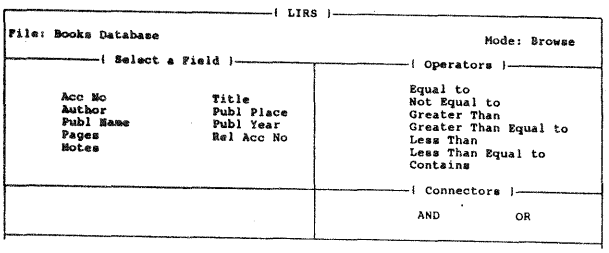

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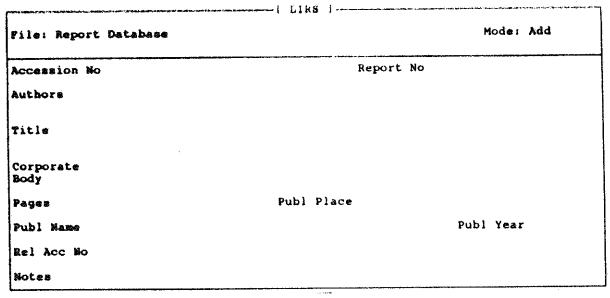

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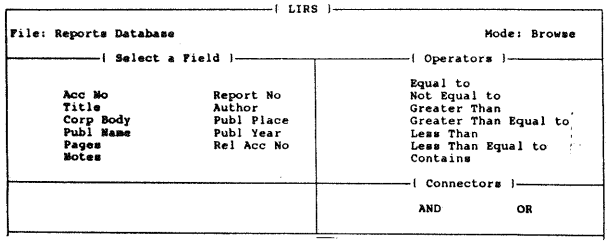

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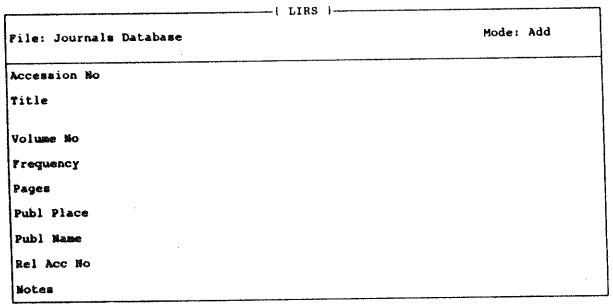

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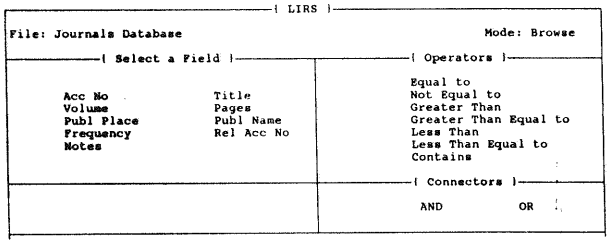

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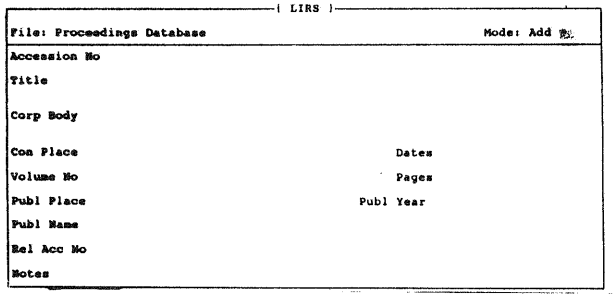

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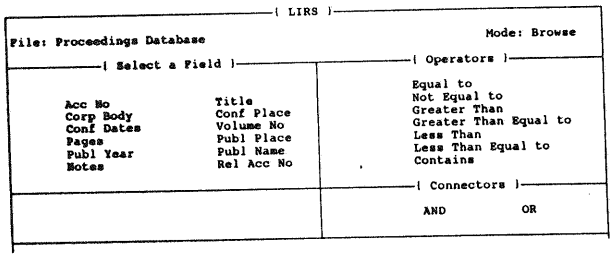

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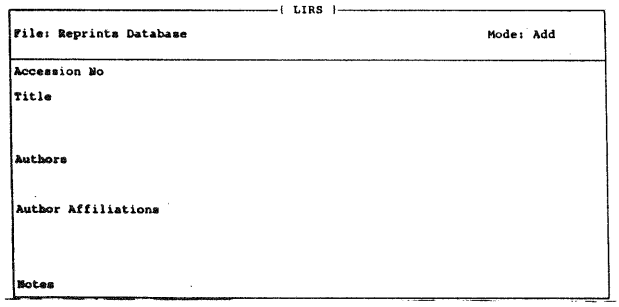

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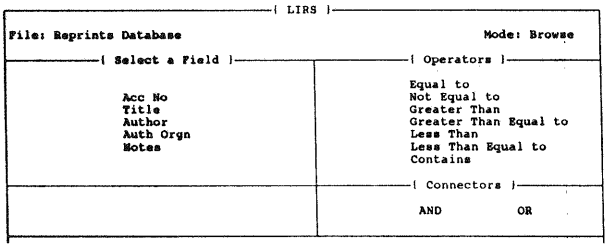

Screen 3.11