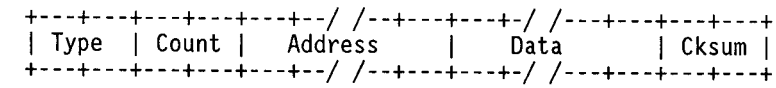
APPENDIX C

S-RECORD FILE FORMAT

An S-record file consists of a sequence of specially formatted ASCII character strings. Several fields within these records have groups of characters that must be interpreted as hexadecimal values of one to four bytes in length. An S-record will be less than or equal to 70 bytes in length. Since each S-record requires 10 to 14 bytes in fixed overhead for the type, byte count, address and checksum fields, the variable length data field may be allocated up to 60 bytes. This translates to 60 characters or 30 character pairs or bytes of data per data record from the user viewpoint.

The S-record file output by the linker is not in any particular order so the order of S-records within a file is of no significance.

The general format of an S-record is:



Field	Size (Bytes)	Contents
Type	2	ASCII bytes, whose associated characters describe the type of record (S0, S1, S2, S3, S7, S8, or S9).
Count	2	ASCII bytes whose associated characters, when paired and interpreted as a byte value, display the count of the remaining character pairs in the record.
Address	4-8	ASCII bytes whose associated characters, when paired and interpreted as a two to four byte value, display the address where the data field is to be loaded into memory.
Data	0-60	ASCII bytes whose associated characters, when paired and interpreted as byte values, represent memory loadable data or descriptive information.
Cksum	2	(Checksum) ASCII bytes whose associated characters, when paired and interpreted as a byte value, display the least significant byte of the one's complement of the sum of the byte values represented by the pairs of ASCII characters making up the count, the address, and the data fields.

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The "S0" Record

The type of record field is "S0" ($5330). The address field is unused and filled with zeros ($30303030). The user supplies the header information in the data field with the interactive user command **IDENT**. The subfields are:

Subfield	Size (Bytes)	Contents
mname	20	module name
ver	2	version number
rev	2	revision number
description	0-36	text comment

Each of the subfields is composed of ASCII bytes whose associated characters, when paired, represent one byte hexadecimal values for the version and revision numbers, or the hexadecimal values of the ASCII characters comprising the module name and description specified with the **IDENT** command.

If the **IDENT** command is not used, the filename portion of the output file the linker is creating is used as the module name; the version and revision numbers are 1; and there is no description.

The "S1" Record

The type of record field is "S1" ($5331). The address field is interpreted as a 2-byte address. The data field is composed of memory loadable data.

The "S2" Record

The type of record field is "S2" ($5332). The address field is interpreted as a 3-byte address. The data field is composed of memory loadable data.

The "S3" Record

The type of record field is "S3" ($5333). The address field is interpreted as a 4-byte address. The data field is composed of memory loadable data.

The "S7", "S8", and "S9" Records

The type of record field is "S7", "S8", and "S9" ($5337, $5338, and $5339), respectively. The address field contains the starting execution address specified by the user with the interactive user command **ENTRY**. The first entry point encountered in the object module's input is used, if an **ENTRY** command is not specified. If no starting address is encountered, the

beginning address of the first segment is used. If none of these methods is used to specify the starting address, this field is set to zeros. The address field of the "S7", "S8", and "S9" records is four, three, and two bytes, respectively. There is no data field.