

FILE CLAIM

The disk file claim mechanism provides a primitives which can be used to interlock access to disk files. The claim mechanism is ~~not~~ logically independent of all other disk system functions and requires user co-operation if it is to work properly.

Two types of 'claim' on an open disk file are allowed. The exclusive claim is issued to one user and only if there are no other outstanding claims on the file. The shared claim can be issued to any number of users at once. The intention of the claim mechanism design is that the exclusive claim be used to interlock file writing.

← The shared claim is intended to be used

to interlock file reading. Thus, several users may safely read a file using a shared claim. A successful exclusive claim, on the other hand, permits the user to read and write the file knowing that no other user can succeed in making any claim on the file.

The file claim mechanism is implemented using a doubly linked waiting queue. This claim wait queue is used to queue up claims which cannot be honored due to outstanding claims on the file. Whenever a claim is relinquished, the claim wait queue is checked. ~~and a file claim is honored~~
If the claim wait queue is non-empty,
for either a single exclusive claim is honored from

the head of the queue or a sequence of shared claims is processed from the beginning of the queue. To avoid locking up a user process in the disk system, a time limit is enforced in the claim wait queue. If a claim cannot be satisfied after a wait of (one[?] to two minutes) in the claim wait queue, the user is removed from the queue and an error is returned from the disk system claim mechanism.

← Finally, the claim wait mechanism permits only one claim per user. Any attempt to make more than one claim by a single user, will cause an error to be returned.

Release Claim

IP1 C: ECS file capability for open disk file (OR. REL

If there is a local claim on the file, the global claim status is updated to reflect the release of the claim. If the global claim status becomes zero (i.e. no claims), the claim wait queue is processed. Either one exclusive claimer or a sequence of shared claimers are awakened from the claim wait queue.

errors

E: files, E: nofil

E: files, E: NOCLAIM

C-list index too large

C-list index negative

type or options bad

no such open disk file

no local claim

Shared claim

IP1 C: ECS file capability for open disk file (OP.SCLM)

If there is no current local file claim and the file is not currently exclusively reserved, another shared claim is issued. Otherwise, the user is added to the end of the claim wait queue.

errors:

E.file, E.nofil
E.file, E.exclam
E.file, E.shclam
E.files, E.timeout

C-list index too large
C-list index negative
type or options block
no such open disk file
local exclusive claim already
local shared claim already
time out on claim wait queue

Exclusive Claim

IP1 c: res file capability for open disk file
(OP.ECLM)

If there is no current local claim and no

global claim, an exclusive claim is honored. Otherwise,

the user is added to the end of the claim wait queue

errors:

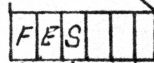
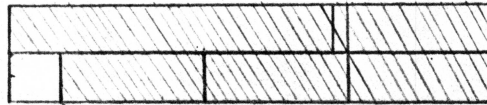
E.files, E.nofil
E.files, E.exclam
E.files, E.shclam
E.files, E.TIMEOUT

c-list index too large
c-list index negative
type or options bad
no such open disk file
local exclusive claim already
local shared claim already
time out on claim wait queue

DISK FILE CLAIM

LOCAL DATA

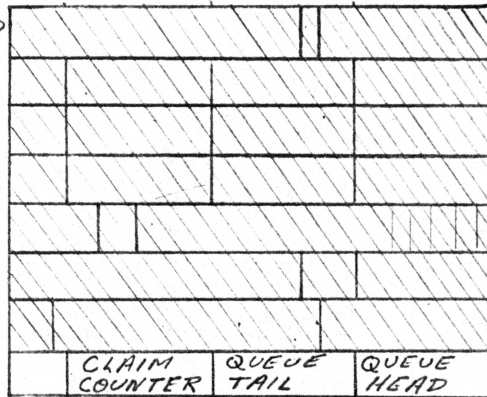
LOCAL FILE HEADER
(LFH)



FROZEN FLAG
EXCLUSIVE FLAG
SHARED FLAG

GLOBAL DATA

FILE HEADER RECORD
(FHR)



FR. CLAIM

CLAIM COUNTER = 0 $\Rightarrow$ NO CLAIM
CLAIM COUNTER = -1 $\Rightarrow$ EXCLUSIVE CLAIM
CLAIM COUNTER > 0 $\Rightarrow$ SHARED CLAIM(S)

CLAIM QUEUE

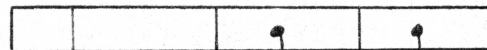
SUSPENSE WORD



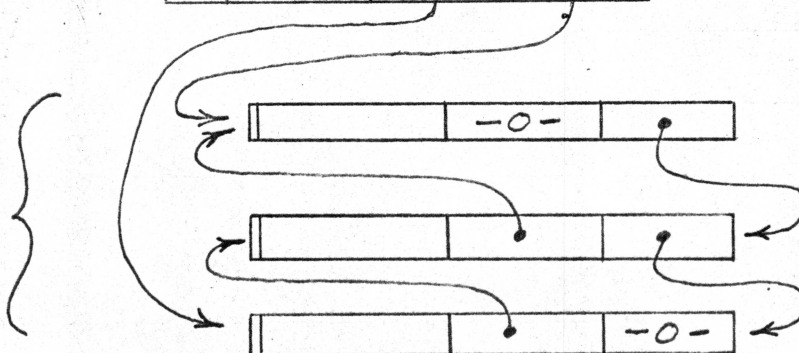
TYPE CLAIM
(0 = SHARED
1 = EXCLUSIVE)

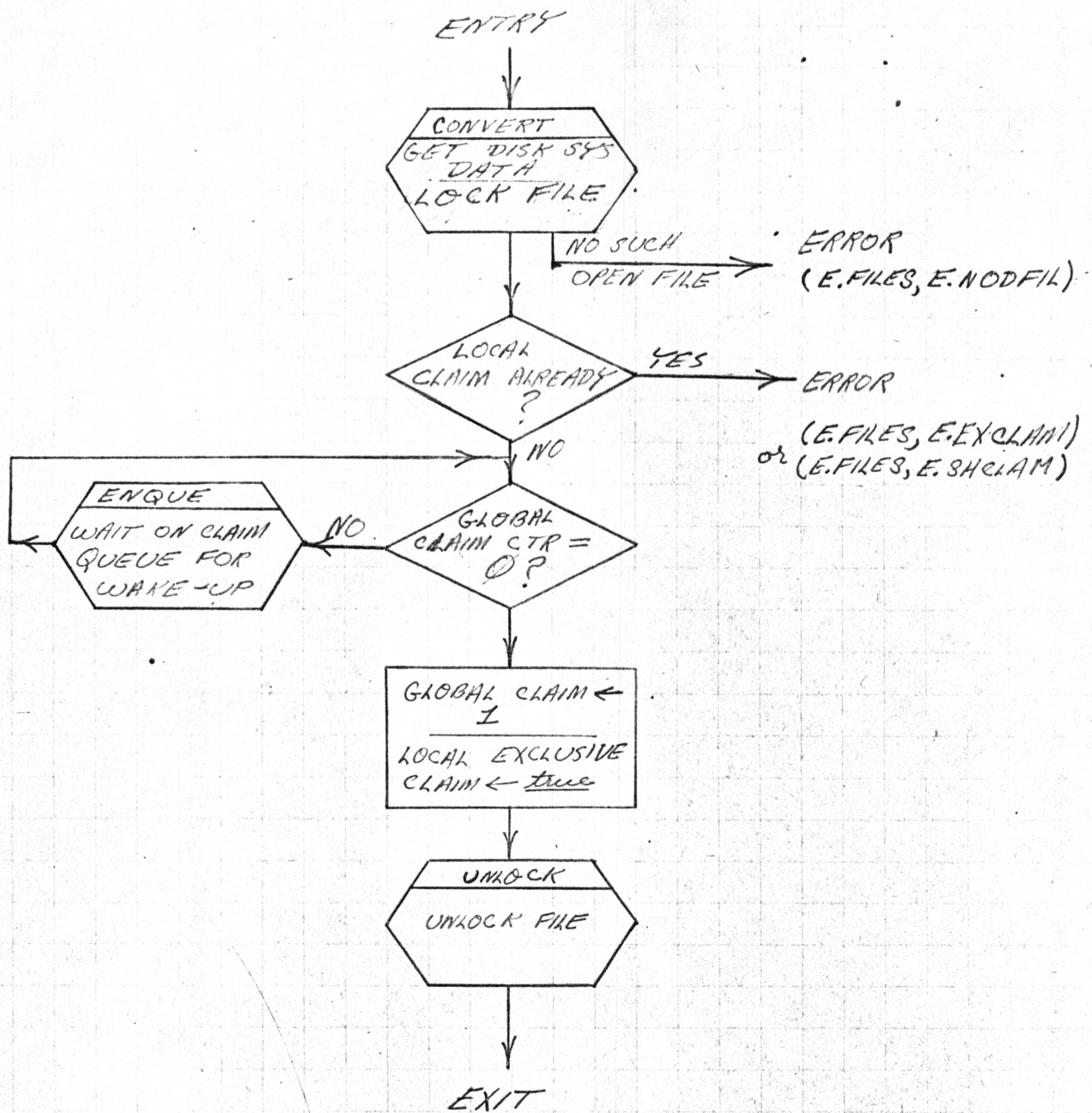
PROCESS IDENTIS
(MYIDENT)

FR. CLAIM

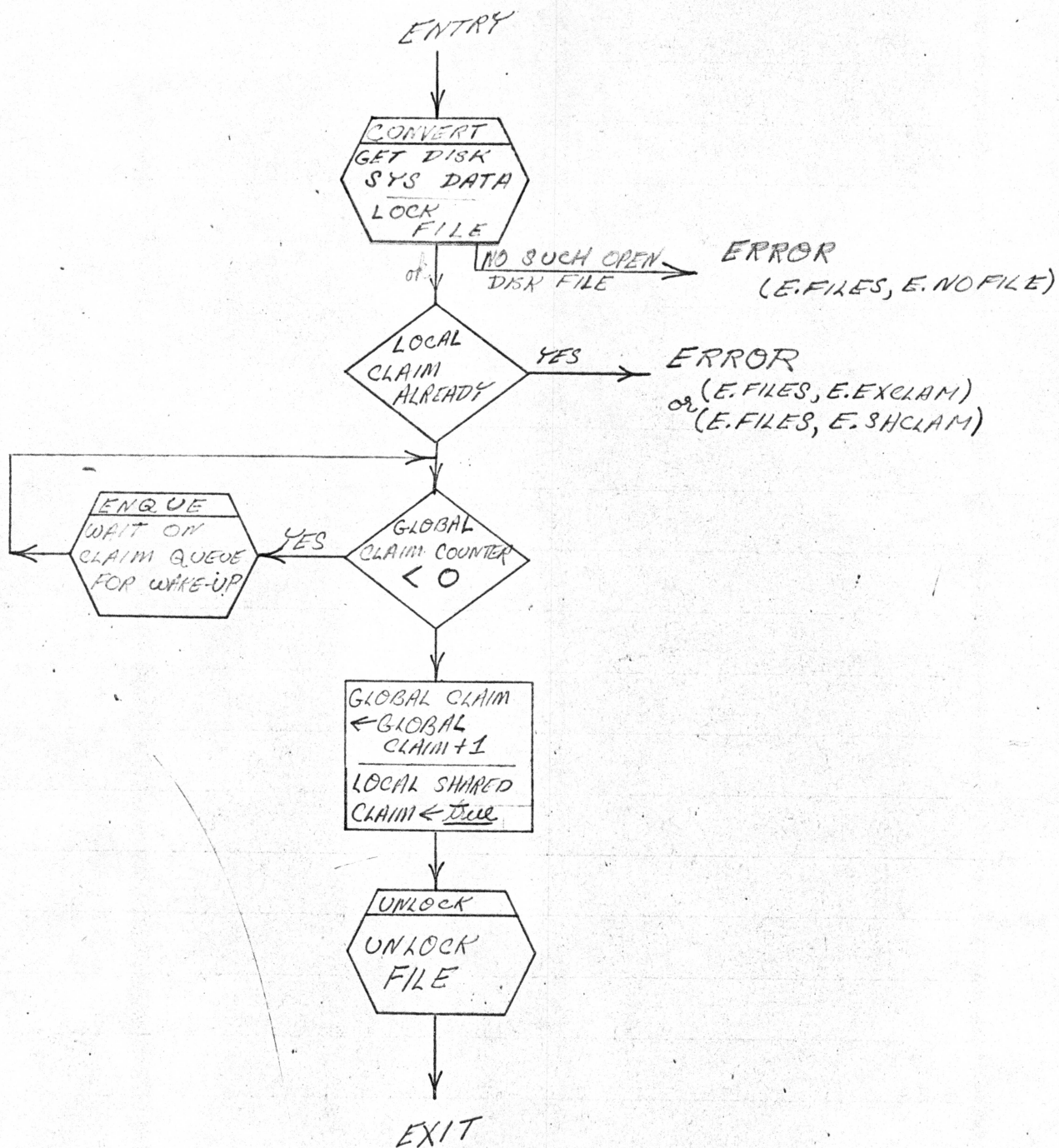


SUSPENSE WORDS



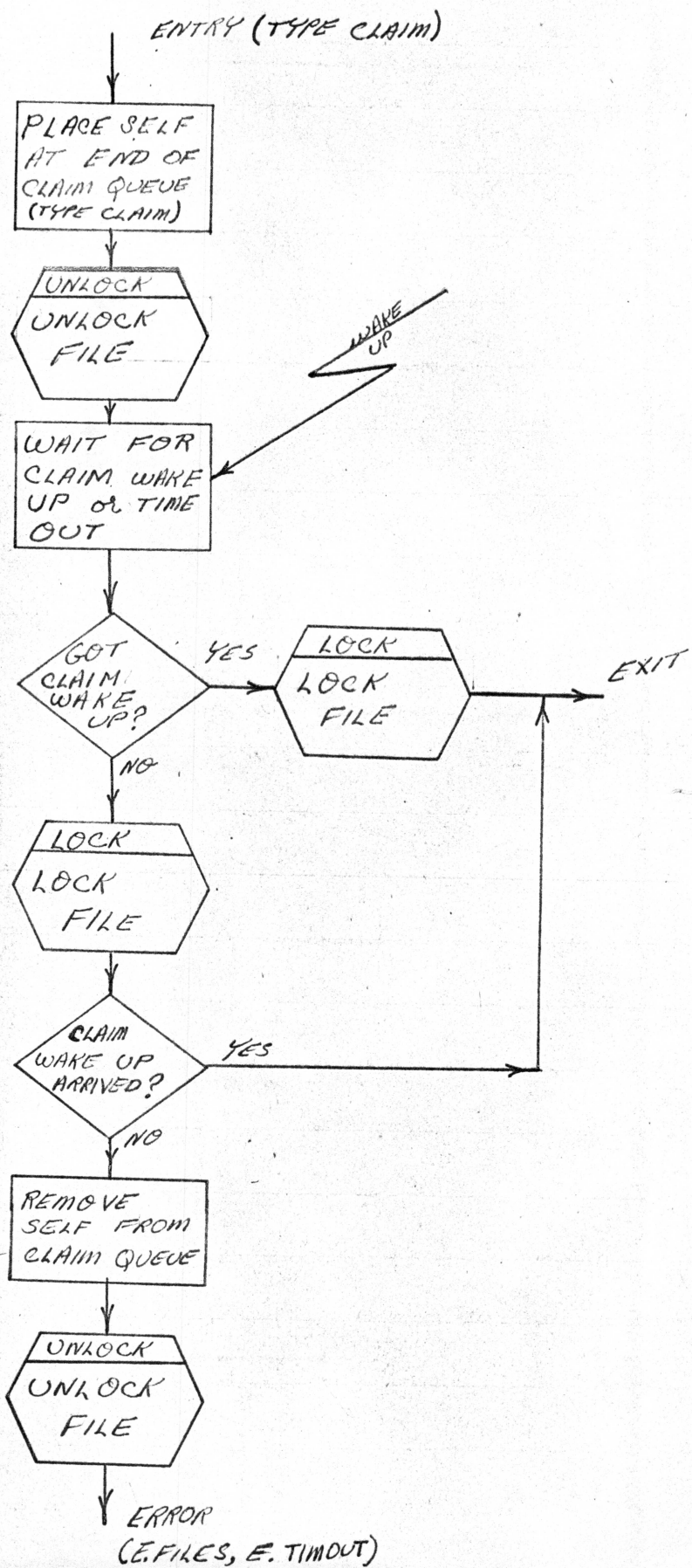


EXCLUSIVE CLAIM



SHARED CLAIM

ENQUE



RELEASE CLAIM

