

RELOCATING LOADER

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WHAT IS A RELOCATING LOADER?

- IT IS A SYSTEM PROGRAM THAT LOADS AN OBJECT PROGRAM INTO MEMORY AT A DIFFERENT ADDRESS THAN THE ONE ORIGINALLY SPECIFIED DURING ASSEMBLY.
- IT ADJUSTS ALL ADDRESS-DEPENDENT VALUES (SUCH AS INSTRUCTION OPERANDS AND DATA REFERENCES) SO THE PROGRAM CAN EXECUTE CORRECTLY FROM ITS NEW LOCATION.
- USES MODIFICATION (M) RECORDS IN THE OBJECT FILE TO DETERMINE WHICH ADDRESSES REQUIRE ADJUSTMENT.

SIC RELOCATION

- COMPUTE RELOCATION FACTOR
- APPLY MODIFICATIONS FROM M RECORDS



SICXE RELOCATION

- Supports XE addressing formats
- Nibble-based modification handling

ADDF = Add floating points,
SUBF = Subtract floating points,
MULF = Multiply floating points,
DIVF = Divide floating points

SCOFF FORMAT & STRUCTURES

1

H – header

2

T – text

3

M – modification

4

E – end record

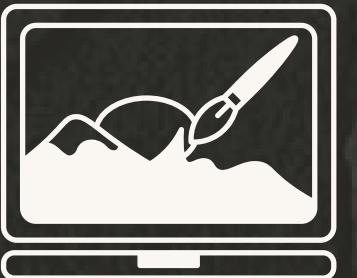
5

Parsed into
objFile

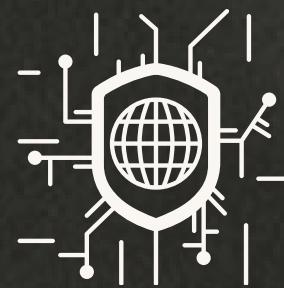
HIGH-LEVEL ARCHITECTURE

1. MAIN.C – ARGUMENT PARSING
2. LOADER.C – RELOCATION PIPELINE
3. OBJFILEPARSER.C – PARSING SCOFF
4. RELOCSIC.C / RELOCSICXE.C –
RELOCATION LOGIC

OBJFILEPARSER - PURPOSE



- 01** Open object file
- 02** Identify record types



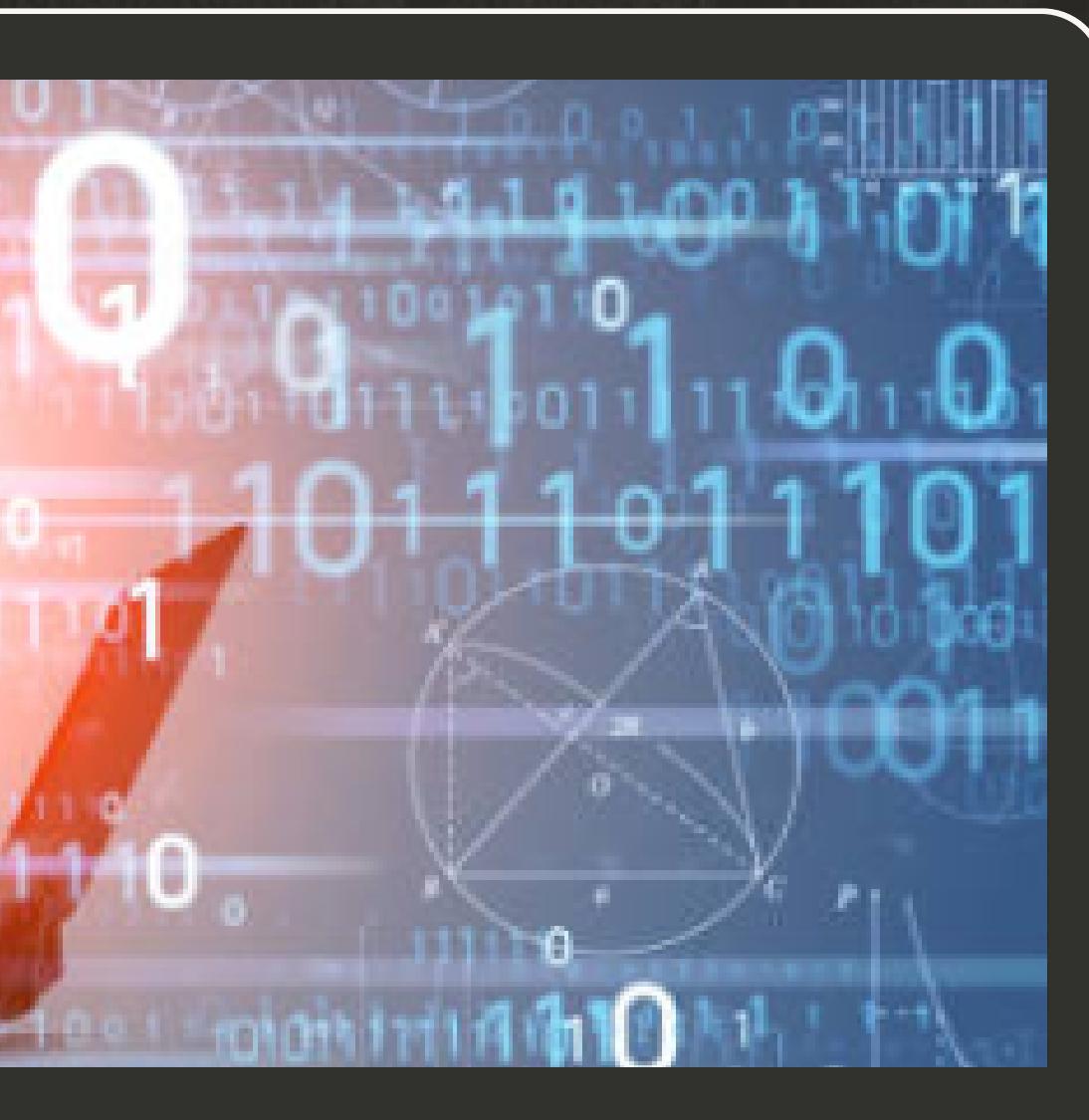
- 03** Parse fields
- 04** Validate format & addresses

PARSING DETAILS

- + TrimEo1Chars()
- + parseFixedHex()
- + Dynamic arrays (realloc)
- + Error flag pattern



LOADER PIPELINE



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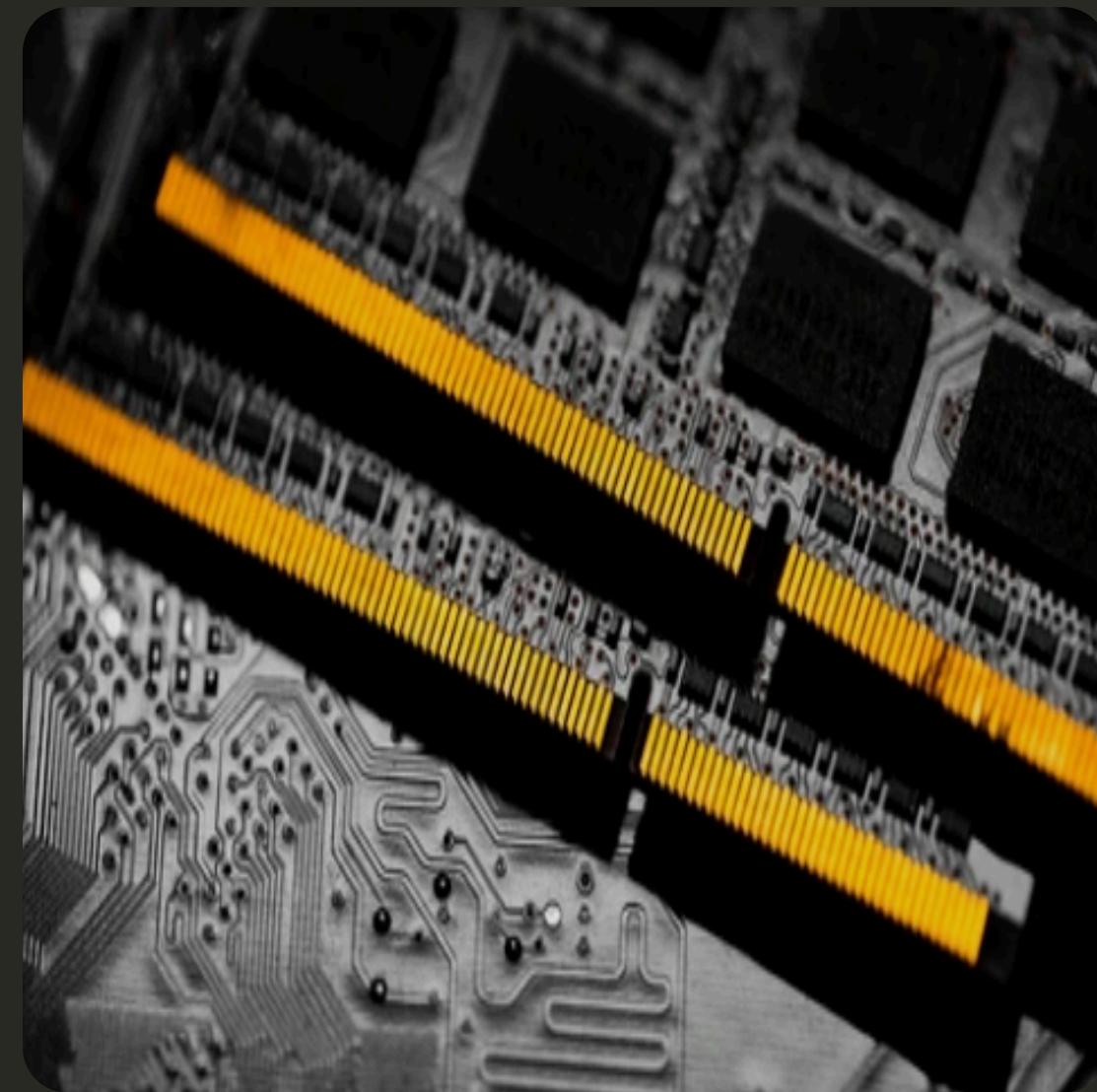
- + Main.c builds config
- + Loader.c chooses SIC/SICXE backend
- + Relocation applied to text bytes

MEMORY & OUTPUT

 Optional memory image

 Emit relocated T records

 Update E record



CHALLENGES - PARSING



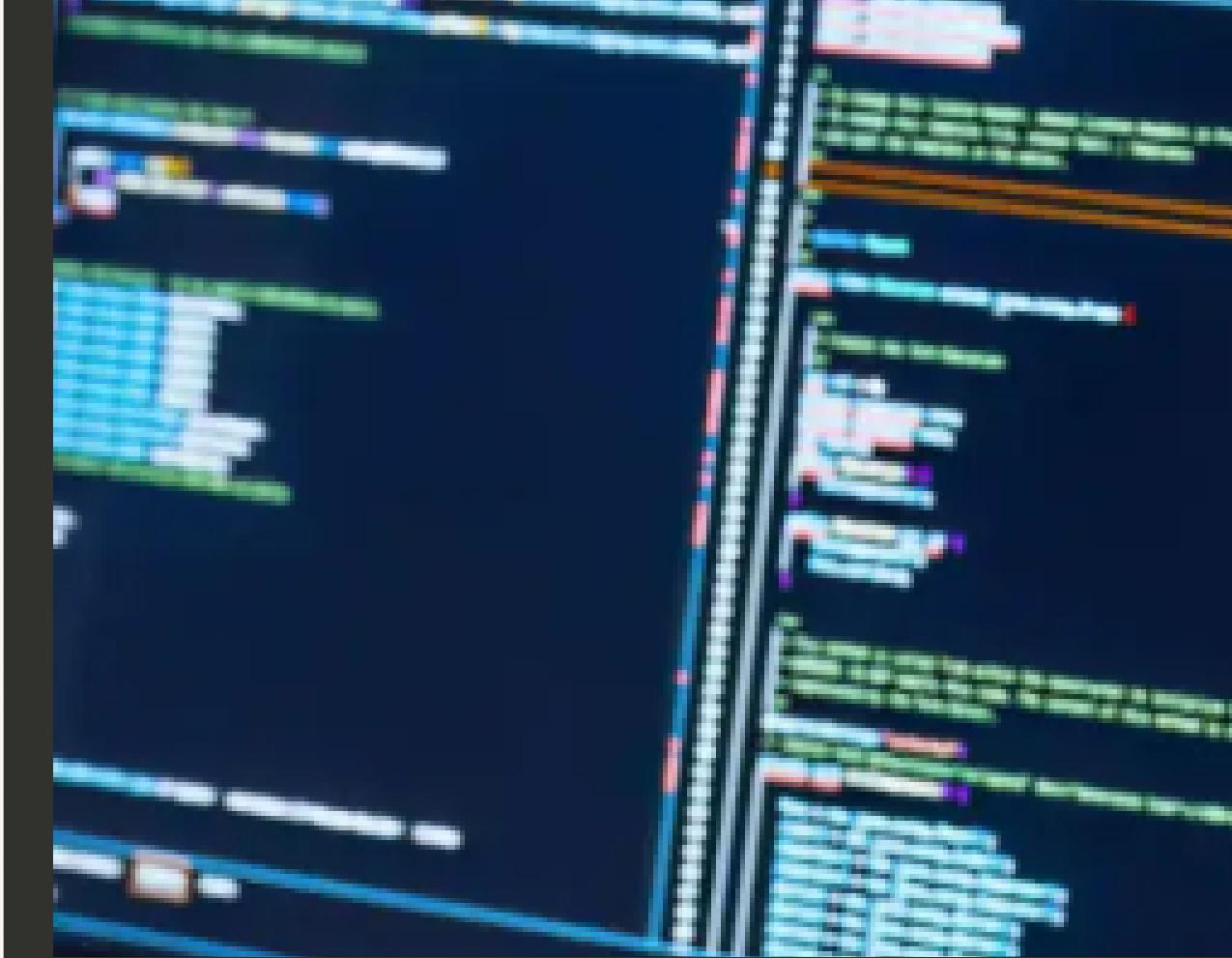
- + Strict SCOFF field widths
- + Handling malformed input
- + Avoiding goto for cleanup

CHALLENGES - RELOCATION

- ★ Nibble-level patching
- ★ Address range validation
- ★ Dynamic record management

TESTING STRATEGY

- ★ Positive tests with sample SCOFF
- ★ Negative tests (bad hex, missing H/E)
- ★ Verified relocated addresses



CONCLUSIONS

- ★ Modular relocating loader
- ★ Robust parsing logic
- ★ Future: full XE support, more tests

THANK YOU