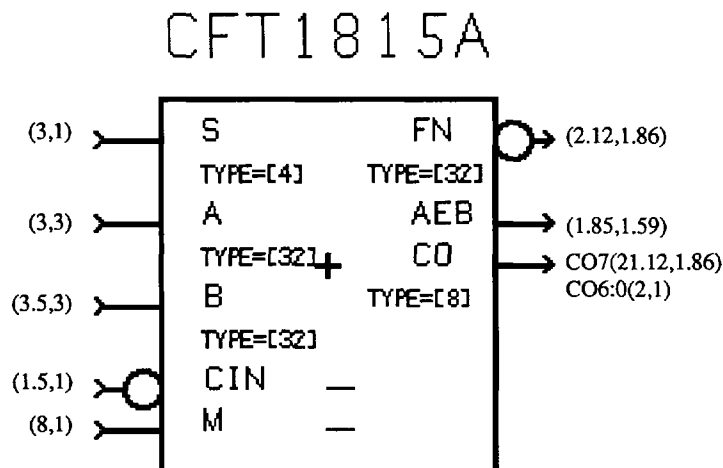**GENERAL DESCRIPTION:** 32-BIT 74181 TYPE ALU, USING CARRY SELECT ADDER(FB0231A)

CFT1815A is a 32-bit 74181 type ALU using carry select adder with carry out every 4 bits. Its logic functions and arithmetic operations are fully compatible with TI74181 ALU except the A=B output(the detail information about A=B is on the bottom of this file).

PIN CONNECTION DIAGRAM:

CFT1815A

(3,1)	S TYPE=[4]
(3,3)	A TYPE=[32]
(3.5,3)	B TYPE=[32]
(1.5,1)	CIN
(8,1)	M

FN TYPE=[32]	(2.12,1.86)
AEB	(1.85,1.59)
CO TYPE=[8]	CO7(21.12,1.86) CO6:0(2,1)

FEATURES:

- Uses carry select
- Arithmetic operating modes: Addition, Subtraction, Shift operand A one position, Magnitude comparison operations, plus twelve other arithmetic operations
- Logic function modes: Exclusive-OR, Comparator, AND, NAND, OR, NOR, plus ten other logic operations

EQUIVALENT USED GATES: 1346 GATES (for rough area estimates)

THIS MEGAFUNCTION CONSISTS OF :
1346 soft-coded gates.

POWER: NOT AVAILABLE.

FAULT COVERAGE(%): 100%

This megafunction was designed to be 100% functionally compatible as specified in the vendor's data book. However, LSI LOGIC makes no warranty that this megafunction behaves identically to the standard part. It is the user's responsibility to assure that the megafunction operates correctly in his/her ASIC design and meets desired system requirements.

PIN DESCRIPTION:

S3:0	FUNCTION SELECT LINES.
A31:0	A OPERAND.
B31:0	B OPERAND.
CIN	CARRY-IN.
M	MODE SELECT LINE.
CO7:0	CARRY-OUT.
FN31:0	FUNCTION OUTPUTS.
AEB	A OPERAND EQUALS B OPERAND.

AC CHARACTERISTICS:

(Nominal case, output loading is 2, delay predicted by LPACE)

From	To	10K Typical Delay (ns)	100K typical Delay (ns)
anyA	AEB	7.2	5.9
anyB	AEB	7.8	6.4
anyS	AEB	9.2	7.1
ARITHMETIC OPERATION			
anyA	CO	14.6	9.1
anyA	FN	15.3	10
anyB	CO	15.0	9.5
anyB	FN	16.1	10.4
anyS	CO	16.8	10.2
anyS	FN	17.9	11.1
CIN	CO	8.6	5.8
CIN	FN	9.3	6.5
LOGIC OPERATION			
M	FN	4.3	3
anyA	FN	5.6	4.5
anyB	FN	6.2	5
anyS	FN	7.6	5.7

In TI74181, "A=B" is valid when the ALU is in subtract mode with CIN=H.
This is because if A and B are equal, A-B will be Zero and "A=B" pin
will become true. This algorithm uses the ALU and it is slow. CFT1814A
doesn't use the ALU to generate the "A=B" signal, instead it is generate
from the output of encoder circuitry. As a result, it is faster, The
following is a table showing the difference between TI74181 and CFT1814A.

```
-------------------------------------------------
|CIN S3 S2 S1 S0|    TI74181    |   CFT1814A    |
|               |  A=B output   | A=B output    |
|---------------|---------------|---------------|
| H  L  H  H  L |     A=B       |      A=B       |
| L  L  H  H  L |     A=B-1     |      A=B       |
|               |               |               |
|   all others  | functions not |functions not  |
|               | the same as   |the same as    |
|               | A=B           |A=B and not    |
|               |               |the same as    |
|               |               |TI74181        |
-------------------------------------------------
```