Features

- IDE Mode CompactFlash interface
- Real-time clock with programmable interrupts
- 242 Bytes non-volatile memory
- Software-controllable system power-on function

Tables of Information

Table 1: Card Memory Map

ADDRESS RANGE	FUNCTION
$X00-$X1F	CompactFlash Card
$X20	RTC Address (W)
$X21	RTC Data
$X80	Card Status Register
$XFF	Card ID Register (R)

Table 2: Card Configuration

SETTING	FUNCTION
JP1	Enable wait states for all card accesses
JP2	Enable CF interrupts
JP3	Enable bus $\overline{\text{WAIT}}$ signal
JP4	Enable bus $\overline{\text{IRQ}}$ signal
JP5	Clear RTC NVRAM
JP6	Enable CF-generated wait states

Table 3: CompactFlash Registers

ADDRESS	REGISTER
$X00	Data
$X01	Error (R) / Feature (W)
$X02	Sector Count
$X03	Sector Number (LBA 7-0)
$X04	Cylinder Low (LBA 15-8)
$X05	Cylinder High (LBA 23-16)
$X06	Drive/Head (LBA 27-24)
$X07	Status

CompactFlash Interface

The CompactFlash interface provides removable high-capacity storage to the system using widely available CompactFlash cards. This allows for data to be transferred between XMICRO systems, PCs, and other compatible devices. Refer to the CompactFlash specifications for more information on interacting with these cards.

The CompactFlash interface is implemented in 8-bit IDE mode. The CF card must be initialized in 8-bit mode to work properly. Native DMA is therefore not implemented, as it is a 16-bit function. The base address of the onboard registers is $X00 as listed in *Table 3*.

Real-Time Clock

The DS1685 RTC can accept either 6pF or 12.5pF crystals. During assembly, the board should be marked to indicate which crystal value is installed. To maintain accurate timekeeping, it is important that the Crystal Select bit (bit 5) of Extended Control Register $4B is set to correctly reflect the installed crystal.

The RTC's Kickstart function allows an optional soft power control of the system. To use this, a momentary power switch is connected to J2, and J1 is connected to the backplane's Power-on switch header. The polarity of J1 may need to be reversed for correct operation if the system always remains on.

The DS1685 is highly sensitive to negative transients on the power input and is prone to corruption if they occur. To protect against this, the RTC is powered by an independent +5V regulator U15 through diode D2.

Onboard Registers

Table 4: Card Registers

ADDRESS	D7	D6	D5	D4	D3	D2	D1	D0
$X80	0	0	0	0	Interrupt Disable (R/W)	CF Insertion Status (R)	CF Interrupt Status (R)	RTC Interrupt Status (R)
$XFF	Card ID $03 (R)							

Card Status Register ($X80)

The CSR is used to determine basic status of the card's functions in a single read operation. CSR bits indicate the following:

CSR Bit 0:
- 0: RTC interrupt is not asserted
- 1: RTC interrupt is asserted

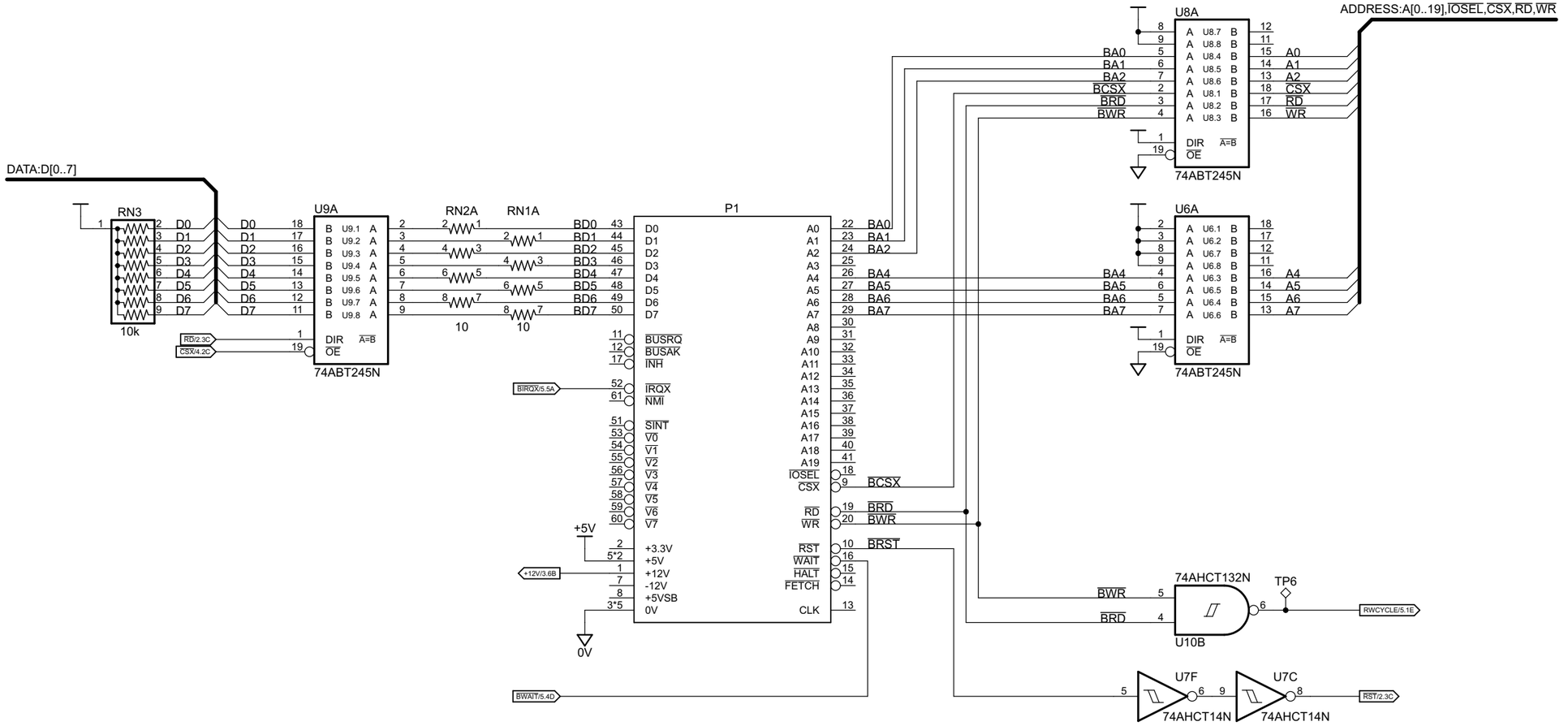
CSR Bit 1:
- 0: CompactFlash interrupt is not asserted
- 1: CompactFlash interrupt is asserted

CSR Bit 2:
- 0: CompactFlash card is not present
- 1: CompactFlash card is present

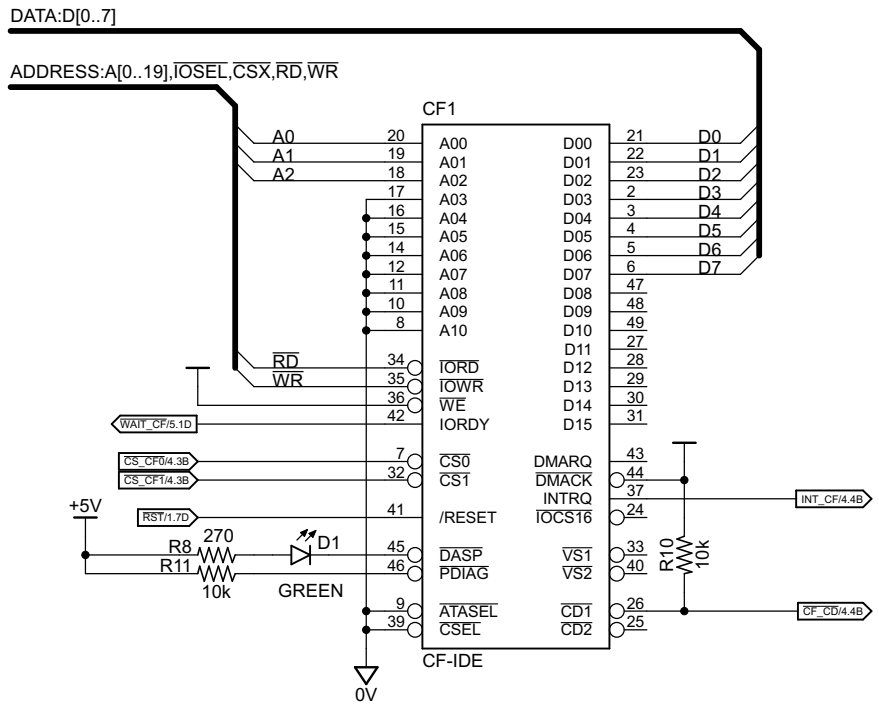
CSR Bit 3:
- 0: All interrupts are disabled
- 1: Onboard interrupts are allowed

Card ID Register ($XFF)

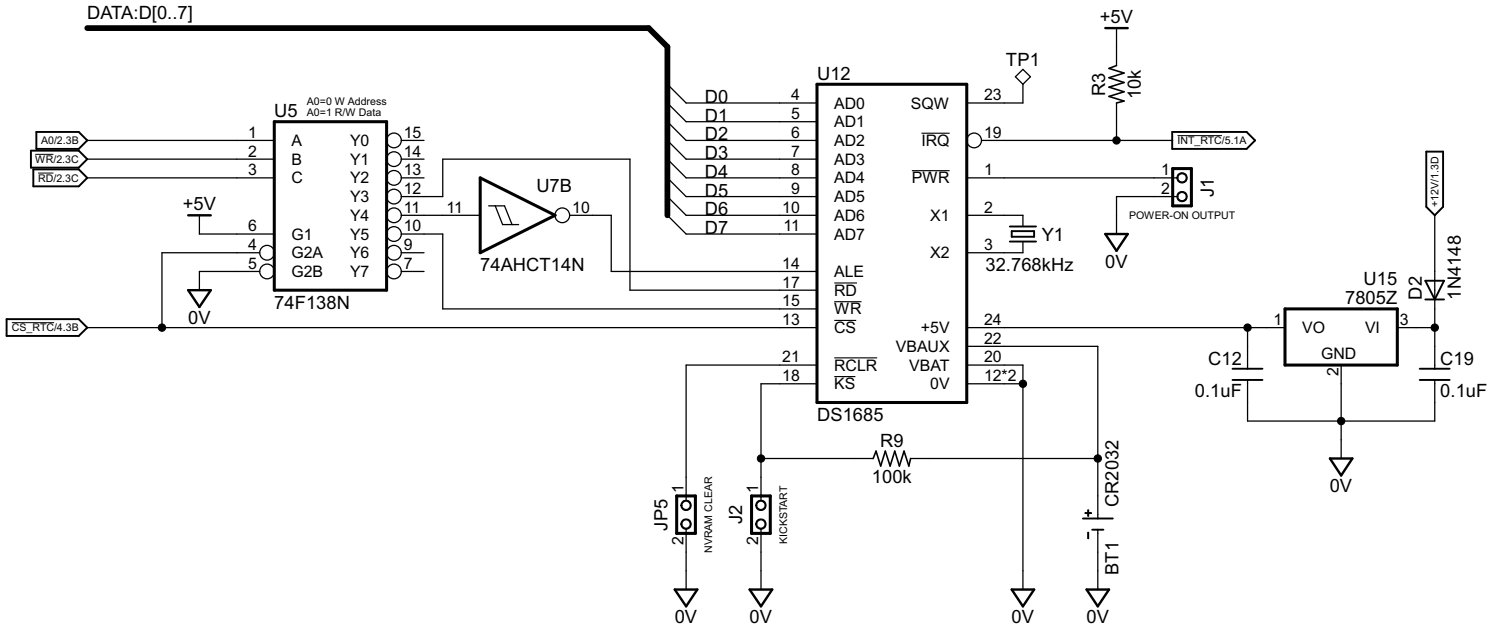
The Card ID Register contains the ID value $03 as assigned in XMICRO Bus specification Appendix A. This register is used by the system to determine card types and locations.



Title: Bus Interface		XMICRO	
Project: XMICRO-CF		Revision:	1.0
Drawn by: Chris Weir	2024-04-06 13:06:02	Sheet:	1/5



Title: CompactFlash Interface		XMICRO
Project: XMICRO-CF		Revision: 1.0
Drawn by: Chris Weir	2024-04-06 13:06:02	Sheet: 2/5

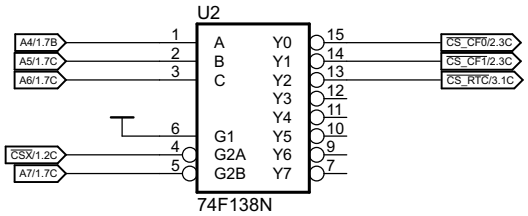


NVRAM is easily corrupted by low-amplitude negative transients.
U15 and D2 prevent this.

Title: Real-time Clock		XMICRO
Project: XMICRO-CF		Revision: 1.0
Drawn by: Chris Weir	2024-04-06 13:06:02	Sheet: 3/5

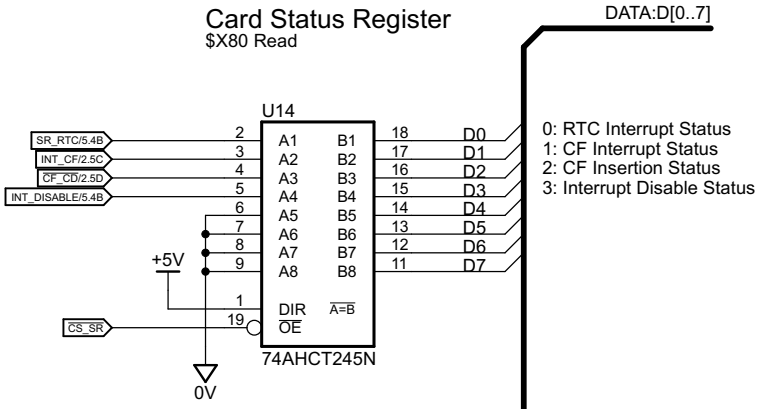
Chip Select (CF/RTC)

$\overline{CS_CF0}$ = $00-$0F
$\overline{CS_CF1}$ = $10-$1F
$\overline{CS_RTC}$ = $20-$2F



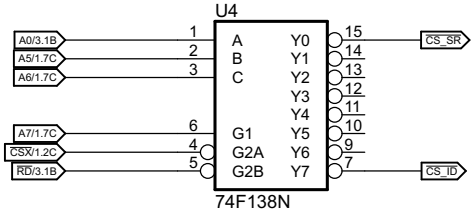
Card Status Register

$X80 Read



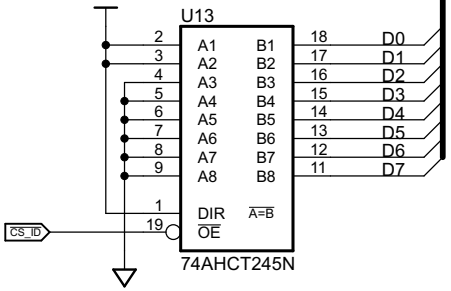
Chip Select (Onboard Registers - Read)

$\overline{CS_SR}$ = $80
$\overline{CS_ID}$ = $FF



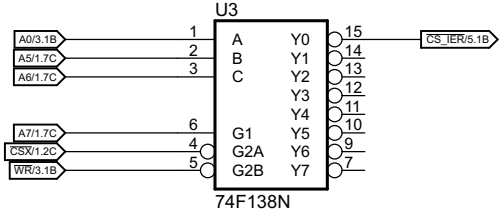
Card ID Register

$XFF Read, Value $03

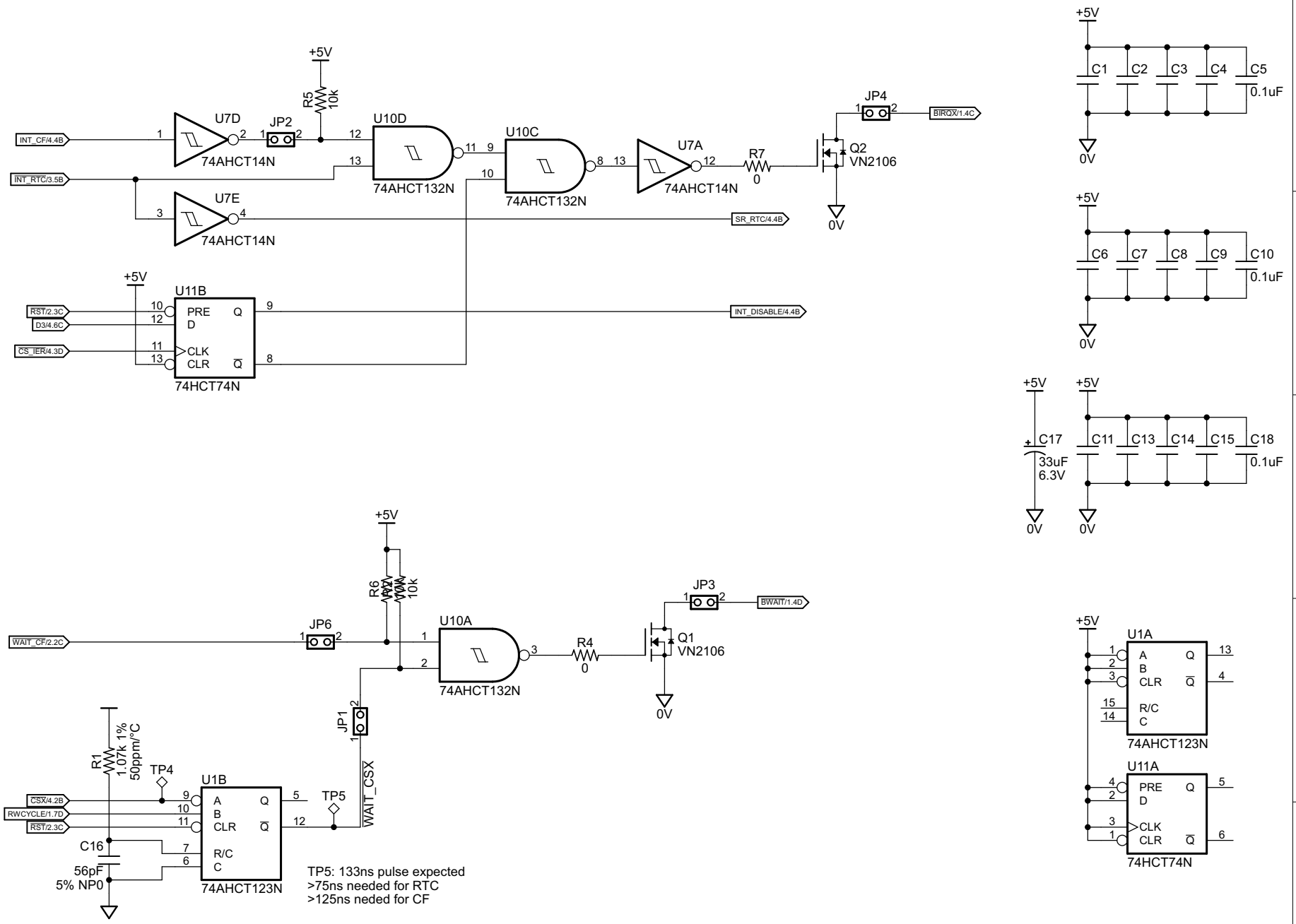


Chip Select (Onboard Registers - Write)

$\overline{CS_IDR}$ = $80



Title: Chip Selects/Registers		XMICRO
Project: XMICRO-CF		Revision: 1.0
Drawn by: Chris Weir	2024-04-06 13:06:02	Sheet: 4/5



Title: Interrupt/Wait Combiners, Misc.		XMICRO
Project: XMICRO-CF		Revision: 1.0
Drawn by: Chris Weir	2024-04-06 13:06:02	Sheet: 5/5