Grant Searle Multicomp v1.10 December 2015
www.retrobrewcomputers.org

VGA

R10 470R
R11 680R
PIN69_R1
PIN70_R2   Red
PIN65_G1
PIN67_G2   Green
PIN63_R1
PIN64_B2   Blue
PIN71_HSYNC
PIN72_VSYNC
R12 470R R13 680R
R14 470R R15 680R
D15
VGA

Monochrome TV

PIN75_TVVID   Video   R18 470R
PIN74_TVSYNCH Synch   R19 1K
RCA socket
X1

SD Card

SD card
+3V3
PIN97_SDCS
PIN93_SDDI
PIN94_SDCLK
PIN92_SDDO
1 CS
2 DI
3 GND
4 VCC
5 SCK
6 GND1
7 DO
8 IRQ
WP
CD
SW
SHIELD
DO
CK
0V
0V
DI
CS
0V.
Pads so easier to solder

RTC

RTC module contains DS1302 and button cell
+3V3
0V
PIN41_RCLK
PIN40_RIO
PIN42_RCERST
RTC

VDUFFD0

PIN48_VDUFFD0   VDUFFD0
Fit link to swap address decode of VDU and Serial A

Supply

Connect 5V to 5V on FPGA board
+3V3   +5V
Near SD
C3 470uF 6V3   C12 0.1uF   C4 470uF 6V3
0V
+5V
5V   3V3   GND
The inside pin of the 2 pin header on the cyclone II board is 5V

Cyclone II

Leds
PIN3_SDACTIVE
PIN7
PIN9

Reset
PIN144_RST

Ram CS
PIN126_CS1
PIN79_CS2

Ram Rd and Wr
PIN134_RD
PIN4_WR

Serial A
PIN103_TX
PIN104_RTS
PIN101_RX
PIN45_CTS

Serial B
PIN100_TX
PIN96_RTS
PIN99_RX
PIN47_CTS

Unused input only group
PIN18
PIN21
PIN22
PIN88
PIN89
PIN90
PIN91

VGA group
PIN63_B1
PIN64_B2
PIN65_G1
PIN67_G2
PIN69_R1
PIN70_R2

TV
PIN75_TVVID
PIN74_TVSYNCH

Keyboard
PIN86_KCLK
PIN87_KDAT

SD group
PIN92_SDDO
PIN94_SDCLK
PIN93_SDDI
PIN97_SDCS

PIN40_RIO
PIN41_RCLK
PIN42_RCERST

PIN43_SDA
PIN44_SCL

PIN48_VDUFFD0

PIN51_GPIO0
PIN52_GPIO1
PIN53_GPIO2
PIN57_GPIO3
PIN58_GPIO4
PIN58_GPIO5
PIN59_GPIO6
PIN60_GPIO7

Address A0-A18
PIN121_A0
PIN125_A1
PIN129_A2
PIN133_A3
PIN135_A4
PIN137_A5
PIN141_A6
PIN143_A7
PIN142_A8
PIN139_A9
PIN132_A10
PIN136_A11
PIN28_A12
PIN24_A13
PIN30_A14
PIN8_A15
PIN25_A16
PIN31_A17
PIN32_A18

Data D0-7 group
PIN119_D0
PIN115_D1
PIN112_D2
PIN113_D3
PIN114_D4
PIN118_D5
PIN120_D6
PIN122_D7

http://www.leonheller.com/FPGA/EP2C5T144mini.pdf for schematic (and website)
http://zx80.netai.net/grant/Multicomp/index.html
http://www.muzique.com/schem/groundplane.pdf

Pin 3,7,9 are leds
Pin 144 = pushbutton to ground
Pin 17 = 50Mhz clock
Pin 73 - RC reset network
Pin 26,27,80,81 zero ohm links to vcc
Input only pins 18,21,22,88,89,90,91
Pin 76 is ? part of the jtag

Clock
1.2V
+3V3

Keyboard

Jumper 5V or 3V supply
+5V
5V_K_3V
+3V3
5=supply, 3=0v, 6=clock, 1=data
KEYBOARD
R1 10K   R2 10K
PIN86_KCLK   Clock
PIN87_KDAT   Data
D1 3V6 Zener   D2 3V6 Zener
Zeners if running keyboard from 5V
PE   PE

Mounting holes

H5 MOUNT-HOLE3.6
H6 MOUNT-HOLE3.6
H7 MOUNT-HOLE3.6
H8 MOUNT-HOLE3.6

Serial A

+3V3
C9 0.1uF
IC9P
0V
SERA_3V_0V_TX_RX_RTS_CTS
F_D9_A
C21 0.1uF
C22 0.1uF
IC9 SP3232
V+
V-
C1+ C1-
C2+ C2-
C24 0.1uF
C23 0.1uF
T1OUT T1IN
T2OUT T2IN
R1IN R1OUT
R2IN R2OUT
Tx   PIN103_TX
RTS   PIN104_RTS
Rx   PIN101_RX
CTS   PIN45_CTS

Reset

PIN144_RST   RST
0V

I2C

+3V3
R3 10K   R4 10K
PIN43_SDA
PIN44_SCL
I2C_3V_0V_SDA_SCL

GPIO

PIN51_GPIO0 1
PIN52_GPIO1 2
PIN53_GPIO2 3
PIN57_GPIO3 4
PIN58_GPIO4 5
PIN58_GPIO5 6
PIN59_GPIO6 7
PIN60_GPIO7 8
GPIO

Data Bus

PIN119_D0 1
PIN115_D1 2
PIN112_D2 3
PIN113_D3 4
PIN114_D4 5
PIN118_D5 6
PIN120_D6 7
PIN122_D7 8
DATA

Memory

+3V3   +3V3
C2 0.1uF   C10 0.1uF
Use ASC61008 or AS6C4008

ASC61008_OR_ASC4008 / AS6C4008
PIN121_A0 A0   VCC
PIN125_A1 A1
PIN129_A2 A2   D0 PIN119_D0
PIN133_A3 A3   D1 PIN115_D1
PIN135_A4 A4   D2 PIN112_D2
PIN137_A5 A5   D3 PIN113_D3
PIN141_A6 A6   D4 PIN114_D4
PIN143_A7 A7   D5 PIN118_D5
PIN142_A8 A8   D6 PIN120_D6
PIN139_A9 A9   D7 PIN122_D7
PIN132_A10 A10
PIN136_A11 A11
PIN28_A12 A12
PIN24_A13 A13 /RD PIN134_RD
PIN30_A14 A14 /WR PIN4_WR
PIN8_A15   A15 /CS PIN126_CS1
           A16
           A17
           A18
           GND
128K or 512K

Jumper 1 to 2 for 128K ram
Jumper 2 to 3 for 512K ram
A16   PIN25_A16
A17   PIN31_A17
A18   PIN32_A18

Optional second (512k) ram chip
+3V3
AS6C4008
PIN121_A0 A0   VCC
PIN125_A1 A1
PIN129_A2 A2   D0 PIN119_D0
PIN133_A3 A3   D1 PIN115_D1
PIN135_A4 A4   D2 PIN112_D2
PIN137_A5 A5   D3 PIN113_D3
PIN141_A6 A6   D4 PIN114_D4
PIN143_A7 A7   D5 PIN118_D5
PIN142_A8 A8   D6 PIN120_D6
PIN139_A9 A9   D7 PIN122_D7
PIN132_A10 A10
PIN136_A11 A11
PIN28_A12 A12
PIN24_A13 A13 /RD PIN134_RD
PIN30_A14 A14 /WR PIN4_WR
PIN8_A15   A15 /CS PIN79_CS2
PIN25_A16 A16
PIN31_A17 A17
PIN32_A18 A18
           GND
512K

LEDS

+3V3
PIN3_SDACTIVE   LED1   R5 5K6
PIN7   LED2   R6 5K6
PIN9   LED3   R7 5K6

Serial B

SERB_3V_0V_TX_RX_RTS_CTS
+3V3
0V
Tx   PIN100_TX
RTS   PIN96_RTS
Rx   PIN99_RX
CTS   PIN47_CTS