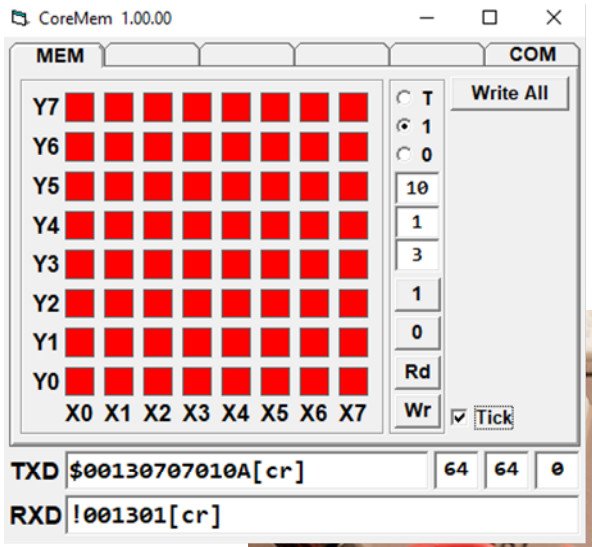
64 BIT MAGNETIC MEMORY SYSTEM



64 bit core matrix
1747C x 1

C_{FILT} = 100pF

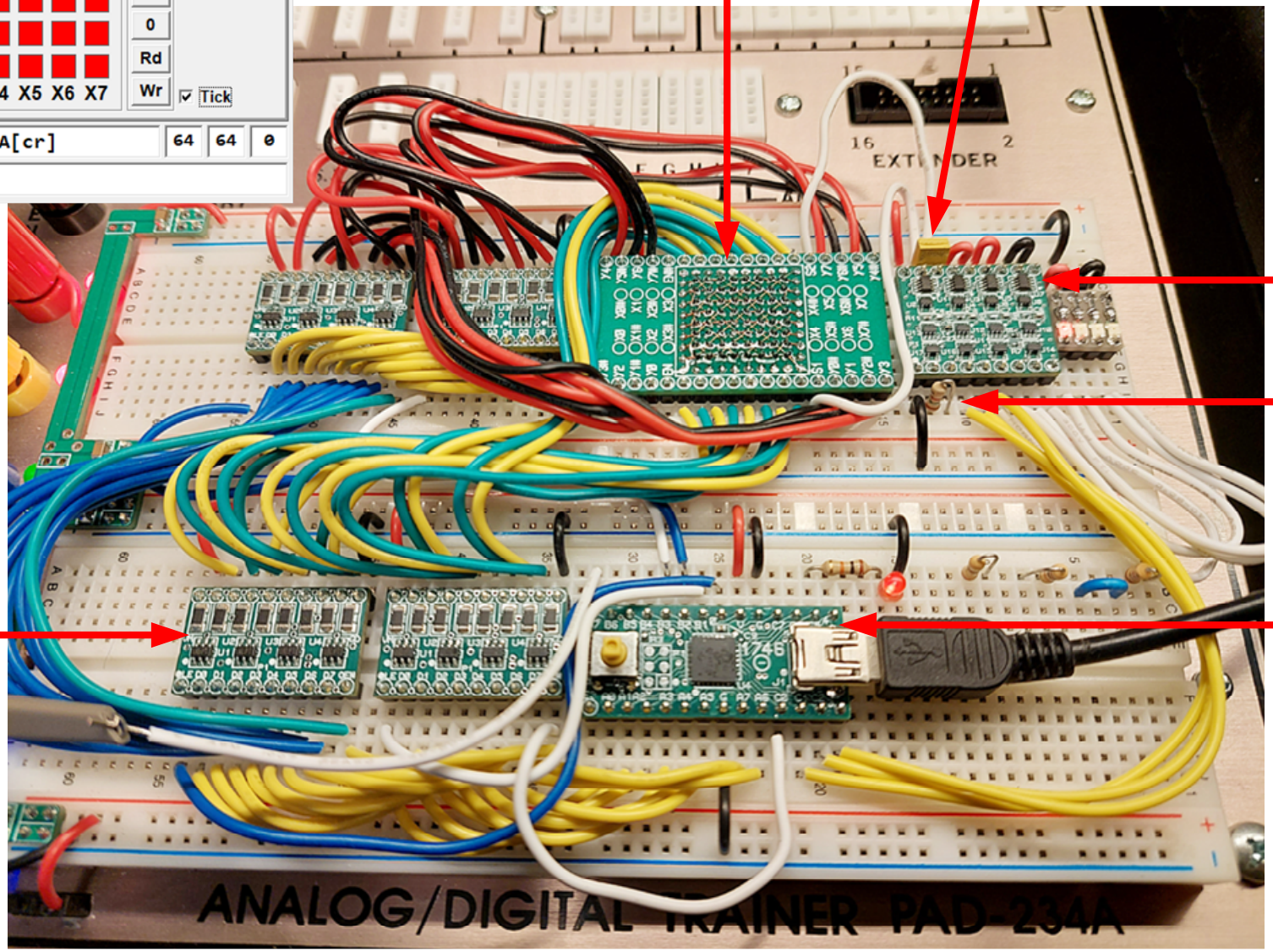
Y Drivers
1749 x 2
R = 10Ω

Sense Amp
1752 x 1

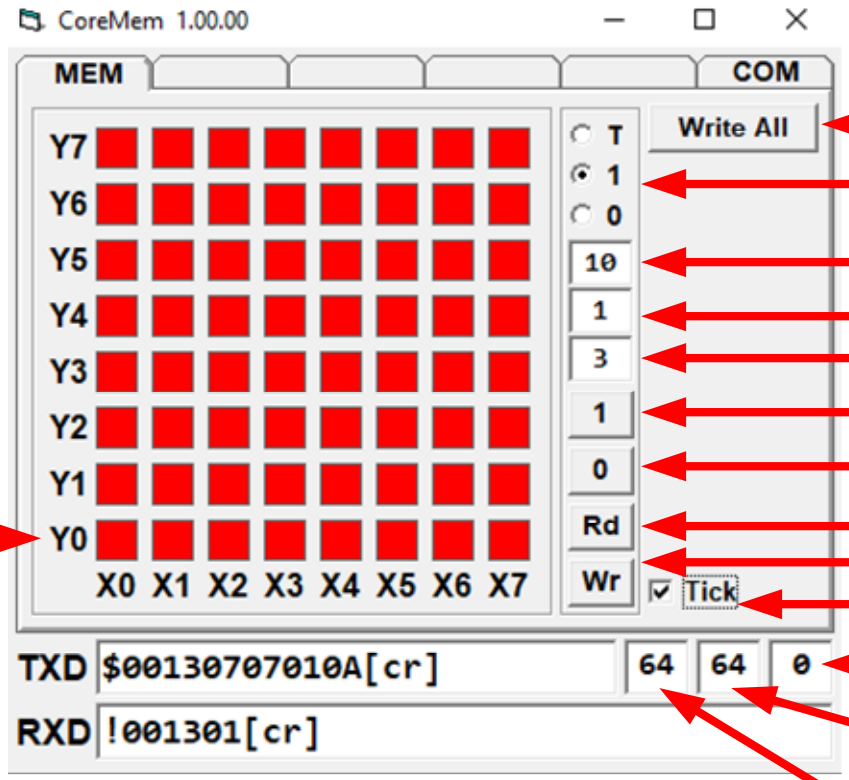
RSET = 1.2K
= 0.95V/1.2K
= 792uA
= 7.92mV

X Drivers
1749 x 2
R = 10Ω

Controller
1746P x 1



TEST UI



Clicking each bit cell writes to the matrix using the selected command

Command each bit in sequence

Command: Toggle, Set or Clear

Hold time, uS

Command repeat count

Write all cycle delay, n x 100mS

Set all boxes to Red = "1"

Clear all boxes to Green = "0"

Read entire matrix

Write entire matrix

Audible tick for Write All function

Sense amp reported "No change"

Sense amp reported "Change"

Command count

$0013xxyysshh[cr]

```
$0013    Matrix write command
xx       X coordinate, 00-07
yy       Y coordinate, 00-07
ss       Core state, 00 or 01
hh       Hold time, uS
```

!0013ss[cr]

```
!0013    Matrix write response
ss       Core state, 00 or 01
```

TEST FW (IN CCS PICC)

```
////////////////////////////////////////////////////////////////////////////
void xy_drv_init (void){

driver_fwd[0] = 0b00000001;
driver_fwd[1] = 0b00000100;
driver_fwd[2] = 0b00010000;
driver_fwd[3] = 0b01000000;
driver_rev[0] = 0b00000010;
driver_rev[1] = 0b00001000;
driver_rev[2] = 0b00100000;
driver_rev[3] = 0b10000000;

}
////////////////////////////////////////////////////////////////////////////
//Clears all drivers to 0x00 = Float
////////////////////////////////////////////////////////////////////////////
void driver_clr(void){

//All driver latches written at once
dataout = 0x00;
blat = 0x0F;
delay_cycles(1);
blat = 0x00;

//When high, all drivers see latch as tri-state, i.e. pulled down.
//Now that the latches are initialized, it's safe to let them take control.
driveren_n = 0;

}
////////////////////////////////////////////////////////////////////////////
```

```
////////////////////////////////////////////////////////////////////////////
//Write to individual cores in the matrix
//00000xxx,00000yyy,0000000m,dddddddd
//m     1   Sets X=1/X#=0
//      0   Sets X=0/X#=1
//
//After delay, driver returns to X=0/X#=0 and Y=0/Y#=0
//All unselected driver pairs set to 00, i.e. float mode
////////////////////////////////////////////////////////////////////////////
unsigned int1 xy_drv(unsigned int8 x,
                     unsigned int8 y,
                     unsigned int8 mode,
                     unsigned int8 delay){
unsigned int1 datain;

//Scope trigger high
trigger = 1;

//Reset the sense amplifier latches
senserst_n = 0;
delay_cycles(1);
senserst_n = 1;

//Forward is X = 1 / X# = 0
//Reverse is X = 0 / X# = 1
if (mode)
    dataout = driver_fwd[x & 3];
else
    dataout = driver_rev[x & 3];

//Drivers are 4 channels per byte so decide which driver to address
if (x & 4)
    {
    x74 = 1;
    delay_cycles(1);
    x74 = 0;
    }
else
    {
    x30 = 1;
    delay_cycles(1);
    x30 = 0;
    }

//Forward is Y = 1 / Y# = 0
//Reverse is Y = 0 / Y# = 1
if (mode)
    dataout = driver_fwd[y & 3];
else
    dataout = driver_rev[y & 3];

//Drivers are 4 channels per byte so decide which driver to address
if (y & 4)
    {
    y74 = 1;
    delay_cycles(1);
    y74 = 0;
    }
else
    {
    y30 = 1;
    delay_cycles(1);
    y30 = 0;
    }

//Hold the X and Y current to allow the core to flip.
//This usually happens about 5uS after the current is turned on
if (delay)
    delay_us(delay);

//Read the sense amplifier state (Since demo only uses 1 pin, not on data bus)
datain = sense0;

//All off, write all drivers to 0x00 at the same time
dataout = 0x00;
blat    = 0x0F;
delay_cycles(1);
blat    = 0x00;

//Scope trigger low
trigger = 0;

return datain;
}
////////////////////////////////////////////////////////////////////////////
```