ScadaPack 350 to Profire 2100
ISAGRAF

Configure the COM2 serial port using TOOLS->CONTROLLER->SERIAL PORT


Note even though the port type is set to RS232. By setting Jumper J13 on the ScadaPack will set the port to RS-485.
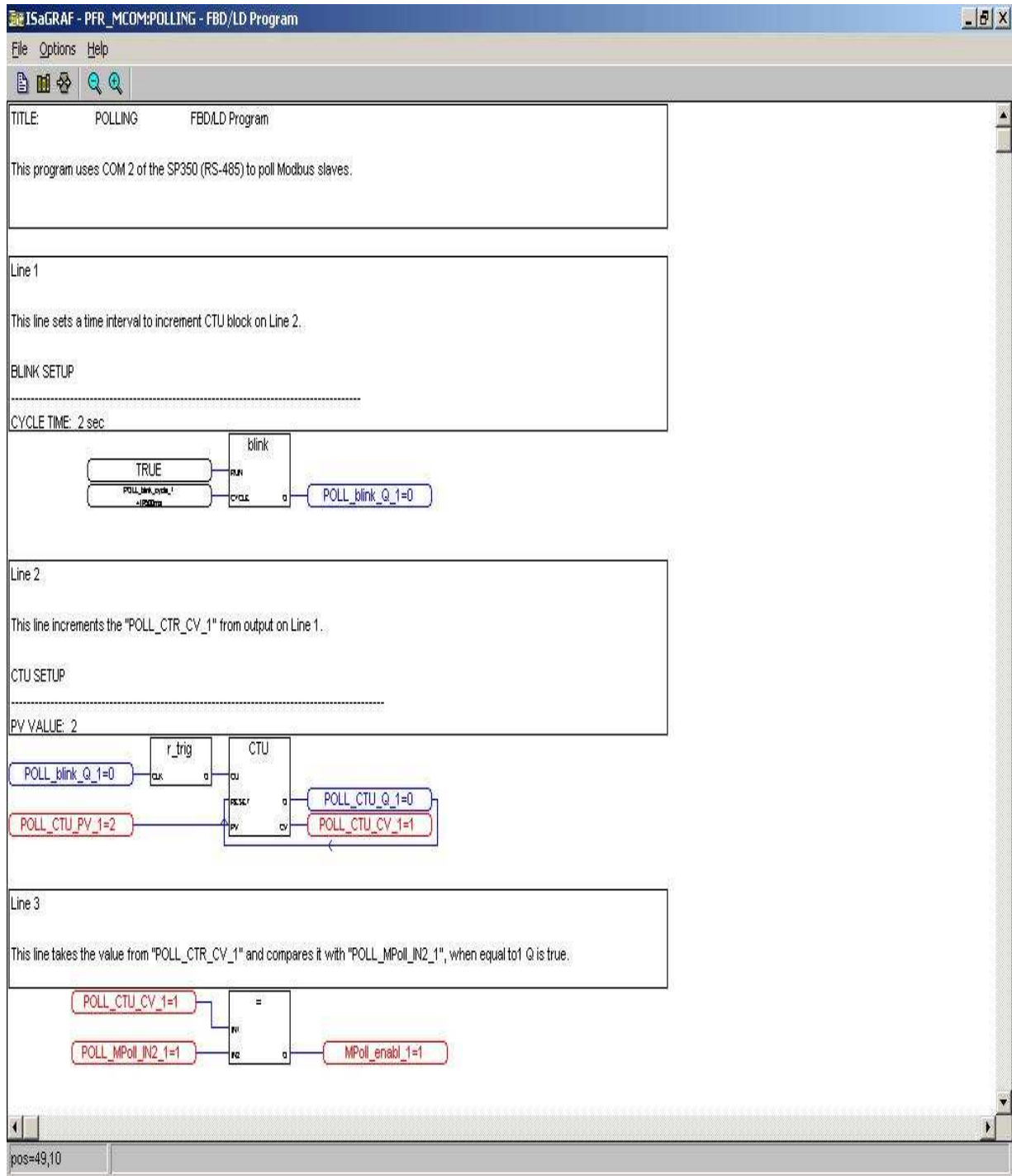
Dictionary variables need to be set but probably easiest to go into the example program for details on the variables. Basically the variable to trigger the MASTER Modbus poll block need to be set along with variables to store the received Modbus data, variables to save the Profire registers and the various constants for the program.

The below ScadaPack COM2 serial port diagram, connect A+ to Profire Comm Card A and Y, then connect B- to Profire Comm Card B and Z. Important: connect the GND from the ScadaPack COM2 port to the Profire Comm Card GND since the Profire RS-485 is isolated from power supply ground.

Set all the switches on the Profire Comm Card to OFF. Enable the Comm Port using the Profire front panel settings and set the address to "2".

RJ-45 Modular Jack

Pin	Signal
1.	+5V
2.	NC *
3.	NC *
4.	GND
5.	B –
6.	A +
7.	NC *
8.	NC *
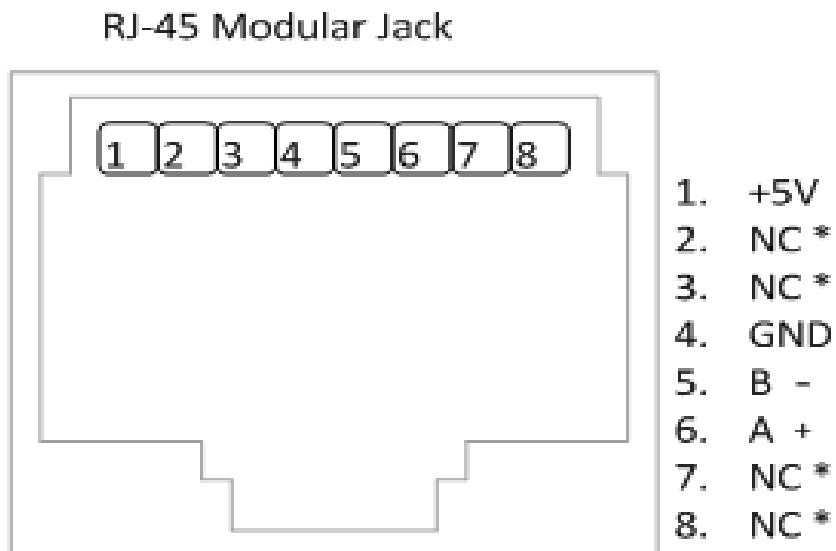
Load the demonstration program into the ScadaPack 350 and RUN. When displaying the Polling display on the ScadaPack program the following will be shown.

File Options Help

TITLE: POLLING   FBD/LD Program

This program uses COM 2 of the SP350 (RS-485) to poll Modbus slaves.

Line 1

This line sets a time interval to increment CTU block on Line 2.

BLINK SETUP

CYCLE TIME: 2 sec

```
                          blink
    ┌──────────────┐    ┌──────────┐
    │    TRUE       │────┤RUN       │
    ├──────────────┤    │          │
    │ POLL_blink_cycle_1 ├──┤CYCLE   Q├──( POLL_blink_Q_1=0 )
    │   =1500ms      │    └──────────┘
    └──────────────┘
```

Line 2

This line increments the "POLL_CTR_CV_1" from output on Line 1.

CTU SETUP

PV VALUE: 2

```
                    r_trig         CTU
                  ┌────────┐    ┌──────────┐
( POLL_blink_Q_1=0 )──┤CLK   Q├──┤CU        │
                  └────────┘    │          │
                                │RESET   Q├──( POLL_CTU_Q_1=0 )
( POLL_CTU_PV_1=2 )────────────┤PV     CV├──( POLL_CTU_CV_1=1 )
                                └──────────┘
```

Line 3

This line takes the value from "POLL_CTR_CV_1" and compares it with "POLL_MPoll_IN2_1", when equal to1 Q is true.

```
( POLL_CTU_CV_1=1 )──┐    ┌────────┐
                     │    │   =    │
                     ├────┤IN1     │
( POLL_MPoll_IN2_1=1 )────┤IN2   Q├──( MPoll_enabl_1=1 )
                          └────────┘
```

pos=49,10

This first page shows the trigger so the Master Modbus block is triggered once per second.

File   Options   Help

Line 4

This line holds the master polling block for count 1.

MASTER SETUP

COM PORT: 2 (RS-485)
FUNCTION: 3 (Read Holding Registers)
SLAVE STATION: 2
SLAVE ADDRESS: 40001
MASTER ADDRESS: 40001
REGISTERS: 6

Note: Add one to the modbus registers in ISaGRAF to get correct location.

master

MPoll_enabl_1=0 — enabl
MPoll_comx_1=2 — comX
MPoll_funct_1=3 — func
MPoll_slave_1=2 — slave
MPoll_sAddr_1=40001 — sAdd
MPoll_mAddr_1=40001 — mAdd   done — MPoll_done_1=0
MPoll_lengt_6=6 — leng   erro — MPoll_error_1=0
MPoll_timeO_1=30 — timeO   statu — MPoll_statu_1=1

The ISAGRAF registers are 32 bit so the following
extracts the 16 bit Profire values from the 32 bit ISAGRAF
registers

Modbus_40001=196868

40001 is RUN status and Valve
status

shr

IN
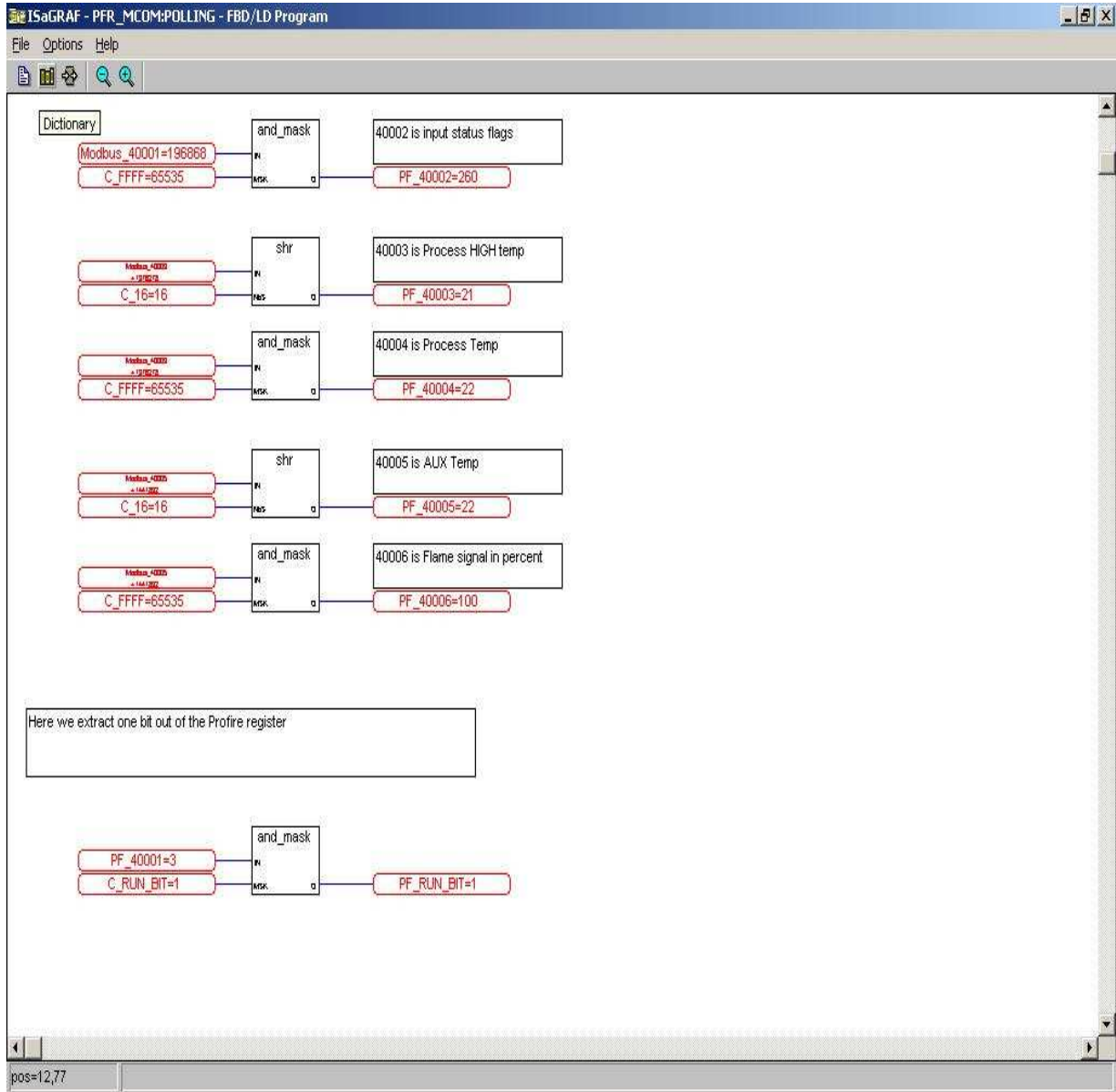C_16=16 — NbS   Q — PF_40001=3

and_mask

Modbus_40001=196868 — IN

40002 is input status flags

pos=9,41

The Master Poll block is shown.

Now as mentioned above, the ScadaPack registers are 32 bit so two 16 bit Profire registers (ex: 40001 and 40002) are polled and placed into the ScadaPack 40001 register. To extract the high 16 bit Profire registers, first a Shift Right function is used to shift the 32 bit ScadaPack register over 16 bits and that value is saved. Then the low 16 bit Profire register is extracted by using a AND MASK with a constant of FFFF Hex (65535 decimal) and that will mask out the lower 16 bits.

At the end of the above example, again using the AND MASK, an individual bit can be extracted and in the above example, the Profire 40001 register which has the RUN bit, Pilot bit, LowFire bit and HighFire bit, is AND MASKED with a constant C_RUN_BIT = 1 and the resulting RUN bit on or off is stored in the PF_RUN_BIT variable.

Note that Profire registers 40003 has the Process High temperature, 40004 has the Process temperature and 40005 has the AUX temperature. These temperatures are in Celsius and if Fahrenheit temperatures are needed for recording or display, they will have to be converted in the ScadaPack or in the HMI using the equation:

F = ((C x 9) / 5) + 32