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noForth

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# MSP-EXP430G2 with noForth 2553

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In this text we refer to these two documents:

- MSP430G2553.PDF "MSP430G2x53, MSP430G2x131 mixed signal microcontroller"
- SLAU144J.PDF "MSP430x2xx Family User's Guide"

1. MSP-EXP430G2 with noForth 2553
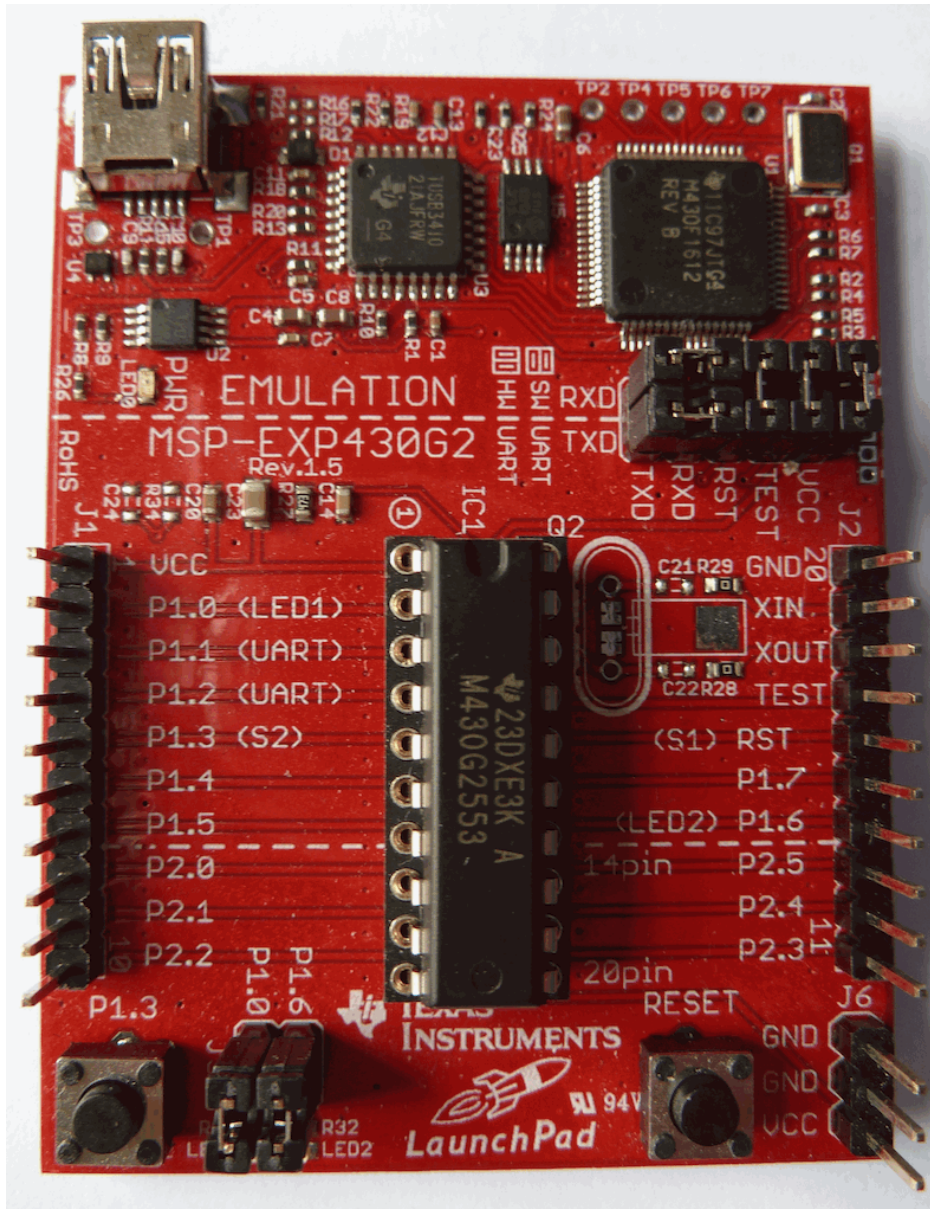
MSP-EXP430G2, LAUNCHPAD, DEV KIT
Core Sub-Architecture: MSP430
Kit Contents: LaunchPad Emulator, Mini USB-B Cable, Quick Start Guide

- Farnell - Ordercode: 1853793, TEXAS INSTRUMENTS - MSP-EXP430G2
- Aliexpress - Product ID: 1125692571, MSP-EXP430G2 launchpad

RS232/USB driver

Download the USB driver for the MSP-EXP430G2 Launchpad under Windows to your PC.

For a working RS232/USB connection the jumpers must be in the "HW|UART" position, as the picture shows.
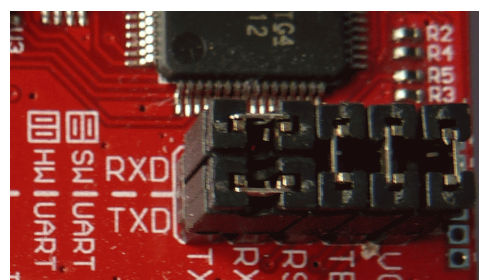
i/o port connections on MSP-EXP430G2

```
Port 1                      Port 2
Digital i/o, UART           Digital i/o


P1.0    Led red             P2.0    ...
P1.1    Uart                P2.1    ...
P1.2    Uart                P2.2    ...
P1.3    S2                  P2.3    ...
P1.4    ...                 P2.4    ...
P1.5    ...                 P2.5    ...
P1.6    Led green           P2.6    Xin
P1.7    ...                 P2.7    Xout
```

Connectors on MSP-EXP430G2

```
J1      = i/o P1, P2 and VCC
J2      = i/o P1, P2, Reset, Test and GND
J3      = Programmer connection and USB RS232
J4      = eZ430 interface
J5      = Jumpers to red led and green led
J6      = External power (2,5V tot 3,6V)
EZ_USB  = USB RS232 and programmer interface
TP1     = +5 Volt
TP3     = GND
```

Hardware on MSP-EXP430G2

- Red led on P1.0
- Green led on P1.6
- Switch S2 on P1.3
- Reset switch S1

2. MSP430G2553 i/o ports

Port addresses

The MSP430G2553 port registers are memory mapped. An overview:

Label	P1	P2	Function
PxIN	20	28	In
PxOUT	21	29	Out
PxDIR	22	2A	Direction
PxIFG	23	2B	Interrupt flag
PxIES	24	2C	Interrupt edge on
PxIE	25	2D	Interrupt on
PxSEL	26	2E	Select
PxREN	27	2F	Resistor on/off
PxSEL2	41	42	Select 2

See: MSP430G2553.PDF under "peripheral file map" page 18-20.

PxDir, PxREN and PxOUT

The three registers PxDIR, PxREN and PxOUT are used to configure an i/o pin:

PxDIR	PxREN	PxOUT	Pin configuration
0	0	x	Floating input
0	1	0	Input with resistor to GND
0	1	1	Input with resistor to VCC
1	x	x	Output

More info in MSP430G2553.PDF page 328-329.
Texas Instruments recommends to configure unconnected i/o pins as Output.

PxSEL and PxSEL2

The registers PxSEL and PxSEL2 are to assign a special function to an i/o pin. In this way, for example, the ADC or UART can be activated.
More info: MSP430G2553.PDF page 42-57: Port Pin Functions.

PxSEL2	PxSEL	i/o-function
0	0	Normal i/o
0	1	Basic extra function
1	0	Controller specific!
1	1	Second extra function

3. MSP430G2553 RAM & ROM

```
RAM        0200 – 03FF
FlashROM   C000 – FFFF
```

4. MSP430G2553 interrupt vectors

```
FFDE    End of free Flash

FFE0    ...
FFE2    ...
FFE4    P1
FFE6    P2
FFE8    ...
FFEA    ADC
FFEC    USCI B0 TX
FFEE    USCI B0 RX

FFF0    TIMER0A0 CCR1 CCR2
FFF2    TIMER A0 CCR0
FFF4    WATCHDOG
FFF6    COMPARATOR
FFF8    TIMER A1 CCR1 CCR2
FFFA    TIMER A1 CCR0
FFFC    NMI
FFFE    RESET
```

See MSP430G2553.PDF page 11 for details.

5. Processor registers in noForth

All processor registers (R0..R15) have their own name in noForth assembler:

`PC  RP (SP in TI texts!) SR CG`	MSP430 system registers
`SP  IP  TOS  DOX  NXT`	noForth system registers
`W   DAY SUN  MOON`	Registers, locally used by noForth
`XX  YY  ZZ`	Unused (free) registers