THOMSON SEMICONDUCTEURS

ET9420/9421/9422 • ET9320/9321/9322

SINGLE-CHIP MICROCONTROLLERS

The ET9420/9421/9422, ET9320/9321 and 9322 Single-Chip N-Channel Microcontrollers are fully compatible with the COPS ® family, fabricated using N-channel, silicon gate XMOS technology. They are complete microcomputers containing all system timing, internal logic, ROM, RAM and I/O necessary to implement dedicated control functions in a variety of applications. Features include single supply operation, a variety of output configuration options, with an instruction set, internal architecture and I/O scheme designed to facilitate keyboard input, display output and BCD data manipulation. The ET9421 is identical to the ET9420, except with 19 I/O lines instead of 23 ; the ET9422 has 15 I/O lines. They are an appropriate choice for use in numerous human interface control environments. Standard test procedures and reliable high-density fabrication techniques provide the medium to large volume customers with a customized Controller Oriented Processor at a low end-product cost.
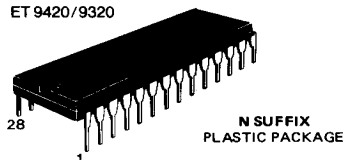
The ET9320 is the extended temperature range version of the ET9420 (likewise the ET9321 and ET9322 are the extended temperature range versions of the ET9421/ET9422). The ET9320/9321/9322 are exact functional equivalents of the ET9420/9421/9422.

- Low cost
- Powerful instruction set
- 1 K x 8 ROM, 64 x 4 RAM
- 23 I/O lines (ET9420, ET9320)
- True vectored interrupt, plus restart
- Three-level subroutine stack
- 4.0 µs instruction time
- Single supply operation
- Internal time-base counter for real-time processing
- Internal binary counter register with MICROWIRE ® compatible serial I/O capability
- General purpose and TRI-STATE® outputs
- TTL/CMOS compatible in and out
- LED direct drive outputs
- MICROBUS ® compatible
- Software/hardware compatible with other members of ET9400
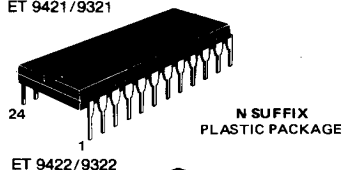- Extended temperature range device ET9320/9321/9322 (-40° C to + 85° C)

NMOS
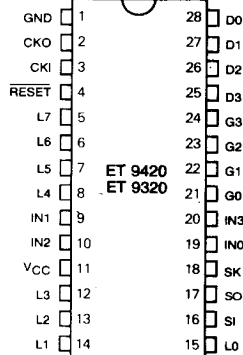
SINGLE-CHIP MICROCONTROLLERS

ET 9420/9320

28 / 1 — N SUFFIX PLASTIC PACKAGE

ET 9421/9321
24 / 1 — N SUFFIX PLASTIC PACKAGE

ET 9422/9322
20 / 1 — N SUFFIX PLASTIC PACKAGE

PIN ASSIGNMENTS
(See page 7)

ET 9420 / ET 9320	
GND 1	28 D0
CKO 2	27 D1
CKI 3	26 D2
RESET 4	25 D3
L7 5	24 G3
L6 6	23 G2
L5 7	22 G1
L4 8	21 G0
IN1 9	20 IN3
IN2 10	19 IN0
VCC 11	18 SK
L3 12	17 SO
L2 13	16 SI
L1 14	15 L0

43 - 45, Avenue de l'Europe 78140 VELIZY-FRANCE Tel. (1) 39.46.97.19 Telex : 240780F

1145

This Material Copyrighted By Its Respective Manufacturer

OPTION LIST

The ET9420/9421/9422 mask-programmable options are assigned numbers which correspond with the ET9420 pins.

The following is a list of ET9420 options. When specifying a ET9421 or ET9422 chip, Options 9, 10, 19, 20 and 29 must all be set to zero. When specifying a ET9422 chip, Options 21, 22, 27 and 28 must also be zero, and Option 2 must not be a 1. The options are programmed at the same time as the ROM pattern to provide the user with the hardware flexibility to interface to various I/O components using little or no external circuitry.

Option 1 = 0: Ground Pin — no options available

Option 2: CKO Pin
    = 0: clock generator output to crystal
       (0 not available if option 3 = 4 or 5)
    = 1: pin is RAM power supply (V_R) input
       (Not available on ET9422, ET9322)
    = 2: general purpose input with load device
    = 3: multi-COP SYNC input
    = 4: general purpose Hi Z input

Option 3: CKI Input
    = 0: crystal input divided by 16
    = 1: crystal input divided by 8
    = 2: TTL external clock input divided by 16
    = 3: TTL external clock input divided by 8
    = 4: single-pin RC controlled oscillator (-4)
    = 5: Schmitt trigger clock input ($\div 4$)

Option 4: RESET Pin
    = 0: Load devices to V_{CC}
    = 1: Hi-Z input

Option 5: L_7 Driver
    = 0: Standard output (figure 9D)
    = 1: Open-Drain output (E)
    = 2: LED direct drive output (F)
    = 3: TRI-STATE®push-pull output (G)

Option 6: L_6 Driver
    same as Option 5

Option 7: L_5 Driver
    same as Option 5

Option 8: L_4 Driver
    same as Option 5

Option 9: IN_1 Input
    = 0: load device to V_{CC} (H)
    = 1: Hi-Z input (I)

Option 10: IN_2 Input
    same as Option 9

Option 11 = 0: V_{CC} Pin — no options available

Option 12: L_3 Driver
    same as Option 5

Option 13: L_2 Driver
    same as Option 5

Option 14: L_1 Driver
    same as Option 5

Option 15: L_0 Driver
    same as Option 5

Option 16 : SI Input
    same as Option 9

Option 17: SO Driver
    = 0: standard output (A)
    = 1: open-drain output (B)
    = 2: push-pull output (C)

Option 18: SK Driver
    same as Option 17

Option 19: IN_0 Input
    same as Option 9

Option 20: IN_3 Input
    same as Option 9

Option 21: G_0 I/O Port
    = 0: Standard output (A)
    = 1: Open-Drain output (B)

Option 22: G_1 I/O Port
    same as Option 21

Option 23: G_2 I/O Port
    same as Option 21

Option 24: G_3 I/O Port
    same as Option 21

Option 25: D_3 Output
    = 0: Standard output (A)
    = 1: Open-Drain output (B)

Option 26: D_2 Output
    same as Option 25

Option 27: D_1 Output
    same as Option 25

Option 28: D_0 Output
    same as Option 25

Option 29: Chip Function
    = 0: normal operation
    = 1: MICROBUS® option

Option 30: Chip Bonding
    = 0: ET9420 (28-pin device)
    = 1: ET9421 (24-pin device)
    = 2: 28 and 24-pin versions
    = 3: ET9422 (20-pin device)
    = 4: 28- and 20-pin versions
    = 5: 24- and 20-pin versions
    = 6: 28-, 24-, and 20-pin versio

Option 31: IN Input Levels
    = 0: normal input levels
    = 1: Higher voltage input leve
       ("0" = 1.2V, "1" = 3.6V)

Option 32: G Input Levels
    same as Option 31

Option 33: L Input Levels
    same as Option 31

Option 34: CKO Input Levels
    same as Option 31

Option 35: SI Input Levels
    same as Option 31