


Power Line Modem

25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off.
All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.

intelligence  everywhere™

MOTOROLA
digital dna™ 

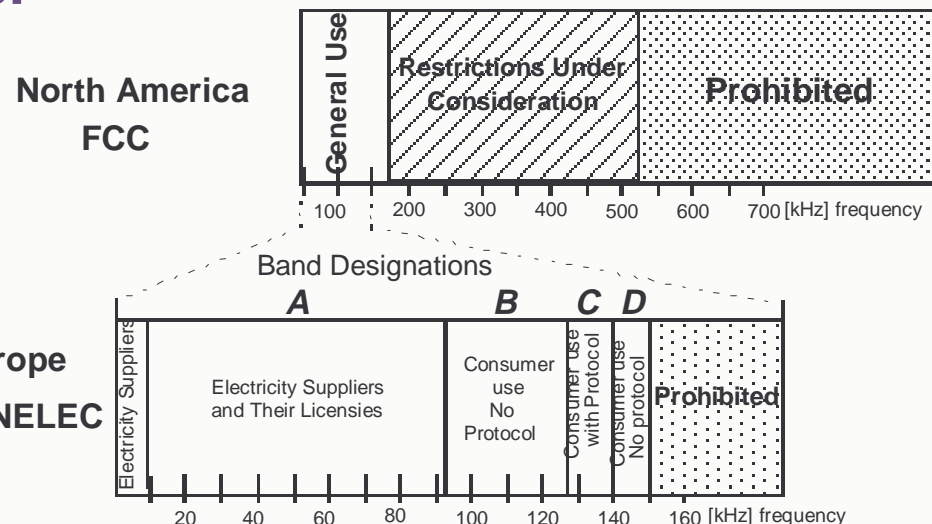
PLC modules basic introduction

- **Introduction:**

- PL investigations in MCSL started in Dec. 2000

- **Basic technical requirements:**

- low cost low speed solution
- based on the Motorola DSP56F80x
- FSK modulation used in CELENEC EN 50065-1 “B” band (95-125kHz)
- transparent channel operation
- half-duplex mode of communication



25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off. All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.

Another technical requirements

- **16 bits *Cyclic Redundancy Check (CRC)*** is used to verify the integrity of every transmitted frame
- ***Encryption / Decryption*** ensures the security of the transmitted data. The PLM board software utilizes *The Tiny Encryption Algorithm (TEA)*.
- ***Forward Error Correction (FEC)*** uses added redundancy information in order to correct the errors which occurred during the transmission. Quite straightforward method of FEC called *Linear Block Codes* is used. Added redundancy is characterized by expression (7, 4).
- ***Interleaving*** is another technique which should assure better consistency of the transmitted data. It simply modify the sequence of bits of frame to be transmit in defined way.

25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off.
All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.

PLC modules evolution history

- **First version (generation)**
 - external hardware (modulator & demodulator) necessary => quite expensive
 - communication speed up to 20kbps
 - logical "1" - 105,00kHz, logical "0" - 116,67kHz
- **Current version**
 - modulation & demodulation done completely in SW => cheaper solution
 - lower speed (10.000bps)
 - variable configuration of carrier frequencies: 100, 105, 110, 115 and 120kHz with freq. difference equal to 10kHz
- **Next version – should be KNX compatible!!!**

25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off. All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.

PLC modules evolution history



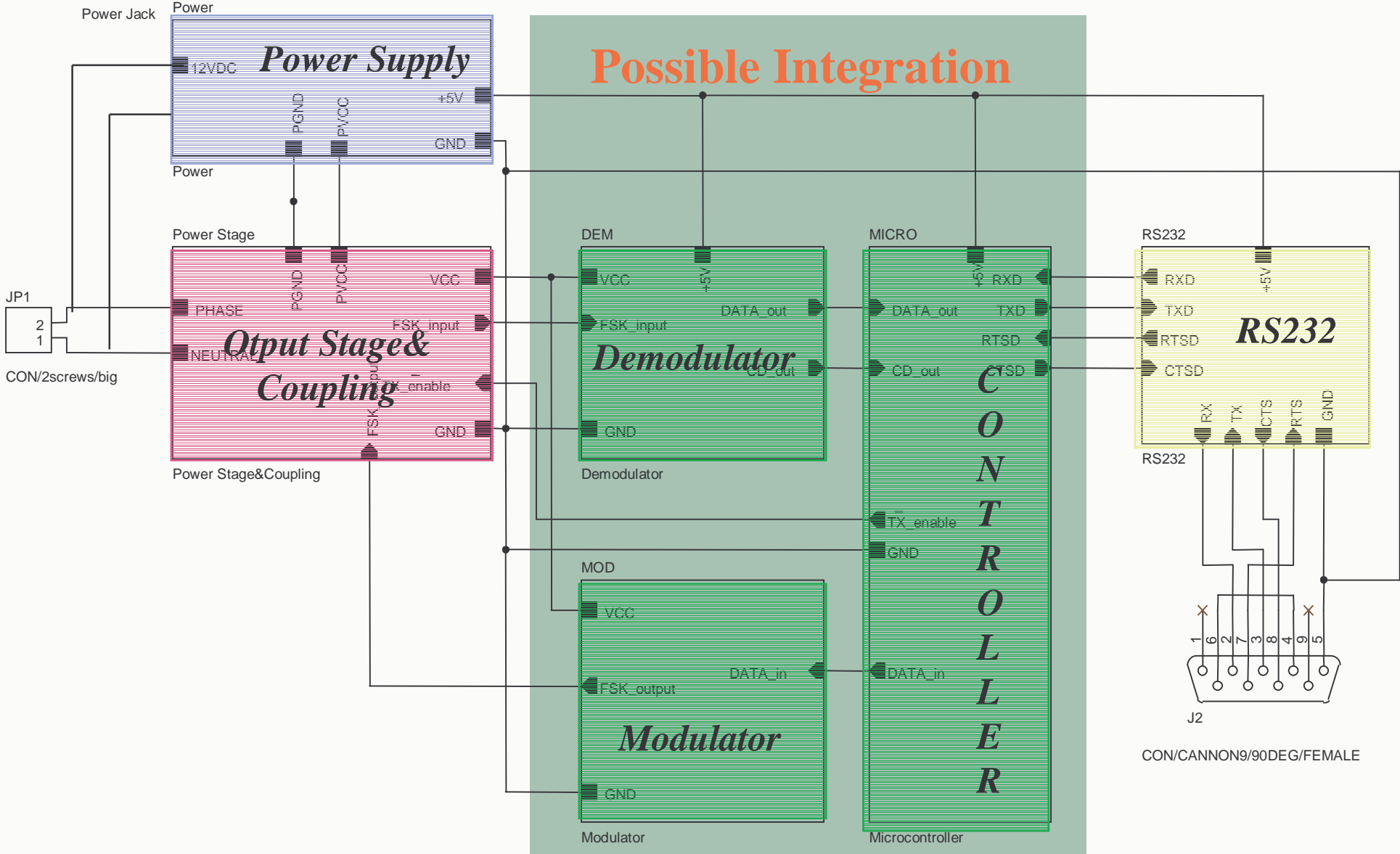
PLC modem - first generation

25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off.
All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.

Structure of 1st version PLC



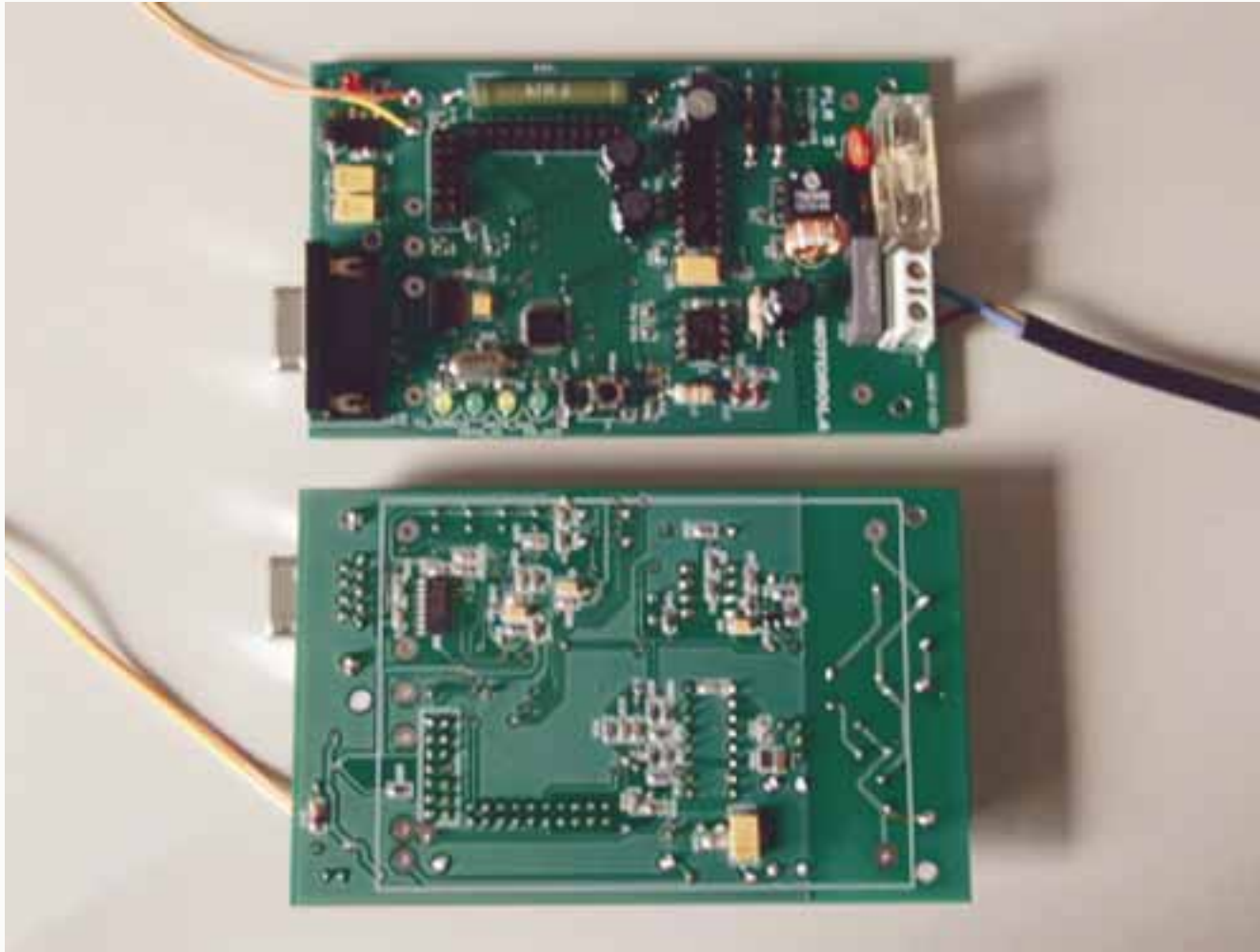
25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off. All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.



PLC modules evolution history



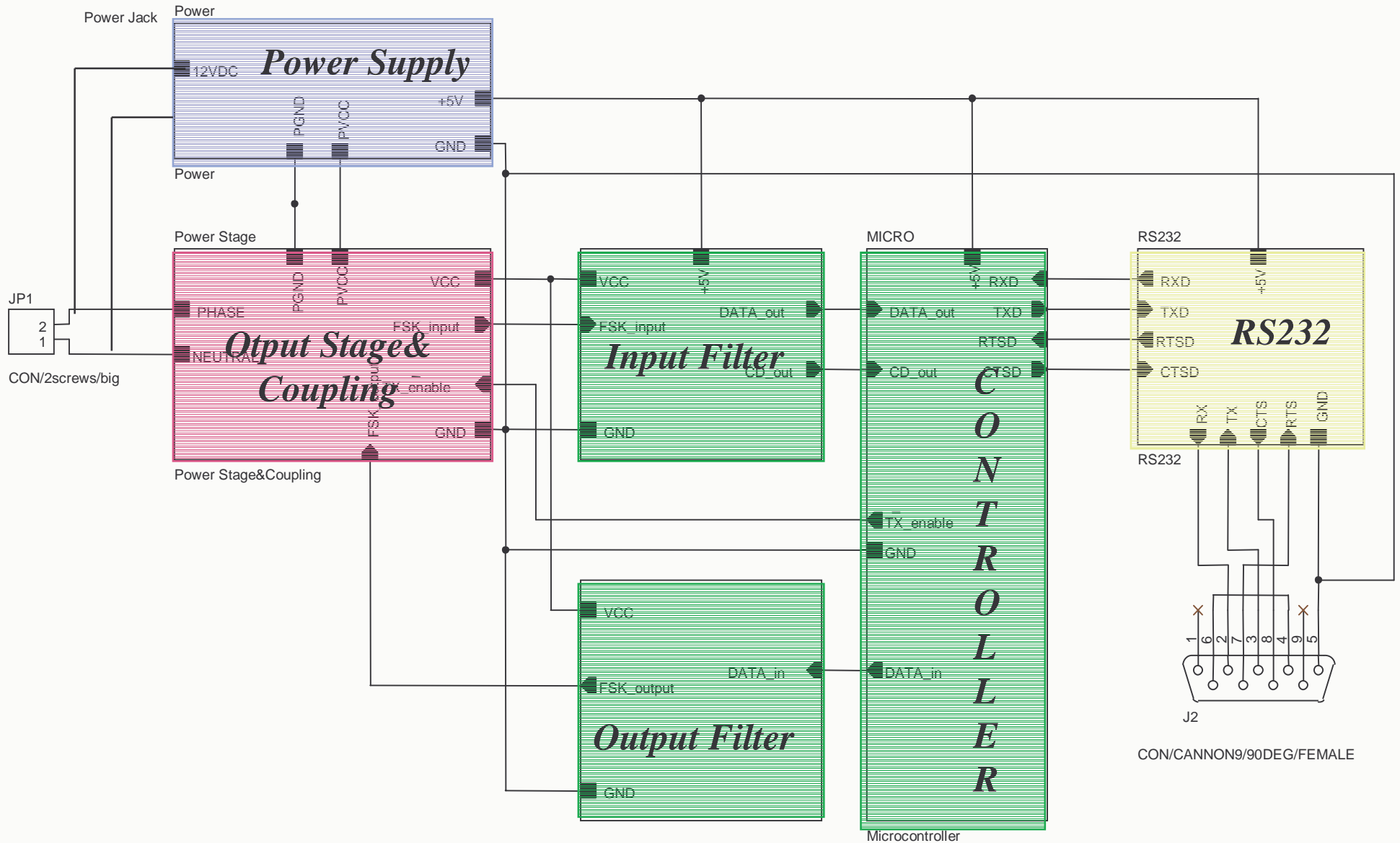
PLC modem – current version

25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off. All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.

Structure of current version PLC



25-10-2001

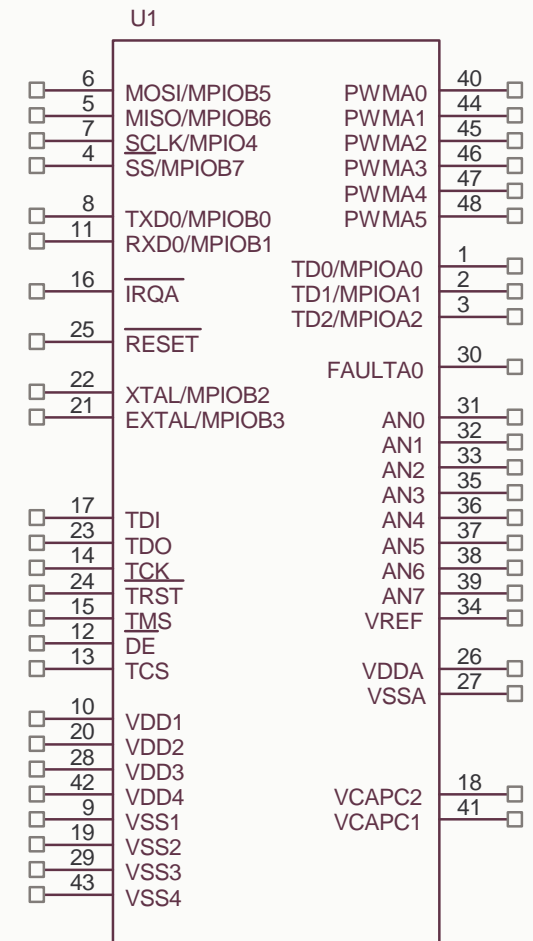
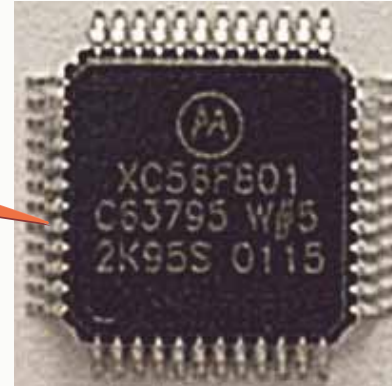
Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off. All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.

DSP56F801

16-bit Digital Signal Processor

- Up to 40 MIPS operation
- 48-pin LQFP Package
- 8K 16-bit words Program Flash
- 1K 16-bit words Program RAM
- 2K 16-bit words Data Flash
- 1K 16-bit words Data RAM
- 2K 16-bit words BootFLASH
- Serial Communications Interface (SCI)
- Serial Peripheral Interface (SPI)
- 6-channel PWM Module
- Two 4-channel, 12-bit ADCs
- General Purpose Quad Timer
- JTAG/OnCE™ port for debugging
- On-chip relaxation oscillator
- 11 shared GPIO



DSP56F801FA80

25-10-2001

Motorola General Business, KNX ver 1.0

Motorola, the Stylized M, and all other trademarks indicated as such herein are trademarks of Motorola, Inc. © Reg. U.S. Pat. & Tm. Off. All other product or service names are the property of their respective owners. © Motorola, Inc. 2001. All rights reserved.