

Welcome to [E-XFL.COM](https://www.e-xfl.com)

What is "[Embedded - Microcontrollers](#)"?

"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "[Embedded - Microcontrollers](#)"

Details

Product Status	Active
Core Processor	PIC
Core Size	8-Bit
Speed	20MHz
Connectivity	-
Peripherals	Brown-out Detect/Reset, POR, PWM, WDT
Number of I/O	5
Program Memory Size	1.75KB (1K x 14)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	64 x 8
Voltage - Supply (Vcc/Vdd)	2V ~ 5V
Data Converters	A/D 4x10b; D/A 1x5b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	8-VDFN Exposed Pad
Supplier Device Package	8-DFN (3x3)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic12hv752-i-mf

14-Pin Flash-Based, 8-Bit CMOS Microcontrollers with Intelligent Analog

High-Performance RISC CPU:

- Only 35 Instructions to Learn
- All Single-Cycle Instructions except Branches
- Operating Speed:
 - DC – 20 MHz clock input
 - DC – 200 ns instruction cycle
- 2048 x 14 On-Chip Flash Program Memory
- Self Read/Write Program Memory
- Interrupt Capability with Automatic Context Saving
- 8-Level Deep Hardware Stack
- Direct, Indirect and Relative Addressing modes

Special Microcontroller Features:

- Precision Internal Oscillator:
 - Factory calibrated to $\pm 1\%$, typical
 - Software selectable frequency:
8 MHz, 4 MHz, 1 MHz, or 31 kHz
- Power-Saving Sleep mode
- Operating Voltage Range (PIC16F753):
 - 2.0V-5.5V
- Shunt Voltage Regulator (PIC16HV753):
 - 5.0V regulation
 - 1 mA to 50 mA shunt range
 - 2.0V to user defined
- Multiplexed Master Clear with Pull-up/Input Pin
- Interrupt-on-Change Pins
- Individually Programmable Weak Pull-ups
- Power-on Reset (POR)
- Power-up Timer (PWRT)
- Brown-out Reset (BOR)
- Watchdog Timer (WDT) with Internal Oscillator for Reliable Operation
- Industrial and Extended Temperature Range
- High Endurance Flash/EEPROM Cell:
 - 100,000 write Flash endurance
 - Flash retention: >40 years
- Programmable Code Protection
- In-Circuit Serial Programming™ (ICSP™) via Two Pins
- In-Circuit Debug (ICD) via Two Pins

Low-Power Features:

- Standby Current:
 - 50 nA @ 2.0V, typical
- Operating Current:
 - 11 μ A @ 32 kHz, 2.0V, typical
 - 260 μ A @ 4 MHz, 2.0V, typical
- Watchdog Timer Current:
 - <1 μ A @ 2.0V, typical

Peripheral Features:

- 11 I/O Pins (1 input-only pin):
- High Current Sink/Source:
 - 50 mA I/O (2 pins)
 - 25 mA I/O (9 pins)
- Two High-Speed Analog Comparator Modules:
 - 50 ns response time
 - Fixed Voltage Reference (FVR)
 - Programmable on-chip voltage reference via integrated 9-bit DAC
 - Internal/external inputs and outputs (selectable)
 - Built-in Hysteresis (software selectable)
- Analog-to-Digital Converter (ADC):
 - 10-bit resolution
 - Eight external channels
 - Two internal reference voltage channels
- Operational Amplifier:
 - Three terminal operation
 - Internal connections to DAC and FVR
- Digital-to-Analog Converter (DAC):
 - 9-bit resolution
 - Full range resolution
 - 4 mV steps at 2.0V
- Fixed Voltage Reference (FVR), 1.2V Reference
- Capture, Compare, PWM (CCP) Module:
 - 16-bit Capture, max. resolution 12.5 ns
 - 16-bit Compare, max. resolution 200 ns
 - 10-bit PWM, max. frequency 20 kHz
- Timer0: 8-Bit Timer/Counter with 8-Bit Programmable Prescaler
- Enhanced Timer1:
 - 16-bit timer/counter with prescaler
 - External Timer1 gate (count enable)
 - Four selectable clock sources
- Timer2: 8-Bit Timer/Counter with 8-Bit Period Register, Prescaler and Postscaler

PIC16F753/HV753

Peripheral Features (Continued):

- Complementary Output Generator (COG):
 - Slope Compensation Circuit for use with SMPS power supplies
 - Complementary Waveforms for Full and Half-Bridge topologies
 - Two I/O (50 mA) for direct MOSFET drive
 - Rising and/or Falling edge input sources for flexible control topologies
 - Phase, Blanking dead-band control
 - Auto-shutdown
 - Hardware Limit Timer (HLT)
 - 8-bit Timer with prescaler
 - 8-bit period register and postscaler
 - Asynchronous H/W Reset sources

PIC12F752/HV752/PIC16F753/HV753 Family Types

Device	Data Sheet Index	Program Memory Flash (words)	Self Read/Write Flash Memory	Data SRAM (bytes)	I/O's ⁽²⁾	10-bit ADC (ch)	Comparators	Timers (8/16-bit)	CCP	Complementary Output Generator (COG)	DAC	Operational Amplifiers	Shunt Regulator	Debug ⁽¹⁾
PIC12F752	(1)	1K	Y	64	6	4	2	3/1	1	Y	5-bit	N	N	H
PIC12HV752	(1)	1K	Y	64	6	4	2	3/1	1	Y	5-bit	N	Y	H
PIC16F753	(2)	2K	Y	128	12	8	2	3/1	1	Y	9-bit	Y	N	I/H
PIC16HV753	(2)	2K	Y	128	12	8	2	3/1	1	Y	9-bit	Y	Y	I/H

Note 1: I - Debugging, Integrated on Chip; H – Debugging, Available using Debug Header

2: One pin is input-only.

Data Sheet Index:

- 1: DS41576 [PIC12F752/HV752 Data Sheet, 8-Pin, Flash-Based 8-Bit CMOS Microcontrollers.](#)
- 2: Future Release [PIC16F753/HV753 Data Sheet, 14-Pin, Flash-Based 8-Bit CMOS Microcontrollers with Intelligent Analog.](#)

Note: For other small form-factor package availability and marking information, please visit <http://www.microchip.com/packaging> or contact your local sales office.

FIGURE 1: 14-PIN PDIP, SOIC, TSSOP DIAGRAM FOR PIC16F753/HV753

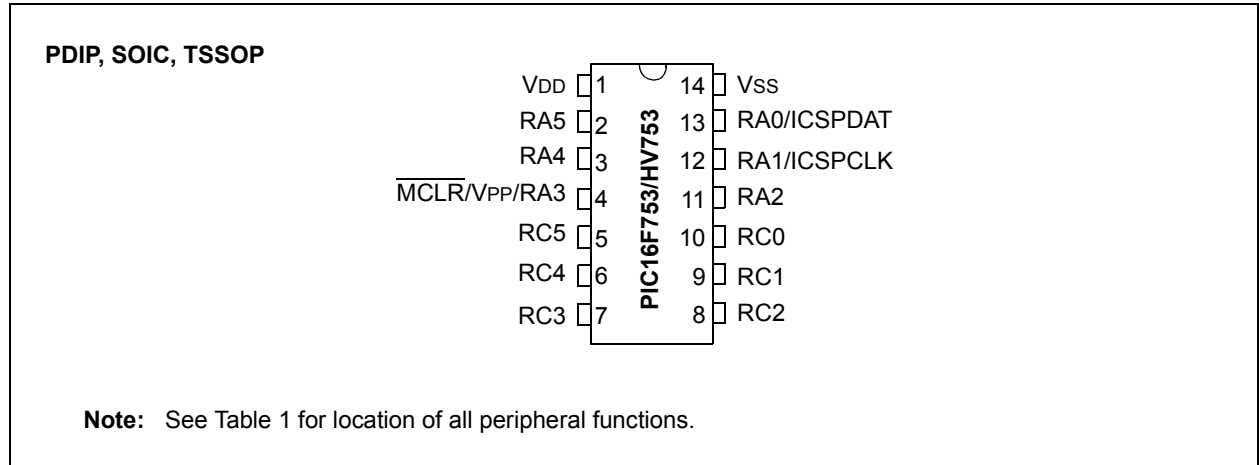
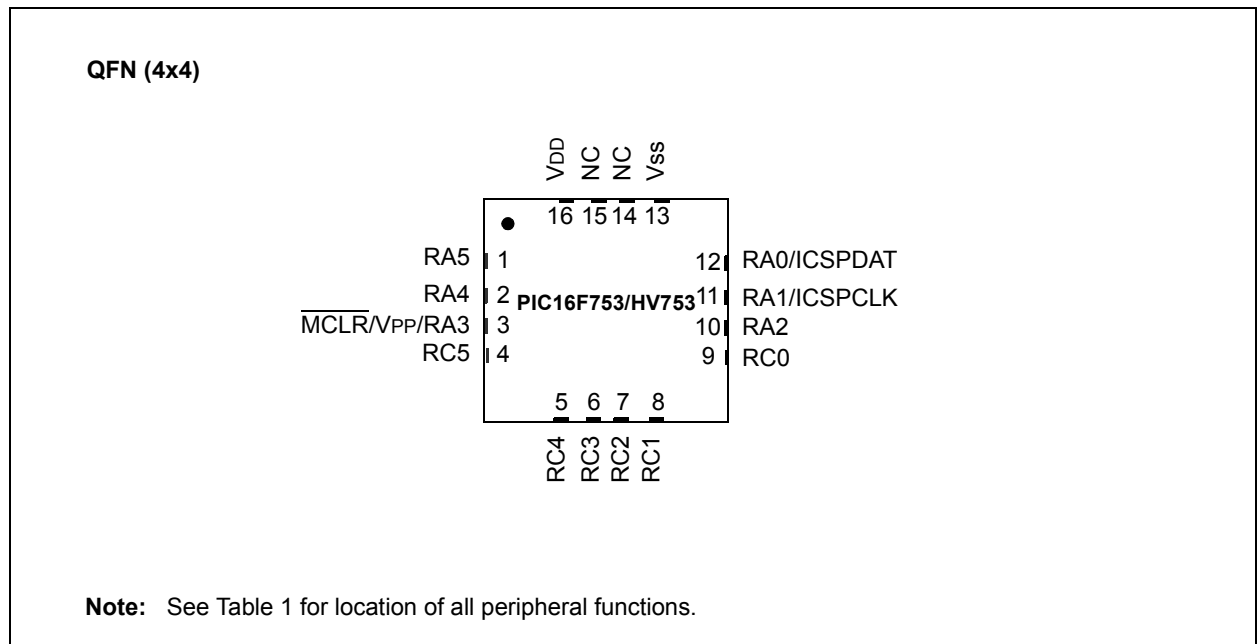


FIGURE 2: 16-PIN QFN DIAGRAM FOR PIC16F753/HV753



PIC16F753/HV753

TABLE 1: 14-PIN ALLOCATION TABLE (PIC16F753/HV753)

I/O	14-Pin PDIP/SOIC/TSSOP	16-Pin QFN	ADC	Reference	Op Amp	Comparator	Timer	CCP	Interrupt	Pull-Up	Basic
RA0	13	12	AN0	FVROUT DACOUT	—	C1IN0+	—	—	IOC	Y	ICSPDAT
RA1	12	11	AN1	VREF FVRIN	—	C1IN0- C2IN0-	—	—	IOC	Y	ICSPCLK
RA2	11	10	AN2	C0G1FLT	—	C1OUT	T0CKI	—	INT IOC	Y	—
RA3	4	3	—	—	—	—	T1G ⁽²⁾	—	IOC	Y	MCLR
RA4	3	2	AN3	—	—	—	T1G ⁽¹⁾	—	IOC	Y	CLKOUT
RA5	2	1	—	—	—	—	T1CKI	—	IOC	Y	—
RC0	10	9	AN4	—	OPA1IN+	C2IN0+	—	—	IOC	—	—
RC1	9	8	AN5	—	OPA1IN-	C1IN1- C2IN1-	—	—	IOC	—	—
RC2	8	7	AN6	—	OPA1OUT	C1IN2- C2IN2-	—	—	IOC	—	—
RC3	7	6	AN7	—	—	C1IN3- C2IN3-	—	—	IOC	—	—
RC4	6	5	—	COG1OUT1	—	C2OUT	—	—	IOC	—	—
RC5	5	4	—	COG1OUT0	—	—	—	CCP1	IOC	—	—
VDD	1	16	—	—	—	—	—	—	—	—	VDD
VSS	14	13	—	—	—	—	—	—	—	—	VSS

Note 1: Default location for peripheral pin function. Alternate location can be selected using the APFCON register.

Note 2: Alternate location for peripheral pin function selected by the APFCON register.

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

Trademarks

The Microchip name and logo, the Microchip logo, dsPIC, FlashFlex, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, PIC³² logo, rPIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Hampshire, HI-TECH C, Linear Active Thermistor, MTP, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.


Analog-for-the-Digital Age, Application Maestro, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, HI-TIDE, In-Circuit Serial Programming, ICSP, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mTouch, Omniclient Code Generation, PICC, PICC-18, PICDEM, PICDEM.net, PICkit, PICTail, REAL ICE, rLAB, Select Mode, SQL, Serial Quad I/O, Total Endurance, TSHARC, UniWinDriver, WiperLock, ZENA and Z-Scale are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

GestIC and ULPP are registered trademarks of Microchip Technology Germany II GmbH & Co. & KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2012, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

ISBN: 9781620766514

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY DNV
== ISO/TS 16949 ==

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
<http://www.microchip.com/support>
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Cleveland
Independence, OH
Tel: 216-447-0464
Fax: 216-447-0643

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Farmington Hills, MI
Tel: 248-538-2250
Fax: 248-538-2260

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

Santa Clara
Santa Clara, CA
Tel: 408-961-6444
Fax: 408-961-6445

Toronto
Mississauga, Ontario,
Canada
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon
Hong Kong
Tel: 852-2401-1200
Fax: 852-2401-3431

Australia - Sydney
Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing
Tel: 86-10-8569-7000
Fax: 86-10-8528-2104

China - Chengdu
Tel: 86-28-8665-5511
Fax: 86-28-8665-7889

China - Chongqing
Tel: 86-23-8980-9588
Fax: 86-23-8980-9500

China - Hangzhou
Tel: 86-571-2819-3187
Fax: 86-571-2819-3189

China - Hong Kong SAR
Tel: 852-2401-1200
Fax: 852-2401-3431

China - Nanjing
Tel: 86-25-8473-2460
Fax: 86-25-8473-2470

China - Qingdao
Tel: 86-532-8502-7355
Fax: 86-532-8502-7205

China - Shanghai
Tel: 86-21-5407-5533
Fax: 86-21-5407-5066

China - Shenyang
Tel: 86-24-2334-2829
Fax: 86-24-2334-2393

China - Shenzhen
Tel: 86-755-8203-2660
Fax: 86-755-8203-1760

China - Wuhan
Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xian
Tel: 86-29-8833-7252
Fax: 86-29-8833-7256

China - Xiamen
Tel: 86-592-2388138
Fax: 86-592-2388130

China - Zhuhai
Tel: 86-756-3210040
Fax: 86-756-3210049

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444
Fax: 91-80-3090-4123

India - New Delhi
Tel: 91-11-4160-8631
Fax: 91-11-4160-8632

India - Pune
Tel: 91-20-2566-1512
Fax: 91-20-2566-1513

Japan - Osaka
Tel: 81-66-152-7160
Fax: 81-66-152-9310

Japan - Yokohama
Tel: 81-45-471-6166
Fax: 81-45-471-6122

Korea - Daegu
Tel: 82-53-744-4301
Fax: 82-53-744-4302

Korea - Seoul
Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur
Tel: 60-3-6201-9857
Fax: 60-3-6201-9859

Malaysia - Penang
Tel: 60-4-227-8870
Fax: 60-4-227-4068

Philippines - Manila
Tel: 63-2-634-9065
Fax: 63-2-634-9069

Singapore
Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsin Chu
Tel: 886-3-5778-366
Fax: 886-3-5770-955

Taiwan - Kaohsiung
Tel: 886-7-213-7828
Fax: 886-7-330-9305

Taiwan - Taipei
Tel: 886-2-2508-8600
Fax: 886-2-2508-0102

Thailand - Bangkok
Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

UK - Wokingham
Tel: 44-118-921-5869
Fax: 44-118-921-5820