Z86160
SET-TOP CONTROLLER

FEATURES

Part	ROM Kbytes	RAM* Bytes	Speed	Package Information
Z86160	32	768	16	100-Pin QFP

*General-Purpose

- 3.0- to 5.5-Volt Operating Range
- Low-Power Consumption
- Custom Input/Output Lines
- 0°C to +70°C Temperature Range
- 512 Bytes Battery Backed-Up (BBU) Secure RAM
- Keypad Buffer
- LED Controller
- Two Comparators
- Two On-Chip Counter/Timers

GENERAL DESCRIPTION

The Z86160 is a member of the Z8® single-chip microcontroller family offering a unique architecture that is characterized by Zilog's 8-bit microcontroller core.

This CMOS microcontroller features fast execution, efficient use of memory, sophisticated interrupts, input/output bit manipulation capabilities, and easy hardware/software system expansion along with low-cost and low-power consumption.

For applications demanding powerful I/O capabilities, the Z86160 fulfills this with custom I/O, specifically tailored to meet the needs of set-top requirements.

Four basic address spaces, the Program Memory, Data Memory, 236 General-Purpose Registers, and 512 bytes of protected RAM, support a wide range of memory configurations. The protected RAM is mapped into data memory.

To unburden the program from coping with real-time problems such as counting/timing, and serial data communications, the Z86160 offers two on-chip counter/timers with a large number of user selectable modes, and an asynchronous receiver/transmitter (UART) (see Block Diagram).

Notes:
All Signals with a preceding front slash, "/", are active Low, e.g., B//W (WORD is active Low); /B/W (BYTE is active Low, only).

Power connections follow conventional descriptions below:

Connection	Circuit	Device
Power	V_{CC}	V_{DD}
Ground	GND	V_{SS}

GENERAL DESCRIPTION

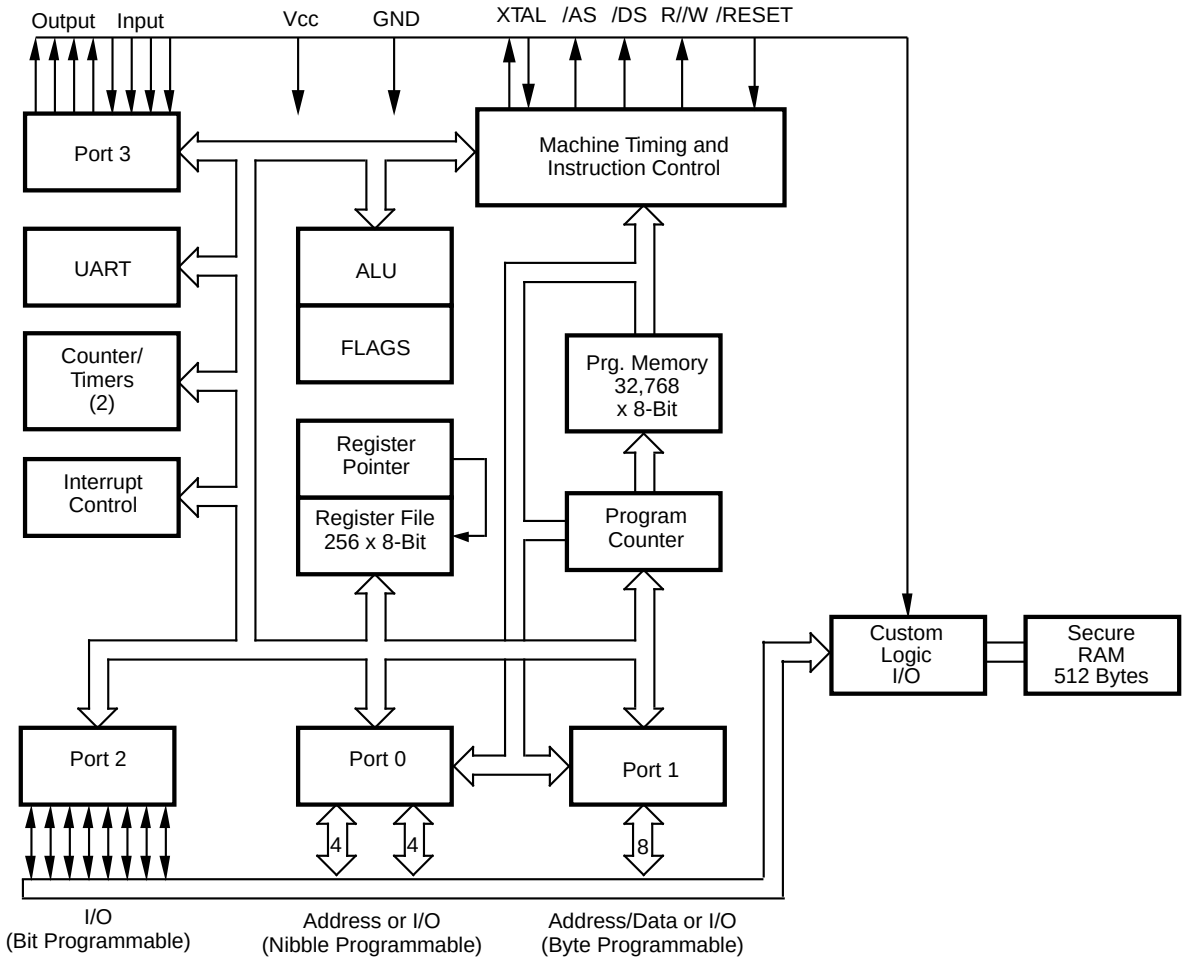


Figure 1. Z86160 Functional Block Diagram

PIN DESCRIPTION

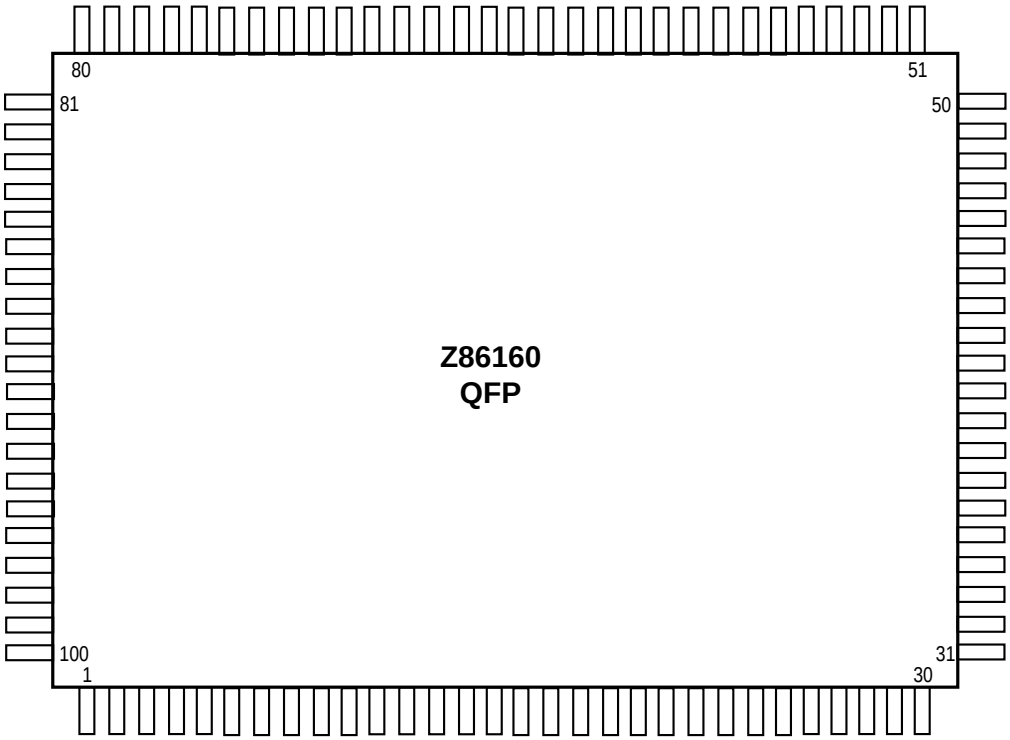


Figure 2. Z86160 100-Pin QFP Package

PIN DESCRIPTION (Continued)

Z86160 100-Pin QFP Pin Identification

Pin #	Symbol	Pin #	Symbol	Pin #	Symbol	Pin #	Symbol
1	EXADR14	26	V_{CC}	51	S4	76	M7
2	EXR/W	27	D5	52	S5	77	ON/OFF
3	EXADR07	28	D1	53	S6	78	GND
4	EXADR12	29	D4	54	K1	79	N1
5	GND	30	D2	55	S7	80	N2
6	EXADR13	31	D3	56	T0	81	V_{CC}
7	EXADR08	32	S0	57	T1	82	K5
8	EXADR06	33	S1	58	T2	83	N3
9	EXADR09	34	GND0	59	T3	84	K6
10	V_{CC}	35	GND1	60	T4	85	K7
11	EXADR05	36	GND2	61	T5	86	L0
12	EXADR11	37	GND3	62	GND	87	L1
13	EXADR04	38	S2	63	T6	88	L3
14	/EXDS	39	GND	64	T7	89	B0
15	GND	40	I0	65	M0	90	B1
16	EXADR03	41	I1	66	M1	91	GND
17	EXADR10	42	I2	67	M2	92	XTAL1
18	EXADR02	43	I3	68	V_{CC}	93	XTAL2
19	/EXRAMCS	44	I4	69	M3	94	GND
20	EXADR01	45	I5	70	K2	95	B2
21	D7	46	I6	71	M4	96	B3
22	EXADR00	47	I7	72	K3	97	L4
23	D6	48	K0	73	M5	98	N4
24	D0	49	V_{CC}	74	K4	99	N5
25	GND	50	S3	75	M6	100	L5

ABSOLUTE MAXIMUM RATINGS

Symbol	Description	Min	Max	Units
V_{CC}	Supply Voltage*	–0.3	+7.0	V
T_{STG}	Storage Temp	–65	+150	C
T_A	Oper Ambient Temp	0°	70°	C

Notes:
* Voltages on all pins with respect to GND.

Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; operation of the device at any condition above those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating conditions for an extended period may affect device reliability.

STANDARD TEST CONDITIONS

The characteristics listed below apply for standard test conditions as noted. All voltages are referenced to GND. Positive current flows into the referenced pin (Test Load).

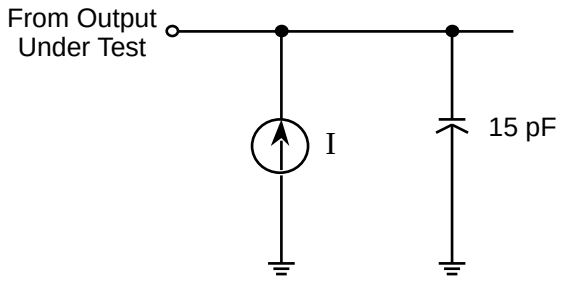


Figure 3. Test Load Diagram

DC ELECTRICAL CHARACTERISTICS

Z86160

Sym	Parameter	T_A = 0°C to +70°C Min	Max	Typical at 25°C	Units	Conditions
	Max Input Voltage		V_{CC} +0.3		V	I_{IN} <250µA
V_{CH}	Clock Input High Voltage	0.85V_{CC}	V_{CC} +0.3		V	Driven by External Clock Generator
V_{CL}	Clock Input Low Voltage	V_{SS} –0.3	0.8		V	Driven by External Clock Generator
V_{IH}	Input High Voltage	2	V_{CC} +0.3		V	
V_{IL}	Input Low Voltage	V_{SS} –0.3	0.2V_{CC}		V	
V_{OH}	Output High Voltage	4			V	I_{OH} =–2.0 mA [3]
V_{OH}	Output High Voltage		V_{CC} –100 mV		V	I_{OH} =–100µA
V_{OL}	Output Low Voltage		0.75		V	I_{OL} = +7.0 mA [3]
V_{OL}	Output Low Voltage		0.3		V	I_{OL} = +2.0 mA [3]
V_{OL}	Output Low Voltage		0.3		V	I_{OL} = +1.0 mA [2]
I_{IL}	Input Leakage	–2	2		µA	V_{IN} =0V, V_{CC}
I_{OL}	Output Leakage	–2	2		µA	V_{IN} =0V, V_{CC}
I_{CC}	Supply Current (Standard Mode)		44	30	mA	[1] @ 16 MHz
I_{CC1}	Standby Current (Standard Mode)		18.75	5.75	mA	[1] HALT Mode V_{IN} =0V, V_{CC} @ 16 MHz
I_{CC2}	Standby Current		5		µA	[1] @ 0 MHz V_{IN} =0V, V_{CC} =3V
I_{ALL}	Auto Latch Low Current	–14	14	5	µA	

Notes:

[1] All inputs driven to either 0V or V_{CC}, outputs floating.

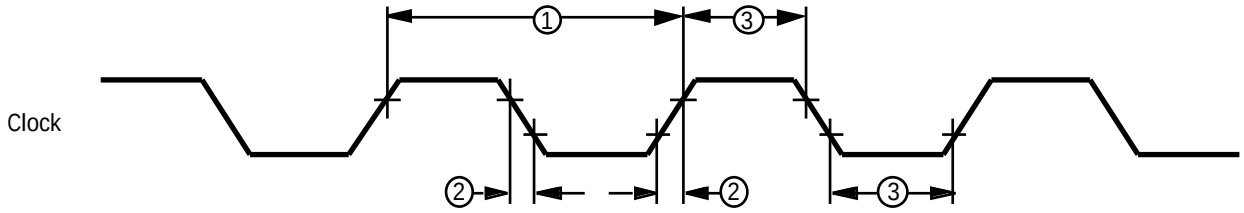
[2] V_{CC} = 3.0V to 3.6V

[3] V_{CC} = 4.5V to 5.5V

Data Retention @ 2.0V – BBU

AC CHARACTERISTICS

Additional Timing Diagram



Additional Timing

AC CHARACTERISTICS

Additional Timing Table
Z86160

No	Symbol	Parameter	T_A = 0°C to +70°C 16 MHz Min	Max	Units	Notes
1	TpC	Input Clock Period	TBD		ns	[1]
2	TrC,TfC	Clock Input Rise & Fall Times	TBD		ns	[1]
3	TwC	Input Clock Width	TBD		ns	[1]

Notes:
[1] Clock timing references use $0.85V_{CC}$ for a logic 1 and 0.8V for a logic 0.

LIMITATIONS

Be advised that AC Electrical Characteristics and Timing Diagram information was unavailable at the time of this publication, they will be supplied at a later date.

Development Projects:

Customer is cautioned that while reasonable efforts will be employed to meet performance objectives and milestone dates, development is subject to unanticipated problems and delays. No production release is authorized or committed until the Customer and Zilog have agreed upon a Customer Procurement Specification for this project.

Low Margin:

Customer is advised that this product does not meet Zilog's internal guardbanded test policies for the specification requested and is supplied on an exception basis. Customer is cautioned that delivery may be uncertain and that, in addition to all other limitations on Zilog liability stated on the front and back of the acknowledgement, Zilog makes no claim as to quality and reliability under the CPS. The product remains subject to standard warranty for replacement due to defects in materials and workmanship.

Pre-Characterization Product:

The product represented by this CPS is newly introduced and Zilog has not completed the full characterization of the product. The CPS states what Zilog knows about this product at this time, but additional features or non-conformance with some aspects of the CPS may be found, either by Zilog or its customers in the course of further application and characterization work. In addition, Zilog cautions that delivery may be uncertain at times, due to start-up yield issues.

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