



ZLP32300100KIT

**Crimzon RC
Development Platform**

Z i L O G
Crimzon™

PUG002002-0704

Product User Guide

Overview

Thank you for purchasing the ZiLOG ZLP32300100KIT Crimzon™ RC Development Platform. The Crimzon™ RC Development Platform (Figure 1) provides a universal remote control development platform for ZiLOG's ZLP32300 family of IR microcontrollers. Powered by two 1.5V AAA batteries, the kit is self-contained, provides a prototyping area, and uses ZiLOG's Universal IR database.

The ZLP32300 IR microcontroller provides two counter/timers with an enhanced counter/timer architecture that automates pulse generation and reception. It also includes 237 Bytes of general-purpose RAM that can be used as data RAM or executable RAM. Its register-based RAM includes four I/O port registers, 16 control and status registers, and 237 general-purpose registers. An extended register file provides two additional register groups.

The sample code provided on the kit's ZDS II CD-ROM shows how to set up the development platform as a universal remote control. Refer to the *ZiLOG ZLP32300100KIT Crimzon™ RC Development Platform Quick Start Guide*, QS0036, for details on setting up the development platform and installing ZDS II.

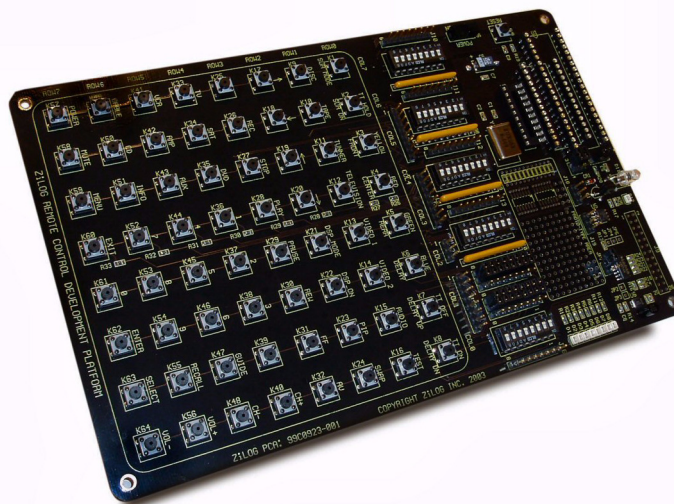


Figure 1. The ZiLOG Crimzon™ RC Development Platform

Devices Supported

Supported ZLP32300 devices are listed in Table 1.

Table 1. Supported ZLP32300 Devices

Package	Device
40-pin DIP	ZLP32300P40xx
28-pin DIP	ZLP32300P28xx
20-pin DIP	ZLP32300P20xx

Operation

Use the following procedures to enable a universal remote control:

1. Changing a device (device can be TV, VCR, CABLE, SAT and so forth)
Press and release any device key (for example, a TV, VCR, CABLE or AUX1).
2. Changing a code (CODE is the three-digit number for the code selected)
 - a. Press and hold the device key for three seconds. The LED stays ON for three seconds and then turns off.
 - b. Release the device key. The LED is ON.
 - c. Press and release the three digit keys one by one. The LED stays OFF when pressing a key and ON when the key is released.
 - d. The LED turns OFF if the three-digit code is accepted. If the number is rejected or is invalid, the LED blinks quickly eight times. Try reentering the code number.

A list of IR device codes is available in “Codesets” on page 6.

Key Matrix

The Crimzon™ RC Development Platform key matrix has eight rows and columns with two alternate configurations. The default configuration uses the eight port 2 (input) pins as column signals for key press detection and the eight port 0 (output) pins as row signals for the key scanning signal. This configuration provides 64 keys.

The key matrix is shown in Table 2. See Figures 1 and 2 for key locations.

Table 2. ZiLOG Crimzon™ RC Development Platform Key Matrix

K1 SUR MODE	K2 TT HOLD SUR ON	K3 YELLOW FRONT	K4 RED CENTER	K5 GREEN REAR	K6 BLUE DELAY	K7 TT OFF DELAY UP	K8 TT ON DELAY DN
K9 DISC	K10 TAPE	K11 TUNER	K12 TELEVISION	K13 VIDEO 1	K14 VIDEO 2	K15 AUDIO	K16 TEST
K17 UP ARROW	K18 DOWN ARROW	K19 LEFT ARROW	K20 RIGHT ARROW	K21 DSP_MODE	K22 DSP_ON	K23 PIP	K24 SWAP
K25	K26 REC	K27 STOP	K28 PLAY	K29 PAUSE	K30 REW	K31 FF	K32 AV
K33 TV	K34 SAT	K35 DVD	K36 1	K37 2	K38 3	K39	K30 CH+
K41 VCR	K42 AMP	K43 AUX	K44 4	K45 5	K46 6	K47 GUIDE	K48 CH-
K49 CABLE	K50 CD	K51 INFO	K52 7	K53 8	K54 9	K55 RECALL	K56 VOL+
K57 POWER	K58 MUTE	K59 MENU	K60 EXIT	K61 0	K62 ENTER	K63 SELECT	K64 VOL-

Switches

There are five eight-position DIP switches on the development platform. Switch settings are described in Table 3. Refer to the schematic at the end of this document for specific information on ports and port settings.

Table 3. ZiLOG Crimzon™ RC Development Platform DIP Switch Settings

Switch	Description
SW1	Controls the connection of eight LEDs to port 0 when it is configured as output.
SW2	Controls the pull-up resistors for Port 0.
SW3	Controls the pull-up resistors for Port 1.
SW4	Controls the pull-up resistors for Port 2.
SW5	Controls the pull-up resistors for Port 3.

Switch SW8 is a pushbutton device reset switch used only on the 40-pin package. Switch SW6 is a Power On/Off slide switch.

Jumpers

Jumpers are set as follows:

- Jumper U4: 1-2 Off, 3-4 Off
 - Serial EEPROM is not connected
- Jumper JP7: 1-2 Off
 - Infrared receiver is not connected
- Jumper J8: 2 and 3 IN
 - IR LED is driven by resistor connection.
 - If 1 and 2 are IN, the IR LED is driven by a capacitor coupling.
- Jumpers J2 and J3: All In
 - Port 2 is connected to key matrix columns. P20 through P27 connect to Columns 0 through 7, respectively.
- Jumpers J5 and J6: All In
 - Port 0 is connected to key matrix rows. P00 through P07 connect to Rows 0 through 7, respectively.

When using the 20-pin ZLP32300P20xx, setting jumpers J3 and J4 IN and J6 and J7 IN provide the maximum 7x6 key matrix for the 20-pin configuration with Stop Mode Recovery supported.

Learning Circuit

The learning circuit on the LP32300 IR development platform consists of four major components (refer to the schematic starting on page 18):

- Photo detector D10
- Operational amplifier U6A
- Low-pass filter U6B
- Schmidt trigger U7A

The photo current of photo detector D10 is summed with the feedback current of operational amplifier U6A. The output signal is brought up to the TTL-compatible level by low-pass filter U6B, and the resulting signal is delivered to the IR_IN (P31) of U1 and U2. The circuit has been tested for $1.8V = V_{bat} = 3.6V$, and for frequencies $40KHz = F = 2MHz$. The learning circuit is available only for 28- and 40-pin parts.

Board Layout

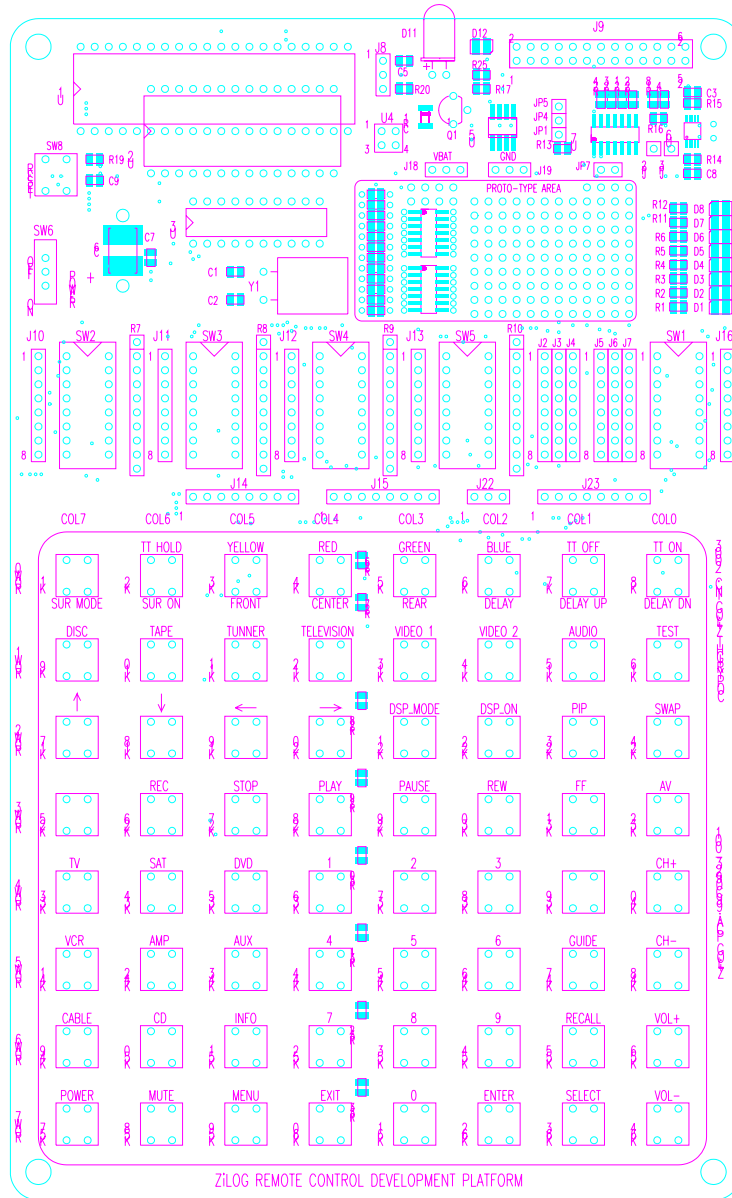


Figure 2. ZiLOG Crimzon™ RC Development Platform Board Layout

Codesets

Table 4. Television Brands

Brand	Zilog Code Numbers															
Admiral	116	234														
Adventura	235															
Aiko	126															
Akai	63	91	117													
Alba	33															
Alleron	151															
A-Mark	29															
Amstrad	90															
Amtron	145															
Anam	28	29	83	105	145											
Anam National	248	249	269													
AOC	14	29	99	108	109	118	119	120	251							
Archer	29															
Audiovox	29	145														
Bauer	35															
Belcor	118															
Bell & Howell	116	183	230													
Bradford	145															
Brockwood	14	118														
Candle	14	95	97	98	108	118	120	121	235							
Capehart	14															
Celebrity	117															
Circuit City	14															
Citizen	18	94	95	96	97	98	101	108	118	120	121	126	145	199	235	236
Colortyme	14	118	120	122	254											
Concerto	97	118	120													
Contec	49	83														
Contec/Cony	123	124	145													
Craig	15	83	145													
Crown	94	145														
Curtis Mathes	94	101	108	115	118	120	125	199	230							
CXC	83	145														

Table 4. Television Brands

Brand	Zilog Code Numbers																
Daewoo	2	91	92	94	109	118	119	120	126	127	213	214	256				
Daytron	14	118	120														
Dimensia	115																
Dixi	29	52	91														
Dumont	14	118															
Electroband	117																
Electrohome	3	5	94	118	120	128	129	130	269								
Elta	91																
Emerson	1	12	14	83	84	85	86	87	88	89	90	94	118	120	123	131	132
	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149
	150	151	152	211	230	236	237	260	270								
Envision	108	118	120														
Etron	91																
Fisher	50	82	153	154	155	230											
Formenti	35																
Fortress	39																
Fujitsu	15	89	151														
Funai	15	83	89	145	151												
Futuretec	145																
Futuretech	15	83															
GE	14	20	80	81	84	102	105	106	111	115	118	120	130	156	187	231	232
	239	269															
Genexxa	33																
Gibraltar	118																
Goldstar	14	52	78	79	94	97	109	118	119	120	123	128	129	159	160	161	228
Granada	3	14															
Grand	14																
Grandiente	3																
Grundy	145	151															
Hallmark	14	118	120														
Harvard	145																
Hinari	89																
Hitachi	3	10	24	71	72	73	74	75	76	77	94	97	118	120	123	124	163
	164	218	221	222	223	224	237	253									
Hitachi Pay TV	273																
IMA	145																

Table 4. Television Brands

Brand	Zilog Code Numbers																
Infinity	64	165															
Janeil	235																
JBL	64	165															
JC Penney	46	81	94	101	108	109	111	115	118	119	120	121	130	156	161	166	167
	174	187	199	239	255												
JCB	117																
Jensen	70	118	120														
JVC	66	67	68	69	123	124	163	168	169	229	240						
Kawasho	65	117	118	120													
Kenwood	108	118	120	128	129												
Kloss	36	98	235														
Kloss Novabeam	170	171	241														
KTV	83	84	85	94	145	172	236										
Lloyds	14																
Loewe	165																
Logik	183	266															
Luxman	97	118	120														
LXI	25	30	47	50	64	111	115	120	153	165	173	174	175	230	239		
Magnavox	4	36	64	95	99	108	118	120	121	128	165	170	171	176	177	178	184
	188	215	216	217	241	267											
Majestic	183																
Marants	165	52	64	108	118	120	165	179									
Matsui	91																
Megatron	14	120															
Memorex	14	50	91	116	120	182	183	230	266								
MGA	14	62	108	109	110	118	119	120	128	129	130	155	180	182			
Midland	239																
Minutz	156																
Mitsubishi	7	14	27	61	62	63	109	110	118	119	120	128	129	130	155	180	181
	182	212															
Motorola	234	269															
MTC	14	97	101	108	109	118	119	120	199								
Multitech	145																

Table 4. Television Brands

Brand	Zilog Code Numbers																
NAD	14	30	112	120	173	174	243										
National	13	105	13														
NEC	23	97	100	107	108	109	118	119	120	129	185	254	269				
Nikkai	33	34															
Nikko	14	120	126														
Normande	0																
NTC	126																
Onwa	83	145															
Optimus	243																
Optonica	37	39	192	234													
Orion	15	142	260														
Osaki	34																
Panasonic	6	11	12	13	60	64	104	105	106	165	263	265	269				
Philco	36	95	108	109	118	119	120	121	123	128	165	170	171	176	178	184	241
		267	269														
Philips	52	64	118	121	123	128	165	170	171	177	186	187	188	269	176		
Pilot	118																
Pioneer	59	77	112	118	120	189	190	237	243	264							
Portland	94	109	118	119	120	126											
Price Club	199																
Proscan	111	115	239														
Proton	14	26	94	103	120	123	191	244	118								
Pulsar	113	118															
Quasar	11	105	106	172	263	269											
Radio Shack	34	37	83	94	115	118	120	123	145	153	192	230					
RCA	16	17	25	53	54	55	56	57	58	77	102	109	111	115	118	119	120
		128	193	194	196	197	239	245	256	269	273	274					
Realistic	50	118	120	123	145	153	192	230									
Saisho	90	91															
Sampo	108	118	120														
Samsung	0	8	14	34	52	91	94	97	101	108	109	118	119	120	123	125	127
		128	129	198	255												
Sansui	260																
Sansung	199																

Table 4. Television Brands

Brand	Zilog Code Numbers																
Sanyo	49	50	51	82	118	153	154	180	200	230							
SBR	52																
Schneider	52																
Scotch	120																
Scott	83	87	89	94	118	120	123	132	142	145	151						
Sears	9	14	30	40	41	42	43	44	45	46	47	50	51	82	89	97	111
	118	120	124	128	129	151	153	154	155	169	173	174	201	202	230	239	
Seimitsu	14																
Sharp	21	22	37	38	39	49	94	118	120	123	137	192	203	205	210	234	
Shogun	118																
Siemens	49																
Signature	116	183	266														
Simpson	121																
Sony	114	117	259	268	272												
Soundesign	14	83	95	118	120	121	145	151									
Spectricon	29	99															
Squareview	15																
SSS	83	109	118	145													
Starlite	145																
Supra	97																
Supre-Macy	98	235															
Supreme	117																
Sylvania	35	36	64	95	108	118	120	121	128	165	170	171	176	177	178	188	207
	241	267	184														
Symphonic	15	145	270														
Tandy	33	39	234														
Tatung	105	237	269														
Technics	106																
Techwood	97	118	120	157													
Teknika	31	32	83	89	94	95	96	97	98	101	109	110	118	119	120	121	123
	124	126	145	151	177	182	183	199	266								
Teletech	91																
Tera	103	244															
Thomas	14																
Thompson	5																
TMK	14	97	118	120													

Table 4. Television Brands

Brand	Zilog Code Numbers																	
Toshiba	19	30	46	50	101	153	173	174	199	201	230	255						
Totevision	94																	
Toyomenko	14																	
Universal	81	156	187															
Vector Research	108																	
Victor	69	169	240															
Video Concepts	63																	
Vidtech	14	109	118	119	120													
Viking	98	235																
Wards	37	81	89	102	108	109	116	118	119	120	128	132	151	156	156	165	170	
	171	176	177	183	184	187	188	192	208	209	266	267	268	270				
Yamaha	108	109	119	120	128	129												
York	14																	
Zenith	113	118	183	226	227	261	266	271										
Zonda	29																	

Table 5. VCR Brands

Brand	Zilog Code Numbers																	
Admiral	154																	
Aiko	169																	
Aiwa	21																	
Akai	75	76	77	136	137	138	139	140	156	157	141	155						
Alba	115																	
Amstrad	21																	
ASA	101																	
Asha	160																	
Audio Dynamics	12																	
Audio Dynamics	158																	
Audiovox	161																	
Beaumarck	160																	
Broksonic	159																	
Broksonic	167																	
Bush	20																	
Calix	161																	

Table 5. VCR Brands

Brand	Zilog Code Numbers																	
Candle	17	160	161	162	163													
Canon	108	117																
Capehart	115	116																
Capeheart	74	164																
Carver	36																	
CCE	35	169																
Citizen	17	18	160	161	162	163	169											
Colt	35																	
Craig	5	18	35	160	161	165												
Curtis Mathes	8	17	78	108	153	163	166	160										
Cybernex	160																	
Daewoo	74	114	115	123	167	169	170	162										
Daytron	74	115																
DBX	12	158																
Dumont	112																	
Dynatech	21																	
Electrohome	4	161	171															
Electroponic	161																	
Emerson	4	19	21	23	38	77	79	142	143	144	145	146	147	159	161	162	166	167
		171	173	174	175	176	177	178	179	180								
Fisher	3	5	21	25	26	28	29	80	86	112	113	165						
GE	8	18	30	52	78	108	109	110	111	153	160							
Go Video	106	107																
Goldstar	2	17	31	126	161													
Goodmans	20																	
Gradiente	168																	
Grundig	101																	
Harley Davidson	168																	
Harman Kardon	98	126																
Harwood	35																	
Hinari	20																	
Hi-Q	165																	
Hitachi	15	16	21	32	33	72	75	118	119	120	121	122						
JC Penney	11	12	18	72	80	108	126	158	160	161								
Jensen	32	75																
JVC	11	12	17	75	82	102	103	104	105	158								

Table 5. VCR Brands

Brand	Zilog Code Numbers																			
Kenwood	11	12	17	75	82	89	104	158	163											
KLH	35																			
Kodak	161																			
Lloyd	21	168																		
Logik	20	35																		
LXI	161																			
M. Wards	4	5	6	18	19	20	21	108	129											
Magnavox	36	37	101	108	129															
Magnin	160																			
Marantz	10	11	12	17	36	101	108	158	163											
Marta	161																			
MEI	108																			
Memorex	5	21	89	100	108	112	124	154	160	161	165	168								
MGA	4	38	77	99	171															
MGN Technology	160																			
Midland	30																			
Minolta	32	72																		
Mitsubishi	4	32	38	39	40	41	42	44	45	46	47	71	77	82	97	98	99	104		
	171																			
Motorola	154																			
MTC	21	160	168																	
Mukltitech	160																			
Multitech	30	35	163	168	18	20	21													
NAD	96																			
NEC	9	10	11	12	13	17	49	50	51	75	82	104	125	126	158					
Nikko	161																			
Noblex	160																			
Optimus	154	161																		
Optonica	65																			
Panasonic	1	14	73	108	130	132	133	134	135											
Pentax	17	32	72	121	163															
Perdio	21																			
Philco	36	37	108																	
Philips	65	101	108	181	36															
Pilot	161																			
Pioneer	12	32	52	53	82	93	94	95	96	104	158									

Table 5. VCR Brands

Brand	Zilog Code Numbers																	
Portland	74	115	163															
Proscan	8	52	129	153														
Protec	35																	
Pulsar	124																	
Quartz	89																	
Quasar	91	92	108															
Radio Shack	3	4	5	6	26	65	154	160	161	165	168	171						
Radix	161																	
Randex	161																	
RCA	0	7	8	18	32	52	54	55	56	57	60	61	62	72	78	121	127	128
	129	130	131	153	155	160												
Realistic	21	26	65	86	89	108	112	154	160	161	165	168	171					
Ricoh	150																	
Saisho	145	146																
Salora	89	99																
Samsung	18	30	76	90	110	123	138	156	160	162	174							
Sanky	154																	
Sansui	12	63	75	82	104	125	158											
Sanyo	5	87	88	89	112	160	165											
SBR	101																	
Schneider	20																	
Scott	19	38	64	144	159	162	167	173										
Sears	3	5	25	26	28	32	72	80	86	89	112	113	161	165				
Sentra	115																	
Sharp	4	6	65	65	171													
Shintom	20	35																
Shogun	160																	
Singer	35																	
Sony	148	149	150	151	152													
STS	72																	
Sylvania	21	36	37	38	99	108	168											
Symphonic	21	168																
Tandy	21																	
Tashiko	21	161																
Tatung	11	75	85															
Teac	11	21	56	75	168													

Table 5. VCR Brands

Brand	Zilog Code Numbers														
Technics	73	108													
Teknika	21	22	67	108	161	168									
TMK	146	160	166												
Toshiba	19	26	28	32	38	64	99	123	162						
Totevision	18	160	161												
Unitech	160														
Vector Research	12	126	158	162	163										
Victor	12	104	105	158											
Video Concepts	12	77	158	162	163										
Videosonic	18	160													
Wards	32	35	48	65	68	69	70	72	154	160	161	162	165	168	171
XR-1000	35	168													
Yamaha	11	12	17	75	126	158									
Zenith	124	151	152												

Table 6. Cable Brands

Brand	Zilog Code Numbers					
ABC	7	8	9	10		
Archer	11	12				
Century	12					
Citizen	12					
Colour Voice	13	14				
Comtronic	15					
Eastern	16					
Garrard	12					
Hytex	7					
Jasco	12					
Jerrold	5	17	18	30	9	10
Magnavox	19					
Movie Time	20					
NSC	20					
Oak	0	21	7			
Panasonic	1	6				
Philips	24	12	13	14	19	



Table 6. Cable Brands

Brand	Zilog Code Numbers			
Pioneer	2	3	25	
RCA	34			
Regency	16			
Samsung	26	15		
Scientific Atlanta	3	4	27	28
Signal	15			
SL Marx	15			
Starcom	10			
Stargate	15			
Teleview	15			
Tocom	8	17		
TV86	20			
Unika	12			
United Artists	7			
Universal	12	11		
Viewstar	20	19		
Zenith	3	32	33	

Table 7 Satellite Brands

Brand	Zilog Code Numbers			
Alphastar	19			
Chaparral	0	1		
Cheyenne	1			
Dishnet	18			
Drake	2			
Drake	3			
Echostar Dish	27			
GE	13	20	21	
General Instruments	4	5	6	
Hitachi	23	24		
Hughes Network	17	28		
JVC	22			
Magnavox	25			



Table 7 Satellite Brands

Brand	Zilog Code Numbers			
Philips	25			
Primestar	16			
Proscan	20	21	13	
RCA	13	20	21	
Realistic	7			
Sierra	1			
Sony	14			
STS	8	9	10	11
Toshiba	12	15		
Uniden	26			

Schematic

Figures 3 through Figure 5 provide schematics of the Crimzon™ RC Development Platform.

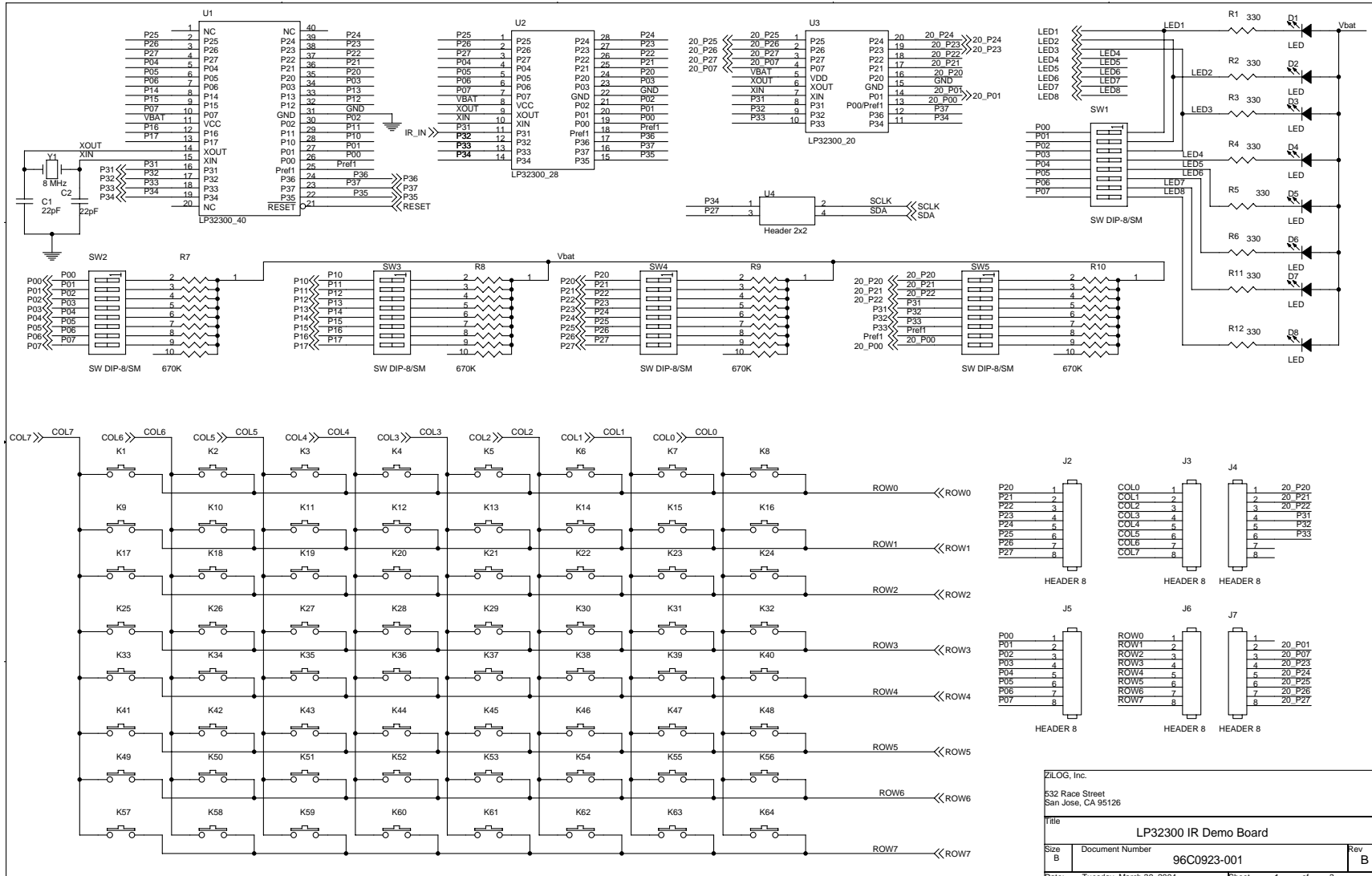


Figure 3. Crimzon™ RC Development Platform Schematic

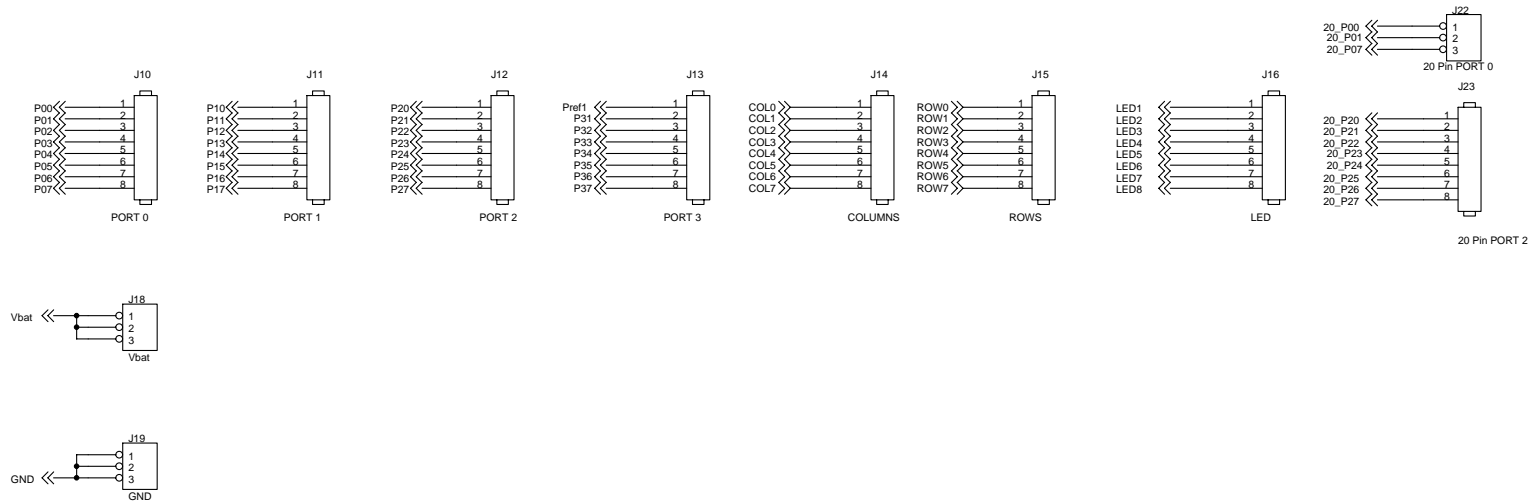


Figure 4. Crimzon™ RC Development Platform Schematic

ZILOG, Inc. 532 Race Street San Jose, CA 95126		
Title LP32300 IR Demo Board		
Size B	Document Number 96C0923-001	Rev B
Date: Tuesday, March 30, 2004	Sheet 2 of 3	

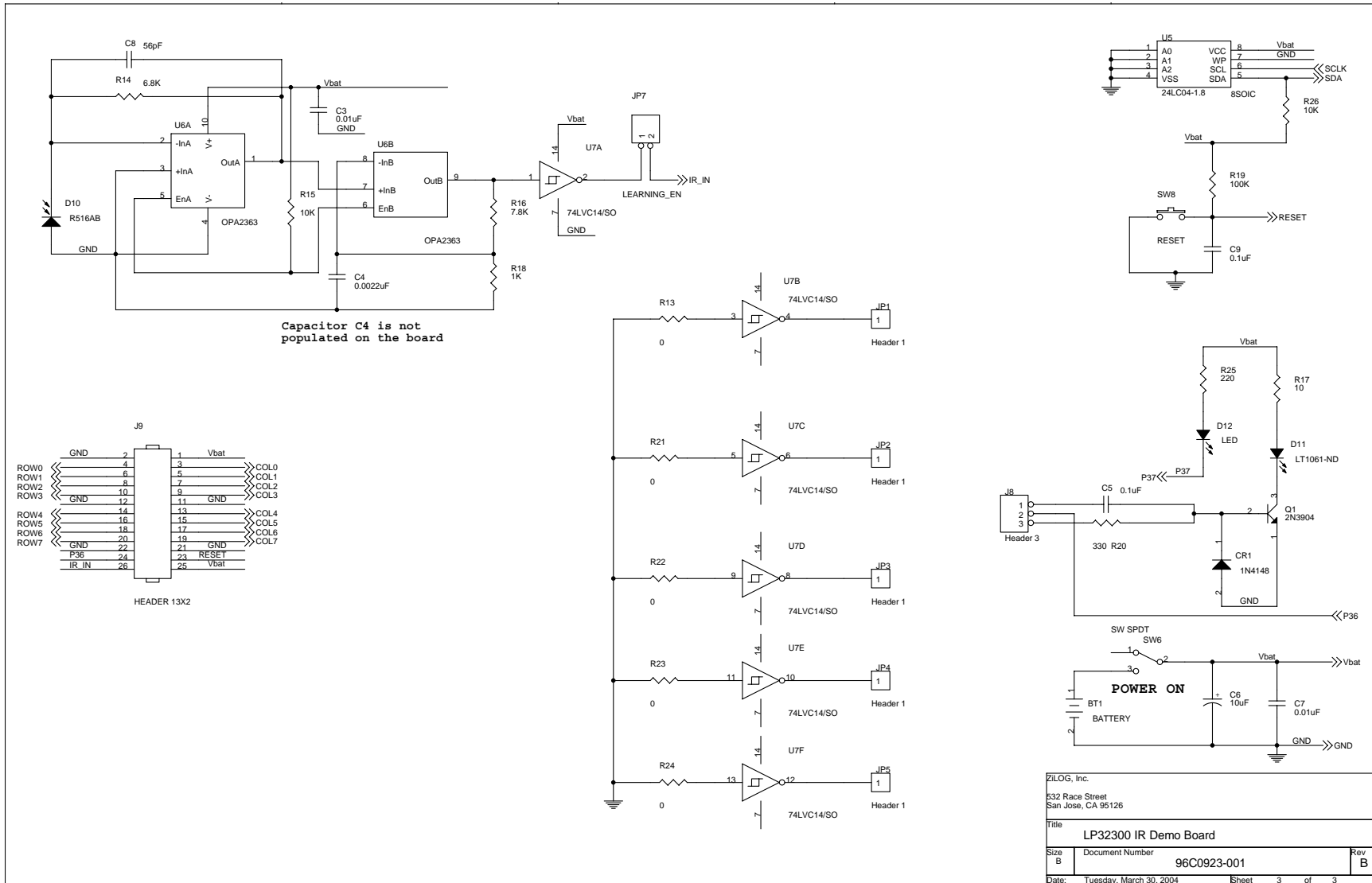


Figure 5. Crimzon™ RC Development Platform Schematic



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