Numbers of rings on groups of prime power order

Note: The following numbers of rings hold for any prime p:

additive group	# rings	with one	# comm rings	with one
Z_p	2	1	2	1
Z_{p^2}	3	1	3	1
$(Z_p)^2$	8	3	6	3

The underlined red numbers are hard to compute, and to my knowledge, were previously unknown.
The spaces that are left blank are a yet bigger computational challenge.

additive group	# rings	with one	# comm rings	with one
Z_4	3	1	3	1
$(Z_2)^2$	8	3	6	3
Z_8	4	1	4	1
$Z_2 \times Z_4$	20	3	14	3
$(Z_2)^3$	28	7	16	6
Z_9	3	1	3	1
$(Z_3)^2$	8	3	6	3
Z_{16}	5	1	5	1
$Z_2 \times Z_8$	29	3	20	3
$(Z_4)^2$	66	6	28	6
$(Z_2)^2 \times Z_4$	170	15	65	11
$(Z_2)^4$	<u>120</u>	25	44	16
Z_{25}	3	1	3	1
$(Z_5)^2$	8	3	6	3
Z_{27}	4	1	4	1
$Z_3 \times Z_9$	25	4	16	4
$(Z_3)^3$	30	7	16	6
	6	1	6	1

$Z_4 \times Z_8$	167	7	64	7
$(Z_2)^2 \times Z_8$	251	15	95	11
$Z_2 \times (Z_4)^2$	11593	24	340	17
$(Z_2)^3 \times Z_4$	6535	79	345	36
$(Z_2)^5$		79		34
Z_{64}	7	1	7	1
$Z_2 \times Z_{32}$	47	3	32	3
$Z_4 \times Z_{16}$	248	7	95	7
$(Z_8)^2$	301	10	79	10
$(Z_2)^2 \times Z_{16}$	332	15	125	11
$Z_2 \times Z_4 \times Z_8$	27332	105	999	46
$(Z_4)^3$	801559	27	1839	16
$(Z_2)^3 \times Z_8$		79	520	36
$(Z_2)^2 \times (Z_4)^2$		232		98
$(Z_2)^4 \times Z_4$				
$(Z_2)^6$				
Z_{81}	5	1	5	1
$Z_3 \times Z_{27}$	38	4	24	4
$(Z_9)^2$	175	5	35	5
$(Z_3)^2 \times Z_9$	264	20	73	13
$(Z_3)^4$		27		16

Numbers of rings of composite order may be obtained by applying the theorem, that
Every finite Ring R can be uniquely (up to isomorphism) decomposed into a direct product of rings of prime power order.

Home.