

## SPECIFICATION

This specification describes a tuner with IF output  
for EU digital satellite direct TV receiving.

### CONTENTS

1. General Specification
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3. Current consumption
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6. Reliability Specification
7. Mechanical Specification

					<b>ALPS ELECTRIC CO., LTD.</b>			
					APPD.	CHKD.	DSGD.	-117A
								TITLE BSDE8 SPECIFICATION
							<i>Nov. 2. '98</i> <i>J. Yoneda</i>	DOCUMENT NO.
SYMB	DATE OR NO	APPD	CHKD	DSGD	( 1 / 7 )			

SECTION	DESCRIPTION	SPECIFICATION										
1.	General Specification											
1-1	Input frequency range	950MHz to 2150MHz										
1-2	Channel spacing frequency	29.5 MHz										
1-3	Input level	-65dBm to -25dBm										
1-4	RF input impedance	75 Ω										
1-5	IF frequency	479.5MHz										
1-6	IF bandwidth	27/36MHz (Switchable by I2C port 3)										
1-7	LO1 frequency	1429.5MHz to 2629.5MHz										
1-8	Tuning circuit	Built in PLL (I2C Bus)										
1-9	Step size	125kHz										
1-10	Comparison frequency	62.5kHz										
		<table border="1"> <thead> <tr> <th>R3</th> <th>R2</th> <th>R1</th> <th>R0</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>64</td> </tr> </tbody> </table>	R3	R2	R1	R0	Ratio	0	1	0	1	64
R3	R2	R1	R0	Ratio								
0	1	0	1	64								
1-11	IF output connector	Pin output										
1-12	RF Input connector	F fe-male										
1-13	Operating voltage											
	+ B	5±0.25 V DC										
	Tuning	30±1 V DC										
	AGC	0 V DC (Maximum gain) 5 V DC (Minimum gain)										
1-14	Operating temperature	0 to 60°C										
1-15	Operating humidity	Less than 80 % RH (at 40°C)										
1-16	Storage temperature	-20 to 70°C										
1-17	Storage humidity	Less than 95 % RH (at 40°C)										

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SECTION	DESCRIPTION	SPECIFICATION															
2.	Standard test condition	Test for electrical specification shall be performed at following condition unless otherwise specified.															
2-1	Ambient condition	Temperature 25°C ± 2°C Humidity 65% ± 5%RH If no doubt on test results, temperature 5°C ~ 30°C and humidity 45% ~ 85% RH could be applied.															
2-2	Measurement to start	30 minutes after DC power supplied.															
2-3	Power supply	<table border="1"> <thead> <tr> <th>Terminal</th> <th>Supply voltage</th> </tr> </thead> <tbody> <tr> <td>LNB Power</td> <td>—————</td> </tr> <tr> <td>+5V</td> <td>+ 5V ± 0.1V</td> </tr> <tr> <td>+30V</td> <td>+30V ± 0.1V</td> </tr> <tr> <td>DATA</td> <td rowspan="2">Specified tuning pulse</td> </tr> <tr> <td>CLOCK</td> </tr> </tbody> </table>	Terminal	Supply voltage	LNB Power	—————	+5V	+ 5V ± 0.1V	+30V	+30V ± 0.1V	DATA	Specified tuning pulse	CLOCK				
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Terminal	MIN.	TYP.	MAX.														
+5V	150	200	250	mA													
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4.	Absolute maximum voltage	<table border="1"> <thead> <tr> <th>Terminal</th> <th>Maximum supply voltage</th> </tr> </thead> <tbody> <tr> <td>LNB Power</td> <td>+25V</td> </tr> <tr> <td>+5V</td> <td>+5.25V</td> </tr> <tr> <td>+30V</td> <td>+33V</td> </tr> <tr> <td>DATA, CLOCK</td> <td>0V to the same voltage as +5V terminal</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Terminal</th> <th>Maximum take off current</th> </tr> </thead> <tbody> <tr> <td>LNB Power</td> <td>0.4A</td> </tr> </tbody> </table>	Terminal	Maximum supply voltage	LNB Power	+25V	+5V	+5.25V	+30V	+33V	DATA, CLOCK	0V to the same voltage as +5V terminal	Terminal	Maximum take off current	LNB Power	0.4A	
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SECTION	DESCRIPTION	SPECIFICATION				CONDITION
		MIN.	TYP.	MAX.	UNIT	
5.	Electrical specification					
5-1	Tuner section					
5-1-1	Input VSWR			2.5		75 Ω
5-1-2	Noise figure		10	12	dB	
5-1-3	Group delay					
	parabolic End to End			10	ns	Aperture 2.625MHz
	local peak to peak			40	nsp-p	Aperture 125 kHz
5-1-4	Gain Variation			7	dB	
5-1-5	Image Rejection	30	40		dB	
5-1-6	IF Rejection	40	45		dB	
5-1-7	2nd order intermodulation (2 carriers)			-30	dBc	RF1+RF2 At -25dBm input Measured against IF output level -40 dBm/50 Ω
5-1-8	3rd order intermodulation (2 carriers)			-50	dBc	2RF1-RF2 At -25dBm input Measured against IF output level -40dBm/50 Ω
5-1-9	LO1 phase noise					
	offset frequency 1 kHz		-54	-48	dBc/Hz	PLL charge pump current: cf. Table 1(Page5/7)
	10 kHz		-82	-73		
	100kHz		-105	-96		
	1MHz		-120	-112		
5-1-10	PLL lock up time			50	ms	
5-1-11	LO1 pushing	-0.5		+0.5	MHz	+B=+5V±5%
5-1-12	Spurious at RF input			-63	dBm	950MHz~2150MHz

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SECTION	DESCRIPTION	SPECIFICATION				CONDITION
		MIN.	TYP.	MAX.	UNIT	
5-2	IF output section					
5-2-1	Center frequency		479.5		MHz	
5-2-2	IF bandwidth (-3dB)		27		MHz	Logic"0"
			36		MHz	Loigic"1"
5-2-3	VSWR			2.0		50 Ω
5-2-4	Amplitude ripple			±1.0	dB	

RF freq. [MHz]	C1(byte5.bit1)	C2(byte5.bit2)	CP current (μ A)
950-1150 >	0	1	±260
1150-1850 >	1	0	±555
1850-2150	1	1	±1200

Table 1

					<b>ALPS ELECTRIC CO., LTD.</b>				
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SECTION	DESCRIPTION	SPECIFICATION	CONDITION
6.	Reliability Specification	Following value shall be maintained after each reliability test except for 6-6. Compared with initial value.  1)LO tuning voltage $\pm 1.3V$ MAX. 2)IF output level $\pm 3dB$ MAX. 3)Practical receiving shall be maintained.	With PLL locked.
6-1	Heat loading test	(1)Level samples in $60^{\circ}C \pm 2^{\circ}C$ for $96 \pm 5$ hours, with standard power supply, then in standard ambient for 30 minutes. (2)Take measurement within hours.	
6-2	Humidity test	(1)Level samples in $40^{\circ}C \pm 2^{\circ}C$ for $24 \pm 2$ hours, with standard power supply, then in standard ambient for 30 minutes. (2)Initial values are measured at standard condition. (3)Leave samples in $40^{\circ}C \pm 2^{\circ}C$ 90~95%RH for $96 \pm 5$ hours then in standard condition for 2 hours. (4)Take measurement within 1 hour.	
6-3	Cold test	(1)Leave samples in $-20^{\circ}C \pm 2^{\circ}C$ for $96 \pm 5$ hours, then in standard ambient for 60 minutes with standard power supply. (2)Take measurement within 1 hours.	
6-4	Life test	(1)Leave samples for 1000hours in normal ambient with standard power supply.	
6-5	Vibration test	Vibration test fixture is used to vibrate the sample with Total amplitude : 1 mmp-p Freq. range : 10 to 55Hz Freq. consecutiveness : once per minute Time duration for each three directions : 40 minutes	

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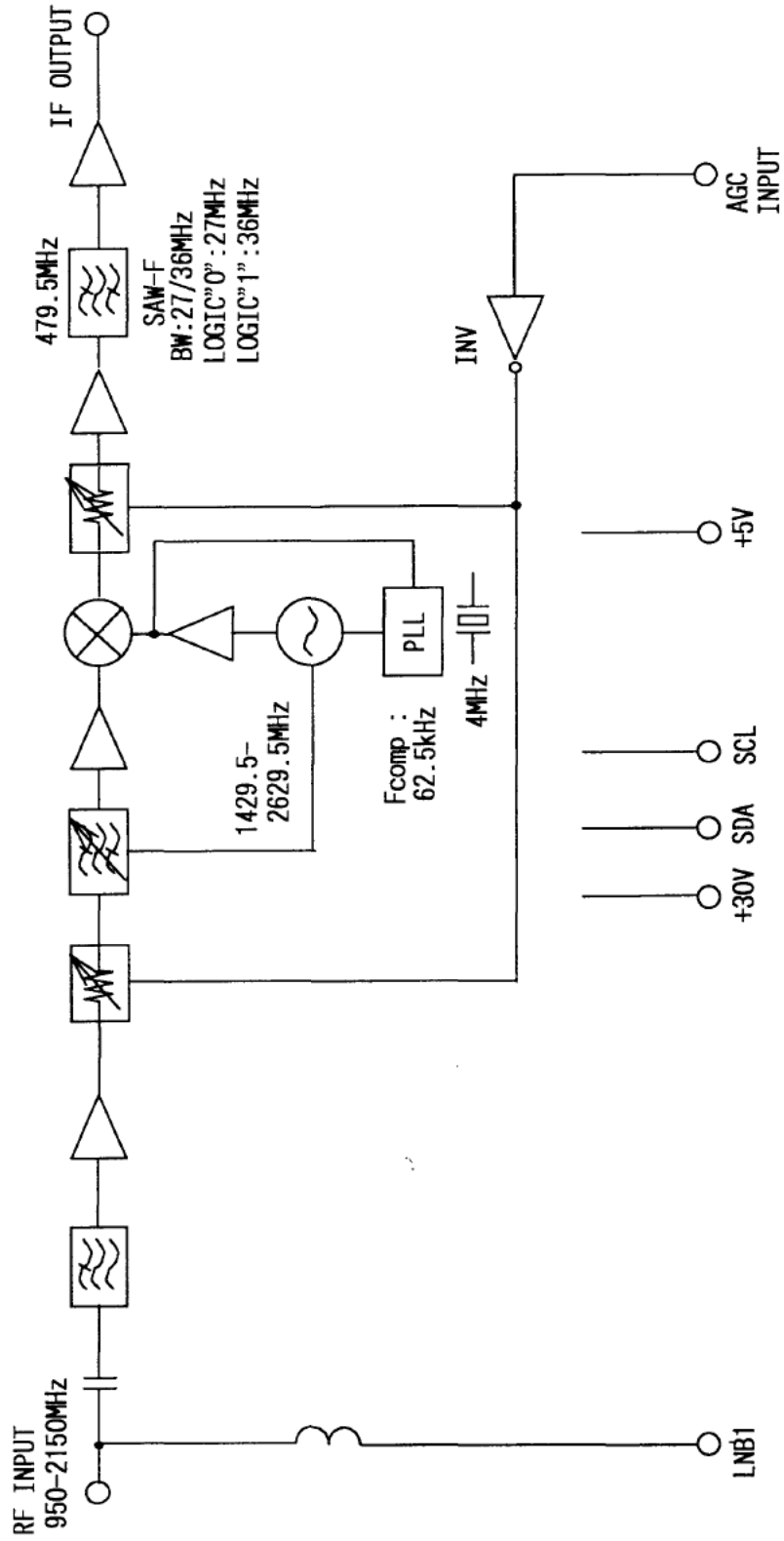
4

SECTION	DESCRIPTION	SPECIFICATION	CONDITION
6-6	Lightning test (1) Surge test	No defect in operation	±15kV through 1000pF and 0 ohm to center conductor (Performed 3 times)
	(2) ESD test	No defect in operation	±200V through 200pF and 0 ohm to terminal (Performed 3 times)
7.	Mechanical Specification		
7-1	Output view	No defects of wiring, soldering or assembling. No dirt, rust, corrosion or foreign materials.	
7-2	Appearance structure	Dimension and mounting shall as mechanical drawing.	
7-3	Terminal strength	Vertical direction : More then 19.6(2kgf) Folding : Bending left and right up to 45° 2 times should not damage the terminals.	

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# DIGITAL DBS TUNER BLOCK DIAGRAM

BSDE8-117A

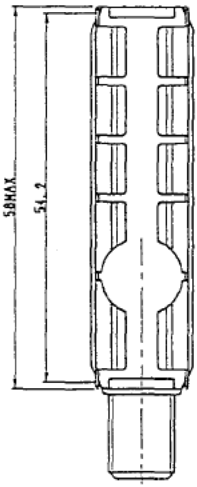




1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PIN NO.	UNB POWER (RF INPUT)	AGC INPUT	IF	15V	+	30V	SDA	SCL						

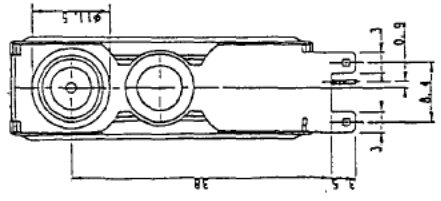
NOTE 1. TOLERANCES ARE ±0.5.

- UNLESS OTHERWISE SPECIFIED.
- THE PITCH BETWEEN TERMINALS IS SPECIFIED AT THE ROOT.
- DATE CODE NO. IS CONFORMED TO ALPS STANDARD SPECIFICATION.
- ALPS CAN ALTER COVER HOLE DESIGN WITHOUT NOTICE IF NO ELECTRICAL DEGRADATION.

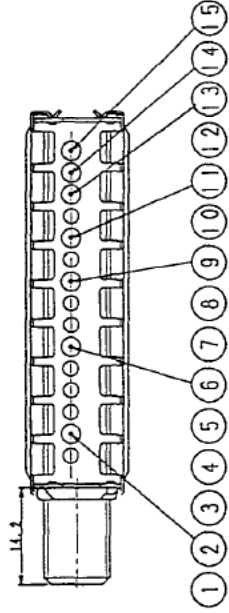
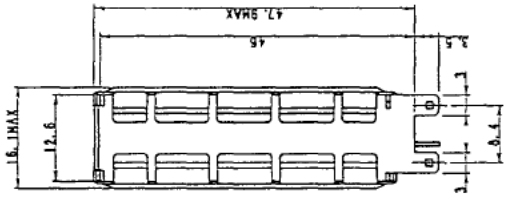
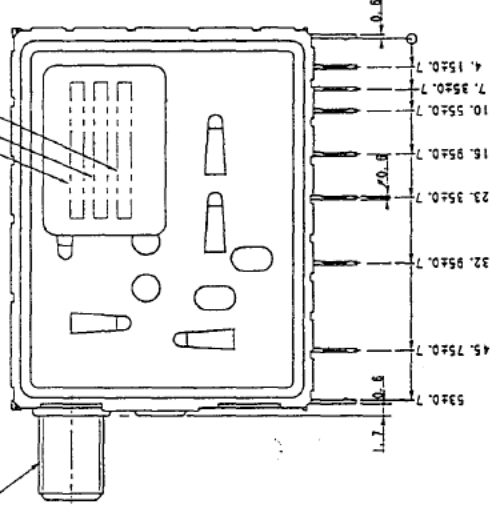


CUST. MODEL NO.  
ALPS MODEL NO.  
DATE CODE NO.

(TYPE F CONN.)  
3/8-32UNEF-2A



RF INPUT



PART NO.	NAME	MATERIAL	SPEC.	FINISH
<b>ALPS ELECTRIC CO., LTD.</b>				
CUST. MODEL NO.	ALPS MODEL NO.	SCALE		
BSDE8-117A		2:1		
DATE	BY	CHECK		
Nov. 2, 88	S. Aoe			
DATE OF NO. APPR	DATE OF NO. ENGR	DATE OF NO. DESG		
TITLE			KEY NO.	
BSDE8 ASSORT DRAWING			8 (A) 2 (B) 1 (C) 1 (D) 1 (E) 1 (F) 1 (G) 1 (H) 1 (I) 1 (J) 1 (K) 1 (L) 1 (M) 1 (N) 1 (O) 1 (P) 1 (Q) 1 (R) 1 (S) 1 (T) 1 (U) 1 (V) 1 (W) 1 (X) 1 (Y) 1 (Z) 1 (AA) 1 (AB) 1 (AC) 1 (AD) 1 (AE) 1 (AF) 1 (AG) 1 (AH) 1 (AI) 1 (AJ) 1 (AK) 1 (AL) 1 (AM) 1 (AN) 1 (AO) 1 (AP) 1 (AQ) 1 (AR) 1 (AS) 1 (AT) 1 (AU) 1 (AV) 1 (AW) 1 (AX) 1 (AY) 1 (AZ) 1 (BA) 1 (BB) 1 (BC) 1 (BD) 1 (BE) 1 (BF) 1 (BG) 1 (BH) 1 (BI) 1 (BJ) 1 (BK) 1 (BL) 1 (BM) 1 (BN) 1 (BO) 1 (BP) 1 (BQ) 1 (BR) 1 (BS) 1 (BT) 1 (BU) 1 (BV) 1 (BW) 1 (BX) 1 (BY) 1 (BZ) 1 (CA) 1 (CB) 1 (CC) 1 (CD) 1 (CE) 1 (CF) 1 (CG) 1 (CH) 1 (CI) 1 (CJ) 1 (CK) 1 (CL) 1 (CM) 1 (CN) 1 (CO) 1 (CP) 1 (CQ) 1 (CR) 1 (CS) 1 (CT) 1 (CU) 1 (CV) 1 (CW) 1 (CX) 1 (CY) 1 (CZ) 1 (DA) 1 (DB) 1 (DC) 1 (DD) 1 (DE) 1 (DF) 1 (DG) 1 (DH) 1 (DI) 1 (DJ) 1 (DK) 1 (DL) 1 (DM) 1 (DN) 1 (DO) 1 (DP) 1 (DQ) 1 (DR) 1 (DS) 1 (DT) 1 (DU) 1 (DV) 1 (DW) 1 (DX) 1 (DY) 1 (DZ) 1 (EA) 1 (EB) 1 (EC) 1 (ED) 1 (EE) 1 (EF) 1 (EG) 1 (EH) 1 (EI) 1 (EJ) 1 (EK) 1 (EL) 1 (EM) 1 (EN) 1 (EO) 1 (EP) 1 (EQ) 1 (ER) 1 (ES) 1 (ET) 1 (EU) 1 (EV) 1 (EW) 1 (EX) 1 (EY) 1 (EZ) 1 (FA) 1 (FB) 1 (FC) 1 (FD) 1 (FE) 1 (FF) 1 (FG) 1 (FH) 1 (FI) 1 (FJ) 1 (FK) 1 (FL) 1 (FM) 1 (FN) 1 (FO) 1 (FP) 1 (FQ) 1 (FR) 1 (FS) 1 (FT) 1 (FU) 1 (FV) 1 (FW) 1 (FX) 1 (FY) 1 (FZ) 1 (GA) 1 (GB) 1 (GC) 1 (GD) 1 (GE) 1 (GF) 1 (GG) 1 (GH) 1 (GI) 1 (GJ) 1 (GK) 1 (GL) 1 (GM) 1 (GN) 1 (GO) 1 (GP) 1 (GQ) 1 (GR) 1 (GS) 1 (GT) 1 (GU) 1 (GV) 1 (GW) 1 (GX) 1 (GY) 1 (GZ) 1 (HA) 1 (HB) 1 (HC) 1 (HD) 1 (HE) 1 (HF) 1 (HG) 1 (HH) 1 (HI) 1 (HJ) 1 (HK) 1 (HL) 1 (HM) 1 (HN) 1 (HO) 1 (HP) 1 (HQ) 1 (HR) 1 (HS) 1 (HT) 1 (HU) 1 (HV) 1 (HW) 1 (HX) 1 (HY) 1 (HZ) 1 (IA) 1 (IB) 1 (IC) 1 (ID) 1 (IE) 1 (IF) 1 (IG) 1 (IH) 1 (II) 1 (IJ) 1 (IK) 1 (IL) 1 (IM) 1 (IN) 1 (IO) 1 (IP) 1 (IQ) 1 (IR) 1 (IS) 1 (IT) 1 (IU) 1 (IV) 1 (IW) 1 (IX) 1 (IY) 1 (IZ) 1 (JA) 1 (JB) 1 (JC) 1 (JD) 1 (JE) 1 (JF) 1 (JG) 1 (JH) 1 (JI) 1 (JJ) 1 (JK) 1 (JL) 1 (JM) 1 (JN) 1 (JO) 1 (JP) 1 (JQ) 1 (JR) 1 (JS) 1 (JT) 1 (JU) 1 (JV) 1 (JW) 1 (JX) 1 (JY) 1 (JZ) 1 (KA) 1 (KB) 1 (KC) 1 (KD) 1 (KE) 1 (KF) 1 (KG) 1 (KH) 1 (KI) 1 (KJ) 1 (KK) 1 (KL) 1 (KM) 1 (KN) 1 (KO) 1 (KP) 1 (KQ) 1 (KR) 1 (KS) 1 (KT) 1 (KU) 1 (KV) 1 (KW) 1 (KX) 1 (KY) 1 (KZ) 1 (LA) 1 (LB) 1 (LC) 1 (LD) 1 (LE) 1 (LF) 1 (LG) 1 (LH) 1 (LI) 1 (LJ) 1 (LK) 1 (LL) 1 (LM) 1 (LN) 1 (LO) 1 (LP) 1 (LQ) 1 (LR) 1 (LS) 1 (LT) 1 (LU) 1 (LV) 1 (LW) 1 (LX) 1 (LY) 1 (LZ) 1 (MA) 1 (MB) 1 (MC) 1 (MD) 1 (ME) 1 (MF) 1 (MG) 1 (MH) 1 (MI) 1 (MJ) 1 (MK) 1 (ML) 1 (MN) 1 (MO) 1 (MP) 1 (MQ) 1 (MR) 1 (MS) 1 (MT) 1 (MU) 1 (MV) 1 (MW) 1 (MX) 1 (MY) 1 (MZ) 1 (NA) 1 (NB) 1 (NC) 1 (ND) 1 (NE) 1 (NF) 1 (NG) 1 (NH) 1 (NI) 1 (NJ) 1 (NK) 1 (NL) 1 (NM) 1 (NO) 1 (NP) 1 (NQ) 1 (NR) 1 (NS) 1 (NT) 1 (NU) 1 (NV) 1 (NW) 1 (NX) 1 (NY) 1 (NZ) 1 (OA) 1 (OB) 1 (OC) 1 (OD) 1 (OE) 1 (OF) 1 (OG) 1 (OH) 1 (OI) 1 (OJ) 1 (OK) 1 (OL) 1 (OM) 1 (ON) 1 (OO) 1 (OP) 1 (OQ) 1 (OR) 1 (OS) 1 (OT) 1 (OU) 1 (OV) 1 (OW) 1 (OX) 1 (OY) 1 (OZ) 1 (PA) 1 (PB) 1 (PC) 1 (PD) 1 (PE) 1 (PF) 1 (PG) 1 (PH) 1 (PI) 1 (PJ) 1 (PK) 1 (PL) 1 (PM) 1 (PN) 1 (PO) 1 (PP) 1 (PQ) 1 (PR) 1 (PS) 1 (PT) 1 (PU) 1 (PV) 1 (PW) 1 (PX) 1 (PY) 1 (PZ) 1 (QA) 1 (QB) 1 (QC) 1 (QD) 1 (QE) 1 (QF) 1 (QG) 1 (QH) 1 (QI) 1 (QJ) 1 (QK) 1 (QL) 1 (QM) 1 (QN) 1 (QO) 1 (QP) 1 (QQ) 1 (QR) 1 (QS) 1 (QT) 1 (QU) 1 (QV) 1 (QW) 1 (QX) 1 (QY) 1 (QZ) 1 (RA) 1 (RB) 1 (RC) 1 (RD) 1 (RE) 1 (RF) 1 (RG) 1 (RH) 1 (RI) 1 (RJ) 1 (RK) 1 (RL) 1 (RM) 1 (RN) 1 (RO) 1 (RP) 1 (RQ) 1 (RR) 1 (RS) 1 (RT) 1 (RU) 1 (RV) 1 (RW) 1 (RX) 1 (RY) 1 (RZ) 1 (SA) 1 (SB) 1 (SC) 1 (SD) 1 (SE) 1 (SF) 1 (SG) 1 (SH) 1 (SI) 1 (SJ) 1 (SK) 1 (SL) 1 (SM) 1 (SN) 1 (SO) 1 (SP) 1 (SQ) 1 (SR) 1 (SS) 1 (ST) 1 (SU) 1 (SV) 1 (SW) 1 (SX) 1 (SY) 1 (SZ) 1 (TA) 1 (TB) 1 (TC) 1 (TD) 1 (TE) 1 (TF) 1 (TG) 1 (TH) 1 (TI) 1 (TJ) 1 (TK) 1 (TL) 1 (TM) 1 (TN) 1 (TO) 1 (TP) 1 (TQ) 1 (TR) 1 (TS) 1 (TT) 1 (TU) 1 (TV) 1 (TW) 1 (TX) 1 (TY) 1 (TZ) 1 (UA) 1 (UB) 1 (UC) 1 (UD) 1 (UE) 1 (UF) 1 (UG) 1 (UH) 1 (UI) 1 (UJ) 1 (UK) 1 (UL) 1 (UM) 1 (UN) 1 (UO) 1 (UP) 1 (UQ) 1 (UR) 1 (US) 1 (UT) 1 (UU) 1 (UV) 1 (UW) 1 (UX) 1 (UY) 1 (UZ) 1 (VA) 1 (VB) 1 (VC) 1 (VD) 1 (VE) 1 (VF) 1 (VG) 1 (VH) 1 (VI) 1 (VJ) 1 (VK) 1 (VL) 1 (VM) 1 (VN) 1 (VO) 1 (VP) 1 (VQ) 1 (VR) 1 (VS) 1 (VT) 1 (VU) 1 (VV) 1 (VW) 1 (VX) 1 (VY) 1 (VZ) 1 (WA) 1 (WB) 1 (WC) 1 (WD) 1 (WE) 1 (WF) 1 (WG) 1 (WH) 1 (WI) 1 (WJ) 1 (WK) 1 (WL) 1 (WM) 1 (WN) 1 (WO) 1 (WP) 1 (WQ) 1 (WR) 1 (WS) 1 (WT) 1 (WU) 1 (WV) 1 (WW) 1 (WX) 1 (WY) 1 (WZ) 1 (XA) 1 (XB) 1 (XC) 1 (XD) 1 (XE) 1 (XF) 1 (XG) 1 (XH) 1 (XI) 1 (XJ) 1 (XK) 1 (XL) 1 (XM) 1 (XN) 1 (XO) 1 (XP) 1 (XQ) 1 (XR) 1 (XS) 1 (XT) 1 (XU) 1 (XV) 1 (XW) 1 (XX) 1 (XY) 1 (XZ) 1 (YA) 1 (YB) 1 (YC) 1 (YD) 1 (YE) 1 (YF) 1 (YG) 1 (YH) 1 (YI) 1 (YJ) 1 (YK) 1 (YL) 1 (YM) 1 (YN) 1 (YO) 1 (YP) 1 (YQ) 1 (YR) 1 (YS) 1 (YT) 1 (YU) 1 (YV) 1 (YW) 1 (YX) 1 (YZ) 1 (ZA) 1 (ZB) 1 (ZC) 1 (ZD) 1 (ZE) 1 (ZF) 1 (ZG) 1 (ZH) 1 (ZI) 1 (ZJ) 1 (ZK) 1 (ZL) 1 (ZM) 1 (ZN) 1 (ZO) 1 (ZP) 1 (ZQ) 1 (ZR) 1 (ZS) 1 (ZT) 1 (ZU) 1 (ZV) 1 (ZW) 1 (ZX) 1 (ZY) 1 (ZZ)	

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