Vol. 19 No. 2 Summer 1967

COLOR TELEVISION - COLORIMETRY - II

In the last issue the nature of light was explained. Subtractive and additive primaries were described and the results of mixing various colors. In this issue the chromaticity diagram will be explained.

COLOR DIMENSIONS

Before venturing further into colorimetry, a few definitions are in order. To be completely catalogued a color must be described three-dimensionally. The three dimensions are hue, saturation and luminosity.

1. Hue = dominant wavelength.

No matter what primaries are used to make a color, the resulting color or hue cannot be resolved into its component parts. This new color has a dominant wavelength which would correspond to that hue when seen on the visible spectrum.

2. Saturation = color purity.

This is an indication of the spectral purity of a color or, in other words, the amount of white light present along with the dominant wavelength. As an example of the effect saturation can have on a hue, compare fire-engine red with baby pink. The only difference between the two is saturation. Fire-engine red is a highly saturated color because it contains very little white light in addition to its dominant wavelength. Baby pink, on the other hand, has the same dominant wavelength but also has a good amount of white light contaminating this hue. As might be expected, 100% saturation indicates a pure spectral hue while 0% saturation of any color is white.

3. Luminosity = brightness.

This indicates the amount of light energy which is contained within a given hue. There are certain factors concerning the brightness of a color which should be mentioned.

- (A) The total brightness of a mixture is equal to the sum of the individual brightnesses of all colors in the mixture.
- (B) If a color match is obtained at one brightness level, the match will be maintained over a wide range of brightness levels.

CHROMATICITY DIAGRAM

The last fact concerning color match is very helpful because it will

allow the use of a two-dimensional "road map" for color determination. Color has three factors — hue, saturation and brightness, as previously stated. To lay out a two-dimensional representation of color, one variable must be held constant. Because hue and saturation are unaffected by variations in brightness, it is possible to hold brightness constant and show two-dimensionally the remaining two variables — hue and saturation.

This representation of the colors visible to the human eye is commonly called the Chromaticity Diagram, and is the result of exhaustive investigation on the part of the International Commission on Illumination who, in order to standardize colors and color-mixtures, developed a psychophysical system of color specification. The system makes use of the "Standard Observer" and a standard light source. This means that any experiment can be dupli-

cated at any time without the result being dependent on the visual characteristics of a single individual.

It will be recalled that when threeprimary-color reproduction was first discussed, it was implied that all visible colors could be matched by the proper proportions of the primaries. This is not true. The chromaticity diagram will be very useful in visualizing the limitations of this color reproduction system.

Figure 6 is a black and white representation of the ICI Chromaticity Diagram. Starting at the lower left corner of the horseshoeshaped boundary and moving clockwise, the eye passes a familiar gamut of colors. The horseshoe-shaped boundary does indeed represent the spectrum of visible colors. The boundary itself is indicative of 100% saturated colors. In about the center of the area bounded by the horseshoe

Continued on Page 7

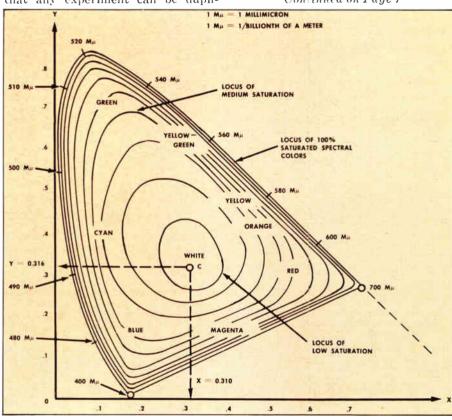


Fig. 6 — STANDARD XYZ CHROMATICITY DIAGRAM: Any color completely defined by two numerical quantities specifying chromaticity (hue and saturation) plus brightness information.



BENCH NOTES

SPEAKER REPAIR

While servicing television and radio sets, I find many speakers with damaged cones. Where the damage is not so excessive so as to require replacing the cone, I have found that it can be repaired quickly and inexpensively by using plastic rubber.

This compound can be purchased in almost any store handling hardware items. It is wet when applied but will dry soft and elastic within 24 hours. This makes it ideal to apply to speaker cones, even at the outer edge, because it does not hinder the free movement or stiffen the cone which is the case when other cements are used.

The product I use comes in a 4 oz. tube retailing for about \$1.00. The brand name is Duro Plastic Rubber manufactured by the Woodhill Chemical Co., Cleveland, Ohio.

William A. Pierce 122 Wesley Ave. Cherry Hill, N. J. 08034

SOLDER REMOVAL

In regard to the trouble (bugaboo), of removing components with multiple leads from printed circuit boards, I recently stumbled on to a system, which has, anything yet devised beat by a country mile.

Secure an air storage tank. The kind oil stations use for emergency inflation of flat tires on the road. Equip the tank with about 6 to 10 feet of hose and a hand operated squeeze valve or blow gun. On the gun fasten on a piece of copper tubing with the opening on the end cut down to about 1/16 of an inch or slightly larger. Inflate tank to about 140 lbs. of pressure.

When terminal is heated, a short

When terminal is heated, a short burst of air, not only loosens the connections, but, completely cleans out the holes, so that, after all the terminals are loosened, the part will fall out by

The only precaution to be taken, is to clean the board, for about an inch radius of the part, as a very fine spray of solder will cling to the board.

> F. B. Callahan J. P. Scherrman, Inc. Farley, Iowa

FUSE SAVER

On the new line of Color TV, instead of using circuit breakers as in the past, manufacturers are now using plug in fuses.

If on a job and you find the fuse blown, instead of plugging in a new fuse, I made up a circuit breaker by taking the old plug in fuse pins and soldering them to a breaker. I plug in this breaker until I find what is causing this fuse to blow. When repaired I plug in regular fuse. This way you can save many fuses until you find the short.

Jay Kohler 171 Franklin Ave. Hubbard, Ohio

INEXPENSIVE HEAT SINK

Women's flat hair clips, bent to appropriate shape for the job, make excellent clamps to hold small components



together for soldering. They also serve as a heat sink.

S. Clark Box 2162 East Bradenton, Florida 33507

EASY OFF

When a can of soldering paste gets messed up, it's a job to pry the lid off. This becomes easy when a cuphook is soldered onto the top cover and used as a handle.

Harry J. Miller Advance Television-Radio 991 Forty-Second St. Sarasota, Florida

HORIZONTAL SYNC

Philco TV-8II25 (and other sets using diodes for phase comparators in horiz. sinc.)

We have had several Philcos wherein the horiz. would suddenly lose sync and the horiz frequency would change drastically. A readjustment of the horiz oscillator would return the set to normal, however, at any moment it would do as stated. It appeared that the oscillator was at fault, however, a measurement of the diode pack showed one section as apparently open. The diodes were replaced with GE 1N538 and in each case stability has been perfect.

Leonard Chioma 2020 Natalen Rd. Winter Park, Fla.

ARCING COLOR TV

Most color televisions employ a high voltage supply of approximately 25 KV (25,000 volts).

There may be some crackling that is normal due to moisture in air and dust collection.

If you encounter a color television that arcs repeatedly, replace the high voltage regulator tube 6BK4 — many manufacturers use this tube as a regulator.

Due to its high power most tube checkers cannot check this tube, and turning brightness control shows everything operative.

Direct replacement will usually correct trouble because when this tube fails voltage rises to about 27 KV which can cause the excessive arcing and corona discharge.

Bernard H. Serota 2502 S. Philip Street Philadelphia, Pa. 19148

INSULATE SCREWDRIVERS

When working on radios, T.V.s and other devices where you need insulated screwdrivers, don't go out and buy a set. Just take your favorite screwdriver and measure the diameter of the shank. Find a piece of spaghetti the same diameter and slip it over the shank. This, as you can see, is a very inexpensive way to insulate and you can leave it on permanently or just slip it on when you need it. You can also reinsulate your old torn insulated screwdrivers this way.

Ed LaPour 908 Hayward Bremerton, Wash.

FREEING COIL SLUGS

Often coil slugs are stuck so that any attempt to turn them will result in a cracked slug or stripped hole or stripped alignment tool.

If on the first tug the slug doesn't turn easily don't force it, insert an ice pick into the hole and apply heat to the ice pick with a soldering gun as near to the coil as is practical for about one minute.

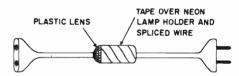
Remove the ice pick and insert the alignment tool into the slug and it will turn freely.

I have used this method for some time on IF's, ratio detectors etc. with almost 100% success.

William J. Praetz 59-23 Cooper Ave. Glendate 27, N. Y.

OUTLET TESTER

I've found one out of about forty dead or intermittent TV sets to be victims of poor electrical outlet contacts or a blown fuse. One neat way to detect this "TV fault" is to permanently



wire a neon test light on to your cheater cord. Before I pull the back off of a set, I plug in my "cheater indicator". With this device, I know the relative condition of my customer's electrical source immediately with no extra effort. The "cheater indicator" is used as a conventional cheater, as soon as the set's back is off.

M. L. Shapiro 75 Hunting Rd. Needham Hts., Mass. 02194

Note:

Those desiring to have letters published in this column should write the Editor, Techni-Talk, Electronic Components Division, General Electric Company, Owensboro, Kentucky. For each such letter selected for publication you will receive \$10.00 worth of General Electric tubes. In the event of duplicate or similar items, selection will be made by the Editor and his decision will be final. The Company shall have the unlimited right without obligation to publish or otherwise use any idea or suggestion sent to this column. Caution: The ideas and suggestions expressed in this column are those of the individual writers. These ideas and suggestions have not been tried by the General Electric Company and therefore are not endorsed, sponsored or recommended.

RECEIVING TUBE POPULARITY LISTING

Listed below are the 267 most popular tube types based on distributor usage. One list is in order by usage and the other by alpha-numerical sequence. The figure following each tube indicates popularity. Number 1, 5U4GB/5AS4A had the highest volume; Number 2, 50C5 was next, etc.

					ıe.	TING BY VO		IME					
SILACD / SACAA	1	4547	20		76 i		114		152	4DE7	102	AE 17 /EE1 0 A	221
5U4GB/5AS4A 50C5	2	6EM7 6CM7	38 39	6BE6 6GM6	77			6SJ7		6DE7 6FH5	193	6EJ7/EF184 6ES8/ECC189	231 232
6CB6A/6CF6	3	6JS6A	40	6CU5	78		116		155	6HF8	194	6EW7	233
6DW4B	4	3AT2	41	3GK5	79		117			6HQ5			234
6JE6A	5	5Y3GT	42	5CG8	80	6DA4A/6DM4A				11KV8	196	6U10	235
6AQ5A/6HG5	6	6V6GTA	43	6CY5	81	6GY6/6GX6	119	17AY3A	158	12SN7GTA	197	8BQ5	236
6DQ6B/6GW6	7	12AX4GTB	44	6X4	82	6KT8	120	21CY5	159	17D4	198	10GK6	237
6AX4GTB	8	12AV6	45	17DQ6B/			121	6AH6	160	22BW3	199	12AQ5	238
35W4	9	1X2A/B	46	17GW6	83		122	6AK5/EF95	161	7025/12AX7A	200		239
6BQ7A/6BZ7	10	3BZ6	47	1 K3	84		123	6AS8	162	3BN6	201	12DT8	240
6SN7GTB	11	1V2	48	5AN8	85		124		163	6CB5A	202	12SA7	241
6AU6A	12	5U8 6BK7B	49 50	6AS5 6AU8A	86 87	. ,	125		164	6ER5 12DT5	203	12SK7 12W6GT	242 243
6EA8 6BZ6	14	12DQ6B/	50	8UL9	88		127	13GF7A	166	105		1AD2	244
6GH8A	15	12GW6	51	6KZ8	89		128	22DE4	167	4DT6	206	4EJ7	245
6FQ7/6CG7	16	1G3GT/1B3GT	52	6W6GT	90		129	2BN4A	168	6CY7	207		246
6CG8A	17	6CD6GA	53	12AU6	91	33GY7	130	5AT8	169	6EU7	208	6BH11	247
0Z4	18	6L6GC	54	6AF4A/6DZ4	92	6CL6	131	5KE8	170	6HE5	209	6BK5	248
6U8A/6KD8/		6J6A	55	6AM8A	93		132		171	6JN6A	210	6BS3A	249
5KD8	19	6AV6	56	6JC6	94		133	6BH8	172	6JZ8	211	6BX7GT	250
3A3A/3CA3/		6T8A	57	6KA8	95		134		173	12816	212	6BY6	251
3AW3	20	6AF4	58	6BC8	96		135	6CN7 6CS6		13DR7	213		252
6AW8A	21	6DE4	59 60	6BN6/6KS6 6EM5	97 98		136 137	6CS7	1 <i>75</i> 1 <i>7</i> 6	17BE3 19AU4GTA	214	6EH7/EF183 6FS5	253 254
12AX7/ECC83 12AU7A/ECC82	22	6GH6 6S4A	61	3DG4	99		138		177	19T8	216	6FV6	255
12BY7A	24	35C5		6BQ6GTB	100		139	6W4GTA	178	22JU6	217	6GC5	256
6AU4GTA	25	6DT6A	63		101		140	12AT6	179	23Z9	218	6KE8	257
12BA6	26	6EB8	64	6C4			141		180	35L6GT	219	616	258
12BE6	27	3CB6/3CF6	65	6GE5	103	12GN7A	142	12CA5	181	1U4	220	6SQ7	259
6BK4A	28	6BU8	66	6HZ6	104	5AM8	143	12SQ7	182	2AS2	221	8B10	260
12BH7A	29	6GK5/6FQ5A	67				144	13EM7/15EA7	183	2FS5		81/8	261
12AT7/ECC81	30	2CW4		12B4A			145	3V4	184	2GK5/2FQ5A		10CW5	262
6AL5	31	4BZ6		17JZ8			146		185	3CY5		12AB5	263
6X8A	32	6AY3B				6DN7	147	6BA8A	186	3DT6		12AF3	264 265
6EW6 6GF7A	33 34	6CL8A 10DE7	71 72	50L6GT 6DE6	110	6EV5 6FG7	149	6BA11 6BG6GA	187 188	4CB6 5EA8		12FX5 22JG6A	266
6GU7	35	35Z5GT		6CQ8	111		150	6BQ6GA/6CU6		6AT8A		25DN6	267
6BQ5/EL84		6AN8A		6DR7	112	6GK6	151		190	6BY8	229	235110	20,
6DQ5		6BA6/EF93		12AZ7A		6HB7		6CZ5		6CU8	230		
							102			0000	200		
										0000	250	1	
27.1		L 511 100 15 15 14			HA-	NUMERICA	L	LISTING				10575	245
0Z4	18	5U4GB/5AS4A		6BK7B	HA -	NUMERICA 6DE6	110	LISTING 6GU7	35	6W6GT	90	12FX5	265
1AD2	244	5U8	49	6BK7B 6BL7GTA	HA - 50 114	NUMERICA 6DE6 6DE7	110 192	LISTING 6GU7 6GY6/6GX6	35 119	6W6GT 6X4	90 82	12GN7A	142
1AD2 1G3GT/1B3GT	244 52	5U8 5Y3GT	49 42	6BK7B 6BL7GTA 6BN4A	50 114 116	NUMERICA 6DE6 6DE7 6DK6	110 192 146	LISTING 6GU7 6GY6/6GX6 6HB7	35 119 152	6W6GT 6X4 6X5GT	90 82 155	12GN7A 12SA7	142 241
1AD2 1G3GT/1B3GT 1K3	244 52 84	5U8 5Y3GT 6AB4	49 42 171	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6	50 114 116 97	NUMERICA 6DE6 6DE7 6DK6 6DN7	110 192 146 147	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5	35 119 152 209	6W6GT 6X4 6X5GT 6X8A	90 82 155 32	12GN7A 12SA7 12SK7	142 241 242
1AD2 1G3GT/1B3GT 1K3 1R5	244 52 84 115	5U8 5Y3GT 6AB4 6AF3	49 42 171 144	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8	50 114 116	ODE OF OR OTHER OF OTHER OF OTHER OF OTHER OF OTHER OT	110 192 146	6GU7 6GY6/6GX6 6HB7 6HE5 6HF8	35 119 152 209 194	6W6GT 6X4 6X5GT 6X8A 7AU7	90 82 155 32 139	12GN7A 12SA7	142 241
1AD2 1G3GT/1B3GT 1K3 1R5 1U4	244 52 84	5U8 5Y3GT 6AB4 6AF3 6AF4	49 42 171	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84	50 114 116 97 136 36	NUMERICA 6DE6 6DE7 6DK6 6DN7	110 192 146 147 37	6GU7 6GY6/6GX6 6HB7 6HE5 6HF8	35 119 152 209 194	6W6GT 6X4 6X5GT 6X8A	90 82 155 32	12GN7A 12SA7 12SK7 12SN7GTA	142 241 242 197
1AD2 1G3GT/1B3GT 1K3 1R5	244 52 84 115 220	5U8 5Y3GT 6AB4 6AF3	49 42 171 144 58	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6	50 114 116 97 136 36	ODE OF ORDER	110 192 146 147 37 7	6GU7 6GY6/6GX6 6HB7 6HE5 6HE8 6HQ5	35 119 152 209 194 195	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A	90 82 155 32 139 122	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT	142 241 242 197 182
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5	244 52 84 115 220 205 48	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4	49 42 171 144 58 92	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB	50 114 116 97 136 36 189	NUMERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ68/6GW6 6DR7 6DS4	110 192 146 147 37 7 112	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8	35 119 152 209 194 195 128	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5	90 82 155 32 139 122 260	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT	142 241 242 197 182 243 213 183
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2	244 52 84 115 220 205 48 46 221	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95	49 42 171 144 58 92 185 160 161	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A	50 114 116 97 136 36 189 100 101	ODERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ68/6GW6 6DR7 6DS4 6DT6A 6DW4B	110 192 146 147 37 7 112 177 63 4	6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A	35 119 152 209 194 195 128 104 234 55	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8	90 82 155 32 139 122 260 236 140 261	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A	142 241 242 197 182 243 213 183 166
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2	244 52 84 115 220 205 48 46 221 124	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3	49 42 171 144 58 92 185 160 161 145	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A	50 114 116 97 136 36 189 100 101 249	ODERICA ODE ODE ODE ODE ODE ODE ODE OD	110 192 146 147 37 7 112 177 63 4 252	6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J5 6J6A 6JC6	35 119 152 209 194 195 128 104 234 55 94	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5	90 82 155 32 139 122 260 236 140 261 262	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A	142 241 242 197 182 243 213 183 166 156
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A	244 52 84 115 220 205 48 46 221 124 168	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5	49 42 171 144 58 92 185 160 161 145 31	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS8	50 114 116 97 136 36 189 100 101 249 173	ONUMERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ65 6DQ68/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7	110 192 146 147 37 7 112 177 63 4 252 127	6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J5A 6J6A 6JE6A	35 119 152 209 194 195 128 104 234 55 94	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7	90 82 155 32 139 122 260 236 140 261 262 72	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA	142 241 242 197 182 243 213 183 166 156 157
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4	244 52 84 115 220 205 48 46 221 124 168 68	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A	49 42 171 144 58 92 185 160 161 145 31 93	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS8 6BU8	50 114 116 97 136 36 189 100 101 249 173 66	ODERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8	110 192 146 147 37 7 112 177 63 4 252 127	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JC6 6JH6	35 119 152 209 194 195 128 104 234 55 94 5	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6	90 82 155 32 139 122 260 236 140 261 262 72 237	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A	142 241 242 197 182 243 213 183 166 156 157 158
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5	244 52 84 115 220 205 48 46 221 124 168 68 222	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A	49 42 171 144 58 92 185 160 161 145 31 93 74	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT	50 114 116 97 136 36 189 100 101 249 173 66 250	6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8	110 192 146 147 37 7 112 177 63 4 252 127 13 64	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH8	35 119 152 209 194 195 128 104 234 55 94 5 129 153	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8	90 82 155 32 139 122 260 236 140 261 262 72 237 196	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3	142 241 242 197 182 243 213 183 166 156 157 158 214
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A	244 52 84 115 220 205 48 46 221 124 168 68 222	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AQ5A/6HG5	49 42 171 144 58 92 185 160 161 145 31 93 74	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BW7GT	50 114 116 97 136 36 189 100 101 249 173 66 250 251	6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA4 6EA8 6EB8 6EH7/EF183	110 192 146 147 37 7 112 177 63 4 252 127 13 64 253	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH8 6JM6A	35 119 152 209 194 195 128 104 234 55 94 5 129 153 133	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3	142 241 242 197 182 243 213 183 166 156 157 158
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/	244 52 84 115 220 205 48 46 221 124 168 68 222 223	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AQ5A/6HG5	49 42 171 144 58 92 185 160 161 145 31 93 74 6	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6	50 114 116 97 136 36 189 100 101 249 173 66 250 251 229	6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184	110 192 146 147 7 112 177 63 4 252 127 13 64 253 231	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH6 6JH6 6JH6 6JM6A	35 119 152 209 194 195 128 104 234 55 94 5 129 153 133 210	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 141	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/	142 241 242 197 182 243 213 166 156 157 158 214 198
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A	244 52 84 115 220 205 48 46 221 124 168 68 222 223	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AQ5A/6HG5 6AS5 6AS8	49 42 171 144 58 92 185 160 161 145 31 93 74	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY8 6BY8 6BY8	50 114 116 97 136 36 189 100 101 249 173 66 250 251	**NUMERICA** 6DE7 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5	110 192 146 147 37 7 112 177 63 4 252 127 13 64 253	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH6 6JH8 6JM6A 6JM6A 6JN6A	35 119 152 209 194 195 128 104 234 55 94 5 129 153 133 210	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6	142 241 242 197 182 243 213 183 166 156 157 158 214
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3	244 52 84 115 220 205 48 46 221 124 168 68 222 223	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AQ5A/6HG5	49 42 171 144 58 92 185 160 161 145 31 93 74 6 86 162	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY8 6BY8 6BY8	50 114 116 97 136 36 189 ,100 101 101 1249 250 251 229 14	**NUMERICA** 6DE7 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5	110 192 146 147 7 112 177 63 4 252 127 13 64 253 231 98	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A	35 119 152 209 194 195 128 104 234 55 94 55 129 153 133 210 40	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AB5 12AF3	90 82 155 32 139 122 260 236 140 261 72 237 196 263 141 264	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6	142 241 242 197 182 243 213 166 156 157 158 214 198
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6	244 522 84 115 220 205 48 46 221 124 168 68 222 223 20 41 201 47	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A	49 42 171 144 58 92 185 160 161 145 31 93 74 6 86 162 228 25 12	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS3 6BU8 6BX7GT 6BY6 6BY6 6BY6 6BY6 6BY6 6BY6 6C4 6CA4	50 114 116 97 136 36 189 100 101 249 173 66 250 251 229 14 102 190 202	6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6ER5 6ES8/ECC189	110 192 146 147 7 112 177 63 4 252 127 13 64 253 231 98 38 203 232	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JS6A 6JT8 6JT8 6JU8 6JZ8	35 119 152 209 194 195 128 104 234 55 94 5 5 129 153 133 133 210 40 164 88 211	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AF3 12AG5 12AT6	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 141 264 238 179 30	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17DQ6B/ 17JZ8 19AU4GTA 1918	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6	244 522 84 115 220 205 48 46 221 124 168 68 222 223 20 41 201 47 65	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AQ5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU4GA 6AU8A	49 42 171 144 58 92 185 160 161 145 31 93 74 6 86 162 228 228 25 12 87	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3 6BU8 6BX7GT 6BY6 6BY8 6BZ6 6C4 6C4 6C4 6C85A 6CB6A/6CF6	500 114 116 97 136 36 189 100 101 101 249 1173 66 250 251 229 14 14 190 202 3	NUMERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6ER5 6EM7 6ER5 6ES8/ECC189 6EU7	110 192 146 1147 37 7 112 1177 63 4 252 127 13 64 253 298 38 203 232 208	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH6 6JH8 6JM6A 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JN6A	35 119 152 209 194 195 128 104 234 55 94 5 5 129 153 133 210 40 40 88 82 211	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT6 12AT6 12AT6 12AU6	90 82 1555 32 139 122 260 236 140 261 262 72 237 196 263 141 264 238 179 30 91	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5	142 241 242 197 182 243 213 166 156 157 158 214 198 83 107 215 216 159
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5	244 522 84 115 220 205 48 46 221 124 168 68 222 223 20 41 201 47 65 224	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AQ5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU4GTA 6AU6A 6AU8A 6AV6	49 42 171 144 58 92 185 160 161 145 31 93 74 6 86 162 228 87 56	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6BY6 6BY8 6BZ6 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA	500 114 116 97 136 36 189 ,100 10 101 1249 250 251 229 14 102 202 3 53	**NUMERICA**	110 192 146 147 7 7 112 177 63 4 252 127 13 64 253 231 838 203 232 208 148	6GU7 6GY6/6GX6 6HB7 6HE5 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JN6A 6JN8	35 119 152 209 194 195 128 104 234 55 54 55 129 153 133 210 40 40 40 40 40 40 40 40 40 40 40 40 40	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU6 12AU6 12AU6	900 822 1555 32 139 122 2600 236 140 261 262 72 237 196 263 141 264 238 179 30 91	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3	142 241 242 197 182 243 213 166 156 157 158 214 198 83 107 215 216 159 199
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4	244 52 84 115 220 205 48 46 221 1124 168 822 223 20 41 47 65 224 99	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AQ5A/6HG5 6AS8 6AT8A 6AU4GTA 6AU6A 6AU8A 6AV6 6AW8A	49 42 171 144 588 92 185 160 161 145 31 93 74 6 86 162 228 25 12 87 56 21	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS8 6BU8 6BX7GT 6BY6 6BY6 6BY6 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CG8A	500 114 116 97 136 36 189 100 101 101 249 173 66 250 251 229 14 102 190 202 3 3 17	6DE6 6DE7 6DK6 6DN7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM5 6EM7 6ER5 6ES8/ECC189 6EU7 6EV5 6EW6	110 192 146 147 7 112 177 63 4 252 127 13 64 253 231 98 38 38 203 208 148 33	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JF6A 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JN6A 6JN6A 6JX8 6KE8	35 119 152 209 194 195 128 104 234 255 94 5 5 129 153 3210 40 164 88 211 105 95 257	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU6 12AU7A/ECC82	90 82 155 32 139 122 260 236 140 261 262 72 237 196 30 141 264 238 179 30 91 233 239	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216 159 167
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6	244 52 84 115 220 205 48 46 22 1124 168 68 222 223 20 41 47 65 224 99 225	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AU5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU6A 6AU8A 6AV6 6AW8A 6AX3	49 42 171 144 588 92 185 160 161 145 31 93 74 6 86 162 228 25 12 87 56 21 163	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6BY6 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CG8A 6CL6	HA- 500 114 116 97 136 36 189 100 101 249 17 250 251 229 190 202 3 53 53 17 131	6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ5 6DQ6B/6GW6 6DN7 6DQ4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6ER5 6ES8/ECC189 6EV5 6EW6 6EW6	110 192 146 147 7 112 177 63 4 252 127 13 64 253 231 98 38 203 232 208 148 33 233	-ISTING GGU7	35 119 152 209 194 195 128 104 234 55 94 55 129 153 133 210 164 88 211 105 257 120	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU7A/ECC82 12AV5GA	90 82 155 32 139 122 236 140 261 262 237 196 263 141 264 238 179 30 9	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A	142 241 242 197 182 243 213 183 166 156 157 158 214 198 83 107 215 216 159 167 266
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5	244 522 844 115 2200 205 484 66 221 124 168 68 222 223 20 41 201 47 65 224 29 29 27 79	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AV5A/6HG5 6AS8 6AT8A 6AU4GTA 6AU6A 6AU8A 6AV6 6AV6 6AV8 6AX8 6AX8	49 42 171 144 58 92 185 160 161 145 31 37 4 6 86 162 22 87 56 21 1163 8	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6BY8 6BZ6 6C4 6CA4 6CB6A/6CF6 6CD6GA 6CG8A 6CL6 6CL8A	HA- 500 114 116 97 136 36 189 100 101 249 173 66 250 251 229 14 102 190 202 3 53 17 131 71	6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6ER5 6ES8/ECC189 6EU7 6EV5 6EW7 6FG7	110 192 146 147 37 7 112 177 63 4 252 127 13 64 253 231 28 38 203 232 208 38 38 38 203 234 244 254 254 38 27 28 29 20 38 38 38 38 38 38 38 38 38 38 38 38 38	-ISTING GGU7	35 119 152 209 194 195 128 104 234 55 94 55 129 153 133 210 40 40 40 40 55 95 128 1104 227 1105 95 1105 1105 1105 1105 1105 1105 1	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU6 12AU7A/ECC82 12AV5GA 12AV5GA 12AV5GA 12AV6 12AV7	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 141 264 238 179 30 91 2 23 239 81 81 81 81 81 81 81 81 81 81 81 81 81	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17JZ8 19AU4GTA 19TB 21GY5 22BW3 22DE4 22JE4 22JG6A 22JU6	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 215 216 159 199 167 266 217
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4	244 522 84 115 220 205 48 46 221 124 168 68 222 223 20 47 65 224 99 225 79 184	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AN8A 6AU8A 6AU4GTA 6AU6A 6AW8A 6AW3	49 42 171 144 58 92 185 160 161 145 31 37 4 6 86 162 228 87 56 21 163 163 163 163 164 165 166 166 166 166 167 168 168 168 168 168 168 168 168 168 168	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS8 6BU8 6BX7GT 6BY6 6BY8 6BZ6 6C4 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CCBA 6CL6 6CL8A 6CM7	HA- 50 50 50 50 50 50 50 50 50 50 50 50 50	NUMERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ65 6DQ68/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6ER5 6EW7 6EV5 6EW6 6EW7 6FG7 6FG7	110 110 146 147 7 1112 63 4 252 127 13 64 253 231 98 303 232 208 148 33 34 3149 193	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JN8 6JS8 6HZ8 6KE8 6KE8 6KE8	35 119 152 209 194 195 128 104 234 55 51 29 153 131 40 164 88 81 105 95 257 120 89 258	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT6 12AT7/ECC81 12AU6 12AU7A/ECC82 12AV5GA 12AV7 12AV4 12AV7	90 82 155 32 139 122 260 236 140 261 72 237 196 263 179 30 91 2 23 239 45 180	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216 159 199 167 227 227 227 227 227 227 227 227 227 2
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7	244 522 84 115 220 205 48 46 221 124 168 222 223 20 47 65 224 99 225 728 184 125	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AQ5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU4GTA 6AU4GA 6AW8A 6AV6 6AW8A 6AX3 6AX4GTB 6AY3B 6B10	49 42 171 1444 58 92 1855 160 161 145 31 93 74 6 86 162 228 25 12 163 87 56 21 163 87 163 87 163 163 163 163 163 163 163 163 164 165 165 165 165 165 165 165 165 165 165	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6BY8 6BZ6 6C4 6CA4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CG8A 6CL6 6CL8A 6CM7 6CN7	HA- 500 114 116 97 136 36 189 100 101 124 173 66 250 251 190 202 202 3 53 17 131 71 39 174	OUMERICA 6DE6 6DE7 6DK6 6DN7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6ES8/ECC189 6EV5 6EW6 6EW7 6FG7 6FH5	110 110 192 146 147 7 112 117 63 4 252 127 7 13 64 253 231 98 38 32 232 208 148 33 233 231 248 3149 149 149 149 149 149 149 149 149 149	GU7 6GY6/6GX6 6HB7 6HE5 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JN8 6JT8 6JU8 6JZ8 6KE8 6KE8 6KE8 6KE8 6KE8	35 119 152 209 194 195 128 104 234 55 94 5 5 129 153 133 210 40 164 88 211 105 95 257 120 257 120 257 120 257 257 257 257 257 257 257 257 257 257	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU6 12AU7A/ECC82 12AV5GA 12AV7 12AV7 12AV6 12AV7 12AV7 12AV6 12AV7 12AV7 12AX4GTB 12AX7/ECC83	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 179 30 91 22 23 239 45 180 44 42	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6	142 241 242 197 182 243 213 166 157 158 214 198 83 107 215 216 159 199 167 266 217 218 227 2218 227
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4	244 522 84 115 220 205 48 46 221 124 168 68 222 223 20 47 65 224 99 225 79 184	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AN8A 6AU8A 6AU4GTA 6AU6A 6AW8A 6AW3	49 42 171 144 58 92 185 160 161 145 31 37 4 6 86 162 228 87 56 21 163 163 163 163 164 165 166 166 166 166 167 168 168 168 168 168 168 168 168 168 168	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS8 6BU8 6BX7GT 6BY6 6BY8 6BZ6 6C4 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CCBA 6CL6 6CL8A 6CM7	HA- 50 50 50 50 50 50 50 50 50 50 50 50 50	NUMERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ65 6DQ68/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6ER5 6EW7 6EV5 6EW6 6EW7 6FG7 6FG7	110 110 146 147 7 1112 63 4 252 127 13 64 253 231 98 303 232 208 148 33 34 3149 193	-ISTING GGU7 GGY6/6GX6 6HB7 6HE5 6HE8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN8 6JM8 6JM8 6JM8 6JM8 6JM8 6JM8 6JM8 6JE8 6KT8 6KCT 6KA8 6KE8 6KT8 6KCZ8 6L6 6L6GC 6LF8	35 119 152 209 194 195 128 104 234 55 51 29 153 131 40 164 88 81 105 95 257 120 89 258	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU7A/ECC82 12AV5GA 12AV7 12AV7 12AV6 12AV7 12AV7 12AV6 12AV7 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7	90 82 155 32 139 122 260 236 140 261 72 237 196 263 179 30 91 2 23 239 45 180	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216 159 199 167 227 227 227 227 227 227 227 227 227 2
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BX6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6	244 522 84 115 220 205 48 46 221 1168 68 222 223 20 41 201 47 65 224 99 225 79 184 125 69	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AQ5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU6A 6AU6A 6AU8A 6AV6 6AW8A 6AX3 6AX4GTB 6AY3B 6B10 6BA6/EF93	49 42 171 144 58 92 185 160 161 145 31 93 74 6 8 8 162 228 8 7 163 8 163 8 163 163 8 163 163 163 163 163 163 163 163 163 163	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS8 6BU8 6BX7GT 6BY6 6BY6 6C4 6CA4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CG8A 6CL6 6CL8A 6CL6 6CN7 6CN7	HA- 500 114 116 97 136 36 189 100 101 249 173 66 250 251 14 102 190 202 3 17 131 71 39 174	6DE6 6DE7 6DK6 6DE7 6DK6 6DN7 6DQ5 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6EK5 6EW7 6FG7 6FW7 6FG7 6FW7 6FG7 6FS5	110 192 146 147 37 7 7 1112 177 63 4 252 217 13 64 253 231 38 203 232 232 248 38 233 3149 3148 3149 3148 3149 3148 3148 3148 3148 3148 3148 3148 3148	-ISTING GGU7	35 119 152 209 194 195 128 104 234 55 129 153 133 210 40 164 88 211 110 89 257 120 89 258 54 165	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU6 12AU7A/ECC82 12AV5GA 12AV7 12AV7 12AV6 12AV7 12AV7 12AV6 12AV7 12AV7 12AX4GTB 12AX7/ECC83	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 141 264 238 179 30 91 92 233 45 180 44 42 2113	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25L6GT	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216 217 266 217 218 217 218
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6	244 522 84 415 220 205 48 466 221 124 168 68 222 223 20 41 47 65 224 99 184 125 79 184 125 69 205	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AS5 6AS8 6AT8A 6AU4GTA 6AU6A 6AU8A 6AV4 6AV6 6AW8A 6AX3 6AX4GTB 6AY3B 6B10 6BA6/EF93 6BA8A	49 42 171 144 58 92 185 160 161 145 31 93 74 6 86 162 228 87 56 6 21 163 87 1134 75 1134 75 1136	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CL8A 6CL8A 6CCM7 6CN7 6CN7 6CQ8	HA- 500 114 116 97 136 36 189 100 101 249 1102 251 229 190 202 3 53 17 131 71 39 74 111 175	NUMERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EW7 6EV5 6EW7 6FC7 6FW6 6FW7 6FG7 6FH5 6FW7 6FQ7/6CG7 6FS5 6FV6	110 192 146 147 37 7 112 1177 63 4 252 1177 63 64 253 231 232 208 203 232 208 203 231 49 193 116 1179 1189 1189 1189 1189 1189 1189 1189	-ISTING GGU7	35 119 152 209 194 195 104 234 555 94 55 129 153 133 210 40 164 88 211 105 89 257 120 89 258 54 165 61	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU7A/ECC82 12AV5GA 12AV5GA 12AV6 12AV7 12AV4GTB 12AX4GTB 12AX7A 12B4A	90 82 155 32 139 122 236 140 261 262 27 72 237 196 263 141 264 238 179 30 92 32 39 45 180 44 44 42 21 13	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25I6GT 33GY7	142 241 242 197 182 243 213 166 157 158 214 198 83 107 215 216 159 167 266 217 218 267 123 130 219
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6 4DT6 4EJ7 5AM8	244 522 84 115 220 205 48 46 221 1124 168 68 222 223 20 41 47 65 224 99 225 79 184 125 69 226 226 227 227 228 229 229 229 229 229 229 229 229 229	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AV5 6AS8 6AT8A 6AU4GTA 6AU6A 6AW8A 6AV6 6AW8A 6AX3 6AX4GTB 6AY3B 6B10 6BA6/EF93 6BA8A	49 42 171 144 58 92 185 160 161 145 31 93 74 6 8 8 6 162 228 25 12 8 7 7 163 8 7 163 8 163 8 163 163 163 163 164 164 165 165 165 165 165 165 165 165 165 165	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6CB4 6CC4 6CA4 6CCB6A 6CCBA 6CCBA 6CCBA 6CCBA 6CCBA 6CCBA 6CCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCBA 6CCCCBA 6CCCBA 6CCBA 6CCCBA 6CCBA 6CCCBA 6CCC	HA- 500 114 116 97 136 36 189 100 101 124 173 66 250 251 14 102 190 202 190 202 173 171 131 71 139 174 111 175 176 78 230	OUMERICA 6DE6 6DE7 6DK6 6DN7 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EW5 6EW5 6EW6 6EW7 6FG7 6FH5 6FM7 6FQ7/6CG7 6FS5 6FV6 6GC5 6GE5	110 110 192 146 147 7 7 112 177 63 4 252 127 13 64 253 233 38 203 232 208 148 33 233 149 193 193 194 195 195 195 195 195 195 195 195 195 195	-ISTING GGU7 GGY6/6GX6 6HB7 6HE5 6HE5 6HS8 6HZ6 6J5 6J6A 6JC6 6JC7 6KA8 6KE8 6KE8 6KT8 6KC8 6L6 6L6 6L6 6L6 6L6 6L6 6L7 6SJ7 6SN7GTB	35 119 152 209 194 195 128 104 234 55 129 153 133 210 64 88 211 105 95 257 120 89 89 40 165 61 165 61 115 61 115 61 61 61 61 61 61 61 61 61 61 61 61 61	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU6 12AV7 12AV5GA 12AV7 12AV6 12AV7 12AV7 12AV6 12AV7 12AV7 12AV6 12AV7 12AV7 12AV7 12AV7 12AV7 12AX4GTB 12AX7/ECC83 12AZ7A 12B4A 12BA6 12BE6 12BH7A	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 1264 238 179 30 91 223 239 45 180 261 180 261 27 27 27 27 27 27 21 261 261 261 261 261 261 261 261 261	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 2516GT 33GY7 35C5 35L6GT 35W4	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216 217 267 123 130 622 218 227 228 229 229 229 229 229 229 229 229 229
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6 4DT6 4EJ7 5AM8 5AN8	244 522 84 46 220 205 48 46 221 1168 68 222 223 20 41 201 47 65 224 99 225 79 18 1125 69 226 206 214 1125 85 88 88 88 88 88 88 88 88 88 88 88 88	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AQ5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU6A 6AU6A 6AW8A 6AV6 6AW8A 6AV3 6AV4GTB 6AY3B 6B10 6BA6/EF93 6BA8A 6BB66 6BG6GA	49 42 171 1444 588 92 1855 160 161 145 31 93 74 6 8 8 162 228 8 75 12 163 8 8 7 11 163 8 7 163 163 163 164 164 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CCBA 6CL6 6CL8A 6CCM7 6CN7 6CQ8 6CS6 6CS7 6CU5 6CU8	HA- 500 114 116 97 136 36 189 100 101 249 173 66 250 251 229 14 102 190 202 3 17 131 71 39 174 111 175 176 78 230 137	6DE6 6DE7 6DK6 6DE7 6DK6 6DN7 6DQ5 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM5 6EM7 6EK5 6EW7 6FF5 6EW6 6EW7 6FF5 6FW7 6FF5 6FW7 6FG7 6FH5 6FM7 6FG7 6FG7 6FS5 6FW7 6FG7 6FG7 6FG7 6FG7 6FG7 6FG7 6FG7 6FG	110 110 192 146 147 37 7 112 177 63 4 252 117 13 64 253 231 233 232 233 232 24 253 231 148 33 233 149 1138 1138 1138 1138 1138 1138 1138 113	-ISTING GGU7 GGY6/6GX6 6HB7 6HE5 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH8 6JM6A 6JM6A 6JM8 6JM6A 6JM8 6JM8 6JM8 6JM8 6JM8 6JM8 6JE8 6KE8 6KT8 6KE8 6KT8 6KE8 6KT8 6KE8 6KT8 6KZ8 6L6 6L6GC 6LF8 6SJ7 6SJ7GT 6SM7GTB 6SQ7	35 119 152 209 194 195 128 104 234 55 129 153 133 210 40 164 88 211 1105 257 120 89 257 120 89 258 61 154 155 61 154 155 61 155 61 155 61 155 61 155 61 155 61 61 61 61 61 61 61 61 61 61 61 61 61	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AD6 12AT7/ECC81 12AU7A/ECC82 12AV6 12AV7A/ECC83 12AV6 12AV7 12AV4GTB 12AV7 12AV4GTB 12AV7 12AV4GTB 12AV7 12BAA6 12BA6 12BA6 12BA6 12BB6 12BB6 12BB6 12BB6 12BB6 12BB7A 12BL6	90 82 155 32 139 122 260 236 140 261 262 237 196 263 141 264 238 179 30 91 92 233 45 180 44 44 42 21 13 106 26 27 27 27 27 27 27 27 27 27 27 27 27 27	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25L6GT 33GY7 35C5 35U6GT 35W4 35Z5GT	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216 217 266 217 218 267 123 130 62 219 73
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6 4DT6 4EJ7 5AM8 5AM8 5AM8 5AT8	244 522 84 46 221 1124 168 68 222 223 20 41 47 65 224 925 79 184 125 69 226 245 143 85 169	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AN8A 6AS5 6AS8 6AT8A 6AU4GTA 6AU6A 6AU8A 6AV6 6AW8A 6AV6 6AW8A 6AX3 6AX4GTB 6AY3B 6B10 6BA6/EF93 6BA8A 6BA11 6BC8 6BG6GA 6GH6	49 42 171 144 58 92 185 160 161 145 31 93 74 6 86 162 228 27 56 21 11 163 8 70 134 75 187 76 76 187 76 188 76	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6CB4 6CB4 6CB5A 6CB6A/6CF6 6CD6GA 6CCBA	HA- 500 114 116 97 136 36 189 100 101 249 117 666 250 251 229 190 202 3 53 17 131 71 39 174 111 175 176 78 2137 117	6DE6 6DE7 6DK6 6DD7 6DK6 6DN7 6DQ5 6DQ5 6DQ6B/6GW6 6DR7 6DS4 6DT6A 6DW4B 6EA4 6EA7 6EA8 6EB8 6EH7/EF183 6EJ7/EF184 6EM5 6EM7 6EK5 6EW7 6FG7 6FU7 6FG7 6FW6 6GC5 6GC5 6GC5 6GF7A- 6GH8A	110 110 146 147 37 7 112 1177 63 4 252 127 13 64 253 231 232 208 203 232 208 203 233 149 193 116 254 255 256 117 256 256 118 257 257 257 257 257 257 257 257 257 257	-ISTING GGU7 GGY6/6GX6 6HB7 6HE5 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6J6A 6J6A 6J6A 6J86A 6JM6A 6JM6A	35 119 152 209 194 195 128 104 234 55 129 153 133 210 40 164 88 211 1105 257 120 89 257 120 89 258 61 154 155 61 154 155 61 155 61 155 61 155 61 155 61 155 61 61 61 61 61 61 61 61 61 61 61 61 61	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AU6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12B4A 12B4A 12B4A 12B46 12BE6 12BF7A	90 82 155 32 139 122 236 140 261 262 27 237 196 263 141 264 238 179 30 9 213 239 45 180 44 22 23 113 106 26 27 27 27 27 27 27 27 27 27 27 27 27 27	12GN7A 12SA7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13F7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17DW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25IGGT 33GY7 35C5 35IGGT 35W4 35Z5GT 50C5	142 241 242 243 213 183 166 157 158 83 107 215 216 159 199 167 218 267 217 218 267 217 218 267 217 218 267 217 218 267 27 27 27 27 27 27 27 27 27 27 27 27 27
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6 4DT6 4EJ7 5AM8 5AN8 5AN8 5AN8 5AN8 5AN8 5BR8	244 522 84 46 221 124 168 68 222 223 20 41 201 47 65 224 99 225 79 184 125 69 225 226 245 143 85 86 86 86 86 86 87 87 87 87 87 87 87 87 87 87 87 87 87	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AV6 6AS5 6AS8 6AT8A 6AU4GTA 6AU4GTA 6AU6A 6AW8A 6AV6 6AW8A 6AX3 6AX4GTB 6AY3B 6B10 6BA6/EF93 6BA8A 6BA11 6BC8 6BE6 6BG6GA 6GH6 6BH8	49 42 171 144 58 92 185 160 161 1145 31 93 74 6 86 162 228 25 56 21 163 8 70 134 75 163 188 70 188 70 188 70 188 70 188 70 188 70 188 70 188 70 188 70 188 70 188 70 188 70 188 70 188 70 70 70 70 70 70 70 70 70 70 70 70 70	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQGGTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6CB4 6CB6A/6CF6 6CD6GA 6CG8A 6CL6 6CL8A 6CM7 6CN7 6CQ8 6CS7 6CU5 6CU8 6CW4 6CX8 6CY5	HA- 500 114 116 97 136 36 189 100 101 1249 173 66 250 125 129 14 102 23 53 17 131 71 39 174 111 175 176 78 230 137 81	**NUMERICA**	110 110 110 110 110 110 110 110 110 110	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JC6 6JE6A 6JH6 6JH6 6JH8 6JM6A 6JH8 6JW8 6JS6A 6JT8 6JW8 6JS8 6KCB 6KCB 6KCB 6KCB 6KCB 6KCB 6KCB 6KCB	35 119 152 209 194 195 128 104 234 55 51 29 153 133 31 31 40 164 88 81 11 105 95 257 120 120 120 120 120 120 120 120 120 120	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT6 12AT6 12AT6 12AV7 12AV6 12AV7 12AV4 12AV6 12AV7 12AX4GTB 12AX7/ECC83 12AZ7A 12BAA 12BBA 12BBA 12BBA 12BBA 12BBA 12BBA 12BY7A 12CA5	90 82 155 32 139 122 260 236 140 261 262 237 196 263 141 264 238 179 30 91 92 233 45 180 44 44 42 21 13 106 26 27 27 27 27 27 27 27 27 27 27 27 27 27	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25L6GT 33GY7 35C5 35L6GT 35W4 35Z5GT 50C5 50EH5	142 241 242 197 182 243 213 183 166 157 158 214 198 83 107 215 216 217 218 267 123 267 123 30 62 219 97 32 219 97 32 219
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6 4DT6 4EJ7 5AM8 5AN8 5AN8 5AN8 5AN8 5AN8 5AN8 5CG8	244 522 84 415 220 205 48 46 68 222 223 20 41 47 65 224 99 225 69 69 245 143 85 169 124 80	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AU5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU4GTB	49 42 171 144 58 92 185 160 161 145 31 93 74 6 86 86 162 228 87 56 21 163 87 134 75 186 187 187 188 60 76 188 60 76 188 76 76 76 76 76 76 76 76 76 76 76 76 76	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS8 6BU8 6BX7GT 6BY6 6BY8 6BZ6 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CG8A 6CCI6 6CL6 6CL6 6CL6 6CL8A 6CM7 6CN7 6CN7 6CN7 6CN7 6CU5 6CU8 6CV4 6CX8 6CY5 6CY7	HA- 500 114 116 97 136 36 189 100 101 101 249 173 66 250 251 190 202 21 190 202 21 170 39 174 111 175 78 230 137 117 176 78 81 207	**NUMERICA** **ADEC A** **AD	110 110 192 146 147 7 7 112 177 63 4 4 252 127 13 64 253 233 233 233 233 148 33 233 233 148 169 254 255 256 103 344 159 169 169 169 169 169 169 169 169 169 16	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JF6 6JF6A 6JH6 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JT8 6JU8 6JT8 6JU8 6JZ8 6KE8 6KE8 6KE8 6KE8 6KE8 6KE8 6KE8 6KE	35 119 152 209 194 195 128 104 234 55 94 5 129 153 133 30 40 164 88 211 105 95 257 120 257 120 165 61 165 61 111 211 111 211 111 211 111 111 111	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12BV6 12BV7 12BV7 12BV6 12BV7	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 141 264 238 179 30 91 2 23 239 45 180 261 27 22 27 21 21 21 21 21 21 21 21 21 21 21 21 21	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17AE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25L6GT 33GY7 35C5 35L6GT 35W4 35Z5GT 50C5 50EH5 50L6GT	142 241 242 197 182 243 213 166 157 158 214 198 83 107 215 216 216 217 228 247 123 130 62 217 218 227 218 227 219 219 219 219 219 219 219 219 219 219
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6 4DT6 4EJ7 5AM8 5AN8 5AN8 5AN8 5AN8 5AN8 5AN8 5CG8 5CL8A	244 522 84 46 221 104 115 220 205 48 46 222 223 20 41 47 65 224 99 225 79 184 125 69 226 226 245 143 85 169 246 80 126	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AU5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU4GTA 6AU4GTA 6AU6A 6AW8A 6AY3B 6B10 6BA6/EF93 6BA8A 6BB11 6BC8 6BG6GA 6GH6 6BH8 6BH11 6BJ6A	49 42 171 144 58 92 1855 160 161 145 31 93 74 6 6 86 228 25 12 228 87 76 21 163 87 70 134 75 186 187 75 186 187 75 186 187 188 187 188 188 188 188 188 188 188	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS3A 6BS3A 6BS8 6BU8 6BX7GT 6BY6 6CB4 6CC4 6CA4 6CCB6A 6CCB6A 6CCBA	HA- 500 114 116 97 136 36 189 100 101 1249 173 66 250 251 14 102 190 202 190 3 3 17 131 71 39 174 111 175 176 78 230 137 117 81 81 207 191	**NUMERICA** 6DE6** 6DE7** 6DK6** 6DN7** 6DQ5** 6DQ6B/6GW6* 6DR7** 6DS4** 6DT6A** 6EA4** 6EA7** 6EA8** 6EB8** 6EH7/EF183* 6EJ7/EF184* 6EM5* 6EM5* 6EM7* 6EK5* 6EW6* 6EW7* 6FC7* 6FFC7* 6FFC7* 6FFC7* 6FFC7* 6FG7/6CG7* 6FS5* 6FV6** 6GC5* 6GC5* 6GF7A** 6GH8A* 6GJ7/ECF801* 6GK5/6FQ5A* 6GK6/6K6**	110 110 192 146 147 37 7 112 177 63 4 252 117 63 64 253 231 13 64 253 231 148 33 233 149 148 153 149 153 154 165 167 151	STING GGU7 GGY6/6GX6 6HB7 6HE5 6HE5 6HS8 6HZ6 6J5 6J6A 6J5 6J6A 6J78 6J86A 6J86A 6J86A 6J88 6J88 6J88 6K6GT 6KA8 6KE8 6K78 6K6GT 6KA8 6KE8 6K78 6	35 119 152 209 194 195 128 104 234 55 94 51 129 153 133 210 64 88 211 105 95 257 120 89 258 61 154 155 61 154 155 61 155 61 155 61 155 61 155 61 155 61 155 61 155 61 61 61 61 61 61 61 61 61 61 61 61 61	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV7 12AV7 12AV7 12AV6 12AV7 12AV7 12AV7 12AV7 12AV6 12AV7 12BV6 12BV7 12BV6 12BV7 12CA5 12CA5 12CW6	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 141 264 238 179 300 91 92 233 45 180 44 22 113 106 26 27 27 27 27 27 27 27 27 27 27 27 27 27	12GN7A 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13EM7/15EA7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17GW6 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25L6GT 33GY7 35C5 35L6GT 35W4 35Z5GT 50C5 50EH5	142 241 242 197 182 243 213 166 157 158 214 198 83 107 215 216 216 217 228 247 123 130 62 217 218 227 218 227 219 219 219 219 219 219 219 219 219 219
1AD2 1G3GT/1B3GT 1K3 1R5 1U4 1U5 1V2 1X2A/B 2AS2 2AV2 2BN4A 2CW4 2FS5 2GK5/2FQ5A 3A3A/3CA3/ 3AW3 3AT2 3BN6 3BZ6 3CB6/3CF6 3CY5 3DG4 3DT6 3GK5 3V4 4BQ7A/4BZ7 4BZ6 4CB6 4CD6 4CD7 5AM8 5AN8 5AN8 5AN8 5AN8 5AN8 5AN8 5CG8	244 522 844 115 220 205 48 466 221 1124 1168 622 223 20 47 65 224 125 79 184 125 69 226 245 1185 1185 1185 1185 1185 1185 1185 11	5U8 5Y3GT 6AB4 6AF3 6AF4 6AF4A/6DZ4 6AF11 6AH6 6AK5/EF95 6AL3 6AL5 6AM8A 6AN8A 6AN8A 6AN8A 6AU5A/6HG5 6AS5 6AS8 6AT8A 6AU4GTA 6AU4GTB	49 42 171 144 58 92 185 160 161 145 31 93 74 4 6 86 162 228 87 56 62 11 163 87 70 1134 186 187 96 172 247 135 28	6BK7B 6BL7GTA 6BN4A 6BN6/6KS6 6BN8 6BQ5/EL84 6BQ6GA/6CU6 6BQ6GTB 6BQ7A/6BZ7 6BR8A/6FV8A 6BS8 6BU8 6BX7GT 6BY6 6BY8 6BZ6 6C4 6CA4 6CB5A 6CB6A/6CF6 6CD6GA 6CG8A 6CCI6 6CL6 6CL6 6CL6 6CL8A 6CM7 6CN7 6CN7 6CN7 6CN7 6CU5 6CU8 6CV4 6CX8 6CY5 6CY7	HA- 500 114 116 97 136 36 189 100 101 249 173 666 250 229 14 102 190 202 3 17 131 71 39 174 111 175 176 78 78 137 117 81 81 81 81 81 81 81 81 81 81	## A C C C C C C C C C C C C C C C C C C	110 110 146 147 37 112 1177 63 4 252 1177 13 64 253 231 232 208 38 203 232 208 38 148 33 233 149 151 151 150 151 151	-ISTING 6GU7 6GY6/6GX6 6HB7 6HE5 6HE5 6HF8 6HQ5 6HS8 6HZ6 6J5 6J6A 6JF6 6JF6A 6JH6 6JH6 6JH8 6JM6A 6JN6A 6JN6A 6JN6A 6JT8 6JU8 6JT8 6JU8 6JZ8 6KE8 6KE8 6KE8 6KE8 6KE8 6KE8 6KE8 6KE	35 119 152 209 194 195 128 104 234 55 129 153 133 210 40 164 88 211 105 257 120 89 257 120 89 258 61 154 112 259 61 1154 1155 61 1154 1154 1155 61 1154 61 1155 61 61 61 61 61 61 61 61 61 61 61 61 61	6W6GT 6X4 6X5GT 6X8A 7AU7 8AW8A 8B10 8BQ5 8FQ7/8CG7 8JV8 10CW5 10DE7 10GK6 11KV8 12AB5 12AD6 12AF3 12AQ5 12AT6 12AT7/ECC81 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12AV6 12AV7 12BV6 12BV7 12BV7 12BV6 12BV7	90 82 155 32 139 122 260 236 140 261 262 72 237 196 263 141 264 238 179 30 91 2 23 239 45 180 261 27 22 27 21 21 21 21 21 21 21 21 21 21 21 21 21	12GN7A 12SA7 12SA7 12SK7 12SK7 12SN7GTA 12SQ7 12W6GT 13DR7 13GF7A 15KY8A 17AX4GTA 17AY3A 17BE3 17D4 17DQ6B/ 17DQ6B/ 17JZ8 19AU4GTA 19T8 21GY5 22BW3 22DE4 22JG6A 22JU6 23Z9 25DN6 25IGGT 33GY7 35C5 35IGGT 35W4 35Z5GT 50C5 50EH5 50IGGT 7025/12AX7A	142 241 242 197 182 243 213 166 157 158 214 198 83 107 215 216 216 217 228 247 123 130 62 217 218 227 218 227 219 219 219 219 219 219 219 219 219 219



GENERAL ELECTRIC



EXPERIMENTER HOBBYISTS KIT

Easy to assemble and wire simple electronic circuits.

Some typical circuits can be found in the new G E Hobby Manual, ETR-3960.

Rubber feet (4) — fasten with self-tapping screws to each corner.

Push-In terminals (15) — fit board holes. Serrated slots go on top.

 $3\frac{1}{2}$ " x $4\frac{1}{2}$ " terminal board will fit many small metal boxes or can be cut to size. FTR-4288 Cost \$.98



This G E Soldering Gun or Electric Drill Holder prevents burns and damage to instruments. wires and service manuals. Holds an electric drill in a safe, ready-to-use position. It can be easily mounted to ony surface with clamps and screws supplied with units.

ETR-2582 Cost \$0.75



desired height.



SOLDERING IRON HOLDER

Made to mount on bench edge or bench top. Will accommodate soldering irons up to 3/4" in diameter. Protects your hands, wires, diagrams, other tools from burns. Cadmium aluminum finish resists heat discoloration. Holes in both inside and outside cylinders provide maximum air circulation,

ETR-2790 Cost \$1.70



FIRE EXTINGUISHER

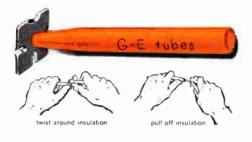
Effective against all types of fires - grease, gasoline and electrical. Chemical contents is an electrical "non-conductor." It won't "short out" line circuits.

Small enough to carry in service case and economical enough to have one in shop, home, car and service truck.

Needs no inspection or recharging — does not corrode or deteriorate. Guaranteed for 20 years.

Effectiveness of chemical makes it possible to extinguish a fire very quickly — as fast as three seconds — reducing fire damage.

ETR-4500 Cost \$3.95



WIRE STRIPPER

Four cutting edges for most wire sizes. Select cutting edges slightly smaller than outside dimension of insulation.

Press insulated wire fully into cutting channel.

Rotate wire stripper completely around wire and pull.

ETR-2376

COST \$0.65

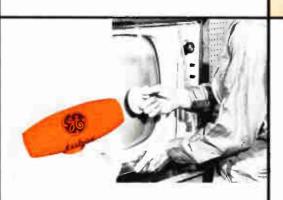




TUBE PULLER

Never be without it on your workbench or in your service case. It protects you against burns, cuts and shocks — no matter how firmly the tubes may be wedged in their socket. Fits all regular glass types, all metal tubes, plus sevenand nine-pin miniatures, and compactrons.

ETR-1094 Cost \$0.35



SAFETY GLASS PULLER

It's exactly what you need to remove safety glass quickly, easily — and safely! Prevents cracking, chipping and other damage while you remove the glass. The three-inch suction cup holds firmly, is easily removed from the glass by unique vacuum release tip. Won't leave marks on glass.

ETR-1592

Cost \$0.95



PICTURE TUBE PILLOW

This 1/2" thick foam-plastic cushion provide the surest possible protection against scratches on the tube face and edges. Order at least one for every technician in your shop. Never lay a picture tube on anything else. ETR-1469

SERVICE AIDS

specifically engineered and field-tested for the TV/radio service dealer

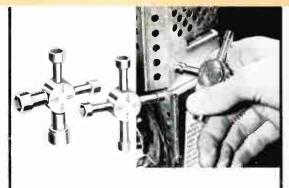


SERVICE DROP CLOTH

A rugged, hard-wearing plastic sheet that does double duty: It protects furniture and floor coverings, even against hot solder. It serves as a protective cover for radio and TV cabinets when moving them to or from the home.

ETR-1021

Cost \$1.95



TWIN-X-WRENCH SET

The two wrenches in this set actually do the work of eight hex-head socket wrenches, save plenty of space and weight in your repair kit. They're designed especially for TV and radio service work, where you need to get maximum leverage, often in very close quarters.

ETR-752

Cost \$3.45



SERVICE CALL BOARD

In a single glance, this easy-to-use rolling chart tells you where your work stands — shows you your work schedule for days or weeks in advance — enables you to schedule work immediately. Marking pencil and complete instructions included.

ETR-2144

Cost \$1.49



FUSE AND HEATER CHECKER

Pocket-size — yet it will check virtually all tubes used in series-string TV sets and radios (AC, DC, and portable), including compactons, novars and picture tubes. Also tests pilos lamps and fuses. Rugged construction. Battery powered. Actual size — $4'' \times 2 \frac{3}{4} i'' \times 1 \frac{3}{4} i''$.

ETR-981

Cost \$2.95



COMPACTRON SOCKETS

Two 12-pin sockets for compactron devices in each package. New feature — a raised "key" ridge between pins 1 and 12 to help when inserting the compactron in hidden locations. The pins are numbered on the bottom of each socket.

ETR-2976 Cost \$0.39



CAPACITOR TAB ADJUSTER

Simplifies removal and installation of twistprong electrolytic capacitors and also some types of variable controls. Hollow tip fits perfectly over mounting tabs. With a twist you break off old tab . . . lock in new.

ETR-2958 Cost \$1.00





REAR CONTROL EXTENSION

Permits quick, sure adjustment of TV controls without removing back of set. One end tapered to fit snugly over knurled control shafts. Pin in other end fits slotted shafts and, unlike screwdrivers, cannot slip off.

ETR-2089 Cost \$0.35

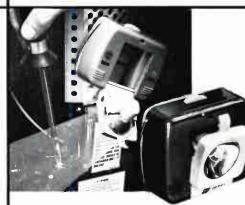


LARGE 9 PIN

nate tube damage caused by bent pins. New small size just right to slip into trouser or shirt pocket. Red-orange color makes it easy to find.

ETR-3200

Cost \$0.60



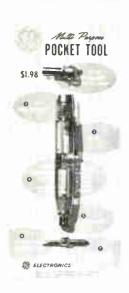
MAGNETIC SWING-BEAM SERVICE LIGHT

This TV Service Light has a magnet that holds it firmly to the chassis, leaving both hands free for work. The front of the lamp swings out to any desired angle, allowing you to aim the beam exactly where you need it.

ETR-1593

Cost \$2.25

G E SERVICE AIDS



POCKET TOOL

Here is a practical and useful tool that will make servicing easier and faster. This new pocket too! will enable you to remove the back of any receiver regardless of the type of fastening without opening your tool or service case.

Lightweight pocket tool clips to a shirt pocket and contains Phillips and standard screw driver; 1/4", 5/16" ond 3/8" hex sockets; high voltage tester and level.

Use screwdriver end as prod, neon bulb in handle indicates presence of high peak voltage at plate of horizontal output tube or high voltage rectifier.

Lay unit flat with G E monogram down to use as a level when installing phonographs, air conditioners, etc.

FTR-3594

Cost \$1.98



PRINTED CIRCUIT BOARD **CUTTING TOOL**

This new G E Service Aid is a real time saver when servicing printed circuit boards. This versatile tool makes Printed Circuit trouble shooting easy. Use tool to cut through - make test - then flow solder across cut.

Blade slides horizontally — adjusts to cut "paper thin." In this position tool cuts only the printed circuit and does not weaken boord.

Handy for opening packages and numerous other daily tasks. Blade retracts - safe to carry in pocket or service case.

Uses standard single-edge blade.

ETR-3896

Cost \$0.25





PART HOLDER

The General Electric Part Holder is designed to stand upright or attach to edge of service bench. Many times a "third hand" is needed to hold parts in position porticularly while soldering. Other times something is needed to hold a piece of solder or some other item when both hands are being used. More than one G-E Part Holder can be used to hold different parts in a fixed position until solder

ETR-3851

Cost \$0.35



Here is a new lightweight tool that will save time either on the bench or on home service calls.

It is five tools in one with a pocket clip. Contains No. 1 Phillips screwdriver and standard screwdriver; 1/4", 5/16" and 3/8" hex sockets.

rogress in lectronics

ETR-3910

Cost \$0.98





tubes

WILL RETURN

FLECTRONICS Best for any set

PROMPT - SERVICENT SERVICE

tubes

OPEN ELECTRONICS Best for any set!

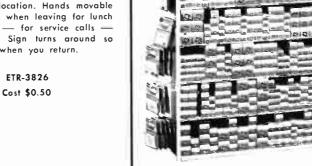
GENERAL BELECTRIC

DOOR CLOCK SIGN

Let your customers know when - you are OPEN, you are CLOSED, you will be BACK.

It can be used to hang on front door or in a visible location. Hands movable to time of return when leaving for lunch — for the day — for service calls for emergencies. Sign turns around so OPEN is visible when you return.

ETR-3826



NEW G E TUBE AND PARTS CABINET

Here is the answer to your tube and parts storage problem. Dress up your store with one or more for over-thecounter stock. Save time by having another at the bench to hold servicing supplies

Six shelves provide over twelve feet of storge space. The pegboard hanger holes on each side give additional capacity for numerous items such as capacitors, semiconductors, tape, etc.

Cabinets can be mounted side by side or stacked one obove the other.

Designed for shipping via parcel post. Can be assembled in a few minutes. All parts snap into place without use of nuts or bolts

ETR-3803

Cost \$11.75

TELEVISION

CB — 23" CHASSIS INSUFFICIENT WIDTH

This problem may result from several conditions which should be investigated in proper order as follows. If step 1 or 2 corrects the condition, do not perform step 3.

Check value of yoke capacitors

C-121, C-122. ET77X91 Transformer used in chassis stamped EN151 and lower in conjunction with C121, C122 @ 260 pf in Deflection Yoke, ET77X93 Transformer used in chassis stamped EN 152 and higher in conjunction with C121, C122

@ 470 pf in Deflection Yoke.
Yoke - Deflection. In ET76X42 and ET76X47, C121 and C122 are 260 pf. In ET76X44 and ET76X46, C121 and C122 are 470 pf. ET76X47, used as a general replacement, is supplied with both 260 pf and 470 pf capacitors with

instructions.

Adjust line voltage to 117 volts and check Horizontal Deflection alignment as given below:

Horizontal Deflection Alignment

Test equipment connections:

GENERAL — Tune receiver to signal and synchronize the picture.

MILLIAM METER Open the jumper and insert a 0-500 ma. meter between pin 2 (cathode) of V103 (Horizontal Output) and ground. Bypass meter with .47 uf. capacitor at the tube socket. See Fig. 1 and 2.
VACUUM TUBE VOLT METER -

Connect to high voltage anode lead through high voltage probe at picture

Alignment Procedure T.P. 501 A500 TOP

Fig. 1

REMOVE JUMPER

STEP 1: Short jumper from TP501 to ground. Adjust horizontal hold control R130 to the center of its range. See Fig. 3.

FRONT CONTROLS

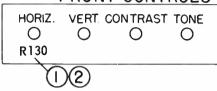
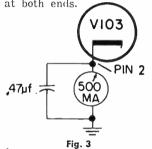


Fig. 2

STEP 2: Adjust L502 slug until picture drifts very slowly and sides are vertical. Remove TP501 jumper. Check R130 at both ends.



Use Order Coupon Below

ORDER COUPON

Order from your local G E electronic components distributor or mail this form to:

General Electric Company Department "B" 3800 N. Milwaukee Ave. Chicago, III. 60641

Enclosed is money order or check payable to General Electric Company for:

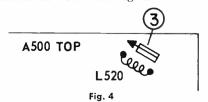
Quantity	. •	Price
FTR.15M	Essential Characteristics\$	2.00
	Twin-X Wrench Set	
ETR-981	Fuse and Heater Checker	
	Service Drop Cloth	
	Tube Puller	.35
	Bench Mirror	3.60
	Picture Tube Pillow	.75
	Safety Glass Puller	.95
ETR-1593	Magnetic Swing-Beam Service Light	2.25
ETR-2089	Rear Control Extension.	.35
	Service Call Board	1.49
	Wire Stripper	.65
ETR-2582	Soldering Gun or Electric Drill Holder	.75
	Soldering Iron Holder	1.70
	Capacitor Tab Adjuster	1.00
	Compactron Sockets	.39
ETR-3200	Multi-tube Pin Straightener	.60
ETR-3594	Pocket Tool	1.98
ETR-3803	Tube and Parts Cabinet	11.75
ETR-3826	Door Clock Sign	. 50
	Part Holder	
ETR-3896	Printed Circuit Board Cutter	.25
	Five-in One Combination Tool	.98
	Electronic Components Hobby Manual	
	Experimenter Hobbyist Kit	
ETR-4500	Fire Extinguisher	3.95
(Ir	nclude applicable state and local tax) \$	
	TOTAL \$	

STREET ADDRESS

CITY, STATE and ZIP CODE.....

(Please Print)

STEP 3: Adjust L520 for minimum current dip on the milliameter in the cathode of V103. See Fig. 4.



STEP 4: Adjust R140 for 25 kilovolts at the anode of the picture tube with minimum brightness. Check V102 regulator operation by adjusting brightness from minimum to normal. High voltage should not vary more than 300V to 400V over this brightness range.

Be certain to replace jumper when

milliameter is removed.

3. Add an 82pf, 6KV Capacitor (ET18X579) from junction of L-105 and C-107 to ground. (See C-117 on 21" CB schematic.) Check for sufficient size while operating set on 107V line, horizontal size should fit screen at this line voltage.

COLOR TELEVISION COLORIMETRY - II

Continued from Page 1

is Illuminant C. This is the color specified by the color television standards as white. Its coordinates on the chromaticity diagram are x = 0.310, y = 0.316. This point, then, corresponds to 0% saturation of any color. As might be expected, between this point (Illuminant C) and the outer periphery (100% saturated spectral hues) the colors will range from low to high saturation. Thus, the ICI Chromaticity Diagram gives the desired results. First, the hue is determined by the point on the outer boundary of the horseshoe curve. Second, saturation is determined by the position between Illuminant C (white) and the 100% saturated

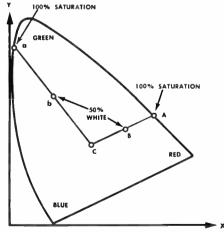


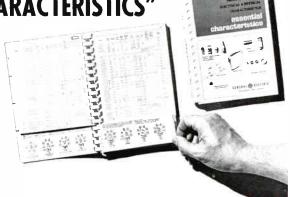
Fig. 7 — The Meaning of Saturation: The distance from point "C" determines the saturation or purity.

boundary. For illustration, Figure 7 shows two separate hues whose saturation is varied. Color A and color B have the same hue, but vary in the amount of white light contamination. Color a is the same saturation as A since it is on the outer boundary but is different in hue. Color b is the same hue as a but lower in saturation.



LEADERSHIP IN ELECTRONICS! LEADERSHIP IN SERVICE AIDS ... and here is another

1967 EDITION OF "ESSENTIAL CHARACTERISTICS" NOW **AVAILABLE**



The 360 page twelfth edition of "Essential Characteristics" (ETR-15M), the General Electric handbook on receiving, five-star and special-purpose tubes, compactrons, thyratrons, gas filled di-odes, ceramic tubes, television picture tubes, reed switches, photoconductive cells, photoconductive cell-lamp combinations and replacement capacitors, now is available from your General Electric tube distributor.

New tube characteristics added to this edition bring to 3287 the total number of tubes, including 741 monochrome and color picture tubes.

The new edition contains a number of improvements which will make this booklet easier to use and even more practical in electronic servicing,

One such improvement which first appeared in ETR-15K is the rearrangement of base diagrams which have been enlarged to make them easier to read. All tube types using the same base drawing are listed with each diagram.

Also, the basing diagrams are arranged in numerical-alphabetical order with four on each individual page. The base diagram portion of each page has been cut so the basing can be viewed

at the same time as the tube characteristics. First the base diagram number is located in the "Base Connections" column for any tube type. Then, without turning the top section, the appropriate base diagram can be located in the lower section and opened so both the electrical characteristics and base drawings are visible at the same time.

The listing of all tube types using the same base diagram should be of considerable value particularly when servicing older model receivers. If a tube type is not available, a check of the electrical characteristics for other tubes with the same basing will enable the technician to determine whether or not a substitute can readily be made with another type.

As before, the book includes typical characteristics curves, tube outline drawings, circuit diagrams showing typical applications of receiving tubes and capacitors, and construction data for speaker enclosures.

Tube classification charts have been expanded to facilitate reference to similar types. Cross-reference listings of prototypes for five-star and special-purpose types and a listing of Foreign Types and American near-equivalents are included.

New additions include outline drawings, characteristics for reed switches and photoconductive cells.

Get the new ETR-15M from your distributor — or if he is unable to supply you, use order coupon on page seven. The price is \$2.00.



Vol. 19 No. 2 Summ	er 1967
In this issue:	Page
Color Television — Colorimetry — II	1
Bench Notes	2
Receiving Tube Popularity Listing	3
Complete Line of General Electric Service Aids	4
Service Notes	7

Techni-talk on AM, FM, TV Servicing, published quarterly by ELECTRONIC COMPONENTS DIVISION, GENERAL ELECTRIC COMPANY, OWENSBORO, KY. In Canada: Canadian General Electric Co., Ltd., 189 Dufferin St., Taranta 3, Ontaria. R. G. Kemptan, Editar, Capyright 1967 by General Electric Campany.



NOTE: The disclosure of any information here-NOIE: The disclosure of any information here-in conveys no license under any General Elec-tric patent and, in the absence of an express written agreement to the contrary, the General Electric Company assumes no liability for patent infringement (or any other liability) arising out of use of such information by This copy of Techni-talk comes to you through the courtesy of your General Electric tube distributor.