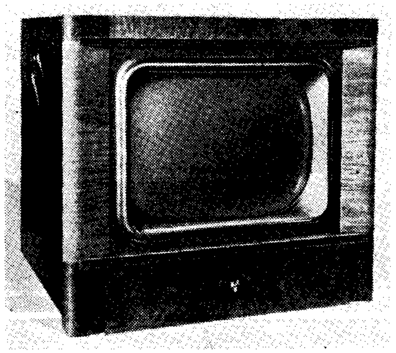
VIDOR CN4216

Fifteen-valve television receiver with 12in. CRT and tunable to any of the five BBC channels. Suitable for 195-255V 50c/s AC and DC. Walnut veneered table cabinet. Manufactured by Vidor Ltd., Erith, Kent.



THE receiver is a superhet operating on lower sideband of vision carrier. Vision interference and sound noise suppression circuits are fitted, the former being provided with a plug and socket adjustment giving three degrees of limiting. EHT is obtained from rectified line flyback pulses. Mains consumption is approximately 120W.

The receiver is assembled on two chassis with separate front control panel and with CRT, deflector coils, focus magnet, Picture Width and Horizontal Linearity controls, supported on a sub-chassis bolted across rear of cabinet. Connections between chassis, etc., are by plugs and sockets.

Aerial input circuit is for use with 75-ohm coaxial feeder which is directly coupled to primary L2A of aerial input transformer but isolated from chassis by C1 C2 C3.

L1A C2, tuned to 16 mc/s, function as an IF filter whilst L1B C4, tuned to 78 mc/s, provide second channel rejection.

RF amplifier. Aerial signal is fed by secondary L2B of RFT1 to grid of RF amplifier V1, the gain of which is controlled, with that of common sound and vision IF amplifier V3, by **Contrast** control R63 in the common cathode circuit. Amplified signals are developed across L3 C5 in anode V1.

Frequency-changer is pentode V2 operated as a combined oscillator and mixer, the oscillatory tuned circuit L4 C9 C10 being connected through C12 between g1 and g2 in a Colpitts arrangement. R8 is oscillator anode load and R5 its grid leak. RF signals at anode V1 are fed to junction C9 C10 and mixed with oscillator signal to produce across L5 in the anode circuit a vision IF of 16 mc/s and a sound IF of 19.5 mc/s.

Aerial input transformer RFT1, RF amplifier anode circuit L3 C5, and oscillator coil L4 are tunable over a range covering all five BBC channels.

Common IF amplifier. Vision and sound IF signals at anode of mixer V2 are coupled by C14 to grid of common IF amplifier V3, the gain of which is pre-set adjusted by **Sensitivity** S1 and controlled with that of V1, by **Contrast** control R63. Amplified vision and sound signals are developed across L6A.

Vision channel consists of further IF amplifier V4, germanium crystal signal rectifier GX, video amplifier V5, and interference limiter V6B. Vision signal at anode V3 is fed through sound rejector circuit L6B C19 C20 to grid of final vision IF amplifier V4. The output of this is bandpass transformer coupled by L7A L7B to germanium crystal signal rectifier GX. L7A L7B with L9 constitute a double-tuned transformer with common inductance coupling.

Further sound-on-vision rejection is given by L8 C23 C24. Rectified video signal is fed through IF harmonic filter L29 and IF filter coil L10 to grid of video amplifier V5. Output signal at anode is DC/AC coupled by R25 C32 R26 to cathode of CRT V7. Cathode of video amplifier V5 is heavily decoupled by C28 and compensation for relative loss of DC component is effected by R68 C59 in anode circuit. HT for this stage is obtained from boosted supply available from C58. C59 is connected to normal HT line to cancel hum introduced into video stage by g2 of V5.

Vision noise limiter is diode V6B which can be brought into operation if desired by inserting plug of **Vision noise limiter** control S2 into either No. 2 or 3 position. The diode is connected with its cathode to anode of video amplifier V5 and its anode down to chassis through C29. When switched in circuit C29 charges through R22 or R21 R22 to a potential approximately equal to peak-white of signal.

When a high-frequency interference pulse appears with video signal, cathode V6B is driven negative but, due to comparatively long time constant of R21 R22 C29, its anode potential remains unchanged and the diode conducts momentarily to short circuit the pulse to chassis through C29.

Sound channel consists of one further IF amplifier V8, signal rectifier V9A, noise suppressor V9B, and combined triode AF amplifier and pentode output valve V10.

Sound signal of 19.5 mc/s at anode of V3 is fed by C17 to L12 in grid circuit of sound IF amplifier V8. Amplified signal at anode is coupled by L13B L13A C36 to signal rectifier V9A in cathode of which is **Volume** control R62.

Rectified audio signal on R62 is passed by C40 through noise suppressor diode V9B and fed by C38 to grid of triode AF amplifier section of V10, the signal at the anode of which is further amplified by pentode output section and thence transformer coupled by OP1 to the 7 in. elliptical PM speaker L28.

Noise suppressor is diode V9B which is normally held conducting by positive anode bias from HT line through R29. Audio signal is fed by C40 to its cathode. Time constant of R29 C37 is such that anode potential V9A follows that of the audio signal fed to its cathode. When a large-amplitude high-frequency interference pulse appears with signal, cathode is driven positive to anode the potential of which is unable to change rapidly due to the comparatively long line constant of R29 C37. Thus during interference pulse V9B is cut-off.

Sync separator. Video signal at anode of video amplifier V5 is fed to anode of diode V6A which is so biased as to conduct only on the positive sync pulses of waveform. The positive sync pulses developed at cathode V6A are passed by C31 to grid of pentode section of V11. The positive going pulses drive the valve into grid current and the resultant bias is sufficient to place negative portion of waveform, which may include random noise pulses, etc., beyond cut-off, thus only sync pulses are amplified by V11. Frame pulses are integrated by R40 C44 and fed through R42 C46 to anode of triode frame scan oscillator section of V11.

Line sync pulses are fed by C53 to anode of triode line scan oscillator V12B.

Frame scan oscillator is triode section V11 operated as a grid blocking oscillator with anode to grid back-coupling by transformer FT1. Adjustment of grid voltage by R49 gives **Vert Hold** control and variation of oscillator HT voltage by R50 gives **Height** control.

Frame amplifier. Scan voltage, developed across C48 C49, is fed by C50 to pentode frame amplifier V12A which is transformer coupled by FT2 to low-impedance frame deflection coils L17A. **Vertical Linearity** is controlled by R47 which varies degree of anode to grid negative feedback.

Line scan waveform is generated by triode oscillator V12B in conjunction with pentode line scan output amplifier V14. Triode V12B is caused to oscillate by feedback from secondary portion of line output auto-transformer LT1 which is applied by C57 to its grid. Oscillator output is fed by C54 to grid of line amplifier V14. Output is developed across section L20 of LT1 and fed through variable **Horizontal Linearity** inductance L19 and **Width** control inductance L18 to low-impedance line deflection coils L17B. R57 by varying grid resistance of oscillator V12B gives **Horizontal Hold** control.

Recovery Diode. Additional HT for anode of video amplifier V5 and first anode of CRT is provided by charge built up on C58 by V13 when it rectifies and damps out shock oscillation set up across LT1 when V14 is cut off at end of each line scan.

EHT of approximately 8kV for final anode of CRT is provided by V15 which rectifies high surge voltage developed across section L22 and overwind L23 when V14 is cut-off. EHT is smoothed by R70 R71 with capacity formed between inner and outer coatings of CRT.

HT is provided by indirectly-heated half-wave rectifier V16 fed through surge limiter R78 from the mains direct on 195-214V and through droppers R75 R76 R77 on higher voltage supplies. Choke-capacity smoothing is given by L27 C64 C65. Reservoir smoothing capacitor C65 should be rated to handle 600mA ripple current.

Heaters V1-14 V16 are series connected and obtain their current from the mains through R74 and thermal surge limiter R73 shunted by R72. Heater chain is RF decoupled by C60 C61 C62.

As cathode V13 is connected to a high pulse voltage section of LT1 protection against heater-cathode breakdown is provided by secondaries L25 L26 of LT1 which are connected in series with valve heater chain on either side of heater V13 and which develop an opposing pulse voltage. Heater of EHT rectifier V15 is fed from separate secondary L24 of LT1.

Mains input is fitted with 1A fuse in each lead and filter capacitor C66. S3 which is ganged to **Brightness** control is on/off switch.

CRT is a 12in. tetrode, Mullard MW31-74, employing permanent magnet focus and fitted with ion trap. Video signal is fed to its cathode and **Brightness** is controlled by variation of grid voltage by R64.

ALIGNMENT INSTRUCTIONS

Apparatus required. Insulated trimming tools, 500-ohm resistor, 0-500 microammeter, 0-50 milliwatt output meter, signal generator. This should have a reliably-calibrated attentuator and be

SERVICE CASEBOOK

ALBA T372

CUSTOMER complained that the frame jumped at the slightest vibration and height then collapsed to about an inch. Set was tested on bench and frame and sync. valves checked but found to be in order.

Cabinet was turned on its side, and the bottom cover removed. Set was now turned on and found to work perfectly. This was so when chassis was on either side or upside down. When turned the correct way up, however, the original fault returned. To enable this fault to appear whilst the underneath side of the chassis was being examined, we had to do some vigorous prodding in the frame and sync. stages.

This soon brought to light the fault, which was nothing more than a loose earthing tag which came away from the chassis in the upright position.—G. A. Pearson, Sheffield.

PHILIPS 414 A

A BRAND new model had an objectionable "buzz" when tested. The chassis was removed but inspection showed the "buzz" was not of mechanical nature. Smoothing capacitors were bridged with new ones but the noise persisted.

Commencing at the output stage, anodes and grids were "earthed" through a 0.5 mF capacitor. Upon reaching the grid of the DDT, the "buzz" ceased but was present again when the anode of the IF amp was earthed. This indicated that the trouble was arising in the coupling of these stages.

The grid of the DDT is fed from the slider of the volume control by a screened lead about 3in. in length. Although earthing the grid end of this lead stopped the noise, it persisted when the volume control end was earthed. Close inspection showed that the grid end of the screening was not connected to earth, although the other end was securely connected to chassis. Anchoring the "high" end to a near-by tag effected a complete cure.—J. C. H., IoM.

HMV 1804 TV

THIS set had been serviced elsewhere and since being returned to the owner had developed spurious oscillations on the sound side. Examination revealed the top cover screening cans on RF and IF valves had been left off, and the flexible leads from the timebase circuits to the CR tube deflection coils were lying over the valves. By cleating these leads to the side of the cabinet (as they should have been) and replacing the top cap covers the trouble was cured.—J. R.

able to give up to 0.1V output, with an output impedance of 80 ohms. When carrying out RF alignment or taking RF sensitivity or bandwidth measurements, it is important that the output impedance is about 80 ohms. If generator output impedance is not 80 ohms the appropriate correcting series or parallel resistor should be incorporated between generator and receiver.

Unsolder earthy end of R18 and connect microammeter between this and chassis, negative of microammeter to chassis. Connect output meter across primary L14A of sound output transformer. Back off Contrast control one third from maximum gain and set Sensitivity control in high gain position.

Sound IF alignment. Connect generator between grid V2 and chassis. Inject modulated 19.5mc/s signal and tune L12 L13A for maximum output. Repeat until maximum gain is achieved.

Sound rejection. Inject 19.5mc/s CW increasing input to give about 30microA reading on microammeter. Tune L6B and L8 for minimum reading increasing input as correct alignment is approached. Inject 19.5mc/s modulated signal and re-check tuning of L12.

Vision IF alignment. Inject 18.7mc/s CW and adjust input to give about 300microA reading on microammeter. Tune L5 for maximum output. Inject 16.75mc/s as above and tune L6A for maximum output. Connect 500-ohm resistor across L7B, inject 16.35mc/s CW and tune L7A for maximum output.

Connect 500-ohm resistor across L7A, inject 17.45mc/s and tune L7B for maximum. Remove resistor.

Channel 1. Connect generator to aerial socket. Inject modulated 41.5mc/s signal and tune L4 for maximum sound output (first peak with core coming out). Inject 43mc/s and tune L3 for maximum output on microammeter. Tune L2A/B for maximum.

Inject 16mc/s and increase input until a reading is obtained on microammeter. Tune IF rejector L1A for minimum response. (Contrast control will probably have to be turned up to max. gain). Leave contrast at maximum gain. Inject 78mc/s CW and increase input until reading is obtained on microammeter. Tune C4 for minimum response.

For other channels refer to table below.

Channel	L2, L3	L4	C4
2	49.75 mc/s	48.25 mc/s	83.75 mc/s
3	54.75 mc/s	53.25 mc/s	88.75 mc/s
4	59.75 mc/s	58.25 mc/s	93.75 mc/s
5	64.75 mc/s	63.25 mc/s	98.75 mc/s

ADJUSTMENTS

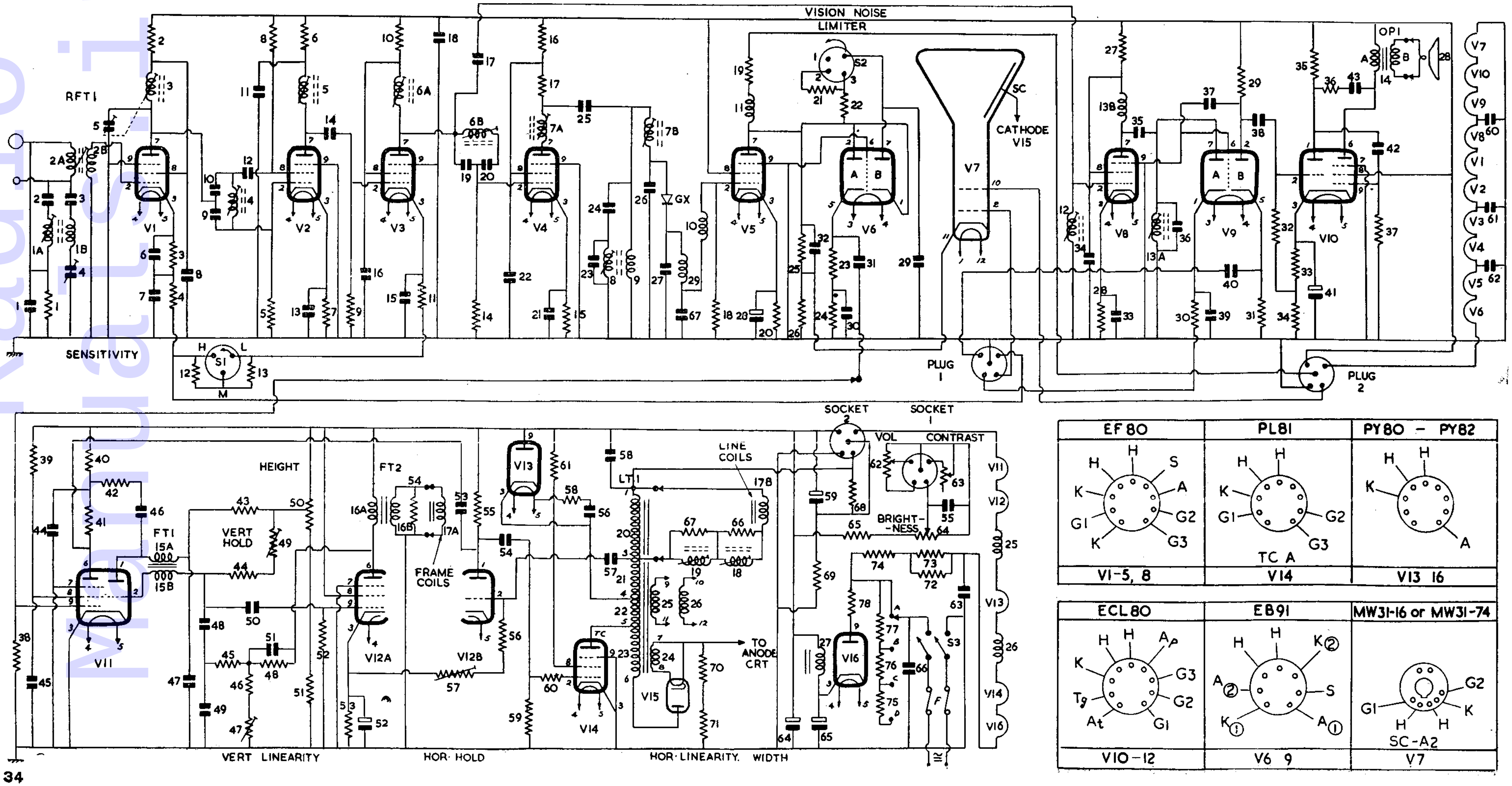
Horizontal linearity. This is situated on righthand side of back CRT support. Care should be taken not to touch tags connected to the coil. The position of coil relative to focus magnet is adjusted in the factory and will normally not require any alteration. Horizontal linearity is controlled by movement of plunger inside the coil in conjunction with picture width control. If focus magnet has been changed and is of a different type it may be impossible to obtain correct linearity with plunger. The plunger should then be left half-way into coil and position of coil varied for optimum linearity, final adjustment being made with plunger.

Picture position and focus. To centralise action of focus arm, the three thumbscrews attached to focus magnet should be adjusted by equal movement of all three screws in same direction.

Picture position may be varied by unequal movement of the three screws.

Ion trap adjustment. The ion trap magnet should be placed on neck of CRT with arrow pointing towards back and be rotated 180 degs. from line marked on neck. It should be adjusted axially and rotated slightly for maximum picture brightness.

There may be two positions which fulfil this condition—the position towards rear of CRT is the correct one.



VOLTAGE READINGS

V	Type	A	G_2	K	Remarks
1	EF80	174	174	2-5.5	R63 Max. to Min
2	EF80	178	64	.2	
3	EF80	172	172	2.2-5.7	R63 Max. to Min
4	EF80	151	173	2.4	
5	EF80	120	188	2.6	
6 A	EB91	120	—	—	
6 B		—	—	120	
7	MW31-74	8kV	325	80	Grid 0-95V
8	EF80	174	174	2.4	
9 A	EB91	—	—	—	No Reading possible due to high value of R29
9 B		—	—	—	
10	ECL80	58	—	6.5	Triode
		180	188		Pentode
11	ECL80	122	43	0	Pentode
		86	—		Triode
12	ECL80	175	186	9.5	Pentode
		45	—		Triode
13	PY80	—	—	325	
14	PL81	—	110	0	Cathode Current =72mA
15	EY51	—	—	8kV	
16	PY82	200V RMS	—	192V	

Total HT current = 250mA with R63 at Max. Gain.
Mains current = 450mA.

RESISTORS

R	Ohms	Watts
1	1M	¼
2	1K	¼
3	33	¼
4	150	¼
5	120K	¼
6	2.2K	¼
7	47	¼
8	100K	¼
9	6.8K	¼
10	1K	¼
11	150	¼
12	4.7K	¼
13	22K	¼
14	2.2K	¼
15	180	¼
16	1K	¼
17	1.8K	¼
18	8.2K	¼
19	4.7K	½
20	270	¼
21	1M	¼
22	470K	¼
23	15K	¼
24	3.3M	¼
25	100K	¼
26	330K	¼
27	1K	¼
28	180	¼
29	10M	¼
30	2.2K	¼
31	1M	¼
32	220K	¼
33	180	¼
34	180	¼
35	220K	¼
36	22K	¼
37	220K	¼
38	1M	¼
39	270K	¼
40	2.2K	¼
41	33K	¼
42	120K	¼
43	68K	¼
44	470K	¼
45	18K	¼
46	22K	¼
47	100K Linear Potr.	
48	1M or 2.2M	¼
49	500K Linear Potr.	
50	30K WW Potr.	3
51	22K	½
52	2.2M	¼
53	680	¼
54	82	¼
55	1.5M	¼
56	180K	¼
57	200K Linear Potr.	
58	1.2K	¼
59	820K	¼
60	10K	¼
61	6.8K	1
62	50K Log Law Potr.	
63	3K WW Potr.	
64	50K Linear Potr. with DP Switch	
65	47K	¼
66	3.3K	½
67	2.7K	6
68	18K	1.5
69	100K	¼
70	68M	1
71	68M	1
72	330	10
73	CZ1 Brimistor	
74	180	18
75	33	8
76	33	13.5
77	33	13.5
78	40	10

CAPACITORS

C	Capacity	Type
1	470pF Ceramic	
2	250pF Silver Mica	
3	470pF Ceramic	
4	3—30pF Trimmer	
5	Part of L3 Coil Assembly	
6	30pF Silver Mica	
7	470pF Ceramic	
8	470pF Ceramic	
9	50pF Silver Mica	
10	35pF Silver Mica	
11	.003 Tubular	350V
12	470pF Ceramic	
13	100pF Silver Mica	
14	470pF Ceramic	
15	.003 Tubular 350V	
16	.003 Tubular	350V
17	3pF Ceramic	
18	.003 Tubular	350V
19	400pF Silver Mica	
20	400pF Silver Mica	
21	.003 Tubular	350V
22	.003 Tubular	350V
23	35pF Silver Mica	
24	20pF Silver Mica	
25	470pF Ceramic	
26	3pF Ceramic	
27	5pF Ceramic	
28	100 Electrolytic	12V
29	.1 Tubular	350V
30	.1 Tubular	350V
31	.05 Tubular	350V
32	.25 Tubular	350V
33	.003 Tubular	350V
34	.003 Tubular	350V
35	470pF Ceramic	
36	25pF Silver Mica	
37	.001 Tubular	350V
38	.02 Tubular	350V
39	20pF Silver Mica	
40	.01 Tubular	150V
41	100 Electrolytic	12V
42	.005 Tubular	350V
43	200pF Silver Mica	
44	.01 Tubular	350V
45	.1 Tubular	350V
46	.01 Tubular	350V
47	.1 Tubular	350V
48	.1 Tubular	350V
49	.1 Tubular	350V
50	.1 Tubular (Trop.)	350V
51	.05 Tubular	350V
52	100 Electrolytic	12V
53	5pF Silver Mica	
54	.01 Tubular	350V
55	.01 Tubular	350V
56	.001 Tubular	500V
57	80pF Silver Mica	
58	.5 Tubular	350V
59	2 Electrolytic	275V
60	.003 Tubular	350V
61	.003 Tubular	350V
62	.003 Tubular	350V
63	.01 Tubular	1000V
64	100 Electrolytic	275V
65	60 Electrolytic	275V
66	.01 Tubular	1000V
67	5pF Silver Mica	

INDUCTORS

L	Ohms
1A-6B	Very Low
7A	.5
7B	.5
8-9	Very Low
10	6.5
11	10
12	.5
13A	1
13B	1
14A	700
14B	Very Low
15A	500
15B	800
16A	550
16B	2
17A	10.5
17B	11.5
18	5
19	6.5
20	5.4
21	6.2
22	12.5
23	95
24	Very Low
25	8
26	8
27	42
28	3
29	2