VINTRONICS 25-Watt AM BROADCAST TRANSMITTER

In the right conditions, this transmitter will cover 1 mile radius, enough to broadcast to a medium size town.


The transmitter has been designed to cover the AM Medium Wave band. Tuneable between 1024 and 1640Khz of the Medium Waveband band. Output pre-tuned for desired frequency.

Features:

• Digital IC design

• 28 Volt   3 Amp DC powered. (UK adapter included)

• 1KHz channel spacing for EU and US operation

• Inherently stable

• Audio input with automatic Modulation circuit (volume) via 2 RCA phono sockets (stereo input is mono'd internally)

• Low Distortion Analogue Linear modulator.

• SO259 Aerial Socket on rear of unit

• average 25W RF output (100W peak) into 50 Ohm load

- 1024 to 1640KHz selectable from rear panel

- RF LED Meter on front panel

- Pre-figural output tuning via internal links.
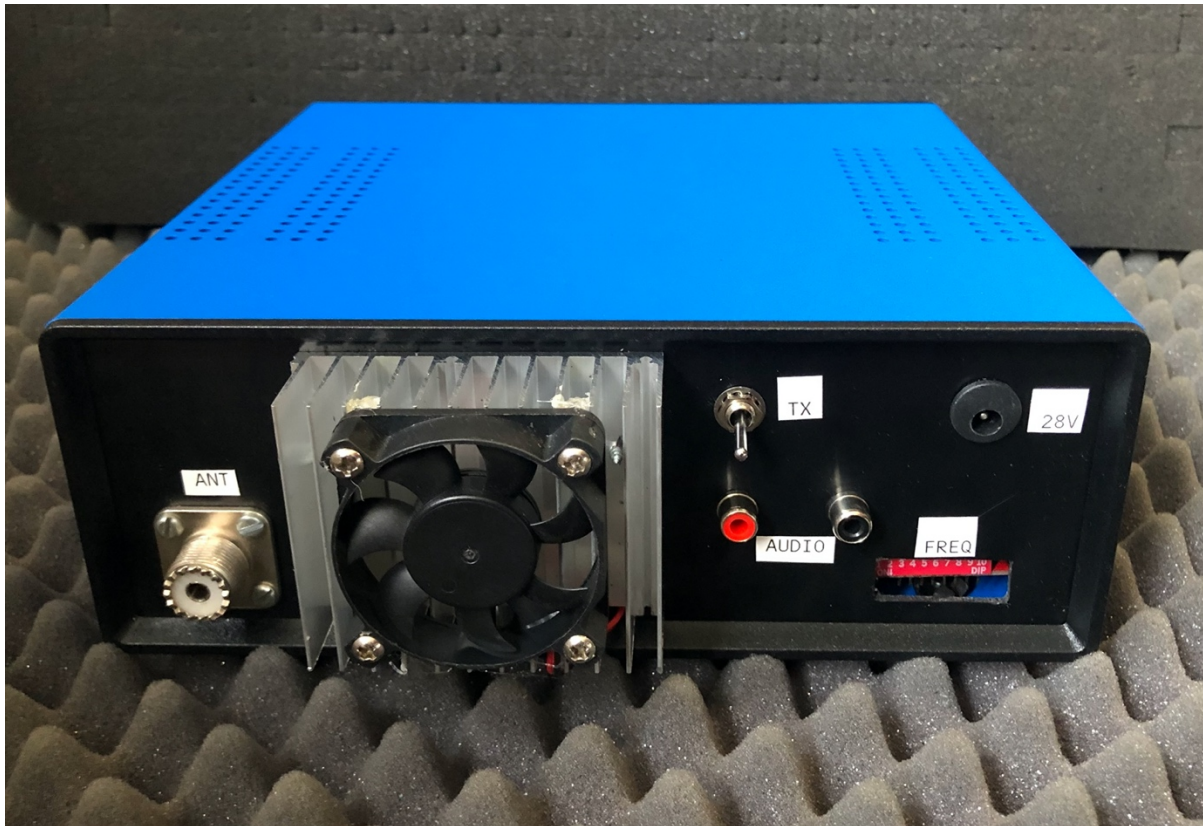
This AM Transmitter is a self-contained unit housed in a steel box of dimensions 220 mm by 210 mm by 80mm high. It covers frequencies between 1024Khz to 1640 KHz. Powered by an external power adapter providing 28V DC, it is plugged into the rear socket. A power on-off switch is located on the rear panel.

Audio input is via 2 RCA Phono sockets also on the front which mono's up a stereo feed. This in turn drives an automatic gain control circuit which enhances modulation depth and at the same time reduces the effect of over-modulation. If your audio feed is already mono, feed it into both RCA sockets. The pre-amp feeds into the power modulator amplifier. The output of the modulator feeds the MOSFET PA stage. The unit achieves over 100% positive modulation and peak output of 100 Watts can be measured. The audio frequency response is approximately 50Hz to 5KHz.

The Phase-Locked Loop oscillator frequency is controlled by the lever switches on the rear panel. Frequency assignment is determined by the lookup table shown later. It is set as multiples of 1Khz spacing,

The PA output of the transmitter is very rugged, utilising a high power MOSFET which are therefore significantly de-rated. The output power is maximised by adjusting capacitors in the output stage. The output stage is on its own circuit board located vertically next to the RF output socket.

 The table shows the settings for maximum matching/output, which is achieved by inserting or removing Links as per the table.

Table 1. Tuning adjustments and setup.

Power Output Amplifier presets

The Link settings used in the table below are typically required for frequencies of nearby frequencies also.

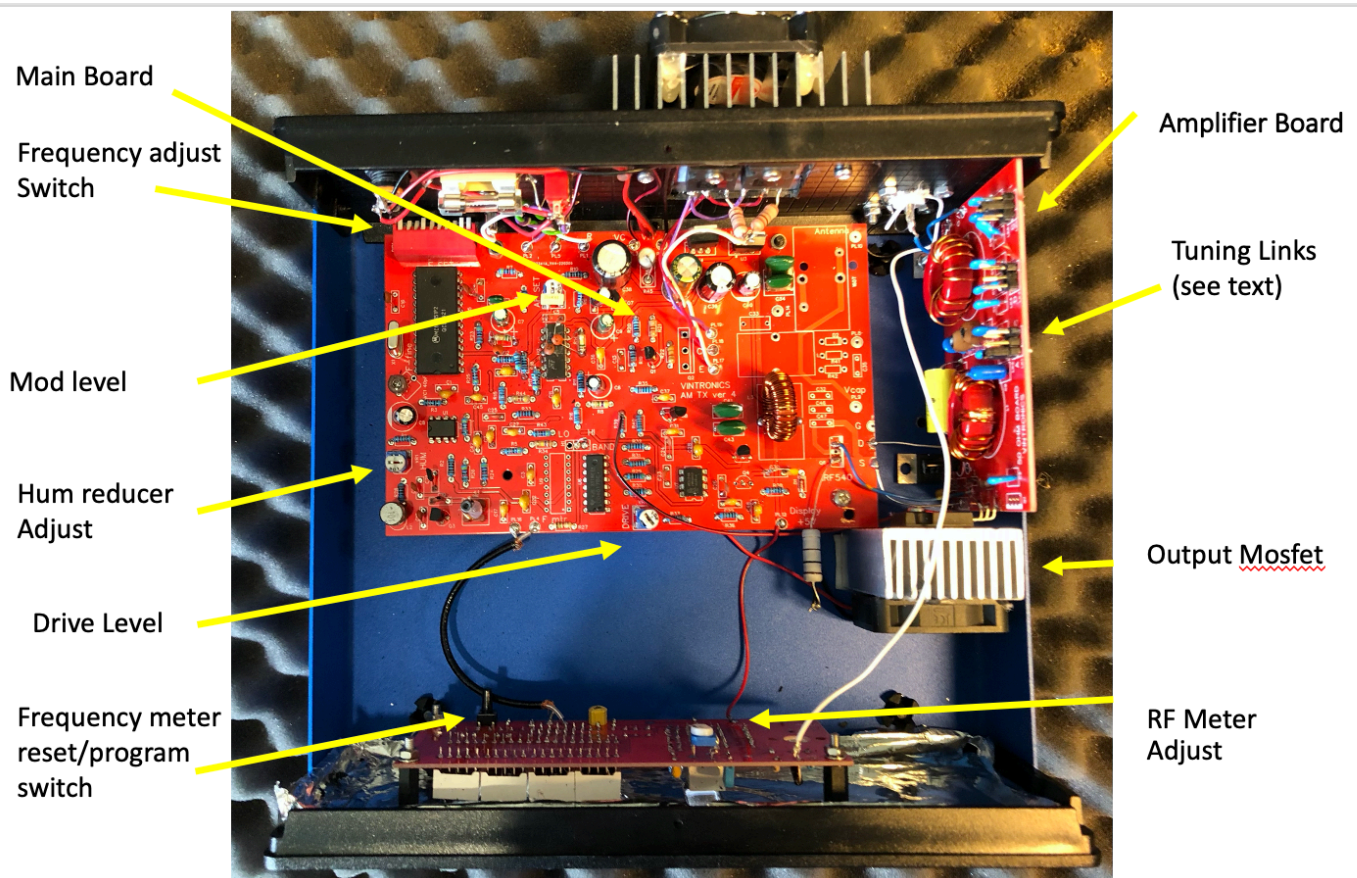| FREQUENCY	LINK A	LINK B	LINK C	LINK D	LINK E	LINK F	LINK G	LINK H	LINK I
1600	LINK						LINK		
1500	LINK						LINK		
1400	LINK						LINK	LINK	
1300	LINK	LINK		LINK			LINK	LINK	
1200	LINK	LINK	LINK	LINK	LINK		LINK	LINK	LINK
1024	LINK	LINK	LINK	LINK	LINK	LINK	LINK	LINK	LINK
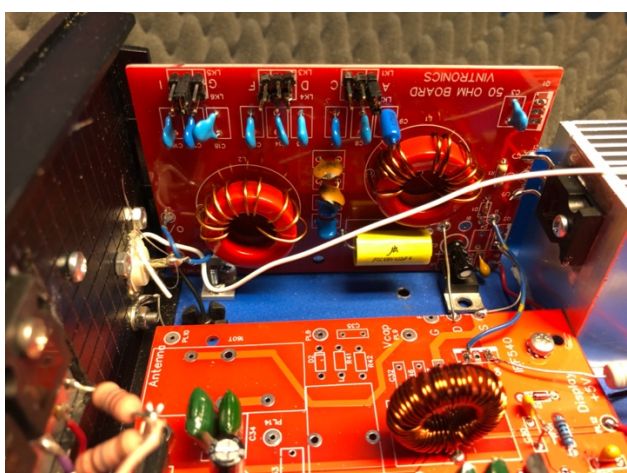
RF Amplifier Board. Note the links as per table above.

SETUP and Tuning

Method. It is advisable to use a SWR meter between TX output and the Aerial Tuning Unit (ATU) input. Aim for lowest SWR but maximum RF out. A field Strength meter is also invaluable in order to realise the signal strength emitted from the aerial. For stability, keep the transmitter away from the ATU and high voltage RF line via a coaxial feed cable.

Set up the ATU with your aerial tester so that it presents the transmitter with as near 50 ohms as possible and minimum reactance. Switch Transmitter on and observe SWR for minimum. Apply Audio signal and check all is good!

Main Board

Frequency adjust Switch

Mod level

Hum reducer Adjust

Drive Level

Frequency meter reset/program switch

Amplifier Board

Tuning Links (see text)

Output Mosfet

RF Meter Adjust

MATCHING ARRANGEMENT

A suitable 'long-wire' aerial can be matched to this transmitter by using the Vintronics ATU, which is recommended as it is fully compatible.

Other arrangements can be used. Look on-line for information regarding aerials and matching circuits. Be sure to try and get an efficient aerial system which provides a low SWR in order to maximise the transfer of power into the aerial.

PLEASE NOTE, damage may occur to the transmitter if it is not matched correctly. Its not as forgiving as a Valve TX!

30W at 1602KHz into 50 Ohm load.

80W peak shown at 1602KHz into 50 Ohm load.

TRANSMITTER ARRANGEMENT USING THE VINTRONICS ATU.

Arrangement of Transmitter and Aerial Tuning unit. A coax cable is used to connect both together, but the ATU is situated away from the Transmitter in order to improve stability. Pay special attention to audio feed, it is best to keep this away as much a possible from the aerial feed as this will have very high voltages, it can cause audio instability and the frequency counter to flicker.

The ATU is a 'L – C' matching arrangement comprising of a 60 turn airwound inductor and a 375pF 750v Variable Capacitor, as seen below. It has a LED signal strength display in order to aid maximising signal into the aerial.

Good results have been obtained using a 18M long wire, at frequencies from 800KHz and the top end of the MW Band. Please note: the tap on the coil is to be soldered by yourself as the adjustable arrangement was not reliable enough.

ATU CIRCUIT
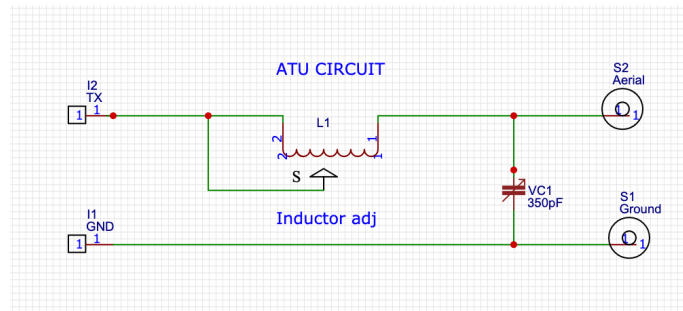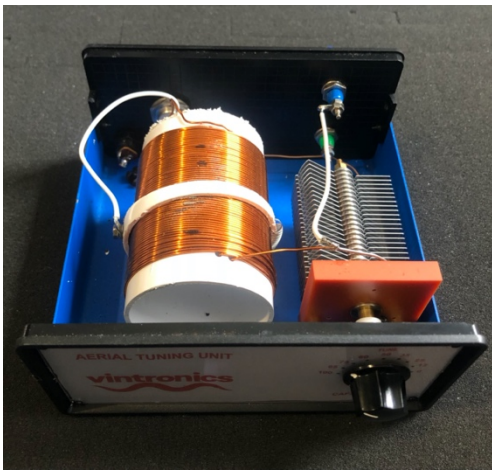
A suitable aerial system can be as simple as a long-wire, 20 metres in length. Use the signal strength meter to ascertain its effectiveness. Also it is strongly advised to use an Antenna Analyser to match the random aerial to the matching unit.

Another aerial system for matching to the 50 Ohm output is shown below:

.

Inverted 'L' Aerial system

L1 details:

10 – 12mm Diameter
1mm enam. copper wire
1 - 2 = 5 turns
2 - 3 = 5 turns
3 - 4 = 50 turns
4 - 5 = 30 turns
5 - 6 = 20 turns
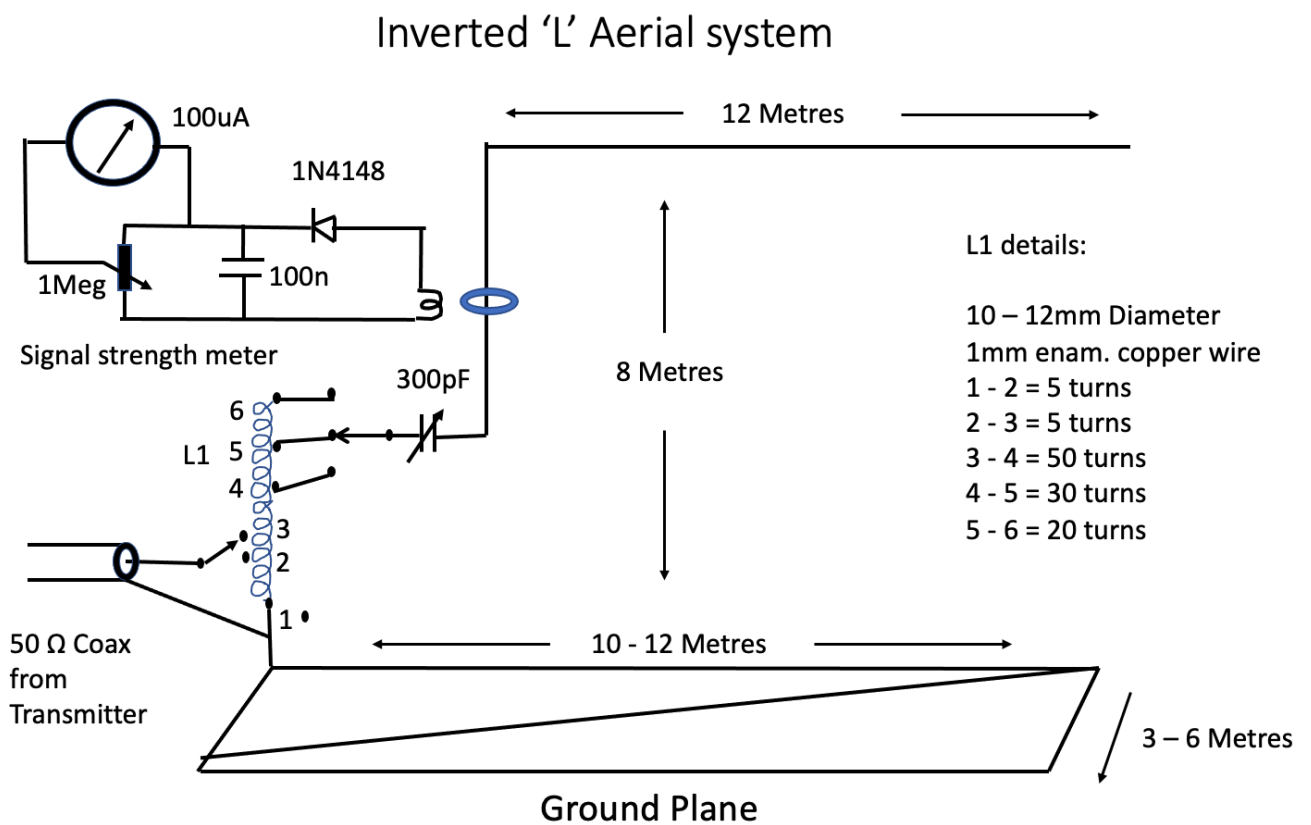
Setting frequency using dip switches

At the rear of the transmitter there are a set of dip switched numbered 1 to 10.

Using the frequency table set the switches to the desired frequency.

On the High Frequency unit for example, if your desired frequency is 1400Khz, look it up in the table and you will see its binary setting to the left.

As we can see the binary position for 1620 is   0101010110

The switch positions are up for 0 and down for 1. So therefore, starting from the left-most switch and working our way to the right we get the following:

Binary number	0	1	0	1	0	1	0	1	1	0
Switch position	off	on	off	on	off	on	off	on	on	off

It looks like this:

On the rear of the unit, the DIP switches determine the frequency.

(in this case up is off and down is on)

PLEASE NOTE: EUROPEAN CHANNELS ARE UNDERLINED BELOW

Binary switch positions

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10	
1 1 1 1 1 1 1 1 1 1	1024	0 0 0 0 1 0 1 1 1 1	1071
0 1 1 1 1 1 1 1 1 1	1025	1 1 1 1 0 0 1 1 1 1	1072
1 0 1 1 1 1 1 1 1 1	1026	0 1 1 1 0 0 1 1 1 1	1073
0 0 1 1 1 1 1 1 1 1	1027	1 0 1 1 0 0 1 1 1 1	1074
1 1 0 1 1 1 1 1 1 1	1028	0 0 1 1 0 0 1 1 1 1	1075
0 1 0 1 1 1 1 1 1 1	1029	1 1 0 1 0 0 1 1 1 1	1076
1 0 0 1 1 1 1 1 1 1	1030	0 1 0 1 0 0 1 1 1 1	1077
0 0 0 1 1 1 1 1 1 1	1031	1 0 0 1 0 0 1 1 1 1	1078
1 1 1 0 1 1 1 1 1 1	1032	0 0 0 1 0 0 1 1 1 1	1079
0 1 1 0 1 1 1 1 1 1	1033	1 1 1 0 0 0 1 1 1 1	1080
1 0 1 0 1 1 1 1 1 1	1034	0 1 1 0 0 0 1 1 1 1	1081
0 0 1 0 1 1 1 1 1 1	1035	1 0 1 0 0 0 1 1 1 1	1082
1 1 0 0 1 1 1 1 1 1	1036	0 0 1 0 0 0 1 1 1 1	1083
0 1 0 0 1 1 1 1 1 1	1037	1 1 0 0 0 0 1 1 1 1	1084
1 0 0 0 1 1 1 1 1 1	1038	0 1 0 0 0 0 1 1 1 1	1085
0 0 0 0 1 1 1 1 1 1	1039	1 0 0 0 0 0 1 1 1 1	1086
1 1 1 1 0 1 1 1 1 1	1040	0 0 0 0 0 0 1 1 1 1	1087
0 1 1 1 0 1 1 1 1 1	1041	1 1 1 1 1 1 0 1 1 1	1088
1 0 1 1 0 1 1 1 1 1	1042	0 1 1 1 1 1 1 1 1 1	1089
0 0 1 1 0 1 1 1 1 1	1043	1 0 1 1 1 1 0 1 1 1	1090
1 1 0 1 0 1 1 1 1 1	1044	0 0 1 1 1 1 0 1 1 1	1091
0 1 0 1 0 1 1 1 1 1	1045	1 1 0 1 1 1 0 1 1 1	1092
1 0 0 1 0 1 1 1 1 1	1046	0 1 0 1 1 1 0 1 1 1	1093
0 0 0 1 0 1 1 1 1 1	1047	1 0 0 1 1 1 0 1 1 1	1094
1 1 1 0 0 1 1 1 1 1	1048	0 0 0 1 1 1 0 1 1 1	1095
0 1 1 0 0 1 1 1 1 1	1049	1 1 1 0 1 1 0 1 1 1	1096
1 0 1 0 0 1 1 1 1 1	1050	0 1 1 0 1 1 0 1 1 1	1097
0 0 1 0 0 1 1 1 1 1	1051	1 0 1 0 1 1 0 1 1 1	1098
1 1 0 0 0 1 1 1 1 1	1052	0 0 1 0 1 1 0 1 1 1	1099
0 1 0 0 0 1 1 1 1 1	1053	1 1 0 0 1 1 0 1 1 1	1100

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 0 0 0 0 1 1 1 1 1	1054	0 1 0 0 1 1 0 1 1 1	1101
0 0 0 0 0 1 1 1 1 1	1055	1 0 0 0 1 1 0 1 1 1	1102
1 1 1 1 1 0 1 1 1 1	1056	0 0 0 0 1 1 0 1 1 1	1103
0 1 1 1 1 0 1 1 1 1	1057	1 1 1 1 0 1 0 1 1 1	1104
1 0 1 1 1 0 1 1 1 1	1058	0 1 1 1 0 1 0 1 1 1	1105
0 0 1 1 1 0 1 1 1 1	1059	1 0 1 1 0 1 0 1 1 1	1106
1 1 0 1 1 0 1 1 1 1	1060	<u>0 0 1 1 0 1 0 1 1 1</u>	<u>1107</u>
0 1 0 1 1 0 1 1 1 1	1061	1 1 0 1 0 1 0 1 1 1	1108
<u>1 0 0 1 1 0 1 1 1 1</u>	<u>1062</u>	0 1 0 1 0 1 0 1 1 1	1109
0 0 0 1 1 0 1 1 1 1	1063	1 0 0 1 0 1 0 1 1 1	1110
1 1 1 0 1 0 1 1 1 1	1064	0 0 0 1 0 1 0 1 1 1	1111
0 1 1 0 1 0 1 1 1 1	1065	1 1 1 0 0 1 1 0 1 1	1112
1 0 1 0 1 0 1 1 1 1	1066	0 1 1 0 0 1 0 1 1 1	1113
0 0 1 0 1 0 1 1 1 1	1067	1 0 1 0 0 1 0 1 1 1	1114
1 1 0 0 1 0 1 1 1 1	1068	0 0 1 0 0 1 0 1 1 1	1115
0 1 0 0 1 0 1 1 1 1	1069	<u>1 1 0 0 0 1 0 1 1 1</u>	<u>1116</u>
1 0 0 0 1 0 1 1 1 1	1070	0 1 0 0 0 1 0 1 1 1	1117

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10	
1 0 0 0 0 1 0 1 1 1	1118	0 1 0 0 1 1 1 0 1 1	1165
0 0 0 0 0 1 0 1 1 1	1119	1 0 0 0 1 1 1 0 1 1	1166
1 1 1 1 1 0 0 1 1 1	1120	0 0 0 0 1 1 1 0 1 1	1167
0 1 1 1 1 0 0 1 1 1	1121	1 1 1 1 0 1 1 0 1 1	1168
1 0 1 1 1 0 0 1 1 1	1122	0 1 1 1 0 1 1 0 1 1	1169
0 0 1 1 1 0 0 1 1 1	1123	<u>1 0 1 1 0 1 1 0 1 1</u>	<u>1170</u>
1 1 0 1 1 0 0 1 1 1	1124	0 0 1 1 0 1 1 0 1 1	1171
<u>0 1 0 1 1 0 0 1 1 1</u>	<u>1125</u>	1 1 0 1 0 1 1 0 1 1	1172
1 0 0 1 1 0 0 1 1 1	1126	0 1 0 1 0 1 1 0 1 1	1173
0 0 0 1 1 0 0 1 1 1	1127	1 0 0 1 0 1 1 0 1 1	1174
1 1 1 0 1 0 0 1 1 1	1128	0 0 0 1 0 1 1 0 1 1	1175
0 1 1 0 1 0 0 1 1 1	1129	1 1 1 0 0 1 1 0 1 1	1176

1 0 1 0 1 0 0 1 1 1	1130	0 1 1 0 0 1 1 0 1 1	1177
0 0 1 0 1 0 0 1 1 1	1131	1 0 1 0 0 1 1 0 1 1	1178
1 1 0 0 1 0 0 1 1 1	1132	<u>0 0 1 0 0 1 1 0 1 1</u>	<u>1179</u>
0 1 0 0 1 0 0 1 1 1	1133	1 1 0 0 0 1 1 0 1 1	1180
<u>1 0 0 0 1 0 0 1 1 1</u>	<u>1134</u>	0 1 0 0 0 1 1 0 1 1	1181
0 0 0 0 1 0 0 1 1 1	1135	1 0 0 0 0 1 1 0 1 1	1182
1 1 1 1 0 0 0 1 1 1	1136	0 0 0 0 0 1 1 0 1 1	1183
0 1 1 1 0 0 0 1 1 1	1137	1 1 1 1 1 0 1 0 1 1	1184
1 0 1 1 0 0 0 1 1 1	1138	0 1 1 1 1 0 1 0 1 1	1185
0 0 1 1 0 0 0 1 1 1	1139	1 0 1 1 1 0 1 0 1 1	1186
1 1 0 1 0 0 0 1 1 1	1140	0 0 1 1 1 0 1 0 1 1	1187
0 1 0 1 0 0 0 1 1 1	1141	<u>1 1 0 1 1 0 1 0 1 1</u>	<u>1188</u>
1 0 0 1 0 0 0 1 1 1	1142	0 1 0 1 1 0 1 0 1 1	1189
<u>0 0 0 1 0 0 0 1 1 1</u>	<u>1143</u>	1 0 0 1 1 0 1 0 1 1	1190
1 1 1 0 0 0 0 1 1 1	1144	0 0 0 1 1 0 1 0 1 1	1191
0 1 1 0 0 0 0 1 1 1	1145	1 1 1 0 1 0 1 0 1 1	1192
1 0 1 0 0 0 0 1 1 1	1146	0 1 1 0 1 0 1 0 1 1	1193
0 0 1 0 0 0 0 1 1 1	1147	0 1 1 0 1 0 1 0 1 1	1194
1 1 0 0 0 0 0 1 1 1	1148	0 0 1 0 1 0 1 0 1 1	1195
0 1 0 0 0 0 0 1 1 1	1149	1 1 0 0 1 0 1 0 1 1	1196
1 0 0 0 0 0 0 1 1 1	1150	<u>0 1 0 0 1 0 1 0 1 1</u>	<u>1197</u>
0 0 0 0 0 0 0 1 1 1	1151	1 0 0 0 1 0 1 0 1 1	1198
<u>1 1 1 1 1 1 1 0 1 1</u>	<u>1152</u>	0 0 0 0 1 0 1 0 1 1	1199
0 1 1 1 1 1 1 0 1 1	1153	1 1 1 1 0 0 1 0 1 1	1200
1 0 1 1 1 1 1 0 1 1	1154	0 1 1 1 0 0 1 0 1 1	1201
0 0 1 1 1 1 1 0 1 1	1155	1 0 1 1 0 0 1 0 1 1	1202
1 1 0 1 1 1 1 0 1 1	1156	0 0 1 1 0 0 1 0 1 1	1203
0 1 0 1 1 1 1 0 1 1	1157	1 1 0 1 0 0 1 0 1 1	1204
1 0 0 1 1 1 1 0 1 1	1158	0 1 0 1 0 0 1 0 1 1	1205
0 0 0 1 1 1 1 0 1 1	1159	<u>1 0 0 1 0 0 1 0 1 1</u>	<u>1206</u>
1 1 1 0 1 1 1 0 1 1	1160	0 0 0 1 0 0 1 0 1 1	1207
<u>0 1 1 0 1 1 1 0 1 1</u>	<u>1161</u>	1 1 1 0 0 0 1 0 1 1	1208
1 0 1 0 1 1 1 0 1 1	1162	0 1 1 0 0 0 1 0 1 1	1209
0 0 1 0 1 1 1 0 1 1	1163	1 0 1 0 0 0 1 0 1 1	1210
1 1 0 0 1 1 1 0 1 1	1164	0 0 1 0 0 0 1 0 1 1	1211

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10	
1 1 0 0 0 0 1 0 1 1	1212	0 0 1 0 1 0 0 0 1 1	1259
0 1 0 0 0 0 1 0 1 1	1213	1 1 0 0 1 0 0 0 1 1	1260
1 0 0 0 0 0 1 0 1 1	1214	0 1 0 0 1 0 0 0 1 1	1261
0 0 0 0 0 0 1 0 1 1	1215	1 0 0 0 1 0 0 0 1 1	1262
1 1 1 1 1 1 0 0 1 1	1216	0 0 0 0 1 0 0 0 1 1	1263
0 1 1 1 1 1 0 0 1 1	1217	1 1 1 1 0 0 0 0 1 1	1264
1 0 1 1 1 1 0 0 1 1	1218	0 1 1 1 0 0 0 0 1 1	1265
0 0 1 1 1 1 0 0 1 1	1219	1 0 1 1 0 0 0 0 1 1	1266
1 1 0 1 1 1 0 0 1 1	1220	0 0 1 1 0 0 0 0 1 1	1267
0 1 0 1 1 1 0 0 1 1	1221	1 1 0 1 0 0 0 0 1 1	1268
1 0 0 1 1 1 0 0 1 1	1222	0 1 0 1 0 0 0 0 1 1	1269
0 0 0 1 1 1 0 0 1 1	1223	1 0 0 1 0 0 0 0 1 1	1270
1 1 1 0 1 1 0 0 1 1	1224	0 0 0 1 0 0 0 0 1 1	1271
0 1 1 0 1 1 0 0 1 1	1225	1 1 1 0 0 0 0 0 1 1	1272
1 0 1 0 1 1 0 0 1 1	1226	0 1 1 0 0 0 0 0 1 1	1273
0 0 1 0 1 1 0 0 1 1	1227	1 0 1 0 0 0 0 0 1 1	1274
1 1 0 0 1 1 0 0 1 1	1228	0 0 1 0 0 0 0 0 1 1	1275
0 1 0 0 1 1 0 0 1 1	1229	1 1 0 0 0 0 0 0 1 1	1276
1 0 0 0 1 1 0 0 1 1	1230	0 1 0 0 0 0 0 0 1 1	1277
0 0 0 0 1 1 0 0 1 1	1231	1 0 0 0 0 0 0 0 1 1	1278
1 1 1 1 0 1 0 0 1 1	1232	0 0 0 0 0 0 0 0 1 1	1279
0 1 1 1 0 1 0 0 1 1	1233	1 1 1 1 1 1 1 1 0 1	1280
1 0 1 1 0 1 0 0 1 1	1234	0 1 1 1 1 1 1 1 0 1	1281
0 0 1 1 0 1 0 0 1 1	1235	1 0 1 1 1 1 1 1 0 1	1282
1 1 0 1 0 1 0 0 1 1	1236	0 0 1 1 1 1 1 1 0 1	1283
0 1 0 1 0 1 0 0 1 1	1237	1 1 0 1 1 1 1 1 0 1	1284
1 0 0 1 0 1 0 0 1 1	1238	0 1 0 1 1 1 1 1 0 1	1285
0 0 0 1 0 1 0 0 1 1	1239	1 0 0 1 1 1 1 1 0 1	1286
1 1 1 0 0 1 0 0 1 1	1240	0 0 0 1 1 1 1 1 0 1	1287

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
0 1 1 0 0 1 0 0 1 1	1241	1 1 1 0 1 1 1 1 0 1	1288
1 0 1 0 0 1 0 0 1 1	1242	0 1 1 0 1 1 1 1 0 1	1289
0 0 1 0 0 1 0 0 1 1	1243	1 0 1 0 1 1 1 1 0 1	1290
1 1 0 0 0 1 0 0 1 1	1244	0 0 1 0 1 1 1 1 0 1	1291
0 1 0 0 0 1 0 0 1 1	1245	1 1 0 0 1 1 1 1 0 1	1292
1 0 0 0 0 1 0 0 1 1	1246	0 1 0 0 1 1 1 1 0 1	1293
0 0 0 0 0 1 0 0 1 1	1247	1 0 0 0 1 1 1 1 0 1	1294
1 1 1 1 1 0 0 0 1 1	1248	0 0 0 0 1 1 1 1 0 1	1295
0 1 1 1 1 0 0 0 1 1	1249	1 1 1 1 0 1 1 1 0 1	1296
1 0 1 1 1 0 0 0 1 1	1250	0 1 1 1 0 1 1 1 0 1	1297
0 0 1 1 1 0 0 0 1 1	1251	1 0 1 1 0 1 1 1 0 1	1298
1 1 0 1 1 0 0 0 1 1	1252	0 0 1 1 0 1 1 1 0 1	1299
0 1 0 1 1 0 0 0 1 1	1253	1 1 0 1 0 1 1 1 0 1	1300
1 0 0 1 1 0 0 0 1 1	1254	0 1 0 1 0 1 1 1 0 1	1301
0 0 0 1 1 0 0 0 1 1	1255	1 0 0 1 0 1 1 1 0 1	1302
1 1 1 0 1 0 0 0 1 1	1256	0 0 0 1 0 1 1 1 0 1	1303
0 1 1 0 1 0 0 0 1 1	1257	1 1 1 0 0 1 1 1 0 1	1304
1 0 1 0 1 0 0 0 1 1	1258	0 1 1 0 0 1 1 1 0 1	1305

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10	
1 0 1 0 0 1 1 1 0 1	1306	0 1 1 0 1 1 0 1 0 1	1353
0 0 1 0 0 1 1 1 0 1	1307	1 0 1 0 1 1 0 1 0 1	1354
1 1 0 0 0 1 1 1 0 1	1308	0 0 1 0 1 1 0 1 0 1	1355
0 1 0 0 0 1 1 1 0 1	1309	1 1 0 0 1 1 0 1 0 1	1356
1 0 0 0 0 1 1 1 0 1	1310	0 1 0 0 1 1 0 1 0 1	1357
0 0 0 0 0 1 1 1 0 1	1311	1 0 0 0 1 1 0 1 0 1	1358
1 1 1 1 1 0 1 1 0 1	1312	0 0 0 0 1 1 0 1 0 1	1359
0 1 1 1 1 0 1 1 0 1	1313	1 1 1 1 0 1 0 1 0 1	1360
1 0 1 1 1 0 1 1 0 1	1314	0 1 1 1 0 1 0 1 0 1	1361
0 0 1 1 1 0 1 1 0 1	1315	1 0 1 1 0 1 0 1 0 1	1362
1 1 0 1 1 0 1 1 0 1	1316	0 0 1 1 0 1 0 1 0 1	1363
0 1 0 1 1 0 1 1 0 1	1317	1 1 0 1 0 1 0 1 0 1	1364

1 0 0 1 1 0 1 1 0 1	1318	0 1 0 1 0 1 0 1 0 1	1365
0 0 0 1 1 0 1 1 0 1	1319	1 0 0 1 0 1 0 1 0 1	1366
1 1 1 0 1 0 1 1 0 1	1320	0 0 0 1 0 1 0 1 0 1	1367
0 1 1 0 1 0 1 1 0 1	1321	<u>1 1 1 0 0 1 0 1 0 1</u>	<u>1368</u>
1 0 1 0 1 0 1 1 0 1	1322	0 1 1 0 0 1 0 1 0 1	1369
<u>0 0 1 0 1 0 1 1 0 1</u>	<u>1323</u>	1 0 1 0 0 1 0 1 0 1	1370
1 1 0 0 1 0 1 1 0 1	1324	0 0 1 0 0 1 0 1 0 1	1371
0 1 0 0 1 0 1 1 0 1	1325	1 1 0 0 0 1 0 1 0 1	1372
1 0 0 0 1 0 1 1 0 1	1326	0 1 0 0 0 1 0 1 0 1	1373
0 0 0 0 1 0 1 1 0 1	1327	1 0 0 0 0 1 0 1 0 1	1374
1 1 1 1 0 0 1 1 0 1	1328	0 0 0 0 0 1 0 1 0 1	1375
0 1 1 1 0 0 1 1 0 1	1329	1 1 1 1 1 0 0 1 0 1	1376
1 0 1 1 0 0 1 1 0 1	1330	<u>0 1 1 1 1 0 0 1 0 1</u>	<u>1377</u>
0 0 1 1 0 0 1 1 0 1	1331	1 0 1 1 1 0 0 1 0 1	1378
<u>1 1 0 1 0 0 1 1 0 1</u>	<u>1332</u>	0 0 1 1 1 0 0 1 0 1	1379
0 1 0 1 0 0 1 1 0 1	1333	1 1 0 1 1 0 0 1 0 1	1380
1 0 0 1 0 0 1 1 0 1	1334	0 1 0 1 1 0 0 1 0 1	1381
0 0 0 1 0 0 1 1 0 1	1335	1 0 0 1 1 0 0 1 0 1	1382
1 1 1 0 0 0 1 1 0 1	1336	0 0 0 1 1 0 0 1 0 1	1383
0 1 1 0 0 0 1 1 0 1	1337	1 1 1 0 1 0 0 1 0 1	1384
1 0 1 0 0 0 1 1 0 1	1338	0 1 1 0 1 0 0 1 0 1	1385
0 0 1 0 0 0 1 1 0 1	1339	<u>1 0 1 0 1 0 0 1 0 1</u>	<u>1386</u>
1 1 0 0 0 0 1 1 0 1	1340	0 0 1 0 1 0 0 1 0 1	1387
<u>0 1 0 0 0 0 1 1 0 1</u>	<u>1341</u>	1 1 0 0 1 0 0 1 0 1	1388
1 0 0 0 0 0 1 1 0 1	1342	0 1 0 0 1 0 0 1 0 1	1389
0 0 0 0 0 0 1 1 0 1	1343	1 0 0 0 1 0 0 1 0 1	1390
1 1 1 1 1 1 0 1 0 1	1344	0 0 0 0 1 0 0 1 0 1	1391
0 1 1 1 1 1 0 1 0 1	1345	1 1 1 1 0 0 0 1 0 1	1392
1 0 1 1 1 1 0 1 0 1	1346	0 1 1 1 0 0 0 1 0 1	1393
0 0 1 1 1 1 0 1 0 1	1347	1 0 1 1 0 0 0 1 0 1	1394
1 1 0 1 1 1 0 1 0 1	1348	<u>0 0 1 1 0 0 0 1 0 1</u>	<u>1395</u>
0 1 0 1 1 1 0 1 0 1	1349	1 1 0 1 0 0 0 1 0 1	1396
<u>1 0 0 1 1 1 0 1 0 1</u>	<u>1350</u>	0 1 0 1 0 0 0 1 0 1	1397
0 0 0 1 1 1 0 1 0 1	1351	1 0 0 1 0 0 0 1 0 1	1398
1 1 1 0 1 1 0 1 0 1	1352	0 0 0 1 0 0 0 1 0 1	1399

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10	
1 1 1 0 0 0 0 1 0 1	1400	0 0 0 1 1 0 1 0 0 1	1447
0 1 1 0 0 0 0 1 0 1	1401	1 1 1 0 1 0 1 0 0 1	1448
1 0 1 0 0 0 0 1 0 1	1402	0 1 1 0 1 0 1 0 0 1	1449
0 0 1 0 0 0 0 1 0 1	1403	1 0 1 0 1 0 1 0 0 1	1450
1 1 0 0 0 0 0 1 0 1	1404	0 0 1 0 1 0 1 0 0 1	1451
0 1 0 0 0 0 0 1 0 1	1405	1 1 0 0 1 0 1 0 0 1	1452
1 0 0 0 0 0 0 1 0 1	1406	0 1 0 0 1 0 1 0 0 1	1453
0 0 0 0 0 0 0 1 0 1	1407	1 0 0 0 1 0 1 0 0 1	1454
1 1 1 1 1 1 1 0 0 1	1408	0 0 0 0 0 1 0 0 1	1455
0 1 1 1 1 1 1 0 0 1	1409	1 1 1 1 0 0 1 0 0 1	1456
1 0 1 1 1 1 1 0 0 1	1410	0 1 1 1 0 0 1 0 0 1	1457
0 0 1 1 1 1 1 0 0 1	1411	1 0 1 1 0 0 1 0 0 1	1458
1 1 0 1 1 1 1 0 0 1	1412	0 0 1 1 0 0 1 0 0 1	1459
0 1 0 1 1 1 1 0 0 1	1413	1 1 0 1 0 0 1 0 0 1	1460
1 0 0 1 1 1 1 0 0 1	1414	0 1 0 1 0 0 1 0 0 1	1461
0 0 0 1 1 1 1 0 0 1	1415	1 0 0 1 0 0 1 0 0 1	1462
1 1 1 0 1 1 1 0 0 1	1416	0 0 0 1 0 0 1 0 0 1	1463
0 1 1 0 1 1 1 0 0 1	1417	1 1 1 0 0 0 1 0 0 1	1464
1 0 1 0 1 1 1 0 0 1	1418	0 1 1 0 0 0 1 0 0 1	1465
0 0 1 0 1 1 1 0 0 1	1419	1 0 1 0 0 0 1 0 0 1	1466
1 1 0 0 1 1 1 0 0 1	1420	0 0 1 0 0 0 1 0 0 1	1467
0 1 0 0 1 1 1 0 0 1	1421	1 1 0 0 0 0 1 0 0 1	1468
1 0 0 0 1 1 1 0 0 1	1422	0 1 0 0 0 0 1 0 0 1	1469
0 0 0 0 1 1 1 0 0 1	1423	1 0 0 0 0 0 1 0 0 1	1470
1 1 1 1 0 1 1 0 0 1	1424	0 0 0 0 0 0 1 0 0 1	1471
0 1 1 1 0 1 1 0 0 1	1425	1 1 1 1 1 1 0 0 0 1	1472
1 0 1 1 0 1 1 0 0 1	1426	0 1 1 1 1 1 0 0 0 1	1473
0 0 1 1 0 1 1 0 0 1	1427	1 0 1 1 1 1 0 0 0 1	1474
1 1 0 1 0 1 1 0 0 1	1428	0 0 1 1 1 1 0 0 0 1	1475

Switch Position	FREQ	Switch Position	FREQ
0 1 0 1 0 1 1 0 0 1	1429	<u>1 1 0 1 1 1 0 0 0 1</u>	<u>1476</u>
1 0 0 1 0 1 1 0 0 1	1430	0 1 0 1 1 1 0 0 0 1	1477
<u>0 0 0 1 0 1 1 0 0 1</u>	<u>1431</u>	1 0 0 1 1 1 0 0 0 1	1478
1 1 1 0 0 1 1 0 0 1	1432	0 0 0 1 1 1 0 0 0 1	1479
1 0 1 0 0 1 1 0 0 1	1433	0 1 1 0 1 1 0 0 0 1	1480
0 0 1 0 0 1 1 0 0 1	1434	0 1 1 0 1 1 0 0 0 1	1481
1 1 0 0 0 1 1 0 0 1	1435	1 0 1 0 1 1 0 0 0 1	1482
1 1 0 0 0 1 1 0 0 1	1436	0 0 1 0 1 1 0 0 0 1	1483
0 1 0 0 0 1 1 0 0 1	1437	1 1 0 0 1 1 0 0 0 1	1484
1 0 0 0 0 1 1 0 0 1	1438	<u>0 1 0 0 1 1 0 0 0 1</u>	<u>1485</u>
0 0 0 0 0 1 1 0 0 1	1439	1 0 0 0 1 1 0 0 0 1	1486
<u>1 1 1 1 1 0 1 0 0 1</u>	<u>1440</u>	0 0 0 0 1 1 0 0 0 1	1487
0 1 1 1 1 0 1 0 0 1	1441	1 1 1 1 0 1 0 0 0 1	1488
1 0 1 1 1 0 1 0 0 1	1442	0 1 1 1 0 1 0 0 0 1	1489
0 0 1 1 1 0 1 0 0 1	1443	1 0 1 1 0 1 0 0 0 1	1490
1 1 0 1 1 0 1 0 0 1	1444	0 0 1 1 0 1 0 0 0 1	1491
0 1 0 1 1 0 1 0 0 1	1445	1 1 0 1 0 1 0 0 0 1	1492
1 0 0 1 1 0 1 0 0 1	1446	0 1 0 1 0 1 0 0 0 1	1493

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10	
<u>1 0 0 1 0 1 0 0 0 1</u>	<u>1494</u>	0 1 0 1 1 1 1 1 1 0	1541
0 0 0 1 0 1 0 0 0 1	1495	1 0 0 1 1 1 1 1 1 0	1542
1 1 1 0 0 1 0 0 0 1	1496	0 0 0 1 1 1 1 1 1 0	1543
0 1 1 0 0 1 0 0 0 1.	1497	1 1 1 0 1 1 1 1 1 0	1544
1 0 1 0 0 1 0 0 0 1	1498	0 1 1 0 1 1 1 1 1 0	1545
0 0 1 0 0 1 0 0 0 1	1499	1 0 1 0 1 1 1 1 1 0	1546
1 1 0 0 0 1 0 0 0 1	1500	0 0 1 0 1 1 1 1 1 0	1547
0 1 0 0 0 1 0 0 0 1	1501	<u>1 1 0 0 1 1 1 1 1 0</u>	<u>1548</u>
1 0 0 0 0 1 0 0 0 1	1502	0 1 0 0 1 1 1 1 1 0	1549
<u>0 0 0 0 0 1 0 0 0 1</u>	<u>1503</u>	1 0 0 0 1 1 1 1 1 0	1550
1 1 1 1 1 0 0 0 0 1	1504	0 0 0 0 1 1 1 1 1 0	1551
0 1 1 1 1 0 0 0 0 1	1505	1 1 1 1 0 1 1 1 1 0	1552

1 0 1 1 1 0 0 0 0 1	1506	0 1 1 1 0 1 1 1 1 0	1553
0 0 1 1 1 0 0 0 0 1	1507	1 0 1 1 0 1 1 1 1 0	1554
1 1 0 1 1 0 0 0 0 1	1508	0 0 1 1 0 1 1 1 1 0	1555
0 1 0 1 1 0 0 0 0 1	1509	1 1 0 1 0 1 1 1 1 0	1556
1 0 0 1 1 0 0 0 0 1	1510	<u>0 1 0 1 0 1 1 1 1 0</u>	<u>1557</u>
0 0 0 1 1 0 0 0 0 1	1511	1 0 0 1 0 1 1 1 1 0	1558
<u>1 1 1 0 1 0 0 0 0 1</u>	<u>1512</u>	0 0 0 1 0 1 1 1 1 0	1559
0 1 1 0 1 0 0 0 0 1	1513	1 1 1 0 0 1 1 1 1 0	1560
1 0 1 0 1 0 0 0 0 1	1514	0 1 1 0 0 1 1 1 1 0	1561
0 0 1 0 1 0 0 0 0 1	1515	1 0 1 0 0 1 1 1 1 0	1562
1 1 0 0 1 0 0 0 0 1	1516	0 0 1 0 0 1 1 1 1 0	1563
0 1 0 0 1 0 0 0 0 1	1517	1 1 0 0 0 1 1 1 1 0	1564
1 0 0 0 1 0 0 0 0 1	1518	0 1 0 0 0 1 1 1 1 0	1565
0 0 0 0 1 0 0 0 0 1	1519	<u>1 0 0 0 0 1 1 1 1 0</u>	<u>1566</u>
1 1 1 1 0 0 0 0 0 1	1520	0 0 0 0 0 1 1 1 1 0	1567
<u>0 1 1 1 0 0 0 0 0 1</u>	<u>1521</u>	1 1 1 1 1 0 1 1 1 0	1568
1 0 1 1 0 0 0 0 0 1	1522	0 1 1 1 1 0 1 1 1 0	1569
0 0 1 1 0 0 0 0 0 1	1523	1 0 1 1 1 0 1 1 1 0	1570
1 1 0 1 0 0 0 0 0 1	1524	0 0 1 1 1 0 1 1 1 0	1571
0 1 0 1 0 0 0 0 0 1	1525	1 1 0 1 1 0 1 1 1 0	1572
1 0 0 1 0 0 0 0 0 1	1526	0 1 0 1 1 0 1 1 1 0	1573
0 0 0 1 0 0 0 0 0 1	1527	1 0 0 1 1 0 1 1 1 0	1574
1 1 1 0 0 0 0 0 0 1	1528	<u>0 0 0 1 1 0 1 1 1 0</u>	<u>1575</u>
0 1 1 0 0 0 0 0 0 1	1529	1 1 1 0 1 0 1 1 1 0	1576
<u>1 0 1 0 0 0 0 0 0 1</u>	<u>1530</u>	0 1 1 0 1 0 1 1 1 0	1577
0 0 1 0 0 0 0 0 0 1	1531	1 0 1 0 1 0 1 1 1 0	1578
1 1 0 0 0 0 0 0 0 1	1532	0 0 1 0 1 0 1 1 1 0	1579
0 1 0 0 0 0 0 0 0 1	1533	1 1 0 0 1 0 1 1 1 0	1580
1 0 0 0 0 0 0 0 0 1	1534	0 1 0 0 1 0 1 1 1 0	1581
0 0 0 0 0 0 0 0 0 1	1535	1 0 0 0 1 0 1 1 1 0	1582
1 1 1 1 1 1 1 1 1 0	1536	0 0 0 0 1 0 1 1 1 0	1583
0 1 1 1 1 1 1 1 1 0	1537	<u>1 1 1 1 0 0 1 1 1 0</u>	<u>1584</u>
1 0 1 1 1 1 1 1 1 0	1538	0 1 1 1 0 0 1 1 1 0	1585
<u>0 0 1 1 1 1 1 1 1 0</u>	<u>1539</u>	1 0 1 1 0 0 1 1 1 0	1586
1 1 0 1 1 1 1 1 1 0	1540	0 0 1 1 0 0 1 1 1 0	1587

SWITCH POSITION	FREQ	SWITCH POSITION	FREQ
1 2 3 4 5 6 7 8 9 10		1 2 3 4 5 6 7 8 9 10	
1 1 0 1 0 0 1 1 1 0	1588	0 0 1 0 1 1 0 1 1 0	1611
0 1 0 1 0 0 1 1 1 0	1589	1 1 0 0 1 1 0 1 1 0	1612
1 0 0 1 0 0 1 1 1 0	1590	0 1 0 0 1 1 0 1 1 0	1613
0 0 0 1 0 0 1 1 1 0	1591	0 0 0 0 1 1 0 1 1 0	1615
1 1 1 0 0 0 1 1 1 0	1592	1 1 1 1 0 1 0 1 1 0	1616
0 1 1 0 0 0 1 1 1 0	1593	0 1 1 1 0 1 0 1 1 0	1617
1 0 1 0 0 0 1 1 1 0	1594	0 0 1 1 0 1 0 1 1 0	1618
0 0 1 0 0 0 1 1 1 0	1595	1 1 0 1 0 1 0 1 1 0	1619
1 1 0 0 0 0 1 1 1 0	1596	0 1 0 1 0 1 0 1 1 0	1620
0 1 0 0 0 0 1 1 1 0	1597	1 0 0 1 0 1 0 1 1 0	1621
1 0 0 0 0 0 1 1 1 0	1598	0 0 0 1 0 1 0 1 1 0	1622
0 0 0 0 0 0 1 1 1 0	1599	1 1 1 0 0 1 0 1 1 0	1623
1 1 1 1 1 1 0 1 1 0	1600	0 1 1 0 0 1 0 1 1 0	1624
0 1 1 1 1 1 0 1 1 0	1601	1 0 1 0 0 1 0 1 1 0	1625
1 0 1 1 1 1 0 1 1 0	1602	0 0 1 0 0 1 0 1 1 0	1626
0 0 1 1 1 1 0 1 1 0	1603	1 1 0 0 0 1 0 1 1 0	1627
1 1 0 1 1 1 0 1 1 0	1604	0 1 0 0 0 1 0 1 1 0	1628
0 1 0 1 1 1 0 1 1 0	1605	1 0 0 0 0 1 0 1 1 0	1629
1 0 0 1 1 1 0 1 1 0	1606	0 0 0 0 0 1 0 1 1 0	1630
0 0 0 1 1 1 0 1 1 0	1607		
1 1 1 0 1 1 0 1 1 0	1608		
0 1 1 0 1 1 0 1 1 0	1609		
1 0 1 0 1 1 0 1 1 0	1610		

Adjustment and alignment.

PLL alignment setting.

The PLL is set by selecting the switches to 1629 KHz.

Adjust the Oscillator coil slug so that by turning the slug clockwise the frequency counter moves up in frequency until it just reaches 1629. The PLL should 'lock' and further adjustment of the slug (inwards) does NOT increase the frequency reading. If necessary, turn the slug back out of the coil (anticlockwise) for it to be screwed back inwards to 're-lock' on the PLL.

Now set the switches to 1024 and make sure the PLL follows on the display.

There is a 'sweet spot' where the tuning slug will allow full frequency range to be selectable.

RF Drive.

The preset VR3 Is used to adjust the signal drive to the output FET. It is critical that this is set this correctly. Turing the preset to obtain maximum drive and therefore maximum output from the transmitter.The use an oscilloscope to observe drain and gate voltages on the output FET is necessary.


Audio Level

Adjust preset VR2 for maximum modulation, ideally using an oscilloscope for maximum (but not over) modulation depth. Without breaking carrier. (Solid line at 0%)

Resetting the Frequency display

The Programmed Chip can get swamped with RF and makes it display incorrectly. (very uncommon but has been observed)

A micro switch is fitted to the display board to allow the display to be reset. Press the switch once to enter setup. Press through the stages, so that you select 'No PS' (does not enter 'sleep mode'), Zero (offset) press and hold until it flashes to set this and press to hold for exit to save setup.
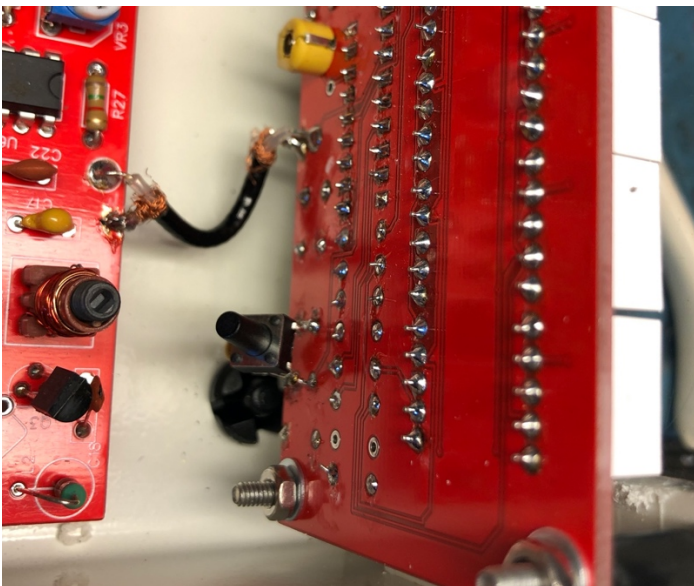
RF level monitor

The Bargraph is a visual representation of carrier level and Modulation. The signal is detected by the mini RF sniffer aerial inside and this converts to the LED scale. The sensitivity of this is adjusted by VR4 on the front panel PCB and by moving the sniffer nearby to the RF Capacitor conductor between the main board and the front panel board.

Technical Specifications

Size   - 220mm wide, 240mm depth, 80mm high

Weight. -   1.45Kg

Power requirement   -   DC 28 V @ 3A maximum.

Frequency Range - 1024KHz to 1630KHz in 1KHz steps

Audio input – RCA Phono sockets, left and right audio between 75mV and 775mV RMS

            (XLR mono input available on request)

Audio Bandwidth ($+-3dB$) - 50Hz to 6KHz

Modulation level – up to 100% positive.

RF Output level – 25 Watts RMS (100W peak) dependant on Aerial Match and Frequency.

RF connection – SO259 coax socket

Display -

        Signal level – 10 segment Bar-Graph multi-colour LED

        Frequency – 4   7-segment LED display

Ventilation and cooling – Fans forced air and convection