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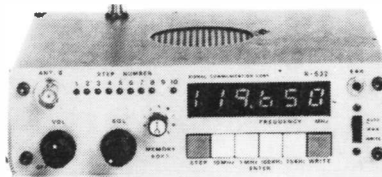
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SHORT WAVE MAGAZINE

(GB3SWM)

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VOL. 44

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No. 516

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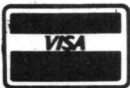
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VHF BANDS

NORMAN FITCH, G3FPK

THIS month's reports cover the launch of the latest amateur satellite, the results of the *Perseids* meteor shower and the last of this summer's *Sporadic E* openings, plus the usual ingredients.

The Satellite Scene

As reported in our *Stop Press* item last month, the Japanese amateur satellite *JAS-1* was successfully launched on August 12 at 2045.005 UTC from the island of Tanega shima in the extreme south of Japan. The orbit is an almost circular one inclined at 50°, the nodal period being 115½ minutes and the track separation 29.24° west *per* orbit. The average altitude is 1,500 kilometres. The analogue, or JA, transponder has been working perfectly since the first orbit and the 145 MHz Rx seems very sensitive. Users have reported excellent results with far less than the 100w EIRP originally suggested by the designers.

The latest *Keplerian Element Set* to hand is no. 7 for August 24 and for computer buffs is:—

EPOCH	86236.15793831
INCL	50.0124°
RAAN	218.3851°
ECC	0.0010984
ARGP	252.2631°
MA	107.6705°
MM	12.44388330 Revs per day
DECAY	-3.9E ⁻⁰⁷
REV	140
SMAX	7866.866 kms.
PER	115.719504 mins.
APOG	1508.751 kms.
PERG	1491.469 kms.
REFP	3157.13390363°

Note that the above period is the anomalistic one, from *perigee* to *perigee* and which is slightly more than the 115½ mins, which is the interval between successive equatorial crossings as used for prediction calendar purposes; *i.e.* the nodal period. The orbit is a highly stable one, as can be deduced from the very small decay figure, so accurate predictions for several months ahead can be made with confidence.

The digital transponder, Mode JD, was due to be made available about the middle of November. The four uplink channels for this mode are 145.85, 145.87, 145.89 and 145.91 MHz, the one downlink

channel being 435.91 MHz. AX-25 protocol using Manchester coded FM is needed. This means that the *modems* in TNCs using the *Bell 202* AFSK system will have to be bypassed and replaced by another. Jim Miller, G3RUH, has already designed a suitable *modem* on a PCB measuring 160 × 100mm. and the description is in *AMSAT-UK's Oscar News* No. 61.

For Mode JA, the uplink band is 146.000 to 145.900 and the inverted downlink band is 435.80 to 435.90 MHz. Note that to get a USB signal back, you need to transmit on LSB. The general band plan is that the bottom one third of the *downlink* band is CW, the top third SSB and the middle third is mixed mode. Because of the inverting transponder, ground stations will have to transmit CW at the top end and SSB at the bottom. The telemetry beacon is on 435.797 MHz, usually running CW at 20 w.p.m. The Doppler shift on the beacon will be up to ±8 kHz. Transponded signals will have up to 5½ kHz shift, plus or minus, since the up and down shifts are subtractive.

The expected life of this all-Japanese satellite, now known officially as FO-12, is three years. Our congratulations to the *JARL* and *NASDA* for a successful project which came to fruition very close to the announced date. For a full account of *FO-12* see your scribe's article elsewhere in this issue.

Oscar-10 seems to be in serious trouble still and the Mode B transponder has been on continuously. Since there is no telemetry, the condition of the battery system is unknown. Needless to say, it would be sensible not to use it until *AMSAT* advises to the contrary. But if you do attempt the occasional QSO, please keep your ERP down to the absolute minimum — 100w or less. John Acton, G1DOX, (CBA) got up early on Aug. 31 and first worked 7P8CM in Maseru followed at 0600 by PT2WVWV in Brasilia, DG5MAA, HB9SDY, HB9SJJ, three Is, six Ws in Illinois, Texas, Minnesota and the Carolinas, and finally SV1AB in Athens for his best *O-10* DX session so far. Using only 10w to a 5-ele. *Yagi* on Aug. 29, Colin Morris, G0CUZ, (WMD) worked a station on CW at RST599 both ways. His 2m. Rx antenna was a 5-ele. *Yagi* indoors. He has copied *FO-12* at good strength and John Palfrey, G4XEN, (NHM) worked W2RS on Aug. 25 on CW for his first QSO on the new "bird".

In a *News Release* dated Aug. 8, the *University of Surrey* reports on the success of the Digital Communications Experiment, DCE, on *UoSAT-2* and which has been used to relay 15 pages of text, about 100 kilobytes, *per* day between inexpensive ground stations in the U.K. and the U.S.A. Data gained from the DCE is being used by designers of large scale storage-and-forward systems. The *UoS*

engineers are liaising with their counterparts in the USA-based *VITA* group — *Volunteers in Technical Assistance* — to evaluate protocols and error detection and correction techniques to further refine these systems.

At press time, there was no firm news about the launch of the long-awaited Soviet satellites *RS9* and *RS10*. Mediocre tropo. conditions at the end of August caused G0CUZ to operate over the Russian "birds". In a four-day period on *RS-7*, CW mode brought QSOs with DL, EA8, F, HG, OE, OK, PA, SM, UA, VE2 and YU. Using *RS-5*, Colin had SSB contacts with DL and ON. On 2m. he uses 20-40w to a 5-ele. indoor *Yagi* or 6m. dipole for overhead passes and his 10m. Rx system uses 20m. dipole antenna.

"VHF Bands" deadlines for the next three months:—

November issue — October 8th
December issue—November 5th
January issue — December 3rd

Please be sure to note these dates.

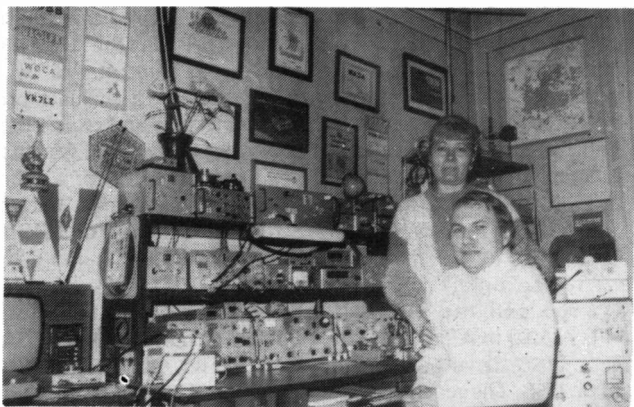
Award News

Congratulations to Suli (Szigy) Iulius, YO2IS, who is member number 69 of the 144 MHz QTH Squares Century Club. His certificate was issued on Sept. 2 with stickers up to 300. He is 45 years old and was first licensed as an operator of the YO2KAB Club station in 1959, his own licence coming in 1962. His XYL, Delia, is YO2DM and prefers HF band operation. Szigy's first VHF activity was in 1964 but he then operated more on the HF bands until 1975, when Delia took over. After that, YO2IS returned to the VHF's *via* the satellites.

All his equipment is home made, apart from a *Yaesu* FT-7, and since 1967 he has been a member of W2MEL's *World Institute of Home Brewers*, or *WIHB*. His 2m. stations runs the legal limit of 400w using a single 4CX250-series PA the antenna being a 10-ele. PA0MS *Yagi*. All modes except *E-M-E* have been used to work 341 squares, 308 of which are confirmed. The QTH is in the middle of Timisoara (KF17e). Best tropo. DX is OY9JD/P (WW76g) at 2,550 kms., best *Ar* DX is G3NSM (ZL14e) at 1,775 kms. on 25-7-81 but which Bob has not sent the QSL for, so far.

The breakdown of the 308 squares is, CW 244; SSB 61; SSB/CW 2 and one on FM. Propagation types were, Tropo. 77; *Es* 68; MS 162 and *Ar* 1. Szigy is also QRV on 70cm. and lately on 23cm. and enters the Squares Table.

Gerald Nenner, DL8FBD, (EK75f) was awarded his "200" sticker for QTHCC certificate no. 39 on Aug. 22 and now has



YO2IS will be a familiar call to VHF DX-ers and satellite users. Szigy Iulius is pictured here with his XYL Delia, YO2DM, in his well-equipped shack. Apart from a Yaesu FT-7 which Delia uses, all the gear is home built, including a computer and the antennas. YO2IS is member number 69 of the QTH Squares Century Club with 308 squares confirmed out of 341 worked by all modes except E-M-E.

202 confirmed. His latest 25 were SSB mode 8; CW 17, with three *via Ar*; 14 by MS; three *via Es* and five on tropo. His total of squares worked on 2m. up to Aug. 15 was 266.

Two more readers have joined the 144 MHz VHF Century Club. John Wainwright, G6PBW, from Cutthorpe (DYS) was awarded certificate no. 386 on Aug. 15. His amateur radio interest started in 1975, his first Rx being a two valve "H.A.C." set. Later sets included a Sony ICF 8900L and Yaesu FRG-7 used with lengths of wire up to 70ft. John sat the R.A.E. in May 1982 and got his licence in the October. His station comprises a Yaesu FT-290R and 30w amplifier with a 5-over-5 slot fed Yagi in the loft and a 5-ele. Yagi on a mast outside. He is QRV on 70cm. with a Yaesu FT-790R and outside 5-ele. Yagi. He is a keen WAB type and future plans include some 3cm. work and to take the Morse exam.

Member no. 387 is Gordon Allis, G1LRS, from West Ewell (SRY) whose certificate was issued on Sept. 8. He also began as an *s.w.l.* in the late 1960s, and did some awards hunting, antenna experimenting and some home-brewing. In Dec. 1984 he took the R.A.E., passed it, and got his licence the following February. His station consists of a Trio TR-9130 running 25w. The antenna is a QDX Double Quad-Yagi array at 35ft. Gordon has an Eddystone EC-10 and a Geloso 209R Rx for HF listening and a Mosley TA-33JR beam at 35ft. He is studying for his Morse exam. helped by a computer and DRAE Morse Tutor. For details of the QTHCC and VHFCC send an *s.a.e.* to the VHF address.

Repeaters

The Southwest Hertfordshire UHF Group has sent an Information Sheet on the 10th anniversary of its 433 MHz repeater GB3HR. It began operation on Aug. 21, 1976 from a site at Bushey Heath but is now sited near Stanmore, providing

better coverage. Its reliability has been excellent with only one component failure and a feeder fault at the Stanmore site. Future plans are for a standby repeater station, a new duplexer for single antenna working and a protected mains supply.

The Group has been building a 23cm. FM repeater/beacon, due to become operational from Bushey Heath this year. The Tx/Rx QRGs are 1,297.0/1,291.0 MHz respectively. The Treasurer is Brian Greenaway, G3THQ, who would like to hear from anyone keen to make a donation so that more projects can be funded and existing ones maintained. No address was given in this document, so he is presumably QTHR.

Beacon Notes

In the above-mentioned Information Sheet it was stated that the SWHUG was responsible for the GB3SWH 3cm. beacon, also located at Bushey Heath. It is on 10.3680 GHz, horizontally polarised with good coverage. The Tx was built by Les Sharrock, G3BNL, and reception reports are welcomed by Trevor Groves, G4KUJ.

Paul Turner, G4IJE, is reported to have built a beacon Tx and sent it to Norway to LA6QBA for installation at his summer QTH. This is for the 6m. band, so further details, such as frequency, operating times, beam heading and QTHL when available.

Contest News

The Barking Radio and Electronics Society's VHF Contest results are out. It was held on April 6 and the high power section brought 14 entries. The winner was G4WET/P (HWR) with 12,220 points and who ran 400w to two 14-ele. beams. G4NXO/P (HWR) was runner up with 10,887 pts. amassed with 300w and two 13-ele. Yagis. G4CRA/P (ESX) came third with 10,584 pts. In the QRP section there were but ten entries, the winner being G4RLF/P (WLT) whose 18w and 6-ele.

Quad made 8,700 pts. Mick Cuckoo, G6ECM, (KNT) using 15w and an 11-ele. Yagi was second with 4,445 pts. In spite of the small number of entries, the organisers say that over 650 different calls were in submitted logs. Next year the contest will be on March 29.

October contests start with the RSGB and IARU UHF events on the 4th/5th from 1400. The RSGB one is in three sections; Single-op., Multi-op. and SWL. One point *per* kilometre scoring. The IARU version is two sections; Single-op. and All-other, again one pt./km. scoring, with band multipliers; 432 MHz x 1; 1,296 MHz x 5; 2,320 MHz x 10 and higher bands x 20. The bands are 432 MHz to 24 GHz.

The 432 MHz Cumulatives start on Oct. 7 with the second leg on the 23rd. Times are 1930-2200. The 1.3/2.3 GHz Cumulatives start on Oct. 15, 1930 to 2200, the next session being on the 31st, when we revert to GMT for domestic purposes, the times being 2030 to 2300. All these Cumulatives are for Fixed and All-other stations.

The 70 MHz Fixed contest is on Oct. 26, 1000-1500 with radial ring basic scoring. Then multiply these points by the total of counties and countries worked. Note that up to three stations in each Scottish region can be counted as a separate county for multiplier purposes. Into November and the weekend 1/2 sees the Marconi Memorial Contest, 1400-1400, with a subsection on the 2nd, 0800-1400. Single-op. and Multi-op. with one pt./km. scoring.

Six Metres

Paul Turner, G4IJE, (ESX) has sent in a comprehensive computer print-out of all 6m. stations/beacons worked or heard, including crossband QSOs, for the months of May through August. The only in-band DX worked in August was to Portugal. On the 6th, at 1852, he worked GJ3YHU who was beaming 230°. ZB2VHF was copied on the 19th at 2030 at S5 and on the 26th at 0930 at S3. On the 27th it was S9 at 0830 but each time there was nothing else heard on 6m. Since Feb. 1, Paul has worked 12 countries and 44 squares but has yet to work CU, GD, OX, VE, or ZB2 since the band was generally released. He mentions random MS activity every Saturday and Sunday morning from 0615 to 0715 local time on 50.350 MHz with LA6QBA a regular participant. G4IJE had a few random MS QSOs in the *Perseids* and wants to do it again in the December *Geminids*.

John Jennings, G4VOX, (LEC) worked G3KKJ (CBA) on a flat band at 2315 on Aug. 9. Alex was working G4BLX in Brighton so they made it a three-way. Other new stations worked were G4YBB, G3BUT, G3LRS and G3PLP. Mike Johnson, G6AJE, (LEC) is a keen listener on 6m. and makes crossband QSOs too. He writes that there are a lot of unanswered "CQ" calls so suggests those

making them might care to add they were monitoring another band, say 432.2 MHz, for any Class B stations. He also thinks it unwise to QRT when the *Es* is over, since there are other interesting modes to explore. On Aug. 31, the band was wide open for *Es*, yet not one signal was heard. Mike has learned that WA1OUB, who has been heard and worked from the U.K., runs 2kW to two 11-ele. *Yagis*. With that much difference in power, no wonder few Gs make it across the Atlantic.

John Baker, GW3MHW (YM24e in Powys) had a two-way QSO on Aug. 27 with CT4KQ at 2130 on 50.100, 50.104 and 50.115 MHz. G4IFX was the only other one to show up. He now has 16 countries on 6m. the latest being GD3HQR who has a *Yaesu* FT-690.

Four Metres

Bill Somerville-Large, EI9FK, lives in Bray, Co. Wickford, and is a keen 4m. operator and came on the band last May with a transverter and 40w amplifier borrowed from EI2CA. He made up a 5-ele. *ZL-Special* antenna and on Sunday mornings in June and July worked a number of G, GI and GW stations. His home QTH is not good for VHF so Bill operates -/P from a nearby hill using a wide-spaced 3-ele. *Yagi* mounted on the side of his car. The first two Sundays in August brought QSOs with G3APY, G3UVR and G4HVK.

Bill and Paul, EI2CA, were members of the EI5WAR NFD station on July 5/6 and they were amazed at the amount of activity with S9 signals from the east of England. EI9FK works crossband to Europeans but thinks most of them are more interested in crossband to 6m. than 4m. He had some MS experience in the *Perseids* copying bursts from such as GB2ZR, GB4MTR, and GB2YS. He did complete with EI2CA/P in UM on the 12th, however. While on holiday in west Cork (IO51FM) he did some -/P operating from a hill and worked 11 stations. If anyone needs Wickford and/or WN square contact Bill who is *QTHR*, or arrange a sked *via* EI2CA.

Tony Collett, G4NBS, (CBE) added GW3MHW (PWS) on Aug. 11; GB2YS (HLD) on the 12th, completed *via* MS, and GB4MTR (LNH) on the 25th, for all-time new counties and his first GM on the band. Jerry Russell, G4SEU, (WKS) telephoned his report and worked the GB2ZR and GB2YS expedition stations. On Aug. 11 he got EI2CA/P (UM) and GM4FRE (XS) but from EI9FK/P on Aug. 31, only a few MS pings.

G4VOZ reports continuing reasonable activity with G4LPD (NOT) a newcomer to the band. On Aug. 15, John worked GB4MTR on SSB and on the 26th, G4HWA (NHM) for the first time. GW3MHW admits to his Tx getting rather old. A replacement PA valve from G3XEV was personally delivered by

ANNUAL VHF/UHF TABLE

January to December 1986

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	
G1KDF	—	—	93	22	74	12	26	6	233
G4NBS	31	3	68	19	57	15	43	11	213
G1DOX	—	—	82	10	49	7	29	5	182
G6XVV	—	—	83	17	42	7	20	4	173
G4SEU	56	5	62	13	30	4	—	—	170
G6HKM	—	—	73	21	49	11	—	—	154
G4YCD	—	—	79	20	39	7	—	—	145
G0CUZ	—	—	80	30	28	4	—	—	142
G4MUT	31	3	51	13	28	5	10	4	131
G1LSB	—	—	56	12	48	14	—	—	130
G4HGT	21	2	68	16	6	2	—	—	115
G6AJE	—	—	48	12	38	8	3	1	110
G4TIF	50	5	28	12	6	2	—	—	103
G3FPK	—	—	80	21	—	—	—	—	101
G6OKU	—	—	61	9	25	2	—	—	97
G1EHJ	—	—	49	6	36	4	—	—	95
G4WXX	—	—	79	14	—	—	—	—	93
G4DEZ	—	—	48	14	5	1	16	6	90
G1SWH	—	—	76	8	—	—	—	—	84
G4VOZ	40	4	—	—	32	5	—	—	81
GW6VZW	—	—	61	18	—	—	—	—	79
G8XTJ	—	—	62	13	—	—	—	—	75
G1PDW	—	—	60	13	—	—	—	—	73
G4YIR	—	—	55	14	—	—	—	—	69
G4TGK	—	—	55	12	—	—	—	—	67
G6XRK	—	—	58	9	—	—	—	—	67
G1CRH	—	—	53	8	—	—	—	—	61
G8RWG	—	—	45	9	4	1	—	—	59
GW4HBK	49	6	—	—	—	—	—	—	55
GU4HUY	—	—	39	6	—	—	—	—	45
G4EZA	—	—	32	10	—	—	—	—	42
G1HGD	—	—	17	4	13	2	—	—	36
G2DHV	4	1	24	2	1	1	—	—	33
G6CSY	—	—	9	2	6	1	—	—	18

Three bands only count for points. Non-scoring figures in italics.

G4DGM. He lists 16 stations recently worked including EI9FK/P (Cork) on Aug. 24, EI2CA, GU2HML and distant Gs. John has been having full duplex QSOs with G2AOK on 6m./4m. lately. Dave Lewis, GW4HBK, (GWT) reckons the expedition stations deserve a vote of thanks; he worked GB2ZR on Aug. 8 at 2320 *via* MS by tailending G4ASR, and on the 10th, GB4MTR (YR). DL7YS was worked crossband *via Es* on Aug. 4, also DK1PZ who were both on 10m. Best tropo. DX was on the 3rd to EI9Q, EI2CA on the 23rd and EI9FK/P (VL) on the 24th.

Two Metres

Charles Coughlan, EI5FK, (Cork) sent a long letter detailing activity up to mid-August. He finally worked EA8XS on July 19 at RS51 but later, Salvador was up to S7. At 2,714 kms. it was his best DX. His short -/P operation from UL square, July 12-15 was quite good with about 100 stations worked in 25 squares, most on CW. The station comprised a *Standard* C5800, *BNOS* 100w amplifier with preamp. and a G2BCX type antenna at 20ft. The site was 1,600ft. *a.s.l.* with an excellent take-off in all directions. Beacons GB3VHF, GB3CTC and FX3THF were audible much of the time even though conditions were only fair. Some of the longer DX included G1KDF (YN), G4SWX (AM), GM4CXM (XP), GM0BQM/P (YP), and G0AEI (AL). Charles wrote while on holiday in Crosshaven where the weather, like the *Perseids* MS shower, was "poor enough".

Many of his skeds failed, but he did complete with DL8HCZ (FN) and possibly SM6KJX (GR).

Szgy lulus, YO2IS, reveals a fascinating picture of what can be worked from Romania and he has 53 DXCC countries from Europe, Asia and Africa. The Asian ones are OD, UD6, UG6 and 4X, while IW9AJZ/IH9 was the African connection. In the Aug. 5 *Es*, he missed out on UL7AAX (LN53PN) but says the YUs worked him. In the early-August *Es*, YO4AUL (OE64g) got the first Turkish QSOs on 2m. by contacting TA1E/2 and TA1D near Istanbul. Also heard *via Es* were SV9ZR (Crete), SU1ER (Cairo), some JYs on FM and SV5s.

Szgy reckons that the 1986 *Es* season has been quite-capricious, the best opening being on July 8 from 1600 till 1900. It started with UA3, then OH1 to 8, thence SM2, 3, 4, 5 and 0 down to SM6 and LA, taking in squares from JY in the north to EU and FT in the south. At the end, the GMs and northern Gs came in and he worked GM0BQA (YP) and Marion, G1PEN, (CBA) in YO, the first YL operator on VHF *Es*. YO2IS is a very keen MS operator with over 500 QSOs completed, 80 with PAs as he is chasing his PACC 2m. award. He has never worked GD so would any IOM reader care to try the first YO/GD MS QSO? Also he would appreciate QSLs from G8ECI and GM3ZBE.

Now how's this for *Es*? Colin Morris, G0CUZ, (WMD) heard that in FC square in Italy on Aug. 29, a TV repeater was being badly QRM-ed by UK Band 3 TV on

180 MHz between 0900 and 1100. He got three new squares on tropo. in August; EI3VPH/P alias G8GXP in UM on the 3rd, GM4AFF/A (WR) on the 5th and GB2YS on the 15th. His main interest is MS and he found the *Perseids* particularly disappointing. All 11 CW skeds failed; some were troubled by QRM, one deliberately so, three did not turn up and three with UQ2GCG (LR) were a bit ambitious. However, SSB skeds with IK3GLF (FF) and SP3JBI (JL) on the 13th were completed. Also on the 13th on the random CW QRG, he heard a strong burst from UP2KBH (KP). In the first part of August Colin had more success on CW MS and new squares worked were LA8OW (EU), OK3CBU (JI), YU2CCB (IF), YU7MS (KF), F6DMD (BC), HG7PL (JH), YU2EZA (IG), HG2NP/0 and HG0IL (KH) and LA6QBA (FT). In the gales on the 25th his antenna was "removed" but it only suffered a few bent elements.

Philip Everett, G1CRH, (CBE) now has his 5-ele. *Yagi* outdoors and has pushed up his counties tally to 53, better DX including GW6TEO/P (DFD) and GB2FI (GNS) on Flatholm Is. From Cumbria, G1DOX lists GM3IDS (FFE) on July 26, EI2CLB (Waterford) on the 29th, EI3VPH/P (WL) on the 30th and again on Aug. 3 when Dave was in Co. Kerry in UM, GM4AFF/A on the 4th and GB2YS on the 10th. Ian Rose, G1PDW, (ESX) has added a 50w amplifier to his station and is now up to 60/13 in the table, the extra country being Guernsey, GU4ZRB/M, on Sept. 1.

Bob Nixon, G1KDF, (LNH) was on holiday for three weeks in August so has little to report other than that the Monday night EI activity is still quite high. QRGs are 144.260, .265 and .300 but precious few EIs are ever heard in the south of G, since these frequencies are invariably occupied with local QSOs. Ken Osborne, G4IGO, (SOM) worked GB2ZR on tropo. on Aug. 3. His CW MS successes included DL4EA/LA (DT) on the 8th, F6DMD (BC) on the 10th, DL4EA/LA (DU) and GM4AFF/A on the 13th and an MS/tropo. QSO with GB2YS on the 12th. He is definitely of the opinion that the *Perseids* shower is declining and this seems to be the general idea.

G4NBS made but two QSOs, GB2YS for a new square and GB2FI. Tony is still looking for his first EI. Ian Cornes, G4OUT, (SFD) added a further 13 CW stations in August to his Ladder list including GB2MRI, the Marconi/Kemp Anniversary station on Rathlin Is. on the 8th. Operating time has been brief for Graham Jarrett, G4PPV, (KNT) due to the demands of decorating, but he did work Guernsey for the first time in the shape of GU0BDV, on the key.

G4XEN moved QTH about one mile on July 29 and soon got going on 6m., 70cm. and 2m. Prior to the move, he completed

QTH LOCATOR SQUARES TABLE

Station	23cm.	70cm.	2m.	Total
G3IMV	—	111	393	504
G3POI	—	—	342	448
G8GXP	13	133	296	442
GJ4JD	59	117	239	415
G4NQC	63	99	234	396
G3XDY	77	130	177	384
GW4LXO	45	98	238	381
G3UVR	61	106	213	380
YO2IS	—	37	341	378
G3JXN	77	119	172	368
GW4TTU	37	87	238	362
G3PBV	41	106	200	347
G8TFI	79	141	126	346
G4DCV	25	71	248	344
G4KUX	—	36	306	342
G4IJE	—	—	338	338
G4RGK	29	86	213	328
G3BW	15	38	269	322
G3COJ	43	99	174	316
G6DER	53	95	164	312
G4NICU	25	82	201	308
G4XEN	—	88	219	307
G1EZF	32	85	189	306
G8XVJ	—	86	213	299
G4ERG	—	16	278	294
G4DHF	—	—	280	280
G4TIF	—	104	174	278
9H1CG	—	—	276	276
G8PNN	53	91	126	270
G4DEZ	13	4	244	261
G6NIGL	45	83	133	261
G4FRE	56	124	78	258
G8HHI	23	96	135	254
G6HKS	—	65	186	251
G4HPK	—	—	245	245
G4MUT	18	86	137	241
G4OAE	—	46	195	241
G6HKM	—	90	142	232
G6XVV	7	38	174	219
G1KDF	19	73	126	218
G6DZH	—	82	136	218
G3FPK	—	—	217	217
I4YNO	—	—	214	214
G4SFY	—	—	208	208
G4MEJ	—	—	198	198
G4IGO	—	—	195	195
G8LFB	—	—	194	194
G6ECN1	—	—	194	194
G4NBS	44	76	68	188
G4MJC	—	23	165	188
G4NRC	—	47	132	184
G0CJHE	—	—	181	181
G6JNS	5	53	119	177
G4ZTR	35	57	82	174
GW3CIB	18	46	107	171
G4YUZ	—	—	168	168
G4YCD	—	31	135	166
G4FRX	—	66	99	165
G8ZDS	—	41	123	164
G4VPM	—	46	117	163
G8MKD	—	46	113	158
G16TMM	—	26	127	153
G4DOI	—	—	153	153
G4XEK	—	—	151	151
GW8VHI	—	48	101	149
G6YLO	20	59	67	146
G6XLL	—	36	109	145
G6YIN	—	58	87	145
G4CQM	—	52	87	139
G6AJE	3	43	89	135
G4RSN	2	34	92	128
E15FK	—	—	126	126
G1EGC	—	—	121	121
G8RWG	—	13	105	118
G0CAS	—	—	115	115
G1LSB	—	58	46	104
G6XRK	—	—	100	100
G6XSU	—	52	43	95
G4TGU	—	—	95	95
G8XTJ	—	—	94	94
G1DOX	19	25	48	92
G6CSY	16	39	34	89
GM8BDX	13	31	41	85
G1H2O	—	—	82	82
G1DWQ	—	—	72	72
G4JZF/P	—	63	—	63
GW6VZW	—	—	55	55
G1HGD	—	7	38	45
G8UDV	—	2	42	44
G1JOU	—	—	44	44
GM4WLL	—	—	39	39
G6SIS	—	1	31	32
G2DHV	—	3	24	27
G1CRH	—	—	26	26

Starting date January 1, 1975. No satellite or repeater QSOs.

on CW MS with GM4DHF/P and SM5BEI (JP90). On Aug. 4 this mode brought OH2TI (KP20= MU) who used the "missing info." procedure to good advantage. On the 6th John heard IOFHZ at 1744 on 144.300 when there was strong *Es* on 106 MHz. Back to CW MS on the 8th with HG7KPL (JN97= JH) — 33s. burst, OK2PZW (JN89= IJ) for a new

square on the 9th, HG5AM (JN97) in poor conditions on the 10th, I6DQE (JN63= GD) on the 11th which took 50 mins. at the height of the shower, LA6QBA/P (JP51= FV) on the 24th, and SM2CEW (KP15CR= LZ) on the 26th *via* sporadic meteors, the QRB being 1,950 kms. Later that day, through the rain and gales, he worked GM0CLN/A (IO88= YS) on tropo. and who peaked to S7.

June Charles's, G4YIR, (ESX) highlight of August was almost working her first *Es* station, OE3OKS (IH) on the 4th who came back "G4RIR?..." before disappearing. John Lemay, G4ZTR, (ESX) sent a brief resumé of the GB4XN expedition in which 44 squares were worked. Best tropo. DX was 780 kms. and seven MS skeds came off, including SM2CEW, all using random meteors. He apologises if people thought they were a bit deaf one evening. This was due to the PA relays arcing over and acting like a 20dB attenuator because of the high resistance contacts.

For G6AJE, Aug. 17 produced calm weather so Mike put his mast up to its full height and was delighted when his "CQ" call was answered by G1JKX/P (NLD), then G6DBE/P (YSN). On Aug. 23 he managed GB2FI but could not make it on 70cm. Mike has learned from K3HZO that in the eastern U.S.A. *Es* propagation is often noticed on their 220 MHz band, a typical opening lasting 20-30 mins. On 2m. such openings last 2-3 hours. *Es* openings to the south, to the Caribbean, often happen during the hurricane season, lending support to the wind shear theory to explain *E-layer* ionisation. While Auroras are rarer than in Europe, especially on 70cm., there is more 70cm. MS activity. Finally, he understands that a "state-of-the-art" U.S. 2m. contest station would run two kilowatts into eight long *Yagis* at 6,000ft. *a.s.l.*

Ela Martyr, G6HKM, (ESX) is another whose household has been suffering from the decorating bug, so no additions to the Squares table. However, a "CQ" call on Aug. 9 brought a response from EI3VPH/P in Co. Cork, followed by a call from EI5FK (VL). On the evening of the 9th she worked GB2YS. John Fitzgerald, G8XTJ, (BKS) was in California the first two weeks of August. New 1986 counties later were GB2RRR (MSY) on the 15th and G4KIS/P (LDR) on the 24th. He is busy with this latest "in thing" of collecting islands for the WAB awards programme. John is now Publicity Manager for the WAB and is also on its Committee, so we are promised occasional press releases. In spite of his severe antenna restrictions, he has achieved his "Gold Award" for 1,000 WAB areas.

Keith Boleat, GJ6TMM, worked IC8EGJ (HA) and YU1GT (KE) *via Es* on July 18, then went on holiday to Spain and Portugal, taking an FT-290R, 100w

Station	ANNUAL CW LADDER				Points
	4m.	2m.	70cm	μ Wave	
G4AGQ	24	267	12	1	304
G0ABB	—	237	2	—	239
G4YIR	—	230	—	—	230
G4SFY	—	221	—	—	221
G4ZVS	—	164	—	—	164
G4EIB	—	140	—	—	140
G4OUT	—	139	—	—	139
E15FK	—	116	—	—	116
G4PPV	—	115	—	—	115
G4XUM	—	105	—	—	105
G0DJA	—	68	—	—	68
G4EZA	—	67	—	—	67
G4VOZ	39	—	22	—	61
G4TJE	—	52	—	—	52
GW4HBK	46	—	—	—	46
G2DHF	4	18	—	—	22

No. of different stations worked since Jan. 1.

amplifier and 5-ele. *Yagi*. Operating -/CTI from VA square he contacted EA8XS (SO) and EA8BEX (SN) on July 28. On Aug. 6, while mobile in EA2 in YD near Santander, he worked SP9DKD and SP9EWO in JK and DK5RV (GI) via *Es* using a gutter-mounted $\frac{7}{8}$ -wave whip antenna. From home, XD was another new square.

Paul Baker, GW6VZW, (GWT) wrote, "At last a little success to report . . ." Aug. 1 brought tropo. QSOs with FC1CBC/P (AJ) and FF1KTX/P (YI), then on the 3rd, at 1640, a brief *Es* event produced IT9OWA/IT9 (GY) at 1,950 kms., his best DX. Next day he contacted one YU, and two each OE, HG and OK stations the furthest being HG8CE (KG32c) at 0900 for about 20 mins. All-time new squares were HI, II, JI, JH and KG. OE3NFC was 45 dB-over-S9 and the loudest DX Paul has ever heard. In flat tropo. conditions, he has been working assorted islands for the WAB awards.

Reg Woolley, GW8VHI, (GNW) spends a lot of time operating G6RAF but is still active when he goes home in leave periods. On July 17 he worked F6HMQ/P (XI), F6BQX (ZH), EA1s BLA and TA in VD, 'TA giving a 40 dB-over-9 report, and EA2s AMU and RCU in YD. On Aug. 11, he turned to MS and completed with EA3DXU/6 (AZ), on the 12th with Y22HA (GO), and DD5TD (EJ) on random. The 13th brought F6DKQ (DH). Reg. heard many Europeans on the 144.200 MHz.random QRG but suffered lots of QRM from inexperienced "locals" who has no idea of procedures.

Seventy Centimetres

YO2IS operates on this band and has 37 squares worked with 32 confirmed. Szigy runs 400w, the antenna being a modified W0EYE *Yagi*. He is getting an *E-M-E* station together and has built a K2RIW PA, made up the four DL6WU *Yagis*, an Rx preamp. and the F9FT coaxial relay. He was aiming to get going this autumn if the Rx system checks out satisfactorily. G1DOX's successes were, July 20, GB4MTR (GRN) and YR, GM4UBJ (YP), GM4VYQ (XQ); the 27th G4CJG/P (SOM), GW4ZVQ/P (GWT)

and G1SBS (WLT); the 28th, GM6TIA (XP).

G4NBS, as on 2m., only reports two QSOs. On Aug. 11, GB2YS on CW and on the 25th, GB2FI. Tony reports that most of the time is spent listening to an empty band. Where have we heard that before? In an attempt to remedy this situation, G4VOZ writes, ". . . not content to push lost causes on 6m. and 4m., we now have started a CW net in the Leicester area on 432.140 MHz from 1930 every Wednesday. Listen for G4VOZ or G3CWH in Coventry; all are welcome". The time is GMT, so presumably they will settle for 2030 when we "lose" the hour.

G4ZTR mentions that the GB4XN operation produced 24 squares on 70cm., best DX being 650 kms. For G6AJE, "CQ" calls to the southwest usually only produce white noise. However, on July 31, he was answered by GW8JLY (GWT) and then G3KBS/P (DOR). G6HKM added S. Glamorgan to her 1986 county tally but did not mention who that was. Ela needs one more for her half-century of counties this year.

And now a plea for correspondents to always put their call signs on their letters. A letter came in from Mervyn Rodgers from Alva (CTR) with no mention of his call. He is QRV on 70cm. and has four counties, three countries and six squares on the band and he would like to have QSOs outside of YQ square.

The Microwaves

Dave Ackrill, G0DJA, (WMD) and Glen Ross, G8MWR, will be running a demonstration of 10 and 24 GHz wideband FM from the station of G6MEB and G4MEB, which belong to the *Midlands Electricity Sports and Social Club* on top of Mucklow Hill, Halesowen, behind the main *M.E.B.* HQ building. Glen will be at the *M.E.B.* end and Dave will go to a local hill 5-10 kms. away. This is planned for Oct. 28 at about 8.00 p.m. Further details from Dave on 021-459 9854 most evenings.

On Aug. 22, G1DOX worked John Tindle, GW3JXN/A (DFD) on 23cm. for a new county and square, XM, on the band. On 13cm. John is still carrying out tests with G6FK, but tests with G14CXH/P were postponed after Richard blew an MGF1402 in his transverter. On Aug. 24, he finally worked GW8FKB on Anglesey on 13cm. after ten tries. On Sept.

1, G1KDF also worked GW3JXN/A for a new county and square.

If it had not been for the contest on Aug. 24, G4NBS reckons there would have been nothing to report. It produced 32 QSOs, six more than last year, but activity was low with little -/P work. In the N/S direction, conditions were below normal but appeared above average E/W with deep QSB on some signals. Tony's first QSO with G3AUS (DVN) at 319 kms. was best DX. New ones for '86 were G8NEY (WLT), G8XVJ (CHS), G8GDZ (WMD) and G8CHW (HFD). GW3JXN/A was a new square and G3GRO (SXW) and GB2FI (GNS) all-time new ones.

Ken Ellis

Readers will be very familiar with the pains-taking 50 MHz research and reporting undertaken by Ken Ellis, G5KW, for the best part of half a century. At a Council meeting on Aug. 9, the *RSGB* unanimously elected Ken as a Vice-President of the Society as, to quote from part of the letter to him, ". . . a small demonstration of Council's respect and gratitude for the considerable contribution you have made to amateur radio and for your dedicated services to *RSGB*". All of us at the *Short Wave Magazine* say a hearty, "Hear, hear" to that. This move was started by Ken Willis, G8VR, who edits the VHF section in *RadCom.*, and who well recognises the value of G5KW's work. We understand that G8VR has resigned from the Council of the *RSGB*, and also handed in his Executive Vice-President's badge. It is always sad when an active and very useful member of a team takes such a course: may be he is trying to tell us something?

Magazine Contest

Some time ago, the idea of a *Short Wave Magazine* sponsored contest was suggested and readers were invited to comment. A number of you have but the majority has not, so far. Would those who have not please let your scribe know their views? If you do not favour any contest at all, then please say so. To date your ideas vary a lot; some would prefer a one-off, single band affair, while at the other extreme, some suggest a multiband, cumulative one. G4VOZ made a plea that the scoring be made as simple as John reckons the *RSGB* system puts people off. Point taken.

Finale

That's it for the month. Now will we have another wonderful tropo. lift to report from mid-October like we experienced last year? Whatever happens, please send all your reports, comments and table claims to the usual address by the date in the box:— "VHF Bands", *SHORT WAVE MAGAZINE*, 34 High Street, WELWYN, Herts. AL6 9EQ. 73 *de G3FPK*.

THIRTEEN CENTIMETRES ALL-TIME TABLE

Station	Counties	Countries	Squares	Points
G3JXN	26	8	34	68
G8TFI	26	7	32	65
G3PNN	15	6	23	44
G3XDY	14	6	21	41
G6DER	12	7	15	34
G1DOX	6	2	5	13
G6YLO	6	1	3	10

A Multi-Memory Keyer Part 2

the fully-featured design for all occasions!

PAUL WHATTON, G4DCV

Construction

BOTH the keyer and the memory board are built on double sided PCBs, the component layouts being shown in Fig. 5 and Fig. 6. Track layout for the keyer board is shown in Fig. 7 and Fig 8 and for the memory board in Fig. 9 and Fig. 10.

Because of the high track density, especially around the memories, a small tip (for example 1mm bit) soldering iron along with 22 swg solder should be used. PCB pins should first be inserted around the edges of the boards where inputs and outputs are required. Build the keyer board first since this will be needed to test the memories. Mount all the lowest profile components first, *i.e.* the diodes and resistors followed by the capacitors and any transistors, and finally the ICs. All the ICs used are prone to damage by static, so observe normal precautions for handling CMOS. Since connections are required on the top and bottom of both boards normal IC sockets cannot be used. The author prefers to solder in the 4000 CMOS, keeping sockets for the memories. 'Soldercon' type sockets can be used since these can be soldered both sides of the boards. If luxury is desired then turned-pin IC sockets, can with care be soldered on both sides. Take great care not to bridge adjacent tracks on the PCBs, and observe the polarity of all diodes, transistors and ICs.

The keyer should be built into a metal box for RF proofing, the choice being up to the constructor. Both PCBs can be stacked as their mounting holes line-up, the memory board should be placed

on the top since access to the EPROM socket may be required. (The author keeps a spare EPROM for portable contests and pops it in the night before going out!) Ribbon cable makes the wiring between the board and memory select switches very neat. Suitable sockets should be provided for the paddles and key output, the author using a stereo and mono jack respectively. Board interconnection and switch wiring is shown in Fig. 11.

Power Supply

The keyer requires a stabilised 5V supply and a simple circuit is shown in Fig. 12. This should be rated to allow the EPROM to be used at a later date if not fitted initially. Three-terminal voltage regulators provide a simple solution and a 7805, 5V, 1 amp device is adequate. If the 2532 is used the regulator should be bolted to the case as a heat sink.

Setting-Up and Use

On switch-on, if the memories are in the 'read' mode and a RAM is selected, a string of rubbish will be heard from the sidetone oscillator if all is well. This is because the RAMs are full of random data on switch on, and this needs to be cleared before use. The added complexity of an automatic erase circuit was not considered justified as the RAMs can be quickly cleared. For the moment, switch off the memories with S3 the memory/keyer

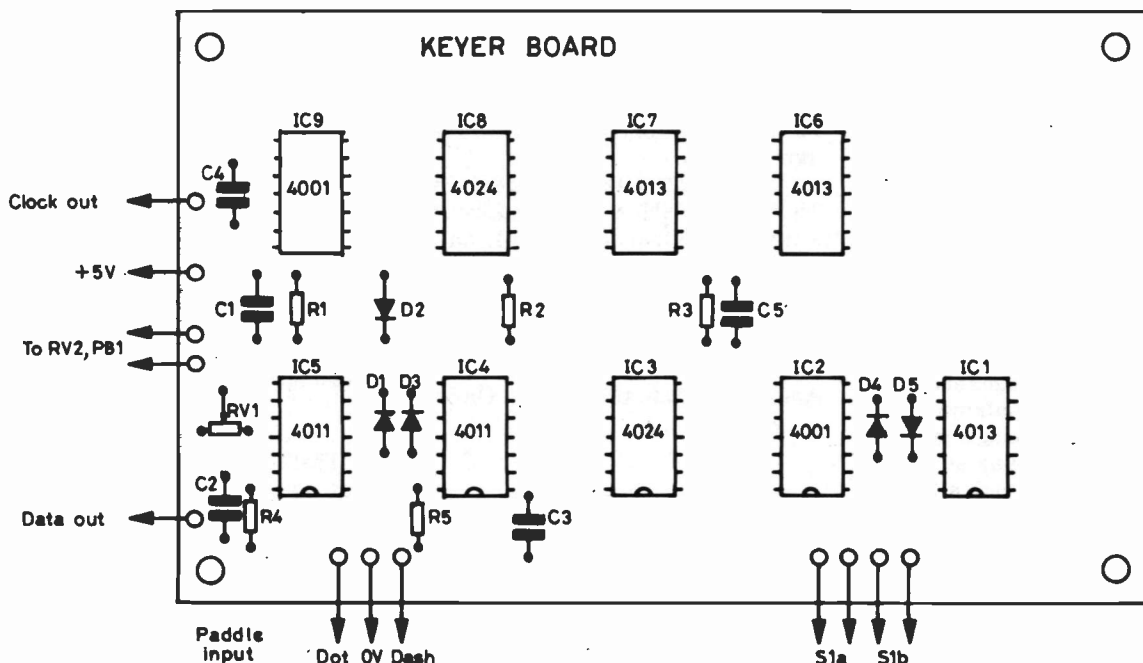


Fig. 5 IAMBIC KEYSER COMPONENT LAYOUT

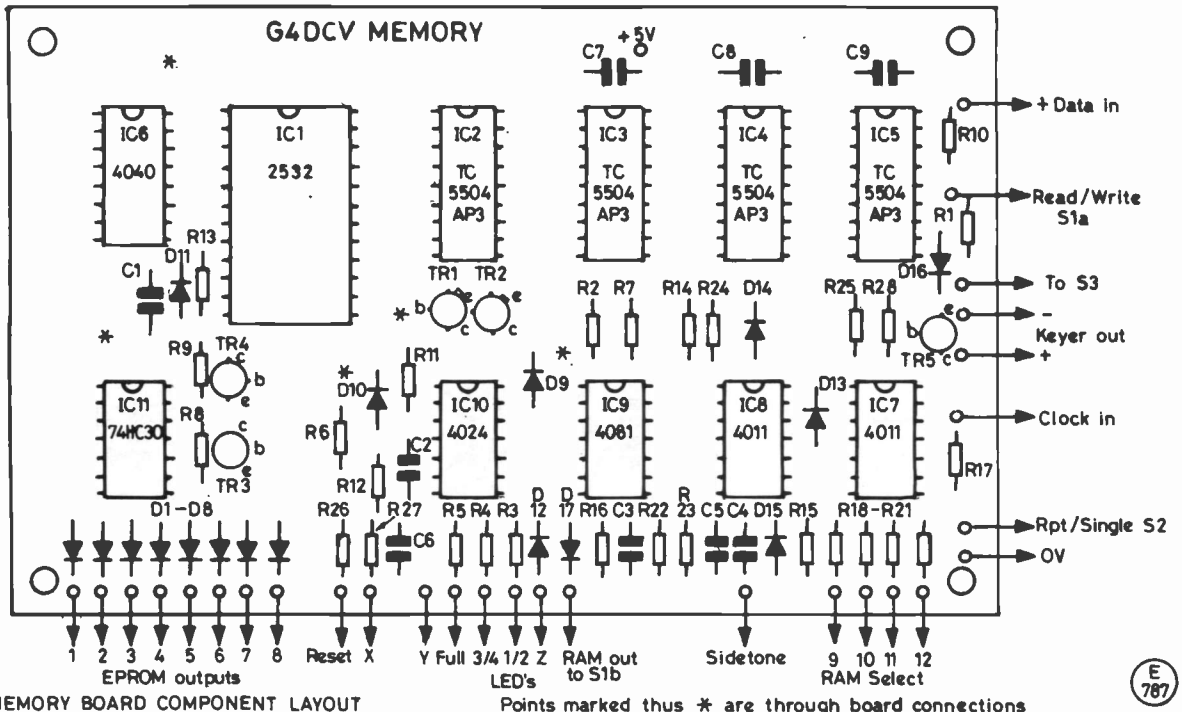


Fig. 6 MEMORY BOARD COMPONENT LAYOUT

Points marked thus * are through board connections

switch. Check the operation of the electronic keyer board with the sidetone-oscillator: dots should be produced when the paddle is moved to the right! (The author knows an amateur who was never told this!) Hold down PB1 on the keyer board, this causes the clock to run at maximum speed. VR1 should then be adjusted to the point where the clock still just runs. This button is used to speed up the clock when erasing a memory.

Switch S3 back to memory and the read/write switch to write. Providing the paddles are not touched the 'fast' button allows a memory to be erased in a few seconds, so holding this button down push each of the RAM select buttons in turn, each time waiting for the 'full' LED to indicate the RAM has been erased. Switching back to read should now produce blissful silence from the RAMs. To write in data switch to write, select a RAM and send with the paddles. Once finished switch back to read, press

'reset' and the message should be faithfully reproduced. By loading in a string of PARIS the speed control can be calibrated. Check that the single/repeat switch functions correctly.

To simplify the construction of this project the author has made arrangements to supply the CMOS RAM ICs, fibre-glass, roller-tinned and pre-drilled PCBs and the EPROM if required. The prices are: TC5504-AP3 CMOS 4k x 1 RAM, £2.00; Keyer-board PCB, £4.50; Memory-PCB, £4.50; 2532 EPROM custom-programmed, £10.00. Please include 50p post/packing.

All the other components are readily available from the usual mail-order stockists. Existing KM4000 owners may wish to interface the memory-board to their keyer and so this PCB has been made available separately. If the EPROM is required then please type or clearly print the eight messages required on a separate piece of paper with your address. Please ensure that the

keyer board

Fig. 7. Keyer board component side (full size)

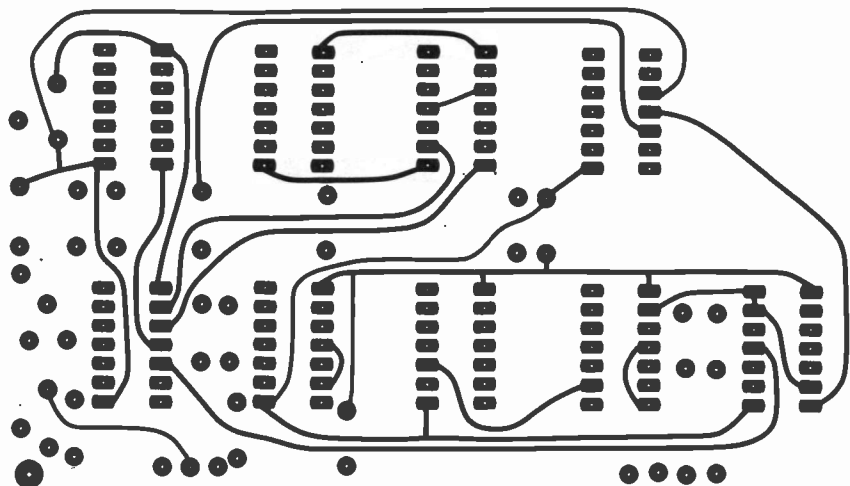


Fig. 8. Keyer board underside (full size)

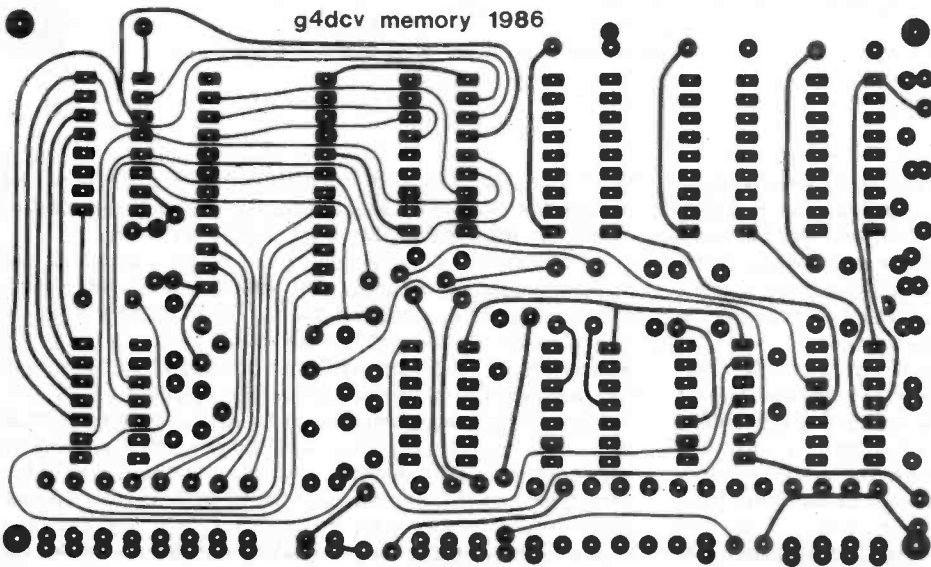
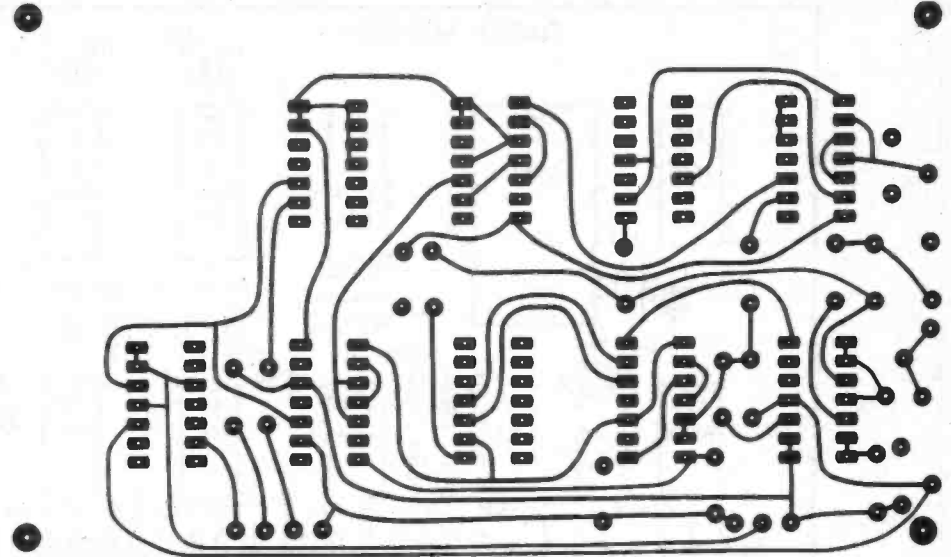
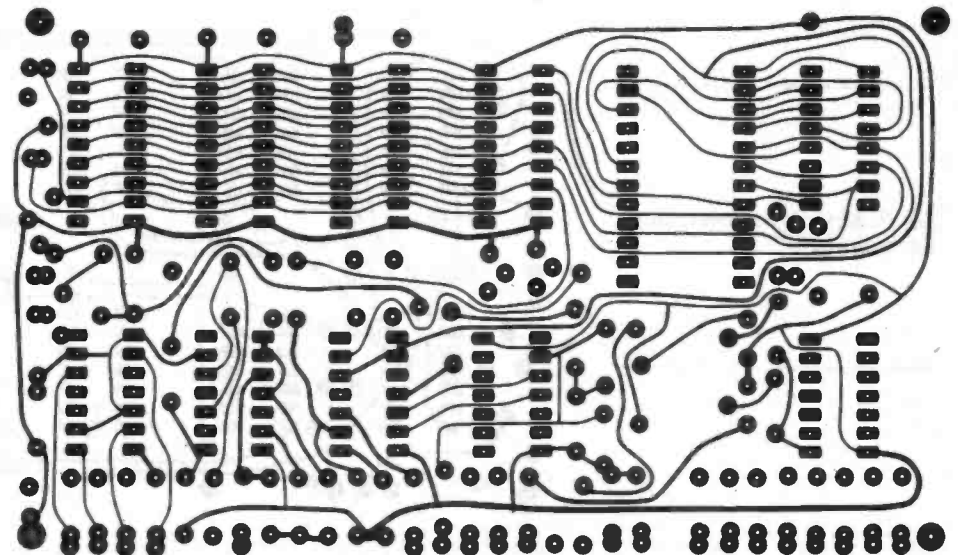


Fig. 9. Memory board component side (full size)

Fig. 10. Memory board underside (full size)



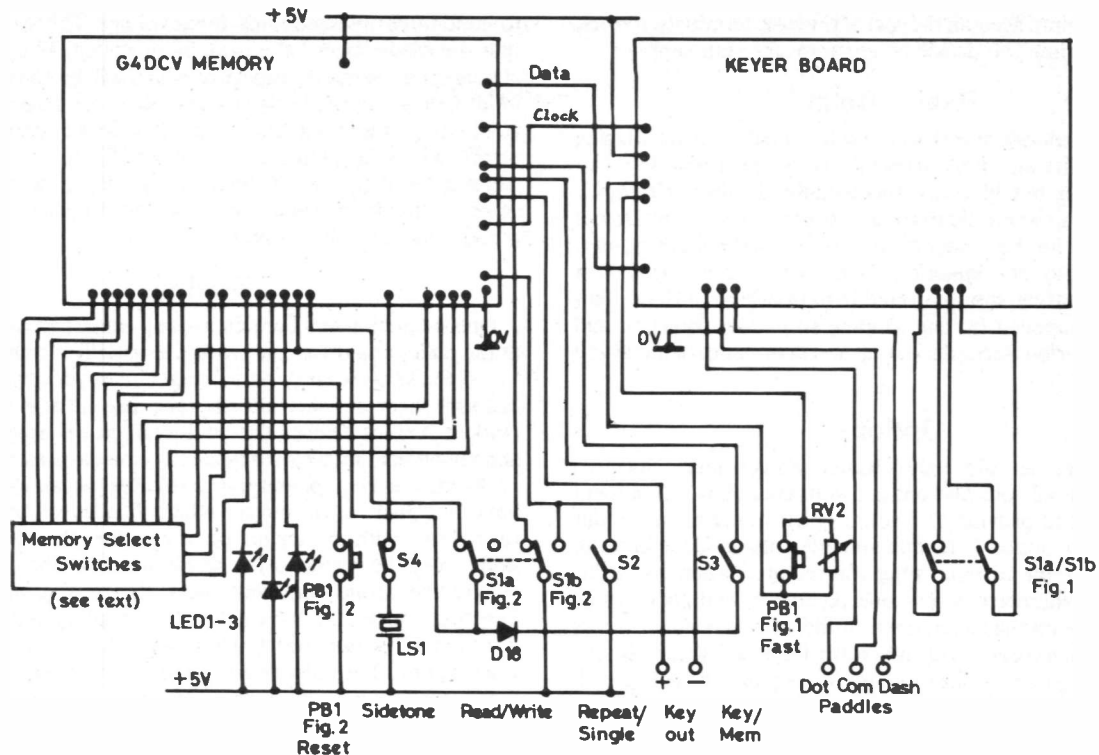


Fig.11 INTERCONNECTION AND SWITCH WIRING

E 788

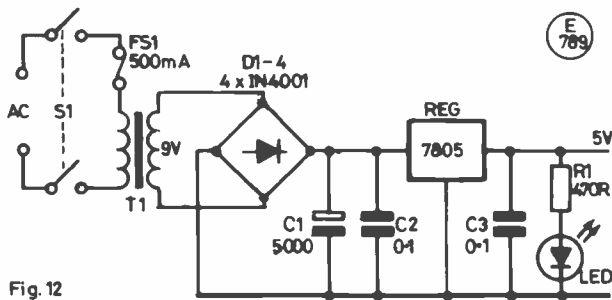


Fig. 12

E 789

messages are not longer than 29 words, in the case of a repetitive message, e.g. a MS CQ call it is sufficient to show the message once, and then put 'to end' after it. The author will then fill up as much memory as possible with that message. For example:

1. CQG4DCV to end
2. RRRRRRRRG4DCV to end
3. CQ CQ CQ DE G4DCV G4DCV QTH JO01QD JO01QD CQ CQ CQ DE G4DCV G4DCV G4DCV AR PSE K etc., etc.

The author's address is: 36 Jubilee Road, Littlebourne, Canterbury, Kent CT3 1TP.

• • • "Practically Yours" • • •

with GLEN ROSS, G8MWR

OVER the last couple of months we have been looking at the various ways of getting on-board voltage stabilisation and this has led to several enquiries for information on complete power supply designs. This is not as easy as it may first appear, simply because of the various voltage and current requirements that may be called for to satisfy varying needs. However, there are some basic guidelines that can be given to enable you to put your own unit together.

Hit or Miss?

A power supply usually seems to be put together these days by the simple expedient of buying a few odds and ends at a rally and

fitting them all into a box. This ends up with a working system but its correctness for the job and its reliability could certainly be questioned. So what *is* required? Let us look at the basic design steps that will result in a well engineered unit at reasonable cost.

Specifications

The first, and known, requirement is obviously the voltage output you need and for our purposes we shall assume that you require a standard 12.0 volt supply. The next point to determine is the current capability that you need and here it is a good plan to go a little bit on the generous side as the difference in overall cost of upping the capability by fifty per cent is not likely to be significant

when you take into account the cost of the case, terminals, meters, etc. Let us assume you decide on ten amps for your supply.

Heavy Metal

Finding a suitable transformer will probably mean digging around at rallies and junk sales as the cost of a new 150 watt transformer can be a bit nasty. Incidentally 12 volts at 10 amps is only 120 watts so where did that extra 30 watts come from? Do not forget to allow for the voltage drop in the rest of the circuitry, and, taking this into consideration, what we actually need is a transformer that can supply around 16 to 18 volts at full load. This need not be supplied by one winding so do not forget to add together the various secondaries that are on the lump of metal you find.

Options

For instance an old valve heater transformer with two secondaries of 6.3 volts and one at 5 volts could have all of them wired in series to provide 17.6 volts, which would be just about right. Another option is to wire suitable voltage secondaries in parallel to give the current rating you require. When doing this wire an AC voltmeter across one secondary and then, while keeping an eye on the meter, connect the other secondary across the first. If you have got it the right way round the voltage will stay the same but if you have the windings out of phase the voltage will disappear. The same type of test is done when wiring the windings in series, but in this case the voltage will either add or subtract the voltage of the added winding.

Booster

A little bit of voltage boost can be obtained on the older type of transformers which have several mains input voltage taps by taking the usual 240 mains input to the 220 or even in extreme cases the 200 volt input points, hence gaining a 10% or more increase in output voltage, say 1.5 to 2 volts on the secondary. If all else fails then look into the possibility of winding a few extra turns onto the transformer; this is only possible if there is a little space between the windings and the core into which the extra turns can be wound.

Extra Turns

Before winding on the extra turns measure the output voltage of the secondary as it stands with no load connected. Next connect a length of wire to one terminal of the secondary and then wind on perhaps ten turns of wire and check to see what the new off-load voltage is. If it is less than the original remove the wire and reverse the direction of the winding. Once you have found out the extra voltage obtained from the ten-turn additional winding it is easy to figure out the number of turns required to get the voltage you need. Wind the new winding on evenly while keeping some tension on the wire and then finish the job with a couple of coats of varnish. Remember that the wire you use must be able to carry the full load current and should be well insulated. As can be seen these measures give quite a lot of scope when looking for a transformer.

Rectifier Diodes

These diodes come in many shapes and forms from the single diode typified by the 1N4000 family of devices through the heavy duty stud mounted types, which are available in both positive and negative stud types — so be careful when mounting them, and onto the “four in a package” surface mounting bridge rectifier types. The peak inverse voltage rating of the diodes is something to be considered and in this connection one important point to bear in mind when choosing your rectifier unit is whether it will be used in a full wave or a bridge configuration. If they are in the bridge circuit then the diodes need to be able to stand only 1.5 times the r.m.s. input voltage but in the full wave system they have

to stand three times the r.m.s. input voltage. The reason for this is that the diode “sees” the peak input voltage plus the off load charge on the reservoir capacitor which will be equal to the peak input voltage. In the bridge rectifier there are always two diodes conducting at any one time so each diode sees only half of this combined voltage. Once again it is sensible to use diodes which will stand well over the expected voltage simply because transient spikes on the mains input can cause much higher voltages to be present than one may imagine.

Testing

One frequently sees bargain bags of unmarked rectifier diodes at the rallies and these can provide an excellent source of supply . . . if you know what you are doing! Unless you are sure that you can sort them out then do not take any chances but go for a marked, known device. The additional cost is usually not great and remember that a blown diode can cause a catastrophic failure of the attached equipment unless suitable precautions have been built-in to guard against over-voltage. Diodes can be easily tested for polarity with the usual type of ohmmeter. Simply connect the leads from the meter to the diode and note the reading; now reverse the connections and check the reading again. In one direction you should have a very high reading and in the other direction a low one, which will at least show that the diode is a working one. The polarity is indicated by the negative lead from the meter which will, in the low ohm reading direction, be connected to the anode of the diode whilst the positive lead is, of course, connected to the cathode. This apparent reversal of the expected result is due to the fact that when measuring resistance the negative lead of the usual analog type of meter is connected to the positive pole of the meter's inbuilt battery.

The Capacitors

The reservoir capacitor is usually chosen on the basis of fitting the largest value that can be found at the rally but, as with so many points of supply design, there is more to it than that. First of all we need to get some idea of the minimum amount of capacity that is required and then resist the temptation to use significantly more. The reason for this is that when you first switch on there is a tremendous surge of current into what is, effectively, a short circuit caused by the discharged capacitor and the resulting high mains current will probably keep blowing your fuses for you unless you fit a “soft start up” system.

How much?

In the usual electronically stabilised type of power supply a good rule of thumb is to use somewhere around 2000 μ F for every ampere capability of the supply, so for a 10 amp unit something in the region of 22000 μ F would be about right. If you use anything much less than this then the voltage across the capacitor will sag to less than the minimum required to operate the regulator correctly during the non-conductive part of the diode cycle and ripple will appear on the output voltage.

Ripple Current

Remember that there is a very high AC current flowing through the rectifier circuit and that this current has to flow through the reservoir capacitor. This component *must* be able to handle an AC or ripple current at least equal to the full current capability of the power supply. Sometimes this rating is marked on the capacitor, but if it is not then look for the type with screw terminals and, most likely, fluted sides to the can. The reason for these heavy terminals is to carry the heavy ripple current and this should also give you a clue to as to the sort of wire which is required to make the connections to the capacitor: none of this “heavy copper leads on all the obvious current carrying leads and then a bit of hook up wire to connect the electrolytic!”

Next month we look at heatsinking, stabiliser circuits and ways of providing over-current and over-voltage protection.

Oscar – 12

an all-Japanese satellite

NORMAN FITCH, G3FPK

History

SINCE the first OSCAR — Orbiting Satellite Carrying Amateur Radio — was launched on December 12, 1971, a total of fourteen, long life, amateur-built spacecraft has been successfully placed into orbit around the Earth. These were Oscars 6 to 11 and the Soviet RS-1 to 8; Oscars 1 to 5 were short-lived satellites. The western ones have been designed and constructed by AMSAT teams in various countries, including the U.S.A., the U.K., Germany, Australia and Japan, and launched from sites in the U.S.A. and French Guiana.

Japan's involvement with the amateur space programme dates back to 1976 when its JAMSAT group developed and built the Mode J transponder for O-8 which was launched on March 5, 1978. Such was the success of this module that the Japanese considered the idea of building a complete satellite, initially identified as JAS-1. JAS-1 was promoted by the *Japanese Amateur Relay League (JARL)* as a joint venture with the *NASDA* space agency. The *NEC* organisation built items including the space frame and power supplies and the *JAMSAT* project team designed and constructed the transponders, telemetry, command and housekeeping computer, and the ground support systems.

Mission Objectives

The objects of the mission were:—

- (i) to provide reliable worldwide amateur radio communication,
- (ii) to enable radio amateurs to study command and tracking techniques,
- (iii) to offer a "proving ground" in space for amateur-built transponders and sub-systems,
- (iv) to provide an opportunity for the *NASDA* to carry out a multi-payload launch by the new H-1 launch vehicle.

Description

The spacecraft is a 26-facet polyhedron measuring 400 by 400 by 470 millimetres and weighing 50 kilogrammes; 25 faces are covered with a total of 979 solar cells which were designed to generate about eight watts of power. The eleven nickel-cadmium battery cells have a capacity of 6AH and supply 14 volts average to the main power bus. A power conditioning unit converts this to three supplies of +10, +5 and -5 volts. There are three antennas, the first a slant quarter-wave mono-pole for two metre reception with a "gain" of -4dBi; the second a slant turnstile with left-hand circular polarisation on the +Z-axis for the 70cm. JA transponder transmitter; the third another slant turnstile with RHCP on the -Z-axis for the 70cm. JD transponder Tx. These latter two have gains of +3 dBi.

The Launch

The launch of the two-stage *NASDA* vehicle H-1 was identified as Test Flight 1. The three payloads were JAS-1, an Experimental Geodetic Payload — EGP, and a Magnetic Bearing Flywheel — MBFW. The launch site was on the island of Tanega shima in the extreme south of the country, latitude 30°.23'.45"N, longitude 130°.58'.22"E. "Blast-off" was on August 12, 1986 at 2045 and half-a-second UTC. At 2147 UTC, when the vehicle was over Chile in South America, JAS-1 was successfully separated from the second stage of the H-1 and the 70cm. beacon was automatically activated. At this point, once the satellite was on its

own, it became OSCAR-12, now known as FO-12 after its subsequent christening as "FUJI". At 2205, the first telemetry signals were received by the *University of Surrey's UoSAT Command Station* and as the spacecraft came over Europe, the JA transponder was on and stations were using it. The *JARL Tracking and Command Room* in Tokyo had to wait till 2239 for its telemetry reception, which lasted twelve minutes.

The Orbit

FO-12 was placed in a near circular, direct orbit inclined at 50° to the equator. The period between successive equatorial crossings is 115½ minutes and the average altitude is 1,500 kilometres. Thus, FO-12 passes over all the area of the globe between latitudes 50°N and 50°S and should be "seen" by observers up to 86°N and down to 86°S. For British Isles observers, the satellite will travel right overhead along the English Channel when it crosses the equator in the west. For those with polar projection maps, the range "circle" will be very slightly larger than that of the old O-7, by the thickness of a pencil line. Up to seven orbits per day are in range, the majority between 20 and 24 minutes duration.

Satellite orbits are defined by a set of Keplerian Elements and the latest ones available at the time of writing were Set No. 7 for August 24. They were provided by *AMSAT-UK's* "Hot News" service and are reproduced in Table 1. They are essential data for those using computer programs for orbital predictions. However, all that is required to establish details of the period, track separation, altitude, relative velocity, Doppler shift and semi-major axis is the mean motion, orbit inclination and eccentricity. In the case of near circular orbits, little error is introduced by ignoring the eccentricity, though. A *direct* orbit is one inclined between 0° and 90° and is so called because the satellite rotates in the same direction as the Earth. Those inclined at 90° to 180° are called *retrograde*, since the satellite then rotates in the opposite direction to the Earth's rotation. For further reading about satellite orbits, see Ref. 1.

When will FO-12 be in range?

To enable a fairly accurate prediction to be made for the acquisition period of any orbit, Figure 1 has been prepared. This diagram is for the London area. (See Appendix 1.) To use it you need to know when one orbit in the day crosses the equator and at which longitude west of the Greenwich meridian this occurs. (Note that in amateur satellite work, longitudes are always measured west from Greenwich, so are in the range 0° through 360°; e.g. although Stockholm is in usual parlance at longitude 18° east, in satellite context it is 360 - 18 = 342° west.) This EQX/°W information is published by *AMSAT-UK* and should be available on the *RSGB's* Prestel service.

An example will illustrate the use of Figure 1. Let us take an orbit which crosses the equator at 1200 at 60°W. Looking up the

Satellite	FO-12
Epoch	83236.15793831 = Aug. 24 at 0347, 25.869s.
Inclination	50.0104°
RAAN	218.3851°
Eccentricity	0.0010984
Argument of Perigee	252.2631°
Mean Anomaly	107.6705°
Mean Motion	12.44388330 Revs. per day
Decay	-3.9E ⁻⁰⁷
Orbit No.	140
Semi-major axis	7866.866 kilometres
Anomalistic period	115.719504 minutes
Apogee	1508.751 kms.
Perigee	1491.469 kms.
Reference perigee	3157.13390363

Table 1. Keplerian Element Set No. 7 for FO-12.

“60” line, the AOS curve crosses the minutes-after-EQX line at about 12, so the satellite will be in range at 1212. The 243° figure is the azimuth or true beam heading. The TNA curve is reached at 1224 at a beam heading of 167° when the elevation would be about 70°, and the satellite will go out of range when the LOS curve is reached at 1236, by which time the azimuth will be 78°. To track FO-12, the antenna will always have to be rotated periodically anticlockwise, e.g. from west, via south, to east. Once you know the EQX/°W for an orbit, others can be calculated by adding 1h.55m.40s. to the time and 29.24° to the longitude west *per* orbit. For the author’s QTH orbits between 178°, through 90° to 347° are in normal range.

What does FO-12 do?

The spacecraft carries two Mode J transponders which require a 145 MHz uplink signal and which transpond into the 435 MHz band. The reason for this way round is that the 435 MHz band is very much quieter than is 145 MHz, so there is a better chance to hear weak signals. The first transponder is referred to as JA, meaning Japanese Analogue, and is a linear one. The downlink passband is 435.80 to 435.90 MHz and its transmitter has an output power up to two watts *p.e.p.* The uplink passband is 146.00 to 145.90 MHz and it is an inverting transponder. This means that a lower sideband signal transmitted on 145.90 MHz will be translated into an upper sideband one on 435.90 MHz, plus or minus Doppler shift — see Appendix 2.

The second transponder is called JD, meaning Japanese Digital, with one only downlink frequency, 435.91 MHz. To access this, you have to operate on one of four uplink frequencies; 145.85, 145.87, 145.89 and 145.91 MHz, using Manchester coded FM. The JD Tx runs one watt and this is not a “digipeater” operating in real time, but a storage-and-forward device. It is very aptly described as an electronic mail box enabling suitably equipped packet radio stations to send messages to it for subsequent retrieval by other radio amateurs, anywhere in the world. Simple commands will enable users to upload, read, list and erase messages. This system has been very successfully demonstrated by the *University of Surrey’s* UoSAT-2 or UO-11, since early this year, in its DCE or Digital Communications Experiment. A problem with this system is that there will probably be several stations, who cannot hear each other, operating simultaneously on one channel, so the uplink will be subject to packet collisions. This scheme is known as “Pure

Aloha” and to maximise efficiency four uplink to one downlink channel were adopted.

All amateur satellites incorporate one or more beacon channels which carry important telemetry messages and news items. FO-12 has one beacon on 435.797 MHz which runs 100 milliwatts. Normally it sends telemetry in CW at 20 w.p.m. but it can be switched to PSK or phase-shift keying.

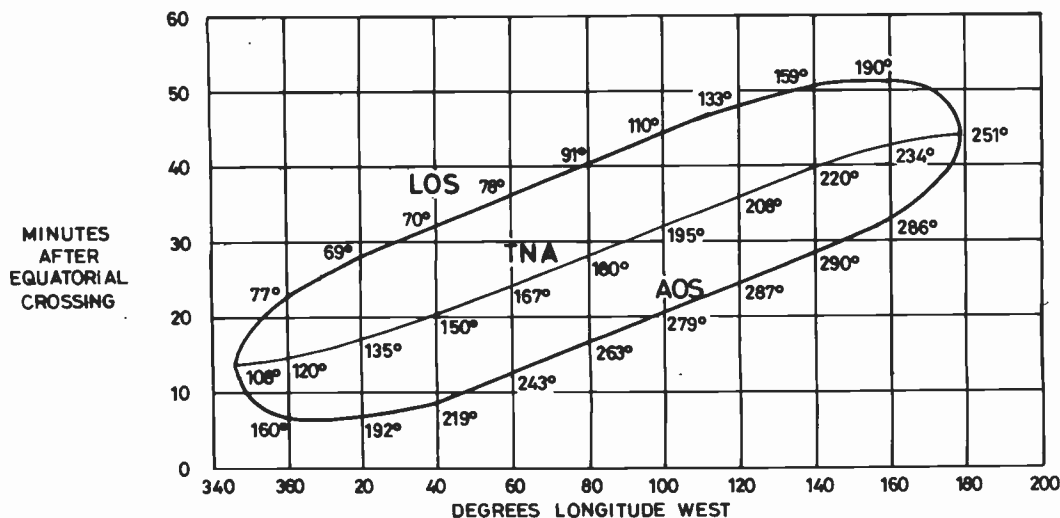
Ground Station Requirements

Mode JA only requires a Tx for SSB and/or CW modes for 2m. and a decent 435 MHz Rx. Anyone who operated through O-8 on Mode J in the past will have the capability to use FO-12. *JAMSAT* suggest a maximum of 100 watts EIRP should be quite sufficient at extreme range, e.g. a 10w Tx with a 10 dBi gain antenna system. The 70cm. Rx should have a low noise figure and a 15 dBi gain antenna is recommended. The 2m. antenna need only be a linear one, such as an ordinary Yagi, since the Rx antenna on the spacecraft is a monopole. Your 70cm. antenna should ideally be a crossed, or X-Y, Yagi so that left-hand or right-hand circular polarisation can be selected.

To use Mode JD, you will need a 10w FM Tx and the same 70cm. Rx and antenna as for Mode JA, any AX-25 protocol Terminal Node Controller — TNC — (2), a terminal device and a Modem (3) between the Rx/Tx and the TNC. Since the uplink is exclusively “OR-ed” with its clock, *i.e.* Manchester coding, standard TNCs incorporating a Bell 202 AFSK modem cannot be used. They would have to be bypassed and an external modem substituted. The terminal would consist of a keyboard for inputting data and a TV screen and/or printer for receiving data. An RS-232 connection is needed for the TNC. Many home computers, with suitable software, would make ideal terminals of course.

The Telemetry

The Mode JA telemetry has 12 analogue channels and 33 system status flags and can be sent without the aid of the spacecraft’s computer. The Mode JD TLM has 29 analogue channels and 33 system status flags and this software driven TLM can include short messages. It can be transmitted on either the JD downlink or on the JA beacon frequency, 435.797 MHz. The analogue TLM consists of five rows of four, three digit numbers preceded by “HI HI”. The first four numbers start with 1, the



- Notes: 1. AOS Acquisition of signal.
- 2. TNA Time of nearest approach.
- 3. LOS Loss of signal.
- 4. Figures on curves are the true Azimuth Beam Headings.

Fig. 1 FO-12 SATELLITE PREDICTION CHART (Compiled for London).



Channel	Parameter	Equation
1A	Total solar array current	$19.1(N - 0.4)$ mA
1B	Battery charge/discharge	$38.1(N - 26.4)$ mA
1C	Battery voltage	$0.21N$ V
1D	Half-battery voltage	$0.0937N$ V
2A	Bus voltage	$0.192N$ V
2B	+ 5V regulated voltage	$0.0572N$ V
2C	JA Tx power output	$51(N - 15.8)$ mW
2D	Calibration voltage	$0.02N$ V
3A	Battery temperature	
3B	Baseplate temp. £1	$1.39(68.9 - N)$ deg. C
3C	Baseplate temp. £2	
3D	Baseplate temp. £3	

Table 2. Telemetry decoding formulae for FO-12. (See text).

next four with 2, and so on. The first three rows can be decoded by the formulae in Table 2. As examples:— (i) if channel 2C was 234, then N would be 34. The decoded parameter would be $51 \times (34 - 15.8) = 928$, which would be the output power of the JA Tx in milliwatts; (ii) if channel 3C was 343, then N would be 43. In this case, the decode would give $1.39 \times (68.9 - 43) = 36$, being the baseplate temperature in degrees Celsius.

Using FO-12

No doubt most operators will use this new satellite for the usual kind of real-time SSB or CW QSOs. However the range is limited. For example, someone in London would have just about two minutes to contact a station in Miami in the U.S.A. during the most favourable pass, whereas the electronic mailbox facility offered by Mode JD makes it possible to communicate with others virtually anywhere in the world. These would not be real-time QSOs since you would transmit your packet message to FO-12, which would then store it. Your correspondent in, say, Melbourne or Hawaii would be able to retrieve it when the satellite was conveniently in view some hours, or even days, later.

Successful real-time operation requires a degree of skill, coordination and nimbleness. You need one hand to operate the Morse key or microphone, another to tune the Rx to cope with the Doppler shift, another to operate the azimuth control and a fourth to operate the elevation control of the antenna system. In most passes, the antennas will have to be rotated through 150° or more in azimuth. Anyone near the 50° N latitude parallel would have a hectic couple of minutes when the spacecraft came in from the west, passed overhead, then whizzed off to the east. For someone further north, say in Aberdeen, the maximum elevation would be a more manageable maximum of about 58° . There is scope here for a genius to develop a system whereby the computer's ability to derive the AZ/EL figures every couple of minutes could be used to automatically control antenna aiming as per (ii) of the Mission Objectives section.

More Spacecraft Details

Unless some measures are taken to control it, an orbiting object will tumble about. This is unsatisfactory for a communications satellite so some method of attitude control is always incorporated. In FO-12 a simple bar magnet system is used, two in its Z-axis.

The digital transponder is controlled by a screened NSC-800 microprocessor with a 1.6 MHz clock and which also functions as in Integrated House-keeping Unit, IHU. 48 NMOS 256K DRAMS are used to provide 1.5 Megabytes of memory, entirely protected by an error detection and correction circuit. The system program occupies 32 kilobytes, the rest of the memory being available for message storage. The memory unit is divided into four 256 k-byte cards any one of which can be assigned as a system area. The spacecraft has five hardware HDLC controllers, four for the uplink channels and one for the downlink one. 140 CMOS MSIs are used but no ROM is provided. Instead a simple hardware bootstrap circuit is used to increase system reliability.

First Results

Up to the time of writing, FO-12's JA Rx has proved to be very sensitive such that NK6K has reported satisfactory results using only one watt to a KLM Yagi antenna. Initially the downlink signals were subject to very deep fading due to the random spinning of the satellite. By the time this is published, this tumbling should have been very much reduced and dampened out by the passive stabilisation system. In the long term the tumble rate should phase lock with the orbital period. The JD system was undergoing evaluation and the aim was to inaugurate it to all by about mid-November.

Alligators

No satellite article would be complete without mentioning the need to use the lowest Tx power commensurate with getting reliable access to the transponder. All past and present satellites have, and do, suffer from the "Alligator Brigade", so called because they are all mouth and no ears, and who insist on running high power to a group of long Yagis more suitable for an E-M-E station. Of course, they will always gain access but in so doing, their big signals will so desensitise the transponder's Rx through its AGC action that those operators sticking to the recommendations will never get a look-in. The "no ears" refers to these selfish operators who probably have very inefficient receiving systems; an ancient corroded antenna, old and lossy feeder probably full of moisture, and a multimode transceiver with an Rx noise figure of 8 dB.

The Mirrorball

Finally, a mention of the EGP experiment launched with JAS-1. This is a totally passive sphere, 2.15 metres diameter, made from fibre-reinforced composite resin material. The surface is covered with laser retro-reflectors and plane mirrors and the *Mirrorball* weighs 685 kilogrammes. It is specifically designed to be ranged by the most accurate of all "radars", laser light, so perhaps we should call these "ladars", i.e. Laser Direction And Range? It should be visible up to magnitude 1 from 15 minutes after sunset till perhaps local midnight, and from about four hours before dawn till about 15 minutes before dawn.

References

1. "The Satellite Orbit and its Behaviour" by P. T. Greed, G3MQD, published in *The Best of Oscar News, Vol. 1 (1980)* by AMSAT-UK.
2. Terminal Node Controller topics were covered in the "Data Comms" feature by Ian Wade, G3NRW, published in *Radio Communication* (RSGB) March and April, 1986.
3. For details of TNCs and Modems send a large s.a.e. to The Secretary, AMSAT-UK, 94 Herongate Road, London, E12 5EQ.

Appendix 1

Figure 1 was prepared for the author's QTH in London. For someone living in SW Wales, when FO-12 crosses the equator at about 90° W, AOS and LOS would be about $1\frac{1}{2}$ minutes earlier. The longitude of Milford Haven, for example, is 5° W. Since the "sausage" shaped graph remains the same, it is only necessary to renumber the Degrees Long. West axis by adding your own longitude, in this case 80° becomes 85° , etc. For stations north of London, orbits crossing the equator from NW direction, e.g. EQX 135° , would find their AOS/LOS times up to three minutes earlier while those crossing about 20° W would be about 3 mins. later. In other words, the "sausage" rotates a little clockwise for them.

Appendix 2

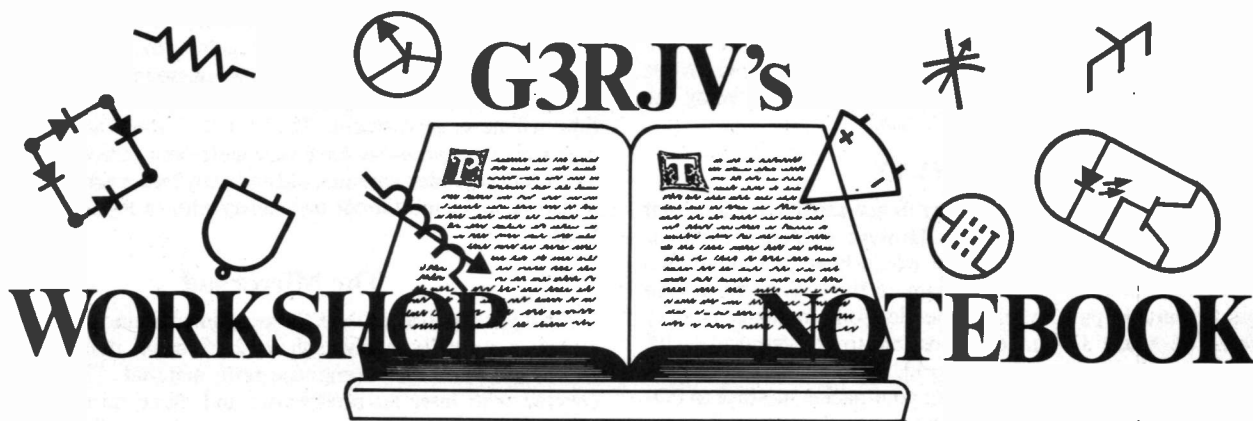
The Doppler shift depends on several factors. These are:—

- (i) the satellite velocity, which is calculated from the gravitational mass of the Earth and the distance of the satellite from the centre of the earth,
- (ii) the inclination of the orbit,
- (iii) the latitude of the observer,
- (iv) the slant height of the satellite from the observer.

To take an example. Consider an observer at latitude 52° and FO-12 satellite just coming over the horizon at a range of 4,610 kms. The actual satellite velocity is 7.118 kms./sec. but allowing for the rotation of the Earth, which in this case is in the same direction as the motion of the spacecraft, the relative velocity at

latitude 52° is 5.627 kms./sec. Now if the ground station transmits on exactly 145.950000 MHz, the satellite's Rx will receive the signal on 145.952737 MHz, a Doppler shift of 2.737 kHz. The transponder's translation frequency is 581.8000 MHz, so it would relay this signal at $581.800000 - 145.952737 = 435.847263$ MHz.

On the return journey at this higher frequency, the Doppler shift will be more, 8.173 kHz in fact. Thus the ground station will receive a signal on $435.847263 + 0.008173 = 435.855436$ MHz. Therefore, the two Doppler shifts are subtractive and the maximum shift is ± 5.436 kHz. The ± 8 kHz shift referred to by some users applies to the beacon signal. For a comprehensive discussion of Doppler effect see the RSGB's *VHF/UHF Manual*, 4th edition, pages 10.2 and 10.3.



SWITCHABLE LOWPASS FILTER UNIT

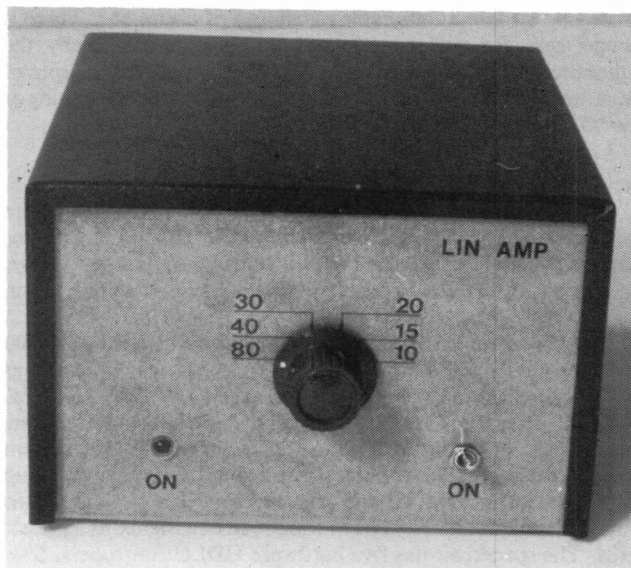
DURING the course of a year I do quite a few club talks. I enjoy meeting club members and enjoy even more talking about amateur radio construction. A few weeks ago I was talking to one of the clubs in a pleasant part of Lancashire. . . and there are plenty of those. One of the club members commented upon my use of low pass filters at the end of QRP transmitter designs and suggested that I might like to do an article about a switchable low pass filter unit. His idea was that such a unit could be built for a range of amateur bands and be placed in front of an ATU or a 50Ω antenna. Then simple little transmitters could be used, with a 50Ω output impedance directly into the unit without the need to build separate low pass filtering in each transmitter. Had I got such a design?

Well — I almost had what he required because sometime ago I built up the HF Linear PA kit supplied by *Cirkit Holdings* (Stock Item: 41-00903). This is a broadband Class-A power amplifier capable of 15W output for 1.0mW input over the range 1.6 to 30 MHz. I intended to use it as a testbed amplifier for homebuilt projects and to that end I built a switchable series of low pass filters for its output. The designs for these filters could easily be used to provide a convenient switchable low pass filter unit. In fact the little PA kit with the switchable filters would be a useful unit for any radio amateur because with a small signal source it will make a clean and useful CW transmitter for any chosen band or bands.

7-Element Low Pass Filters

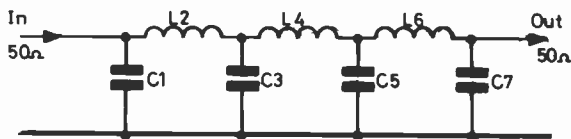
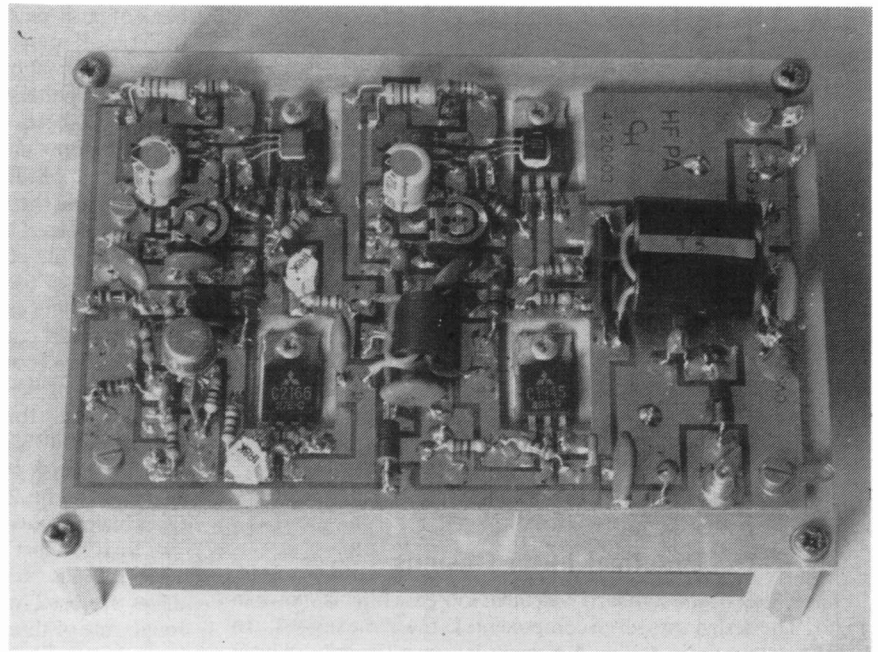
Readers who have followed my articles in recent years (there must be some) will have noticed that I use design material supplied

by Edward Wetherhold, W3NQN, for my low pass filters. This follows what I believe to be a definitive series of articles by W3NQN on low pass filters in *Short Wave Magazine* ("Low Pass Filters for Attenuating RF Amplifier Harmonics", Parts I & II,



The miniature linear amplifier containing the filter unit

The Cirkit HF linear amplifier housed in the case
 photos: Jo-Anna



Band MHz	C1, C7	C3, C5	L2, L6	L4	Wire gauge	Core
3.5	470p	1200p	25t	27t	28	T37-2
7.0	270p	680p	21t	24t	26	T37-6
10.1	270p	560p	19t	20t	26	T37-6
14.0	180p	390p	16t	17t	26	T37-6
21.0	82p	220p	12t	14t	22	T37-6
28.0	56p	150p	10t	11t	20	T37-6
Additional bands:						
1.8	820p	2200p	30t	34t	26	T50-2
18.0	110p	270p	14t	15t	24	T37-6
24.5	82p	200p	12t	13t	22	T37-6

Fig.1 7 Element Low Pass Filter

E 790

S.W.M. Dec. 1983/Jan. 1984). These articles discussed the use of 7-element Chebyshev capacitive, 50Ω, input/output filters. The article described the design and performance characteristics of such filters, comparing them with other low pass filter designs. The theory and mathematics may have put some readers off the articles. That is a shame because they concluded with a set of data for designing a very useful set of filters. W3NQN worked on the basis of using standard values of capacitance in his filter data, a very useful starting point because many filter designs contain non-standard values of capacitance which have to be cobbled together using combinations of preferred values.

The latter part of the two articles describes how to design effective low pass filters for amateur band use, using standard capacitance values, for powers of up to 200 watts. Not only is an extensive computer readout provided for a range of useful frequencies but the information is given to calculate simply the number of turns required on a selected range of toroidal cores. The cores can be chosen according to the frequency range and power handling capacities of the required filter. There is even a chart to show what gauge of wire is ideal for a particular winding. The only mathematics involved is one simple calculation which requires a square root function on a pocket calculator. In short, this little series of articles represents a complete guide to making low pass filters for amateur band use. I use the data all the time and these filters have become my standard range of low pass filters for RF attenuation in transmitters.

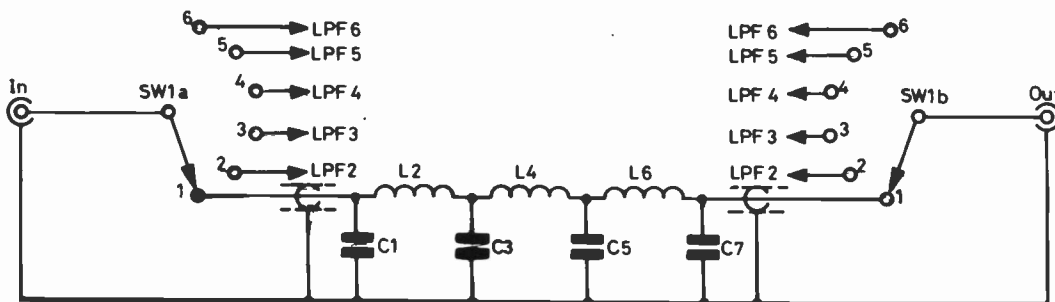


Fig.2 SIX WAY LOW PASS FILTER UNIT

E 791

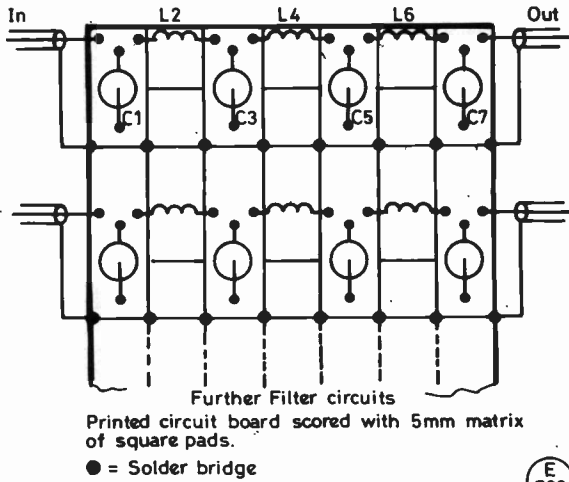


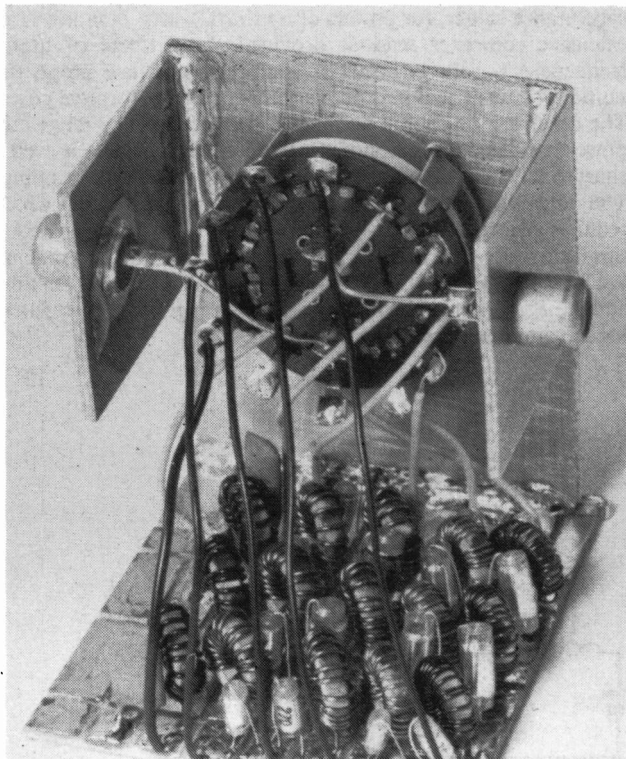
Fig. 3 MOUNTING THE LOW PASS FILTERS



Practical Filter Designs

The circuit of the standard 7-element low pass filter is shown in Fig. 1. The design uses seven components as the name suggests. In some amateur radio designs 5-element low pass filters have been commonly used but for the marginal extra cost of one more inductor and capacitor, the results are worth the minor addition. Beneath the circuit is a chart showing a series of filter designs worked out from the W3NQN data. These are the designs I used in my switchable bank of low pass filters mentioned above.

The top portion of the chart shows designs for six bands (3.5, 7.0, 10.1, 14.0, 21.0 and 28.0 MHz). This is because I used a readily available, and cheap, 2-pole, 6-way wafer switch for the filters. I built filters for the six bands I most commonly use. Below this is the data for the three other HF amateur bands should these be required. If the constructor wishes to build a switchable low pass filter unit for all ten bands in the list there are suitable switches. I would suggest the Toko 'F' series push-button switches sold by *Cirkit Holdings*. A 2-pole switch module would be required for each band with the associated hardware to make up a



Switchable low-pass filter unit

bank of push-button switches. That would make a smart unit — I might try it myself, someday!

The information given in the chart is for a series of filters capable of handling 10 watts of RF. Notice that the small T37 cores have been used for every band except 1.8 MHz. It is surprising how much power these little cores can handle in low pass filter applications; in fact, the design for 28 MHz is good to 200 watts and the 14 MHz and over designs can handle 100 watts. The 10-watt level is all that I ever require but should beefier filters be wanted, the reader can refer back to the W3NQN articles. Along with all the other information, he supplies a chart of the power handling capabilities of toroidal cores.

The toroidal cores used in these designs are easily obtainable in the U.K. (see footnote). They are *iron powder cores* not ferrite core. Most of the surplus cores seen for sale at radio rallies are ferrite so sadly this is one case where the proper items have to be bought. The T37/T44/T50/T68 and T80 range are manufactured by *Micrometals Inc.* in the U.S.A. and are often sold under the 'Amidon' name. The T- designation is the size of the core; the T50 types have an outside diameter of 0.5", the T37 is 0.37" and so on. The final number in the coding refers to the iron dust mix of the core: T50-6 is "6 mix" and T37-2 is "2 mix" for examples. The mixes are used at various frequencies. For the HF bands, the rough rule of thumb is to use the 6-mix at above 7 MHz and the 2-mix below 7 MHz.

The choice of capacitors is also important. Good quality frequency stable types must be used. I tend to use the common polystyrene capacitors; do not confuse these with the polyester types. The voltage rating of the polystyrene capacitors is suitable for my applications. The more expensive silver mica types can also be used. Do not use the cheap and common miniature ceramic plate capacitors.

Building the Unit

Fig. 2 shows the circuit for a switchable low pass filter unit based upon a 2-pole, 6-way wafer switch. The switch simply selects a filter by placing the input and output points across it. When built the unit should be housed in a screened box or metal case with a proper input and output socket to match to station standard. I use the cheap phono sockets. It is also useful to have screened leads between the sockets and the switch banks and filters.

Fig. 3 shows the technique I used to mount the bank of filters. I used a piece of printed circuit board blank cut with grooves into a matrix of 5mm square pads. These pads form the solder points for the connections; C1, L2, C3, L4, C5, L6 and C7 are mounted in line as shown using the square pads. The ground connection pads are joined together by a blob of solder which bridges adjacent pads. These solder bridges are placed on the corner where four pads meet, as shown, to allow a spare line of bridged pads to be a ground screen between each set of filters. The layout is compact but not difficult if a little care is taken. The individual constructor could choose whatever method suits, perhaps Veroboard or an etched circuit board. If Veroboard is used I recommend bridging unused tracks and bits of tracks to form a ground mat for screening.

The photograph shows my switch unit — it is nothing like the description above! It was for placing inside the linear amplifier case and was compact with smaller spacing on the matrix board. That was fiddly but others might like to try a more compact approach.

There we have it — a switchable low pass filter unit to order. After having described it I might now build one . . . or at least another one that is not dedicated to a single purpose.

SOURCES:

Toroid Cores: *TMP ELECTRONICS*, Unit 17, Pinfold Workshops, Pinfold Lane, Buckley, Clwyd CH7 3PL (0244) 549563. (Or *Cirkit*.)

Switches: *CIRKIT HOLDINGS*, Park Lane, Broxbourne, Herts. (0992) 444111.



OBLAST CORNER



NIGEL CAWTHORNE, G3TXF

Oblast Survey

THE results of the 'rarest' oblast survey shows that UA8T (174), UA8V (175), UA9G (141), UA0H (106), UH-W (45), UI-D (173), UI-U (55), UI-V (181), UL-K (24) and UL-Y (176) are the ten most wanted oblasts. The 'top three' most wanted appear to be UA8V (175), UI-V (181) and UH-W (45). Everybody, it seems, needs these. Paul, G4PWA, is the only one lucky enough to have found an UA8T (174).

Thanks to all those whose sent in lists of their 'wanted' oblasts.

Expeditions

RSGB's *DXNS* reports that UZ9OWB/RD will be QRV from UD-K (003) from 21 September onwards (QSL via UA90J). RA6AR and others were scheduled to be on from the much sought-after UF-0 (015) from 13-21 September, with QSLs to RA6AR.

DXNS also reported UA1OHL as being a new station on Franz Josef Land. RZ1OWA and UV100 appear still to be very active from FJL.

Iceflows

An item in "Airport International" reports that a new research station and airfield are being built on a remote iceflow in the Arctic region.

Apparently the previous floating ice airfield serving North Pole 28 drifting research station was split apart by a severe cyclone. A landing strip has been cleared and permanent prefabricated buildings are currently being installed. Amateur radio activity has occasionally been reported from USSR floating ice stations.

Mailbag Notes

Several readers have noted that their 1986 scores are already ahead of their 1985 figures.

Paul, G4PWA, who heads the All-Time worked list, reports UZ0JWA (112) and UA0DW (111) as two recent new ones. Paul also notes QSOs with UA9AN/UI (047), UA9ZAA (100), UI8LF (48), UL7VAD (030) and UM9MWA/U8P (177). This last station was an expedition which was also active as UM9MWA/U8Q (033) in mid-July.

Paul, who keeps separate CW and SSB oblast worked lists comments that some oblasts seem to be rarer on one mode than the other, but he adds that "on CW, unlike SSB, I find I can work nearly everything I can hear. On CW, skill in tracking down the oblasts is more important than having a good signal".

John, G4WSX, confirms that EK9AD is in UA9C (154). John also reports contacting Boris, UM9MWA, operating both /U8P and /U8Q for two new ones.

Steve, GW4BKG, asks if anyone has any info on QSL routings for EM3A and EM0C, both worked several years ago. The oblasts for these are likely to be UA3A (170) and UC2C (009) respectively.

Alex, G4UNH, reports UA0ZDD (128) as a gotaway during the IARU HF Championship Contest in July.

Richard, G4ZFE, found that both the IARU and the WAE-CW contests produced some new oblasts. Recent contacts include the extremely rare 106 oblast: UA0HAU as well as UL8GWW (190), RJ8JDV (040) and UM8NAC (034). Richard queries the 4J4F worked during the IARU contest. This one was just a plain UA4F (148) in disguise!

Russ, GM0CBX, reports new ones UV9FX (140), UB4FXU (070) and UB3IWA (073), all worked with a half-size G5RV.

Ted, G0BZV, has worked 108 oblasts on 40m. CW. Recent contacts on that band include RF6QAI (014), UH8BBQ (180) and UJ8BQ (040). The All-Asia CW contest netted UL7JW (019) for a new one.

Charles, G4ZZG, had a chuckle over the "wanted" lists idea. He says he still needs all the UDs, UFs, UGs, UIs, UJs and UMs!

Tony, BRS-87156, reports that this year's CQ-M brought in 8 all-time new oblasts heard and also that he has just received a certificate for the 1985 event.

Brad, BRS 1066, spotted a good opening for USSR stations on 1.8 MHz on August 24, which he hopes will be an indicator for the coming LF DX season. Brad has already logged 87 oblasts on 1.8 MHz this year. He has also provided an up-date of his 1986 and All-Time oblasts heard-by-hand analysis (band: 1986/All-Time): 1.8:87/122, 3.5:109/133, 7:117/145, 14:143/164, 21:48/116 and 28:9/100.

Frank, BRS-88557, has sent along his All-Time oblasts heard band break-down (CW only): 1.8:26, 3.5:97, 7:88, 14:163, 21:115 and 28:89.

Eddie, 9H1-15357, has still not received his Victory-40 award so has written again to Box 88 to chase it. SWL Neil Melville heard UI8BAA for an all-time new one (053). SWL Ray Williams' all-time entry to the 'heard' table dates from August last year when he started keeping an SWL log.

"Radio"

The June issue of *Radio*, the monthly Russian magazine which covers amateur radio as well as other electronics interests, lists the winning "radiosportsmen" for 1985. Categories include 'speed telegraphy (hand sent)', 'radio-direction finding' (radio fox-hunting) as well as 'shortwave radio communication'.

Under this latter category the top ten individuals are UA9SA, RB5IM, UL7QF, UP2NK, UW3AA, UA1DZ, UA0SAU, RB5AA, UJ8JA and UA0QA. The winning club stations are UZ4FWO, UP1BZO, UZ9SWY, RW9HZZ, UZ6LWT, UZ0QWA, UZ9CWW, UZ6LWA, UL8LWZ and UP1BWW.

Most of these calls will be very familiar to HF contesters. It is



R-series prefixes such as RA, RB, RC, RD, RE, RF, RG, RH, RJ, RL, RM, RO, RP, RQ, RR, RT, RU RV, RW and RZ are now used for HF/VHF individual operator call signs and not just VHF as in the past

OBLASTS 'WORKED' TABLE		
Station	1986 (max 184)	All- Time (max 184)
G4AYO	153	173
G4OII	151	162
G3TXF	144	173
G4WSX	137	148
G4ZFE	128	133
G0BZV	128	128
G4PWÁ	127	175
G4UNH	116	143
GW4BKG	114	149
G3PMR	112	123
G3YRW	106	135
G4OBK	96	152
G4DJX	87	115
GM0CBX	67	77
G4ZZG	66	78
G4TWX	65	120
G4XTM	51	93
G4LZZ	45	88
G4VFG	44	77
G3URA	42	91
G4XRV	38	38
G4YIR	18	43

OBLASTS 'HEARD' TABLE		
Station	1986 (max 184)	All- Time (max 184)
Brad BRS-1066	156	176
Frank BRS-88557	146	174
Eddie 9H1-15357	120	147
Tony BRS-87156	120	135
SWL Philip Davies	101	119
Norman BRS-28198	98	112
Ken BRS-88465	71	71
SWL Mrs G. Cooke	60	112
Maurice BRS-32601	59	148
SWL Angela Sitton	56	56
SWL Ray Williams	55	87
Graeme BRS-44984	48	105
Luciano G1VDW	47	88
SWL Neil Melville	—	158

Table 1. Send your entries for the '1986 in-year' and 'All-time' tables to reach G3TXF by October 29th for the December issue. The 'All-time' table is based on current oblasts only (max 184).

not known how the ratings in the USSR 'top-ten' are worked out, but international contesting probably figures somewhere in the calculations!

The winning SWL in the same 1985 championship was UA9-145-197.

'Creative Logging'

In the same issue of *Radio* on a less happy note, there is an item headed 'falsifiers punished'. The item notes that two stations (UA6HPP and RA6HE) were closed down for three months and were prohibited from participating in further contests until January 1987 for submitting reports of stations that were not on in a contest. The Russian way of describing 'creative logging'?

Also on contesting, the same issue says that USSR stations may use 3.65-3.8 MHz for telegraphy during the IARU HF Championship in July.

Elsewhere KIKI reports that USSR may now be allowed to use more of 80m. than normal, by special dispensation, during eleven

Callsign	Oblast	QSL via'
EK1NBR	UA1N 088	UA1NBR
EK9AD	UA9C 154	UZ9CWW
EV7DN	UD-N 002	—
EZ9C	UA9C 154	UZ9CZA
RA3GD/UM	UM-Q 033	—
RA3GF/UM	UM-Q 033	—
UA6FG	UA6H 108	—
UF6CX	UF-F 012	—
UJ8BQ	UJ-J 040	—
UM9MWA/U8P	UM-P 177	UM9MWA
UM9WMA/U8Q	UM-Q 033	UM9MWA
4J4F	UA4F 148	—

Table 2. Recently worked calls, with their oblasts identification. Included in this list are some older 'two letter' calls where the oblast is not obvious from the callsign.

major contests. Under normal circumstances USSR stations are limited to 3.5-3.65 MHz (CW only) and 3.6-3.65 MHz (SSB and CW).

USSR Licensing

KIKI advises that there have been some recent revisions to the licensing structure in the USSR. There is no more differentiation between HF and VHF stations. Class IV (beginners) requires no CW and allows only 5W on 160m.

Class III licences do require CW but are limited to 10W and do not have 40 or 20 metres. Class II licences allow 50W (recently increased from 40W), but not 20m. SSB. The highest grade of licence, Class I, allows all modes and 200W. Class I licencees have to pass a CW test at 24 wpm.

CQ WW Contests

International contests are a good opportunity to make many QSOs with USSR stations and possibly to pick up a few new oblasts.

The world's two largest international DX contests, the CQ Worldwide DX Contests, are held annually on the last full weekends of October (SSB) and November (CW). Both contests run for 48 hours from 0000z on the Saturday to 2400z on the Sunday. The dates for this year's events are: October 25-26 (SSB) and November 29-30 (CW).

The high level of activity in these contests makes it easy for the newer HF operator to work a number of new countries. From the USSR there will likely be a number of special contest calls in operation.

The CQ WW Contest exchange is an RST signal report (usually abbreviated to 599 on CW and 59 on SSB) followed by the CQ Zone number. The world is divided into 40 CQ Zones; the U.K. is in CQ Zone 14. USSR stations are in CQ Zones 16, 17, 18, 19, 21 and 23 (UA0Y Obl 159 only).

Other Contests

The RSGB's Second 1.8 MHz CW contest, which runs from 2100z on Saturday, November 8th to 0100z on Sunday, November 9th, usually attracts a fair amount of USSR participation. Similarly the all-band OK DX Contest on November 9th (0000-2400z) also generates plenty of activity.

The 'once-in-every-three years' Yuri Gagarin Cup contest is scheduled for April 19-20, 1987. More details later.

Table Entries

Send entries for the "All Time" and the "1986 In-Year" oblast heard/worked tables to reach G3TXF at "Holt Cottage", Kingston Hill, Kingston-upon-Thames, Surrey, KT2 7JH, by **October 29th** to appear in the December issue.

Many thanks to Tom KIKI (USSR *Tidbits*), IARU/ARRL, Dex W4KM and RSGB/*DX News Sheet* for items extracted. Good hunting es DSW!

Practical, Simple Sideband Part 5

*in this special series, these two
very well-known designers and constructors
get together to unravel its mysteries*

REV. G. C. DOBBS, G3RJV and IAN KEYSER, G3ROO

The Completed MLX Transceiver — by G3RJV

“A fool takes no pleasure in understanding,
but only in expressing his opinion”.

Proverbs 18:2

I HAVE heard a lot of radio amateurs expressing their opinions on the merits, or lack of merit, of commercial SSB equipment, especially on 80 metres. From the conversations, few seem to have much real idea of what goes on inside their boxes. This series of articles has been designed to give a little of that understanding by the easiest method: building some SSB equipment.

In Parts 3 and 4 of this series (*Short Wave Magazine*, Aug./Sept. 1986) I described the use of a little SSB transceiver board by Mizuho, called the MLX Board. This board with a few external circuits can be used to build a simple SSB transceiver for the amateur bands. These parts described one simple method of getting this board to receive SSB signals on an amateur band. This article goes on to suggest circuits to complete the amateur bands transceiver. In suggesting these circuits I am merely showing some suggested circuits which I have used to produce a simple sideband transceiver. Individual constructors may like to copy the circuits exactly or, more likely, they may like to use some of the ideas and improve upon them or substitute circuitry of their own. Playing around with the MLX Board provides an excellent introduction to the understanding of SSB communication. These circuits are also offered in their own right to be used by constructors who may not have an MLX Board. They may not be sophisticated, in fact they are purposely simple, but they do offer a route into homebuilt single-sideband amateur radio communication.

Originally I used the MLX Board for a simple 80-metre transceiver which I then converted for use on 160 metres. In fact although I began on 80 metres, I always intended the transceiver to be a single-bander on 160 metres so the circuitry was such that either band could easily be attained. As with the description of the receiving circuits, what follows here offers alternatives for either band. If other bands are required or more than one band, the band option information offered by G3ROO in Part 2 of this series (*Short Wave Magazine*, July 1986) could be used.

The Transmit Mixer

In the receiver mixer I opted for a simple and inexpensive input mixer stage formed by three FET transistors. One was used as an RF stage feeding the source of the other two which performed the input mixing. That little circuit was so successful that I decided to repeat it for the transmit mixer. The MLX Board does not contain input and output mixers, it deals with the signal at 9 MHz and hence requires the received signals to be converted to a 9 MHz signal before it can be amplified and processed. Likewise on

transmit, the signal is generated at 9 MHz and an external mixer must be added, with an appropriate VFO, to convert the SSB signal to the required band before amplification and transmission. A common mixer could have been used but this idea was rejected: it would have to be a bidirectional mixer, therefore passive (unless anyone knows of a good, simple active bidirectional mixer?) with inherent signal loss. The input and output ports on the board are also separate so even with a common mixer, this would have to be switched between transmit and receive. The little FET mixer is so simple and cheap that building another one for the transmit mixing function seems to make sense.

The circuit for the transmit mixer is shown in Fig. 1. The circuit uses just the two FET transistors which perform the mixing operation. The VFO signal is fed onto the gates of the two



The complete transceiver

E 772

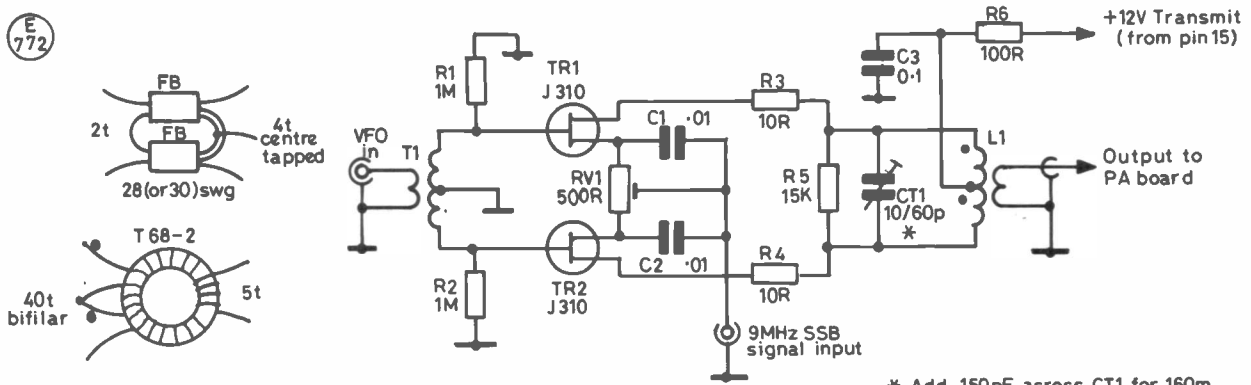
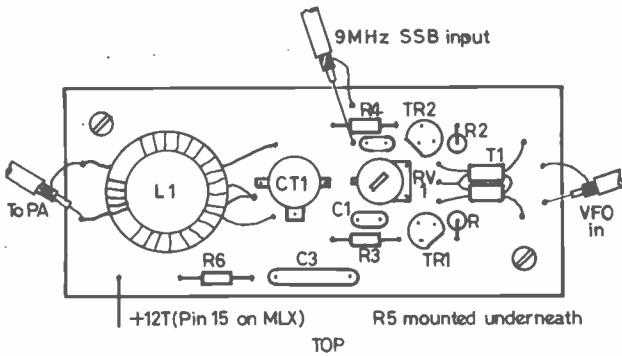


Fig.1 SIMPLE SIDEBAND : TRANSMIT MIXER



PCB underside

Fig. 2 Transmit Mixer layout

E 773

Table of Values

Fig. 1

- R1, R2 = 1M
- R3, R4 = 10R
- R5 = 15K
- R6 = 100R
- RV1 = 500R min. preset
- C1, C2 = 0.01μF
- C3 = 0.1μF

- CT1 = 10-60pF foil trimmer (add 150pF for 160m.)
- T1 = 2t primary, 4t sec., 28 swg on 2 ferrite beads (see Fig. 1)
- L1 = 40t 30 swg bifilar, plus 5t 22 swg PVC-covered, on T68-2 (see Fig. 1)

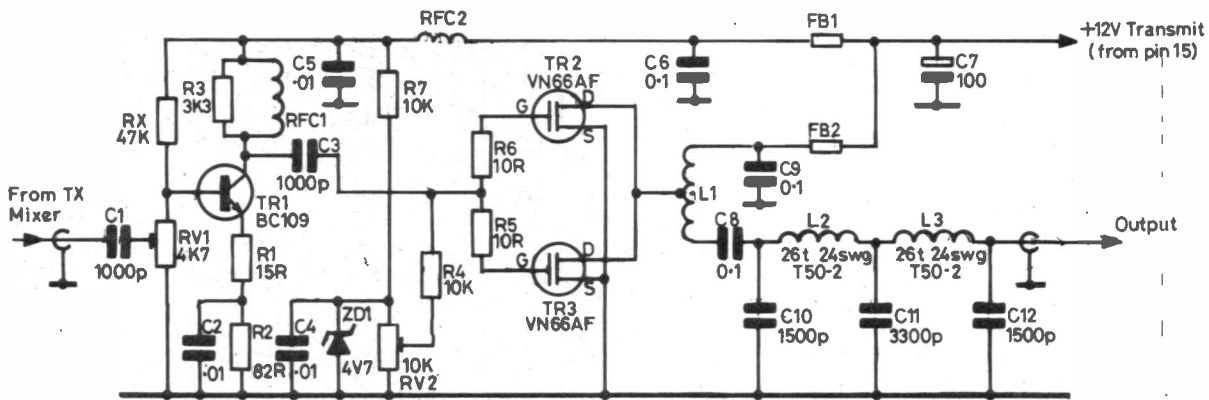
Fig. 3

- Rx = 10K
- R1 = 15R
- R2 = 82R
- R3 = 3K3
- R4, R7 = 10K
- R5, R6 = 10R
- RV1 = 4K7 min. preset
- RV2 = 10K min. preset
- C1, C3 = 1000pF
- C2, C4, C5 = 0.01μF
- C6, C8 = 0.1μF
- C7 = 100μF, 25V elec.

- C10 = 1500pF, polystyrene or s/mica
- C11 = 3300pF, poly. or s/m
- C12 = 1500pF, poly. or s/m
- RFC1 = 100μH Siemens B78108, Cirkit no. 35-71104
- RFC2 = see Fig. 3
- L1 = see Fig. 3 (ferrite beads FX1115 or similar)
- L2, L3 = 26t, 24swg, on T50-2 core
- TR1 = BC109
- TR2, TR3 = VN66AF (suitable finned heatsink required, see text)

Note: the above values of L2, L3 and C10, C11, C12 are for 160m. See below for 80m.

- C13, C16 = 470pF, poly. or s/m
- L4, L6 = 25t, 28swg, T37-2 core
- C14, C15 = 1200pF, poly. or s/m
- L5 = 27t, 28swg, T37-2 core



C10/C11/C12 on Low pass filter board (Low pass filter values for 160m).

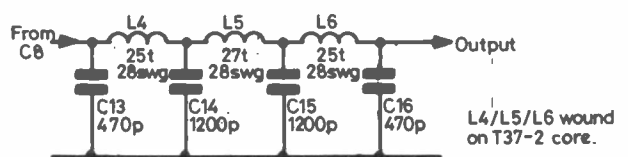
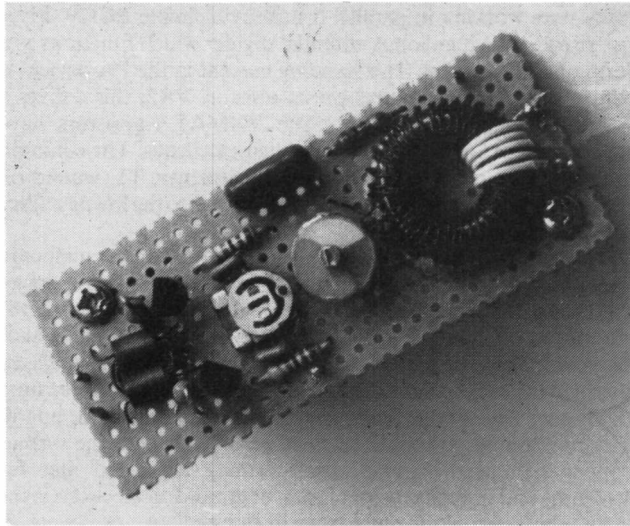


Fig. 3(a) Low pass filter for 80m

Fig. 3 SIMPLE SIDEBAND PA

E 774



Transmit mixer board

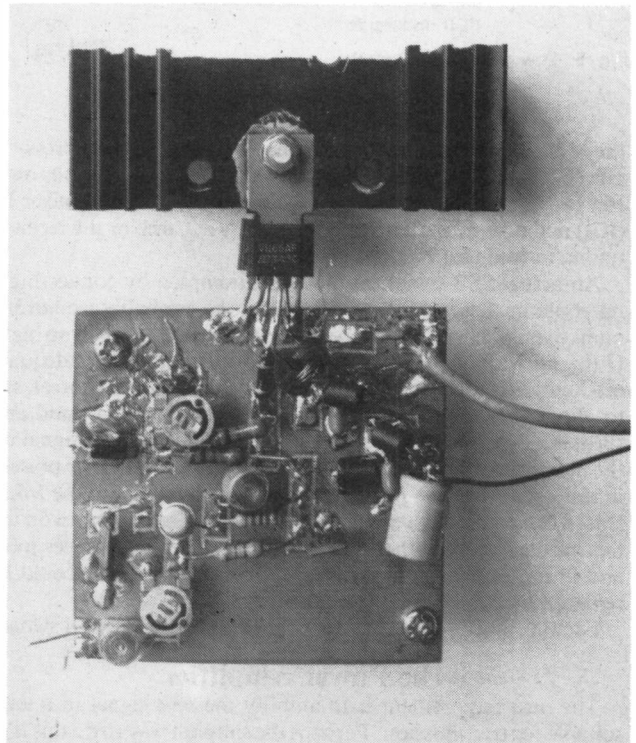
transistors by a small transformer, T1, which is wound on two ferrite beads in the identical manner to the receive mixer. The 9 MHz SSB signal from the MLX Board is fed directly to the sources of the transistors; the sources of TR1 and TR2 are returned to ground through the source follower resistance in the output stage of the MLX Board. The output across the drain leads of TR1 and TR2 is tuned by a bifilar wound coil L1, and CT1 to the required band.

L1 is a compromise value of inductance which can be tuned for either 80 or 160 metres depending upon the total value of capacitance at CT1. The values given in Fig. 1 will tune the 80-metre band. A damping resistance, R5, is added across the tuned circuit to aid broadband tuning. For 160 metres additional capacitance is added. 150pF should be enough to cover 160 metres, across CT1. However even with the damping effect of R5, the adjustment of CT1 was not found to be broad enough across the whole 1.8–2.0 MHz range of 160 metres. This is fine if operation of the transceiver is to be restricted to a portion of the band but I hoped to cover the whole of 160 metres without resorting to readjustment of CT1. So in the final arrangement I used for 160 metres I added a 100pF air-spaced variable capacitor across CT1 plus a further 68pF fixed capacitor. The variable capacitor, became a front panel peaking control for transmitted signals. My original transceiver had taken the microphone gain control onto the front panel. This is a control that rarely, if ever,

requires adjustment, so I reinstated the preset microphone gain control (VR3) on the MLX Board and used this front panel space for the peaking control. Details of replacing the VR3 preset were given in Part 3 of this series.

The layout of the transmit mixer board is shown in Fig. 2. As the photograph shows my prototype board was built up on perfboard, so this could be used in place of an etched printed circuit board. When winding T1 and L1 follow the instructions given for T1 on the receive mixer board (Fig. 8 in Part 4 of this series) and although the number of turns differs, the winding of L1 is done in the same way as L3 in the receive mixer.

It is now possible to listen for the SSB signal on the chosen band. Connect up the screened leads from the outputs of the VFO and the MLX Board and apply power to the transmit mixer board. Connect the output from the transmit mixer board to the antenna input of a receiver on the required band *via* a capacitor of a few picofarads. The signal can be initially indentified by putting



The PA board

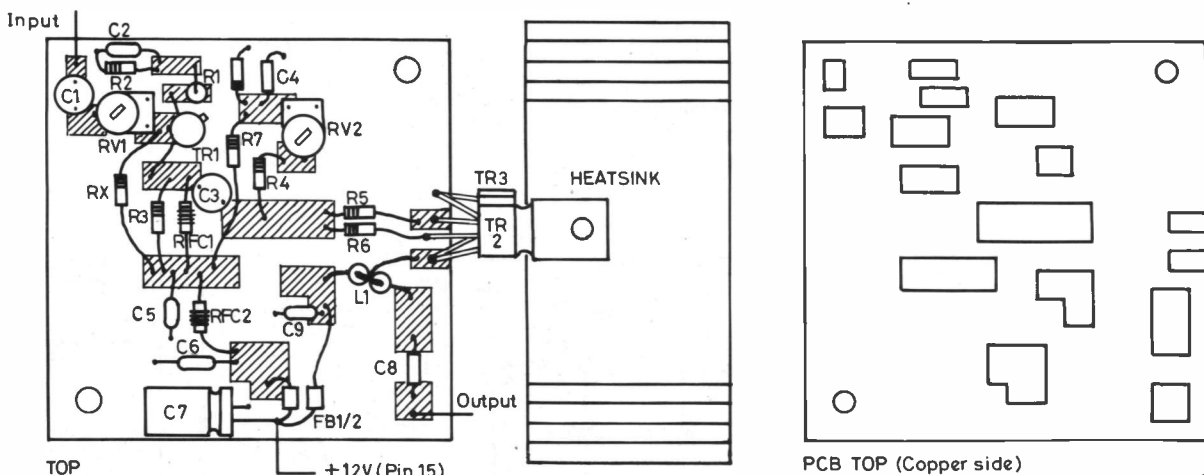


Fig. 4 PA LAYOUT

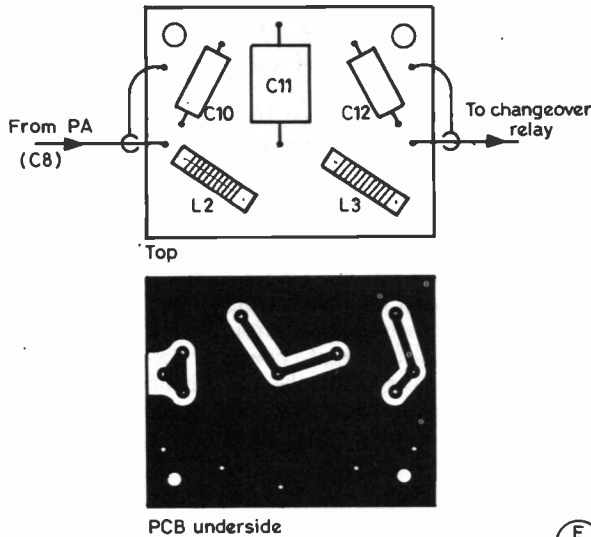


Fig. 5 Low pass filter layout

E 776

the MLX Board into CW mode; that is by shorting the press-to-talk (PTT) point (Pin 20) to ground and then keying 12 volts onto Pin 16. The 12 volts at Pin 16 unbalances the sideband mixer IC (IC1) and produces a carrier. Swing the VFO and/or the receiver tuning to find that carrier signal.

An actual SSB signal can now be attempted by connecting a microphone. I used a reject CB microphone, probably around 500 ohms dynamic, with the microphone gain control turned up high. If the microphone does to provide enough audio for adequate modulation, reduce the value of the microphone gain control, say to about 4.7K ohms. Putting the PTT (pin 20) to ground and speaking into the microphone should produce an SSB signal on the monitoring receiver. If there is a lot of residual carrier present in the signal then the mixer balance control (VR1) on the MLX Board can be used to reduce it. The preset balance control on the mixer board (yet another VR1) is really a "belt and braces job" and in the prototype made little difference. In fact it could be replaced by two 270-ohm fixed resistors.

Exciting stuff — you have produced a single sideband signal!

The Power Amplifier

The next requirement is to amplify the SSB signal to a level suitable for transmission. Perhaps the simplest way to do this is to use the PA Module supplied in kit form by *Cirkit Holdings*. This module is described by G3ROO in Parts 1 and 2 of this series. It certainly represents a simple and effective way of producing a signal up to 10 watts p.e.p. I have used the module with the MLX Board and the results were good. All that I used was the basic PA Module with a lowpass filter on the end of it. For those who do not want to fall back on the use of a kit but build all the associated boards, I offer a simple Power Amplifier circuit.

The circuit is shown in Fig. 3. It is far from original! Versions of this circuit have been used by G3MJW and G4DMH in *Sprat*, the journal of the G-QRP Club. The circuit makes use of two VMOS

transistors working in parallel driven by a simple BC109 driver transistor. VR1 is an input potential divider which functions as a form of drive control. The standing current in the PA devices is controlled by a bias control preset resistor, VR2; this derives a stabilised voltage from ZD1. The VN66AF transistors have separate series limiting resistors on their gate leads. The common output lead is provided by a small transformer, T1, wound on ferrite beads; this matches in the impedance into the lowpass filter network: C10, L2, C11, L3, C12.

The PA is built using the 'island' method of circuit board construction. Islands or copper pads are etched or cut into a piece of printed circuit board blank. I cut the tracks using a 3/16" woodturner's gouge: a very useful instrument for making such boards. It would be possible to use a lino cutting tool or to etch the board in the usual manner. All the components are mounted onto the copper side of the board so no holes are required in the board. The components are soldered from island to island, the surplus copper around the island pads forming a ground mat for screening and the convenient placing of ground connections in the circuit. It does not look much when its finished but it does work. It was to have been my prototype for a better board to follow but it worked as it was, so . . .

The two VMOS devices are mounted piggyback and their heatsink fins fit either side of an aluminium heat sink with side fins. The heatsink tabs are isolated from the heatsink with mica washers and bolted through the heatsink with a nylon 6BA bolt. In the completed transceiver the PA board is attached to the back of the transceiver case on 6BA standoffs. The board is mounted 'upside down' with the heatsink below the board. I did not attach the heatsink to the case as the leads from the VMOS transistors seemed adequate to hold the weight of the heatsink. The other obvious 'crudity' is that the supply line comes to a flying lead from the decoupling capacitor, C7, and thence *via* the ferrite bead RF traps, FB1 and FB2. I found this easier than using another pad and having cramped space for FB1.

The PA should be biased to have a standing current of about 200mA using the bias preset control, VR2. Before switching on the supply, set VR2 to the ground end; then measure the current passed by TR2 and TR3 and adjust accordingly. On peaks of transmission the reading should go to over 700mA. The PA can now be tested into an dummy load using either a wattmeter or an

Table of Values

Fig. 6

- | | |
|-----------------------|--|
| R1 = 1K | D3 = 1N4001 |
| R2 = 2K2 | TR1, TR2 = 2N2904, or similar <i>pn</i> p silicon transistor |
| C1, C5 = 0.01 μ F | RLY = 12v relay with double-pole changeover contacts |
| C2 = 4 μ F, tant. | |
| C3, C4 = 0.1 μ F | |
| D1, D2 = 1N914 | |

Fig. 8

- | | |
|---------------------------|--------------------|
| C1 = 47pF poly., see text | D1, D2, D3 = 1N914 |
| RV1 = 10K linear pot. | FB1, FB2 = FX1115. |
| RV2 = 100K preset | |

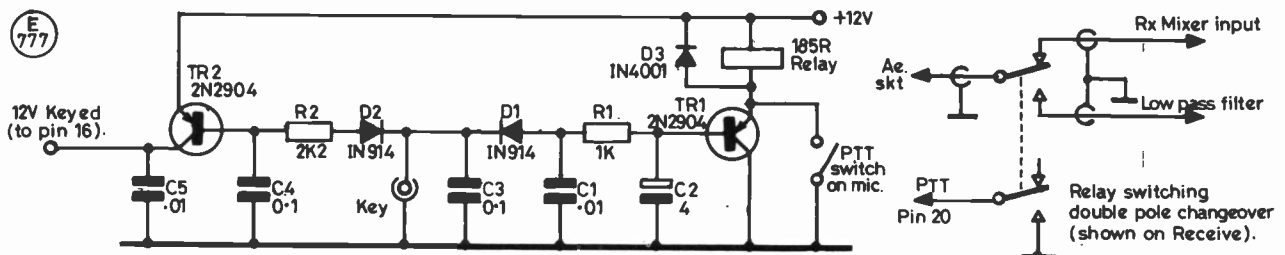


Fig. 6 CHANGEOVER AND KEYING CIRCUIT

E 777

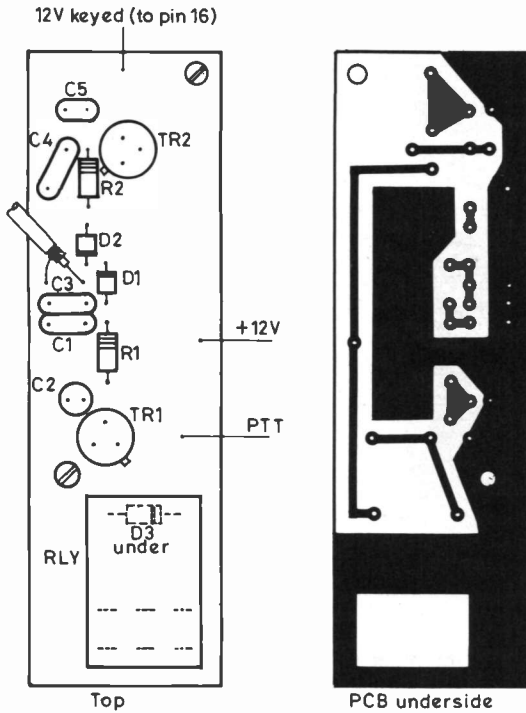
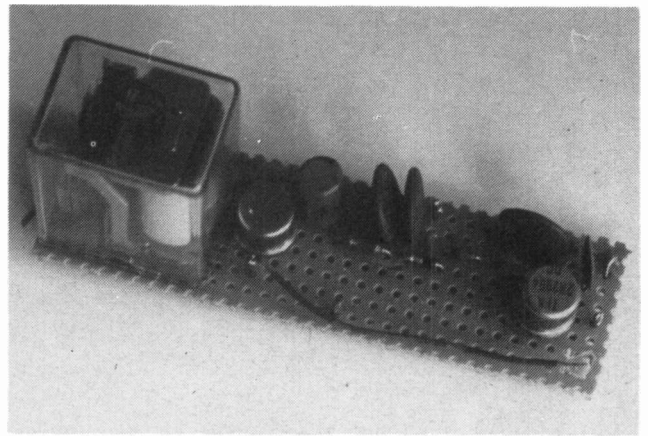


Fig. 7 Changeover/Keying layout



Changeover board

pin 20 on the MLX Board to ground to effect changeover of the voltages to the required circuits. The circuit in Fig. 6 shows the complete changeover system for SSB and CW. In the SSB mode the PTT switch simply places 12 volts across the change over relay. This operates a double-pole changeover set of contacts, half of which effect the antenna changeover from input to output. The spare set of contacts are used to switch Pin 20 on the MLX Board to ground. Nice and simple: the antenna has been changed over and the board voltages are switched to the correct state.

For CW operation two extra facilities are required: a 12 volt keyed line to supply pin 16 and an antenna changeover action which is time delayed enough to hold in on transmit at normal keying speeds but falls out when keying ceases. The circuit in Fig. 6 is one I have used before in *Short Wave Magazine* and represents a neat way of performing these functions. When the key is depressed both TR1 and TR2 conduct; TR1 actuates the changeover relay. The capacitor C2 also becomes charged so when the key is released the switch off of TR1 and the relay depend upon the discharge rate of C2. The given value for C2 is about right for holding in the relay during normal keying speeds with release after keying ceases but it can be adjusted to taste. TR2 produces the required 12 volts keyed to drive pin 16 on the MLX Board which gives a CW output by unbalancing the mixer. The layout for the changeover/keying circuit board is shown in Fig. 7. The relay used is a 12 volt double-pole changeover type. These are usually cheaply available at radio rallies. These relays vary in physical size and layout of contacts, so on the layout drawing I have shown a blank where the contacts should be present. Either the contacts may be connected *via* PCB tracks or the blank cut out as a hole through which all the contacts go and then direct connections made to the tags on the base of the relay.

Having said all this, CW operation is not so straightforward on the MLX Board. The BFO is set to receive SSB signals and is therefore really too far from the frequency of the carrier to be effective on CW reception. That is if the other station is to be monitored at the comfortable listening pitch of around 800Hz. The crudest way around this to work out, perhaps in a test QSO,

SWR meter with a suitable non-inductive 50-ohms load. This little PA will require the drive control VR1 set quite high to give an adequate output. (I managed to get mine to peak to 5 or 6 watts on the wattmeter.) Monitor the signal into the dummy load with the station receiver. It is worth playing around with the drive and bias controls to obtain an acceptable sounding signal. The lowpass filter is built up on a separate small board, shown in Fig. 5. The values on the circuit in Fig. 3 are for 160 metres but values for 80 metres are also given.

The main units for the transceiver are now completed, all that remains is to arrange the changeover circuits from transmit to receive. I had my first QSO with the MLX Board and the associated boards strewn across the bench. It was a pleasant 80-metre SSB contact with an old friend Dennis Hoult, G400. I was pleased with the 5/6 to 7 report between Rochdale and Spalding (Gosbert on Risegate to be precise . . . ah, the magic of those Lincolnshire place names!).

The Changeover Circuit

The transceiver requires a means of changing the antenna input from receive in to transmit out. The voltage changeovers for the various circuit sections in either mode are controlled on the MLX board by Q10 and Q11. I also wanted to have access to a 12 volt keyed supply so that the CW facility provided on the MLX Board at pin 16 could be used. If CW is not contemplated with the transceiver the whole matter is simpler so I will describe the SSB changeover first.

The press-to-talk (PTT) switch on the microphone has to short

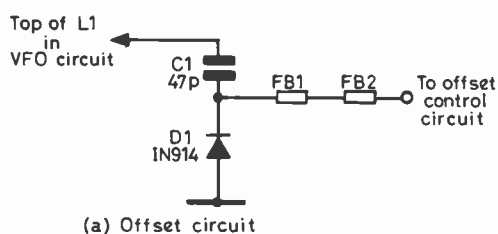
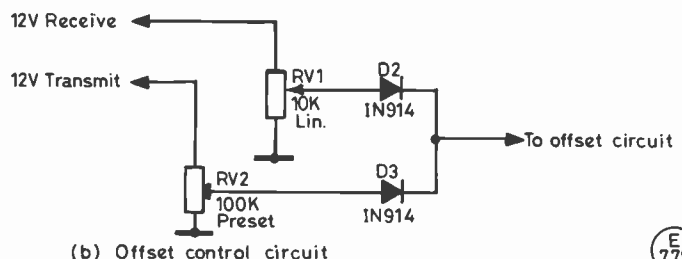
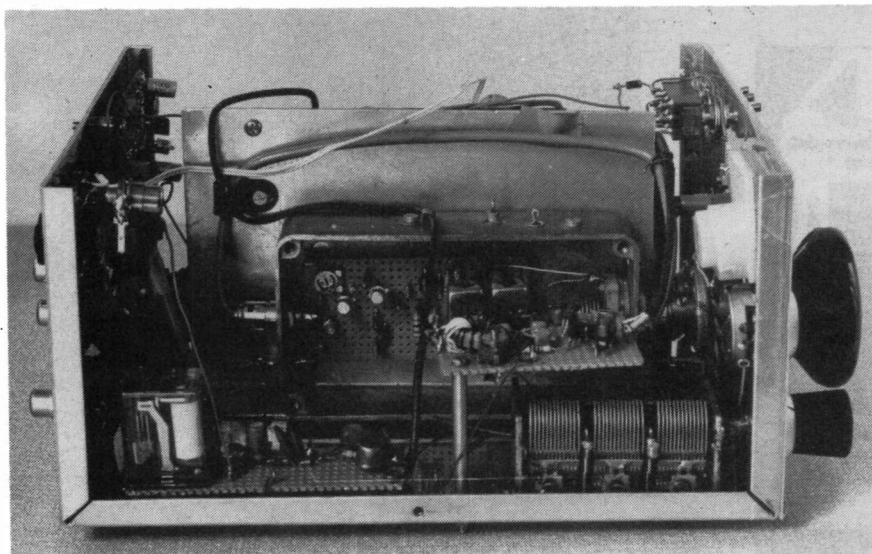


Fig. 8 R.I.T. CIRCUIT



(b) Offset control circuit

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Inside the complete transceiver
photos: Jo-Anna

what the other station will sound like when your transmission is netted with his signal and use that pitch as the guide to further CW QSOs. It will not be a comfortable pitch so if many CW QSOs are thought likely on the transceiver another method must be adopted.

There are three suitable approaches; I will suggest them all and leave the individual constructor to choose. The first is to alter the frequency of the BFO. This can be done using the BFO offset facility on pin 22. This approach is only possible if that facility has not already been tied up in reversing the sideband of the BFO by offsetting the original crystal as described in Part 3 of this series. If instead of that the 8998.5 kHz crystal has been replaced by a 9001.5 kHz crystal then all is well. In the CW mode, on receive, 12 volts can be applied to pin 22 and CVT2 adjusted to give a suitable BFO offset to monitor a netted CW station at a comfortable tone. This can be done with a frequency meter but I really do suggest that a test QSO with a tame local amateur is probably the best method.

The next alternative to add an RIT (Receiver Incremental Tuning) control to the transceiver. This is a method of offsetting the frequency of the VFO on receive. Such a facility is not a bad addition even if the transceiver is only to be used on the SSB mode. A suggested RIT circuit appears in Fig. 8. This is a direct lift of the RIT circuit from my TX80 Transmitter in *Short Wave Magazine*, April/May 1986. A fuller explanation of its function can be found in those articles. The circuit is divided into two sections: the Offset Circuit and the Offset Control Circuit. The offset circuit is added to the VFO, inside the VFO box as close to the tuned circuits as possible. The control circuit is built up behind the front panel RIT control, RV1.

The value for C1 may require some adjustment for the best results. The two supplies for the control circuit come from any of the 12 volt supply points on the MLX Board brought into operation for transmit and receive functions. The preset control, RV2, is set at about the centre of the wiper swing and controls the offset on transmit, the offset on receive is a front panel control provided by RV1. Adjustment of the position of RV2 may be required to give the most useful frequency swing of RV1 around the centre of its travel to allow adjustment either side of the frequency on transmit. Set the system up so that RV1 is midpoint to be netted to the transmit frequency. So on receive in the SSB mode, stations should be tuned with RV1 set midway. A marker point on the front panel is useful. In the CW mode experiment with RV1 to see where it must be set to give a good netting onto other station at a comfortable listening pitch on receive. Another mark can be made on the front panel to indicate this point; this is where the control is set to receive signals so the transmitter is

netted onto the other station. A more sophisticated approach would be to have a third voltage source switched in on CW mode only to allow RV1 to be at the same setting for SSB and CW operation. I leave such refinements for the reader to sort out.

The third method is to derive another signal for the carrier on CW. This entails building an outboard oscillator board using a 9 MHz crystal, which can be keyed. Instead of using the MLX Board as the carrier source on CW, this new signal would be keyed into the transmit mixer. Its crystal frequency could be adjusted with a series trimmer to produce a signal in the appropriate place for the existing BFO to have the required amount of offset. This is the reverse approach to offsetting the BFO to suit the carrier. I have not tried this but I know those who have used the system with success.

Whatever system is adopted it can be seen that providing the CW facility is not as easy as it may first appear.¹

The Completed Transceiver

My complete transceiver was built in an aluminium box 6" wide x 8" deep x 4" high supplied by *Minfford Engineering*. The various circuit boards fit easily into this space with adequate room for front panel controls. The transceiver needs a nominal 13.8 volts DC supply and an antenna termination of 50 ohms.

The circuits shown and discussed in Parts 3, 4 and 5 of this series suggest how an existing SSB transceiver board on 9 MHz can be used with a few uncomplicated extra circuits to make up a simple sideband transceiver. You may think my additional circuits crude and want to try your own, you may not have an MLX Board, or you may not wish to build up any of the suggested circuits, but what these articles do show is that homebuilt SSB equipment is well within the range and capabilities of the average constructor. My completed transceiver is simple and inexpensive and gets good comments for its signal on the band and even better comments when the other station knows that it is homebuilt.

Sources:

Cirkit Holdings PLC, Park Lane, Broxbourne, Herts. EN10 7NQ. Tel: (0992) 444111. for VMOS transistors and other components.

Minffordd Engineering, Sun Street, Ffestiniog, Gwynedd. Tel: (076-676) 2572. For equipment cases. (The case I used does not seem to be in their current list but was supplied by Minfford's, try a phone call.)

Next month, G3ROO returns for Part 6.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

ONCE again we have to report that this will be very short, thanks this time to localised industrial action within the mail system. Carrier pigeons must be more reliable.

However, be that as it may, a couple of letters that arrived at the last moment, and so were delivered separately, managed to reach your scribe, and of course we have the usual inputs from other sources such as W1WY, DXNS, and our own cullings.

The Bands

During the last week the weather has improved, and so my aerials for the LF bands have received their autumn attention. As a result of this, the local eighty-metre net has become totally inaudible under the sideband splash from some chap discussing the gory details of his operation. On the other hand, when I compared a Mercator and a Great Circle map before going up aloft to deal with the HF part of the aerial farm, at least part of the reason for recent problems came to light; the aerial has now been slewed round by some thirty degrees and is 'doing its thing' much more effectively. The moral to this little tale is: when putting up aerials, use a Great Circle map to define the true direction and then, when you are using the compass, make the correct allowances for variation and deviation, and then double check as well. Most of us can find the Pole Star on a clear night, and as that points to True North it can be a valuable cross-check — which is not to suggest mast-climbing on dark nights! But it does certainly indicate that 'conditions' get better when the aerial is somewhere near right. For example, I have already indicated Eighty bulging with signals as this is written and the same goes for Twenty, particularly at the CW end. Of course, things are also at their best near the equinoxes in March and September, as we all know. So — lively's the word, even in the absence of the sunspots.

Ten Metres

The increased level of activity on this band, to keep out the CB intruders, has of itself been of benefit to our knowledge of propagation on the band. For example, it is now well proven that at sunspot minima there are intercontinental openings to be expected on the band during the summer months, mainly in the north-south direction to Africa and S. America, but also on occasion to the Caribbean and North America. For instance we have the report from G3NOF (Yeovil) who worked

CE3GWO, GM3PHD/M on Benbecula, T77C, UP2BAY and 6W1CK, plus lots of the Europeans.

The letter from BRS-88639, Angela Sitton of Stevenage, mentions a hearing in July of WB2KQE, working an IK2 at 2100z on 21st, with other East Coast stations just audible and all after the same IK2; Angela has an HR-10B and quite limited aerial facilities. Notice the time: at 2100z one would have expected the band to have been well dead if the 'normal' rules of ten-metre propagation applied, even if there was enough sunspot activity to make that possible. As with so many things, the more we learn about propagation the more we realise how little we know! It is noted that Angela is in for the December RAE and taking Morse form G4ISO, so we must hope she passes and gets on the air soon.

Fifteen

Here we have only one report that escaped the disruption — thank heavens Don, G3NOF, nearly missed the deadline! Don found the band patchy, with lots of Sporadic-E about; around noon zulu a few openings to Indonesia, and in the evenings around 2100z South America occasionally. He made SSB contact with C31LDL, CE4FXV, EJ4ALE (Bofin), HC1OT, HK6IID, J87D, JA4CYG, KP4BZ, KM5X, PJ2MN, PP2ZD, VP2MU, VS6CT/KP2, WB0NAA/YN1, YB0EZF, YC4GAP, YC0DAJ, YC0DLG, YC0GTP, YC0LWA, YM3KA(TA3B), 9J2RSZ, 9L1AR, and 9Y4RJS. Clearly, even at sunspot minimum, there is some DX about.

Events

From NQ4I, by way of G3NOF, a letter that indicates Rick is going to do the CQ WW SSB Contest in October from Guyana, using his contest call 8R1Z. For a few days before the contest 8R1Z will be on, mainly on Eighty, plus Top Band. The Mosley Classic 33 will be atop the Hotel Pegasus, at 185 feet, with the 7MHz dipole on another corner at 190 feet, and a couple of slopers for Top Band and Eighty will run down from the hotel roof towards the sea, one for EU and one for Stateside. Rick says he will go on to *Top Band* at 0200z, 0300z and so on to 0700z for the first ten minutes of each hour, transmitting on 1827 and listening on 1849 kHz. QSLs for this activity go *via* Carol, W14K, direct or through the Bureau. Thanks to G3NOF for passing this news on, but we must say that we think that

NQ4I is doing the game a disservice as far as Top Band goes. After all, the rules are clear enough, even if the Contest Committee haven't used them. To actually announce beforehand that you are going to operate in the DX Window is tantamount to saying to hell with the rules. That remains true whether you agree with the Window concept on Top Band or not.

That Rockall trip planned for mid-August: the cancellation announcement, which wiped out a year's work, was left till the very last moment, but they are back in the hunt with a new, 1987 target. However, one can't help wondering why; after all, ARRL's Don Search is on record as saying it couldn't qualify as a DXCC 'counter' under Rule 2(b). And one can hardly think of it as a holiday resort!

During this month, ZL1AMO will be on Christmas Island; at the time of writing it is not confirmed but this is one DX-peditioner who is not in the business of busted flushes!

On the other hand, it does seem likely that the recent mutterings on the subject of a ZA expedition by some OKs was a manifestation of Walter Mitty . . . our own view on ZA is just that any you may come across will be pirates; but on the off-chance that they might be for real, work 'em, and hope.

"CDXN" deadlines for the next three months:

November issue — October 8th
December issue — November 5th
January issue — December 3rd

please be sure to note these dates

The XU1SS signal is said to be on almost daily, usually around 0900-1000z, using battery power to a dipole, deep in jungle, and restricted by a lack of light at times when they might have more chance of being heard in this country; and G4DYO added a note to this entry that it might be worth a comb-out on Twenty long-path for them.

The Operaton Raleigh, GB0SWR, team have carried on their merry way, although the Fiji stop seems to have been somewhat comic in the matter of licences; they ended up operating from 3D2CM, and at the time of writing the story was that they should make the next stop at Cairns in VK, with no more Pacific Islands *en route*.

John Layton was to leave the expedition and return to this country from Fiji, and we have no current word of who will replace him.

Early in August a station signing ET3US appeared, asking for QSLs via KJ0M. In the present known circumstances of that part of Africa that sounds as likely as a flying penguin; and indeed all has been silent about this one ever since.

ISWL

We very sad indeed to hear that after a long period of difficulty the President and the council members of ISWL felt they could no longer carry on, the more so as there were serious financial problems. So, ISWL dies, after forty years, unless some enterprising people are game to try and get it back on its feet. However this could be quite costly, as to circulate the members individually with no hope of getting one's expenses back would be a serious pain in anyone's wallet.

Twenty

As we have already indicated, the band seems livelier than we have heard it for a while.

G3NOF notes, however, that this was another month with no signs of VK and ZL on the morning long-path opening times, and there were only a few Pacific stations. Around 1100z the short path showed openings to VK, YB, JA, VU and SE Asia; signals faded down and peaked again around 1600z. Some Africans came in about 1800z, mostly north of the Equator, while the East Coast Americans were noted during the evenings, peaking around 2200z, although the band seemed to collapse quickly after 2300z. There was also some short-skip stuff about most of the time too. It added up for Don to contacts with A22TJ, A4XKC, A92C, AP2SQ, BY4AOM, C30C, C30BBP/P, C30AAU, CN8EL, CN8MK, CO1EG, CP5HK, CU3AU, DU9RG, DX9C (= DU), EK1NBR (the USSR Arctic Expedition), F6AXP/P, F6HMP/P and FV6NDX/P all on Isles du Re. FG5CB/FS (St. Barthelemy), FM5BX, FY7AN, G0FDK/OX/P, (the Salford University Expedition, on Cape Farewell), GB2F1 on Flatholm, GD4PTV, GM6UW/P on Treshnish, HB0/G4GIR, HZ1FM, I5OVS/IA5 (Elbe), I0SNT/ZB2, IF9/IT9JKY, IK1CIX/ID8 (Chirella), IK8GGQ/ID8 on the same island, J28EO, JA1LSP, JA2FJP,

JA3GAK, JA4IKD, JA5RH who runs 3kW input, JA7FWR, JF1HOH, KB0NL (N. Dakota), JT1BG, K7AII (Oregon), KH6IJ, KL7IWC, KL7TC, NL7AX, N4MJH/SV8 (Zante), OD5SM, OH0MD/OJ0, PZ1AP, R9AL, RF0FWW, RW9WA, SUIFN, TA1E, TA1F, T12LTA, T18ZB, T10RC, TL8KH, TK5BL/TKO3, TK0KP (San Dinar), TV6CIN, UA0QF in zone 19, UH8HCB, UL71BQ, UL8ZAC, UL7GM, UM9MWA/U8P, UV100 (Franz Josef), UZ9YXO, UZ0BWL (Dickson Island), V31PC, V44KR, V85MK/OD5, VE8DX (Baffin), V15JSA/W5, VP8F1R, VP2MH, VS6CT/KP2, VU2AU, VU2ZAP, W5VWK, WA5XZX, WA6QXH, WL7E, YV2BYT, YB0JH, YB0ZEA, ZC4AP, ZC4IT, ZD9CA, ZK1XV, ZS3KC, 1AOKM, 3C1MB (quick QSL via EA7KF), 4S7VK, 5B4TI, 5H3ZR, 5N8HEM, 5R8JD, 6W1NQ, 7J1ACH (Minami Torishima), 8O2FJT (= A2), 9M2DF, 9M2FZ, 9M2CW, 9M2MM and 9N5HCK. Not a bad haul after a bout of 'flu!

Turning to the log from Angela Sitton, we notice J87CD, EJ5EP, JA1XM, V2PAB/P/4U, DX9HT, JQ6IHO for the best Japanese signal so far heard, W7GN, K6IRF, W4CDK/MM and KP2AH.

Eighty

The QRM on Sunday mornings has to be heard to be believed; the local net signals are all in the order of S9 or better but to obtain solid copy of them requires one to twiddle just about every relevant control on the rig — when one is having some difficulty copying a 100-watt signal at less than a mile and both stations are properly 'on the nose' then you are talking about real QRM! On a different tack, it is quite amazing how much of the difficulty is caused by over-driven SSB signals when people don't sit still in front of their microphones. The users of desk mikes are bad offenders in this context.

G2NJ (Peterborough) all but lives on Eighty — I can't recall how long it is since he last reported a QSO on any other band. This time the 'meat' of his notes have failed to reach us but he does have some details on G5NX, who used to do so much /M operating on CW around the country; Leslie, it may be recalled, went to New Zealand to join his son and Nick reports that he is now on the band with the call ZL1PM — a far cry from his old base at Windermere.

Other Points

We hear that the Chinese 'pirate BY calls' list which was being circulated recently included such as BY5HN and BY5SN, and John Allaway, in his feature in *RadCom* points out how nearly 'B' and '6' are related; we must admit to being a trifle surprised the CRSA folk didn't spot this for themselves. However it is also being whispered that the Chinese are seriously considering licencing individual stations and also foreigners. And, to revert to G3FKM's column, we notice BY5QH among the new members of RSGB.

West Yorks Scouts

We have a letter from the West Yorkshire Scout Radio Group in which we see with some sadness that they have, thanks to changes in regulations at the licencing authority, lost their GB3RSS, a call they have had continuously for 28 years. They are now using GB2RSS, and hope to make that call as well known as the old one was, world-wide — and all we can say is we hope they do just that. ~

W1WY

Frank's ever-useful galleys of his *Contest Calendar* shows the usual rush in October. The major ones seem to be the VK/ZL/Oceania Contest, CW October 11/12, and SSB the previous week. The October 11/12 slot is also down for the RSGB 21/28 MHz shindig on SSB, and on 18th there is the RSGB 21 MHz CW, coinciding with the QRP ARCI contest weekend. October 25/26 is down for the CQ WW DX Phone Contest as well as being the start of the Caymans Pirate Week; this is not a contest but an 'activity' generator, with some special prefixes.

J.O.T.A.

Once again it is time for the annual JOTA activity, and this year it takes place over the October 18/19 weekend. Again not a contest, but rather an activity for the Scouts, as anyone who has ever participated will know.

Close Down

If the missing letters turn up we'll have a bonzer pile next month, always assuming we actually *get* the usual letters as well; for these the deadlines are as shown in the 'box', and should be addressed, as ever, to your conductor, "CDXN", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ.

Amateur Radio Computing

a bi-monthly feature for all those with a radio station and a computer

PAUL NEWMAN, G4INP

AS promised last issue, my column this month is something special and it's a program called CHANMON for Spectrum owners.

Reproduced in full here is a program which monitors a frequency and measures the "on" and "off" times of audio present on the channel to produce usage statistics for a chosen time-slot over lengthy periods. Uses such as repeater-usage, simplex channel usage and beacon conditions-watch have all been tried successfully with this program.

CHANMON will run on any Spectrum 48k, plus/or 128k (in 48k mode); BASIC and concept by G4INP, machine-code by Roger G4IDE whose permission to use it is acknowledged with thanks.

Program Construction

Enter the listing as given; 128k owners must place the machine in 48k mode first. Use of embedded control-codes has been avoided since certain of them cannot be used on the 128k. Pay careful attention to the machine code sections; a checksum has been incorporated. So you can enter embedded space characters correctly, note that the listing is based on a 60-character line printout.

Pay special care to the function definitions at the start of the program since proper operation can only be obtained if they are correct. Note that, in the listing, the "pound sign" should be entered as a "hash symbol" available on symbol-shift/3 keys.

Note the use of graphics in 2260, 2280 and 2290. Use the graphic symbol given in the REMark after each line; place the graphic symbol between the quotes.

Save the program regularly. Tape or microdrive may be used and disc systems ought to have no conflict with anything done in the program. Save the final version LINE 1 so it will autorun on loading.

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10 CLEAR 65278: CLS : PRINT AT 10,0;"WAIT PLEASE - IDENTIFYING ULA": PRINT "" INVERSE 1; BRIGHT 1;"DO NOT TOUCH KEYBOARD!!!"
20 PAUSE 200: LET Z=IN 254
30 IF Z=255 THEN LET NN1=65373: LET NN2=65374: LET NN3=65375: LET NN4=65376: LET NN5=65377: LET NN6=65378: PRINT ""VE RSION 1 ULA FOUND"
40 IF Z=191 THEN LET NN1=65376: LET NN2=65377: LET NN3=65378: LET NN4=65373: LET NN5=65374: LET NN6=65375: PRINT ""VE RSION 2 ULA FOUND"
50 IF Z<>255 AND Z<>191 THEN PRINT "Unknown ULA detected!!": STOP
60 POKE 23658,8: GO TO 770
70 REM *****
80 REM
90 REM CHANMON BY G4INP/G4IDE
100 REM
110 REM *****
120 DEF FN M(X,Y)=(X+Y+ABS(X-Y))/2: REM FIND MAX READING TIME
130 DEF FN U()=(65536+PEEK 23674+256*PEEK 23673+PEEK 23672)/50: REM ELAPSED CLOCK SECONDS
140 DEF FN T()=FN M(FN U(),FN U()): REM FIND TRUE TIME - see ZX manual p 131

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150 DEF FN N()=PEEK NN1+256*PEEK NN2+65536*PEEK NN3: REM TH E ON COUNT
160 DEF FN F()=PEEK NN4+256*PEEK NN5+65536*PEEK NN6: REM TH E OFF COUNT
180 GO TO 670: REM M/C & MENU
190 REM CLEAR THE PLOT AREAS
200 FOR J=3 TO 9
210 PRINT AT J,3;" ";AT J,19;" "
220 NEXT J: RETURN
230 REM UPDATE DISPLAY
240 PRINT AT 18,0: INVERSE 1; BRIGHT 1;"TIME : "; INVERSE 0; BRIGHT 0;Y$;" ";ONTM;"% "; INVERSE 1; BRIGHT 1;"ON"; INVERSE 0; BRIGHT 0;TAB 32
250 PRINT AT 20,0: INVERSE 1; BRIGHT 1;"Running Average ";CUMONTM;"% "; INVERSE 1; BRIGHT 1;"ON"; INVERSE 0; BRIGHT 0;TAB 32
260 RETURN
270 REM TIME SUBROUTINE
280 LET MN=MN+WINDOW: IF MN>=60 THEN LET HR=HR+1: LET MN=MN-60
290 LET Y$=STR$ HR: IF MN<10 THEN LET Y$=Y$+"0"+STR$ MN: GO TO 310
300 LET Y$=Y$+STR$ MN
310 IF HR<10 THEN LET Y$="0"+Y$
320 RETURN
330 REM START OF PROGRAM
340 LET ST=FN T(): REM START TIME
350 RANDOMIZE USR ON: REM START COUNTING
360 IF INKEY$="F" THEN GO TO 1540
370 IF FN T()-ST<W1 THEN GO TO 360: REM WAIT
380 LET ONTM=FN N(): LET OFFTM=FN F(): REM STORE ON & OFF TIMES
390 RANDOMIZE USR ON: REM RESET COUNTERS
400 LET ST=FN T(): REM NEW START TIME
410 LET PER=PER+1: GO SUB 280
420 LET ONTM=(2*ONTM)/50: LET OFFTM=(OFFTM-ONTM)/50: REM STORE TRUE ON/OFF
430>LET TOTON=TOTON+ONTM: REM TOTAL ON
440 LET TOTOFF=TOTOFF+OFFTM: REM TOTAL OFF
450 LET ONTM=INT(ONTM/W1*100): REM % ONTIME
460 LET O$=O$+CHR$ ONTM: REM ACCUMULATE ON TIME
470 LET OFFTM=100-ONTM: REM % OFFTIME
480 LET CUMONTM=INT((TOTON/(W1*PER))*100)
490 GO SUB 200: REM CLEAR PLOT
500 GO SUB 240: REM UPDATE DISPLAY
510 IF ONTM=0 THEN GO TO 560
520 FOR Z=0 TO 23: REM ONTIME
530 PLOT W(1,1)+Z,W(1,2): DRAW INK 2;0,ONTM/2
540 NEXT Z
550 IF OFFTM=0 THEN GO TO 570
560 FOR Z=0 TO 23: PLOT W(1,1)+Z+36,W(1,2): DRAW INK 4;0,OFFTM/2: NEXT Z: REM OFF TIME
570 IF CUMONTM=0 THEN GO TO 600
580 FOR Z=0 TO 23: PLOT W(2,1)+Z,W(2,2): DRAW INK 2;0,CUMONTM/2: NEXT Z: REM CUMULATIVES
590 IF CUMONTM=100 THEN GO TO 610
600 FOR Z=0 TO 23: PLOT W(2,1)+Z+36,W(2,2): DRAW INK 4;0,(100-CUMONTM)/2: NEXT Z: REM CUMULATIVES
610 IF SUB=1 THEN RETURN
620 GO TO 350
630 STOP
650 REM EARMON ROUTINE
670 DATA 1,255,245,229,219,254,230,64,32,31,61,50
680 DATA 0,64,42,93,255,35,34,93,255,124,181,32,44
690 DATA 33,0,0,34,93,255,58,95,255,60,50,95,255,195
700 DATA 68,255,175,58,0,64,42,96,255,35,34,96,255,124
710 DATA 181,32,13,33,0,0,34,96,255,58,98,255,60,50
720 DATA 98,255,225,241,195,56,0,33,93,255,6,6,54,0
730 DATA 35,16,251,62,254,237,71,237,94,201,237,86,201,0,0,0,0,0,0
770 RESTORE 670
780 LET TOT=0
790 FOR J=65279 TO 65378
800 READ Z: POKE J,Z
810 LET TOT=TOT+Z
820 NEXT J
830 IF TOT<>10614 THEN PRINT "DATA ERROR": STOP
840 FOR J=0 TO 7: REM HISTOGRAM PARTIAL GRAPHICS
850 POKE USR "S"+J,192: REM .25
860 POKE USR "T"+J,240: REM .5
870 POKE USR "U"+J,252: REM .75
880 NEXT J
900 LET ON=65353: LET OFF=65370: REM ON & OFF ADDRESS
910 REM
920 REM INSTRUCTIONS
930 REM
940 LET T$=CHR$ 20+CHR$ 1+CHR$ 19+CHR$ 1+"G4INP/G4IDE CHANMON SYSTEM"+CHR$ 19+CHR$ 0+CHR$ 20+CHR$ 0
950 CLS : PRINT 'TAB 3;T$
960 LET SUB=0
970 PRINT 'TAB 8; BRIGHT 1; INVERSE 1;"INSTRUCTIONS"
980 PRINT '"CHANMON will monitor a receiver & store statistics on channel usage."'
990 PRINT '"This may be a REPEATER, BEACON or SIMPLEX CHANNEL."'
1000 PRINT '"The program will allow beacon or repeater-keeper to monitor the channel over long periods."'
1010 PRINT '"Channels should be squelched so that a normal signal will raise it."'
1020 PRINT ' INVERSE 1; BRIGHT 1;"PRESS KEY FOR MORE INFORMATION"
1030 PAUSE 0
1040 LET O$="": LET AGG=0
1050 CLS : PRINT 'TAB 3;T$
1060 PRINT 'TAB 8; INVERSE 1; BRIGHT 1;"INSTRUCTIONS"
1070 PRINT '"CHANMON requires a connection from receiver EAR/PHONE socket to the Spectrum EAR socket."'

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1080 PRINT "The program may be left running for long period
s - for example monitoring a beacon for raised signal-stre
ngth due to improved conditions."
1090 PRINT "Better accuracy is given if FM signals are rec
eived in SSBmode."
1100 PRINT ' INVERSE 1; BRIGHT 1;"PRESS KEY FOR MORE INFORMA
TION"
1110 PAUSE 0
1120 CLS : PRINT 'TAB 3;T$
1130 PRINT 'TAB 8; INVERSE 1; BRIGHT 1;"INSTRUCTIONS"
1140 PRINT "'CHANMON displays 2 information windows. Choos
e a 'time-window' which may be from 1 to 60 mins long, over
which the frequency will be monitored."
1150 PRINT "The display will give data for the current per
iod & a running average. The on-time is given inRED; off-ti
me in GREEN as % of window."
1160 BEEP .2,30: POKE 23617,236: INPUT "What time-window (mi
nutes) "; LINE M$: GO SUB 2720
1170 IF M$="" THEN GO TO 1160
1180 LET WINDOW=VAL M$
1190 IF WINDOW<1 OR WINDOW>60 THEN GO TO 1160
1200 LET WINDOW=INT WINDOW
1210 LET W1=WINDOW*60: REM WINDOW IN SECONDS
1220 PRINT ' INVERSE 1; BRIGHT 1;"WINDOW ";WINDOW;" Minute
s."
1230 PRINT ' INVERSE 1; BRIGHT 1;"PRESS KEY FOR MORE INFORMA
TION"
1240 PAUSE 0
1250 CLS : PRINT 'TAB 3;T$
1260 PRINT 'TAB 8; INVERSE 1; BRIGHT 1;"INSTRUCTIONS"
1270 PRINT " RECEIVER/PROGRAM SETUP"
1280 PRINT "Connect Spectrum EAR to receiver with squelch
OFF. Then raise squelch level when the channel is clear to
the point where the underline character at top-left of scr
een flashes in time with audio."
1290 PRINT ' INVERSE 1; BRIGHT 1;"PRESS ENTER WHEN SETUP CO
MPLETE"
1300 RANDOMIZE USR ON
1310 IF CODE INKEY$<>13 THEN GO TO 1310
1320 LET M$="1200": LET SUB=0: GO TO 1540
1330 DIM W(2,2): CLS : PRINT TAB 3;T$
1340 PLOT 0,80: DRAW 0,86: DRAW 255,0: DRAW 0,-86: DRAW -255
,0: PLOT 128,80: DRAW 0,86
1350 PRINT AT 10,3;"On Off";AT 10,19;"On Off"
1360 PRINT AT 2,1; INVERSE 1; BRIGHT 1;"Current period"
1370 PRINT AT 2,17; INVERSE 1; BRIGHT 1;"Running avg"
1380 REM THESE ARE ON-PLOT ORIGINS FOR EACH WINDOW
1390 LET W(1,1)=24: LET W(2,1)=152: REM X ORIGINS
1400 LET W(1,2)=96: LET W(2,2)=96: REM Y ORIGINS
1410 LET PER=0: REM CURRENT PERIOD
1420 LET TOTON=0: LET TOTOFF=0: REM TOTAL ON & OFF TIMES
1430 FOR Z=1 TO 2: PLOT W(Z,1)-10,W(Z,2): DRAW 0,50: NEXT Z
1440 FOR Z=1 TO 2: PLOT W(Z,1)-10,W(Z,2): DRAW 5,0: PLOT W(Z
,1)-10,W(Z,2)+25: DRAW 5,0: PLOT W(Z,1)-10,W(Z,2)+50: DRAW 5
,0: NEXT Z
1450 IF SUB THEN RETURN
1460 LET M$="": BEEP .2,30: POKE 23617,236: INPUT INVERSE 1;
BRIGHT 1;"START TIME(HHMM) sym/A exits"; LINE M$: IF M$=" S
TOP " THEN LET M$="1200": GO TO 1550
1470 IF LEN M$<>4 THEN GO TO 1460
1480 LET HR=VAL M$( TO 2): LET MN=VAL M$(3 TO ): REM START T
IME
1490 PRINT AT 13,6; INVERSE 1; BRIGHT 1;"MONITORING STATISTI
CS"
1500 PRINT ' INVERSE 1; BRIGHT 1;"START TIME "; INVERSE 0;
BRIGHT 0;M$( TO 2);";";M$(3 TO );" "; INVERSE 1; BRIGHT 1;"P
ERIOD ";WINDOW;" "; INVERSE 1; BRIGHT 1;"MINS"
1510 PRINT 0; INVERSE 1; BRIGHT 1;"PRESS A KEY TO START": P
AUSE 0
1520 INPUT "": PRINT 0; INVERSE 1; BRIGHT 1;"PRESS F TO FIN
ISH LOGGING"
1530 GO TO 340: REM REAL EXIT
1540 RANDOMIZE USR OFF: REM STOP
1550 CLS : PRINT 'TAB 3;T$
1560 LET HR=VAL M$( TO 2): LET MN=VAL M$(3 TO )
1570 PRINT 'TAB 10; INVERSE 1; BRIGHT 1;"OPTIONS"
1580 PRINT ' INVERSE 1; BRIGHT 1;"M"; INVERSE 0;"ACHINE GENE
RATED EXAMPLE"
1590 PRINT ' INVERSE 1; BRIGHT 1;"A"; INVERSE 0;"GGREGATE DA
TA TO NEW TIMESCALE"
1600 PRINT ' INVERSE 1; BRIGHT 1;"D"; INVERSE 0;"E-AGGREGATE
DATA"
1610 PRINT ' INVERSE 1; BRIGHT 1;"R"; INVERSE 0;"EPLAY DATA
PERIOD BY PERIOD"
1620 PRINT ' INVERSE 1; BRIGHT 1;"H"; INVERSE 0;"ISTOGRAM PR
INT OF DATA"
1630 PRINT ' INVERSE 1; BRIGHT 1;"P"; INVERSE 0;"RINT LOGGED
DATA"
1640 PRINT ' INVERSE 1; BRIGHT 1;"L"; INVERSE 0;"OG MORE DAT
A - ERASES OLD DATA"
1650 PRINT "DATA IS ("NOT " AND NOT AGG);"AGGREGATED"
1660 LET X$=INKEY$
1670 IF X$="L" THEN LET SUB=0: GO TO 1330
1680 IF X$="D" THEN GO TO 2580
1690 IF X$="P" THEN IF LEN O$>0 THEN GO TO 1760
1700 IF X$="R" THEN IF LEN O$>0 THEN GO TO 1930
1710 IF X$="M" THEN BEEP .3,10: GO TO 2620
1720 IF X$="H" THEN GO TO 2160
1730 IF X$="A" THEN IF LEN O$>0 THEN GO TO 2350
1740 BEEP .2,20: GO TO 1660
1750 REM PRINT OUTPUT
1760 GO SUB 1770: GO TO 1810
1770 POKE 23617,236: INPUT "IS A PRINTER ONLINE "; LINE X$
1780 LET CH=2: IF X$="Y" THEN LET CH=3
1790 IF CH=2 THEN CLS
1800 RETURN
1810 PRINT 0; INVERSE 1; BRIGHT 1;" LOGGED DATA
1820 PRINT 0; INVERSE 1; BRIGHT 1;"FINISHED ANY KEY": PAUSE 0
1830 PRINT 0; INVERSE 1; BRIGHT 1;"FINISHED - ANY
KEY": PAUSE 0
1840 PRINT 0; INVERSE 1; BRIGHT 1;"FINISHED - ANY
KEY": PAUSE 0
1850 FOR X=1 TO LEN O$
1860 LET PER=X: GO SUB 280
1870 LET O1=CODE O$(X): LET O2=100-O1
1880 PRINT 0; INVERSE 1; BRIGHT 1;"REPLAY OF DATA"
1890 PRINT 0; INVERSE 1; BRIGHT 1;"REPLAY OF DATA"
1900 NEXT X: LET PER=LEN O$
1910 PRINT ' INVERSE 1; BRIGHT 1;"FINISHED ANY KEY": PAUSE 0
1920 REM REPLAY
1930 LET SUB=1: GO SUB 1330
1940 PRINT AT 13,6; INVERSE 1; BRIGHT 1;"REPLAY OF DATA"
1950 PRINT "START TIME ";M$
1960 INPUT "": PRINT 0; INVERSE 1; BRIGHT 1;"PRESS S for SL
OW REPLAY/any key"
1970 LET Z$=INKEY$: IF Z$="" THEN GO TO 1970
1980 LET SL=0: IF Z$="S" THEN LET SL=1
1990 INPUT "": IF SL THEN PRINT 0; INVERSE 1; BRIGHT 1;"SL
OW REPLAY ";
2000 PRINT 0; INVERSE 1; BRIGHT 1;"F=FINISH, A=ADVANCE"
2010 LET TOT=0: FOR X=1 TO LEN O$
2020 BEEP .3,10
2030 LET ONTM=CODE O$(X): LET OFFTM=100-ONTM: LET TOT=TOT+ON
TM: LET CUMONTM=INT (TOT/X)
2040 GO SUB 280
2050 GO SUB 500: IF SL THEN LET T1=FN T()
2060 LET Z$=INKEY$
2070 IF Z$="A" THEN GO TO 2110
2080 IF Z$="F" THEN GO TO 1540
2090 IF NOT SL THEN GO TO 2060
2100 IF SL THEN IF FN T()-T1<10 THEN GO TO 2060
2110 GO SUB 200
2120 NEXT X
2130 INPUT "": PRINT 0; INVERSE 1; BRIGHT 1;"FINISHED - ANY
KEY": PAUSE 0
2140 GO TO 1540
2150 REM HISTOGRAM
2160 CLS : PRINT TAB 3;T$
2170 GO SUB 1770
2180 PRINT 0; INVERSE 1; BRIGHT 1;"HISTOGRAM PLOT OF ON-TIME "
2190 PRINT 0; INVERSE 1; BRIGHT 1;"HISTOGRAM PLOT OF ON-TIME "
2200 FOR J=1 TO LEN O$
2210 LET PC=(CODE O$(J))/4
2220 LET PPC=INT ((PC-INT PC)*10): LET PC=INT PC
2230 GO SUB 280
2240 LET P$=Y$+" "
2250 IF PC=0 THEN PRINT 0; INVERSE 1; BRIGHT 1;"HISTOGRAM PLOT OF ON-TIME "
2260 FOR Z=1 TO PC: LET P$=P$+" ": REM USE graphics/space he
re
2270 NEXT Z
2280 IF PPC<3 THEN LET P$=P$+"?": GO TO 2310: REM USE graphi
cs/S HERE
2290 IF PPC<7 THEN LET P$=P$+"?": GO TO 2310: REM USE graphi
cs/T HERE
2300 LET P$=P$+"?": REM USE graphics/U HERE
2310 PRINT 0; INVERSE 1; BRIGHT 1;"FINISHED ANY KEY": PAUSE
0: GO TO 1540
2320 NEXT J
2330 PRINT ' INVERSE 1; BRIGHT 1;"FINISHED ANY KEY": PAUSE
0: GO TO 1540
2340 REM AGGREGATE DATA
2350 CLS : PRINT TAB 3;T$
2360 LET OW=WINDOW: LET OQ=O$: REM STORE WINDOW & DATA
2370 PRINT ' INVERSE 1; BRIGHT 1;"DATA AGGREGATION"
2380 PRINT "DATA IS ";LEN O$;" PERIODS OF ";WINDOW;" MINUTE
S"
2390 PRINT "Input the number of original- length periods
over which to aggregate data."
2400 POKE 23617,236: INPUT "Number of periods ";N: LET N=INT
N
2410 LET NP=INT (LEN O$/N): IF NP=0 THEN BEEP .3,10: GO TO 2
400
2420 PRINT "Data is ";NP;" periods of ";OW*N;" mins"
2430 PRINT "Any remainder is ignored."
2440 PRINT ' INVERSE 1; BRIGHT 1;"OK ? Y/N"
2450 LET Z$=INKEY$: IF Z$="" THEN GO TO 2450
2460 IF Z$="N" THEN GO TO 2350
2470 IF Z$<>"Y" THEN GO TO 2450
2480 PRINT ' INVERSE 1; BRIGHT 1;"AGGREGATING": LET OQ=""
2490 LET WINDOW=OW*N: LET PER=N
2500 FOR J=1 TO NP*N STEP N: LET N1=0
2510 FOR K=0 TO N-1
2520 LET N1=N1+CODE O$(J+K)
2530 NEXT K
2540 LET N1=INT (N1/N): LET OQ=OQ+CHR$ N1
2550 NEXT J
2560 BEEP .3,30: PRINT ' INVERSE 1; BRIGHT 1;"FINISHED": PAU
SE 1: PAUSE 100: LET AGG=1: GO TO 1540
2570 REM DEAGGREGATE
2580 IF AGG=0 THEN GO TO 1540
2590 LET WINDOW=OW: LET OQ=O$: LET PER=LEN O$
2600 LET AGG=0: GO TO 1540
2610 REM GENERATE EXAMPLE
2620 DATA 10,30,45,70,90,100,100,100,100,45,23,11,0,0,0,
100,0,20,50
2630 RESTORE 2620: LET OQ=""
2640 FOR Z=1 TO 20: READ N: LET OQ=OQ+CHR$ N: NEXT Z
2650 LET PER=20: LET M$="1400"
2660 PRINT ' INVERSE 1; BRIGHT 1;"SAMPLE AVAILABLE, use Repl
ay"
2670 LET HR=VAL M$( TO 2)
2680 LET MN=VAL M$(3 TO )
2690 LET WINDOW=5

```

```

2700 GO TO 1660
2720 FOR Z=1 TO LEN W$
2730 IF W$(Z)<"0" OR W$(Z)>"9" THEN BEEP .3,5: INPUT "": PRI
NT £0: INVERSE 1: BRIGHT 1:"NO - INPUT A NUMBER PLEASE!": P
AUSE 75: LET W$="": RETURN
2740 NEXT Z
2750 RETURN
9999 ERASE "m";1;"CHMON/REN": SAVE "*"M";1;"CHMON/REN": VERIF
Y "*"M";1;"CHMON/REN"

```

Running the System

The program first identifies the ULA resident in the micro so that it can adjust operation for the different ways in which they handle data on the EAR socket. The machine code is loaded followed by the instruction screens, each of which is viewed in turn and explains the set-up process.

Connect a suitable lead from receiver 'phone or extension speaker socket to the EAR socket on the micro. The set-up screen instructs accordingly and, after suitable adjustment of the volume control, a signal should cause the bar in the top left-hand corner of the screen to flash.

Use an FM channel; more accurate results are obtained when FM is received than SSB since the continuous heterodyne keeps the machine-code triggered "on".

The suggested time-window is 3 to 5 minutes which produces 15 to 20 samples per hour. When these results have been studied, and replayed if necessary, they may be aggregated into 15 minute or hour periods. Short periods of high activity, especially on a repeater, will show up as well as average activity over longer periods.

A machine-generated example may be used to illustrate the displays and to practice aggregation of data into longer time-spans. No audio connection is required here.

Monitoring a beacon of "lift" conditions is done by squelching the receiver on a normal-strength signal. Any change in conditions raises the signal which will be measured as "on" time. Beacons usually key so the figures measured will be less accurate than FM readings, but nonetheless good indications are obtained. Depending on the type of keying employed by the beacon, better results can be got by detuning the signal to give a heterodyne.

Although not tested, I am sure that the program will measure the length of meteor "pings" and might find some use in this area of amateur activity.

Better results were obtained by placing the receiver well away from the micro. I used the Network lead provided with the Interface One as the audio connection.

The program has been left running for many hours monitoring one of several local repeaters on 2 metres, as well as simplex channels. The keepers of one repeater might well be surprised by both the huge periods of near-silence (idents only) and high activity especially in the small hours of the morning!

Other Business

I've had several pleas for help from owners of some of the older micros. Apparently amateur radio software is almost non-existent for these. I am willing to co-ordinate any information which might help here and will publish a list if enough information comes in.

Simply send me (care of *S.W.M.*) a list of any software you have, which micro it's for and how it can be obtained. Likewise any commercial outlets for minority micros might also like to contact me with details of what is available.

If you have any ORIC software, Dave Organ is interested. Write to him *via* G4INP at *Short Wave Magazine*, 34 High Street, Welwyn, Herts. AL6 9EQ.

CLUBS ROUNDUP

By "Club Secretary"

PERHAPS the time has come to re-state that we will take an entry for this column for up to three months in advance, provided we have a name and address of club secretary and of course the other details. So many changes of Hq. and Hon. Sec. occur that we always reckon that we need an update after three months. The system we use at the office makes sure that if you miss the deadline, the material is not thrown away but put into the pile for the following month's piece. After all, your new club members are our future readers — we have an interest in keeping "Clubs" up to date and accurate!

The Mail

Fridays at 35 Thistle Lane from 7.30 p.m. is the form for the **Aberdeen** crowd; October 3 is a junk sale, and on 10th they have their 40th Anniversary cheese and wine party. October 17 is a demonstration of amateur radio microwave by GM4ZUK and GM3GQH, and on 24th they have various members' recollections of 40 years in the hobby. Finally, on October 31, they have a 40 Years Hallow'een Night — free fun and food for family and friends! Details from the Hon. Sec. — *see* Panel.

From GM to GW, and **Abergavenny** & **Nevill Hall** where on

October 16 they have G4ASR talking about meteor scatter. They meet on Thursday evenings in the room above Male Ward 2 at Pen-y-Fal Hospital, Abergavenny. This club, be it noted, is a registered centre for the December RAE and early applications should go to the Hon. Sec. — *see* Panel.

October 21 is the date for **Acton, Brentford & Chiswick** group, at Chiswick Town Hall, Chiswick High Road, London, for an evening on members' holiday activities.

Now to **BARTG**, the club for the RTTY and data communication buffs. Membership enquiries to GW6MOJ/GW6MOK, Pat and John Beedie, Ffynnonlas, Salem, Llandeilo, Wales SA19 7NP, and other enquires to the Hon. Sec. at the address in the Panel.

Barry College of Further Education members number over 70 and they foregather on Thursday evenings at the College Annexe at Weycock Cross, Barry — this is the bit of the college with the HF and VHF towers and beams.

It's the AGM on October 6 for **Basingstoke** at Forest Ring Community Centre, Sycamore Way, Winklebury; they also have the odd informal or VHF Foxhunt, the details of which are settled at the last minute and so need to be obtained from the Hon. Sec. — *see* Panel.

Now to **Biggin Hill**; this means Downe Village Hall, next to the "George and Dragon", High Street, Downe, Kent, on October 21 for an antenna demonstration. Note that the meetings now start at 7.30 p.m. for the benefit of the younger members.

Bishops Stortford are at the British Legion in Windhill on the third Monday in each month, and informally every Thursday evening at the "Nag's Head" on the A120 Dunmow Road out of the town. More details from the Hon. Sec. — *see* Panel.

For **Borders** the first and third Friday of every month are taken

at the Tweed View Hotel in Berwick-on-Tweed — details from the Hon. Sec., see Panel.

Borehamwood and Elstree are based at the Organ Hall Community Centre, Bairstowe Close, Borehamwood, on the second Monday of each month; for October G3JPJ will give a demonstration of QRP.

For **Braintree** the first and third Monday are booked at the Braintree Community Centre, Victoria Street, by the bus park. On the other Mondays they have a club net on 144 MHz channel S15.

Stapenhill Institute is home to the **Burton-upon-Trent** club, every Wednesday evening. There is also a Morse class starting in September on Monday evenings at the same place. In addition they are deeply into both Top Band and VHF D/F contests, and on October 22 they welcome G3BA for his talk "Clandestine Radio".

The Tuesday meetings of the **Bury** club are at the Mosses Centre, Cecil Street, Bury, and we note that on October 14 they have a construction contest.

Bredhurst meets on October 2 for an inter-club quiz, October 16 and October 30 when they have a QRP and homebrew components contest; Parkwood Community Centre, Parkwood Green, Deanwood Drive, Gillingham, Kent, is the place and every Thursday the night — the dates not noted above are for informals.

Now **Central Lancashire** where we have to refer you to the Hon. Sec. for details — they seem to have had a hang-up! See the Panel for his name and address.

October 7 is the AGM, and November 4 a junk sale, for **Chelmsford** at Marconi College, Arbour Lane, Chelmsford.

Now to **Cheltenham** where they have a natter night on October 3, and a joint meeting with other local clubs on October 17 at which G3IEE will talk about and show his collection of war-time equipment. The venue, as usual, is Stanton Room, Charlton Kings Library, Cheltenham.

Bury Farm, Pednor Road, Chesham, is the home of the **Chesham** group, and they are to be found there every Wednesday evening.

Turning to **Cheshunt** now, we find them at Church Room, Church Lane, Wormley, every Wednesday evening. Much time and effort has been put in to the club Hq. of late, and things seem to be going very well for this large and active club.

Colchester has its AGM on October 2, and a talk on spy sets by G3EUR on October 16. On October 30, G4TZM talks about making aerials for VHF and UHF.

At the time their newsletter was being printed the **Cornish** club was startled to realise that nothing was finalised for the October meeting! Doubtless this will have been resolved in time for the first Thursday of the month, at the Church Hall, Treleigh, on the old Redruth Bypass; and on November 6 they have a junk sale.

Turning to **Coventry** we find them at Baden-Powell House, 121 St. Nicholas Street, Radford, Coventry, every Friday evening. October 3 is the AGM and on 10th and 24th they are on-the-air. October 17 is a DIY forum, and there is a (members only) visit on 22nd. Finally, October 31 is the construction contest.

Main meetings at **Crawley** are now at the Leisure Centre; October 22 is down for G4EFO to demonstrate *Microwave Modules* gear. Informals for this club are at members' homes and details can be obtained from the Hon. Sec. — see Panel. Notice that on November 12 the junk sale will be at *TS Cossack*, London Road, Crawley.

The **Crystal Palace** crowd continues to have its dates in the All Saints Parish Rooms, Beulah Hill, London SE19 (opposite the IBA transmitting mast); October 18 is a junk sale.

On second and fourth Wednesdays the **Chiltern** gang head for the Sir William Ramsey School, Science Block, Rose Avenue, Hazlemere, near High Wycombe. October 22 is set aside for a talk on 10-metre conversions.

The **Dartford Heath D/F Club** programme shows their home events to be the pre-hunt meet at the "Horse and Groom" pub, Leyton Cross, on October 14, and the hunt itself on October 19. The pre-hunt meet is the one at which the details are handed out,

so that's the one to attend. Other details from the Hon. Sec. — see Panel.

The meetings of the **Denby Dale** club are held at the Pie Hall; October 1 is the AGM, but it seems they have meetings every Wednesday evening.

That is certainly the case for **Derby**, where they have the top floor at 119 Green Lane for their Hq. October 1 is a junk sale, and October 8 a talk on meters by G3SZJ. On 15th G4UUQ will give an illustrated talk on New Zealand, and October 22 is still to be settled as we write. October 29 is a recap, by G5LP, of their adventures on the Lundy Island DX-pedition.

The **Dover** club is properly called SE Kent YMCA, and this lets it be known that they are at Dover YMCA, Godwynehurst, Leybourne Road, Dover, where they foregather on Wednesdays. October 1, 15 and 29 are the natter nights, and October 8 a talk on Fire Service communications; October 22 is a Top Band D/F event.

Eastbourne are at Archery Youth Centre, Seaside, Eastbourne, on Sunday evenings at 7.30 for an RAE and Morse class. More details of the club from the Hon. Sec. at the address in the Panel.

On October 9, G4HFL talks to **Edgware** about syntony, and on 23rd at the informal G3MNO will talk about the club's history. The venue is Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

Deadlines for "Clubs" for the next three months—

November issue—September 25th

December issue—October 30th

January issue—November 27th

February issue—December 29th

Please be sure to note these dates!

Falkirk have the first and third Wednesdays of each month booked at the Grange Centre, Brightons, near Falkirk. Further details from the Hon. Sec. — see Panel.

At **Fareham** we believe, although they don't say so, that the group has its base at Portchester Community Centre; there are the natter nights on October 1, 15 and 29, and talks on the other two dates. October 8 is down for G4CJO on Packet Radio, while the subject and speaker for October 22 were still unsettled when they wrote.

For **Felixstowe** the Hq. is "The Feathers" in Walton High Street, Felixstowe, and they like to acknowledge the landlord's help in this respect. October 6 is a social and on 16th they visit the *East Anglian Daily Times*. On October 20, G4SYG of BT will talk about testing and trouble-shooting.

On October 7 the **Fylde** group has the G6CJ tape and slide talk on aerials, and on 21st it is informal and Morse all evening. Both are at the Kite Club at Blackpool Airport, where they have a combined sub, giving access to the club at all times.

October 30 is provisionally a natter night for the **Glossop** crew, at the "Nag's Head", starting at around 8 p.m.

The **G-QRP Club** has to be the one for anyone who is interested in low-power operating, or simple gear and aerials, or indeed almost any form of home-brew. Get the details from the Hon. Sec. — see Panel.

We are a bit low on current information from **Harrow** but they seem to be still at the Harrow Arts Centre, in High Road, Harrow Weald; usually in the Roxeth Room, and from around 8 p.m.

Now **Hastings** where they have the main meeting at West Hill Community Centre, on the third Wednesday of the month. However, there is also an informal every Friday at their room in Ashdown Farm Community Association in Downey Close.

Names and Addresses of Club Secretaries reporting in this issue:

- ABERDEEN: D. Travis, GM4GXD, Gorsedd, Kirkton, Chapel of Garioch, Inverurie AB5 9HF. (*Pitcaple 04676*) 251)
- ABERGAVENNY: J. B. Davies, GW4XQH, 109 Croesonen Parc, Abergavenny, Gwent NP7 6PF. (*0873 4655*)
- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. (*01-992 3778*)
- BARTG: P. & J. Beedie, GW6MOJ/GW6MOK, Ffynnonlas, Salem, Llandeilo, Wales SA19 7NP. (*0538 822286*)
- BARRY (College of F.E.): J. Cooper, GW0ACH, 'Meerhay', Church Street, Wick, Nr. Cowbridge, S. Glam. (*0656 79710*)
- BASINGSTOKE: D. A. Birleigh, G4WIZ, 14 Winchfield Gardens, Tadley, Basingstoke, Hants. RG26 6TX
- BIGGIN HILL: R. Senft, G0AMP, Mill Hay, Standard Road, Downe, Kent BR6 7HL. (*0689 57848*)
- BISHOPS STORTFORD: S. Mammatt, G6HKK, 11 Twyford Gardens, Bishops Stortford, Herts. CM23 3EH. (*0279 52297*)
- BORDER: Mrs. M. Bottomley, G0M1RN, 4 Home Farm Cottages, Lady Kirk, Nr. Berwick-on-Tweed, Northumberland.
- BOREHAMWOOD: Ivor Rosenberg, 11 Parkside Drive, Edgware, Middx.
- BRAINTREE: D. Brades, 3 Coldnailhurst Avenue, Braintree CM7 7SL. (*0376 44908*)
- BURTON-ON-TRENT: M. Cotton, G4HBY (*Burton-on-Trent 33958*)
- BREDHURST: K. Fay, G0AMZ, 37 Sandringham Road, Rainham, Gillingham, Kent ME8 8RP. (*0634 376991*)
- BURY: M. Sivieri, G4ZTB, 47 Ramsay, Bacup, Lancs.
- CENTRAL LANCs: D. W. Fowler, G4YWG, 22 Larchwood Crescent, Leyland, PR5 1RJ. (*0772 432275*)
- CHELMSFORD: A. C. Mead, G4KQE, 9 Abraham Drive, Silver End, Witham, Braintree, Essex CM8 3SP.
- CHELtenham: T. Kirby, G4VXE, 29 Tivoli Road, Cheltenham, Glos. GL50 2TD. (*0242 36723*)
- CHESHAM: J. Alldridge, G6LKS, 95 Rose Drive, Chesham HP5 1RT.
- CHESHUNT: J. & T. A. Watkins, G4VMR/G4VSL, "One Ash," Frogs Hall Lane, Haulwick, Herts. SG11 1JH. (*Dane End 250*)
- COLCHESTER: F. R. Howe, G3FIJ, 29 Kingswood Road, Colchester. (*0206 851189*)
- CORNISH: N. Pascoe, G4USB, Bosvathick Farm, Constantine, Falmouth, Cornwall. (*Falmouth 40367*)
- COVENTRY: R. Tew, G4JDO, 4 Chetwode Close, Coventry CV5 9NA. (*0203 73999*)
- CRAWLEY: D. L. Hill, G4IQM, 14 The Garrones, Worth, Crawley, West Sussex RH10 4YT. (*Crawley 882641*)
- CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crscent, London SE23 3BN. (*01-699 6940*)
- CHILTERN: R. Ray, G3NCL, 21 Parish Piece, Holmer Green, High Wycombe, Bucks. (*0494 712020*)
- DARTFORD HEATH D/F: A. Burchmore, G4BWV, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.
- DENBY DALE: G. Edinburgh, G3SDY, 37 Westerly Lane, Shelley, Huddersfield HD8 8HP. (*0484 602905*)
- DERBY: J. Anthony, G3KQF, 77 Bransfield Road, Littleover, Derby DE3 6GT. (*0332 772361*)
- DOVER (S.E. Kent YMCA): A. Moore, G3VUS, 42 Nursery Lane, Whitfield, Dover, Kent CT16 3HG. (*0304 822738*)
- EASTBOURNE: R. Peirce, G1BRC, 69 Bridgmere Road, Eastbourne, BN22 8TF. (*Eastbourne 29913*)
- EDGWARE: J. Coble, G4RMD, 4 Briars Close, Hatfield, Herts. (*Hatfield 64342*)
- FALKIRK: G. L. Leishman, GM4MCB, Woodside, Redding, Falkirk, Stirlingshire FK2 9UQ. (*0324 715624*)
- FAREHAM: A. S. Chester, G3CCB, Deva Wood, 44 The Ridgeway, Down End, Fareham, Hants. (*0329*) 288139)
- FELIXSTOWE: P. J. Whiting, G4YQC, 77 Melford Way, Felixstowe IP11 8UH. (*0473 642595, daytime*)
- FYLDE: H. Fenton, G8GG, 5 Cromer Road, St. Annes, Lytham St. Annes, Lancs. FY8 3HD. (*Lytham St. Annes 725717*)
- GLOSSOP: E. Calvert, G4EIC, 6 Barber Street, Padfield, Hadfield, via Hyde, Cheshire SK14 7EQ.
- G-QRP: Rev. G. Dobbs, G3RJV, 498 Manchester Road, Rochdale, Lancs. OL11 3HE. (*0706 31812*)
- HARROW: D. Atkins, G8XBZ, 25 Maxwell Close, Rickmansworth, Herts. (*0923 779942*)
- HASTINGS: D. Shirley, G4NVQ, 93 Alfred Road, Hastings, Sussex. (*Hastings 420608*)
- HEREFORD: F. E. G. Cox, G3WRQ, 35 Thompson Place, Hereford. (*Hereford 54064*)
- HOLYHEAD: Mrs. B. Anziani, 12 Beach Close, Morawelon, Holyhead, Anglesey, Gwynedd.
- IPSWICH: J. Tootill, G4IFF, 76 Fircroft Road, Ipswich, Suffolk IP1 6PX. (*0473 44047*)
- IRTS: G. Gervin, E18CC, 185 Elton Court, Leixlip, Co. Kildare, Eire.
- LOUGH ERNE: W. Ward, G1ANRE, 6 Brackvede Park, Enniskillen, Northern Ireland BT74 7DX. (*0365 24905*)
- LOUGHTON: D. Thorpe, G4FK1, 44 Townfield Road, Flitwick, Beds. MK45 1JF.
- MAIDSTONE (YMCA): P. Martin, G0BUW. *Address Wanted.* (*0622 30544*)
- MALTBY: I. Abel, G3ZHI, 52 Hollytree Avenue, Maltby, Rotherham, Yorks. (*Rotherham 814911*)
- MAXWELLTOWN: C. D. S. Rodgers, GM4NNC, 5 Elder Avenue, Lincluden, Dumfries DG2 0NL.
- MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 1LB. (*021-422 9787*)
- NENE VALLEY: M. R. Byles, G6UWS, 108 Kingsway, Wellingborough, Northants. (*Wellingborough 71189*)
- NORTH CHESHIRE: P. Kirsop, G4WCE, Peel House, 5 Planetree Road, Hale, Cheshire WA15 9JJ. (*061-980 5173*)
- NOTTINGHAM: J. Towle, G4PJZ, 63 Digby Avenue, Mapperley, Nottingham NG3 6DS.
- PONTEFRAC: C. Mills, G0AAO, 27 Pendennis Avenue, South Elmsall, Nr. Pontefract, West Yorks.
- POWYS: M. Smith, GW4DWX, Yonn Marr, Welshpool, Powys. (*Welshpool 2068*)
- RAIBC: Mrs. C. Clark, G1GQJ, 9 Conigre, Chinnor, Oxon. OX9 4JY.
- RAOTA: G. R. Jessop, G6JP, 32 North View, Eastcote, Pinner, Middlesex. HA5 1PE.
- SARUG: P. Newman, G4INP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ.
- SOLIHULL: P. Gaskin, G8AYY, 58 Elmcroft Road, South Yardley, Birmingham B26 1PL. (*021-783 2996*)
- SOUTH BRISTOL: L. Baker, G4RZY, 62 Court Farm Road, Whitchurch, Bristol, Avon BS14 0EG.
- SOUTHDOWN: R. Evans, G4VOS, Oakside, Waldron, Heathfield, Sussex. (*Heathfield 3168*)
- SOUTHGATE: D. C. Elson, G4YLL, 200 Churchgate Road, Cheshunt, Herts. EN8 9EL.
- STAFFORD: J. Brown, G6DAT, 33 Bush Drive, Rugeley, Staffs. WS15 2AQ. (*08894 2453*)
- STOCKPORT: M. Betts, G4FFW. (*061-224 7880*)
- STOURBRIDGE: C. S. Williamson, G1IEB, 7 Hanbury Hill, Stourbridge DY8 1BE.
- SURREY: J. Simkins, G8IYS, 18 Riding Hill, Sanderstead, Croydon CR2 9LN. (*01-657 0454*)
- SUTTON & CHEAM: G. Plucknett, G4FKA, 32 West Road, Maldon Rushett, Cheshington.
- TELFORD: T. Crosbie, G6PZZ, 41 Culmington, Stirchley, Telford TF3 1UN. (*Telford 597506*)
- THAMES VALLEY: J. Pegler, G3ENI, Brook House, Forest Close, East Horsley, Leatherhead KT24 5BU.
- TODMORDEN: Mrs. V. Mitchell, G1GZB, Parrock Farm, Shore Green, Todmorden, West Yorks. OL14 8SF. (*Todmorden 7572*)
- TORBA: B. Wall, G1EUA, 48 Pennycare Road, Teignmouth TQ14 8LB. (*Teignmouth 78554*)
- VALE OF EVESHAM: M. J. Butler, G4UXC, 16 Clevedon Green, South Littleton, Evesham, Worcs. (*0386 831508*)
- VERULAM: G. Wimpenny, G4OBH, 30 Faircross Way, St. Albans, Herts. (*St. Albans 52003*)
- WACRAL: L. Colley, G3AGX, "Micasa", 13 Ferry Road, Wavne, Nr. Hull, Yorks. HU7 5XU.
- WAKEFIELD: W. Parkin, G8PBE, 14 Clevedon Grove, Lupset Park, Wakefield WF2 8LD. (*Wakefield 378727*)
- WARRINGTON: P. Forster, G0CBN, 6 Birchdale Road, Paddington, Warrington, Cheshire WA1 3ER. (*0925 814005*)
- WELWYN-HATFIELD: D. Fairbank, G0AII, 2 Sandpit Road, Welwyn Garden City, Herts. AL7 3TN. (*Welwyn Garden City 326138*)
- WIGAN: J. Cooke, G6TYB, 106 Wirral Drive, Winstanley, Wigan WN3 6LD. (*Wigan 214969*)
- WIMBLEDON: G. Cripps, G3DWW, 115 Bushey Road, Raynes Park, London SW20 0JN. (*01-540 2180*)
- WOLVERHAMPTON: K. Jenkinson, G1OIA, 10 Avondale Road, Wolverhampton WV6 0AL. (*0902 24870*)
- WORCESTER: D. W. Batchelor, G4RBD, 14 Oakleigh Heath, Hallow, Worcester. (*Worcester 641733*)
- WORKSOP: Mrs. C. Gee, G4ZUN, 100 Plantation Hill, Kilton, Worksop, Notts. (*0909 486614*)
- WORTHING: R. Jones, G4SWH, PO Box 599, Worthing, West Sussex BN14 7TT. (*Worthing 208752*)
- YEovil: E. H. Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, Somerset. (*0935 75533*)
- YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.
- 308: R. Chalker, G4JRR, 89 Mount Road, Chessington, Surrey KT9 1JH. (*01-391 0788*)

October 3 at **Hereford** is G3PGQ's talk and demonstration on antenna radiation patterns, and on October 17 there is an informal session. The venue for both is the County Control, Civil Defence Hq., Gaol Street, Hereford.

The "Forresters Arms", Kingsland Road, is home to the **Holyhead** group; they are booked in on alternate Sunday evenings, and you can get the details from the Hon. Sec. — see Panel.

Ipswich has the big thick newsletter called *QUA*, which marks roughly the mid-point in the exercise of writing this piece. From it we learn that the "Rose & Crown", 77 Norwich Road, Ipswich is their base. Nominally they have the second and last Wednesday, but there are usually members there on the other Wednesdays too.

Looking through the *IRTS* newsletter this time we note that they are the national society in Eire and have the details of the local clubs around the country; and we see a very good article on

lightning, plus a reference to EI2W — for so long active and leading the way on VHF.

Up to Ulster, and **Lough Erne** where they foregather at the Railway Hotel, Enniskillen. As they have only just had the AGM, we guess they are busy putting the programme together as we write.

Back to England and **Loughton**. October 10 is informal, and on 24th they have a D/F hunt on VHF; start at 7.45 p.m. from Loughton Hall, where they have Hq. This is in Rectory Lane, Loughton, Essex.

At **Maidstone** the Hq. is at the YMCA Sportscentre, Melrose Close, Cripple Street, Maidstone. October 3 is the Mobile Rally briefing, and on 10th they have a natter night, repeated on 24th. October 17 is a junk sale, and October 30 a talk on the construction of a valve 100-watt amplifier for 29 MHz.

We don't have any detail of the current **Maltby** activity, so we must refer you to the Hon. Sec., G3ZHI, at the address in the Panel.

Twice monthly in the Tam o' Shanter Inn, the **Maxwelltown** crowd heads for the club meetings; October 15 is the AGM date. In addition, most weekends see members at the club site on Solway Firth, but it is suggested you contact the Hon. Sec. about this activity.

Midland now, and this means Henstead House, Henstead Street, Birmingham, where on October 18 they have a home-brew contest.

October for the **Nene Valley** crowd means October 1 for a talk on the Aylesbury Vale repeater by G8BQH, and on 8th a talk by Dr. Graham of the CEGB on nuclear power. October 15 is an informal, and on October 22 they have Mrs. Cox of the Public Record Office talking about Domesday Book. October 29 is another informal, and all are at the "Prince of Wales" pub, Well Street, Finedon.

The **North Cheshire** Radio Club seems to have its base at Morley Green Social Club, Wilmslow, Cheshire; for the rest we must refer you to the Hon. Sec. — see Panel.

Every Thursday evening the **Nottingham** radio amateurs head for Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham. For October they have their activity nights on 2nd, 16th and 30th; October 9 is a 23cm. night, and on 16th they have a talk on microwaves.

The weekly meetings of **Pontefract** group are on Thursdays at Carleton Community Centre, where they have the top floor; the informals are on Mondays. October 9 is a visit and ATV demo by Goole club members, and on 16th there is a Raynet junk sale. October 23 is a talk by G4LOS on the G2DAF receiver construction, and on 30th they have a committee meeting.

For **Powys** you have to head for Montgomery, and then find Lymore Park Cricket Pavilion where they meet every Thursday evening: take the road toward Chirbury, and turn right just before you see the 'derestriction' sign, then follow the track for about a mile. Perhaps it's easier to phone the Hon. Sec. for details — see Panel.

If you know of a potential or actual radio amateur or SWL who is disabled or blind, you should rope them into **RAIBC** as the club specially for them. And of course, you could join yourself as a supporter or representative. Get the details from the Hon. Sec. — see Panel.

RAOTA is the club for the old-timers; that means those who can show 25 years or more in Amateur Radio. Get the details from the Hon. Sec. — see Panel.

If you have a Sinclair computer you should be a member of **SARUG**; every newsletter issue contains interesting programme material for the various computers, plus notes on commercial software and much more. Details from the Hon. Sec. — see Panel.

The **Solihull** members nowadays get together at the Shirley Centre, 274 Stratford Road, Shirley, Solihull; October 16 is the AGM. New members are welcome and Morse classes are run.

For **South Bristol** you should find Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol; October 1 is a demo by

G4WUB and G0EZE on modem use, and on 8th there is a session on packet radio. October 15 sees the final preparations for the Bristol Rally, and the Rally itself is on 19th. October 22 is a debriefing and activity night, and on 29th there is a lecture which was still to be finalised when they wrote. Usually they are in rooms 2, 3 or 4, but as rebuilding goes on this may change.

Southdown meets on the first Monday of each month at Chaseley Home, Southcliffe, Eastbourne, plus, on Tuesdays and Fridays, Wealden District Council Offices, Vicarage Field, Hailsham.

Holy Trinity Church Hall is host to **Southgate** club these days; October 9 is a talk on DBS and ATV, and the informal is on October 23. The venue, by the way, is in Green Lanes, Winchmore Hill, London.

Every Tuesday evening **Stafford** members are to be found at the Coach and Horses Motel, Weston, Stafford. October is down for G6YHQ to talk on ceramics.

October 8 at **Stockport** is a talk by G8OMH on logic circuitry, and 15th is an informal natter in the bar. "Shocks and Socks" is the title of G4SSN's talk on 22nd. Meetings at the Magnet Inn.

Stourbridge means the Robin Woods Centre, School Street, on first and third Mondays; detail not completed at the time they wrote.

Surrey has first and third Mondays at *TS Terra Nova*, 34 The Waldrons, South Croydon.

If you want to locate the **Sutton & Cheam** crowd, you must find Downs Lawn Tennis Club, Holland Avenue, Cheam. The first Monday of each month is an informal in the bar, and the third Monday is the formal. October 17 is a junk sale.

Next **Telford** which means Dawley Bank Community Centre, Bank Road, Dawley, Telford, Shropshire, every Wednesday.

For **Thames Valley** the form is to meet on the first Tuesday of each month, at Thames Ditton Library, Watts Road, Thames Ditton. For October, there is the judging of entries for the QRP project.

October 6 for **Todmorden** is a surplus equipment sale, and on 20th a talk by Mr. Simpson of *Ant Products*. Both are at the Queen Hotel, Todmorden, starting at 8 p.m.

The **Torbay** routine has changed a little, as they now alternate between Thursdays and Fridays for the weekly meetings at ECC Social Club, Ringslade Road, Highweek, Newton Abbot, Devon. However, the main meeting on the last Saturday remains unchanged.

On to the **Vale of Evesham** and the "Round of Gras" at Badsey, near Evesham, on the first Thursday of the month. Should you miss, then look for "The Anchor" at Fladbury on the third Thursday.

The **Verulam** Hq. is at the R.A.F.A., New Kent Road, St. Albans, on the second and fourth Tuesday of each month. For details, contact the Hon. Sec. — see Panel.

The **WACRAL** members are practising Christian radio amateurs or SWLs, of any denomination. Details from the Hon. Sec. — see Panel.

The new **Wakefield** newsletter is reduced in size and a little hard to read, but we gather they are still at the Community Centre, Prospect Road, Ossett. October 7 is entitled 'Getting Through after Getting Through' and on 14th they have a competition on the air. October 21 is the home-construction display, and on 28th there is a bonfire party.

An open forum is down for October 7 at **Warrington**, and on 14th they have G3OGQ to talk about spectrum analysis. October 21 is the talk on VHF NFD and other contests, by G4HGI, and October 28 was still not finalised when they wrote. Grappenhall Community Centre, Grappenhall, is the Hq.

October 6 is down for G3FRX to talk about RSGB to **Welwyn/Hatfield** at the Scout Hq. in Knightsfield, Welwyn Garden City. The same venue on October 20 sees a film and video show.

New Club

This is at **Wigan** and is to be found on Wednesdays at St. Jude's Club; the programme was being built up as this piece is written. More details from the Hon. Sec. — see Panel.

Wimbledon has been reporting in ever since the writer took on this column a couple of decades ago; nowadays they are based on St. Andrews Church Hall, Herbert Road, Wimbledon, where they have the AGM on October 10 and a surplus sale on October 31.

Yet another AGM is at **Wolverhampton** on October 7, at Wolverhampton Electricity Sports and Social Club, St. Mark Road, Chapel Ash. October 14 is a talk on 'skin effect', and on 21st G8VXY talks and demonstrates RTTY. A D/F hunt on 144 MHz starts from Tettenhall Rock at 11.00 on 26th, and the month ends on 28th with a night-on-the-air.

These days the **Worcester** activities are concentrated on the Oddfellows Hall, New Street, Worcester. October 6 is club publicity night, and October 20 an informal.

A change of home for **Workshop** which is now to be found on Tuesdays at the Woodhouse Inn, Woodend, Rhodesia, Workshop.

Worthing now, and here the venue is Lancing Parish Hall, where they meet every Wednesday. This Hq. is in South Street, Lancing, Sussex; October 1 is a ragchew, October 8 the AGM, October 15 another ragchew, and on 22nd they have a talk on SS/TV.

Yeovil has a briefing for GB4OYC on October 9, and G3MYM answering questions on propagation on 16th. He also has 23rd, for a talk on the W8JK aerial, and the matter night is on 30th. G3MYM is back in the chair on November 6 for 'Great Circle Calculations'. The club Hq. is at the Recreation Centre, Chilton Grove, Yeovil.

Every Friday the **York** crowd is to be found at the United Services Club, 61 Micklegate, York, starting at 7.30 p.m. Visitors are always welcome here.

To meet the 308 crowd, you look for the Coach House, Church Hill Road, Surbiton (no, it's not a pub!). On October 7 there is all the ado of an AGM, and on 28th there is a club junk sale.

Finished

The bottom of the pile aired for another month! Deadlines are in the 'box', and meantime please check your club's details are right. Copy, to arrive by the deadlines, should be addressed to Club Secretary, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. *Cuagn.*

Rally

November 1, North Devon Radio Rally, Bradworthy Memorial Hall (near Holsworthy), 10.30 a.m. to 5 p.m., bring-and-buy, etc., talk-in on 2m. (S22). Details from G8MX1, QTHR.

Special Event Stations

BBC Radio Newcastle will be holding a public Open Day on **October 12** at their new studios at Fenham near the city centre, and **Tyneside A.R.S.** will operate **GB2FBC** from the Newsroom.

The **Eighth Army Veterans Association** El Alamein Reunion will be held at the Winter Gardens, Blackpool, on **October 24-26**, and application has been made for **GB8AER** for contacts on 2m. FM (especially with R.S.A.R.S. members). G2DHV/P and G3JFE/P will also be operating.

Ipswich Radio Club will be operating **GB2IRC** at the **Suffolk Scouts Corrobooree 1986**, Eurosports Centre, Shotley, during the period **October 31 to November 1**. Details from G4IFF, QTHR.

R.A.E. Courses

The following information was received too late for inclusion in the main listing in last month's issue (places may be still available):

Knottingley: Knottingley High School, West Yorks., tutor A. E. Ashby G3HCW (QTHR).

Loughborough: Loughborough Technical College, Radmoor, Loughborough, Leics. LE11 3BT (0509-215831), Tuesdays 6-7 p.m. (Morse) and 7-9 p.m. (Theory), tutor Terry Kirk, G3OMK. Course fee: £8.32 (Morse), £17.94 (Theory).

College Quest for 100-year-old Former Student

The London Electronics College, which celebrates its 80th anniversary this year, intends to mark the event by setting out on an international quest to find its oldest former student. The College, formerly known as the British School of Telegraphy, was founded in 1906, trained early marine radio officers using the original Marconi wireless telegraph, some 300 of its students being at sea in 1912. Harold Bride, wireless operator on the *SS Titanic* at the time of the tragic iceberg disaster, and Thomas Cottam on the *SS Carpathia*, the first ship to acknowledge radio distress messages which saved so many lives, were both trained at the college.

Nowadays, the college specializes in professional electronics technician education, having ceased radio officer training in 1980. The nautical connection was maintained to the end, as the college was among the sponsors of the Trans-globe Polar Expedition led by Sir Ranulph T-W Fiennes under the patronage of H.R.H. The Prince of Wales, during 1979-82. Lady Virginia Fiennes, the expedition's radio operator, trained at the college during one of the last marine courses.

Since its foundation the college reckons it must have trained some 5,000 students, many of whom will still be scattered over the remote parts of the world, both on land and at sea. In honour of the college's 80th birthday, a general signal "QSO" is being sent out to all former students asking them to get in touch again. It's just possible that some of those original 1906 MARCONI wireless telegraph operators will respond to the call. Present-day staff and students would be delighted to welcome such visitors on a tour of inspection — just to see how much electronics has changed in the era of microcomputers and new technology.

Contact Mr. M. D. Spalding, Senior Lecturer, London Electronics College, 20 Penywern Road, London SW5 9SU (01-373 8721).

New Morse Journal

Since 1983, two Dutch radio amateurs, Rinus Hellemons, PA0BFN, and Dick Kraayveld, PA3ALM, have published a quarterly journal, *Morsum Magnificat*, for Morse enthusiasts. Contributions have been written by amateur and professional Morse telegraphers, young and old, from around the world, but as the journal appears in Dutch, its circulation has been very limited.

In 1985, an experimental, one-off, English version was published to "test the ground" for a wider audience. Now, Tony Smith, G4FAI, has joined the editorial team as English Language editor, and a new English version of *Morsum Magnificat* will shortly be available by post, worldwide. Its aim is to publish material about Morse, past and present, not normally found to any extent in popular magazines today, and will include history, illustrations, anecdotes and adventures in both wire and wireless telegraphy.

At last, CW addicts can have their fill of Morse matters, can make their own contributions, or have their say, sure of the attention of a specialized and receptive readership.

U.K. subscription for one year (four issues) is £6, postpaid, from G4FAI, 1 Tash Place, London N11 1PA, cheques payable to "Morsum Magnificat". For further information, including overseas rates, send an s.a.e., or ring 01-368 4588.

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TRADE

Copy must be received by Friday, October 17th to be sure of inclusion in the November issue.

A Guide to HF Amateur Radio Equipment. Lists all rigs available since 1965 with details of facilities, sources for modifications, tests, with new and used prices, illustrated, £2.50 including postage. — S. Foster, 91 Cophorne Road, Leatherhead, Surrey KT22 7EF.

Wanted: EE8 American field telephones, any condition, any quantity.— Ring 01-743 0899, 9-5 p.m. Monday-Friday.

November issue: due to appear on Friday, October 31st. Single copies at £1.70 post paid will be sent by first-class mail for orders received by Wednesday, October 29th, as available.—Circulation Dept., Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

Amidon toroidal cores, ferrite rings and beads. Send *s.a.e.* for data and prices. Business hours: 10-5 p.m. Tues., Wed., Fri.; 10-4 p.m. Sat. — SMC (TMP Electronics), Unit 27, Pinfold Workshops, Pinfold Lane, Buckley, Clwyd CH7 3PL.

Service Manuals: most makes, models, amateur, test, televisions, vintage etc., *s.a.e.* with enquiries please;—Mauritron (SWL), 8 Cherrytree Road, Chinnor, Oxon. OX9 4QY.

FREE READERS' ADS

see Information Panel on page 323

Wanted: Stolle 2010 rotator control box (or willing to purchase complete motor and control box), or possibly updated version provided it is of the 'feed through' type for 1½" o.d. tubing. Details and price please. — Evans, 120 Loughton Way, Buckhurst Hill, Essex IG9 6AR.

For Sale: Yaesu FRG-7700 Rx with Yaesu FRT-7700 ATU and Yaesu FRV-7700 converter, Discone VHF Rx antenna, SWL books and manuals. all very good condition, £250 or near offer (buyer collects). — Howes, 149 Warren Wood Road, Rochester, Kent ME1 2XG. (Tel: 0634-404096).

For Sale: Yaesu FRG-7 communications receiver, no mods., recently realigned, complete with manual, box, two books and aerial wire, £115 or very near offer. — Le-Brun, 22 Russet Road, Cheltenham, Glos. GL51 7LW. (Tel: 0242-571279).

Selling: Hameg HM203-4 dual-trace oscilloscope, 20 MHz, good condition, little used, with manual and one switchable probe, £200. Also Leader LAG-27 audio signal generator, sine, square, good condition, £75. — Ring Halfacre, 01-6541882 (Croydon).

Sale: FT-620B 6m. Tx/Rx, £250 or near offer. Microwave Modules 6m. converter with 10m. IF, as new, £25. FT-75 with VFO, but Rx duff, £40. Taylor 45C valve tester, £25. Would accept exchanges for the above, *e.g.* TS-700 or SSB/CW 70cm. rig, 4m transverter. — Ring GW4HBK, 0495-228516.

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Sale: Sagant EL-40X dipole antenna for 80 and 40m., will tune on 20m., with balun and insulators, £25. Yaesu YD-844 desk mic., high impedance, £20. Pace Nightingale multi-function modem with Commstar ROM, suitable for BBC computer, £50. Hokushin HF-5R 5-band radial kit for use with Hokushin HS-HF-5 trap vertical or similar antenna, £25. All items postage extra.—Michaelson, G3RDG, QTHR. (Tel: 01-455 8831).

Offering: Falklands War souvenir: Argentinian-made Philips RT-3600 VHF/FM manpack transceiver, modular, solid-state, synthesized, coverage 26-70 MHz in 50 kHz steps, working, with complete set of spare plug-in modules and circuit diagrams, but lacks whip aerial, handset and optional RF power amp. Cash offers? Or swap for HF receiver. — Turff, 164 Station Road, Lower Stondon, Beds. SG16 6JH.

For Sale: Realistic PRO-2009 8-channel scanner, VHF/UHF, one month old, boxed, £160. Buyer must collect. — Mayer, 22 Sunningdale Close, Whitestone, Nuneaton, Warks. CV11 6NB. (Tel: Nuneaton 373294).

Selling: Sony ICF-2001D synthesized receiver, Air/AM/FM, brand new in box, with AN1 active antenna, must sell, bargain. — Ring 01-767 7736.

Wanted: CW filter for Heathkit HW-101. W-H-Y? Details and price please. — Hands, G0FBG/PA, Franciscushof 179, 4133 Be Vianen, The Netherlands.

For Sale: Brand new 4CX250B linear amplifier, 400 watts, never been on-air, £475 or near offer. Buyer collects. — Hampson, G4MGH, QTHR. (Tel: 0643-7222 day, 0643-821276 evenings).

Sale: Trio TS-830S, immaculate condition, as new, boxed, ready to go (reason for sale: gone home-brew), £650. — Gregor, G4OWH, QTHR. (Tel: 0373-812274).

For Sale: SB-220 linear outer case with front and back panels, knobs and fan, excellent condition, £12 plus postage. Lyon variac, 0-270V, £20 plus carriage. BC-221AJ, modulator model, with manual and power pack, excellent condition, £25 plus carriage. New 6146B valves, £6. 4X150A, new, £5; one used, £3. Valves for Collins and Drake, please state requirements. Collins spares: variable pot. for 32S-3 and 75S-3C/BS-meter, 10 xtals for 10m., mechanical filter, manuals for 62S-1, 32S-3, 312B-4/5 and SX-101A. Electro-Voice mobile mic., as new, £15. **Wanted:** TL-922 linear, less tubes. Details and price please. — Box No. 5824, Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

Selling: Icom IC-251E transceiver, as new, with original packing and manual, £425. Yaesu FT-209RH handheld, 5 watts, 1 hour's use only, original packing, with manual and charger, £200. Regency HX-2000E VHF/UHF scanner, 20-channel, programmable, £95. — Newman, G4TGN, QTHR. (Tel: 01-897 3794).

For Sale: Global AT-1000 SWL antenna coupler, £20 plus postage. Tonna 9-ele 144 MHz antenna, used but in good condition, £10. Tonna 19-ele 432 MHz antenna, new and unused, £16. — Ring 0926-498388.

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For Sale: B2 agents' Tx/Rx in original steel dropping case, 4 coils, no power pack. Offers? — Jolliffe, Bedford School, Bedford MK40 2TU.

Sale: Yaesu FT-209RH 2m. FM handheld transceiver, 5 watts output, 144-148 MHz, 6 months old, with soft case, offers around £225. Global AT-1000 ATU. Offers? — Ring 01-845 4008 (Ruislip).

Sale: Icom IC-R71E communications receiver, brand new, including UHF unit, voice synthesizer, remote controller, external speaker, headphones and world clock, in maker's carton, must sell, bargain. — Ring 01-767 7736.

November issue: due to appear on Friday, October 31st. Single copies at £1.70 post paid will be sent by first-class mail for orders received by Wednesday, October 29th, as available. — Circulation Dept., Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

Sale: Trio TR-7800 2m. FM transceiver, 5/25 watts, 15 memories, with auto-scan, battery back-up, mic., mobile mount and manual, original packing, very good condition, £150. — Ring 093588-560 (Somerset).

Wanted: Codar Type 250/S (AT-5) AC power unit. For sale: Howes ST2, new, £4. Codar mobile power unit for AT-5, £40. — Marris, 35 Kingswood House, Farnham Road, Slough, Berks. SL2 1DA.

Selling: Audioline 340 CB rig, 160 channels, low-mid-high, legal, FM only, with two 12v nicads and charger, carrying case and rubber duck, £100. Tristar 747, covers 26.9-28.3 MHz (full 10m. conversion?), 15-20 watts, AM/FM/SSB, no mic., £80. TM-56 2m. scanning Rx, brand new, 16 channels, 17 xtals, 240/12v., £100. Handic 8-channel scanning Rx, xtal'd for marine band 16/10/12/14/18/67/0/37 but will xtal for 80-160 MHz, new and boxed, £100. — Ring Chris, Canterbury (0227) 711172 evenings only.

Wanted Urgently: Handbooks (or photocopies) for Elliott Type 8100 transistor curve tester (CRT display), Airmec Type 319 UHF wattmeter, Boonton Type 280AP UHF 'Q' meter. Good price paid. — Ring Dike, Camberley (0276) 63880.

Sell or Exchange: TS-430S HF transceiver, YK-88SN SSB filter and FM-430 units fitted, very good condition, £600. Microwave Modules MMT 144/28 transverter, with cables to fit above rig, £65. Both together, £655. Free service manual for TS-430S. Will swap for good TS-830S. — Ring Terry, G4OXD, Hitchin 35248 after 6 p.m.

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