BARG News

Ballarat Amateur Radio Group

Inc. #6953T

July

Monthly Newsletter

Next Meeting

Friday 31st July @ 7:30pm

Virtual Meeting via Webex

All Welcome

Contacting us

You can write to the club at the address below, or e-mail the secretary

The Secretary : B.A.R.G. Inc.
Box 1218
Mail Centre
Bakery Hill Vic. 3354

Or E-Mail : **vk3bml@barg.org.au**

We're on the web
www.barg.org.au

Presidents Report

Welcome to the July newsletter. As we come to the middle of the year it's coming time to be thinking about the AGM. Gordon has been reviewing the club constitution with a view to addressing a couple of items that have dated somewhat over time. In particular allow notifications to be sent via electronic means in additional to being able to be sent only via traditional mail. I'm expecting that's something that'll be supported easily.

It'll also be time for election of office holders. Doug, VK3DRE has said that he'll be standing down from the role of secretary. Doug commenced in the role in July 2008 and has done an excellent job for the last 12 years. The role of secretary is one of a small number of roles that must be filled or the club isn't able to continue as an incorporated organisation.

If your able to assist with the running of the club by being a member of the committee, then fill in and send back to the secretary.

BARG NOMINATION FORM.

Ballarat Amateur Radio Group Inc. #6953T

Date: _____

I wish to nominate _____ Call_____

For the position of _____ within BARG Inc.

Nominated by: _____ and _____

Nomination accepted by (Nominee) _____

The next meeting will again be on Webex. At this stage I'm expecting that the remaining meetings this year will be on Webex, but I guess time will tell.

This Friday the general meeting. We're asking members share something about their antenna set up. Particularly if there's an antenna farm out the back.

The next construction night is the following Monday. There'll be discussion about the antenna project and other projects that we might do at some future point. Members and guests are welcome to join.

The newsletter is for all the club to contribute too. Articles are welcome from everyone.

Thank you again to both Craig and Ian for their contributions this month.

I hope to see you all Friday and Monday.

Malcolm, VK3OAK

ELEKTOR MAGAZINE REVIEW. 3/2020. May/JUNE. Volume 46. No: 501

Again an interesting collection ov articles and construction within 114 pages.
Elector has been around for many years now initially a Dutch publication is now available for the English reading market.

REGULARS.

26 How to GitHub for Dummies.
35 Peculiar parts The Speech Synthesizer.
36 Interactive corrections & updates.
42 Developers zone. Tips, Tricks, Best practices and other useful data.
50 Starting out in Electronics. (3)
52 Small circuit revival from the suggestion box.
90 Analogue electronic Design (3) Pre-amplifier responses
98 Steeped in Electronics, Regulations and Lead free soldering.
100 The Lab, the Holy of Holy places. Can yours compare to others.?
102 The Elector store. May find some hard to obtain parts.
108 Multifunction 1.2GHz Frequency meter (1992-1993)
114 Hexadoku. Original Sudoku.

FEATURES.

6 Open Network Wx Station Mk2.
12 Artificial Intelligence for beginners. Uses a Maixduino.
82 REVIEW Joy-IT HD35 Electronic USB Load. Use to test performance.
81 Start up Update for investment program.
94 Inexpensive E-Scooter.
101 REVIEW: Peak Tech 6080. A Lab Power supply.

PROJECTS.

6 Open Network Wx StationsMk2.
18 Universal Triac Control using ATmega Switch and dim a variety of loads.
28 My IoT Button: A Button for the Web. (2) Pt2 Prototyping with board and Cloud.
38 BASIC for the ESP32/ESP8266An hourglass with the 8266 and Annex WiFi RDS.
45 Balbot: Self Balancing Robot?]
54 Tamper Proof Evident Box. For secure data transfer thru the postal service.
62 Elektor New Precise Nixie Clock Revisited.
68 Practical ESP32 Multitasking (3) looks at software timers.
72 SigFox and the IoT (4) Setting up the Dashboard.
86 CAN Bus + Arduino for Solar PV Cell Monitoring. Locate serviceable panels I large arrays.

Surely there is a load of interesting reading or construction activities here to keep us happy during the lock down time.

Silicon Chip July 2020. 7-2020

Vol 33. No 7.

FEATURES AND REVIEWS.

P10 Subtractive Manufacturing. Starting with a solid material and then using mechanical or chemical process reform or reshape it. Consider the making of a printed circuit board which is chemical processing. CNC or Computer Numerical Control started from early machine usage. The first horizontal milling machine was developed by Eli Whitney around 1818 and earlier than that in 1774 Wilkinson used a water driven horizontal boring machine. Read this article and follow some of the You tube references and some interesting milling machine videos to look at.

P27 REVIEW; A 100kHz – 500MHz digital RF Power meter. +20dBm to -60dBm using a cheap Chinese module with a two line display module. All for about $50.

P42 REVIEW: Low cost DAB+ Receiver. Is it any good.? Jim Rowe was impressed.

CONSTRUCTIONAL PROJECTS.

P30 All new Colour Maximite 2.

P44 Ol<Timer II. Non standard display of time by displaying time in words.

P76 Infra Red remote Control assistant. Combine many devices like TV, VCR, DVD, and

X Boxes or any other type of machine with a single hand held controller.

P90 Digital/Touchscreen RCL substitution Box Part 2.

YOUR FAVOURITE COLUMNS.

P61 Serviceman's Column. Dave speaks out about poorly designed equipment and the fact that they can be a serviceman's nightmare. Then he discusses the effect of "potting" components and the problem of releasing them when fault finding. A HP 8595 spectrum analyser bought on the internet doesn't perform as advertised and how it gets repaired. Finally a common tale of a burnt out resistor in 3A USB chargers and how a heavy duty resistor fixes most calls.

P68 Vintage Workbench. Looks at the Tektronix T130 LC meter Part 2. A further part next month will describe how to return and calibrate back to factory spec. An interesting journey in repair and calibrate of these old valve units..

P84 Circuit Notebook.
Novel method of GPS locking an oscillator.
USB privacy dongle emulates keyboard
Running Micro python on a ESP32ESP8266
Multi output -15 to 12V supply.
Digital soldering iron timer with relay.

P100 Vintage Radio. Loewe's 1927 OE33: Simplicity itself. The 3NF is three valves in one.

EVERYTHING ELSE.

P2 Editorial Viewpoint Paperless Office and working from Home.

P4 Mailbag

P98 Silicon Chip Online shop

P105 Product Showcase

P106 Ask Silicon Chip

P111 Market Centre

P112 Note & Errata.
May2020 H Field Trans-analyser
Mar 2020 NutubeGuitar Overdrive& Distortion Pedal.
Nov/Dec 2019 Super 9 FM Radio.
Mar/Apr2019 Ultra Low noise Rem Stereo preamp.

P112 Advertiser index.

73 Craig

VHF and Above for July 2020

Being in the middle of the Winter months has seen activity on these bands slip away somewhat with little or no enhanced propagation occurring on the local scene. However we have seen an upsurge in participation from some club members dipping their toes into the bottom end of these bands.

In recent times Ric VK3BEB and Ben VK3NRD have popped up on 2mx and 70cm SSB. I'm sure that as the warmer months come along and the chance to improve individuals antenna setups a marked increase in activity will occur.

As a member of BARG I'm well pleased with the activity from club members and as best I can tell we represent the bulk of the activity to heard in the mornings. This time of the year is perfect for planning and doing upgrades to your own individual station setup so you can be ready for the upcoming summer season. Remember it's never too early to start.

BARG Antenna Project

All participants will have been contacted now regarding payment for the material to build their antenna's of choice most of which if not all have done so. Given the current health situation it's not certain when we will be able to gather as a group to get things underway. In the meantime plans are being looked at to accommodate those that would like to assemble their antenna's at home rather than waiting for things to improve. I'm aware that some still want to construct their antenna at the club rooms which is their individual choice. We are still looking at the mounting arrangements for the feed point of the 70cm antennas. There will be a couple of ways it can be done which will be up for discussion down the track. If you have any inquiries please contact VK3AXH.

Magic Band 6 metres

Forwarded to me by Steve VK3ZAZ are some notes on the early days of operation in the 6 metre band. After reading this you will no doubt be impressed with the achievements of those dedicated to this interesting band. Today with the advent of digital modes being able to qso at levels much lower thanks CW using the WSJT suite should allow for even greater records to be obtained.

The Early History of 6m

SIX METRES IS BORN

A look back at the history of six metres, starting from day one. Compiled by Neil, G0JHC, from Harry School's KA3B Six Metre Digest 1987.

The 6 metre band (50 - 54MHz) first came available in the USA on Much 1, 1946. Although there were many operators giving the band a try in the Northeast and Great Lakes areas, other parts of the US had very few, if any, active stations. The turn pioneers utilized CW, AM, and even NBFM. Antennas included rhombics, corner reflectors, folded dipoles, to name a few.

The first 2-way QSO involving "skip" was reported to have taken place on April 23, 19:46 at 10.43 PM EST when W1LSN of Exeter, NH worked W9DWU of Minneapolis, MN. This and many other contacts were made on that night via a combination of aurora and sporadic-E. The distance of this contact was 1100 miles.

Although the distance record for 56MHz (the old 5 Metre band) was held by W1EYM and W6DNS for a 2500 mile contact on July 22,1938, G5BY in England

began running a series of test transmissions on high gain antennas beamed at the US. Each Sunday through June and July of 1946, G5BY made automatic CW transmissions on 58.632MHz beginning at 1300 GMT. While transmitting 10 minutes on the hour and half hour for 8 minutes, he listened for 10 minutes following each session for replies from American amateurs on 50MHz. G5BY's QTH was on a 400 foot cliff overlooking the sea. For transmitting to the US he utilised an 8 element array consisting of (2) 4 element W6QLZ arrays stacked one above the other and fed in phase.

For receiving he used a rhombic. 240 feet on a leg. Prior to World War II, G5BY was the first European to span the Atlantic on 56MHz when his signals were heard by W2HXD. The historic event took place on December 27, 1936. The first 50MHz transcontinental QSO, the second in VHF history, was made on the evening of June 14, when W6OVK, Redwood City, CA. raised W2BYM. Lakehurst, NJ, on a CQ at 7.00 PM PST. This was a distance of 2590 miles and a new 6 metre record. The same afternoon, W1LLL in Hartford, CT worked W6NAW in Los Angeles, CA for the second 6 metre transcontinental QSO.

By August of 1946, 6 metre operators were popping up in many areas of the US. Six metre activity in other areas was growing as well. By September 1946, about 30 Canadians were on the band. In the Pacific, Australia and New Zealand had their share of "experimenters" also.

Some of the early Australians on 6 metres included : VK2WJ, VK2ABZ, VK2LS, VK2LZ and VK2NO.

Prospects for international work by means of F2 skip began to appear in September of 1946 and during a 27 day recurrence cycle in late October, American FM stations near 45MHz were heard in England. Anticipating a peak in the F2 season to take place in November, G6DH, Dennis Heightman, of Clacton-on-sea, Essex, England, suggested a series of daily scheds with W1HDQ on 28MHz. These schedules started on November 13th and took place each morning at 8.15 AM EST. On several days signals were heard on both ends of the path on frequencies as high as 48MHz. Test after test were made on 50.002MHz with no results, On Sunday morning. November 24th signals in the 47 to 48MHz range were heard on both sides of the Atlantic. Many of them S9 and higher. Arrangements were made whereby W1HDQ would transmit for 5 minute periods each 15 minutes, listening on 28MHz for replies from G6DH.

The first transmission was made at 11.15 AM in the form of a QST on voice to all 50MHz stations, to the effect that an opening across the Atlantic was imminent and urging all stations to get on and transmit. The QST was continued for 4 minutes, followed by a one minute call to G6DH. G6DH heard W1HDQ and the first VHF QSO was on. (A VHF 2-way was attempted 5 metres to 6 metres but the MUF didn't go quite high enough to permit G5BY to make it on 58.632MHz with W1BEQ in Connecticut) W1HDQ's signal faded out at 12.00 PM (43 minutes later) at G6DH and at 12.25 PM with G5BY, Hilton O'Hefferman. Although G5BY intercepted W1HDQ's signal first it was G6DH who made the first contact.

1947: A YEAR OF FIRSTS

With a combination of flourishing activity and the peak of Solar Cycle 18, the year 1947 proved to be a winner in almost every respect.

South of the border XE1KE put Mexico on the air by operating on 50.024MHz with 100 watts to an 829B feeding a 4-element beam at 90 feet. CE3CV in Chile was attempting to get permission for 6 metre operation. In Europe PA0UN of Eindhoven, Holland was active by special permission with 100 watts with a 4-element beam. Later PA0LTM and PA0WJ followed suit. The big news was that G's were given permission for 50 - 54MHz operation for experimentation lasting until January 1, 1948. This special authorisation was later extended to April 30, 1948 and was available to anyone paying the 10 shillings tax. Maximum power was 25 watts input.

By late 1947 there were large amounts of activity taking place in VK-ZL and in South America, with nearly 50 active stations in Argentina alone. The

first major event of 1947 took place on January 25th when Major W.O. Brewer (J9AAK) at Okinawa worked Captain Bob Mitchell (KH6DD) at Ewa, Oahu for a new distance record of 4600 miles.

The QSO began at 3.13 PM Hawaiian time and lasted 27 minutes with signals as high as S-7. A second QSO took piece at 4.33 PM with signals over S-9. At 4.48 PM, W7ACS/ KH6 at Pearl Harbor took over, until 5.07 PM when signals faded out.

THE RECORDS CONTINUE

Although the South Africans were not allowed 6 metre operation. ZS1T. ZS1P, ZS1AX and ZS1DJ were actively listening on 50MHz for hopes of possible cross-band contacts. On March 26, 1947 the automatic transmissions of PA0UN were heard S9+ by ZS1P and others. On March 29th, ZS1P worked PA0UN cross-band with S9 signals both ways during an hour long QSO.

Seven months after the famed KH6DD - J9AAK QSO, a new distance record was set once again. This time, W7ACS/KH6 worked VK5KL in Perth, Australia on August 25th at a distance of 5350 miles, breaking the old mark by 750 miles. DX in the form of F2 propagation returned with a vengeance during October 1947 placing the 6 metre band in a frenzy.

The South Africans finally obtained operating privileges and put them to immediate use. On October 11th, ZS1T worked PA0UN for the first European 2-way on 50MHz with South Africa. This contact broke the short lived world record set two months before. The record now stood at 6000 miles. Six days later, CE1AH Chile and J9AAK Okinawa and smashed the record for the third time in less thin a year, with their QSO covering 10500 miles.

The latter part of October saw many days with cross-band activity between England and the eastern portions of North America. On October 29th, PA0UN worked 2-way 50MHz into the US for the first time. W2AMJ made the contact first at 8.14 AM EST followed shortly thereafter by W3OR. W3OR's luck continued. November lst saw a major opening between the East Coast and the Western areas of North America. In addition to many W6's and W7's, W3OR landed Alaska, in the form of KL7DY. On November 3rd an opening across the Atlantic took place, lasting for over 2 hours. The band opened at 8.10 AM EST. G5BM, G5ZT and G4NT worked a record number of US 6 metre stations via cross-band.

THE ENGLISH RECEIVE PERMISSION FOR 50MHz

Special temporary licenses for 6 metre work were issued by English authorities in early November of 1947. As mentioned earlier, licenses for "experimental" purposes such as these, were to expire on January 1, 1948. They were later extended to April 30. 1948. The licenses were subject to certain time and frequency limitations with 25 watts of maximum input. Stations located within London were not to operate after 15.00 UTC. Hilton O'Heffernan (G5BY) received his temporary license on November 5th, 1947.

The January 1948 CQ Magazine reported the following: "Having no rig on 50Mc, Hilton grabbed a few eats and worked until 4.30 AM to get a rig on. He then went to bed for 2 hours sleep and got up to have his first 50Mc 2-way QSO with ZS1P, a distance of 6000 miles. Forty-five minutes later he had a QSO with W1HDQ and in another 30 minutes with a local. Within 1 hour and 15 minutes 3 contacts and 3 continents had been worked"!

Between November 6th and December 1st, G5BY completed 175 QSOs with 93 different stations in North America, South America. Egypt and Suez. Actually, Dennis Heightman (G6DH) was the first "G" to work the US on 50MHz. Dennis contacted W1HDQ on November 5th, 1947 at 13:02 GMT. A QSO with W2AMJ took place at 13:45 GMT. Later at 16:20 GMT.

G5BD worked VE1QZ for the first G to VE QSO. The month of November 1947 continued to be an excellent one for the British operators. In additions to the numerous trans-Atlantic openings which took place, rare DX in the form

of MD5KW (Suez) and SU1HF (Egypt) graced a few logs. G6DH was the first "G" to work MD5KW which was being operated by Major Ken Ellis (now G5KW). This QSO took place on November 10th with MD5KW running 35 watts to an HK54, and a S27 receiver, and a 4 element beam at 35 feet.

TRANS-EQUATORIAL PROPAGATION IS "DISCOVERED"

By the fail of 1948, Mexico had as many as 15 active operators on metres. Most of them ran high power levels to Yagi antennas. In Argentina, as many as 50 stations, some running as much as 300 watts. were looking towards the north for contacts. As fate would have it, the operators of both countries soon realised that a path between them existed quite often on 6 metres. On many occasions openings were intense with very solid signals. Although the mystery of "why" was unanswered at the time, amateurs took full advantage of this propagation medium. On January 24th, 25th and 26th, 1949, a very severe ionospheric storm took place. The storm began at 1400 EST on the 24th and continued to 0700 EST on the 26th.

The 6 metre band was full of Sporadic-E and Aurora. On the 25th, HC2OT in Ecuador worked W5NXM at 1800 EST followed by other W5's. HC2OT’s signal was heard as far north as W0. This was the first prime evidence of TE propagation during an ionospheric disturbance. Less than a month later during another aurora session, Bill Colburn W1ELP in Massachusetts worked HC2OT via TE for the first WI contact into South America.

THE EARLY 1950's.

As Solar Cycle 18 drew to a close activity continued to grow, especially in the Western Hemisphere. Active stations included C02EV, C02QY, C02WL, C02FN, C06WW, CX1AQ, CX1AY, CX3AA, HC1CA, HC10T, HC1JW,HK1DW, HK1DX, PZ1A, PY1DS, PY1LQ, PY2AC, PY2PK, PY4CL, TG5CH, TG9UA, TI2AFC, KZ5NB, KZ5AY, XE1FE. XE1A, XE1GE, XE1QE and XE2C. About the same time, a new mode called Single Side Band (SSB) was making inroads and SSB articles began appearing in amateur publications.

Although many jumped on the SSB bandwagon realising its full potential, most 6 metre operators stayed with AM operation. As a matter of fact, it would be another 15 years before SSB would reign as the dominant mode on the band.

In late 1955, the Swiss Federal Observatory announced that the new sunspot cycle 19 began in April of 1954 and would be one of outstanding intensity, with a maximum likely to surpass all others observed.

1956: THINGS HOT UP ON SIX

Spring of 1956 saw a few openings between North America and Argentina but it wasn’t until the winter that things began looking up for the first time in 7 years. By late October, European signals well up to 53MHz with facsimile, RTTY and ship-to-shore were heard in the US.

BBC Channel 2 video on 51.75MHz was heard clearly and the BBC TV audio on 53.50MHz was broadcast quality at times. The big news of 1956 was the new world record which was set by LU9MA and JA6FR on March 24th at 04:20 GMT. This historical QSO took place on a frequency of 50.350MHz and stretched the distance record to 12,000 miles.

1957: THE BAND IS ON FIRE

International Geophysical Year began during 1957 - an international cooperative research programme concerning the geophysics of the earth.

This research program included major studies of the ionosphere as well as other areas as climatology, meteorology, and geomagnetism. To further enhance these efforts, many countries not normally operational on 6 metres were granted privileges. The first of these countries was Portugal, who authorised amateurs to utilise 50 - 54MHz until December 1958, the official end of the IGY. This authorisation included CT2 (Azores) and CM (Madeira).

Operators who took advantage of these privileges included CT1CO, CT1ST, CT3AN and CT3AE. Other countries allowing operation on 6 metres included Norway and Sweden. Norway authorised 50 - 54MHz with daytime operation up to 1900 GMT.

The original authorisation was to expire on July lst 1958 but was later extended until the end of 1959. The Swedish amateurs were allocated 50.0 - 50.5MHz on an individual basis to class A licensees.

With 150 watts maximum allowed on CW or voice, their privileges were valid from June 1, 1957 until December 31, 1958. Active Swedish stations included SM5SI, SM6ANR. SM6BT7, SM5CHH, and SM7ZN, By March of 1958, SM7ZN had worked 29 states and SM6BTT had worked 27.

In addition to Poland who allowed full 6 metre privileges with stations such as SP2DX, SP5AR and SP5BR active, Russian amateurs operating on their 38 - 40MHz VHF band were looking for cross-band contacts. Authorities in Switzerland gave temporary permission to amateurs allowing them full use of the 6 metre band. However, the Swiss stations were restricted to a maximum power of 50 watts and could only operate when TV was off the air. RB9BZ was quite active and on April 5th he worked ZS6UR. Probably one of the most well-known European amateurs to be granted special 6 metre privileges during the IGY was Harry Wilson, EI2W. Harry's station was located at Foxrock.

Co. Dublin, Ireland at a height of 240 ft ASL. Harry used a homebrew AM transmitter, with in input of 40 watts, crystal controlled on 50.016MHz. He was only able to operate until January 28, 1958 due to business commitments, however his extensive research with various antennas in a very short period of time brought about some interesting questions concerning propagation Even today his findings are quite fascinating.

With the extra added activity on 6 metres and a high sunspot count, the stage was set. A record amount of DX was worked by all during 1957 - 1958. By early 1957 the African continent was jumping with 6 metre activity. In addition to the approximately 50 ZSs that were active on the band, other countries represented were Kenya, Uganda, Nyasaland, Belgium Congo, Mozambique and Northern and Southern Rhodesia. On February 18, 1957 W8LPD in Cincinnati, Ohio worked VQ2PL and ZE2JE for the first W to Africa 6 metre contacts. The late 1950's were definitely exiting times. In brief, active European cross-banders not previously mentioned at this time included: EA1EY. F9BG, G2BVN, G2CDI, G3BTA, G3BA, G3COJ, G3FXB, G3IUD, G3XC, G4LX, G5BD, GM3EGW, PA0FM and OH5NW. Even though Cycle 19 was winding down and DX was scarce, 6 metres experienced a tremendous growth in the US and Canada. The early 1960s saw many new equipment manufacturers arrive on the scene with 6 metre gear being available in large quantities.

The gear of the early 60's was primarily AM. However, by the end of the decade, multi-mode and SSB only rigs were being produced. Six metre nets and round-tables popped-up in many areas. By the early 1979s, many groups, nets etc. moved to 2 metres leaving a very small number of operators on the band. The DX exploits of cycle 20 were very disappointing as compared to Cycle 19. The first evidence of F2 propagation due to the now cycle in the winter of 1967 with southern areas of the US working South America. Probably the biggest DX news of cycle 20 was on December 1st, 1969 at 1515 GMT when Hank W2UTH nabbed ZD8NK on Ascension Island.

Another event occurred during 1969 when Mel Wilson W2BOC made the first recorded aurora reception across Atlantic by making a strip chart recording of the BBC TV signal on 41.5MHz.

FIRST VHF CONTACT BETWEEN RUSSIA AND AUSTRALIA

The early 1970's were somewhat uneventful in terms of DX. By 1976, things started to get interesting. During that year, sporadic-E was very intense and consistent. The most bizarre event of the year was reported by Bill Tynan W3XO in his "World above 50MHz Column" in March 1977 QST. It was

reported that VK3BIZ in Australia worked two Russians on the 6 metre band. The following is from QST Magazine, March 1977, page 83: "The VHF column in the December issue of Amateur Radio, the Journal of the Wireless Institute of Australia, contains a fascinating story. It relates that after working a number of JA's and UA0's on 10 metres; VK3BIZ of Melbourne went to 6 and worked a raft of JA's. At about 0505 UTC followed by a CQ, VK3BIZ was called by a station thought to be a JA0. A QRZ brought a request to QSY down.

After some frequency gyrations, he identified the calling station as UA0CCY. Reports of 569 both ways were exchanged but QSB set in before final "rogers" could be received. At that point a second station was heard signing RA0CCM. A full CW contact including exchange of names was completed with this station. The frequency for VK3BEZ was 50.001MHz and for the Russians, 51.990MHz. The VK band extends from 52 to 54MHz while the allocation in Eastern Russia must be only to 52MHz. Thus it was that piece of VHF history was written as a result of alertness and good operating on the part of one Australia and two Russian hams.

Till next time cheers, VK3AXH

80m Net Roster. Thursday @ 8 pm on 3.608 MHz

Date	Name	Call	Alt Name	Alt Call
23-Jul-20	Doug	VK3DRE	Ian	VK3AXH
30-Jul-20	Ian	VK3AXH	scott	VK3MCL
6-Aug-20	Scott	VK3MCL	paul	VK3TXR
13-Aug-20	Paul	VK3TXR	Chris	VK3QY
20-Aug-20	Chris	VK3QY	David	VK3KQT
27-Aug-20	David	VK3KQT	Scott	VK3MCL
3-Sep-20	Scott	VK3MCL	Craig	VK3KG
10-Sep-20	Craig	VK3KG	Doug	VK3DRE
17-Sep-20	Doug	VK3DRE	Ian	VK3AXH
24-Sep-20	Ian	VK3AXH	Scott	VK3MCL
1-Oct-20	Scott	VK3MCL	Paul	VK3TXR
8-Oct-20	Paul	VK3TXR	Chris	VK3QY
15-Oct	Chris	VK3QY	David	VK3KQT
22-Oct	David	VK3KQT	Scott	VK3MCL
29-Oct	Scott	VK3MCL	Craig	VK3KG
5-Nov	Craig	VK3KG	Doug	VK3DRE
12-Nov	Doug	VK3DRE	Ian	VK3AXH
19-Nov	Ian	VK3AXH	Scott	VK3MCL
26-Nov	Scott	VK3MCL	Paul	VK3TXR
3-Dec	Paul	VK3TXR	Chris	VK3QY
10-Dec	Chris	VK3QY	David	VK3KQT
17-Dec	David	VK3KQT	Scott	VK3MCL
24-Dec	Scott	VK3MCL	Paul	VK3TXR
31-Dec	No official net tonight. NEW YEARS EVE.			
7-Jan-21	Paul	VK3TXR	Chris	VK3QY
14-Jan-21	Chris	VK3QY	David	VK3KQT
21-Jan-21	David	VK3KQT	Scott	VK3MCL
28-Jan-21	Scott	VK3MCL	Craig	VK3KG