SPECTRUM **April 2018 Vol. 55 No. 3**

The Official Newsletter of the

Auckland VHF Group Inc.

Spectrum

Neighbour's Day brings locals to the
Auckland VHF Group

President's Column—see page 4
General Meeting—see page 5
Erecting a Radio Mast—see page 8

Auckland VHF Group Inc.
Branch 66 NZART

PO Box 10138, Dominion Rd, Auckland 1446
Clubrooms: 30 Hazel Ave, Mt Roskill

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ZL1VHD Dstar gateway registration URL : http://zl1vhd.dstar.org.nz

Club News and Net:

The combined Auckland VHF Group and Auckland Regional Branch News and Net are held on 146.625 MHz and 439.875 MHz at 8.15 pm each Sunday or after the ZL6A National Broadcast on the last Sunday of the month.

Club meetings are held at the Clubrooms at Hazel Avenue, on the second Monday of each month at 7.30 pm. For other details, listen to the News and Net each Sunday evening.

SPECTRUM is the official journal of the Auckland VHF Group Inc. Opinions expressed are those of the authors and do not necessarily reflect club points of view. The closing date for SPECTRUM articles is by the 1st of each month. Articles to be submitted to the editor Peter ZL1UKG
peterlov@xtra.co.nz

Auckland VHF Group (Inc) Branch 66

General Meeting Notice

Monday 09th April 2018 7.30pm,

At the Hazel Avenue Club Rooms
(Located on left at the end of Hazel Avenue)

The Evenings Subject:

"Naval Combat Weaponry"

Come and meet an Engineer (retired) who worked for over 43 years in the Navy responsible for setting up and commissioning the weaponry on board combat ships.

He will cover his career from the 2nd World War to more recent missile launchers, tracking systems, control systems, radar, engineering problems encountered and more.

EVERYBODY WELCOME

Help Required

The Auckland VHF Group is seeking a volunteer to review the Annual Accounts. This is a role that occurs in October/November each year when the accounts have been finalised following the close off of the year at 30th September. Familiarity with simple Spreadsheets and Accounting is required.

The Auckland VHF Group will attend the Radio Electronics Group Market Day in Hamilton on 19 May 2018. Please let the Trading Table Manager or a member of the Committee know if you can help.

The Auckland VHF Group would like to be able to assist newcomers to take up Amateur Radio. This will require people who can act as Examiners to manage and mark the test that an applicant is required to pass. This may develop into providing newcomers with the knowledge to enable them to sit the test. Members with these interests should let Laurie Mathews know.

Coming Events:

- Low Bands Contest. 6 m, 2 m and 70 cm. Saturday 07 April from 5 pm and Sunday 08 April from 7 am.
- Radio Electronics Group Market Day— from 10 am Saturday 19 May 2018 at the Glenview Club Inc., 221 Peacocks Road, Hamilton

The President's Column

April is almost upon us and by the time you read this, it probably will be here.

Your committee and I have been busy sorting out the everyday business of the cub and putting together the year's activities. The general meeting subjects are almost sorted. Last meeting Ian Ashley gave a very interesting talk about his aviation career starting with piloting small aircraft to NAC Fokker friendships. With the merging of NAC with Air New Zealand, Ian then progressed through to becoming a Boeing747 flight captain. Ian's talk was very well received by all present with discussions continuing over supper.

Next meeting is April 9th where we have a retired engineer who will talk about his career in charge of fitting out weaponry on ships for the navy (See the advert this issue). Future speakers include a talk about the Henderson AM transmitter site and how multi high power AM transmitters have been matched and filtered to a single antenna. We also have planned an interesting talk on the history of Auckland Trams with some stories that you may not know about. Watch this space, our website and listen to the Sunday News and Net for more information and future happenings.

Sunday 25th March was Neighbours Day Aotearoa. Auckland VHF Group took part with a grant from the Puketepapa Board. Neighbours from around the club house area were entertained with sausages and onions on bread, with condiments, tea Coffee cold drinks. Some people came from further afield and we had visitors from other branches. Civil defence activity back packs and toys were given out to the children.

From this event, AREC was promoted and interest in membership and meetings was shown.

Best Regards to everyone,
Laurie ZL1ICU

Something to think about

Daylight Saving has ended. Apart from current good weather it is time to retreat into your shack. This will give you time to put together a project for a "Show & Tell Evening" later in the year.

General Meeting Date: Monday 12 March 2018

Started: 1930hrs (7.30pm).

Present: 18 members as per the Roll Book.

Apologies: ZL1TDG Vern Morris, ZL1CCA Adam Cumberlege, ZL1EME Ross Hannah, ZL1TIA Dave Dingley, ZL1VH Vaughan Henderson

Minutes of the previous meeting as per Spectrum, read and accepted.
Moved ZL1DRB Seconded ZL1TCI Carried.

Correspondence:
In: Papakura Br 65 March Newsletter – emailed.
North Shore Br 29 March Newsletter – emailed.
Out: None.
Moved ZL1AYV Seconded ZL1TUX Carried.

Finance:
In: NZ Post - Post Box Invoice
Auckland Council Insurance
Out: First Aid Kit purchased for 25 people –
Inv 41578 $123.04 + GST = $141.50

ASB Operational A/C $22,700
ASB Investment A/C $19,900
ASB Internet A/C $ 700
Moved ZL1TUX Seconded ZL1AOX Carried.

General Business:

Neighbours Day: At the Clubrooms - 24 or 25th – March - BBQ and nibbles, tea and coffee.

North Shore - Branch 29 are organising a Communications Exercise trial on 6 metres on a new website QSL.net/ZK1EB.

Advertise in April Spectrum – 3 examiners required for future classes.

Meeting Closed: 1948 (7.48pm).

Guest Speaker
Ian Ashley ZL1AOX gave the Group, a splendid informative talk about flying 747's, with some history about other aircraft he had flown.

Ian Ashley holds the audience attention with early flying experience (DC 3)

Ian Ashley shows a 747 who is the boss

Auckland VHF Group Inc Neighbours Day Aotearoa

On 25th March 2018 Auckland VHF Group held a Neighbours Day Sausage Sizzle in Arthur Faulkner Reserve beside the clubrooms. 160 invitations were delivered to the neighbour who reside on the three adjoining streets early Friday morning 23rd March 2018. The plan was to serve food from 12pm – 3pm on Sunday 25th March. We arrived on site at 10am to set up. By 10.30am people were arriving so Laurie ZL1ICU started cooking sausages and onions. He cooked 150 sausages and 20 vegetarian sausages and 10kg of onions. The onions cooked in a pan over the grill with a knob of butter and a splash of pure olive oil. Even the toddlers enjoyed the onions asking Laurie for "a sausage with the works". We supplied Tea and Coffee for the Adults and 50% less sugar Orange juice for the children.

We made up 30 back packs for the children with "What's the Plan Stan" activity book and a booklet for the parents. We also included a small toy, an Apple or Pear and a pack of Sun Maid Raisins. When we ran out of back packs we used some grab bags left over from a VHF Conference. We ran out of those so then just gave out the booklets.

People came in family groups so we were able to chat to them and make sure the children were welcome and were given food to suit their age. (Toddlers enjoyed snack packs of washed grapes and packs of Mandarin slices) Some parents took their children to play in the park after they had eaten and then returned for a coffee while the children enjoyed an Orange Juice.

We got some great feed back. They loved our colourful invitations. They loved that we extended our time table so they could attend. Most said they were time poor due to the activities they have to attend with the children. They loved we supplied healthy child friendly food. They were surprised and delighted when the children got given their back packs. They said they will be coming back again next year. Some of the fathers have made arrangements to attend our General Meetings and 5 people want to study for their Amateur Licence. They love that they don't need to drive to come to visit us.

We are very grateful to the Puketapapa Local Board who granted us some funding to cover this event. To the sponsors Civil Defence for the Activity Booklets and our President Laurie ZL1ICU who supplied the toys for the back packs. We were able to prove that a small amount of money and a little time spent with the Neighbours in our Community is well worth the effort.

Marlene Mathews

Funeral Notice in the NZ Herald: BICHENO, Noel Charles. RNZAF NZ405635

Peacefully on 27 March 2018 in his 101st year. A much loved Uncle of his 16 nieces, nephews and their families. One of nature's true gentleman, now at rest. A farewell for Noel will be held at Chapel 2, Waikumete Cemetery, Great North Road, Glen Eden on Wednesday 4 April at 10.30am. ZL1VG Out.

Some brief information has been supplied by his niece Carol Johnston ZL1AJL.
He was the brother of the late ZL1ALE Aola.
Noel was a very private person who as a builder, assisted the Auckland VHF Group with the maintenance of the Clubrooms as and when he saw something needed doing. He mostly preferred operating on HF and preferred point to point contacts over using repeaters.

Neighbours Day
25 March 2018

Marlene Mathews catering for the neighbours

Club members enjoying the hospitality

Prospective members showing off their Civil Defence instructions

Erecting an Amateur Radio Mast

The Building Permit may be the most difficult part

The advice offered by Douglas Birt in his Local Government column in Break In is that a mast or pole attached to an existing building that extends not more than 7 m above the attachment point does not meet the definition of a building. As such it appears to not need a permit[1]. If 7 m is exceeded or you have a free standing pole or mast a Building Permit will be needed. Poles and masts need engineering calculations to show that they are safe in the face of strong winds. Commercially made masts will probably have a certificate from the maker regarding their wind rating. Where there is no manufacturer information it is possible to calculate for yourself what guying is required to make it safe.

The starting point is to obtain the NIWA publication "The Climate and Weather of Auckland"[2] which list the maximum gusts and maximum 10 minute average over a period going back to 1975. Choose the monitoring station closest to your location for a design target adding a safety facture.

To determine the wind force you have to know the effective wind area of the pole or mast. Examples of "Drag Coefficients" for familiar shapes can be found online[3]. 1.2 can be used for tubes and 2.0 for rectangular plates. The velocity of wind increases as the height above ground increases. The average height of each 3 m long section is used to calculate the moment applied to the pole or mast. A calculation table will look like

Height (m)	0 - 3	3 - 6	6 - 9	9 - 12	12 - 15
Factor	0.7	0.8	0.9	1.0	1.0

For pressure in Pascals from units of Newtons per square metre (N/m^2) the equation is
$Pa = 0.613 * V^2 * Area$ for wind units V in m/s. The finished calculations looked like

Height (m)	**Items**	**Area (m^2)**	**Speed (m/s)**	**Force (Pascals)**	**Average height**	**Moment N*m**
0 - 3	Mast	0.66	31.5	401.4	1.5	602.2
3 – 6	Mast	0.66	36	524.3	4.5	2359.5
6 – 9	Mast	0.66	40.5	663.6	7.5	4977.1
9 - 12	Mast Rotator 6m antenna 2m antenna Extension	0.22 0.041 0.31 0.12 0.18	45	1081.2	10.5	11352.5
				2670.5		19291.3

where 45 m/s was selected for the author's location. The horizontal component at the attachment height of guy wires is the next factor in calculations. The author used 9 m above ground leading to 2143.5 N (ewtons) of force. A minimum of 3 guy wires are required but 4 or more will reduce the tension in any one wire. With 3 wires the direction of the wind at 90° to any guy wire generates the greatest tension.

Divide the force by the Cos of the angle to the wire under tension. This is not required when 4 wires at 90° are used. The angle made by the guy wire to the anchor point will determine the tension required to resist the horizontal force. Divide the force by the Cos of the angle of the wire to horizontal. Suppliers selling stainless wire rope like Anzor have tables on their web site[4]. The required size with a safety factor can be chosen for tension calculated. These calculations were further complicated by sloping ground resulting in different angles of guy wires.

The ARRL Handbooks discuss breaking the length of guy wires with insulators so that resonances in the wires do not distort the pattern of the antenna(s). The placement of insulators will depend on the frequencies in use.

The anchor point will have vertical and horizontal forces on it from the guy wire. In the author's case it was elected to have the wire terminate on a post at a point above head height. Using formulae from the electricity distribution industry made for a simple calculation of the depth in the ground that the post should be buried to resist the lateral force[5]. The vertical component which will lift the post out of the ground will be resisted by the contact area of the post in the ground. An example referring to sandy soil was found and a calculation of the difference of contact areas between the example and a 100 x 100 mm post was calculated[6]. Whangaparaoa clay is more sticky than sandy soil.

A plinth will be required at the base of the mast. The properties of the local soil are required here. The Whangaparaoa clay has a value of 440 Pa(scal) = 4300 kg / m². The weight of the mast, antenna(s) and guy wire forces under peak wind gust apply here. The access manner will also vary the calculations and structure. The author chose a tilt-over configuration using steel "U" channel which extends through the plinth and down 1.5 m into the ground inside sand filled pipes encased in concrete. The weight of these must be taken into account when calculating the area of the plinth. The headings for the weight to be supported by the plinth looked like

Mast	Ancillary items	Antenna 6 m	Antenna 2 m	Guy wires	Steel	Concrete Plinth	Base	Total (kg)
38	12	8	4	220	55	102	459	898

The value for guy wires is the vertical component of the tension in the wires under maximum wind gust. This was an iterative process as the weight of the plinth had to be taken into account as well. In these calculations a safety factor of about 1.5 was used over the maximum expected force. A spreadsheet was created to assist with the calculations. A copy can be obtained from the author when you begin your own mast calculations. You will need to know the properties of the soil in your area for calculations. The density of sand was taken to be 1600 kg/m³ and concrete 2250 kg/m³.

The Council requires a peer review of engineering designs by a registered Civil Engineer in order to issue a Building Permit. There is no avoiding this cost. It may take some time before the Council issues a Permit. My thanks are due to Douglas Birt who gave me a copy of his application which contained all of the points I had to address. I had to seek further information to use posts as anchors .

Peter Loveridge 28 March 2018

[1] Break In January 2018 p32
[2] https://www.niwa.co.nz/static/Auckland%20ClimateWEB.pdf
[3] http://www-mdp.eng.cam.ac.uk/web/library/enginfo/aerothermal_dvd_only/aero/fprops/introvisc/node11.html
[4] http://www.anzor.co.nz/technical/stainless-steel-wire-ropecable-breaking-loads
[5] Wood Pole Overhead Lines by Brian Wareing Section 6.2.1.1
[6] Uplift Resistance of Post Foundations presented to the 2001 ASAE Meeting, Sacramento, CA

Amateur Radio Emergency Communication.
Volunteers in radio communications.
Using our resources to help the community.

INFORMATION

The Auckland VHF Group has an AREC section that works closely with Auckland Council Emergency Management. They provide advice, resources and manpower to assist in times of need.

The AREC section is headed by Section Leader Laurie Mathews ZL1ICU.

From time to time the VHF Group has training sessions and exercises. Members also assist with sports events, parades and other community activities. For further information about AREC please see the NZART web site: http://www.nzart.org.nz/arec/

JOIN BRANCH 66 AREC

All members of the Auckland VHF Group are encouraged to join the AREC section. Your contribution, large or small is appreciated by all involved.

For further information about joining branch 66 AREC contact the Section Leader or his Deputy:

Section Leader; Laurie Mathews ZL1ICU 634 5130 0274 817 463 perma@xtra.co.nz

Deputy Section; George Raffles ZL1TUX 626 6944 021 735 361 zl1tux@xtra.co.nz

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AUCKLAND VHF GROUP (INC)

SUPPORT THE EFFORTS OF THE VHF GROUP THROUGH YOUR SUBSCRIPTION

SUBSCRIPTIONS FOR 2018

THE SUBS GO TOWARDS;

- Maintenance and on-going improvements to beacons, repeaters and linking systems for the national system, including the Klondyke repeater site.
- Provides on-time and free access to spectrum magazine as soon as it is available.
- Provides facilities for good speakers and lecturers at our general meetings.
- Discounted access to our trading table goodies.
- Access to test equipment and technical help when needed.

FULL MEMBERSHIP **$45.00**

ASSOCIATE MEMBERSHIP **$40.00**

FAMILY MEMBERSHIP ADDITIONAL **$10:00**

SEE ATTACHED MEMBERSHIP RENEWAL FORM (next page)

REMEMBER TO KEEP US INFORMED OF YOUR INTERNET ADDRESS!

OTHERWISE WE CANNOT SEND YOU SPECTRUM!

NAME	Mr/Mrs/Miss/Ms	Christian or given name	Surname
Address			
		Phone: (home)	
		Phone: (work)	
		Phone (Cell)	
		Email	
Occupation:		**Callsign**	
NZART Member		**Branch assigned**	
AREC Member		**Branch assigned**	
Category			To pay
Membership	Full	$45:00	$
New/Renewal/Change	Associate	$40:00	$
Receipt #	Family Add	$10:00	$
Donations	Auckland ATV		$
	Auckland/Klondyke		$
	Brynderwyn		$
	Data/D-Star		$
	IRLP		$
	Beacon/Repeater/Links/ATV Licences		$
	Other		$
		Total	$
Payment			
Circle one -->	Cash	Cheque	Internet deposit
Invoice/Statement re-quired	Please Advise Treasurer		

Internet	To account ASB 12-3020-0473626-00. Account name is: Auckland VHF Group Inc. Include your Name/Callsign for us to track. Note: this form needs to be returned to update records.
Post	The Treasurer, Auckland VHF Group Inc., PO Box 10138, Dominion Road, Auckland 1446.
In Person	Bring this form and payment to the next club meeting, 2nd Monday of the month or to the Committee meeting last Monday of the month.

The Auckland VHF Group Inc Branch 66 NZART

*gratefully acknowledges the sponsorship of Branch 66 Beacons, Repeaters and Fixed Links license fees and the Group's repeater operations by the following radio amateurs and NZART Branches for **2018***

Repeater frequency and name	Repeater location	Sponsorship advised for 2018	Amount paid
53.725 Repeater	Klondyke Road	Gwynne Rowe	50.00
14**4.253** Beacon	Nihotupu	Not operating	
14**5.625** Data Rptr	Klondyke Road	Not operating	
14**5.650** Dstar repeater	Klondyke Road	ZL1ICU	50.00
14**6.625** Repeater	Klondyke Road	ZL1ICU	50.00
14**6.70**0 Repeater	Ruaotuwhenua	ZL1SKL	52.00
14**6.90**0 Repeater	Mt Puketutu Radio	ZL1MR	50.00
43**2.253** Beacon	Nihotupu	**Stability testing**	
43**8.175** Dstar repeater	Klondyke Road	ZL1ICU	50.00
43**8.50**0 Repeater	North Head	Not operating	
43**9.850 Link Tx to Kaimai**	Klondyke Road		
43**9.875** Ak Nat Sys Rptr	Klondyke Road		
43**9.900 Link Tx to Egmont**	Klondyke Road		
43**9.950 Link Tx to Brynderwyn**	Klondyke Road	ZL1OTF	50.00
1291.9 Repeater	217 Glenfield Rd	Ross Hannah	50.00
		Total Sponsorship	**402.00**

NZART Inc: Branch/Personal donations	
Franklin Radio Club. Br: 10	200.00
Papakura Radio Club. Br: 65	500.00
Manukau Radio Club. Br: 21	100.00
Auckand Branch. BR 02	100.00
Paul Godolphin ZL4AX	25.00
Donations	**925.00**

Current as at 26/02/2018

The Auckland VHF Group, Branch 66, would like to thank all those who came forward to sponsor the licence fee for our Beacons, Repeaters or Fixed Links for the year 2018 or donate towards the Group's repeater Operations.

TRADING TABLE

Currently our Trading Table is only open on meeting nights. We will be at the Western Suburbs sale on Saturday 4 November, so come and have a look.

We have heaps of parts from dismantled commercial analog TV gear – transmitters, filters, circulators, patch panels, power supplies, cabinets. Too much to list individually, so come along to the clubrooms and have a look.

Back in Stock—
SO239 UHF Adaptor:
Just what you need to make up a mobile antenna. SO239 socket and mounting nut. The tube on the side is a screw-in fit for RG58 coax cable. Just strip the outer sheath off and allow about 6 to 7mm of centre conductor, screw the RG58 into the side of the adaptor and solder the center conductor to the centre pin of the fitting. A small plastic cap seals off the back of the adaptor (remove it to do the soldering).

Our price: $3.00 each

And there's more....

Two only coaxial transfer relays as per photo. N-Type connectors and 12V operation, removed from equipment but in excellent working condition.

$50.00 each

23cm LOOP YAGI KIT FOR SALE

The last one! Model 2325LYK kit makes a high gain 23cm Loop Yagi. The price for this kit is $120.00.

The kit consists of all the parts to make up a 25 element loop Yagi including the element mounting hardware and assembly in instructions. What is not supplied with the kit is the boom. This can be either a 25mm diameter aluminium tube, or a 25mm square section (square or "U" section).

When built up, the 23cm Loop Yagi has the following performance:

Frequency Range:	1.25-1.30 GHz
Number of Elements:	25
Boom Length:	1.83m (72")
Boom diameter:	25mm (round or square)
Gain:	18 dBi
-3dB Beamwidth (E plane):	30°
F/B Ratio:	> 20 dB
Maximum power:	550 Watts

NEW – 4 Ohm Speaker

We have a good quantity of small 4 Ohm speakers completer with a black plastic bezel. The speakers are 50mm square and 33mm deep. Only $2.00 each.

Radio Frequency Transistors

ATF55143	Low noise E-PHEMT 0.6dB noise figure. Low noise amp for frequencies between 450MHz and 6GHz. SMD package SOT343 (4 lead). [S.case]		$1.00 each
MGF1302	Low noise GaAs FET Nf = 1.4dB @ 4GHz, 4dB @ 12GHz.	[S.case]	$5.00 each
BF199	NS 25V 25mA, 500mW ft = 550MHz TO92[S.4.14]		$1.00 for 10
BF494	NS 20V 30mA Low noise mix-osc/IF amp TO-92 [S.4.15]		$1.50 for 10
BFR91	NS RF Amp. 5GHz 1.9dBnf @ 500MHz	[S.case]	$2.00 each
BFY90	NS 30V 50mA 2.5dBnf @ 200MHz TO72 VHF/UHF	[S.case]	$1.50 each
MFE121	Dual gate N-MOSFET 20V 5mA VHF Amp BF352 equiv.	[S.case]	$0.50
MPS5179	NS TO92 12V 50mA 200mW fT 2000MHz Nf 5.0dB RF Transistor. Use in UHF/VHF amplifiers with collector currents in the 100 uA to 30 mA range, and in low frequency drift, high output UHF oscillators.	[S.5.13]	$0.50 each
BFG67	NS 8GHz 50mA rf amp/preamp SOT143B package	[S.case]	$1.50 each
MPS5172	NS 25V 100mA Ft 120MHz	[S.7.5]	$0.10 each
MPS6507	NS, VHF Mixer, 20V, 100mA, Ft 700MHz	[S.5.8]	$0.20 each
C1-12	NS RF Pwr 400 – 500 MHz 1W 12.5V	[S.Case]	$1.00 each
C3-12	NS RF Pwr 400 – 500 MHz 4W 12.5V	[S.Case]	$2.00 each
MRF237	NS RF Pwr. VHF 4.0W 12V TO39	[S.5.13]	$3.00 each
MRF449	NS RF Pwr. 2-30MHz 30W 12.5V stud mount	[S.Case]	$10.00 each
MRF559	NS RF Pwr. 806-960MHz 0.5W 12.5V	[S.5.13]	$0.50 each
MRF628	NS RF Pwr 400 – 500 MHz 1W 12.5V	[S.Case]	$2.00 each
MRF904	NS RF Small signal amp. Ft 4GHz 15V TO206	[S.5.13]	$3.00 each
SD1144	NS RF Pwr 400–550 MHz 2W 12.5V stud mount	[S.Case]	$3.00 each
2N5945	NS RF Pwr 400–700 MHz 2W 12.5V stud mount.	[S.Case]	$3.00 each
2N5946	NS RF Pwr 400–550 MHz 10W 12.5V stud mount	[S.Case]	$4.00 each
2SC908	NS TO39 RF Amp 1W @ 500MHz 13.6V Designed as driver and RF power amplifier. 0.5 to 0.8W output at UHF land mobile band. Gain 15dB (Vce=6.0V, Ic=5mA, ft=2000MHz)	[S.5.13]	$1.00 each
3SK45	Packaged as ECG221, dual-gate N-channel MOSFET for vhf amp and mixer applications.	[S.6.16]	$0.75 each
3SK73GR	Dual-Gate MOSFET N-channel 30V 7mA	[S.6.7]	$1.50 each
3SK74L	Dual-Gate MOSFET N-Channel 20V 25mA(max)	[S.case]	$1.00 each
3SK192GR	Dual-Gate MOSFET 15V 30mA(max)	[S.7.13]	$1.00 each
2SC5488	NS 30V 70mA low noise rf pre-amp	[S.6.4]	$0.10 each
40673	Dual-gate N-Mosfet – See MFE121	[S.case]	$0.50 each