– Corrections –

Bob Cooper's

May 15 2001

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific and Asia

IN THIS ISSUE

Roll Your Own 2.4 GHz gain antenna

More UEC IRD Shocking Reports

Review: inForM 300 mw FM station

- ✓ Latest Programmer News
- ✓ Latest Hardware News
- ✓ Latest SPACE Pacific Reports
- ✓ Cable TV Connection

Vol. 7 ◆ No. 81
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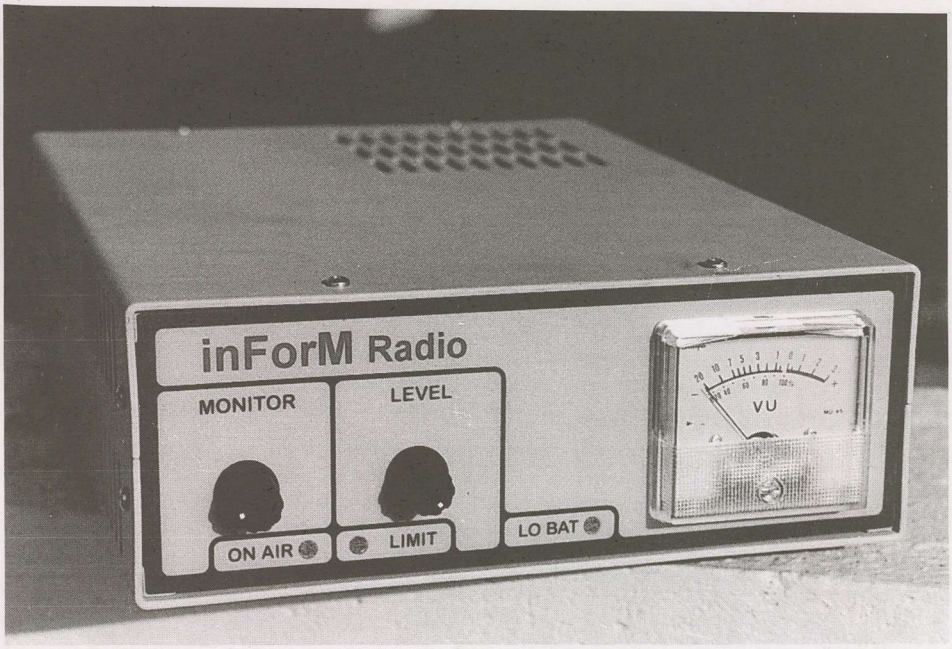

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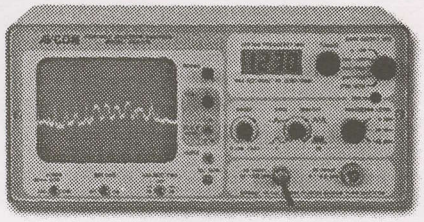

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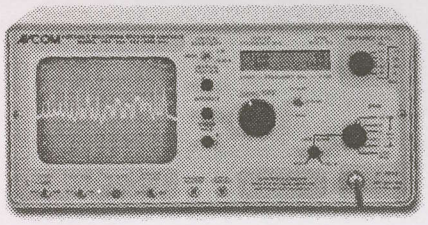

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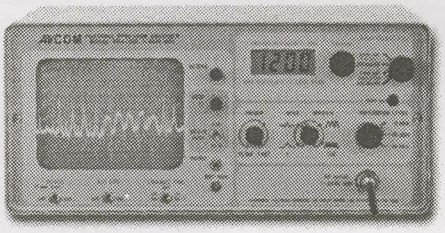

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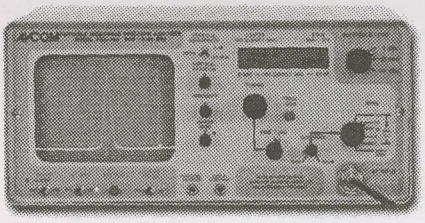

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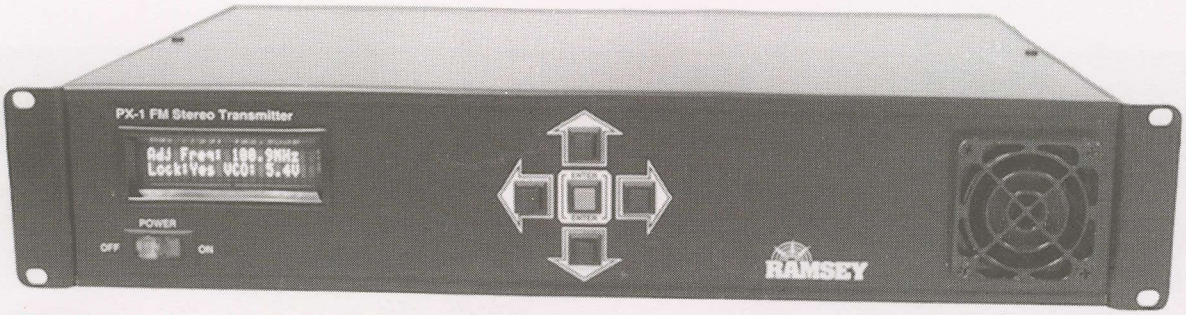
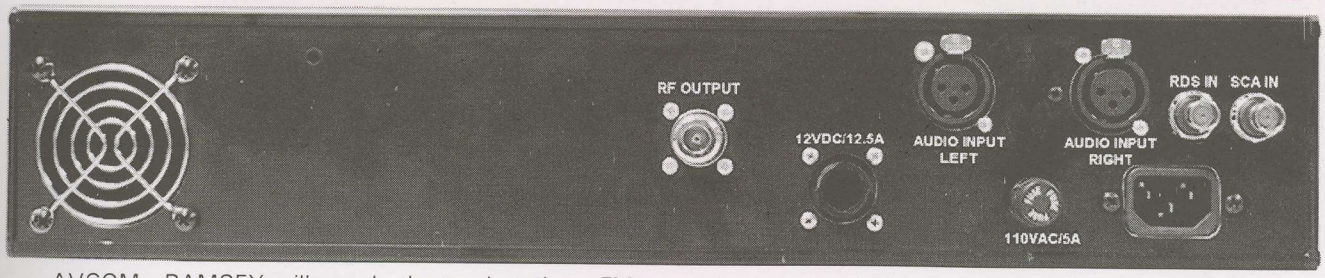


The PX1 Technical Standard - for sound so good you will swear you are in a recording studio!

• **Frequency range**: 87.5 to 108.0 MHz in 100 kHz steps (you dial up your frequency - if circumstances change, just reach up and move your station to a new frequency!) • **Power output**: from -60 dBm to +47 dBm (40 watts maximum output, smoothly adjustable down to a fraction of a watt!) **Broadcast Modes**: Stereo (+/- 75 kHz bandwidth) with 55 dB minimum separation (typically 60-70dB) from 50 hertz to 16 kilohertz audio range with THD (total harmonic distortion) not over 0.3% with processing - or you have switch-option of standard mono with or without SCA (it even has digital inputs for the future!) , and, a "brick wall" 16 kHz steep low pass filter to ensure that even if your CD source somehow has audio stuff above that frequency, it won't get into the system and cause beat problems (19 kHz is "down" 68 dB) • **Operating power source**: 110VAC, 220-250VAC, and 12VDC (requiring 11 amps for full power - a 100amp rated car battery easily runs it for 10 hours or more which means a modest solar panel array would operate PX1 with no commercial power required!) • **Inputs**: Connect the audio output (in stereo or mono) from a satellite receiver through a pair of professional, balanced, XLR audio inputs (yes - we *include* these special plugs with each PX1 so if you are on Kiribati with no Dick Smith store, you're still able to get on the air immediately), or, plug in a CD player, microphone(s) or your own switching audio input source (a mixer - we can source for you until we have our own!) • **Input adjustments**: We've been in the satellite link business forever (well, since 1979) and fully understand that you can have widely varying inputs from different sources. So we built-in 4095 steps of audio input adjustment (you can *really* fine tune this baby!) so even the "weakest" audio input from Granny's cassette player can be amplified to full modulation volume (which, by the way, also has 4095 steps of adjustment) • **Cooling**: High volume CFM fan for those moist, humid climates where you need to get the heat away from the oversized heat sinks quickly to maintain transmitter efficiency - plus, over temperature automatic detection winds back the output power if anything gets "too hot" and is in danger of becoming a problem (we've never been to Kiribati but we can appreciate that an FM transmitter there needs special automatic protection circuits) • **Output stability**: While we expect you to connect the transmitter output to our own line of 50 ohm antennas for maximum coverage, we also know someone will try to broadcast using a 19" clip lead hanging down from the type "N" output connector on the rear panel. So we built in automatic VSWR (standing wave ratio) protection which senses abnormally high reflected power (transmission juice not accepted by the transmitting antenna array and sent backwards to the transmitter) to ensure you never - NEVER - blow up your solid state final amplifier transistors. If the VSWR rises, the output power automatically reduces until you fix whatever is wrong with the antenna system (we field tested the PX1 on a remote island in the Caribbean for years, know what happens if something fails and the manufacturer is thousands of miles away!) • **Clean neighbour policy**: The PX1 has tremendous bandpass filtering built in - hey, we had to beat the very stringent USA specs demanded by the FCC/Federal Communications Commission, to get this transmitter approved for use there - we are better than 90 dB below the selected frequency output at full output on 2X (second harmonic) which means you won't get into anyone's TV reception or screw up the local airport tower when operating this super-clean transmitter! • **More clean neighbour policy**: So the neighbourhood meenie kid comes into the station with his latest rap-CD and wants to "crank it up" to full volume. We've been there and built in "over modulation protection" to make sure that no matter how loud his rap or how much he cranks it up, the only thing that will fault is his own ear drums. • **Comfort zone**: Everything you need to monitor we monitor for you. If it is not automatic (such as automatic over modulation protection), we create a switch selectable (fluorescent character) display which you can check as often as you wish for PX1 operating parameters. Like? The actual temperature of the preamp and the final amplifier, left and right audio levels to PX1, VCO (transmitter oscillator) voltage, modulation levels, and the actual power output plus the reflected power from the antenna - to ensure you know when you have the antenna properly mounted and tuned. It's all there on the front panel display so nothing sneaks up on you and goes "snap." • **Housing**: All of this is in a standard 19" rack (hey - if you are going to be a professional radio station, scrounge up a real world professional rack to stick this baby in - that is 5" high and 15" deep - you don't have to have a rack of course - it will sit nicely on a banana crate or folding card table or even the front passenger seat of your Ford Explorer equipped with the Bridgestone tires) - but it gives your station a "professional" touch. • **More power**? Up to 600 solid-state watts output available!

It is not just a professional transmitter - but a COMPLETE FM STATION in a box!



AVCOM - RAMSEY will supply the total station - FM transmitter, transmission line with connectors attached, and the transmitting antenna (with stainless steel hardware) from our unique selection of FM transmitting antennas (omni-directional or narrow beamwidth Logi design all matched to your proposed transmitter frequency - or broadbanded!). Coming soon - a complete "PC Controller" that allows you to mix inputs from satellite, CD player/changers, and other sources - all automated so your FM station can operate unattended for days!

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COMPLETE THIS FORM - SPRSCS 2001- BE ASSURED OF ADMITTANCE!

September 27 - 28 - 29 in Melbourne

Use form below to REQUEST an invitation to attend. Casual drop-ins will not be admitted.

Registration will be conducted beginning June 1. Attendees must REQUEST an invitation to attend as the highly complex FM/SDS/DVB-T sessions will have seating limited to maximum numbers and only those who register promptly after June 1 will be guaranteed seating. **STEP ONE**: Use the form below to REQUEST an INVITATION to attend. This is NOT a commitment from you to attend but lacking a written invitation from us, you may be prevented from attending the sessions that interest you most. Do not put this off - being late is to not attend for lack of seating! **STEP TWO**: When you receive our written invitation to attend, complete and return as soon after June 1st as possible.

REQUEST FOR INVITATION - this does NOT obligate you to attend!

☑ PLEASE address an invitation to attend SPRSCS 2001 to the individual named below. My areas of interest while attending would be as follows (indicate with "X" mark please):

☐ I am interested in low power **Community FM** radio broadcasting

If yes - please further indicate -

- ☐ I would like to **build** a low power FM stereo transmitter at SPRSCS 2001 and take it home with me
- ☐ The heck with building - I'd still like to **buy** one while there!

☐ I am interested in **SDS** (Shared Dish Systems) - p. 6 this issue

If yes, please further indicate -

- ☐ I am interested in the 950 - 1450 (2150) L-band **retransmission** of dish signals
- ☐ I am interested in retransmission by **remodulating** in L-band from satellite/tape/hard drive
- ☐ I am interested in **2.4 Gig** systems and would like to "play with one" at conference
- ☐ I would be interested in a one-day work shop leading to **building** these systems

☐ I think Aurora-RABS is dead but would still like a chance to **meet with ABA** folks

☐ I'd like the chance to meet with **someone from Optus** - perhaps Ed Guz???

☐ I want to "touch" and "play with" DVB-T

- ☐ I would be interested in a one-day workshop covering all aspects of DVB-T installation

Please place the following name on list for written invitations:

Name _____ Company _____

Mailing address _____

Town/city _____ postal code _____ State/Country _____

Return this to SPACE Pacific, PO Box 30, Mangonui, Far North, New Zealand or, fax to + +64-9-406-1083 or email as attachment to skyking@clear.net.nz

SatFACTS MONTHLY

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This publication is dedicated to the premise that as we are entering the 21st century, ancient 20th century notions concerning borders and boundaries no long define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

Editor/Publisher
Robert B. Cooper (ZL4AAA)
Office Manager
Gay V. Cooper (ZL1GG)

Reaching SatFACTS
Tel: 64-9-406-0651
Fax: 64-9-406-1083
Mail: PO Box 330
Mangonui, Far North
New Zealand
Email -Skyking@clear.net.nz
http://www.satfacts.kwikkopy.co.nz

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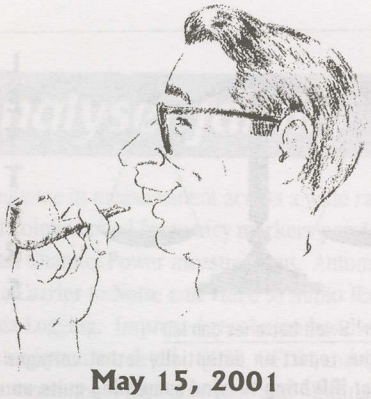
ERRATA

COOP'S COMMENT



May 15, 2001

Our SatFACTS web site is a worry to me. After two years of keeping it reasonably current (some days we post new information as many as five times, other times we go five days with no new news), I am not sure whether there is value here. The number of people hitting the site quickly moved to 10,000 a month and then growth slowed down. Some might suggest if the content was improved there would be more hits. I find we walk a very delicate line between too much information (for free) and too little information (to hold user interest). Back when Rolf Deubel (Mad Max) was in jail in Thailand, we had some days when http://www.satfacts.kwikkopy.co.nz was being hit hundreds of times per hour, several thousand per day. That has never happened again no matter what important news we might post. You can read into that anything you wish about the number of piracy enthusiasts out there in TV land.

Our site provides the necessary form to allow site readers to request a sample copy of SatFACTS or Coop's Technology Digest, or, subscribe on-line. The number of people taking out new subscriptions was very encouraging for the first few months, but more recently it seldom exceeds one per day on average. That's not exactly mind boggling for a site that still attracts as many as 20,000 user-hits per month.

Some people who work professionally with sites (I don't qualify for that category personally) insist we should be supplying "only the headlines and the barest of facts" on the web site and we should routinely end a report with, "Full details in the next issue of SatFACTS." That seems logical enough - would I - I ask myself - actually spend money for a magazine which was foolish enough to give away all of the really important stuff, in great detail, on a freely accessible web site? Probably not.

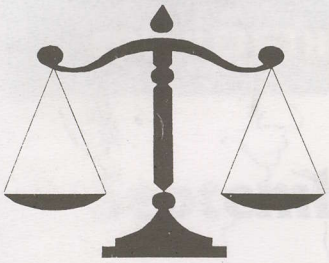
More and more of the sites I personally do use have become "semiprivate" and require some sort of user registration for access. Some now require subscriptions for access. Still others give you a headline with a single sentence or two explaining the headline, and then offer to give you the "complete story" if you have an account with them and they have your credit card details on file.

The big guys believed until recently that web sites would be like newspapers - mixing news and editorial material with advertisements. When Fox (the USA TV network owned by the Murdoch interests) and NBC closed down web sites employing thousands of people recently, it became painfully obvious that advertising sales was not a suitable source of revenue to support web sites. Look at LyngSat which attracts hundreds of thousands of hits per week - after years of being the best and most used at what they do, it is the devotion and attention to detail of one very dedicated man that keeps it going. Not any measurable amount of advertising revenue.

Back in November (2000) we reported that a Toronto, Ontario based group calling their site www.nakednews.com was giving away serious evening TV newscasts to anyone with a modem and connection fast enough to handle live people saying live words through your PC. Last month, www.nakednews.com attracted more visitors than CNN.com. Some incredible number like 6 million hits. Does that mean these ladies (and now one guy) who take off their clothing while giving the news are a financial success? Unfortunately, complete nudity and 6 million hits has to date failed to attract advertising support. It appears that even stripping down is not a money maker on the web. I have no plans to add a newscast to http://www.satfacts.kwikkopy.co.nz. Naked or otherwise.

-ON THE COVER-

There are probably a dozen reasons why you should not put a FM radio station on the air. Here is one reason why you should (p. 15).



LETTERS

Danger! 9-volt batteries can kill

"Your report on potentially lethal voltages in a popular IRD bring to mind something quite unusual that happened to me. My son has a metal cased pocket watch, the type railroad men used to carry in a watch pocket. I found it lying on the floor, stuck it into the front right pocket on my pants for safe keeping. Later I was replacing batteries in an appliance and dropped a standard 9 volt battery into the same pocket. Perhaps 30 minutes later I suddenly realised my upper right leg was sending me messages - 'I am burning up!' I touched the pants over the pocket, as the heat was centred on leg there and immediately yanked my fingers back. Inside of the pocket - I discovered after dropping my pants very rapidly - the 9 volt battery terminals had been wedged against the metal case on the watch. Current flow through the watch case had increased the temperature to the point where I could no longer hold the watch in my hand. After putting my pants back on I measured the voltage left in the battery after it had been shorted through the watch case for some minutes; 8.2 volts against the original 9. The watch survived intact, my leg quit hurting after ten minutes but the cotton lining in the pants where the watch and battery had been wedged was scorched brown - it was actually approaching a flame state! Under the wrong circumstances, even a seemingly harmless 9 volt consumer battery can be a dangerous item."

RL Gardiner, Sydney

A whole new meaning to "hot pants."

2.4 gig equipment

"Interesting article on this stuff in SF#80. I recently imported into NZ an 8 channel transmitter/receiver package in which you select the channel you wish with dip switches. My project is to create a wireless link of about 900 metres length so local D.O.C. team can proceed to monitor endangered bird species using a time lapse VCR. Out of the box, at a cost of US$129 plus US$20 for 8-day freight delivery, units did 200m with short, stubby antennas provided - much as described SF page 8. What we need now are some directional, gain antennas to make these babies really percolate!"

Robert Skilton, Te Anau, NZ

See page 6 here for some practical ideas regarding antennas. What we really need is a home work shop guy with some metalworking equipment to create some reasonably priced gain antennas - ready to come out of the shipping carton and connect with an F fitting to transmitter or receiver as required.

This Boomerang won't return?

"They are no longer accepting new TV customers, plan close down of Internet service via satellite. It's only a matter of time, now."

RA, Northern Territory

PROGRAMMER PROGRAMMING PROMOTION UPDATE

MAY 15, 2001

Aurora cards. For as long as there has been an Aurora service, there has been confusion about who "owns" the cards. Dealers "purchasing" the cards from distributors typically pay a fee in the range of $105 (Hills reportedly offers them for less). Distributors, in turn, are required to purchase 50 or more to "qualify" for the "wholesale" rate in the region of $75. If that sounds to you like any other product moving from "manufacturer" (Optus) to distributor to dealer to consumer - with mark-ups for each step, well - that's how it appears to most dealers. But consumers were told, in Optus literature dating back to 1998, they would "not be charged" for RABS TV channel service although, "you will be required to purchase a smart card for a one time fee" (quote from Optus literature - emphasis on purchase ours). Now, Optus in attempting to clear the air has issued a new policy statement: (1) Aurora cards are not sold to anyone - they remain the property of Optus; (2) the fee charged is for the "loading and ongoing maintenance" of the smart card; (3) the "software" held inside the card remains the (intellectual) property of Optus and is protected by copyright and anti-piracy legislation; (4) if a smart card is no longer required, it should be returned to Optus; (5) if the user requires a change in service authorisations, return the old card, ask for a replacement (a new fee may be due - not clear on this). Optus is now claiming "maintenance of data files and addressing" records is a "considerable ongoing expense" and thus the original fee. Perhaps if they weren't constantly changing the software and sending out letters demanding people upgrade their software, the cost of operation would be lower? (June 28th is revised deadline for updating UEC642s.)

Smart card costs - when ordering 1,000 or more, US$1.50 each from Hong Kong sources for "blank white cards" and as low as US$0.90 from Malaysian firms. NDS charges programmers such as Sky NZ US$17 per card "loaded" with their NDS/Sky software. Those are some mighty lucrative bits and bytes stuck in there!

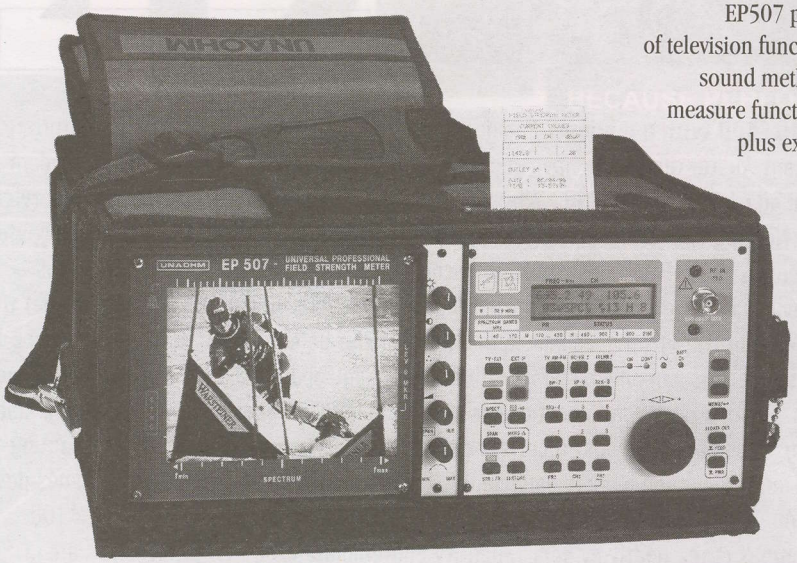
TARBS. Extensive review of status of TARBS appeared in Coop's Technology Digest for May 2. Highlights: They have 25,000 subscribers, claim they need 70,000 to be profitable, have internal "goal" of 250,000 at A$60 a month per home. So far, claim to have invested A$250 million which is probably an exaggeration by two to three times. Their security system has been breached but as breaking system requires matching a unique smart card to a specific receiver, unlike Irdeto, there is little to no market for the piracy product - the receivers are essentially a "closed shop" although work-alike cards are available. Biggest surprise: They plan to expand service into Europe, North America using same format developed in Australia.

XXL may not mean extra-extra large. French Canal+ "adult" service through I701 Ku is being trialled as stand-alone channel (actually a part of a channel as there are only a couple of movies daily). Details from www.xxltvsouthpacific.com.

Optus B3 12.375 test transponder? Evening of May 6th went FTA and one very amusing channel (labelled C7G from the Olympic coverage days) has looping fictitious commercial for flavoured milk featuring flies at a garbage tip. Not funny? Well you had to be there and by the way - to save on data stream bandwidth this "channel" runs shrunk down to 1/6th normal full screen size. Now that's funny!

New 64 page catalogue. Peter Lacey (Lacey's Australia) has extravagant (well, impressively created, a work of art really) new product sourcing reference book (which they hope you will use to order stuff from them). Unusual - front cover features shots done at a "oldie but goodie" TV museum in Melbourne area. Bet you didn't know TV was now old enough to have museums!

The growing Unaohm Television Analyser family

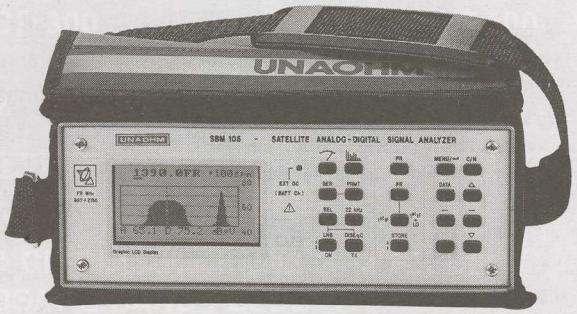


EP507 permits excellence in measurement across a wide range of television functions. Dual colour coded frequency markers provide a sound method of Digital Channel Power measurement. Automatic measure functions include Carrier to Noise and Video to Audio Ratios plus expanded Data Logging. Improved resolution bandwidth displays extra Spectrum detail. QPSK, OFDM and QAM quality measures of Bit Error Rate and Modulation Error Ratio etc., colour Constellation Diagram and printout of MPEG Network Information Tables are available. An internal reference Noise Generator that permits measurement of insertion loss or filter alignment etc. anywhere between 45 and 2000MHz is also available. A quality TFT LCD screen uses colour to clarify the meaning of most measurements, or simply to show a colour TV picture.

EP 319 level and Spectrum measurements feature high accuracy and selectable Resolution Bandwidths of 100kHz, 1.5MHz and 4MHz to provide real time spectrum displays of signals from TV stereo audio and colour sub-carriers to SCPC satellite signals. 5-40MHz is included, with Analogue and Digital data logging. Options include Digital Signal Quality measures of QPSK+QAM or OFDM. Operational running time is extended thanks to a Ni MH battery pack. Dual Spectrum Markers with Frequency and Level difference (Delta) measures, an electronically generated graticule, On Screen Display function indicator, automatic analogue Carrier to Noise and Vision to Audio ratio measures, DiSEqC 2.0 switching, Teletext etc. are included.

EP-313 provides a new benchmark for price, function and quality in a Television Analyser. Spectrum mode uses an easy to see frequency marker. Carrier to Noise ratio, Vision to Audio ratio and Digital Channel Power measurements display digitally and are automatic. 100 PReset tuning positions store your favourite channels, whilst factory preset channel plans enable tuning by CHannel almost anywhere, by FRequency either by direct entry or step. Teletext is standard. Factory Digital Signal Quality options for QPSK, OFDM or QAM round out the EP-313's measurement abilities.

SBM-105 makes all the necessary measurements for Digital and Analogue Satellite signal Quality. Built around the standard Unaohm Digital Signal Quality measures, the SBM-105 includes Spectrum with Analaogue and Digital signal level measurement. The graphic matrix LCD is readable in direct sunlight or low light. Versions are available for QPSK, QAM and OFDM. The SBM-105 is a low cost answer to installer measurement requirements of digital from a company with over 60 years experience manufacturing electronic instruments.



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Ed Guz suggestion

"I have advised all of my DTH customers to return uncompleted the Ed Guz questionnaire using the Optus supplied return postage paid envelope by writing 'You cannot trust Ed Guz' across the front of the envelope."

ADJ

What? No F fitting???

"Have just inspected my first hands-on Thomson DVB-T digital STU boxes for Australia and am shocked to report they do not use F type connectors! Rather, the PAL series plug and socket are used. Is this common elsewhere?"

P. Hadlow, Australia

Sadly, it is the way things are (still) done in Europe. The history of the PAL plug (and socket) is interesting. Belling-Lee brought it out in 1938 as a commercial product after a couple of BBC engineers made the prototypes in 1937. Now nearly 63 years later this variable impedance, difficult to wire, mechanically unstable system continues on into the digital age. The F connector is the more obvious choice and while it is not perfect either, at least it is simple to install, does not depend upon a set screw or melting solder to make the centre conductor connection, and can be used out of doors without fear of moisture ingress. PAL connectors are not reliable and create an impedance "bump" (standing waves) which become progressively worse as the frequency increases - at UHF they are a disaster.

IR3 incompatible?

"I purchased the Icom IR-3 handheld AM-FM TV receiver featured in SF#80 (p. 8). What I want to know is, where can I get the log antenna shown in the picture? I want to receive satellite TV with it but at the moment all I can get is the sound from my dish system."

Gerry Heuer, Western Australia

Oops. Did we forget to mention that before you can receive satellite TV, somebody has to be broadcasting it in a format compatible with the IR-3? The log antenna shown was designed by hams for ham use. See page 22 in this issue for yet another 950-2150 log. This one will be available commercially by perhaps July, as a part of the SDS packages being developed by SatFACTS for guys just like you.

Insulated?

"The article on voltage was good but I believe it may be common on many receivers to have this sort of leakage which in turn requires that the LNBf be 'insulated' at the dish. I think it is a legacy of receivers which have rubber feet leaving no place for the leakage to go except up the coaxial cable shield to the LNBf."

Dave Nolan, Katherine NT

Simple to check. Turn on the receiver, connect nothing to it; take a DVM/DMM and place on AC 200 volt scale. Stick the red lead to the receiver case and the black lead to something you know is ground and read the meter display. If it is tens of volts of AC, the case is hot and you could be too if you got between it and ground.

Not insulated

"If the impedance of C8 limits current to less than 1 mil (SF#80, p. 13), what happens when C8 shorts to ground? Tried it - can report RCD went beserk. Which is OK for techs who use a RCD - those who don't could be toast if C8 really did fail as a short to the case."

IF, Queensland

On the tombstone - "**Killed by 1 nF cap**".

HARDWARE EQUIPMENT PARTS UPDATE

MAY 15, 2001

DGT400 with a modem? Engineers hired by TelstraSaturn working at Saturn parent Austar reportedly have successfully "transplanted" a telephone line modem into an ex-Galaxy DGT400. Why try? Because new July-start TelstraSaturn service for New Zealand using Optus B1 is still on schedule to use ex-Galaxy (Austar, Foxtel) Pace DGT400 IRDs. TelstraSaturn partner in this venture, as we have reported previously, is New Zealand's state broadcaster TVNZ. And TVNZ is insisting that the free to air (view) services included in the bouquet be capable of direct linking back to Internet. This can only be done with a modem-equipped IRD, which the DGT400 was not. By modifying the Pace model with an add-in modem, perhaps TVNZ will be able to use the same low-cost receivers planned by TelstraSaturn rather than selecting a current production modem equipped IRD at greater cost. In the end, it all comes down to money; Pace DGT400s have a book value at Austar between A$50 and $100 whereas in the relatively small quantity contemplated for TVNZ, new IRDs are in excess of NZ$500 each.

Speaking of DGT400s. There were two versions - one that could be software downloaded over the air, and an earlier model which required bench time for reloading software (to EEPROM). There are no obvious markings on either model and you typically know which one(s) you have only after over the air downloads fail to perform. And - there was a Pace DVR500 version of the non-download capable model, created for sale to and through the NBC network for their cable and other affiliates back when NBC had CNBC and a general entertainment channel as well.

Fairfield City, NSW is latest community to adopt onerous regulations that make FTA C-band satellite reception impossible. Dealers there have done brisk business with $1600 price range FTA dish systems for Thaicom 3 receiving Vietnamese and Greek channels; a commercial "incentive" is suspected as the cause of the problem. Details here, p. 20.

WIN signal "quality" versus GWN, ABC, SBS (SF#80, p. 2)? We asked why there appears to be such a difference as all four are using the same transponder for WA service to SA D9234 receivers. Answer is they are not - not using the same transponder. GWN, SBS, ABC are fed on T14 (PAS-2 Ku) while WIN is fed out of Bendigo on T2. Receivers are told to "seamlessly" switch transponders when T2 - T14 are requested and until now, neither we nor the WA viewers were aware of this split-transponder service.

Nokia's latest "not for sale and not entitled to service backup if you are in the Pacific or Asia" products? http://www.jacobsons.nu, including 9450 S FTA receiver, 9650 S with 2 x CI and 9800 S with newest software including Cyrillic fonts.

Sky Network NZ seems to have dropped NICAM stereo service from their terrestrial (UHF) movie channel; if you want stereo, upgrade to digital satellite!

Humax has updated the operating system (OS) for their IRCI 5400, available through authorised distributors and web site (www.humaxdigital.com).

"Let's face it - pay TV is just that. It is in the interest of just about everyone beyond our level of the industry to support the systems that make people pay. Aurora is an aberration as they use Irdeto to control free to air TV services. Perhaps we need to recall the wisdom of the ages condensed by Zig Ziggler to: '*there ain't no free lunch*'." Can you guess which industry supplier recently said these words for public consumption?

Philips will offer DVD-Video Recorder as a "serious challenger to videotape machines" predicting VCRs will lose market share by 2003. Possibly, but not at A$6599 each DVDR will sell for when released in October to Australia.

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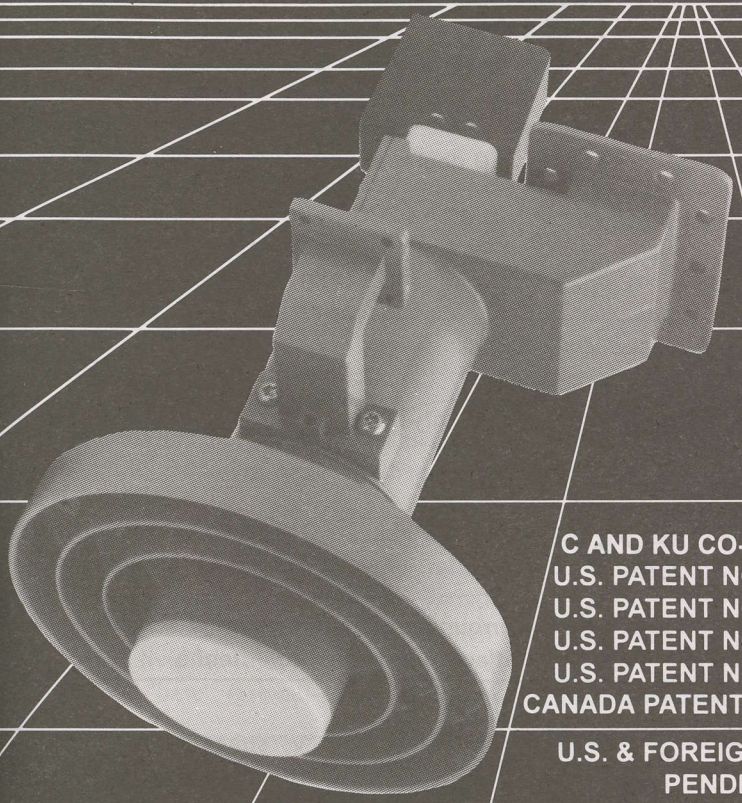

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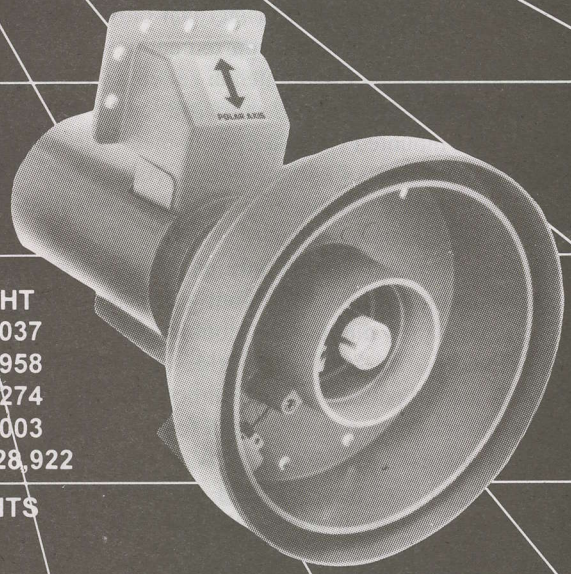

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Roll Your Own 2.4 *gig* Antennas

Getting over a distance with low power microwave transmitters depends almost totally upon the effectiveness of the transmit and receive antennas. As we explored in SF# 70 (page 12), a "point radiation source" expands from a single point (.) to an ever enlarging circle at the speed of light. The total transmitter output, located at the point source, must eventually cover an area significantly larger. This is illustrated in the diagram at top left of the opposing page.

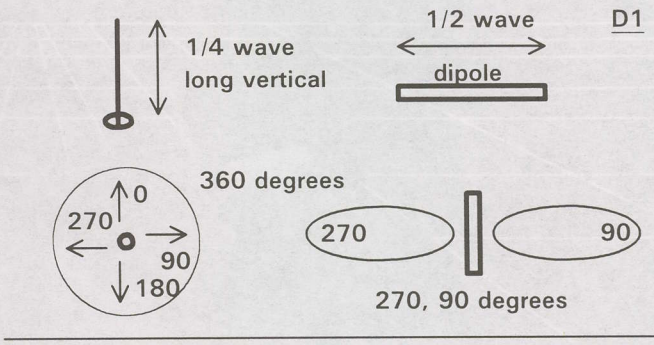
A point source is a handy graphic substitute for the real transmitting antenna and in fact can only exist on paper as a model. One of the closest approximations of a point source is a short, stubby, vertical antenna called a "1/4 wave antenna." The 1/4 wave is simply a short rod, cut to a resonant length, typically mounted (installed) on a metal surface - such as the roof or rear deck of an automobile. As shown in D1 here, the 1/4 wave radiates signal equally in all directions, just like the mythical point source.

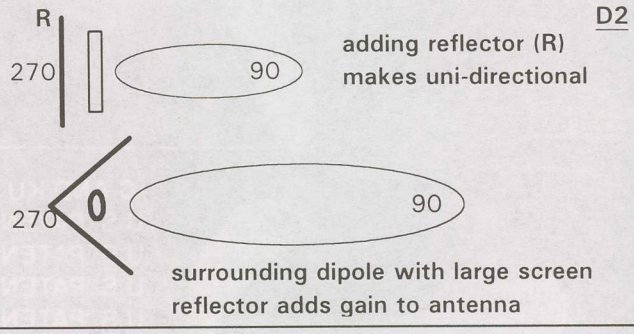
The next step upward in antenna design is a resonant 1/2 wave antenna which can be configured in a number of formats including the dipole or doublet. The dipole mounted horizontally (its long length side above and parallel to the earth) has a "pattern" in two directions. As shown in D1, its maximum radiation (gain if used for receiving) occurs at right angles to the dipole element. With reference to the circular (360 degree) coverage of the 1/4 antenna, the dipole radiates maximum signal towards 90 and 270 degrees, minimum towards 0/360 and 180.

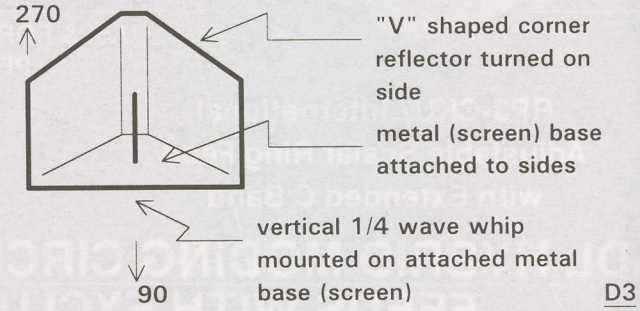
In D2 we add a new (reflector) "element" to the antenna and space it to one side (the 270 degree side in our illustration). The new element is longer by a small amount than the physical dimension of the dipole and because it is longer, it acts like a "blocker" for the dipole - stopping signal radiation towards 270 degrees. As good as a longer (reflector) element might be for greater gain and more directivity, we can do better. The single bar reflector occupies a small physical area and signal originating at the dipole can still radiate above and below it in the general direction of 270. The bottom portion of D2 shows the answer to this problem. The physical size of the reflector is made larger - *much larger*. Now it is a structure shaped like the letter "V" turned on its side, commonly, a "Corner Reflector." The dipole is now enclosed by a V-shaped reflector. The solid nature of the V-sides prevent any radiation in all but one direction - towards 90 degrees.

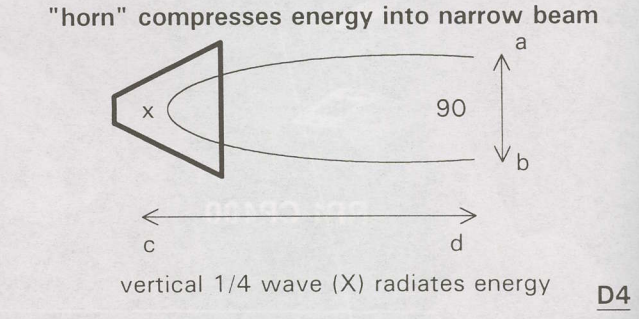
In effect, by building a "shield" around the dipole, we stop all signals from radiating away in any but the one favoured direction. That means the signal that is allowed to radiate at 90 degrees is going to be stronger than it would be from the dipole alone - because energy that would have gone in the 270 degree direction is now added to the original 90 degree energy and the sum of the two is greater than the 90 degree alone. This is the basis for all directional antennas.

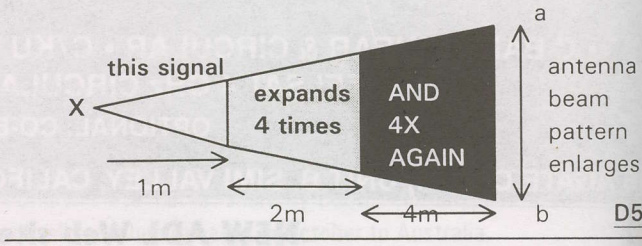
Now, it turns out the dipole is not always the best selection for a transmission antenna installed inside the "V." The dipole

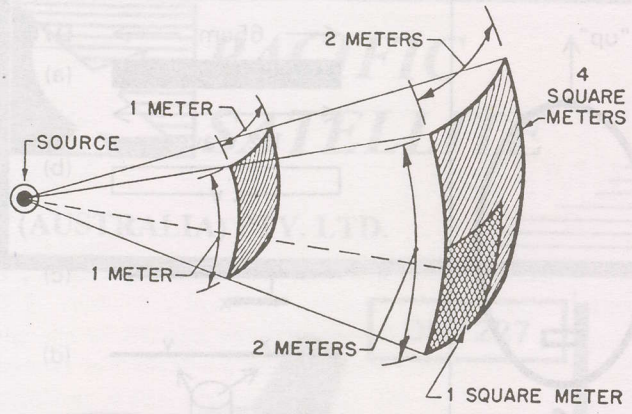












requires special skills which are not easily duplicated in the field without sophisticated test equipment to match the dipole element to the transmission line. "In the field" means you, working on a workbench, or hanging upside down on a roof.

In D3 we see a special modification of the V/Corner Reflector. Rather than using a dipole for the radiator (as in transmit; collection as in receive) element, we substitute the original 1/4 wave radiator (*stubby*). This has the advantage of being able to directly attach a 50 or 75 ohm coaxial transmission line. Field adjustments, if required, amount to carefully trimming the 1/4 radiator a "smidgen" at a time as we will describe.

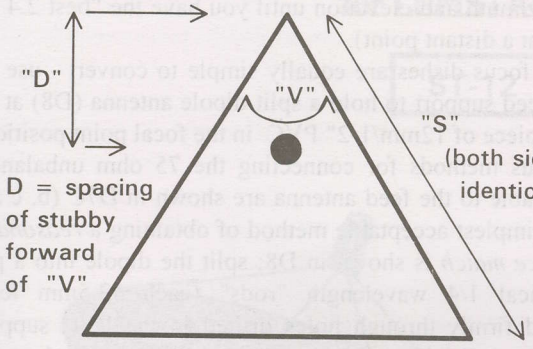
The principal of the simple 1/4 wave and the ease of duplicating a "V" shaped corner reflector are merged in this "*ground-plane corner reflector*" variation. The V sides have specified dimension, the "angle" created at the back where the two individual sides merge is specified. Now the unusual part: a "base" (ground-plane) is created for one of the two open-V sides. This becomes the base, the portion parallel to the ground. The 1/4 wave whip is mounted onto this base at a specified distance from the mating edges of the two V sides. The coaxial cable from the transmitter (or going to the receiver) is connected with the centre conductor attached to the 1/4 wave stubby antenna (which is insulated from the ground-plane) while the shield on the coax is attached to the ground plane plate of the antenna (D6C).

If the dimensions given here (including the "vertex angle" where the two sides are joined) are used in construction, the only "field adjustment" would be the "trimming" of the 1/4 radiator. The best way to do this is to start with the 1/4 stubby slightly longer than the calculated correct length (32.5mm). Set up a distant receiving point and with the transmitter connected to the transmit ground-plane corner reflector, take a pair of wire cutters and trim 1mm off the (stubby) length at a time, observing the effect on the received signal at the other end of the path. At some adjustment you will go "too far" and have to "put back" the last 1mm taken off. By using a straight piece of #10 or 12 solid copper wire as the stubby antenna, you can "go back" a step simply by recutting a new length to the "just before the last cut" dimension.

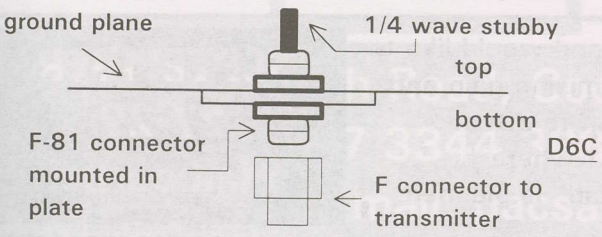
As shown below, there are 3 versions progressively larger and more gain. The smallest, a 90 degree vertex with sides 381mm by 260 mm, could be constructed using G-10 circuit board as a reflector material. The three pieces would be cut to size, positioned and soldered (copper surface to copper surface). Note the F-81 F to F connector is fitted through the bottom (ground plane) surface. The outer (shield side of coax) portion must make good electrical contact with the reflective surface to complete the antenna to coax impedance match. Like any antenna system, it gets bigger to create additional

D6A

Ground-plane Corner Reflector
top down view

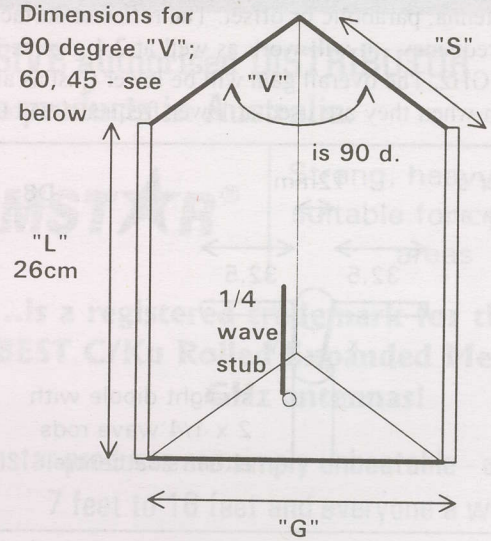


for 90 degree V "D" = 6.35cm
for 60 degree V "D" = 17.15cm
for 45 degree V "D" = 26.03cm



D6C

Dimensions for
90 degree "V";
60, 45 - see
below



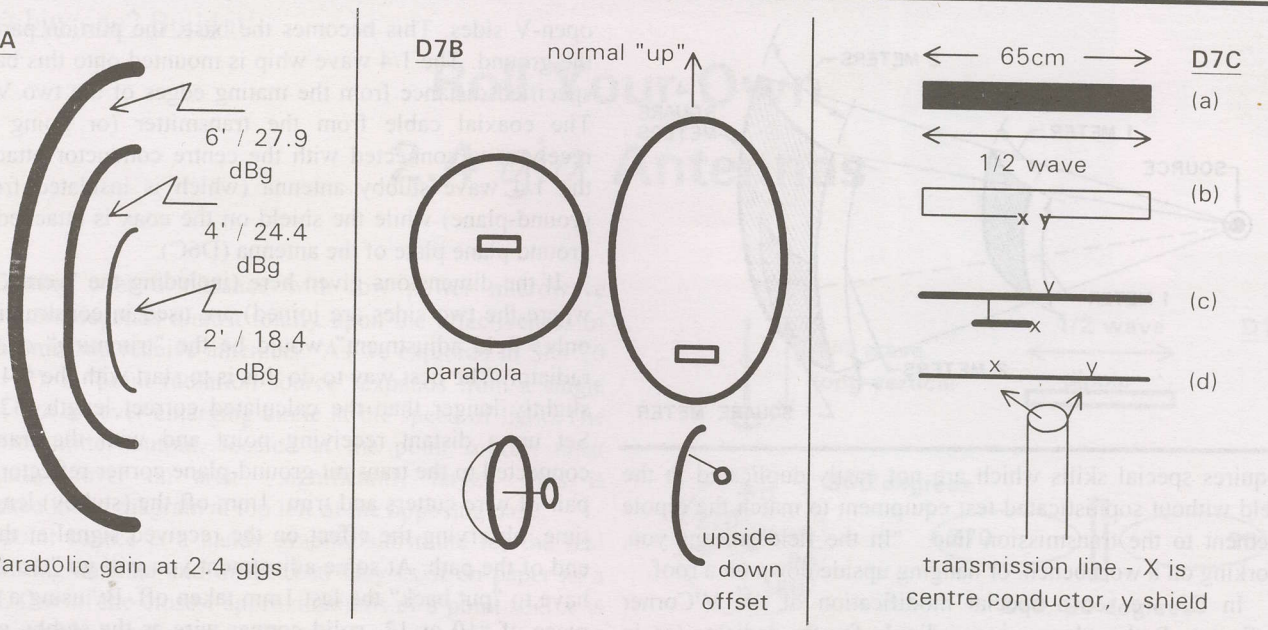
D6B
39.4cm

55.7cm for 90 degree only

Ground-plane corner reflector - feed side view

"V"	D	S	L	Gain
90 deg	63.55mm	394mm	260.4mm	13 dB
60 deg	171.5mm	1029mm	260.4mm	15 dB
45 deg	260.3mm	1562mm	260.4mm	17 dB

1/4 wave stubby is 1.28", 32.5mm

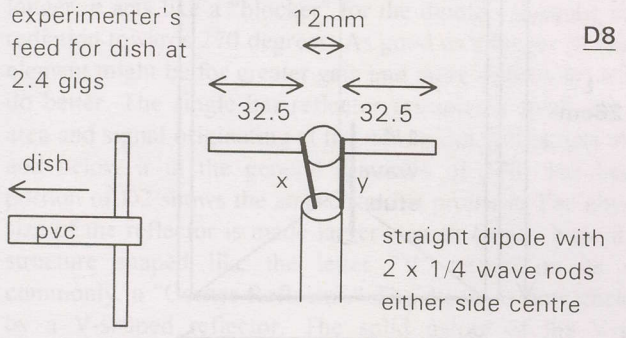


gain. Note that the "V" angle changes (60 and 45 degrees) are part of adjustments required for larger "S" dimensions. Also note that L (260mm) does not change.

A popular and low cost reflector surface would be metal window screening (being careful to avoid the non-reflective but popular plastic mesh). This would require a framework to hold the reflectors in position - a handy garage workshop project for a rainy afternoon. In all three sizes, the reflection surfaces ("L" and "S") are not required to be electrically connected together (these are all passive reflection surfaces) although it will not hurt to do so.

Use what's on hand

Of course you handle antennas every day which could be more than adequate for 2.4 gig extended range work. And that is the "dish" antenna: parabolic or offset. The reflector surface is immune to frequency - it will work as well at 2.4 gigs as it does at 4 or 12 GHz. The overall gain will be lower (just as all dishes lose gain when they are used at lower frequencies) but still very useful. In D7A above, we see a 2' (60 cm) parabola will produce more than 18 dBg (gain), a 4' (1.2m) 24+ dBg and a 6' (1.8m) nearly 28 dBg at 2.4 gigs. That's the good news. The bad is you have to figure out an efficient method of transferring (coupling) the output of the 2.4 gig transmitter into the focal point of the parabolic or offset dish so that it works as a transmit antenna at 2.4 gigs.



Any run of RG-6/U more than 20' long is going to be harmful because of line loss at 2.4. Once to the dish, the 75 ohm transmission line carried energy needs to be passed on to a 75 ohm antenna which you have situated at the focal (normal receive antenna location of the LNBf - feed) point. The focal point for 2.4 gigs will be the same as it is at 3.7-4.2 or 11-12 GHz. First you take off the C or Ku band LNB/feed, then replace in the exact same location a special "feed antenna" that works at 2.4 gigs.

Offset dishes have difficulty looking "at the horizon" because of their geometry. To achieve a low-look-angle (looking at a point on or near the horizon), turn the dish upside down (feed ends up on the top side rather than on the bottom) and peak for maximum as you would with DTH (adjust azimuth and elevation until you have the "best 2.4 gig picture" at a distant point).

Prime focus dishes are equally simple to convert - use the normal feed support to hold a split dipole antenna (D8) at the end of a piece of 12mm/1-2" PVC in the focal point position.

Various methods for connecting the 75 ohm unbalanced coaxial cable to the feed antenna are shown in D7C (b, c and d). The simplest acceptable method of obtaining a *reasonable impedance match* is shown in D8: split the dipole into a pair of identical 1/4 wavelength "rods" (each 32.5mm long) supported firmly through holes drilled in the PVC support, connect the coaxial transmission line cable centre conductor to one side at the end attached to the PVC, the shield side of the line to the opposite 1/4 wave rod, PVC end. The pair of 1/4 wave rods should not touch one another inside the PVC support - each is electrically independent of the other.

More complex matching schemes are available - we'll find out what they are in a future visit to the subject.

SPRSCS 2001 REMINDER!

If you "dig" antennas and would like to learn more about optimising gain and performance - plan to attend SPRSCS 2001 where a full day antenna "lab" is planned.

SEPTEMBER 27-29 Melbourne!

"Not at all uncommon..."

Sparks Still Flying over UEC SMPS

SatFACTS #80 reported our findings with respect to certain UEC IRDs and the existence of a low current but significant voltage potential appearing on the case of the receiver. We also reported our measurements showing in excess of 100 volts AC appearing at the case of the LNB(f) after travelling from the receiver to the antenna system through the shield side of the RG6 interconnection. We characterised the IRD as having, "an 'unusual' power supply design which results in *leakage* to the case of a voltage that we measured between 90 and 110 volts AC." The response to our report.

" This SMPS design is neither unusual nor unique; only the method UEC has chosen to protect users from shock might be characterised as 'unusual'. In fact, an almost identical power supply is found in consumer products, such as the Panasonic J1 and L20 home VCRs. However, Panasonic does equip these VCRs with polarised mains plugs which make it less likely that users will run into difficulties with improper placement of the mains neutral lead."

An opposing view. "The 642 SMPS runs at a nominal 100 kilohertz frequency although some +/- variation can be expected. The transformer is exceptionally small, approximately 1-1/4 x 1-1/4 by 1/2". The service data specifies a 198 - 260 mains voltage and I have been told by (UEC's) Russell Futter the absolute lowest mains voltage is 180V AC. As the various rails seem to be voltage regulated, and we know the supply will in fact power the 642 with mains voltages as low as 117V (SF#79, p. 22), I pondered why UEC should be so adamant about 180V as the absolute minimum. If you look at the +30, +12, -12 volt rails, you will discover the -12V rail has an unusual (and deliberate) 100 hertz ripple (modulation) on it. The others (9 in total) do not. Further, this rail does not stay stable (at -12) when the mains voltage drops. At 180V AC mains, this rail drops to -10.00V DC and at 117V mains this rail is only 6.01 volts. Note the others stay closer to their rated values (+12, 30 etc.) at reduced mains voltages. What does the -12V rail do? One might look around the smart card and authorisation sections of the receiver to answer that question and to also discover why the deliberate 100 hertz modulation is present."

And, "The argument that SMPS design is essential for a product destined for sale world-wide at various mains voltages between 90 and 270 is over stated. For example, Panasonic VCRs designed prior to SMPS had a linear supply with automatic predetection of the operating voltage. The power supply transformer used two or more windings and a relay which switched to the correct winding that matched the detected AC mains voltage - all before the linear power supply actually turned on and all automatically. This may seem like an interim step between single-mains voltage equipment and SMPS but it does demonstrate that technology had an answer for widely varying input voltages before SMPS arrived on the scene."

Another comment. "If you also read carefully the suggestion by Eric Fien (SF#79, p. 22) that you use the UEC receivers at 117 VAC through a step-down transformer (from 240) 'because they will run cooler', you will note there is the suggestion that a 250VA transformer be selected for operating up to 5 UEC receivers. This could be a mistake. For example, at 117 volts AC to the 642, it requires 68VA to operate (including the LNB). Five times 68VA would be 340VA which would exceed the 250VA rating. Also of interest - at 117V the duty cycle of the SMPS is 35% whereas at 240V the duty cycle is 26%. One can be lulled into a false sense of security by using the 'touch test' on the step down transformer to determine whether it is overloaded (as 340VA would definitely do to a 250VA rated transformer). Why? Because the duty cycle of the UEC SMPS is so low (35% at 117VAC) that an external transformer can actually have core saturation (too much current being drawn) without getting hot. Imagine being in the summer sun on a day when cloud cover produces only 35% sunshine; you would still burn but not get hot."

"Picture this: Home Handyman replaces broken antenna connector on TV and bypasses AC isolation on live chassis set. The antenna mast is now at half mains potential (120 V AC) waiting for an innocent installer to touch. Perhaps if installations complied with old A1417.1 - 1987 (Australia) or current AS/NZS 1367:2000 with respect to equipotential bonding, this problem and the one mentioned in your SF#80 report would not occur. How many satellite installs have not been done in this manner because of added cost? With 'duty of care' provisions becoming more commonplace in legal actions, perhaps it is time to revisit this aspect." (Marc Jackson - see page 32 here for 'Duty of Care' discussion; Ed.)

"Why have you singled out the UEC receiver for this criticism? Are not most if not all SMPS powered IRDs guilty of the same fault?" Fair question.

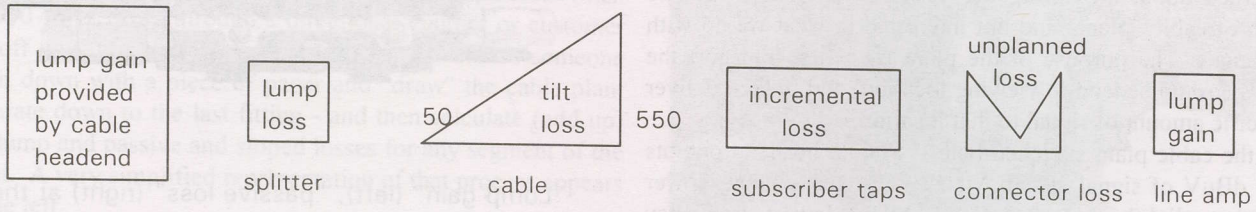
Before writing the April report, we did in fact check (or have checked for us by test participants in Australia) 16 different brands/models of IRDs. This included three different SA models, two from Hyundai, MediaStar and Pace, one each from 7 others. Results? Nothing approaching the UEC 642 leakage.

And this observation. "If you operate the 642 on 240-260 V mains and measure the SMPS 'hash' coming out of the IRD through case radiation, coax lines in and out and through the mains primary, you will find significant noise above 60 MHz. But at 100V, there is essentially no hash at all. The kick-over point for hash measures between 110 and 120V on the primary. The 642 is the only IRD I have come across that emits so much noise that when I have it running in the same (work) room as my TV servicing, I am forced to turn off the IRD to eliminate hash noise on Australian TV channel 0 (46.25 nominal MHz). Older VCRs set to output on 0 cannot be properly serviced when the 642 is running in the same room - no direct wire connections, just radiation from the metal case through the air - one heck of a lot of RFI!"

"To save money, UEC uses 1 ohm carbon resistors as a substitute for fuses in some critical areas."

A motel is electrically a tightly compressed "community"

Cable TV Distribution Basics



Cable distribution networks are designed to overcome the natural losses inherent in all forms of coaxial cable. Unfortunately for the system designer, no matter what size or quality coaxial cable used for a distribution network, an incremental length of cable (such as 100 metres as a reference) will always have more cable attenuation (loss) at higher radio frequencies (such as 550 MHz) than at lower frequencies (such as 55 MHz). The longer the total cable length the greater the disparity between lower and higher frequencies. Some numbers to illustrate:

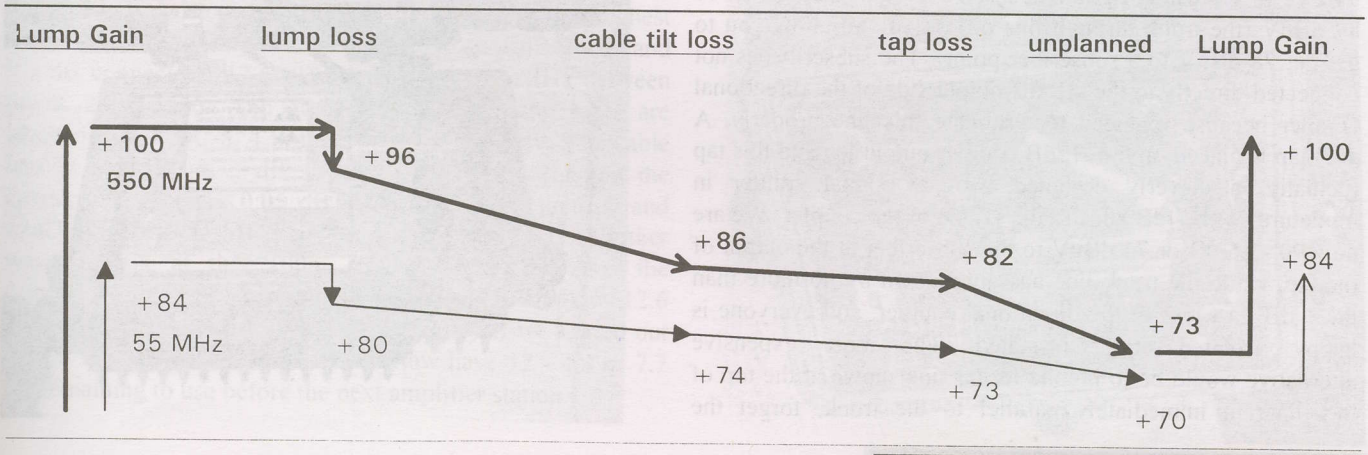
	55 MHz	250 MHz	550 MHz
100m long	1.5 dB loss	3.5 dB loss	5.5 dB loss
500m long	7.5 dB loss	17.5 dB loss	27.5 dB loss

What this table tells us is as follows: If you have two TV channels to distribute through coaxial cable, and one of these is operating at 55 MHz while the second is at 550 MHz, somehow there must be compensation for the different amount of cable loss at the two widely different frequencies. In our table above, if the total cable length is only 100m, the difference in loss between 55 MHz and 550 MHz is 4 dB. But, if the total cable length is 500m, we now have a 20 dB difference between 55 MHz and 550 MHz. This difference in cable attenuation (loss) is caused by the relative efficiency of the cable changing as the frequency of use increases. In the trade, it is sometimes call "cable slope" or cable "tilt:" slope because the loss becomes greater at higher frequencies.

This same "slope" affects RG6 cables on runs between the satellite LNBf and the receiver; IF frequencies near 950 MHz are not nearly as "attenuated" over an incremental length of cable as are 1450 or 2050 MHz signals. However, as our antenna to receiver runs seldom exceed 50 metres and only very rarely are 100m in length, the "slope" of the RG6 is not nearly as apparent as the slope within a cable TV system. For our discussion here, a cable system can be confined to a single building (office, motel, block of flats) or it can be a "community wide" system. The rules don't change - only the ultimate accumulated cable lengths.

We'll see how "slope" is compensated for within a cable system shortly. But first there are other forms of signal loss to consider. Slope loss is gradual, each extra metre of cable adds a fractional part of a dB to the loss column at 550 MHz and even less at 55 MHz. In between 55 and 550, you can draw a straight line that "tilts" downward with slightly more loss for each incremental increase in frequency.

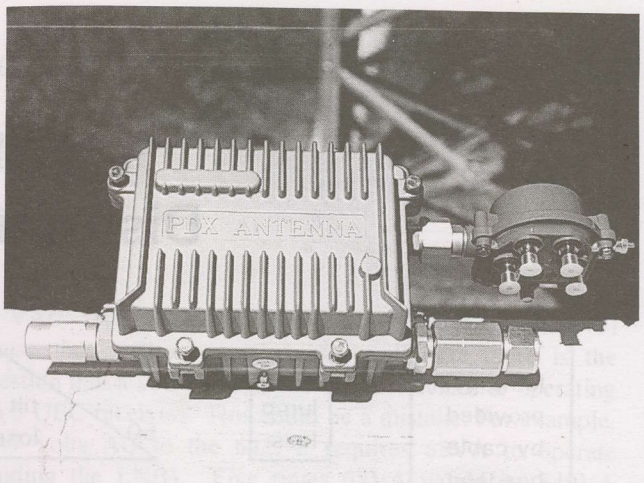
"Lump loss" occurs when the cable line signal is divided into two or more parts. The device we typically use for this purpose is called a splitter simply because it "splits" the original signal into smaller amounts of signal. A splitter has no respect for frequency - it will "lose" the same amount of signal at 55 MHz as at 550 MHz; and all frequencies in between. Thus, while it might take nearly 300m of cable to "lose" 4 dB of signal at 55 MHz, or 75m of cable to lose 4 dB at 550 MHz, in a splitter the signal is lost all at one time all in one place; a "lump of loss." And just for the record, a splitter does not really "lose" signal - it merely takes the original amount and divides it by 2, 3, 4 or some other number into equal parts. If you add the parts back together, you come close to the original amount.



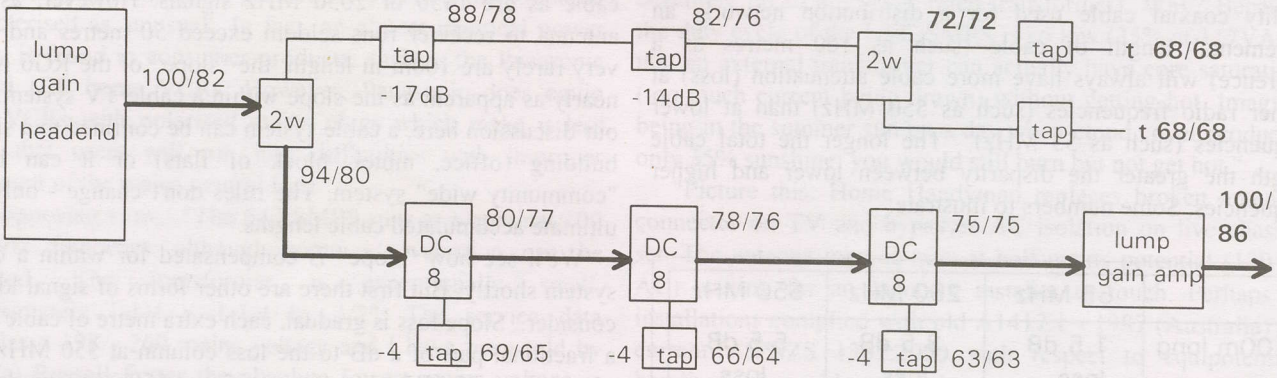
Lump loss is easier to replace than slope loss because it is the same number (of dB) throughout the full cable spectrum. Lose 4 dB of signal? Simple enough - put back 4 dB of gain.

There are other categories of loss. "Passive loss" is a combination of lump and slope and occurs when some interruption to the flow of signals through the full cable spectrum happens. One of these is "incremental loss," which occurs at subscriber tap-off points. Up to now, we have been concerned about measuring the various losses in a specific length of cable "plant" and not interested in what we do with the signals. The purpose of the plant is to first transport the signals (from headend to viewing location) and to then deliver a specific amount of signal to that location.

In the cable plant sketched below, a lump headend outputs +100 dBuV of signal at 550 MHz, with reach channel lower than that slightly lower until 55 MHz (lowest frequency channel) which is outputted at +82 dBuV. This is "tilt," to offset the combined cable "slope" in the plant to follow. The object is to arrive at the end of the plant, or at the input to the next amplifier, "flat" - typically 75/75 dBuV (550 & 55). The solid black line is the "master" or "trunk" cable, feeding sub-lines called feeders. The trunk line is never *tapped* (used to directly connect a house to the headend) while feeder lines (fainter black at top of diagram) are directly tapped.

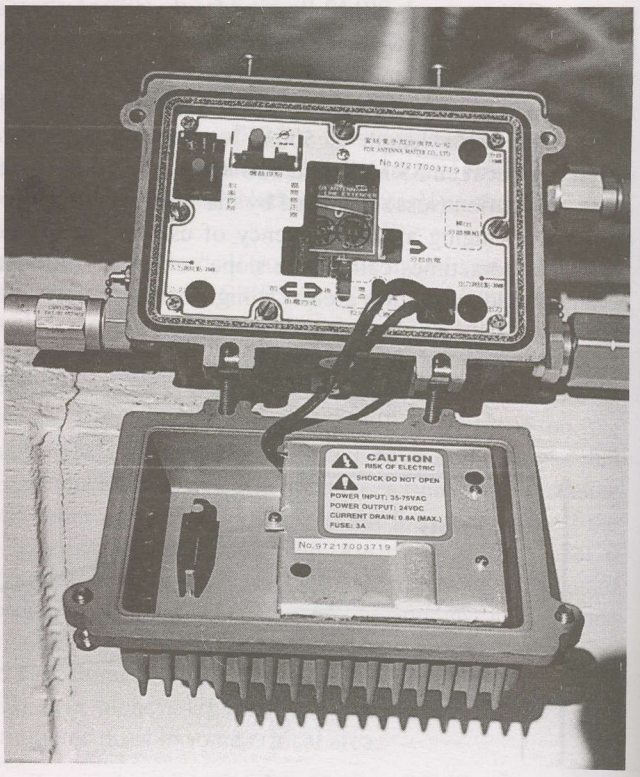


"Lump gain" (left), "passive loss" (right) at the same location. Cable amplifier with connectors for .500 cable (1/2") and 4 outlet tap. Amplifier has twin outputs - see text.



With a trunk line you have two options: (1) simultaneously lay a feeder line parallel to it to allow tapping of the feeder to connect viewing points along the pathway, or, (2) isolating the viewing homes from the trunk by inserting a device called a "directional coupler" in the trunk. The directional coupler sits between the trunk and the viewer tap as shown in a photo on the next page. Directional couplers are available in various values from 8 dB to 16 dB - reference the "coupled output" versus the line level on the trunk itself at that point. If the trunk level is +90 dBuV and a 12 dB directional coupler is used, the output of the line feeding the subscriber tap will be 90 - 12 or 78 dBuV. Simultaneously, the trunk output will be 89 dBuV (the trunk through line drops 1 dB to allow you to get out 78 dBuV to a subscriber point). The subscriber is not connected directly to the -12 dB output side of the directional coupler because we need to terminate this line properly. A 4dB tap is placed on the -12dB coupler output leg and this tap (actually, a cleverly designed two-way signal splitter in miniature) with -4dB adds to the -12dB of the coupler. We are now 90 - 16 dB or 74 dBuV to the subscriber at the output of the tap, while the trunk line has gone down by no more than the 1 dB thru loss of the directional coupler, and everyone is happy, isolated and terminated. The more expensive alternative would be to lay the feeder line shown at the top of the diagram immediately parallel to the trunk, forget the

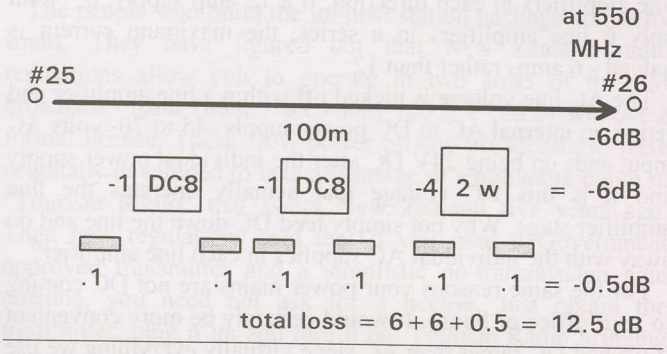
Clamshell construction of cable "line extender" amplifier. Powering through coaxial cable is (60V) AC, lower half of cover has power supply creating DC operating voltages for amplifier (see text).



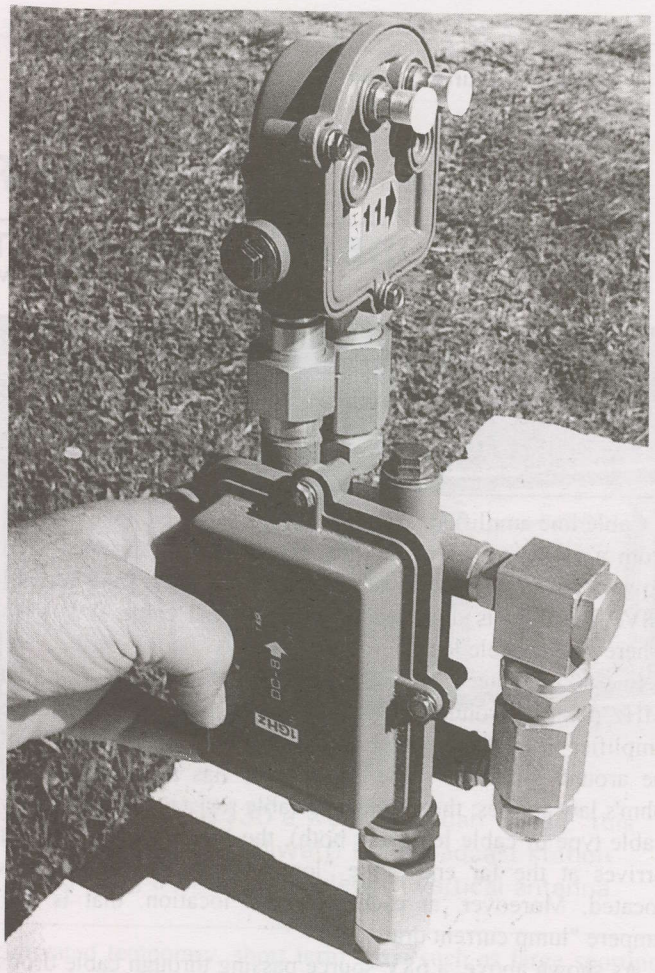
directional couplers and taps on the trunk line - only tap the feeder line. But that means two sizeable cables parallel down the street (whether overhead or buried) and double the cost of the plant (since you would be building two parallel plants to pass the homes on streets where trunk is run).

The "loss," at a specified frequency whether lump or sloped, is quantified for all cable-grade components - even the large 1/2 inch cable fittings (typically .05 dB loss at 55 MHz, .1 dB at 550 MHz). Passive losses, such as experienced when 55-550 MHz flows through a directional coupler or customer tap-off unit, are also well documented. This allows someone to sit down with a piece of paper and "draw" the cable plant accurate down to the last fitting - and then calculate (add up) the lump and passive and sloped losses for any segment of the plant. A very simplified representation of that process appears to the left.

If you know the amount of signal you require at the end of the line (typically between +65 dBuV and +75 dBuV), know the total amount available at the headend (typically +100 dBuV at highest frequency channel, something less at the lowest frequency channel), and also know the amount of loss (from all sources) in between these two points, you can proceed to layout the cable plant. In addition to the losses (and gains) of the cable units, you also need to know with some precision the length of cable between any two points. This is easiest obtained by "walking a measurement wheel" over the cable plant-to-be route and creating a point to point distance map.

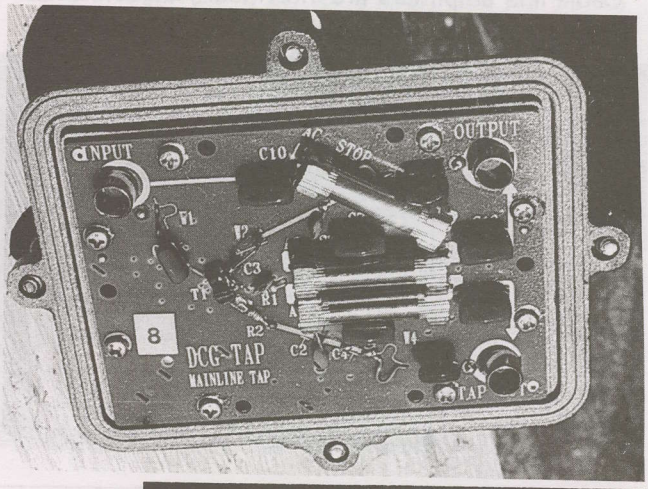


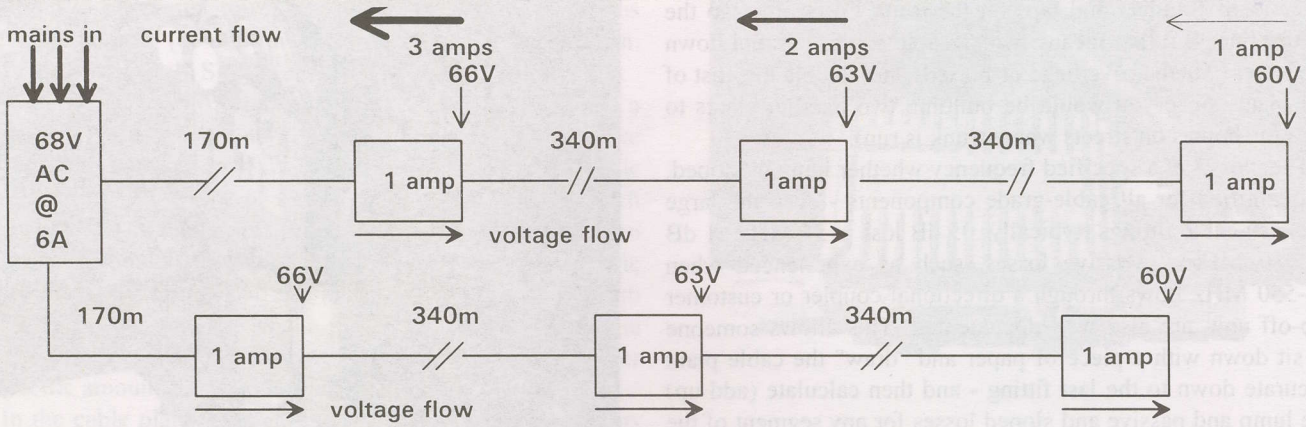
If it is 100m from point 25 to point 26, and you are using cable with 6 dB of loss at 550 MHz per 100m, you know that whatever signal you launch at point 25 will be 6 dB weaker at point 26 (at 550 MHz). If there will be two DC-8s in that 100m span, you add 2 dB of lump loss (1 dB per DC-8) to the 6 dB of cable loss. If there is a 2-way splitter in between 25 and 26 as well, you add another 4 dB for the splitter's "loss." And as there are 6 connectors between point 25 and point 26, with 0.1 dB loss per connector at 550 MHz, we now have 0.6 dB of additional loss to include. Sum it up - at the highest frequency first. 6 dB cable loss, 2 dB DC-8, 4 dB 2-way and 0.6 dB connectors; 12.6 dB total loss at 550 MHz between points 25 and 26. And at 55 MHz? The lump loses are identical (2 for DC-8, 4 in the 2-way - 6 dB total). The cable loss at 55 MHz is 2 dB so now we have 8 dB. And the connector losses are 0.05 dB each or 0 .3 dB total. Grand total? 8.3 dB at 55 MHz and 12.6 dB at 550 MHz. Another way to look at this 100m stretch? We've reduced the "slope/tilt" difference between 55 MHz and 550 MHz by 12.6 - 8.3 or 4.3 dB in this 100m length of plant. If we started out with a 12 dB slope differential, we now have 12 - 4.3 or 7.7 dB remaining to use before the next amplifier station.



Cable TV "Christmas Tree" array. Bottom left, held by hand, DC-8 directional coupler; fitting on underside is "trunk line input" while right angle fitting at top of DC-8 is trunk line thru (output). AT top left of DC-8, closest fitting is feed thru for -8 dB leg and sitting on top, an "11 dB " (so marked) tap. Total signal level at output of the tap, -8 and -11 = -19 dB from trunk level. In most cases, this would be a self-terminating -4dB tap.

Below - like all cable units, the DC-8 is built on a plate which bolts into a moisture proof housing with 4 captive bolts. Input fitting is top left, thru-put output top right, tap bottom right. Fuses? Each input/output fitting has AC line fuse holder to allow selective passage of AC powering to operate active equipment in one or more "leg" directions.





Cable line amplifiers are powered by an AC voltage derived from a mains transformer. This 230-260V AC primary step down transformer has a secondary winding creating around 68V. The 68V is diplexed into the coaxial cable and flows wherever the cable leads.

In .500 diameter cables, a typical amplifier spacing in a 550 MHz plant is around 340 metres. Therefore, in between the amplifier nearest the power supply and the one after that will be around 340m of cable. This cable has a resistance and ohm's law applies: the greater the cable resistance (whether by cable type or cable length or both), the lower the voltage that arrives at the far end - the "load" where the amplifier is located. Moreover, at each amplifier location, that is a 1 ampere "lump current draw."

As shown above, a 68V source passing through cable drops to a 66V source after cable losses and after an amplifier draws 1 amp of current to operate. The next amplifier in the line receives something less than 66V (because of cable resistance between the two units), and draws another amp of current. You can measure the "voltage drop" between an amplifier's input and output with a DVM.

In the simplified example above, a 6 amp power supply runs 6 cable line amplifiers each drawing around 1 amp of AC current. Moving away from the power supply, each amplifier in the chain receives progressively less voltage because of "lump current drop" created by the amplifiers closer to the power supply, and the accumulated "IR" (current times resistance) effects of ohm's law. In our example, only 1 amp of current flows through the third amplifier on each of the two powering legs, 2 amps flows through the middle amplifiers (1 amp for each of two amplifiers) and 3 amps flows through the amplifier nearest the power supply. Typical cable TV power supplies range upwards from 6 amperes in current capacity; 12 amps is common which means (conveniently) 12 amplifiers each drawing one amp can be so-powered.

AC (current) passing through the cable is no particular hazard but we have more than simply line amplifiers and passive cable (with connectors) in these lines. There will be directional couplers, various kinds of splitters, subscriber tap-off units and perhaps additional parts. Any part inserted in the line that carries voltage and current must be rated as "safe" at the maximum voltage (70V AC) and current (12 amperes) likely to be encountered.

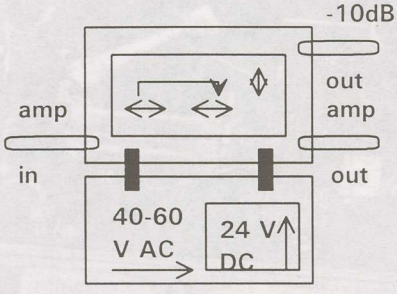
Power supplies are usually placed in the middle of a section of cable plant and they power line amplifiers in both directions along the plant. If a 6 amp supply, that would be 3 line amplifiers in each direction; if a 12 amp supply, 6. With only 6 line amplifiers in a series, the maximum current is halved - 6 amps rather than 12.

The AC line voltage is picked off within a line amplifier and fed to an internal AC to DC power supply. 45 to 70- volts AC input ends up being 24V DC after the individual power supply and it is this DC voltage that actually operates the line amplifier stage. Why not simply feed DC down the line and do away with the individual AC supplies in each line amplifier?

For the same reasons your power mains are not DC coming to your office or house. It would certainly be more convenient if we had DC rather than AC since virtually everything we use that plugs into the mains creates DC internally (TV sets, computers, telephones, electric stove). And in fact DC was used in many major cities (Los Angeles had a significant 250V DC power grid, for example) as late as the 1950s in America. Alas, DC does not do well on long transmission line systems, and corrosion is a major challenge. Pop the bonnet on your car or truck and take a squint at the + (positive) battery terminal. Unless the battery is very new, the + 12V DC terminal connecting through a brass or other dissimilar metal clamp to a large wire will be chalky white with electrolytic residue. DC operated systems, out of doors and spread over large areas, using dissimilar metals, develop electrolysis - electrical corrosion. The first transistorised cable TV line amplifiers were brought out with DC powering along the coaxial lines; a big mistake that was promptly corrected. DC V + sizeable currents + dissimilar metals always adds up to electrolysis - the basic parts in a battery!

Cable powering is pretty basic while cable system design is more complex. Virtually any quality supplier of cable component parts, however, will take your "street map" and create a paper system for you from which a bill of materials can be assembled. After that it is just a "plumbing job!"

Cable line amplifiers are individually adjustable to accept AC power through input, backwards thru output, even thru -10dB output fitting



When 300 milliwatts is adequate...

inForM Radio's Neat & Tidy FM Broadcast Package

For less than NZ$30 a week, you can "lease" this 0.3 watt (300 milliwatt) FM broadcast station including a 5/8ths wavelength vertical antenna.

While 0.3 watts (300 milliwatts) may sound like not very much transmission power, in fact with a suitable antenna located in a clear spot with good "line of sight" (LOS) range you can reasonably expect to find reception on a typical car radio 15km away - if line of sight. The primary challenge to getting solid FM radio coverage into areas within line of sight range are obstacles - hills, tall buildings, extremely dense vegetation.

The inForM Radio FM radio station measures 210mm wide, 300mm deep and 85mm tall. Its footprint is essentially the same as the page you are reading and inside the box is everything required to transmit less the transmitting antenna and interconnecting transmission line - both of which they will supply. Oh yes - you'll need something to modulate the station with: music, a tape loop, a CD stacker, a microphone. At least to get it on the air, audio taken from a satellite receiver is a clip-lead away (MCM is lively, VOA is informative, DW is classic and World Radio Network is intriguing).

The people who build the inForM station package are pretty smart. They have figured out that New Zealand radio regulations allow you to operate in two areas of the FM broadcast band (88.0 - 88.5 and 100.2 - 100.8) without a formal license. These "low power private broadcasters" were originally developed to take advantage of a miniature boom in "Tourism Radio" that swept New Zealand five years ago. Then new regulations said that if you used a Government approved transmitter and a simplistic no-transmission gain antenna, you need not ask for a license. Just obtain the transmitter, plug it in, and turn it on. Tourism Radio bringing short (5 minute or less, typically) monologues went in throughout the country. In major tourism areas, two up to five separate transmitters each broadcasting tourism information ("what to see, how to get there") in a different language (German, French, Mandarin, Japanese and English) sprung up. Signs along the roadway advised "Tourism Radio - 88.1" and tourists and locals alike quickly learned to check these transmission frequencies when arriving in a new portion of the country.

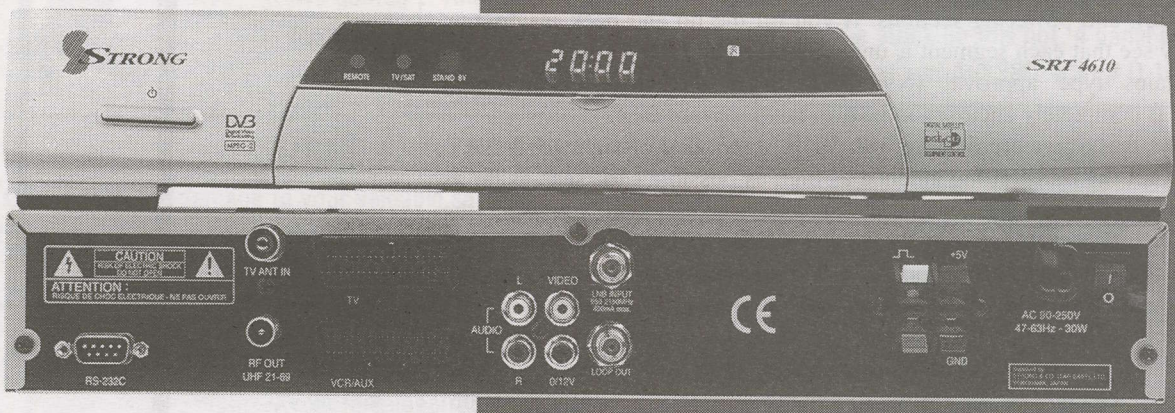
Real estate sales firms became another user of the 300 mW stations - you would be surprised how much information can be packed into a 4-5 minute radio broadcast as potential buyers circle a neighbourhood looking at the exterior of homes. Then came the retail merchants who discovered they could promote their wares to a several square block area even in downtown big-city with 300 milliwatts. And the schools wishing to offer students the opportunity to become skilled in radio broadcasting techniques.

Only a handful of "Government Approved Transmitter" models got past the radio inspectors and inForM was one of those. And while most models included a solid state audio record and playback system (a continuous "tape loop" without any tape), inForM concentrated on the "live broadcaster" and cultivated temporary, short term users such as large sporting events and music concerts - stick in a 300 mW transmitter, advise attendees of a special FM channel just for the event they were attending, and open a new way of communicating with fans during a major gathering.

Our tests ...

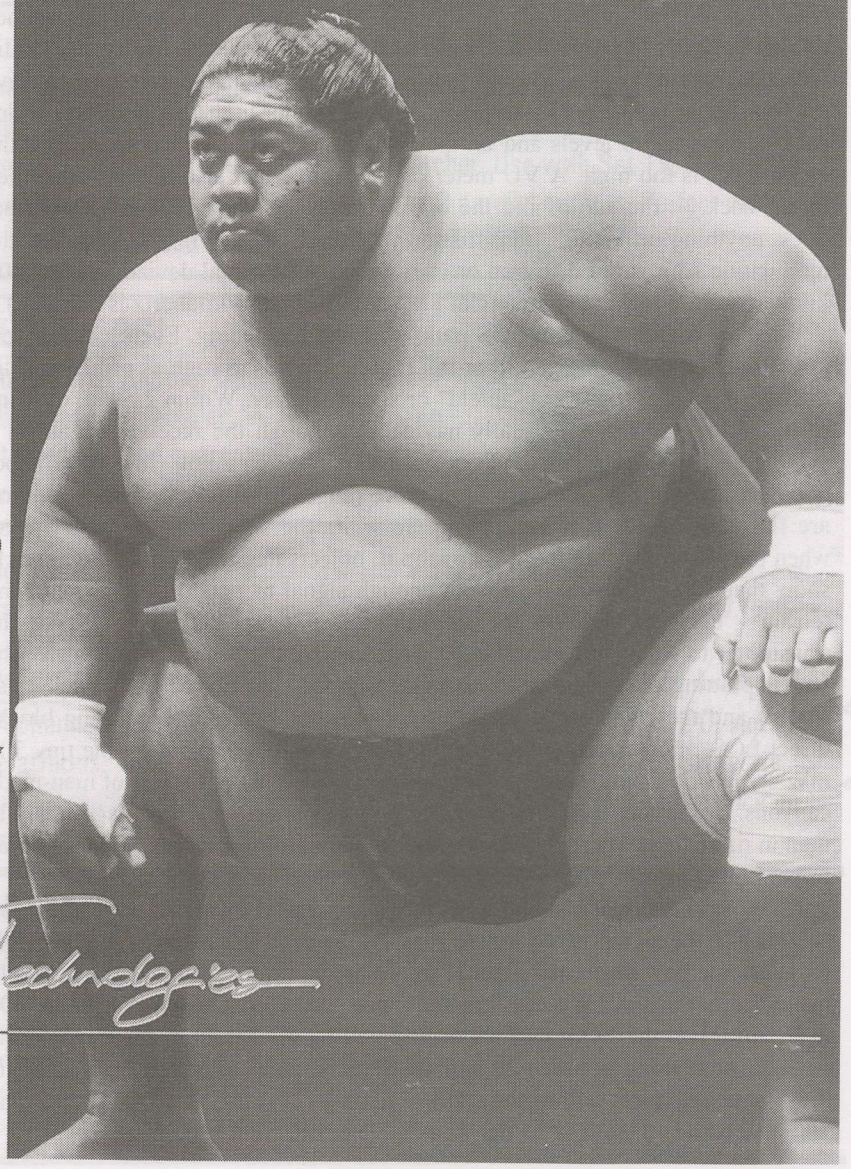
The actual radio frequency (RF) portion is programmable over the band 88.0 to 108.0 in 100 kilohertz steps. We mention this because of readers in Pacific Island and Asian areas where New Zealand's restricted frequency bands would not apply. There are two separate portions of the MR-400 transmitter: (1) the RF generator and amplifier portion with power outputs up to much as 500 mW (1/2 watt), and, (2) the

It would be difficult to hook this up incorrectly. AC mains (with switch), 12V DC battery for automatic standby operation in the event of mains failure, audio input and a piece of 50 ohm coaxial cable (RG-8 or equivalent, or, for a short run RG-59) to the transmitting antenna.



SRT 4610

- 2000 Programmable Channels
- DVB, MPEG-2 Compliant
- C/KU Band
- SCPC/MCPC Reception
- 2-45 Ms/s Symbol Rate
- Loop Through Tuner
- Autoscan, Autoprogram
- PID Insertion
- On Screen Graphics
- 4 Digit LED
- DiSEqC 1.2
- 8 Universal LNB Control
- Mechanical Polarizer Control
- 0/12 V External Switching
- RS-232C Service Port
- Upgradable Software
- Data Transfer Between Units
- Teletext Insertion
- Electronic Programme Guide (EPG)
- Parental Lock
- Auto Power Back On
- PAL/NTSC Modulator
- 21-69 UHF PLL Modulator
- VCR Loop-Through on Stand-By
- Auto Voltage (AC 80-260V) SMPS



STRONG Technologies

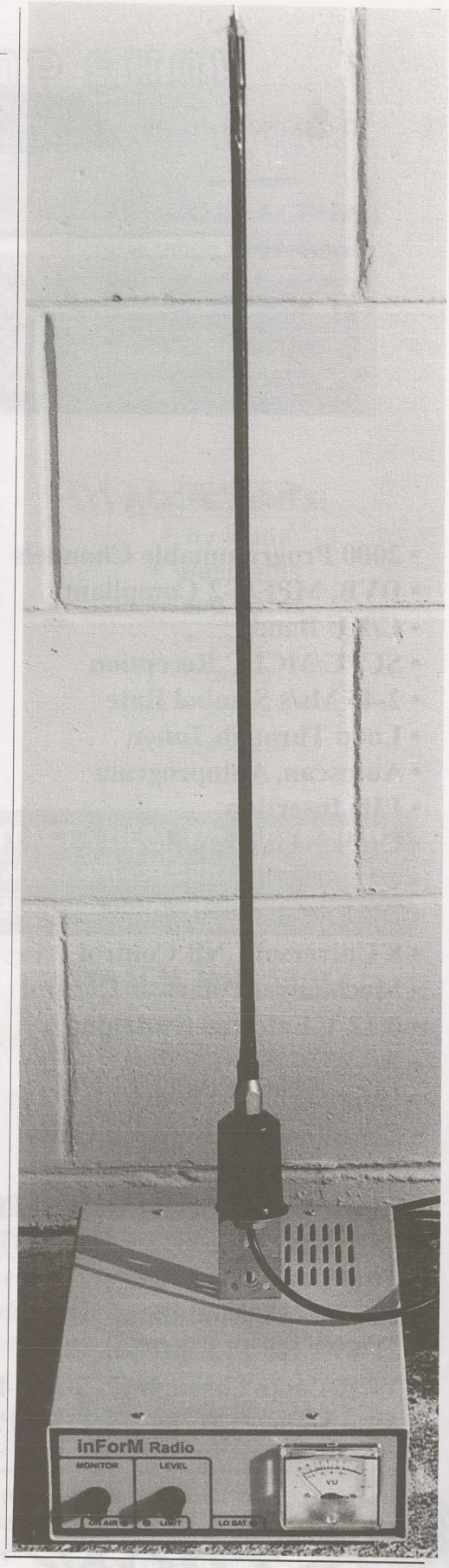
audio, control, and powering sections. If you lift the lid and peek inside, you will quickly see that each segment is unique to itself and the RF portion, which is what gains type approval (N96384/1) from the Government Radio Inspectors, is completely enclosed in its own tamper proof case.

Logic says that as we are dealing with VHF, where line-of-sight coverage is king, you want the transmitting antenna as high as possible - to "see" as far as possible. This presents a dilemma. Logic also suggests that you want the transmission line losses between the output of the transmitter (a type BNC fitting) and the antenna as low as possible. A 30m run in standard RG-8 coax at 100 MHz will cost you 2.5 dB of loss, turning 300 mW output into approximately 175 mW at the antenna. It turns out that you gain coverage range faster with increased transmission height than you lose transmission range with reduced power. At least up to heights such as 30 metres straight up. A site that is 30 metres above average surrounding terrain has line of sight to 15 miles (24 km). Other benchmark heights above terrain: 3.5 m equals 7.2 km, 7m equals 14.5km, 15m is 16 km.

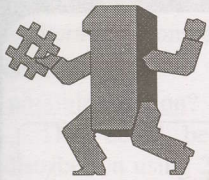
Our experience was as follows. With the whip antenna 15m above average terrain, LOS of 16km to flat ground at the other end and 20 km if the receive site was elevated by 3m or so. We did this through 30m (100 feet) of 1/2" 50 ohm hard-line which calculates to around 210 mW at the antenna. Connecting audio from a satellite receiver involves knowledge of the receiver's line-output impedance. A low impedance (4 ohm for example) output is troublesome - most receivers have an output impedance in the range of 2,000 to 10,000 ohms and the trick is to come as close as you can to matching the audio source (receiver) output impedance to the MR-400's audio line input impedance (which happens to be 10,000 ohms). Matching impedances ensures the audio will have natural lows and highs, that you have adequate input volume to drive the transmitter properly (1 volt p-t-p). A peak limiter in the audio circuit "folds back" excess audio levels and on the front panel, a LED that sparkles if the audio input is too high. A VU meter on the front panel also advises you when to cut back on the audio, and the one knob on the front of the MR-400 that does anything affecting transmission (marked "Level") lets you set the modulation so it is not distorted or over deviating. Normal deviation is +/- 100 kilohertz, close to what commercial FM stations run (75 kilohertz is nominal).

What we found with non LOS paths was less heartening. Even within a few km of the transmitter site, a hill or tall building that is as high as or higher than the transmitting antenna is a "shield" or signal stopper. Within 2.5 km, one line of hills blocking LOS is usually navigable although the received signal in a vehicle test set does pop in and out occasionally when a null (low signal) spot is passed through. Within 5km, 2 or more ranges of hills intervening and you are flat out of luck. - no reception. So while the signal might go 15-16 km when there is nothing in the way to stop it, objects that act as shielding quickly show that 300 milliwatts is just not enough signal to pound through blocking terrain - even in close to the transmitter. It was interesting to take the transmitter to Auckland, install it 30 metres above the street and then drive the streets plotting coverage. Tall man-made buildings do two things - they act as shields and they also act as reflectors or mirrors. Where one building blocks direct LOS, another acts as a reflection surface and bounces even the tiny 300 mW signals down into some surprising spots buried in the bowels of man-made canyons. So, in fact, you will probably find you have better coverage in a city than in rural areas where the shielding is all natural (hills, trees). Tall, flat-sided buildings act as reflectors whereas irregular shaped natural hills do not.

If you stop and make signal level measurements at locations where hills are shields and the signal is too low to play on the car's test receiver it is possible to determine how much more signal would be required at a shielded location to make the radio play. We did this and came to the conclusion that while 300 mW will travel the LOS distance determined by the height of the transmitting antenna, something between 20 and 40 watts is really what you need to fill in those shielded areas within the LOS boundary. 20 watts is 18 dB more than 300 mW while 40 watts is 21 dB greater. The MR-400 is no toy, however.



inForM Radio Systems, PO Box 37-163, Christchurch, NZ. Email inform@radioinfo.co.nz. Freephone within NZ 0800-100-636, outside + +64-3-338-0077. http://www.radioinfo.co.nz/inform.htm



ENTHUSIASTS!

We goofed!!! And ordered too many of these 1.8m USA manufactured mesh dishes. Now our warehouse is filled and we have to trim down the stock on this hot, 4 panel dish item. Polar mount. You reap the benefit of our mistake at just Au$280. (Cat # D 1475)

SURGE PROTECTOR!

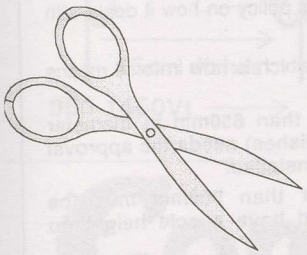
Don't risk lightening damage to your valuable satellite TV equipment or PC. Install this high voltage arrestor right at the input socket to minimise the danger! Great device (sorry, will not protect against small arms fire). Au$22 (Cat # X1480)

12 way MOTHER of all power boards!

Avoid the embarrassment of burning your house down with unsafe double adapters. An even dozen power outlets for today, tomorrow and your future needs. Compare at Au$42. (Cat # P 2000)

PUT IT ALL TOGETHER with a DUAL BAND COMBINER!

Mix the outputs of 2 LNBs at the dish and feed just a single cable to the receiver. Saves the time and expense of an additional cable run, drilling holes through walls, running into plumbing pipes and electrical wires! Great for high rise buildings. Use a standard IF splitter like our X1550 to feed several receivers. Au$35. (Cat #1750)

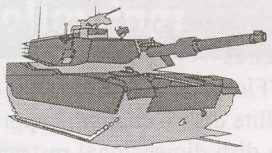


CUT OUT all of those extra REMOTES!

Hey - you reach for the remote and the pile is huge. The kids grab the wrong one and switch off your toilet water when trying to change channels. End it all. Cut to the core of the problem with our 4-way "Intelligent" A/V switcher. Use with Sat TV, DVD, cable and more. Detects and switches the active input to 2 parallel outputs. Perfect with a Video Sender! Au$89. (cat #T1951)

ANALOGUE RECEIVERS!

We scoured the junkyards of Asia to bring you this one! Another landfill special, these famous name receivers are remote control, 250 channel, stereo audio, UHF output, on screen display, 2 inputs. These are not new but near new and guaranteed for 12 months. Au$25 each - less if you purchase more than 1! (Cat # R4000)



"OUTBACK" Flux Gate Compass. This hand held digital compass reads azimuth bearing directly and has a unique self calibrating feature that compensates for residual magnetic fields. This means you can use it around steel dish structures without losing accuracy. Au$180. Cat# 1080.

The best IRD we have ever tested! Humax ICRI 5400 embedded Irdeto. Pre-loaded with all Aurora transponders, will receive all C-band (*) FTA channels. Excellent EPG, exclusive "preview" feature. AND - 2 CI slots supporting both Irdeto and Mediaguard CA platforms. 4000 channel capability, 0/12v and DiSEqC, RS232 software upgrades. Special introductory price for SatFACTS readers - Au$895 while they last. A strong US$ means the price on this must go up on next shipment! (Cat #R3200) * - call for latest list.

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to the membership from your industry trade association

SPACE Pacific
Satellite
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Access
Committ**E**e

A trade association for users, designers, installers, sellers of private satellite-direct systems in the Pacific Ocean & Asia Regions

Another ugly set of anti-dish regulations

Fairfield City, NSW has for a few months enjoyed a "boom" in satellite dish sales and we understand the primary incentive has been Thaicom 3 service delivering Greek and Vietnamese home-country programming to dishes in the 2m range. One can imagine that some commercial groups (such as TARBS) have found this free-to-air reception a business challenge.

The "Public Notice" appearing to the right was published locally on May 3. As you might expect, sales of satellite dish systems have essentially stopped since publication of the notice.

Home DTH systems priced in the $1,600 range are hardly big money makers but for a dozen or so dealers in the area, it was a living. And there was significant value to the residents of the region as competition was keeping the pricing down and affordable even by immigrant families.

What is unusual about this one is the very heavy hand of a local government and the threats being published as a warning to those who might attempt to do something without Council knowledge.

1) "Any satellite dish greater than 650mm/65cm" needs Council approval

2) "Any satellite dish greater than 900mm/90cm must be located on the ground and have a pole height no greater than 1.8 metres"

3) "Fines of up to $110,000 can apply to people who install a satellite dish without the approval of Council"

The dish dimensional restrictions and the over-the-top fines carry all of the earmarks of commercial pressures from business interests who want to force the residents of Fairfield City to a Ku band service that charges money. Such as TARBS. If the Council of Fairfield City can be "bought" and will "cave in" to the commercial demands of a firm such as TARBS so readily, then the people of the community have just lost some basic civil rights. Joe from Stars Installations (0)2-9607-5715 is heading up a committee of volunteer installers/dealers to meet with the City and try to learn what

FairfieldCity
Celebrating diversity

PUBLIC NOTICE

Changes To Council's Satellite Dishes Policy

Satellite Dishes are becoming more popular in Fairfield. Some Satellite Dishes that are used to obtain international broadcasts are large and visible from public places.

This is becoming a concern for our community and has led to Fairfield City Council changing its policy on how it deals with Satellite Dishes.

The main aspects of the policy, which is now in force means that:

* **Any Satellite Dish greater than 650mm in diameter (those larger than pay TV dishes) needs the approval of Council before it can be installed.**
* **Any Satellite Dish greater than 900mm must be located on the ground and have a pole height no greater than 1.8 metres.**

FINES OF UP TO $110,000 CAN APPLY TO PEOPLE WHO INSTALL A SATELLITE DISH WITHOUT THE APPROVAL OF COUNCIL.

As there are specific rules, which now apply for Satellite Dishes, it is important that you contact the Council and ask what is required before you install your Satellite Dish.

You can do this by contacting Council's Administration Centre on 9725-0222.

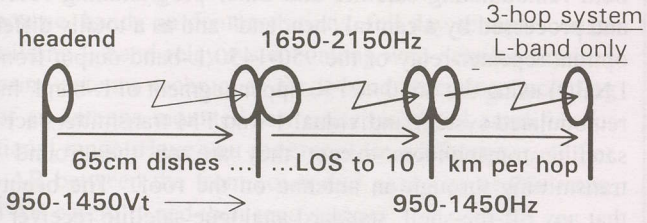
MEMBERSHIP IN SPACE

Membership in SPACE Pacific is open to any individual or firm involved in the "satellite-direct" world in the Pacific and Asia regions. There are four levels of membership covering "Individuals," the "Installer/Dealer," the "Cable/SMATV Operator," and the "Importer/Distributor/Programmer." All levels receive periodic programme and equipment access updates from SPACE, significant discounts on goods and services from many member firms, and major discounts while attending the annual SPRCS (industry trade show) each year (scheduled for September 27 - 29 in Melbourne - 2001). Members also participate in policy creation forums, have correspondence training courses available and their support makes possible the TV show SPACE Pacific Report. To find out more, contact (fax) 64-9-406-1083 or use information request card in previous issues of SatFACTS. Page space within SatFACTS is donated each month to the trade association without cost by the publisher.

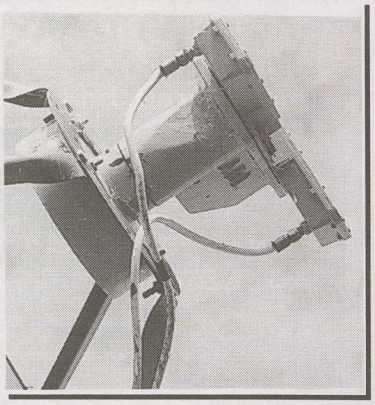
motivated this severe action. We'd liked to believe it is bureaucratic incompetence run amuck but fear something far more sinister.

A possible solution?

This could be an excellent opportunity to explore redistribution using 2.4 GHz or L-band equipment (see Cable Connection, page 22). All that is required is for one existing Thaicom 3 installation to act as the "headend" providing reception from (for example) the Greek and Vietnamese channels which are so popular in Fairfield City. If that site can get line of sight (LOS) to neighbouring receive locations a chain of relays would distribute the services to homes that are prevented by city fiat from having their own dish (larger than 65 cm). A two foot (61cm) dish, offset or parabolic, will produce between 15.5 and 17 dB of gain (dBi) in the 950-2150 MHz L-band and more than 19 dBi at 2.4 GHz. One possibility is to use 2.4 GHz as a "backbone" service inter-linking totally separate L-band transmission sites. Anther possibility is to stay with L-band throughout and flip between 950-1450 and 1650-2150 for "every other site." this would create a multi-hop system with the advantage that in addition to serving viewers along the way, it also interlinks separate transmit sites.



The CABLE Connection



L-band relay progress report

When we outlined a scheme for delivering L-band signals through low power point to point transmitters in SF#80, most of the reaction was positive although a few people worried about the "legality" of transmitting in L-band in regions where other users already occupy these frequencies. Our position on this is that not everyone is so restricted and in areas where there are covenants against using L-band for transmission relay, we believe when the service is operational and equipment is widely available off the shelf from a number of suppliers, the legality of it all will sort itself pout. There is no solid reason to believe that L-band short haul point to point TV relay cannot coexist with existing and future users of the L-band spectrum (950-1450 and 1450-2150).

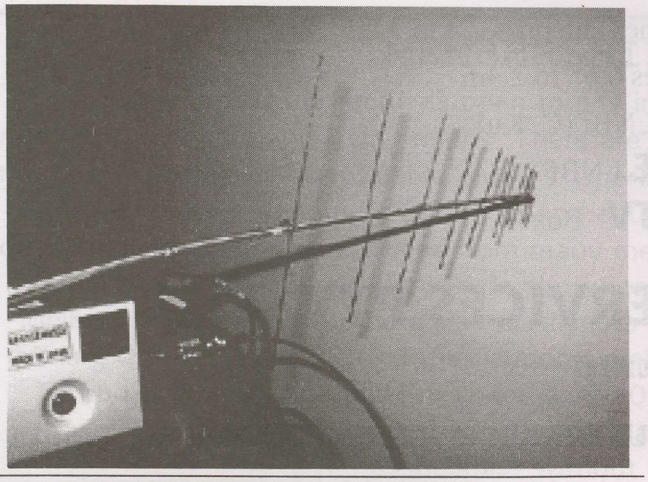
The research and development now underway is targeting the Melbourne SPRSCS 2001 show (September 27-29) as the first public unveiling of the system. This will include 950-1450 single channel transmitters, alone or in multi-channel containers (six channels per container maximum). The next step, underway before the next SatFACTS, is to field test this package in New Zealand over various paths between 1 and 15 km. The log-periodic antenna show in the photos here is a reference antenna which may or may not ultimately be available in the product line. The best gain we can expect with a log is in the region of 7 dB for any single channel. A low cost alternative, creating a broadband feed capable of passing 950-1450 MHz, using readily available 65cm (or 90 cm) dishes, is also underway.

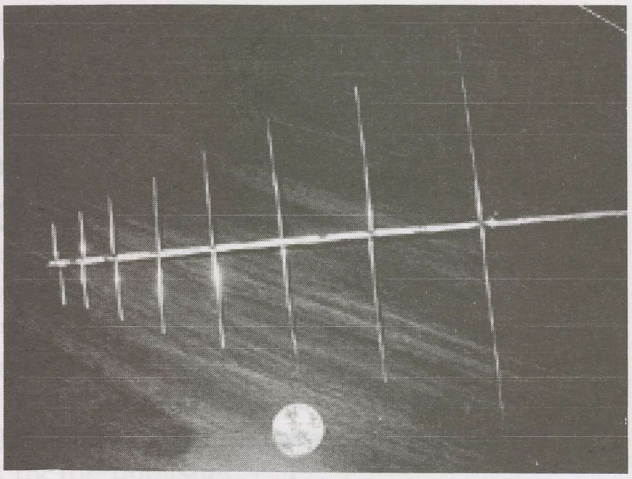
There is nothing like this package of equipment operating in any portion of the world, as best we can determine. The concept, fully explained in SF#80 (pages 6 - 10), involves both remodulating satellite and other programming received and processed by a central "headend" and as a totally different option, repeater-relay of the 950-1450 L-band output from an LNB(f) using the 1650 - 2150 upper segment of L-band. In the remodulated system, individual 1 watt FM transmitters act like satellite transponders except they are on the ground and transmitting through an antenna on the roof. The beauty is that any off-the-shelf, standard analogue satellite receiver will receive, process and demodulate the relayed signal(s). By stacking up two to eighteen separate transmitters, each using a 27 MHz bandwidth someplace between 950 and 1450 MHz, multiple channel reception can be "shared" with neighbours who will only need an analogue L-band (satellite) receiver and perhaps the small log antenna shown here to receive the relayed channels. In a community where C-band antennas are prohibited by bureaucratic manipulation (see Fairfield City, p. 20 here), this could be an answer for families denied access to C-band reception.

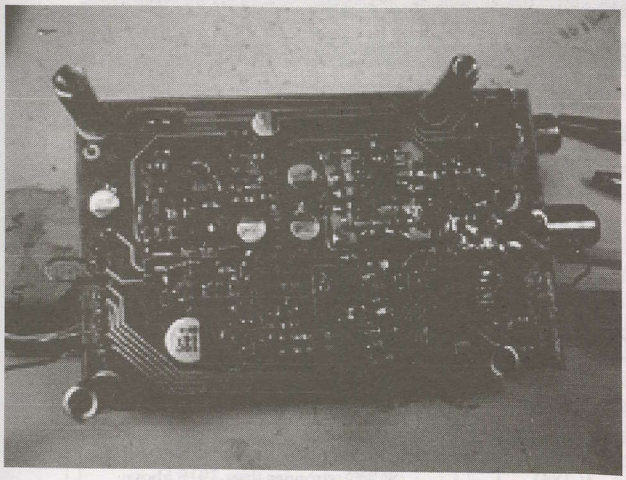
Our tentative "schedule" is as follows: *June* SatFACTS - first preliminary reports of remodulated package coverage.

First "unofficial" picture of actual L-band relay operating. That's a 1983 vintage analogue receiver and if you look closely at its back right corner you will spot a "tiny" log periodic antenna literally hanging out of the F fitting input on the receiver. Path length? A few hundred metres but through several frame and steel walls!

Closer photo of the analogue FM receiver mounted log-periodic receive antenna (left). Yes, it is pointing straight into and through a wall for reception. Right, log periodic covers 950-1450 in one shot.







You won't read any part values here but this is the total 1 watt output L-band TV transmitter small enough to sit comfortably in palm of your hand.

July SatFACTS - Detailed report on reception range maximums using 950 - 1450. *August* SatFACTS - First report on relay package use (rebroadcasting 950 - 1450 exactly as received but at 1650 - 2150). *September* SatFACTS - Final report before Melbourne Show September 27-29. In Melbourne, hands on demonstrations, full day seminar course on building L-band relay systems along with detailed sessions exploring antenna techniques for L-band reception, including use of an antenna mounted low noise masthead amplifier for additional range. Have you registered for Melbourne yet? See page AB between the front cover and page one of this issue. Read AB carefully and then send it along!

SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 May 2001

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym	Receivers and Errata
Ap2/76E	TVB8 +	3849/1301H	4	3/4	13(.238)	PowVu, CA
	AXN	3920/1230H	up to 8	7/8	28(.340)	Tests, promos, **up to 5 chs FTA**
Thcm3/78.5	SkyChAust	3695/1455V	up to 3	3/4	5(.000)	Finally settled here from As2
	MRTV-Mynr	3676/1474H	1	2/3	6(.000)	erratic service
	Mega +	3640/1510H	12	3/4	28(.056)	Mega Cosmos here; new Sr
	Mahar/DD1	3600/1550H	up to 8	3/4	26(.661)	USA religion chs, CMM music FTA
	TRT +	3551/1600H	4+ TV, radio	3/4	13(.330)	3 Angels USA, Ch of Hope, + 9 radio
	Greece TV	3430/1720H	1	3/4 5	3(.225)	Newly reported SCPC 01/01
	PTV2	3420/1730V	1	~~3/4~~ 2/3	~~3(.366)~~ 3(.254)	FTA, ~~not seen Australia~~
	TV Maldives	3412/1738V	1	1/2	6(.312)	FTA (reaches SE Australia)
	Thai Global+	3425/1725V	up to 7?	2/3	27(.500)	FTA
Insat 2E/83	**DD2**	3910/1240V	1	3/4	5(.000)	SCPC, testing MPEG-2; OK E. Aust.
	Kairali TV	3699/1451V	1	3/4	3(.184)	SCPC, stronger than 3910 above
ST1/88E	Taiwan Bqt	3509/1641H	13	3/4	23(.450)	MCPC, **sometimes FTA**, 2 adult chs
Yaml102/9	**Tumen TV**	3578/1572L	1+radio	3/4	4(.355)	unlikely south of eqtor
	TV6 Bqt	3645/1510L	3(+)	3/4	28(.000)	new Sr; unlikely south of eqtor
MeS 1/91.5	**Malay. TV3**	4147/1004H	1	3/4	7(.030)	CA but occ. FTA
As2/100.5E	**Euro Bouqt**	4000/1150H	6TV, 21r	3/4	28(.125)	FTA (TV5 teletext); now includes RTPi
	Reuters Sing	3907/1243H	1	3/4	5(.632)	occasional feeds, **some FTA** MPEG2
	Hubei/HBTV	3854/1296H	1	3/4	4(.418)	FTA SCPC, teletext
	Hunan/SRT	3847/1303H	1	3/4	4(.418)	FTA SCPC, teletext
	Guan./GDTV	3840/1310H	1	3/4	4(.418)	FTA SCPC, radio APID 81
	In. Mongolia	3828/1322H	2	3/4	8(.397)	FTA: #1 Mongolian, #2 Mandarin
	WTN Jer/Lon	3790/1360H	1	3/4	5(.631)	Mostly CA; **some FTA**
	Reuters/Sing.	3775/1375H	1	3/4	5(.631)	**FTA** & CA
	WorldNt/US	3764/1386H	1 + 20 radio	3/4	6(.100)	FTA; up to 20 radio channels; SA format
	Liaonin/Svc2	3734/1416H	1	3/4	4(.418)	FTA SCPC, radio APID 256
	Jiangx/JXTV	3727/1423H	1	3/4	4(.418)	FTA SCPC, teletext, radio APID 81
	Fujian/SETV	3720/1430H	1	3/4	4(.418)	FTA SCPC, + radio APID 80
	Hubei TV	3713/1437H	1	3/4	4(.418)	FTA SCPC, radio APID 80
	Henan/Main	3706/1444H	1	3/4	4(.418)	FTA SCPC, + radio
	Egypt/Nilesat	3640/1510H	7+, radio	3/4	27(.850)	Thru TARBS Aust, subs now OK
As2/100.5E	**Feeds**	4086/1064V	1	3/4	5(.632)	FTA SCPC feeds
	TVSN	4033/1117V	1	3/4	4(.298)	Occ. **FTA**, not same as Aust. version
	Jilin Sat TV	3875/1275V	1	3/4	4(.418)	FTA SCPC, + radio
	Beijing TV	3864/1286V	1	3/4	4(.418)	CA and **FTA** SCPC to Sydney; erratic
	HeiLongJian	3834/1316V	1	3/4	4(.418)	FTA SCPC
	JSTV	3827/1323V	1	3/4	4(.418)	FTA SCPC, + radio
	Anhui TV	3820/1330V	1	3/4	4(.418)	FTA SCPC + radio
	ShaanxiQQQ	3813/1337V	1	3/4	4(.418)	FTA SCPC, radio APID 81
	Guan/GXTV	3806/1344V	1	3/4	4(.418)	FTA SCPC, radio APID 257
	Fashion TV	3795/1355V	1	3/4	2(.533)	FTA SCPC, reload VPID 308, APID 256
	MSTV	3791/1359V	1	3/4	4(.340)	FTA SCPC
	Myawady	3766/1384V	1	7/8	5(.080)	FTA SCPC - difficult to load
	Saudi TV1	3660/1490V	1 (?)	3/4	27(.500)	FTA MCPC
As3S/105.5	Zee bouquet	3700/1450V	9TV	3/4	27(.500)	Mediaguard CA, **ch 8 FTA sometimes**
	ETV Bangla.	3749/1401V	1TV	3/4	4(.340)	PowVu but FTA at this time
	Arirang TV	3755/1395V	1	7/8	4(.418)	FTA SCPC; reported audio problems
	Now TV	3760/1390H	2	7/8	26(.000)	includes TECH TV from USA, both FTA
	Star TV	3780/1370V	17(+)TV	3/4	28(.100)	NDS CA (Pace DVS211, Zenith)
	Star TV	3860/1290V	14(+)TV	3/4	27(500)	NDS CA (Pace DVS211, Zenith)
	Star TV	3880/1270H	12(+)TV	7/8	26(.850)	NDS CA (Pace DV211, Zenith) + **1 FTA**
	Alive TV	3900/1250V	5TV	7/8	27(.895)	PAL, NTSC, 1 ch CA
	Star TV	3940/1210V	12(+)TV	3/4	26(.850)	Most recent addition-NDS CA as above
	CNNI	3960/1190H	4(+)TV	3/4	26(.000)	PowVu CA; some **FTA** feed channels
	Star TV	4000/1150H	7(+)TV	7/8	26(.850)	NDS CA + **info card FTA**
	Sun TV	4095/1055H	1	3/4	5(.554)	"History Channel" testing SCPC
	CCTV bqt	4115/1035H	4(+) TV	3/4	19(.850)	was analogue; now FTA MCPC
	Zee Bqt #2	4135/1015V	4(+) TV	1/2 (was 2/3)	15(.000)	Threatrens CA June 1-all chs
Cak1/107.5	Indovision (S-band)	2.536, 2.566, 2.596, 2.626	33(+) TV	7/8	20(.000)	NDS CA using RCA/Thomson, Pace IRDs
C2M/113E	**TPI**	4185/965V	1	3/4	6(.700)	FTA SCPA; NT only
	Ch NewsAsia	4071/1079H	3	3/4	14(.060)	CH News Asia FTA; VPID 33, APID 34
	Anteve	4055/1095V	1	3/4	6(.510)	FTA SCPC; NT only
	Space TV	4000/1150H	11TV, radio	3/4	26(.666)	CA, sometimes **FTA**
	ETTV Shop	3790/1360H	1	3/4	3(.050)	FTA SCPC
	C Net Taiwan	3760/1390H	11TV, radio	3/4	26(.666)	CA, subs available **-10 radio** typ. **FTA**

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	Receivers and Errata
(C2M/113	**RCTI**	3475/1675H	1	3/4	8(.000)	FTA SCPC, Australia OK
JcSt3/128	Miracle Net	3996/1154V	3 up to 6	5/6	22(.000)	PowVu, some **FTA** (ch # 1,3)
	Asian bqt	3960/1190V	up to 8	7/8	30(.000)	CA & **FTA** Ntsc: Japan, Taiwan
MeaSat 2	Astro Mux	11.106H (+)	up to 7TV	7/8	30(.000)	Aust east coast beam; also 11.168Hz
Op 3/156	Mediasat	12.336V/T2	9TV, 3ra, Inter.t	2/3	30(.000)	CA, **some FTA, Herbalife, new svcs**
	Aurora	12.407V/T3		2/3	30(.000)	cvrs Aust, NZ 90 cm; CA (*)
	Aurora	12.532V/T5	Inc Zee, ATV	2/3	30(.000)	cvrs Aust, NZ 90 cm; CA (*)
	Aurora	12.595V/T6		3/4	30(.000)	Aust only; * - smart card p. 28
	Aurora	12.657V/T7	6CA testing	2/3	30(.000)	cvrs Aust, NZ 90cm; CA(*)
	Aurora	12.720V/T8		3/4	30(.000)	Aust only;* - smart card p. 28
	Austar/tests	12.376H/T10		3/4	29(.473)	Austar I-TV tests
	Austar/Foxtl	12.438H/T11		3/4	29(.473)	CA, subscription available Australia
	Austar.Fxtl	12.501H/T12		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.564H/T13		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.626H/T14		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.688H/T15	(some FTA ra)	3/4	29(.473)	CA, subscription available Australia
Op 1/160	**ABC NT fd**	12.260V	1TV, 3 radio	3/4	5(.026)	may go to 12.280; V832, A833
	ABC feeds	12.317H	1	3/4	6(.980)	also 12.326, 12.335; ex PAS8 Ku
	Central 7	12.354H	1TV	3/4	3(.688)	VPID1280, APID 1281
	Imparja mx	12.360H	1	3/4	5(.424)	VPID 1024, APID 1025
	Mediasat#2	12.406V	up to 6 TV	2/3	30(.000)	also try Sr 28.000; FTA & CA
	Mediasat#3	12.424H	3+ TV	2/3	19(.800)	net feeds, Australia only, FTA & CA
	Ninc Net	12.512H	1 TV typ.	3/4	5(.632)	testing digital feeds
	Sky NZ	12.519/546V	7TV/7TV	3/4	22(.500)	NDS CA, subscription available NZ
	Sky NZ	12.581/608V	6TV/6TV	3/4	22(.500)	NDS CA, subscription available NZ
	Sky NZ	12.644/671V	9TV	3/4	22(.500)	NDS CA, subscription available NZ
PAS8/166	TARBS3	12.326H	13TV + radio	3/4	28(.067)	TPG/Eurodec CA, occ. FTA
	TARBS	12.526H	13TV + radio	3/4	28(.067)	TPG /Eurodec CA, occ. FTA
	TARBS2	12.606H	13TV + radio	3/4	28(.067)	Tests, inc. ESPN, see TARBS above
	JEDI/TVB	12.686H	11+ TV	3/4	28(.126)	Irdeto CA, **some FTA** tests
	Boomerang	12.725H	5 TV	7/8	25(.728)	CA, subs avail Aust, **CNN FTA**
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(.125)	PowVu CA
	NHK Joho	4065/1085H	7TV, 1 radio	3/4	26(.470)	PowVu CA & **FTA**; subscription avail
	Japan Bqt	4050/1100H	2	3/4	12(.000)	PowVu CA; NTV Int, Fuji TV
	ESPN USA	4020/1130H	7+TV, data	7/8	26(.470)	PowVu CA; ch 11 DCP-CCP bootload
	Discovery	3980/1170H	8 typ.	3/4	27(.690)	PowVu/CA (some audio **FTA**)
	CalBqt/Pas8	3940/1210H	up to 8TV	7/8	27(.690)	PowVu CA & **FTA (EWTN/EB Net)**
	CNBC HK	3900/1250H	up to 7TV	3/4	27(.500)	FTA at this time
	Filipino Bqt	3880/1270V	up to 9 TV	3/4	28(.700)	Some **FTA**; also 4040V, 27.686,7/8
	Tzu-Chi TV	38501300H	up to 4	3/4	13(.240))	testing
	Arirang 2	3815/1335V	1	3/4	4(.400)	CA, Korea
	EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(.632)	was As2; PowVu CA
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(.000)	PowVu, CNN now CA
	MTV	3740/1410H	8	2/3	27(.500)	CA; #7,8 **FTA feeds**
PAS2/169	Pv Bouquet	12.290V	2+ TV, radio	2/3	27(.500)	PowVu CA, WIN, ABC NT
	WA PowVu	12.637(.5)V	4TV, 8 radio	1/2	18(.500)	PowVu CA, WA only - D9234
	HK PowVu	4148/1002V	up to 8	2/3	24(.430)	PowVu CA; some **FTA**
	Fox Bouquet	3992/1158V	8TV/data	7/8	26(.470)	Pv, CA/FTA (**FTA ch 3 only**)
	Feeds	3966/1184V	1	2/3	6(.620)	PowVu (FTA) occ feeds
	Feeds	3957/1193V	1	2/3	6(.620)	PowVu (FTA) occ. feeds
	Aust-feeds	3942/1208V	1	2/3	6(.620)	Mediasat outward bound feeds
	Feeds	3934/1216V	1	3/4	10(.850)	PowVu (FTA) occ. feeds
	Feeds	3912/1238V	1	2/3	6(.620)	PowVu(FTA) occ. feeds
	Feeds	3898/1252V	1	2/3	12(.000)	PowVu (FTA) occ. feeds
	Middle East	3836/1314V	4 typ (+ more)	3/4	13(.331)	Pv FTA, testing Irdeto; was 3778V
	Feeds	3803/1347V	1	2/3	6(.620)	PowVu (FTA) occ. feeds
	BBC +	3743/1407V	3	3/4	21(.800)	**BBC FTA**, others CA usually
	CCTV Pv	3716/1434V	5 typical	3/4	19(.850)	PowVu FTA; # pgm chs varies
	Feeds	4040/1110H	1	3/4	10(.850)	PowVu (FTA) occ. feeds
	KBS/Korea	4026/1124H	1	3/4	5(.062)	some **FTA**, some CA
	7th DyAdv	3872/1278H	1	3/4	6(.620)	Sat, Sun 0930UTC typ; sports 3873
	Feeds	3868/1182H	1	2/3	6(.620)	FTA (occ. sports); try 3863, Sr6.110
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(.620)/7(.498	FTA-typ. NTSC-occ. sport, shuttle
	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)	(PowVu) CA+**FTA**

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	Receivers and Errata
(PAS2/169E)	**occ feeds**	3776/1374H	1 typ	3/4	5(.560)	occ feeds, typ FTA; also Sr 5.600
	Koran Bqt	3768/1382H	up to 3	3/4	8(.680)	Korean MBC, KBS, YTN
	Satcom 1-6	3743/1407H	up to 5	7/8	19(.465)	use unknown at this time
I702/176E	AFRTS	4177/973LHC	8TV, 12+radio	3/4	26(.694)	PowVu CA
	RFO Poly	4027/1123L	1TV	3/4	4(566)	SE spot beam
I701/180E	TNTV	11.060V	9	3/4	30(.000)	eastern spotbeam, pay TV tests
	Canal+Sat	11.610H	16TV, 1 radio	3/4	30(.000)	Mediaguard CA, 1 ch FTA
	TVNZ	4195/955RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/BBC	4186/964RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ	4178/972RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/Aptn	4170/980RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/feeds	4161/989RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	RFO-Canal+	4086/1064L	4TV, radio	5/6	13(.347)	east hemi 20.5 dBw, to be 15.5
	TVNZ/feeds	4052/1098RHC	1	3/4	5(.632)	DMV/NTL early version,occ feds, typ ca
	TVNZ feeds	4044/1106R	1	3/4	5(.632)	SCPC, mixed CA and **FTA** feeds
	NZ Prime TV	4024/1126L	1	2/3	6(.876)	PowVu CA; Auckland net feeds
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)	CA, Leitch encoded
	Ioarana	3772/1378L	1	3/4	4(.566)	FTA SCPC; East Hemi Beam-Tahiti
	TVNZ	3846/1304R	1	3/4	5(.632)	SCPC, mixed CA & **FTA**, feeds
	10 Australia	37691381R	4	7/8	20(.000)	PowVu CA & **FTA; #3 TBN**

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

ASTRX D 1000CI. SCPC, MCPC, two CAM slots, auto search routine. Reviews SF#78 & #79. LTG Mason 61-3-9457 1222.
AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. Av-COMM Pty Ltd, 61-2-9939-4377.
Benjamin DB6600-CI. FTA, Foxtel/Austar w/CAM+card. Autosat Pty Ltd 61-2-9642-0266 (review SF#72)
Grundig DTR1100. Mfg by Panasat (SA), very similar to Panasat 630; out of production, Irdeto capable. See Av-COMM above.
Humax F1-CI. Primarily sold for TRT(Australia), does (limited) PowerVu (not Optus Aurora approved).
Humax ICRI 5400. Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available, review SF#76.
Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good. SATECH (V2.26)
Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.
Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.
MediaStar D7. FTA, preloaded w/ known services, exc. software (review SF July 1998). MediaStar Comm. Int. 61-2-9618-5777
MediaStar D7.5. New (May 00) single chip FTA; review June 00 SF. MediaStar Comm. Int. 61-2-9618-5777
MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738
Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. Tricky to use.
Nokia 9200. When equipped with proper CAM, does Aurora, pay-TV services provided software has been "modified" with Dr Overflow or similar program was available from (www.BAKKERELECTRONICS.COM), now only from established users.
Nokia 9500/9600. Numerous versions for different world parts; not distributed in Pacific but assistance from Av-Comm Pty Ltd.
Nokia 9800. Latest single chip version, with CI and Irdeto capable. No software for Pacific, Asia; not recommended.
Pace DVS211. NDS CA (no FTA) for Star Asia, previously used for Indovision. (Solution 42, 61-2-9820-5962)
Pace DGT400. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818)
Pace DVR500. Original DGT400 modified for NBC (PAS-2) affiliate use, with CAM equivalent to DGT400 but more reliable.
Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version.
Pacific Satellite DSR2000. Advises no longer current model; Clone of Mediastar D7 (see above)
Panasat 520/630/635. MCPC FTA, Irdeto capable, forerunner UEC 642, 660. Out of production, spares fax ++27-31-593-370.
Panasonic TU-DS10. FTA + Irdeto CA; one of 2 IRDs approved by Optus for Aurora, but no longer available in Australia.
Phoenix 111, 222. PowVu capable, NTSC, graphics, ease of use. (111 review SF#57). SATECH(below)- 222 out of production
Phoenix 333. FTA SCPC, MCPC, analogue + dish mover. Detailed SF review Nov. 1998. SATECH 61-3-9553-3399.
Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)
PowerCom. FTA, PowVu, NTSC, excellent sensitivity. NetSat 61-2-9687-9903.
PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, GWN+ PAS-2 Ku, CMT etc). Scientific Atlanta 61-2-9452-3388.
Praxis 9800 ADP. FTA SCPC/MCPC, PowVu, analogue, positioner. SF review Dec '98; withdrawn from Pacific sale.
Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.
SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-3749)
SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above).
Skandia SK888 (aka DigiSkan-SMS). FTA MCPC, Irdeto CAM+software upgrade. Out of production; Skandia 61-3-9819-2466
Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. Strong Aust 61-3-9553-3399.
Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, Aurora, exc. vendor support. Strong Aust 61-3-9553-3399.
Sky 21/SJ 3000ci. Claims "clone" Hyundai HSS800ci; if so, poor copy. Runs very hot, reportedly burns up smart cards
UEC642. Designed for Aurora (Irdeto), approved by Optus; limited other uses. Norsat 61-8-9451-8300.
UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel-limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.
UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers.
Xanadu. DVB compliant special receiver for members of SPACE Pacific (Av-comm Pty Ltd, tel +61-2-9939-4377)
Yuri HSS-100C. FTA, clone of Hyundai, V2.27 software custom to Australia (Nationwide-above).

Accessories:

Aurora smart cards. New v1.6 now available, 1.2 no longer available for RABS. Price now A$105, Sciteq 61-8-9306-3738; V1.8 available through Norsat 61-8-9451-8300 at A$107.50.
PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 7/8; pgm ch 11 and follow instructions (do not leave early!)

SatFACTS Pacific/Asian FTA ANALOGUE Watch: 15 May, 2001

BIRD/ Location	RF/IF & Polarity	Service	Errata
I703/57E	3808/1342R	Udaya TV	
	4052/1098R	WorldNet	VOA subcrs.
	4178/972L	MTA Inter.	
I604/602/60E	4166/984	various feeds	
I704/66E	3765/1385R	tests	
	4015/1135L	Mongolia	(SECAM)
PAS4/68.5E	3743/1407V	RTPi	(+ radio subcr)
	3864/1286V	BBC World	
	3907/1243H	Sony TV	Hindi
	4034/1116V	Doordan	(various)
	4087/1063H	CNNI	
	4110/1040H	TNT/Cartoon	
	4113/1037V	Series Ch.	
	4182/968H	MTV	
PAS7/68.5E	3470/1680V	test signal	
LM1/75E	3980/1170V	various	(Madagascar)
ApStar 2R	3780/1370H	TV Malagasy	(SECAM)
Thaicom3/78E	3871/1279H	TVT	
	3760/1390V	Army TV	
	3685/1465V	MRTV	off air???
	3685/1465H	VTV	6.6, 7.02
	3616/1534V	ATN	
	3576/1574V	ATN Bangalr	Bengali
	3554/1596V	test card	
	3536/1614V	Punjabi TV	(occ service)
	3507/1643V	RAJ-TV	
	3489/1661H	Vasta Music	occ tests
	3465/1685V	RAJ-TV	
Expres 6A/80E	3675/1475R	RTR	(global beam)
InSat 2E/83E	3481/1669V	Sun TV	
	3562/1588V	Vijay/Asianet	aud. 5.5/6.6
	3599/1551V	JayaTV	
	3810/1340V	DD1-Tamil	"
	3850/1300V	DD1-National	"
	3929/1221V	DD2 Metro	"
	3970/1180V	Teluga 1	"
	3998/1152V	sport feeds	"
	4035/1115V	Sun TV	"
	4060/1090V	Surya/Sun TV	"
	4093/1057V	DD7	"
ChnStr1/87.5E	3880/1270H	occ feeds/ card	P4 NSW, Ntsc
ST1/88E	3550/1600V	test card	
	3582/1568V	Nila TV	(vintage TV)
Yamal 102/90E	3675/1475R	RTR1	P3 NSW
	3875/1275R	Orbita 1	
	3916/1234R	RTR II	
	3935/1215R	Orbita II	
MeSat-1/91.5E	3710/1440H	VTV1,2, 4	
	3880/1270H	RTM-1	
Gz 28/96.5	3675/1475R	RTR	inc +/- 3.7
Chinasat22/98	3900/1250H	tests	+ 3940/1210
InSat 2B/93.5E	4165/985H	India Metro	NSW on 3.7m
	4080/1070V	DD7 (Tamil)	
	4070/1080H	DD9	
	3970/1180V	DD9 (Kan.)	
	3882/1268V	DD1	
	3840/1310V	DD?	
	3762/1388V	DD4	
AsSat2/100.5E	3660/1490V	feeds, tests	
	3680/1470H	feeds	
	3860/1290V	feeds	

BIRD/ Location	RF/IF & Polarity	Service	Errata
(As2/100.5E)	3885/1265H	WorldNet	VOA subcrs
Exp. 9/103E	3675/1475R	RTR	inc +/- 2.6
	3875/1275R	Vrk Apt	
As3S/105.5E	3640/1510H	Asia Plus	China, 6.6
	3660/1490V	Zee TV	was 3980
	3680/1470H	CETV	
(temp FTA)	3800/1350H	Star Sport	NTSC
(temp FTA)	3840/1310H	Channel [V]	NTSC
(temp FTA)	3920/1230H	Phoenix Ch	NTSC
	4020/1130V	Sahara TV	6.2, 6.8
	4060/1090V	IndusVision	6.6, 7.2
	4100/1050V	PTV2/World	
T'kom1/108E	4000/1150H	tests	
PalapC2/113E	4160/990H	(France) TV5	
	4140/1010V	Brunei + feeds	
	4120/1030H	MTV Asia	
	4080/1070H	Herbalife	+ tests
	4040/1110H	CNBC	
	3970/1180V	CNNI	
	3840/1310H	TVRI	tests
	3742/1408V	RCTI	English subcr
AsSat1/122E	3677/1473V	Test card	3933/1217H
ChinS 6/125E	4085/1065V	feeds	seldom seen
JcSat3/128E	3768/1382V	feeds	occ., P5 NZ
	4085/1065V	test card	NTSC, 6.8
Ap1A/134E	4160/1050V	CETV	
	3980/1170V	CETV1	
	3900/1250V	CETV2	
Ap1A/138E	4160/990H	CCTV7	
G25/140E	3675/1475R	ORT Moscow	inc. +/- 5.3
	3875/1275R	feeds, tests	
LMAP2/142.5	3675/1475L	RTR Moscow	+/- 3.5 deg.
Gorizont 33	3675/1475R	tests	+/- 1.3 deg
	3875/1275R	RTR	audio 7.5
Ag2/146E	3787/1363H	GMA	P1/2 s. eqtr
Me2/148E	4080/1070H	test card	occ. use
PAS8/166.5E	3880/1270V	test card, feeds	not full time
	3865/1285H	Napa test card	not fulltime
PAS2/169E	3940/1240V	Napa test card	not full time
SpNet4/172E	3920/1230V	unknown video	
1802/174E	4166/984R	Feeds	
	4177/973R	Feeds	
I702/176E	4166/984R	Feeds	from 177E
	4187/963R	Occ. feeds	
I701/180E	4187/963R	Occ. feeds	
	3841/1309L	RFO	East Beam
	3845/1305R	Occ. feeds	inc. from USA
	3930/1220R	USA net feeds	**FTA** & ca
	3975/1175R	Occ. feeds	

PAS4/68.5E	3785/1365V	Discovery India	BMAC
	3860/1290H	ESPN India	BMAC
Ap2/76E	3960/1190H	HBO Asia	GI Digicipher2
C2/113E	3930/1220H	Filip. Peo. Net	GI 1.5 MPEG
Ap1/138E	4100/1050V	ESPN	BMAC

COOP asks - "What kind of industry conference do YOU want?"

On 15 May there will be 134 days until we gather as an industry at the 2001 South Pacific Region Conference. What I am asking here is that you take a few minutes to pass along your suggestions about how this year's meeting might be more productive to you as an individual. I am soliciting "selfish" desires here - things that would make you really want to take two or three days out of your life to attend.

Here are some thoughts to get you started. Peter Lacey of Lacey's Australia, seldom at a loss for creative thinking: "We could allow day trade passes (for a bit more than half the cost for both trade days) so that those that can only visit for 1 day won't have to spend for both days"

"If we use a similar floor format to last year, there needs to be some way that those of us spending for the more expensive 'corporate rooms' are not disadvantaged by those who take the lower cost table space. The table takers seemed to have had as much space as they wanted or needed last year. An alternate plan to fill in the front area - offer corporate room exhibitors either a bonus amount of space out front or at a reduced price in addition to the private corporate rooms offered. And then police more carefully the amount of space used by the table top people - it was unfair for last year's corporate room people to see someone who bought a couple of table tops end up in a hallway wide by ten foot deep floor space!"

"People like the Jim's Antenna guy who was trawling for franchisees should be made to pay for a table or keep his presentation folders and business cards out of the buildings." (To which we add - and deny them permission to plant their franchise truck at the entrance to the front door for two solid days!)

"This year DTT is a big subject with much still not understood by technicians. I have guys that have learned amazing things about antennas (stuff they should have already known but did not) just this week with DTT. Might not the show be called '**The Digital TV Show**' with separate courses for satellite and terrestrial? There is a demand for training in most areas of (this) business so promoting the training value in the conference could be good for attendance."

See how easy it is to be a show planner? Just good, common sense with a focus on your own private interests. Peter's a supplier and he was obviously not impressed with how some of the competition sprawled out of their assigned floor space and became miniature cities in the hallways. Good and fair point - it won't happen again. NOW - if you go to the white insert card that is stapled between the front cover and page 1 of this issue, you will find a questionnaire form. Here we are asking for your comments, suggestions and personal interests. For example, John Ramsey of Avcom-Ramsey in the States would like to hold a part day course where attendees who pay a modest extra fee sit down with their own hand tools and build to fully operative an FM (stereo) transmitter kit, low power of course. But before we encourage John to haul boxes of parts and instruction books from New York State to Melbourne, we need to know how many people would take such a course and then walk away with a proudly "*Australian Built*" FM transmitter? Answering the questions on the card will tell us this number. But if there is insufficient interest - we'll cancel "Build your own FM radio transmitter."

DTT (as Peter Lacey calls it - we prefer DVB-T) is a no brainer. Of course we'll demonstrate the good, the bad and the ugly with DVB-T reception techniques and try to teach some intelligent tips that you don't already know about making terrestrial digital work correctly the first time you install a customer's antenna.

SDS (Satellite Distribution System) using L-band and/or 2.4 gigs is another no brainer. An operating 10+channel L-band relay system is assured and you will be able to touch it, take it apart, see how it goes through walls and covers distances right there at the show. You have always wanted to be a 'TV Broadcaster' and this will be your chance.

The ideal show makes everyone who attends glad they came, glad they spent some money, pleased to have had 2 or 3 days away from customers. If you will share with me your concerns, perhaps we can accomplish this for you in September. Bob Cooper, PO Box 330, Mangonui, Far North, New Zealand or telephone 64-9-406-0651 or fax 64-9-406-1083 or Email skyking@clear.net.nz.

TUNING IN THE INDUSTRY'S TV PROGRAMME

SPACE Pacific, the Asia-Pacific industry membership trade association, has produced (and continues to produce) a series of one hour television programmes. These "SPACE Pacific Report" shows, hosted by Bob Cooper, cover a range of topics of interest to installers and enthusiasts. Show numbers and content are as follows: **#9901-** Spectrum Analyser techniques, **#9902-** Feeds and LNBs, **#9903-** Dish antenna designs and problems, **#9904-** The dish marketplace, and, "tiny parts," **#9905-** Dr Overflow (Nokia) software (Robin Colquhoun), **#9906-** How the uplink works (tour of RCA's Vernon Valley site), **#9907-** Uplink Two, including uplink transmitters, **#9908-** Digital Basics (Mark Long), **#9909-** Real World Installs (Mark Long), **#9910** - Installing a polar mount dish and signal level test equipment, **#9911** - "SPIN" (the hidden side of satellite). **#0012** - First Report from SPRSCS 2000 (recorded in Melbourne June 28, 29 - "Ideal IRDs," more), **#0013** - Second Report from SPRSCS 2000 (recorded in Melbourne June 29, 30 -"ABA Blackspot session"), **#0014** - Naughty Nokia from SPRSCS 2000; **#0015** - The DVB-T Tangle from SPRSCS 2000 (Eric Fien). "Report" is broadcast by Mediasat on Optus B3, 12.336Vt, ad-hoc channel 3(*) (Sr 30.000, FEC 2/3). The coming-weeks schedule: **Sunday May 20** - Show 9907, 0200-0300 UTC (1400 NZ, 1200 AEST, 0900 Western Australia; repeats 0700 UTC/7PM NZ, 5PM Sydney, 2PM Perth). **Sunday May 27** - Show 9901, same times as May 20; **Sunday June 3**- Show 9908, same times as May 20; **Sunday June 10** - Show 9909, same times as May 20; **Sunday June 17** - Show 9910, same times as May 20; **Sunday June 24** - Show 9911, same times as May 20; **Sunday July 1** - Show 9912, same time as May 20. (* - Mediasat may pre-empt showings, check other bouquet channels - if not on 3.) In the event of schedule changes (*), SPACE Pacific attempts to pre-announce which show(s) will appear through the SatFACTS Web site prior to each weekend (http://www.satfacts.kwikkopy.co.nz). SPRSCS 2000 sessions taping scheduled for play on Mediasat are currently in "editing production." Sponsorship of SPACE Pacific Report. In general answer to queries - Av-Comm, Satech and Sciteq have contributed corporate funding to make possible the production of the first set of nine SPACE Pacific Report programmes IKUSI ANZ contributed funds for completion of 9910. If interested in sponsoring future shows, contact Bob Cooper at skyking@clear.net.nz (64-9-406-0651).

* - Note: Mediasat Sunday feed loads have increased and the first showing (0200UTC) may be "bumped" to accommodate other clients. The 0700UTC feed typically is not bumped and would be the better choice if taping for later review.

WITH THE OBSERVERS

AT PRESS DEADLINE

Power TV has joined Tzu Chi on PAS-8 3850Hz (VPID 500, APID 501). Mediasat B1 12.336Vt, Sr 30.000, 2/3 now has 2 new services (reload this transponder) at VPID 1360/APID 1320 and VPID 1660/APID 1620 + MSAT Internet 1, Access 1 Internet (two separate data streams) - Bill Richards.

AsiaSat 2/100.5E: "WorldNet (3764Hz, Sr 6.100, 3/4), audio channel 380 conveniently has MusicMix service on left and right output channel 1 - and VOA NewsNow on left side of channel 2 making it simple to do timed switch from music to news at 59 past hour through to 5 past hour; but you need SA D9234 to gain the extra audio channels" (**P. Burton**, NZ) That Beijing TV service on 3864Hz, Sr 4.418, 3/4 is intended as a feed to TARBS and SBS in Sydney.

AsiaSat 3/105.5E: Fifth Star TV Asia MUX 3940Vt, Sr 26.850 and 7/8 - all CA at this time. Zee TV bouquets on 3700 and 4135Vt (including Zed TV, AsiaNet Bharathi, Zee News and AsiaNet Kaveri) now insisting they will be CA only after 1 June - however, chronic shortage of Philips CA IRDs could delay this changeover. 4135Vt appears to have switched from FEC 2/3 to permanent 1/2. Star TV Hong Kong subscribers, told in writing (April 7) all but Star World would disappear 10AM HKT April 23rd were relieved to find nothing has changed - yet. Tech TV, related somehow to Now TV, 3760Hz Sr 26.000, 7/8 - VPID 1060, APID 1020 or 1060/1061 as reported by B. Richards, has replaced second occasional use feed channel from Now. Good stuff here, by the way. "CNNI feeds from China back to USA studios inside CCTV 4116Hz bouquet - Sr 19.850, 3/4, using 2nd feed channel" (**Jacko**, Australia).

InSat 2E/83E: "Kairali TV on 3699Vt, Sr 3.184, 3/4 - stronger than (old) DD Metro and DD National; same service in analogue on 3450Vt, 5.5 audio" (**D. Leach**, NSW).

Intelsat 701/ 180E: "Smallest Sr ever noted? 4030 LHC, Sr 0836 and FEC 2/3. Also RFO/Canal + 4087, 13.334, 5/6 continues to load on 3m here - have they dropped power as expected?" (**Tech Guy**, NZ). "Canal+ Ku service (11.610Hz) has 8.5 dB CNR here on 1.8m, works on 1.5 offset but no headroom - look angle only 13 degrees" (**Zapara**, WA)

Intelsat 702/176E: "My D-box loads 12.691Hz, Sr 27.694, 3/4 with a whopping strong signal but no sign of video in SW of WA - is this Internet?" (**J. Bannister**).

JcSat 3/ 128E: "3996Vt (was 3990Vt), Sr 22.000, FEC 5/6 still running but down 2 to 3 dB from previous checks - typically test cards and occasional USA origin feeds; Taiwan mostly FTA Mux 3960Vt (Sr 30.000, 7/8) does not appear backed off like 3996" (D. Leach, NSW).

Measat 2/148E: "Ku services (11.106, 11.168Hz) are surprisingly strong in Perth region - 4.5 dB or just one below threshold using 2.4m Paraclipse Hydro" (Zapara, WA).

TARBS Expansion

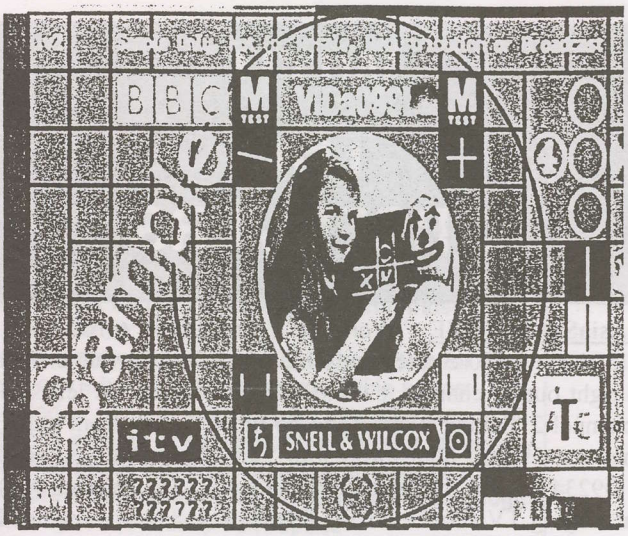
The TARBS PAS-8 Ku bouquet now uses three transponders: 12.526, 12.606 and the newest - 12.326 Hz. On April 19, a major channel reshuffle with the promise that additional service channels will be available before 1 June. This PAS-8 beam covers Australia only, no reports from other regions other than Papua New Guinea (2m and larger dishes). TARBS CA service requires a matching of the receiver and smart card as a set before authorisation occurs. The channels: (1) Sky Racing and Night Moves, (2) ESPN, (3) CNN, (4) MCM Asia, (5) Cartoons + TCM, (6) vacant, (7) ESC-1 Arabic, (8) Nile Drama - Arabic, (9) Future TV - Arabic, (10) NTV - Russia, (11) NTV Plus - Russia, (12) KDTV - Turkish, (13) ATV - Turkish, (14) TGRT - Turkish, (15) TRT International - Turkish, (16) MKTV - Macedonian, (17) vacant, (18) TV Poland - Polish, (19) Tele Liban - Arabic, (20) TV Chile - Spanish, (21) Espana TV - Spanish, (22) TI - Italian, (23) vacant, (24) TV Globo - Portuguese, (25 - 28) vacant, (29) KOTV - Korean, (30) vacant, (31) Phoenix - Mandarin, (32) BTV - Cantonese, (33) Filipino Channel, (34) Pinoy Blockbuster Channel - Filipino, (35) Syrian Channel - Arabic, (36) Pink Plus - Greek, (37) Mega Cosmos - Greek, (38) ERT - Greek, (39) Alpha - Greek; and numerous (16 now, always FTA) radio channels.

Optus B1/160E: "Boxing feeds on 12.365Vt, Sr 5.6312, 3/4 VPID 308, APID 256" (**B. Richards**, Australia).

Optus B3/156E: Optus test transponder 12.376Hz in addition to showing FTA tests of "funny stuff" (page 2, here) also now carrying CA NRL Channel. "12.658Vt Aurora now has 6 CA ZeeTV1 thru ZeeTv6 channels, CA; also 2 FTA radio service channels, not modulated" (**D. Nolan**, Australia)

PanAmSat PAS-2/169E: Sr change from 8.320 to 8.680 for Korean bouquet on 3768Hz; FEC 3/4. "Korean MUX 3769Hz, Sr 8.320, 3/4 has (1) MBC (VPID 3601, APID 3605), (2) KBS (VPID 33, APID 36), (3) YTN (VPID 49, APID 52) - all apparently full-time service" (B. Richards, Australia) "Motorcycle racing feeds 3934Vt, Sr 10.850 VPID 308, APID 256" (Jacko, Australia). "Motorcycle racing

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for June 15th issue: June 4 by mail or 5PM NZ June 5th if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.



Amusing. Sky Network NZ in testing potential FTA distribution for TVOne and TV2 selected this "sample" Snell & Wilcox British ITV test card which plainly says "*Sample only, not for resale, redistribution or broadcast*." Credit: **Craig Sutton.**

3929Vt, Sr 11.265, 3/4 with same VPID 308, APID 256" (B. Richards, Australia).

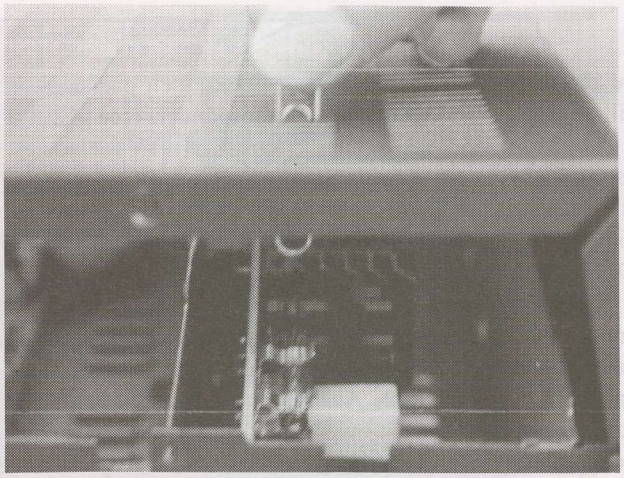
PanAmSat PAS-8/166.5E: New Chinese Tzu-Chi TV 3850Hz, Sr 13.240 is FTA with NTSC test cards (2 or more) and one channel CA, but may only be test (D. Leach, NSW). Barker (self promotion) channel for TARBS service packager announcing up to 7 new service channels and free-to-air viewing of all channels for 2 to 3 week period - provided you

are already a subscriber to at least one of their packages. This will give them 39 TV channels, 3 transponders (see p. 29).

Thaicom 2-3/78.5E: Thai (terrestrial) TVT channel 11 testing 3871Hz, FTA with Sr 4.688, 3/4. The ever elusive MRTV now seen 3676Hz, Sr 6.000, 2/3. "Mega TV bouquet 3640Hz, Sr 28.056, 3/4 still has many FTA services available" (D. Leach, NSW).

Soapbox: Another source for FM broadcast band linear amplifiers, in this case designed to run on 28 VDC or internal mains connected power supply: Dale.Remington@tcpowerconversion.com. Australia 9 digital continues to experience problems not evident with 7-D and 10-D. Latest - picture freezes with unwanted black bar 1/3rd way up screen, lasting from seconds to five minutes. Foxtel, Austar continue to oppose satellite installations for residences located inside block of flats, both requiring all flats (as in 100%) agree to contracts for service before they will wire the complex. Alternate plan - locate third part installer to do the job, then advise Austar/Foxtel you have a location previously wired that you want hooked up. "I have returned permanently from Italy to Melbourne region, now Technical Sales/Design Engineer for IKUSI ANZ and looking forward to September 27-29 satellite show which I missed in 2000!" (**Pietro Casoar**) "Specs for majority of IRDs now available appear to be 600 to 1000 ohms unbalanced, but recent Korean IRD has 2V RMS into 20,000 ohms. When feeding an external device from audio sockets (such as low power FM transmitter), the input impedance on the device being fed should be higher (such as 10,000 ohms impedance) than the source. With lower impedance output sockets such as 600 ohms, reasonably long audio lines can be run without loss of high frequency (audio) information. If the input impedance of the device fed is too low (such as 600 ohms), low frequency losses can occur" (**L. Mathews**, NZ). CMT (PAS-8) continues to have linking problems - latest outage 12 April. "Reports that Humax IRDs would be denied future use of Irdeto CI or CAM technology totally unfounded - in fact, a two year extension to contract between Irdeto and Humax was recently negotiated" (**P. Merrett**, SCITEQ). "From April 17, channel line-up for Canal+ (I701 Ku) is: (1) Canal +, (2) Information channel - barker, (3) RFO1, (4) RFO2, (5) TV5, (7) LCI, (8) Euronews, (9) RTL9, (11) Disney, (12) Cartoon, (14) Planete, (15) Voyage, (16) Eurosport, (18) MCM, (19) RFMTV, (22) Cinecinemas, (23) TCM -*, (24) XXL Adult, (33) Europe 1 - radio, (100) Canal promos - radio. * - TCM will not be shut down on this bouquet on 1 July as has been announced for PAS-8 English language services" (**S. Holzt**, New Caledonia). Web site where Canal+ questions may be answered: www.antenne-cal.com/download.htm. "Newly released Canal + footprint map shows 36 dBw just touches northern tip NZ, 39+ dB into Tasmania, 44 dB to Melbourne, 48 dBw Gold Coast" (**H. Philipe**, Australia) "ART, LBC, RAI International PAS-2 3836Vt, Sr 13.333 tested CA system on these three - but not Greek Antenna Pacific over nearly 5 hour period April 14. May 1 previously announced CA date has come and gone?" (**T. Drexel**, SA). "DGTEC 'true HDTV' set top box to be available sometime in June at A$699 including delivery and set-up in home in Melbourne region. HDTV, SDTV, digital coax audio outputs, VGA/component/RGB/ S-VHS and 2 composite videos out" (**David**, 0414 833 236, 03 9886 3393). "Patriot has agreed to supply new hubs for apparently defective dishes in which we have US$8 grand tied up for months now" (S. Holzt, New Caledonia).

AT Sign-off



"Duty of Care" liability

The belief that a commercial company can be held responsible for its actions (or lack of action) beyond normal civil code responsibilities is quite new in Australian law. What it means is up to the judge hearing a case bearing upon product liability but generally speaking - did the company charged with breach of *Duty of Care* take all reasonable steps to ensure the safety of a product?

There was a long period of time where if an accident occurred and the company could show it met "the standard," it would typically be absolved from legal responsibility for whatever damage the accident created. "*Duty of Care*" modernises Australian law and recognises that not all "standards" are perfect, and the manufacturer of a product more than any other has the intimate first hand knowledge required to make a product safe. "Should the manufacturer with its in-depth knowledge of the product have known that certain parts in the product, while conforming to all safety standards, still presented a hazard to health?" If a consumer brings a *Duty of Care* action against a manufacturer , sizeable monetary awards can be at stake. This is "new legal ground" in Australia and the courts are only now beginning to write the record.

Some examples of *Duty of Care* actions by a manufacturer. In SatFACTS June 1998, page 18, we published a photo showing how a standard 25mm length metal paper clip held between thumb and first finger and slid down through top-of -IRD ventilation slots could come into contact with the 240V AC mains fuse of a then-new IRD. We republish that photo upper right.

The manufacturer howled in protest and in July 1998 SatFACTS, page 7 we reported their writing to us, "*The clearance distance between the primary side of the power supply and the outer case (typically the fuse and holder) requires a clearance distance of >6mm. In the 642 receiver, the distance between the lid and the fuse/fuse holder is nominally 12.7mm.*" So the actual distance in this case was more than twice the regulatory safe distance. Seemingly, a manufacturer who was "this safe" would have no worries about being dragged into court for violating the user's safety.

Duty and Care. Perhaps the safety engineer who wrote the ">6mm" standard did not envision there being ventilation slots directly above the primary side of the mains source connection. Or, perhaps the writer of the standard did not realise that a standard paper clip is 25mm long while a "giant" clip is 50mm long. Either one, in the hands of a small curious child, would be a pathway to instant electrocution death.

The ventilation slots on the top of the IRD could be considered an "attractive nuisance" for young minds. We asked the manufacturer why the slots were directly above the uncovered mains connections and how they decided on the length and width of the slots. Slots that were smaller, too small to stick a paper clip through, would have been significantly safer and probably still offer the ventilation the power supply requires. Their 1998 answer stays with us:

"*We asked some women in our plant who wear long, dangle ear rings to see if by leaning over the receiver their hanging ear ring parts might slip down into the slots. We selected a slot size that would not admit ear rings.*"

Duty of Care. Would a judge rule the company had exercised "due diligence" in determining the slot opening dimensions because it "tested" the slots using lady's ear rings? After SatFACTS published the photo and raised the issue, the company in question promptly (July 1998) modified the power supply design with a fire proof shroud (cover) over the exposed fuse holder. The essence here was, "We were 'legal' with 12.7mm clearance but in the interest of further public safety we have elected to install a cover over the device."

The same power supply has been the unwanted object of significant editorial attention since the initial June 1998 exposure. For example, when Sky Racing Channel installed thousands in their TAB facilities, it was noted that the power supplies were failing at an alarming rate. After hundreds had failed, the company elected to do a product recall and replace two parts (resistor R7 changing from a 1/4 watt to a 1 watt) and zener diode ZD1 (changing out a 1/2 watt dissipation version with a 1 watter). It was determined that TAB facilities, located typically in shopping malls and commercial districts, had AC mains voltages that rose after normal commercial business hours (8AM to 8PM) by as much as 20 volts. Residential areas that use the majority of their electricity from 5PM to 8AM did not have similar rises in mains voltage. The receivers in question could not handle the higher night-time mains levels, and blew one or both of the parts.

Duty of Care. Should the manufacturer have known that receivers installed in areas with fluctuating voltages were more likely to fail? Did the manufacturer get itself off the hook with the TAB shops by doing wholesale upgrading of power supplies, and, if it did, should it not also perform the same upgrades to home sets in consumer hands? By doing the TAB shops haven't they now admitted there is a universal fault that should be corrected with all similar models?

Duty of Care. If the manufacturer has added a fibre insulated shroud to cover the mains fuse holder, have they not admitted there are possible dangers with an IRD that places ventilation slots across the entire power supply? Is not the heat sink riveted to the "chopper IC" (IC1) which is also "live" with a deadly voltage an equally dangerous situation? Going a step further, to save a few pennies per IRD, the manufacturer has chosen 1 ohm carbon resistors in lieu of fuses with safety considerations secondary. Is this *Duty of Care*? A court case that tests who is responsible for product design and why certain design choices have been made is inevitable.

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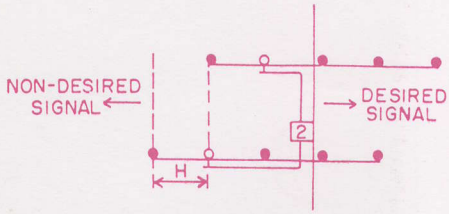

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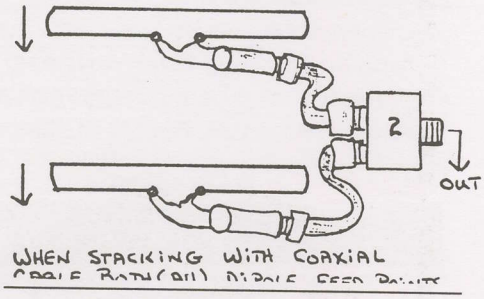

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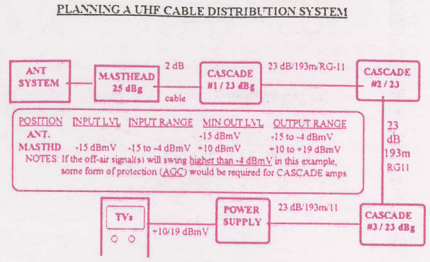

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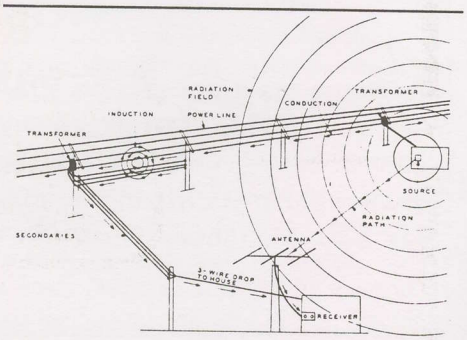

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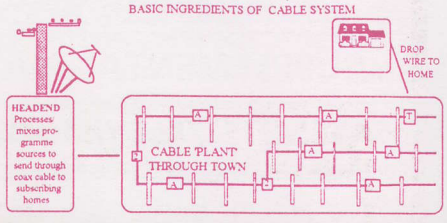

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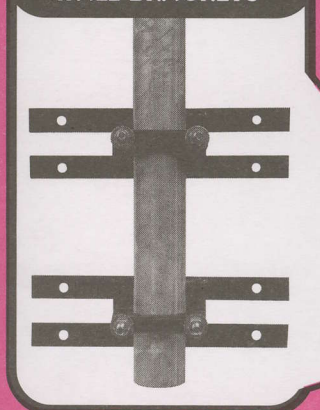

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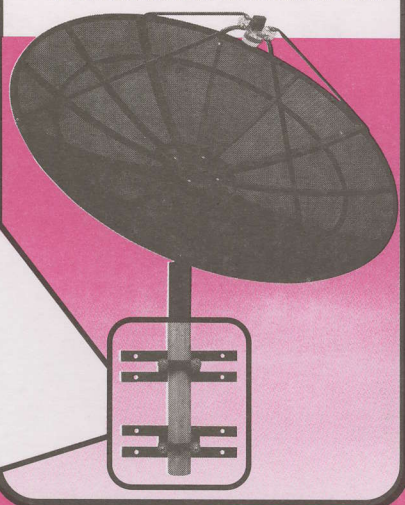

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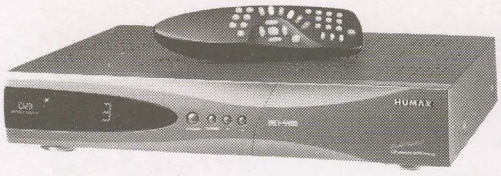

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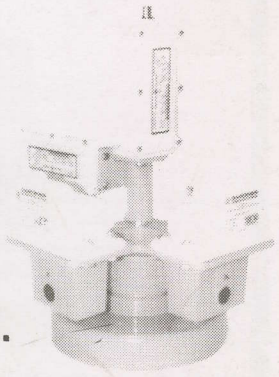

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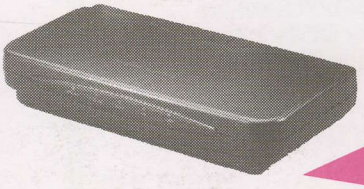

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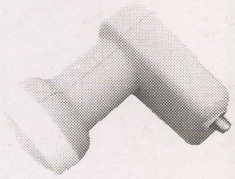

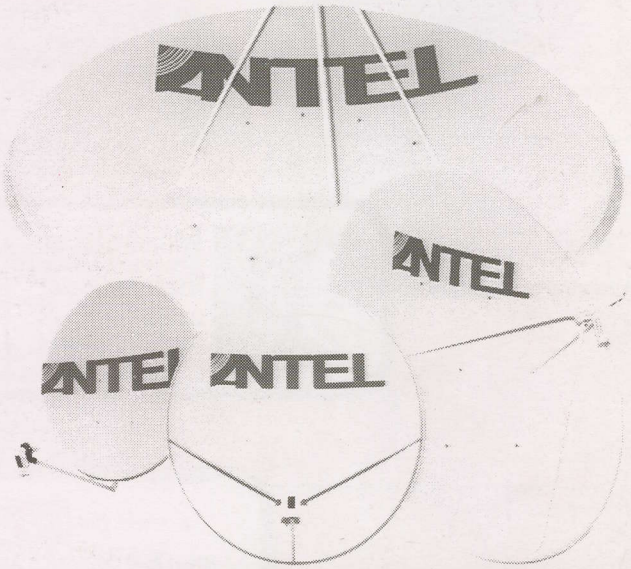

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