THE INFAMOUS WRSU-FM TELCO

INFORMATION BOOK

- or 101 EASY WAYS TO DEPLETE THE STATION BUDGET AND GIVE THE GENERAL MANAGER ULCERS

- or HOW TO PAD A BUDGET AND ROB THE FEE BOARD BLIND

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NOTE - this copy is a rough draft

- please see revised edition for correct info.

E.D.S.

Glossary (1)

A. T.& T.-"The Phone Company". The parent organization that owns the smaller ones we usually deal with: NJ Bell, NY Teleph-one, Western Electric. AT&T itself runs the Long Lines department which takes care of connections between regional companies (i.e.long distance calls & interstate radio lines).

Beeper- Device provided by Telco which emits a "beep" tone on phone line every 15 seconds when conversation is being recorded. WRSU has one installed in the News Prod. room; this particular installation beeps whenever the phone is used, whether ot not the recorder is on. The beeper is required by law.

Block- standard 4-terminal block for connection to phone or radio line.

Central office- Local "nerve center" for phone and line switching. Local calls or lines are connected through the local C.O. Long lines first go to the local C.O., then on a long distance trunk(s) to CO near remote point. then to remote point. The C.O. for WRSU radio lines is on Peterson St. in downtown New Brunswick.

Coupler- device for electronically coupling a telephone signal to an external device such as a broadcast console or tape recorder. NOTE: when discussing this to Telco call it a "Broadcast coupler".

DLQ-Western Electric term for a local intercom(between rooms).

Equalizer-device to filter and emphasize certain audio frequencies and attenuate others on a line; in a sense a fancy"tone contrl". For an extra charge Telco will equalize a line for you; the extra charge,however, is rather expensive.

Exclusion key- used on a phone set when using a particular phone line for conversation or bradcast, to prevent others from interrupting by picking up on another set where that line also appears. AT WRSU there is an exclusion key on the 7887 line on the set in FM MCR.

Frame- panel where lines appear and interconnect at Central Office.

Gateway- Entry-point for a continental long-line.For example, a radio line from Honolulu,Hawaii to New Brunswick may use a San Francisco gateway or a New York City gateway.

Glow lamp- device used in conjunction with a phone set to indicate that a particular line is ringing. May be mounted on wall near phone set or directly on side of phone set.

Hubbell plug- connector sometimes used for Radio lines instead of a block. NJ Bell uses them for lines; other states generally use blocks for lines.

(2)

Line-~~(also-Radio~~-can refer to a Telephone Line or a Radio Line. There is a distinct difference between the two, so always indicate which you are referring to.

Loaded line- For an extra charge Telco will "load" the line: put a transformer at the termination to facilitate connections for whatever devices you may use. Most remote lines used at WRSU are unloaded.

Loop-see standby loop

Long Lines-Dept. of AT&T responsible for interstate ~~radio~~ line radio lines and long distance phone calls. Orders for such lines are placed direetly with them in NYC.

Microwave- technique used to carry telephone and radio line signals over moderate and long distances. Signals travel by wire to Microwave relay point, which transmits signal by UHF radio to one or more relay points, then by wire to destination. Slection of wheter wire line or Microwave is used is largely computer-selected, based on facilities available at time when call is placed or line connected. Several Microwave antennas (dishes) may be seen on top of Central Office building on Paterson st.

Phone line- a two way line usually terminated with a telephone set, of the dial or touch-tone variety. The line has a calling number: it may be called frm another phone, and the phone set on that line may call others simply by dialing. Connection to other points is automatic; in case of accidental disconnet, one may reconnet simply by redialing the number.

QKT- Western Electric term for a coupler.

Radio line - see next page

Right-of-way sales- This refers to what particular phone co. has jurisdiction over a certain area for telephone and radio line orders. NJ Bell of courde has right-of-way over the state of NJ, but also has right-of-way over NYC and Long Island. Therefore when ordering a line to Madison SQ. Garden or other points to NYC or LI, order thru NJ Bell instead of AT&T Long Lines.

Standby loop- For long radio lines AT&T will connect to the Central office, and the local co. connects from the C.O. to the station. Since at WRSU we use several long lines a month(usually)it is easier to keep the connection to the N.B. central office all the time. Therefore we have them maintain a "standby loop" for a monthly charge. When ordering a line with ATT Long Lines they will need the standby loop number(unless a new loop is to be connected).

Switching charge- this is one of several charges on a Long Lines bill, for switching in your line while actually in use.

Glossary- page 3

Radio line- essentially, a pair of wires that is run from one point to another, by Telco. They may be used to send audio or control signals. The line is not automatically switched in;* it is not a "phone line" as it can not be dialed like a phone and is not terminated with a phone set. Normal termination is a transformer or the actual device used, such as a console or recorder.

* see switching charge

Talkback- ability to have two way communications on a line. Phone lines always have talkback capability. Local radio lines(usually no more than 20 miles) have talkback capability. Longer lines do not have talkback, as Telco inserts line amplifiers along the way to keep up the signal level.

Telco- General purpose term for "Phone company". Donot use it when talking to them.

Termination- what kind of device or circuit is connected at end of a line; such as a transformer, phone set, switchboard, console, etc.

(4)

AT&T and subsidiaries

(or, Mother Hen and her Chicks)

American Telephone and Telegraph is well known as the largest and most profitable corporation in the world. It literally covers the globe with its millions or wires and cables, millions of dollars of communications equipment and thousands of employees. Therefore it is extremely easy to become confused when dealing with them for something simple like a phone set being repaired or something more complex like a coast-to-coast radio line.

Plainly speaking, AT&T is broken up into many subsidiaries and runs nothing by itself except the Long Lines Department. The subsidiaries are the regional/state phone companies that provide the service for a certain area; here in NJ it is New Jersey Bell. In some areas several states are covered by one company, such as New England Bell, or Comlumbia & Potomac(Wash.DC area)Bell. Since all the smaller companies are part of AT&T, all their equipment interconnects and is the same electrically, so there is little fluctuation from one state to another.*

Several states have regional phone companies which are not part of AT&T; these are usually GT&E(General Tel.& Electronics). However few problems arise if one has to deal with these, as the FCC ensures that all the equipment interconnects with AT&T and phone and line service is the same.

AT&T Long Lines is basically an interstate division responsible for interconnections between local/regional phone companies, and for overseas lines as well. When you dial a long distance call your call first goes to a local central office, then to Long Lines switching equipment, which automatically "finds" a free line going to the state where your call is going; the call goes on that line to one or more centraloffices in that state until it reaches the local one for the destination of your call.

Since AT&T Long lines is and has been the"only phone company" (for long distance) it has been regulated as a legitimate monopoly and is supervised by the FCC. Any complaints or proposed changes should be directed to them. Local phone companies are regulated by the respective state Public Utilities Commissions.

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*However, watch out for fluctuations in procedures, such as ordering lines, etc. and installation practices, and especially different billing procedures and <u>different rates</u>.

(5)

Phones vs. Lines: Broadcast Usage

For remote broadcasts one has the options of choosing radio lines or telephone service. Each has its own advantages and disadvantages in terms of:

1. Cost
2. Reliability
3. Quaility(audio)
4. Convenience & felxibility
5. Compatability with external equipment

Cost

This is determined by how long/the line is to be used, the distance, the quality(for radio lines) and accessories.

PHONE: A phone line has one fixed quality("lousy"). Rate is determined by the length of the call and distance. If this is to be used within the state of NJ, consult the phone directory for rates. If out of state, get the rate from a long distance operator. If a phone set or sets are to be installed for a remote broadcast, there are fixed charges associated with those.

a) Connection of a phone line
b) One-month* for service & equipment usage
c) Installation of phone set
d) Accessories on phone set

The above (a thru d) whill cost about $20 to $50, plusethe cost of the phone call(s) itself. If you get a secord(or more) set with the same phone number, add another cost c. If you order additional sets with their own private lines, add a thru d again.

Accessories vary according to what your application is. For example, at a remote broadcast with several microphones going into a mixing console, you will need a broadcast coupler on the phone set to connect the console to the phone. If only one person at a time will be talking, perhaps a news reporter or the like, you may wish to lose a slight amount of audio quality and save yourself some money and a lot of trouble by not using a separate mike and mixer, and just have the person talk into the regular phone mouthpiece; therefore no coupler is necessary. If the set is to be used frequethy by the reporter and "hands-free"operation is desired you may order the set with an "Operator" type headset-mike combination which plugs right into the phone set.

If desired, Telco will connect a phone line without a set, and you supply your own(but it must be"legal", that is, electrically safe to connect so you dont mess up the Telco lines). In this case you get charged for a and b.

*Note that even if you use a phone for only one day(such as a sports cast) you still get charged for b. Rip-off, isn't it? Well, that's why AT&T is rich today. BEWARE: In some states the minimum is 2 or even 3 months service. Delaware currently is 3 months minimum, ergo, lines are automatically going to be cheaper in such cases.

(6)

LINE:

There are several fixed charges, one on distance&time, and 2 others depending on time.

Lines come in several qualities.

Class D: the cheapest. Audio frequencies up to around 3 kHz. Note this is not flat frequency response up to 3 KHz, but just "response". Rate currently 14¢/mile/hour. Milage is airline miles from one end of line to the other.

Class(C?): Lines capable of carrying DC voltages, i.e. no transformers mid-way along the line anywhere. WRSU uses 3 currently: one for controlling the FM Transmitter and another for metering the transmitter, a third for simultaneously sending audio and a DC control signal for the AM system in the Douglass dorms.

Other classes: lines for audio with frequency response guaranteed flat to 5 KHz or 8 KHz, depending on what you want.

Class A: Audio guaranteed flat to 15 kHZ(Broadcast quality). We use two of these at WRSU, for FM Left and FM Right channels.

Rates for lines other than Class D are significantly higher, and get ridiculous for out-of-state. Except for a possible donation of a large amount of money from some demented philanthropist, dont ever plan to use anything but class D lines for anything(except FM transmiter lines). This is one of the quikest possible ways known to man to wipe out a bank account in no time.

Flat charges: a) Installing the line at remote location, about $15.
b) Switching charge(only for long lines), $4.50 each(usually one needed).

c) Connection of standby loop to AT&T LongLines at C.O.: $17. for 1st day, $1 each additional day. Connection of LongLine to C.O.:
d) $2.25/connection/hour. Typically 2 connections-one at each end, so figure ~~$4.00~~ 4.50 per hour.

~~EXAMPLE: Typical Sportscast line order: Syracuse Univ, Syracuse, NY.~~ Syracuse NY
~~a) Out of state (Long lines) Harvard U, Cambridge Mass.~~ 3 hours, long.

a) Installation of line	15.00
b) Switching	4.50
c) Loop connection (1 day)	17.00
d) Connections (2 for 3 hrs)	~~13.00~~ 13.50
Class D line (19 miles) @ .14/mile	
Total	

2) In state line. Princton U, Princeton, NJ 3hours 23.73

a) Installation _____

Class D line _____

Total

3) Many points in the ~~local call area~~ local phone-call area (mainly Middlesex county) will bring a flat line charge of $2 (yes, that's $2) plus about $15 for installation. This rate applies to those used for our AM transmitter system; we also took advantage of this for local remote lines used for Election Night coverage.

Reliability

Well, first of all, remember that nothing is perfectly reliabl e when dealing ~~with the~~ Telco. It is wise to recall Murphy's Law. But there are some relative advantages and isadvantages to be considered.

1) The longer a radio line, the worse it gets. A line connection is a series of cross-connections or "patches" at various switching centers and the longer the line, the more connections (usually). This means more places for the ~~it~~ patch to get pulled. Even for an in-state line, you usually have 2 or 3 connections minimum. The standard procedure seems to be that if you are scheduled to have a remote broadcast at 1 PM, the line works perfectly when you first set up at about 12. You check out the line, it's OK, and maybe even ~~the~~ Telco calls to see~~k~~ that everything is all right. No trouble, you tell them. Then, at 12:57, someonein some central office somewhere decides to "check out" the line and pulls a patch. Voila, no line. This happens more than occaisionally. The trick is to have a few telephone numbers to call quickly so you can yell at them and get the *&%#@! line fixed fast.

2) Once your scheduled broadcast starts, there is little danger of some jerk at Telco pulling the line. (Although that has happened once or twice....). Before they disconnect they usually call the station to make sure it's OK with us.

3) Telephones, of course have automatic switching; when you dial, the system automatically "finds" a free line and connects you. For the occaisional accidental disconnect, you can quickly re-establish by redialing.

Quality

As mentioned before, there is one quality for phones: lousy. It will barely handle the voice frequencies, and anyone who considers sending music signals on phone lines is probably tone-deaf.

(8)

Lines have several qualities, depending on how much you want to pay: unequalized, flat to 5 kHz, to 8 kHz, to 15 kHz. Some times you will find that a line ordered flat to 5 kHz may be good to 8 kHz but that is not guaranteed. To provide these higher quality lines, Telco will connect one or more of their expensive, specially-designed line equalizers and charge you an arm and a leg.

You may say"can't we order it unequalized and use our own?" Yes, but the results depend on how good your in-station equipment is. At WRSU we have 2 Altec graphic equalizers, valued at around $600 each, and even when using both of them together on one line, you can't do much with even a moderately long uneq. line. What the equalizers are useful for is removing a characteristic "ring" that apperas inthe line, or any various hums or other stray noises. For most voice applications, an unequalized line with in-station equalizers is satisfactory.

In short, you get what you pay for. You must decide whether the extra audio quality desired is worth all that extra money.

Crosstalk: this is uaually more of a problem on phone lines than on radio lines. Can usually be solved by hanging up and dialing again.

Convenience & Flexibility

Radio lines provide easier connections, at both studio end and remote location. The line usually may be hooked up directly to the equipment with no extra couplers or transformers; there are less devices which can break down.

Telephones will almost always require couplers at both ends; and what happens if you go to your remote locations and find that the Telco installer forgot to install a coupler on the phone set you ordered? Well, you take apart the phone and connect your console to the phone directly. This is an "illegal" connection, but you're doing this because it was their fault in the first place, right? This hook-up is not difficult(see appendix)as long as yu rmember to bring a resistor and a capacitor or two and some clip leads. If you didnt--well, you'll have to pass the phone receiver back and forth between the reporters/spoertscasters/ whatever.

Telephones always offer talkback capability; this feature is often essential for remote broadcasts. Once outside of the local area, most remote lines will not have talkback. Sometimes you can effect a compromise by ordering a radio line for the actual 'cast, and using a phone for talkback and cueing. This comporomise, however, will cost more than just a line, or just a phone order.

(9)

Compatability with external equipment

Studio End of line- The three Consoles in the control rooms (AM,FM,Prod) are designed to be directly connected to radio lines(they/~~have~~boards have their own built-in isolation transformers) and have full talk-back capability. The line connections appear in the patch bays and may be connected to equalizers or other devices if necessary.

Phone connections are a little more difficult. The only permantly connected phone hookup is the Beeper set-up in News Prod. Alas, the beeper is always connected and is rather inflexible if one wishes to use a phone call for live FM broadcast(although it has been done.) There is a coupler installed in the FM MCR, however, at present the setup is rather confusing easily connected. Pending further modification, it involves using another telephone set in addition to the regular one in use, and a multitude of cables,etc. Also available is the semi-legal method of direct connection(through a capacitor,etc.) to the board; this was used on Election night to bring in various remote reporters and worked rather well.

Remote location--Radio line impedences are around 600 ohm balanced and thus compatable with most broadcast equipment. The portable Gates consoles used at WRSU have an output designed specifically for radio lines, with a level of about +4 dB. (Lines usually take about 8 or10 db before clipping).

Telephone circuit parameters are rather complex and direct connection to a line or phone will ~~xxxmitgive~~poor results and may damage equipment. The coupler supplied(if ordered) with a phone set will accept a ¼-inch phone plug from the regular line output of a remote board.

STANDARD Practices at rsu

For remote sportscasts up to 300 miles or so:
A class D radio line; if there is no guarantee of a pay phone near the line installation, a standard phone line and set are ordered for talkback(also useful incase the radio line goes out).

For sportscasts farther than 300 miles:
One or two phones lines and sets with coupler(s). Having a second phone and line will enable talkback while the first is being used for the sportscast; also if one line or set is defective. Second set is recommended if the budget allows(additional cost: a,b,c,d in cost section).