

Field Report

The Comrex Matrix

A Report by Michael Halleck

[St. Paul, Minnesota - February 2004] The holiday season in Minnesota marks the start of the Christmas shopping season and our "Stuff the Bus" promotion. This is a promotion/charitable event KSTP-FM has sponsored for the past seven years. The objective is to stuff a large charter bus with donated Christmas toys and in turn donate them to the Salvation Army. Oh – and did I mention the programming people wanted to carry live cut-ins from each event, along with a PA playing the station signal in the parking lot next to the bus?



SITE TO STUDIO CHALLENGE

The first "Stuff the Bus" events were Marti'ed back to the station. The vagaries of a Marti signal being what they are, as well as the encroaching RF congestion, made the use of the Marti very unreliable at best. The mix products of course adhered to one of Murphy's laws and were the most prevalent when we most needed the frequencies.

Imagine explaining to your program director the occasional mix product (never were there enough recognizable words to pinpoint the culprit, and never a call sign) was a random occurrence and yes, we know it is there and no, we do not know how to prevent it because it is on all of our Marti frequencies (there is a cavity on the receiver) and yes, it occurs at random intervals. Needless to say, we needed a different way to do things.

An ISDN or POTS line remote was out of the question due to the costs of seven different lines and the fact that in some cases the bus was far out in the parking lot, presenting a new set of problems. Doing the cut-ins via cell phone was only considered as an emergency measure – the quality was just not good enough for us. Therefore it was with great interest that we watched the development of the Comrex Matrix with a GSM module.



THE COMREX MATRIX

Several weeks prior to the remotes we arranged with our good friend Dave Kerstin of Broadcaster's General Store for a trial of the Comrex Matrix and an accompanying Blue Box for the studio end. GSM (originally

Group Speciale Mobile, the original standards body, but later known as Global System for Mobile communications) is a cellular communications system in the 1900 MHz band (the standard is PCS 1900, as accepted by ANSI) in the States. The original idea, developed in Europe in 1991, was to allow customers to travel freely among markets, and still be able to use their phones. This "second generation" of cellular technology is just now gaining popularity in the USA.

In order to get GSM service, we contacted a GSM cellular provider in our area, T-Mobile. We requested GSM service with CSD (circuit switched data, a temporary circuit of a constant bandwidth). As you may expect with new technology, it took a few explanations of our objectives and the equipment we were using. ("It's not a telephone, it just holds your Smart Card, and I'm using one codec to call another.")

TELCO FOLLIES

In fact, I really doubt the myriad of people with whom I spoke ever understood exactly what we were doing. They had a hard time understanding all I wanted was SIM (Subscriber Identity Module) to plug into the Matrix GSM module.

After speaking to what seemed to be several hundred people ("Please hold, your call is important to us ..." – If it was so important why was I holding? – And, "This call may be recorded for training or quality control purposes."), I asked for, and was quite happy with myself for getting, what seemed to be a very reasonable unlimited data rate. That is ... until the bill came.

I was under the impression that our connections were data only, hence the data rate pricing. It turned out the connections were considered by T-Mobile as calls, just like voice. In order to get a data rate, T-Mobile explained, the connections needed to be made via the internet through an ISP, a system Comrex does not support. A word to the wise, find a service plan with as many minutes you can afford. Charges add up at twenty cents a minute, for a long remote, it can be quite spendy!

In the defense of T-Mobile, once I got to the proper person (believe it or not a technician in the switched data department), and because of the misunderstanding on both sides, a reasonable billing compromise was reached in spite of my stupidity. If you are just going to demo the unit and do not plan on purchasing, or you would like to demo the unit and buy it, but it takes a while for the PO to wind its way through your corporate financial bureaucracy, be aware most providers will give you a thirty day trial. After that, you are on the hook for a the term of the agreement, whether you use it or not and to drop the service early will cost you a "nuisance" fee.

We received the unit, along with the Blue Box unit for the studio end, installed the SIM card (a very simple process, it plugs into a slot on the back of the phone module) and immediately went to each location to check the systems operation. At each location, we had signal strength of at least the minimum 20. (The Matrix display will show you signal strength and at least a twenty is required, although lower numbers will allow a connection, but reliability will be suspect.) With those results, we decided to put the matrix to the test, at a real remote.

TESTING THE PRODUCT

The first remote was on a typical Minnesota winter's day, cold and dreary. The 65-foot bus arrived on schedule and we proceeded to set everything up. We were concerned with the noise of the small Honda generator, but the noise of the idling bus (heat for the talent –

remember it is a Minnesota Winter) masked just about everything except the powered Mackie PA speakers.

The generator ably ran the pair of Mackie's, a tuner, a small headphone amp and the Matrix. By the way, the Matrix can be powered by a 12 volt cigarette lighter, but in these health conscious days, try finding one in charter bus.



All the necessary cables were run out of the bus via a small window to the Mackie's and an extension cord to the generator. Seeking to get the best RF reception for the Matrix, I stood up on a step ladder to place the magnetic mount Matrix antenna on the top of the bus, only to watch it slide right off and dangle along side the bus. Idiot! The bus body was aluminum! The transmit antenna ended up on top of a plastic Mackie about eight feet in the air outside the bus, not much of a ground plane but this is a remote!

CONNECTING TO THE STUDIO

Now the acid test: connecting to the station. From a cold start the matrix takes a couple minutes to come up, find the GSM circuit and make a connection. This is not the fault of the Comrex box, but more the cellular network. Suffice to say, the Matrix connected with the Blue Box and because the system is full duplex, we were talking to the on air person, just like any other remote. (The Blue Box has to have the GSM algorithm to talk to the GSM module equipped matrix. If yours does not, Comrex will update it for you.) We plugged two stick mics into the Matrix, ran the headphone output to a small headphone amp, and the on-site talent was happy – they were on the air.

The audio quality is what many of you familiar with a Vector would expect. The GSM connect rate, which is limited by the provider, is only 9600 baud, so the audio is similar to a Vector at 9600. There were a few artifacts; we noticed female voices seemed less affected than male. One solution for this was the use of a music bed under the remote feed, which helped mask the undesired artifacts to a degree.

Looking back at our experience in testing the Matrix, we would definitely use the GSM Matrix for cut-ins and limited remotes on FM, and would have no problem on our AM. We hope the 14.4 data rate will be supported soon, which hopefully will extend the frequency response. At any rate, if cellular service is available where phone lines are not, I would highly recommend the Comrex Matrix.

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