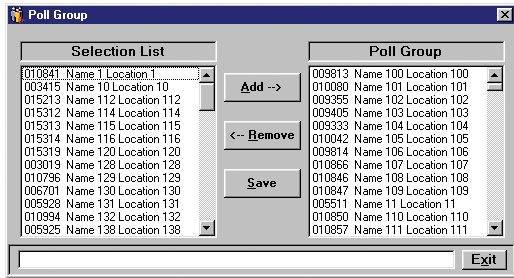## Poll Group Select

Under the Polling menu, select "Poll Group Select..."

This dialog box enables Adding/Removing of radios to/from the automatic poll group. Units in the **Selection list** box are available for adding to the poll group. These units will not be polled during a group poll cycle.

Units in the **Poll Group** list box will be polled during a group poll cycle.

Clicking the **Save** button will save any changes in the poll group to the database.

Group Polling

This is the standard mode of operation. The diagnostic controller will continuously cycle through the poll group, unit by unit at the poll repetition time (2 to 3600 secs).

Bar Graph

Display Bar Graph can be selected and will display all polls on the "Bar Graph". If a unit alarms, the measurement in question will have a red background in the Text box.
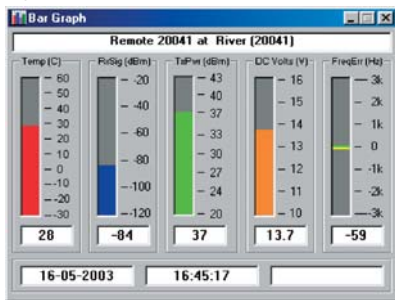
Individual Poll

Allows intensive polling of a single unit, independently of any group polling that may be active. The individual poll window provides a bar graph display for rapid visual recognition of the radio modems parameter levels.
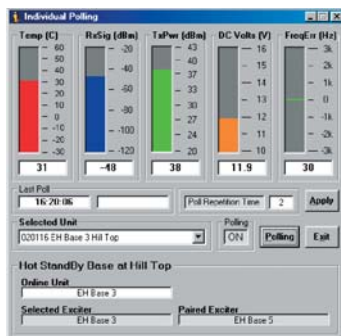
The line above Status Polls is a "Processing Status Bar". It will display messages about errors, warnings and poll processing.

Polling Button

The selected unit will be removed from the poll group, then polled at the selectable rate (Poll Repetition time) by clicking the Polling button.

Poll Repetition Time (2 to 3600 Sec)

Is the rate at which individual status polling will occur. Click on the "Apply" button to apply any change made to the poll repetition time.

Switch Exciter (HSC Only)

Only visible if the selected unit is a "Hot Standby Base station" then a switch base facility is provided for remote switching of the exciter units. With polling on, click on the "Switch Exciter" button. The changeover may take a number of seconds. The active unit will be displayed in the "Active unit" field.

Note: The hot standby base station has a minimum "toggle" time of 1 minute. This is to avoid rapid switching between exciter units, should a fault be detected in both modems.

Data Logging

Status poll and Alarm data can be logged to a database file for viewing at a later date. A relational database is created and managed using Microsoft Jet database engine Ver3.5. The database file, which is an ".mdb" file, can be accessed with external programs such as Microsoft Access. You have the option of enabling logging of Status polls only, Alarms only or both.

Log Status Polls

To log Status polls either select "Log Status polls" under the Data Logging menu item or click the corresponding toolbar button.

Log Alarms

To log Alarms either select "Log Alarms" under the Data Logging menu item or click the corresponding toolbar button.

Note: If "Auto Logging ON" is enabled in the settings dialog box, then Status Poll logging and Alarm logging will automatically be turned on when Group or Individual polling is turned on.

View History

Status poll history may be viewed using the Status Poll & Alarm History window. This window has three tables: Status Poll History, Alarm History and Base Station Activity. Each table has a "Number of Records" box to indicate how big the selection is.

You may select "ALL" to see every units poll results, or view an individual units poll results.
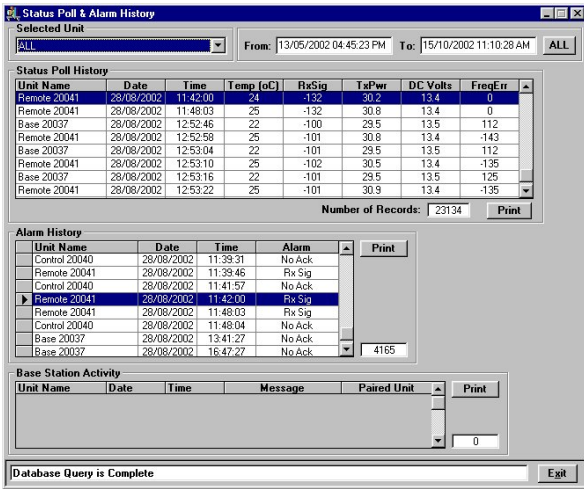
The line above Status Polls is a "Processing Status Bar". It will display messages about errors, warnings and poll processing.

From To or ALL Fields

These fields determine the time span you wish to view. For example, if you have collected several months of data, and only wish to view a 24 hour period, then adjust the From: and To: fields accordingly and select the unit.

When the History window first appears, the From: and To: fields will contain the last 24 hours of data.

If "ALL" is selected it will display the start and end dates of the database. The Date/Time format will be as per the regional settings short date format.

Note: The smaller the time span you select, the faster the database search will be. This will also depend on the poll rate that was used during that time span.

Sorting

Each of these tables can be sorted in ascending order by: unit, date or poll parameter. To sort, just click on the required column header.

To show the full status of a single report in the "Alarm History" click on the box at the left by the unit name. Note this only works on valid poll results not "NoAck".

Printing

A printout of each table is possible by clicking on the associated Print button. The table data will be sent to the default printer and formatted as per your default printer configuration set up.

View Trend

The logged status poll data can be viewed in graph format, which allows viewing of status trends over selectable time spans. This provides a very effective – and fast method of analysing a units' operating parameters over time.

Select "View Trend" under the Data Logging menu item or click the associated toolbar button.
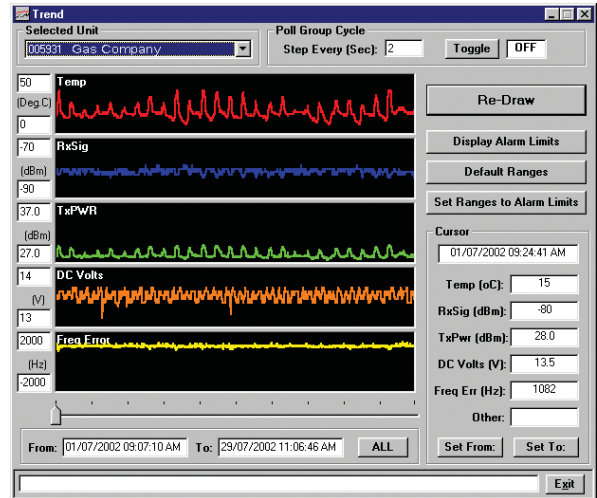
Features available include:

•	Scaling of graph(s).

•	View individual poll results using the cursor.

•	Automatically scroll through the group poll database, unit by unit at a selectable time interval.

•	No Acknowledge messages are displayed by a gap in the graphed data and a "NoAck" in other on the Time Line.

The line above Status Polls is a "Processing Status Bar". It will display messages about errors, warnings and poll processing.

Vertical Scale Setting

•	Manually set the vertical scales by simple typing in the new level(s), then either press "Enter" or click on the "Re Draw" button, or select a new unit.

•	Click the "Default Ranges" button to set all the vertical scales back to the default levels.

•	Click the "Set Ranges to Alarm Limits" button to set the vertical scale limits to the selected unit alarm limits.

From: & To: Fields

These fields determine the time span you wish to view. For example, if you have collected several months of data, and only wish to view a 24 hour period, then adjust the From: and To: fields accordingly.

When the Trending window first appears, the From: and To: fields will contain the last 24 hours of data.

If "ALL" is selected it will display the start and end dates of the database.

Note: The smaller the time span you select, the faster the database search and draw. This will also depend on the poll rate that was used during that time span.

Use the **ALL** button to set the From: and To: fields to the maximum and minimum dates found in the data in the database.

Poll Group Cycle

When toggled ON, this will step through each radio in the poll group and display the trend graph. Set the step interval in the "Step Every (Sec)" field. Default = 2 seconds

Cursor: Use the slider control, found at the bottom of the display to move the cursor. The cursor box displays the parameter data of the status poll at the current cursor position.
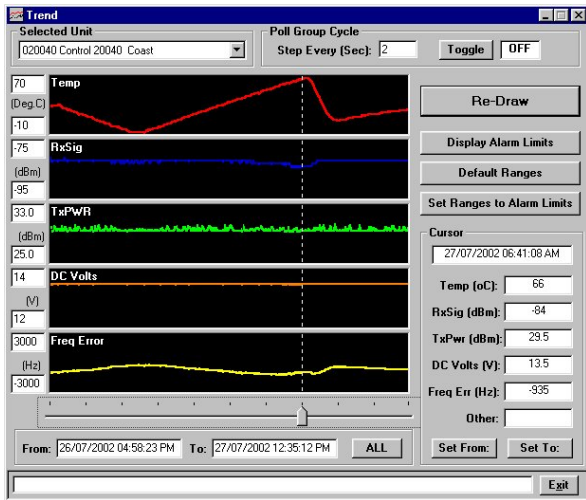
Use the "Set From" button to set the From: field to the current cursor position.

Use the "Set To" button to set the To: field to the current cursor position.

Tools - Statistical Performance

The diagnostic core of radios with Firmware V2.4.X and above have 6 counters which store packet statistics for later retrieval. They are:-

• Lost Synch

• Lost RxSig

• Good Frames

• Bad Frames

• Time Ticker

• RSSI Ticker

The Diagnostic controller software uses these statistics to calculate packet and bit error rates, network efficiency, bandwidth utilisation and radio link integrity. These network analysis features are an invaluable tool for larger networks.

Statistical Performance Formulae

Timers:

Time Ticker (10mS): (RRT) = timer that increments by one every 10mSec

Elapsed Time: = Total elapsed time in hh:mm:ss from reset calculated from RRT

RSSI Ticker (10mS): = timer that increments by one every 10mSec when RxSig present. (Virtual connection to RxSig LED)

Transmit Channel:

Tx Frames: = Number of Tx HDLC frames.

Tx Byte: = Number of Tx Bytes

Average Frame Size: = TxByteCnt / TxFrameCnt

Average Frame Rate (mSec): = TxFrameCnt / RTT * 0.01

Channel Utilisation (%): = (TxByteCnt * 8) / (RTT * RFChannelBitRate) where RFChannelBitRate is 9600 or 4800 Bits per sec.

Receive Channel:

Good Frames: = Good Frames Rx'd

Bad Frames: = Bad Frames Rx'd. Rx HDLC frame error.

Good Bytes: = Good Bytes Rx'd

Average Frame Size: = GoodByteCnt / GoodFrameCnt

Average Frame Rate (mSec): = (GoodFrameCnt + BadFrameCnt) / RTT * 0.01

Channel Occupancy (%): = RSSIgoodTicker / RTT * 100 (Average from reset)

Channel Occ Sliding: = RSSIgoodTicker / RTT * 100
                             (Average from last update)

Channel Utilisation (%):   = (GoodByteCnt * 8) / (RTT *
                             RFChannelBitRate)

Miscellaneous:

Lost Synch: = Increments on lost synch, must be
                             validated with RxSig. (Virtual
                             connection to Synch LED)

Lost RSSI: = Increments on lost RxSig (Virtual
                             connection to RxSig LED)

Radio modems with Firmware Revisions 2.4.x and above have the advanced statistical counters as noted above. Firmware revisions below this (i.e. 2.3.x) only have Good Frame count, Bad Frame count, Lost RSSI count and Lost Synch Count available. The diagnostic controller will detect which firmware the radio has, and only report the available counters.

Statistical Performance Counters Window
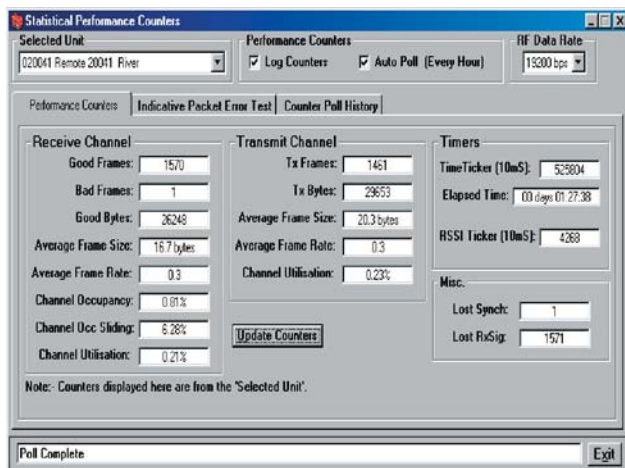
Selected Unit

When a unit is selected, the controller will confirm that the firmware revision has been received. If not, it will attempt to poll the radio automatically to retrieve the revision number.

RF Data Rate

Select from the pull down menu 4800, 9600 or 19200 bps, depending on your system settings

Status Bar

Reports any poll processing in progress or errors that may have occurred.

Performance Counters Tab

This is the main statistical performance tool used for assessing network performance.

- Make sure "log counters" is checked on

- Click the **Update Counters** button to retrieve the current statistical performance results.

- Click the **Auto Poll OFF/ON** button to automatically update the counters every hour for selected unit.

Click the **Log Counters OFF/ON** button to log the counters every time they are updated. These can be viewed on the "Counter Poll History" Tab.

Notes:

- The controller will attempt a series of polls when either resetting or retrieving the counters. You should monitor the status window to ensure that the poll process completes. If errors occur, they may be due to conditions like packet collisions on a busy network, diagnostic controller trying to perform too many poll functions (i.e. group polling, individual polling), etc.

- E Series data radios have 32 bit counters and will count for 1 year, 4 months & 10 days if not reset occurs.

- If an HSC Base is selected, data will only be collected from that base, whether offline or online. With D Series pairs, data can only be collected from the online unit.

Indicative Packet Error Test Tab with Commissioning Record

This Tab provides a simple link test facility. When this is running, continuous Poll/Response diagnostic messages will be transmitted to and from the unit and Packet Error Rate results recorded. If a response is not received within the Poll Response Timeout period, then an error (last Packet) is recorded. If the system is live, collisions are likely and may effect Error results.

Print Commissioning Record

From the "Indicative Packet Error test" a commissioning sheet can be printed to file (e.g. using Adobe PDF Writer or similar), or printed directly.

After running the test for the desired time (best results with no user data), the test can be stopped with the "Finish" button.

Select "Print Commissioning Record" button and a page appears with the results and also the unit identity, last poll results, system status and date/time stamp for each record.

On this page there is also a facility to type in a "Comment" field. This is useful for recording information such as where the test was conducted and through what part of the system the test was conducted. e.g. via a repeater.

Press "Print" button when ready to send to the default printer.

### Counter Poll History Tab

This is a database viewing facility. When logging is enabled "Log Counters", each time the counters are retrieved they will be written to the database. Adjust the **From:** & **To:** fields to view a specified time span or press ALL to obtain complete database period.
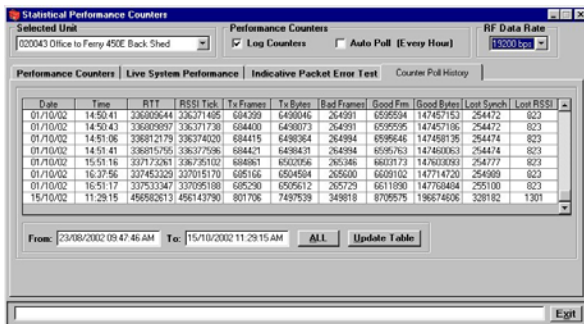
Hot Standby Base/Repeater Controller (HSC) Tab

Shows a list of available HSCs (paired E Series base stations).
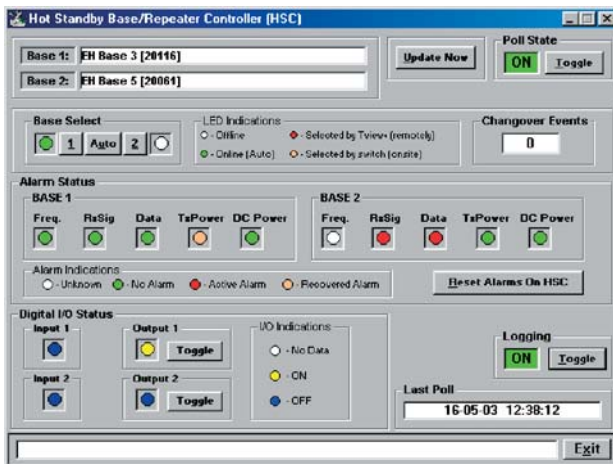
On entering the screen shown in above, an attempt will be made to communicate with both bases, in order to determine the status of the HSC. If the attempt is successful with either of the bases (only one base needs to respond), then the diagnostic controller determines which base is connected to the HSC "Base 1" port and which to the "Base 2" port. When entered in the database, Base 1 and Base 2 will initially appear on this screen in alphanumeric order.

This might not be the true state of the physical connection and the true state will be corrected (if necessary) in the Base 1 and Base 2 display boxes.

Update Now Button

Pressing this button will immediately initiate a status poll sequence and on successful receipt of a status poll the display will update.

Poll State Toggle Button

• Switches automatic status polling ON or OFF. The poll rate is set on the Poll Settings window, which can be viewed by choosing 'Setup..' from the 'Polling menu'.

• The poll rate is dependent on the number of HSC windows that are actively polling.

• The automatic poll rate for any one HSC window is equal to the number of displayed HSC windows with polling ON multiplied by the HSC Group Polling Poll Repetition Time.

Base Select

LED display, indicates the online status of each unit.

LED colour	Switch Select State
Off	Channel not selected (Offline)
Green	Online (Automatic). Automatic changeovers will be actioned by the HSC in response to alarm conditions.
Green Blinking	Change Over Pending. Waiting for one minute time-out period before switching to offline base.
Red	Selected by Tview+ (Remotely). Auto changeovers will not occur.
Amber	Selected by Switch on HSC (On Site). Auto changeovers will not occur.

Providing either of the bases is not forced online by the switch, the user can force either of the bases online remotely by pressing Base Select button 1 or 2. The user can revert back to Automatic mode by clicking on the Base Select Auto button.

If the user attempts to switch bases within one minute of a base changeover event, the change pending indication will appear (i.e. Online Unit LED Blinking Green). The user should then wait until the change over event occurs.

Change Over Events

This is a counter which indicates the number of automatic change over events initiated by the HSC due to alarm conditions.

Alarm Status

The current alarm status (since the last alarm status poll) for the attached Base units is displayed below.

LED colour	Error Status
Off	Unknown. The test hasn't been performed.
Green	No Alarm. Tests passed.
Red	Active Alarm. Test failed
Amber	Recovered Alarm. Test failed previously but has since recovered.

Reset Alarms on HSC

Pressing this button will clear the change over event counter and the alarms displayed by both the HSC and the diagnostics controller.

Digital I/O Status

Displays digital I/O input and output status.

Digital I/O Toggle Buttons

Clicking these buttons will toggle the associated output state.

Toggling the outputs of a HSC is a good way to determine if the HSC has failed. If the toggled output state doesn't change, this will be indicated in the status message bar at the bottom of the HSC window.

Logging Toggle

When logging is ON, all status data including digital I/O is stored in the database. See database structure document.

HSC Status Messages

Status Messages	Comments
No Acknowledge	3 attempts to communicate with the HSC have failed. In most cases, both bases are tried 3 times each.
Re-Booted	The online Base connected to the HSC has been re-booted. This unit is a remote, not a base. The Unit has been entered in the database as a Base, but is factory set as a Remote.

Unknown ErrorCheck Error Log

Unforeseen error events are captured, with any relevant data stored in the 'Error.log' file.

<Base Name> [<Serial>] is Forced Online by switch

When a base is forced online by the switch, remote switching of bases is not possible using Tview+ Diagnostics.

Base1/Base2 already forced online

An attempt was made to force a base online that has already been forced online remotely by Tview+ Diagnostics.

| Already in Auto mode | The Auto button was pressed when the HSC was already in automode. |

Output Toggle Process Failed. HSC may have failed.

When attempting to toggle an output on the HSC, the output state didn't change. **This would indicate that the HSC has failed.**

Changeover Pending. Wait up to one minute.

A change over attempt has been made by either the HSC or a remote Tview+ Diagnostic controller within one minute of a previous change over event. A change over to the offline unit will not occur until the one minute time period has expired.

Base 1 and Base 2 connection state corrected. (Note names display). Up until the first time an HSC is communicated with, the Diagnostic controller doesn't know which of the paired bases in connected to HSC ports One and Two. So the paired Bases are displayed in alphanumeric order. The display is corrected on reception of the first message from either Base.

Base/Repeater Digital I/O

The base/repeater digital I/O window operates in a similar manner to the HSC window.
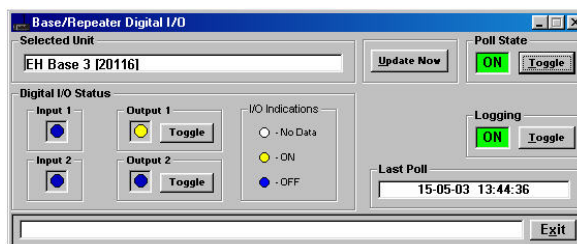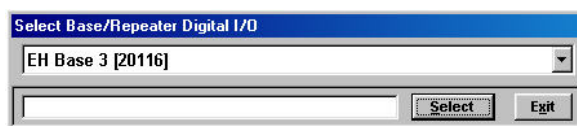
Networking

Monitoring the radio network from other workstations on a LAN network is made easy with the networking facilities provided by the Diagnostics Controller. The radio network controller can be configured as either a Server or Client. The Server will send poll information to each attached client, depending on their access rights.
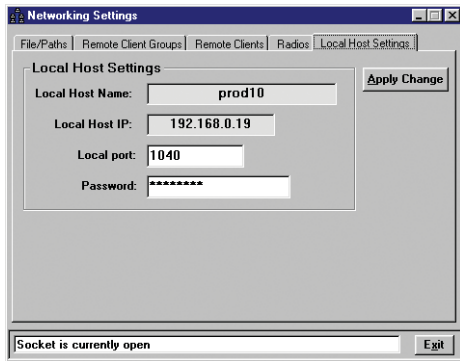
Client groups can be set up. Each Client can be assigned to one client group. Each radio modem can be assigned to one or more Client groups.

A default Client group called "ALL" is automatically set up containing all radio units in the database.

Client Groups Example:

All	Pumps	Test
Test Unit 1	Pump 1	Test Unit 1
Test Unit 2	Pump 2	Test Unit 2
Test Unit 3	Pump 3	Test Unit 3
Pump 1		
Pump 2		
Pump 3		

In the above example, there are three client groups, ALL (the default), Pumps, and Test. A Radio modem can be a member of more than one group.

Client Examples:

Central	This is the Diagnostic Server which is attached to the radio network.
Test Client	This is a Diags controller in client mode.
Pump Monitor	This is a Diags controller in client mode.

In this example, the Central workstation, running Diagnostics in Server mode, is polling all the radios in the network and distributing the received messages to the attached clients.

The Test Client and Pump Monitor are receiving Status poll and alarm information from the Central server. The Test Client will only receive poll information for radios found in the "Test Client Group" i.e. Test Units 1, 2 and 3. The Pump Monitor will only receive poll information for radios found in the "Pumps Client Group" i.e. Pumps 1, 2 and 3.

Networking - Setting

The Server should be configured properly first before any connection attempts are made by clients. It will always be safer to stop any polling that may be in progress when making changes to the Server client set up.

Local Host Settings Tab

It is assumed that the workstation is running Windows, and has been configured with the TCP/IP network protocol.

- Open or create a radio database.

- Under the Networking menu bar select "Settings" from the menu bar.

- In the Networking window click the "Local Host Settings" button.

- The Local Host settings will appear, which contains the Server Host Name, IP address, Local Port and Password.

- The Local Port is the socket number. Select an unused socket number. Usually a number between 1000 and 2000 would be safe.

- Enter a password. This is required when in client mode, to access incoming data from the server.

- Apply Change.

Creating Client Database- File/Paths Tab

When in Server mode the Diagnostic controller uses an additional database file (.mdb) to store Client information. This file is linked to the main radio Database file. The link is managed by the Microsoft Jet database engine. This separate linked file configuration permits archiving of the main radio database (.mdb) without losing client configuration data.
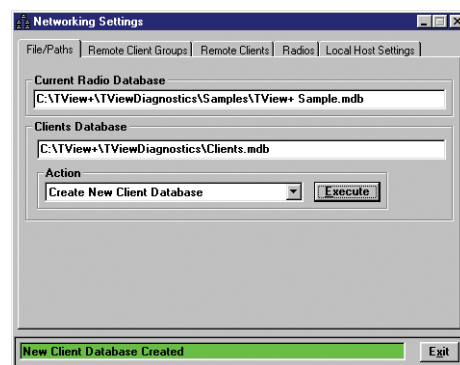
- In the Networking window click the "File/Paths" button.

- The "Current Radio Database" is displayed if open.

- Select "Create New Client Database" from the Action drop down list.

- Click "Execute" to create and link the client database.
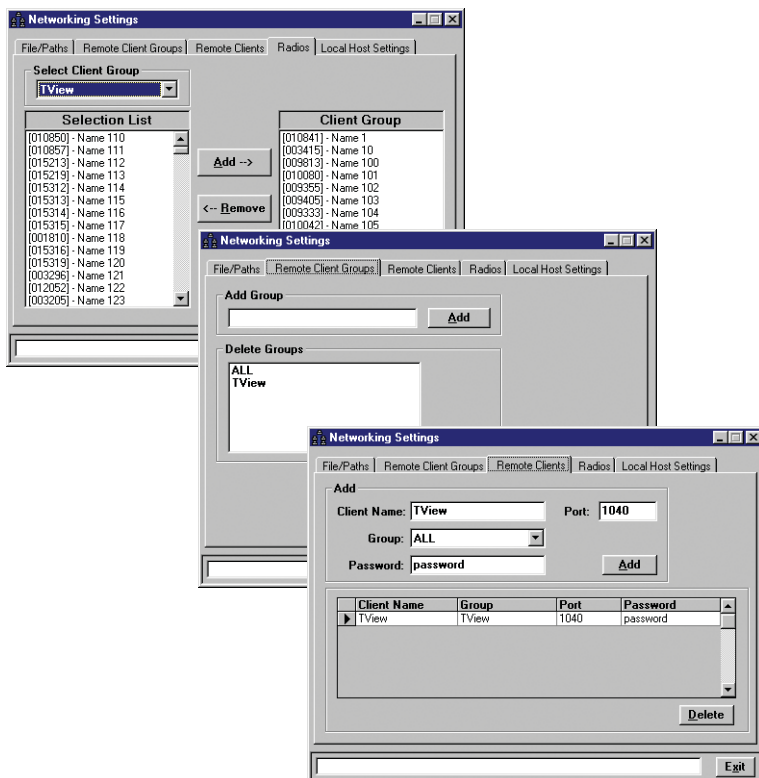
Adding Client Group(s)

• Click the Remote Client Groups tab.

• Enter the group name in the field provided.

• Click on the Add button to add the group name to the database.

Deleting a Client Group

• Click on the "Remote Client Groups" tab.

• Select the group you wish to delete.

• Click on the "Delete" button to delete the group name from the database.

Adding a Client

• Click on the Remote Clients tab.

• Enter Client Name. This can be either the remote clients Host name or IP address. Entering the client Host name requires extra processing to resolve the name into an IP address. Entering the IP address directly in the Client name field is more efficient, although more cryptic.

• Select a client group.

• Enter the clients password.

• Enter the client Port. This is the socket number used at the remote client.

• Click the Add button to add the client to the database.

Deleting a Client

• On the Remote Client Tab, select a client to delete by clicking on the record selector (left most column).

• Click the delete button to delete the client from the database.

Adding Radio(s) to a Client group

• On the Radios tab select a Client Group.

• Using the "Add and/or Remove" buttons to add or remove radios from the Client Group.

• Under Networking on the menu bar, Select the "Server Mode" button. This will place the diagnostic controller into Server mode.

• The Diagnostic Controller Server is now ready distribute messages to client workstations.

Setting Up a Client

In Client mode, the diagnostics controller basically just mirrors the display of the server. Poll information can not be stored locally, polling functions are not available via the remote server, and most of the tools normally provided are disabled.

It is assumed that the workstation is running Win95/98/NT, has been configured with the TCP/IP network protocol and has been added to the Diagnostic Server's Client Groups.

• Under Networking on the menu bar, select "Settings".

• The Network settings window will appear, which contains the Client Host Name and IP address, which are view only.

• Enter the **Client password** as stored at the Diagnostic Controller Server.

• Enter the **Local Port Address** (socket number) as stored in the Diagnostic Controller Server database.

• Click the "Apply Change" button.

• Under Networking on the menu bar, Select the "Client Mode" button. This will place the diagnostic controller into client mode.

A local Diagnostic session can be operated while in client mode, both status messages will appear on screen.

Diags Client

A Client only version of this software is also available. This must be used in conjunction with standard software running in "Server Mode".

Local Com ports are disabled permanently in this version.

Interpreting Poll Results

General

The results returned by the poll requests give an indication of system performance. When a new modem is added to the database, default values are assigned for the limits of the returned results. The user can assign different values to these limits as required, which is determined by the fault tolerance level of their systems.

RSSI

The default RSSI limits are set at -30 to -105 dBm (-110 dBm for Base/Repeater Station). Above -30 dBm the front end of the receiver will saturate and it is unlikely that signal levels much higher than this will ever be reported. Below -105/-110 dBm the error rate may become too high for some applications. In the modem the RSSI measurement is made periodically each 100mS, while R F carrier is being detected.

Transmitter power

The transmitter power limits are set at between 0mW and 20,000mW. The modems will normally be operating at a power level of 1 watt. The above limits are set to ±3dB of the nominal (3dB represents a factor of 2 for power measurements).

The effect of a change in transmittal power can be transposed to the receiver BER curves (3dB down at the transmitter is 3dB down at the receiver). The amount of variation tolerated will be determined by the RF path loss of the data link being used.

If the modem is set to low power, then the transmittal power will be nominally 200mW. Suggested limits for this would be 100mW and 400mW (±3dB).

For base station units or remote units set to high power, the nominal transmitter power is 5 watts. Suggested limits on these would be 2.5 watts to 10 watts (±3dB).

In the modem the reported transmit power measurement is given from a measurement made of the last transmission made by the modems. When the PTT is ON a periodic measurement is made of the transmit power. The modem stores this away and reports it when requested.

Temperature

The modem is specified to operate within the temperature range of -30°C to 65°C. The defaults limits are set to -30°C and 60°C. At 65°C the modem goes into a high temperature foldback mode, when the power is reduced to the low power mode. This is to reduce the risk of damage to the final stage of the transmitter at excessive temperatures.

The modem will operate outside this temperature range but it is not recommended.

Supply Voltage

The modem is specified to operate over a DC supply range of 11V to 16V. The default levels are set to 11.5V to 15.5V. The modem will not operate correctly outside these bounds and damage may occur with high voltage levels being applied.

Frequency

The frequency limits are set to ±3000Hz. This is basically the difference between the different ends of a data link. If the difference gets much greater than this, data errors may occur (the modem will have a degree of long term frequency drift of 1ppm / annum due to the physical properties of internal components).

Parameter	Resolution	Absolute accuracy @ RT	Drift over Temp. range	Notes
Temperature	0.1 degC	+/- 4 degC	+/- 1 degC	
Supply Voltage	0.1 volts	+/- 0.5V	+/- 0.08V	+/- 0.45%
Rx Signal Strength	0.1 dBm	+/- 3 dB	+/- 2 dB	
Frequency Error	1Hz	+/- 200Hz	+/- 2500Hz	
Tx Power (Remote)	0.1 dBm	+/- 1.5 dB	+/- 0.3 dB	Note 1
Tx Reverse Power(Remote)	0.1 dBm	+/- 3 dB	+/- 1 dB	
Tx Power (Base)	0.1 dBm	+/- 0.8 dB	+/- 1 dB	Note 2
Tx Reverse Power (Base)	0.1 dBm			

Notes:

1. Remote Tx power measurements will vary due to power setting variation which can have an initial error of +/- 0.5 dB and final error of +/- 0.2 dB

2. Base Tx power measurements will vary due to power setting variation by the exciter which can have an initial/final error of +/- 0.2 dB and overshoot by the PA <1 dB.

Open Database Connectivity (ODBC)

Open Database Connectivity is a programming interface that enables programs to access data in database management systems that use Structured Query Language (SQL) as a data access standard. The Tview+ database system adheres to this standard.

Tview+ uses the Microsoft Jet Database Engine, which is a Database management system that retrieves data from and stores data in user and system databases. The Microsoft Jet database engine can be thought of as a data manager component with which other data access systems, such as Microsoft Access, Visual Basic and Tview+, are built.

The .mdb file created by Tview+ for logging data is a Microsoft Access file, which can be directly accessed using Microsoft Access , Excel and most other Microsoft products.

Accessing Tview's logged data from another application or platform via ODBC is easy provided the application has an ODBC interface component.

## Configuring ODBC in Microsoft Windows

Using Data Sources (ODBC)

You can use Data Sources ODBC to access data from Tview+'s database management system. To do this you must add software components called drivers to your system. Data Sources ODBC helps you add and configure these drivers. Tview+ requires the Microsoft Access Driver (.mdb).

In the **Windows 98** and **NT** operating systems, Data Sources can be accessed via the Control Panel. Choose the ODBC Data Source (32bit) icon.

In the **Win2000** and **XP** operating systems Data Sources is accessed via Administrative Tools. Choose the Data Sources (ODBC) icon.
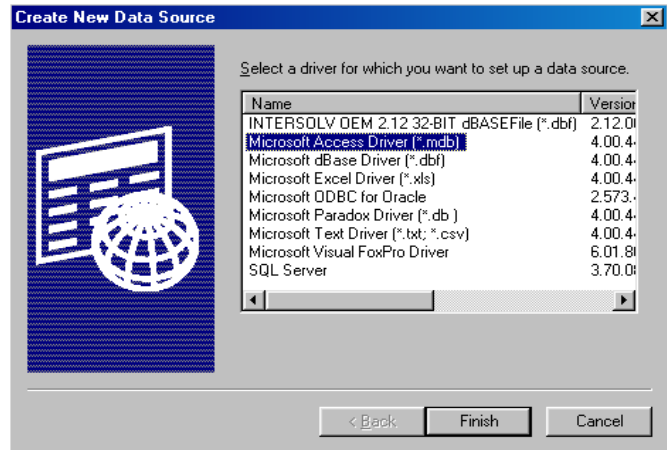
The ODBC Data Source Administrator window will appear:
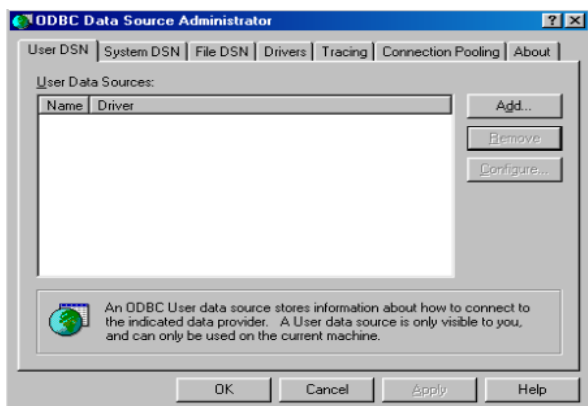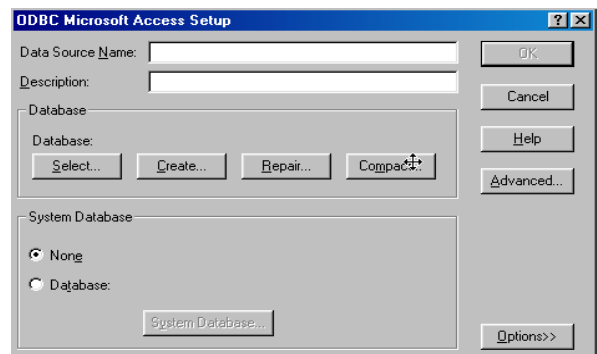

Add Data Source Name (DSN)

Click on the 'Add...' button, to Add a Data Source Name (DSN) and the associated Microsoft Access Driver.

The 'Create New Data Source' driver selection box appears.

Select the Microsoft Access Driver (*.mdb) then click Finish.

The ODBC Microsoft Access Setup window appears:

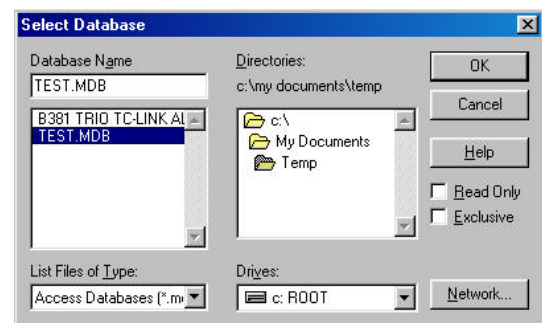
Enter a Data Source Name (DSN):

For example, enter Trio DataCom.

Enter a Description:

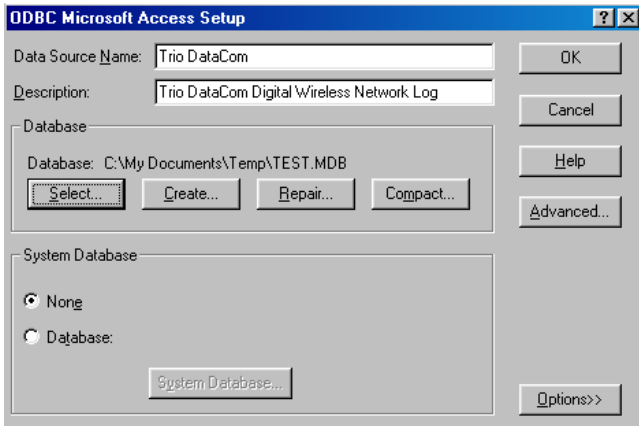For Example, enter Trio DataCom Digital Wireless Network Log.

Click on the 'Select...' button, to select an existing database file:
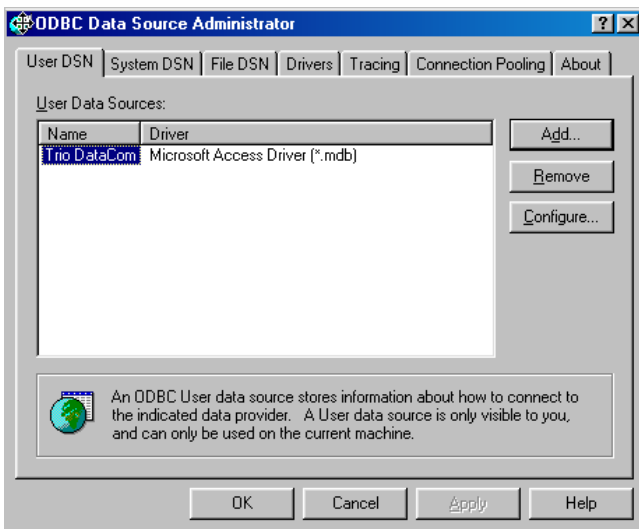
The Select Database window appears:

Select the .mdb log file created by TVIEW+ then press OK.

You are returned back to the ODBC Microsoft Access Setup window:

Click OK to accept the settings.

The ODBC Data Source Administrator window will re-appear as follows:

The ODBC driver setup for Tview+ is now complete.

The next step is then to configure you application to connect to the Tview+ database via this DSN. As this process may vary from application to application you should follow the instructions provided for your application.

To construct SQL statements to access Tview+ data, you need the Tview+ database structure.
The database structure is provided in Appendix D.

Note: If you are using Microsoft applications such as Access and Excel you can access the data directly without the need to use ODBC.

Microsoft Excel Database Query Example

This query will list status data (i.e. Temperature, Volts, Rx Signal Strength, Rx Frequency Error, Tx Forward Power, and Tx Reverse Power) for a specified serial number occurring between specified date ranges.

Two database queries will be required. The first; to retrieve one record from the RadioTable containing the radio name and location for the specified serial number. The second; to retrieve a range of records from the StatusPoll table for the specified serial number, between and including the specified dates.

1. Open a new workbook in Excel.

2. In cell A1 enter the following text: "Serial Number"

3. In cell A2 enter a serial number that exists in the database: e.g. 20061

4. In cell A4 enter the text: "Start Date:"

5. In cell A5 enter the text: "End Date:"

6. Highlight cell B4 and B5 and set the number format to: "dd-mm-yy hh:mm:ss"

7. In cell B4 enter a suitable start date, e.g. 23-04-03 14:57:00

8. In cell B5 enter a suitable end date, e.g. 23-04-03 15:00:00

   The date range fields are intended to limit the query result to a manageable number of rows. In this case the query result will contain records between and including the dates 23-04-03 14:57:00 to 23-04-03 15:00:00.

9. From the Data Menu, select 'Import External Data —> New Database Query..'

   The Choose Data Source window will appear:
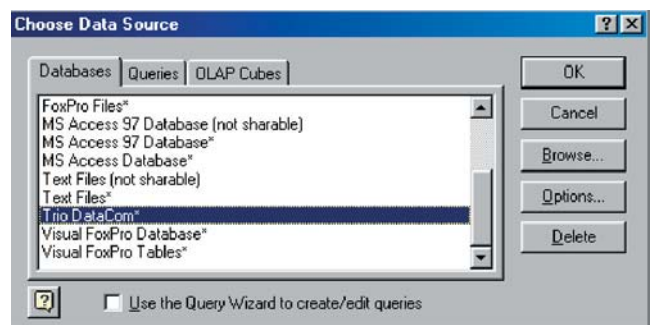
10. Uncheck the 'Use the Query Wizard to create/edit queries' box.

11. Select the DNS 'Trio DataCom', which was created in Data Sources earlier.

12. Click OK. The Microsoft Query Application appears, with the Add Tables selection box on top.
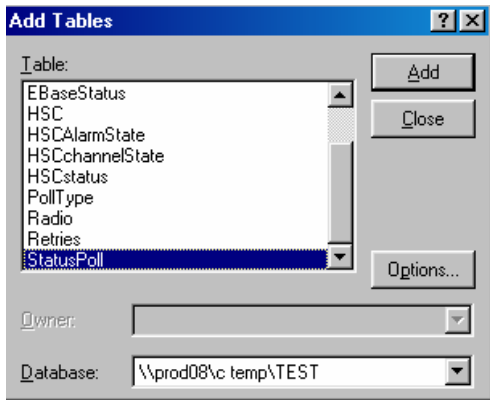

13. Select and Add the 'Radio' table.

The Radio Table will appear on the Microsoft Query screen.

14. Click on the Close button.

15. In the Radio table, find the 'UnitName' field and double click on it to add this field to the query.

16. Similarly, add the 'Location' field to the query.

17. From the view menu select 'Criteria', to view the criteria window.

18. In the criteria field of the first column, enter field name 'Serial' (use the pull down selection list).

19. In the value field, enter the following text: "[Enter serial Number]". When the query is run, a prompt will appear containing this message. You need to enter an existing serial number for the query to work.

20. From the Records menu choose 'Query Now' to run the query. Your screen should appear something like this:
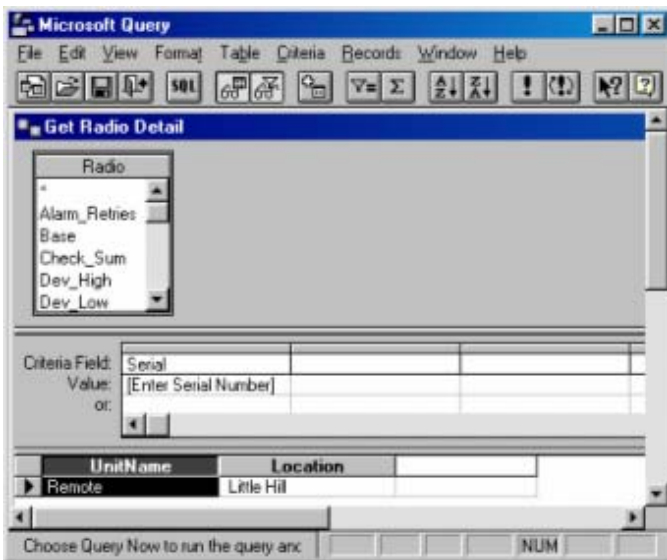
21. Save the query as 'Get Radio Detail.dqy'

22. From the File menu select 'Return Data to Microsoft Excel'

23. Back at the spreadsheet, an 'Import Data' window appears prompting for a cell location. Put the cursor in cell B1.

24. Click on the 'Parameters' button.
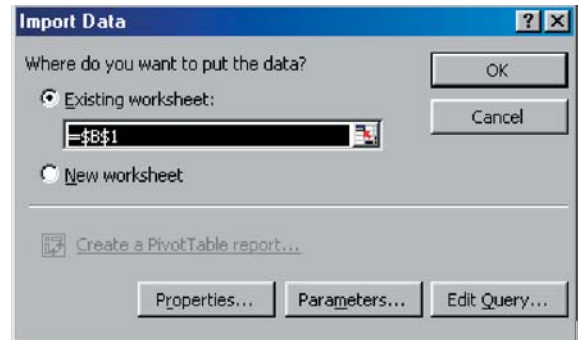
25. Click on the 'Get the value from the following cell button.

26. Place the cursor on the serial number in cell A2.

27. Make sure the 'Refresh automatically when cell value changes' check box is ticked, then press OK.

28. Press OK on the 'Import Data' window. The Spreadsheet should appear something like the following:
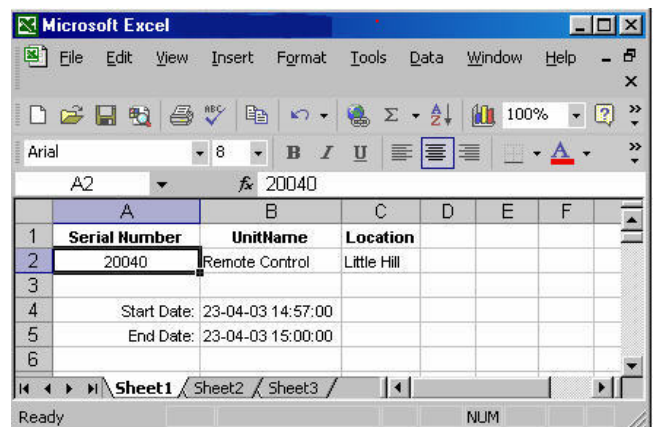
You can do another query with a different serial number simply by changing the number in cell A2. The Unit Name and Location data will automatically update.

Query StatusPoll data

The next Query will list the status data for the unit serial number in A2, occurring between and including the dates specified in cells B4 and B5.

1. To query the StatusPoll table, return to step 9 and follow each step until you have completed step 12, then return here. The Microsoft Query Application appears, with the Add Tables selection box on top.
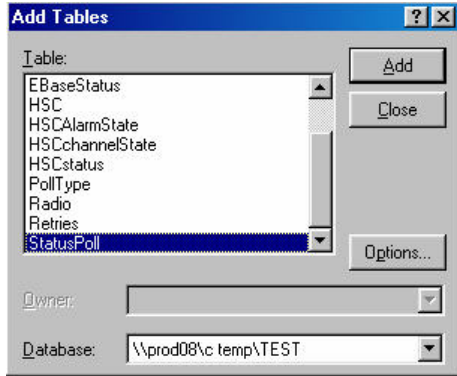
2. Select and Add the 'StatusPoll' table. The StatusPoll Table will appear on the Microsoft Query screen.

3. Click on the Close button.

4. In the StatusPoll table, find the 'Epoch' field and double click on it to add this field to the query.

5. Similarly, add the Volts, Temp, RSSI, FreqErr, TxPWR and TxPWRrev fields to the query.

6. From the view menu select 'Criteria', to view the criteria window.

7. In the criteria field of the first column, enter field name 'Serial' (use the pull down selection list).

8. In the value field, enter the following text: "[Enter Serial Number]".

9. In the criteria field of the second column, enter field name 'Epoch'

10. In the value field under Epoch, enter the following text: ">=[Enter First Date] AND <=[Enter Last Date]"

11. From the Records menu choose 'Query Now' to run the query. You will be prompted for an existing serial number, start date, and end date.

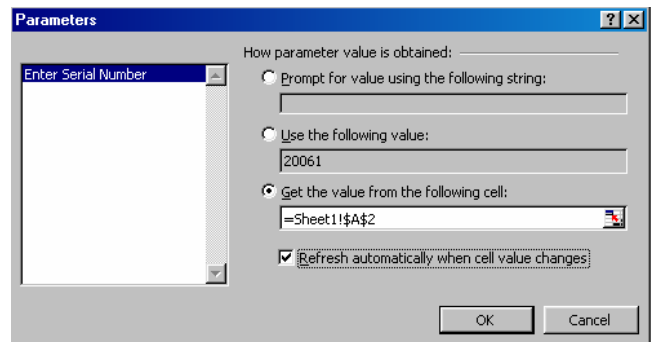   Your screen should appear something like this:

12. Save the query as 'Get Status Data.dqy'

13. From the File menu select 'Return Data to Microsoft Excel'

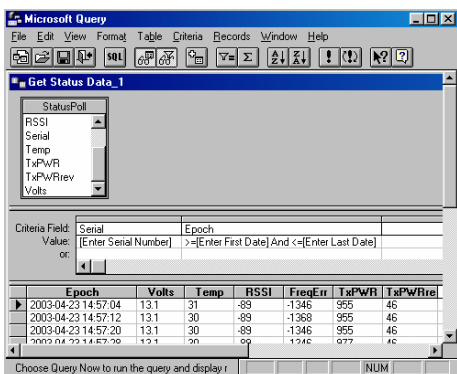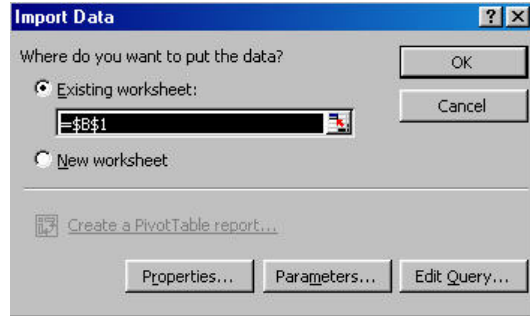14. Back at the spreadsheet, an 'Import Data' window appears, prompting for a cell location. Put the cursor in cell D1.

15. Click on the 'Parameters' button.

16. Select 'Enter Serial Number' from selection list box.

    a. Click on the 'Get the value from the following cell.

    b. Place the cursor on the serial number in cell A2 and select.
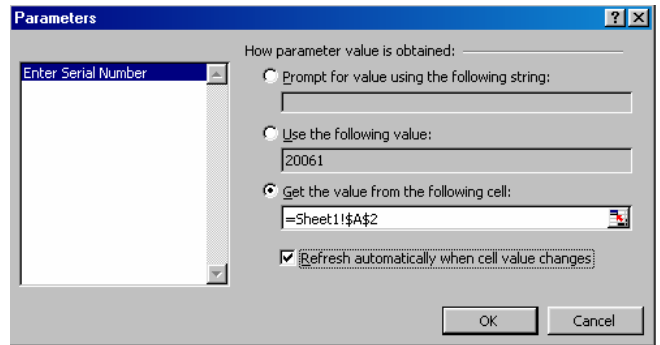
17. Select 'Enter First Date' from selection list box.

    a. Click on the 'Get the value from the following cell.

    b. Place the cursor on the date in cell B4 and select.

18. Select 'Enter Last Date' from selection list box.

    a. Click on the 'Get the value from the following cell.

    b. Place the cursor on the date in cell B5 and select.

19. Make sure the 'Refresh automatically when cell value changes check box is ticked for each field, then press OK.

20. Place the cursor in cell D1, then press OK.

The Spreadsheet should appear something like the following:

Changing the Serial Number in cell A2 will automatically update all the displayed data. Similarly, changing either the Start or End Dates will automatically update the Status Poll Data.

In the figure below, you will note that the columns have been averaged using the spreadsheet AVERAGE function, and an additional query has been included.

The new query selects the last received poll for the specified serial number and displays the associated data.

The Max query function is used on the Epoch field to get the last poll date. This query has been configured to refresh every minute.

An additional element has been added to the spreadsheet, which calculates the VSWR from the last poll data.

To fine tune, or to generate more complex queries you can display and edit the SQL statements corresponding to the queries previously created in Microsoft Query by selecting 'SQL…' from the view menu.

This figures shows the SQL select statement corresponding to the query described in steps 29 to 40.

Part K – Appendices

Appendix A - Application and Technical Notes

TN-4	Remote Diagnostics
AN-D3	SID Code Addressing Scheme for Small to Medium Sized Data Radio Systems
AN-D4	Trunked Multi-Stream Applications of the D Series Product Range

Appendix B - Slip Protocol

The SLIP protocol, is a data transport protocol, originated and used extensively in UNIX™ based systems, and thus also closely associated with TCP/IP networked systems. Although not truly a "standard" it is so widely used that it has become the defacto standard for serial interface in UNIX™ and many other networked systems. SLIP is a method of framing messages containing binary data, on asynchronous channels. The asynchronous serial channel is configured for eight bit character size, no parity, and one stop.

A specific binary code called FEND (Frame End, hexadecimal value=C0) is reserved to define a frame boundary. Should this same code occur in the data message to be transferred across the channel controlled under SLIP, then an escape sequence is used so that the message byte will not be confused for a FEND. This escape sequence, involves replacing the message hexadecimal C0 code with a two byte sequence FESC, TFEND. FESC (Frame Escape) is the binary code hexadecimal DB, and TFEND (Transposed FEND) is binary code hexadecimal DC. Likewise, if the FESC character ever appears in the user data, it is replaced with the two character sequence FESC, TFESC (Transposed FESC). The TFESC is the binary code hexadecimal DD. The following table clarifies this.

Abbreviation	Description	Hex.Value
FEND	Frame end	C0
FESC	Frame escape	DB
TFEND	Transposed frame end	DC
TFESC	Transposed frame escape	DD

As characters arrive at the SLIP receiver, they are appended to a buffer containing the current frame. Receiving a FEND marks the end of the frame, and consequently, succeeding bytes are considered part of the next frame.

Receipt of a FESC code puts the SLIP receiver into "escaped mode", causing it to translate a following TFESC or TFEND back to a FESC or FEND code, appending it to the buffer, and resuming it's normal state. Receipt of any byte other than TFESC or TFEND while in escaped mode, is an error. No translation occurs, and the SLIP receiver leaves escaped mode. A TFESC or TFEND received while not in escaped mode is treated as an ordinary character and stored accordingly. Reception of consecutive FEND characters, causes no action to be taken (i.e. is not interpreted as zero length frames).

An example of a typical SLIP frame is shown below. The message consists of the string DA,C4,C0,C5,DB,20,BD,DC,DD. The SLIP frame will be:-

DA,C4,<FESC>,<TFEND>,C5,<FESC>,<TFESC>,20,BD,DC,DD,<FEND>

   ==>   DA,C4,DB,DC,C5,DB,DD,20,BD,DC,DD,C0

Appendix C - Firmware Updates

Radio or Base Station Exciter Firmware Update

Firmware update is performed on a unit connected locally to the PC. It is recommended that all cabling to the unit be disconnected prior to commencing firmware update to minimise any interruption to the process or disturbances of signals on cables still connected. All other TVIEW+ Management Suite utilities should also be exited during the firmware update process. The steps to update the firmware as follows:

1. Start the firmware update utility from the TView+ front panel.

2. Disconnect power from the unit by turning off the power supply or removing the power connector to the unit.

3. Connect the serial cable from the PC to Port B on the unit

4. Select the unit type from the options on the top right of the firmware update main window. Please note that "Exciter" refers to the radio contained inside the base station.

   Note: Firmware update to base station exciter will result in fatal error display and fan on whilst in this mode.

5. Select the file containing the firmware update package using the "Select" button at the bottom of the main window. After opening the file the browse window will close and a description of the firmware package will appear in the main window.

6. Initiate the firmware updating process using the "Write" button at the bottom of the main window. Another logging window will appear.
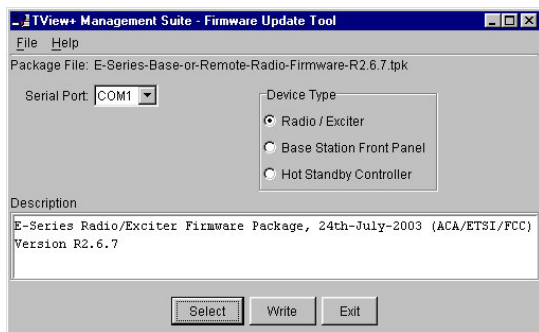
7. Reconnect power to the unit when prompted in the logging window. The status LEDs on the unit including power should all be extinguished and the transfer of firmware should commence. If this does not occur steps 6 & 7 should be repeated.

   Note: Remote radio status LED's including power will all be off.

8. The logging window will display the progress of each firmware block transferred and when complete a success dialogue box appears. Type OK to close this dialogue box and type "Exit" in the main window to exit the firmware update utility.

9. Disconnect the cable from Port B and re power the unit to enable the new firmware.

Base Station Display Firmware Update

Installation Instructions:

1. Update of the front panel firmware uses the firmware update utility supplied with the TVIEW+ Management Suite.

2. Start the firmware update utility from the TVIEW+ front panel.

3. In the firmware update utility select device type as "Base Station Front Panel"

4. Select the file containing the firmware update package using the "select" button at the bottom of the main window. After opening the file the browse window will close and a description of the firmware package will appear in the main window.
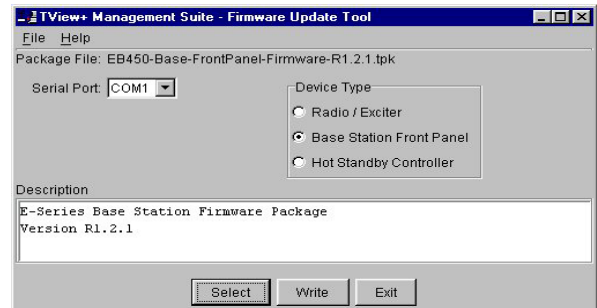
5. Ensure that the base station is powered.

6. Connect the "TVIEW+ cable" to the front or rear system port of the base station.

7. On the base station front panel depress and hold the "Display On/Off" button, then momentarily depress the firmware update switch using a suitable probe before releasing the "Display On/Off" button. The firmware update switch is located behind the small hole (not labelled) in the front panel below the "Display On/Off" button.

   Note: Display Status LEDs will be lit in this Mode.

8. Initiate the firmware update process using the "Write" button at the bottom of the main window. Another logging window will appear.
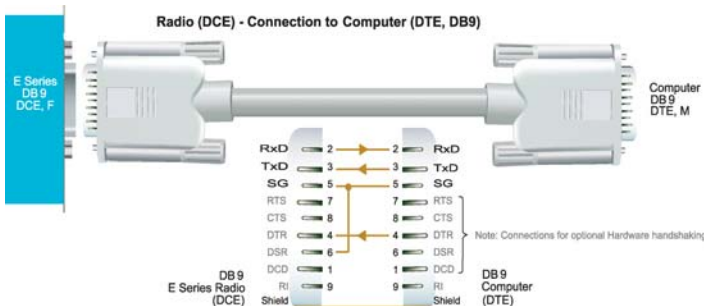
9. The logging window will display the progress of each firmware block transferred and when complete a success dialogue box appears. Click OK to close this dialogue box and click "Exit" in the main window to exit the firmware update utility.

   Note: If a mismatch occurs between selected file and device type, an error message will appear.

10. Repower the base station to enable the new firmware.

Hot Standby Controller Firmware Update

Installation Instructions:

1. Update of the hot standby firmware uses the firmware update utility supplied with the TVIEW+ Management Suite.

2. Start the firmware update utility from the TVIEW+ front panel.

3. In the firmware update utility select device type as "Hot Standby Controller".

4. Select the file containing the firmware update package using the "select" button at the bottom of the main window. After opening the file the browse window will close and a description of the firmware package will appear in the main window.
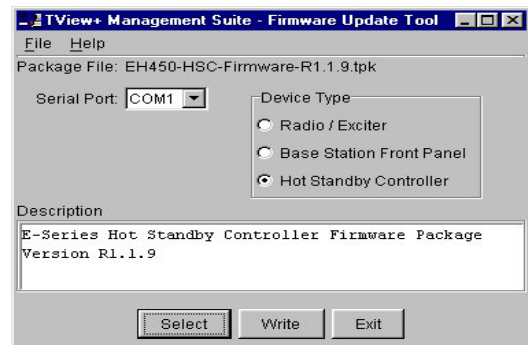
5. Ensure that the hot standby controller is powered.

6. Connect the "TVIEW+ cable" to the front or rear system port of the hot standby controller.

7. On the hot standby controller front panel depress and hold the "Reset Alarms" button, then momentarily depress the firmware update switch using a suitable probe before releasing the "Display On/Off" button. The firmware update switch is located behind the small hole (not labelled) in the front panel to left of "Reset Alarm" button.

   Note: The two LEDs either side of the "Select" switch will be lit green in this mode.

8. Initiate the firmware update process using the "Write" button at the bottom of the main window. Another logging window will appear.

9. The logging window will display the progress of each firmware block transferred and when complete a success dialogue box appears. Click OK to close this dialogue box and click "Exit" in the main window to exit the firmware update utility.

   Note: If a mismatch occurs between selected file and device type, an error message will appear.

10. Repower the hot standby controller to enable the new firmware.

Appendix D - Microsoft Access (.mdb) Structure

Table Definitions

Table 1.0 - Radio

Radio		
Field Name	**Type**	**Comments**
Serial	Long Integer	Unique serial number
UnitName	Text (20)	
Location	Text (20)	
SID_Code	Byte	Stream Identification number
Freq_Sense	Yes/No	D-Series only
Pair_Mode	Yes/No	Yes = Hot Standby
Pair_Unit	Long Integer	Unit serial number to which this unit is paired, if in hot standby configuration
Poll_Resp_Time	Single	Time to wait for response before time-out
Poll_Group	Yes/No	Yes = In Status Poll Group
Alarm_Retries	Yes/No	No longer used
Temp_High	Integer	Degrees Celsius
Temp_Low	Integer	Degrees Celsius
RSSI_High	Integer	dBm
RSSI_Low	Integer	dBm
TxPWR_High	Integer	Milli Watts
TxPWR_Low	Integer	Milli Watts
Volts_High	Single	Volts
Volts_Low	Single	Volts
Freq_High	Integer	Hz
Freq_Low	Integer	Hz
Dev_High	Integer	Not used
Dev_Low	Integer	Not used
Check_Sum	Yes/No	Yes = Eseries radio Checksums ON. Use this field to determine if unit is E or D series No = Dseries radio checksums OFF
Base	Yes/No	Is this a Base Unit?

Table 2.0 - Status Poll

StatusPoll		
Field Name	**Type**	**Comments**
Epoch	Date/Time	Time and date received
Serial	Long Integer	-
Temp	Integer	Degrees Celsius
RSSI	Integer	dBm
TxPWR	Integer	milli Watts
Volts	Single	Supply Volts
FreqErr	Integer	Hz
TxPWRrev	Integer	milli Watts

Table 3.0 - Alarm

Alarm		
Field Name	**Type**	**Comments**
Epoch	Date/Time	Time received
AlarmCode	Byte	See AlarmCode table contents
Serial	Long integer	-
Value	Single	Value in error

Table 4.0 - AlarmCode

AlarmCode		
Field Name	**Type**	**Comments**
AlarmCode	Byte	See Table 4.1 - AlarmCode
AlarmCodeName	Text (20)	

Table 4.1 - AlarmCode

AlarmCode		
AlarmCode	**AlarmCode Name**	**Comments**
0	Temp	Temperature out of Alarm limits range
1	Rx Sig	Received Signal out of Alarm limits range
2	Tx PWR	Tx Power out of Alarm limits range
3	DC Volts	DC supply volts out of Alarm limits range
4	Freq Err	Rx Frequncy Error out of Alarm limits range
5	No Ack	Failed poll attempt three times
6	Cold Boot	Radio has been cold booted since the last received status poll (D-Series)
7	Switch Base	HSC change over event has occurred
8	Deviation	Not used
9	Diags Not Installed	Diagnostics has not been installed on the unit being polled.
10	Re-Boot	Radio has been re-booted since the last received status poll (E-Series)
11	Ports Halted	Radio is in Halted state. User ports will not function.
12	Not Remote	Radio has been entered in the database as a remote but appears to be a base
13	Not Base	Radio has been entered in the database as a base but appears to be a remote

Table 5.0 - Retries

Retries		
Epoch	Date/Time	Time received
PollType	Byte	Refer Table 5.1 - PollType
Serial	Long integer	-

Table 5.1 - Poll Type

PollType	
PollType	**PollTypeName**
65	Assert Param
66	Warm Boot
67	Calib
70	Set Synth
71	GetParam
72	Halt
76	Learn PCW
77	Port Mode
80	Param Set
81	SR UART Version
82	Param Read
83	Status
84	Watch Dog
85	SR UART
86	GetRev
87	Param Write
100	Power Up

Table 6.0 - Poll Type

PollType		
Poll Type	Byte	Refer Table 5.1 - PollType
PollTypeName	Text (20)	Refer Table 5.1 - PollType

Table 7.0 - Counter

Counter		
Field Name	**Type**	**Comments**
Epoch	Date/Time	Time received
Serial	Long Integer	-
RealTicker	Long Integer	Real time (centi-seconds)
RSSITicker	Long Integer	RSSIGoodTicker (centi-seconds)
TxFrameCnt	Long Integer	Number of Frames Tx'd
TxByteCnt	Long Integer	Number of Bytes Tx'd
BadFrameCnt	Long Integer	Number of Bad Frames Rx'd
GoodFrameCnt	Long Integer	Number of Good Frames Rx'd
GoodByteCnt	Long Integer	Number of Good Bytes Rx'd
LostSynchCnt	Long Integer	Synchronisation Lost count
LostRSSI	Long Integer	RSSI Lost count

Table 8.0 - HSC

HSC		
Field Name	**Type**	**Comments**
Serial	Long Integer	HSCserial number
Base1_Serial	Long Integer	Base1 serial number
Base2_Serial	Long Integer	Base2 serial number

Table 9.0 - HSCAlarmState

HSCAlarmState	
Field Name	**Type**
State	Byte
Description	Text (20)

Table 9.1 - HSCAlarmState

HSCAlarmState		
State	Description	Comments
0	No Data	Test not yet performed
1	Active Alarm	An alarm has occurred and is still current
2	No Alarm	No Alarms have occurred
3	Recovered Alarm	An alarm has occurred but has recovered

Table 11 - HSCstatus

HSCstatus		
Field Name	Type	Comments
Serial	Long Integer	HSC serial number
Epoch	Date/Time	Time received
Channel	Byte	See HSCchannelState table
ChangeCount	Long Integer	Changeover counter
ChangePending	Yes/No	Changeover to occur in upto a minute
UserInput1	Yes/No	Yes = Transistor ON
UserInput2	Yes/No	Yes = Transistor ON
UserOutput1	Yes/No	Yes =Transistor ON
UserOutput2	Yes/No	Yes =Transistor ON
Base1Supply	Byte	See HSCAlarmState table
Base1TxPower	Byte	See HSCAlarmState table
Base1 Data	Byte	See HSCAlarmState table
Base1 RxSig	Byte	See HSCAlarmState table
Base1 Freq	Byte	See HSCAlarmState table
Base2Supply	Byte	See HSCAlarmState table
Base2TxPower	Byte	See HSCAlarmState table
Base2 Data	Byte	See HSCAlarmState table
Base2 RxSig	Byte	See HSCAlarmState table
Base2 Freq	Byte	See HSCAlarmState table

Table 10.0 - HSCchannelState

HSCchannelState	
Field Name	Type
State	Byte
Description	Text (40)

Table 10.1 - HSCchannelState

HSCchannelState	
State	Description
0	Unknown
1	Base1 Online (Auto)
2	Base1 Selected by Tview (Remotely)
3	Base1 Selected by Switch (Onsite)
4	Base1 Online (Auto)
5	Base1 Selected by Tview (Remotely)
6	Base1 Selected by Switch (Onsite)

Table 12.0 - EBaseStatus

EBaseStatus		
Field Name	Type	Comments
Serial	Long Integer	HSC serial number
Epoch	Date/Time	Date/Time received
UserInput1	Yes/No	Yes = Transistor ON
UserInput2	Yes/No	Yes = Transistor ON
UserOutput1	Yes/No	Yes =Transistor ON
UserOutput2	Yes/No	Yes =Transistor ON

Part L – Specifications

ER450 Specifications

Radio

Frequency Range: 330-520 MHz (various sub-frequency bands available)

Frequency Splits: Various Tx/Rx frequency splits - programmable

Channel Selection: Dual synthesizer, 6.25 kHz channel step

Channel Spacing: 12.5 or 25 kHz

Frequency Accuracy: ±1ppm (-30 to 60 C) (-22 to 140 F) ambient,

Aging: <= 1ppm/annum

Operational Modes: Simplex, Half duplex or Full duplex*

Configuration: All configuration via Windows based software

Compliances:
ETSI   EN300113, EN301489, EN60950
FCC   PART 15, PART 90
IC   RS119, ICES-001
ACA   AS4295-1995

Transmitter

Tx Power: 0.1 - 5W (+37 dBm) ±1 dB User configurable with over-temperature and reverse power protection

Modulation: User configurable narrow band digitally filtered binary GMSK or 4 level FSK

Tx Keyup Time: <1mS

Timeout Timer: Programmable 0-255 seconds

Tx Spurious: <= -37 dBm

PTT Control: Auto (Data) / RTS line (Port A or B) / System Port Override

Receiver

Sensitivity: -118 dBm for 12 dB SINAD

Selectivity: Better than 60 dB

Intermodulation: Better than 70 dB

Spurious Response: Better than 70 dB

AFC Tracking: Digital receiver frequency tracking

Mute: Programmable digital mute

Diagnostics (Optional)

Network wide operation from any remote terminal.

Non intrusive protocol - runs simultaneously with the application.

Over-the-air re-configuration of user parameters.

Storage of data error and channel occupancy statistics.

In-built Error Rate testing capabilities.

Connections

User Data Ports: 2 x DB9 female ports wired as DCE (modem)

System Port: RJ45 for diagnostic, configuration and re-programming

Antenna: N female bulkhead. Separate N (Tx) and SMA (Rx) connectors for full duplex.*

Power: 2 pin locking, mating connector supplied

LED Display: Multimode Indicators for Pwr, Tx, Rx, Sync, TxD and RxD data LEDs (for both port A and B)

Modem

Data Serial Port A: RS232, DCE, 600-76,800 bps asynchronous

Data Serial Port B: RS232, DCE, 300-38,400 bps asynchronous

System Port: RS232, 19,200 bps asynchronous

Flow Control: Selectable hardware / software / 3 wire interface

RF Channel Data Rate: 4800/9600/19,200 bps Half / Full duplex*

Data Buffer: 16 kbyte of on-board RAM

Bit Error Rate:
$< 1x10^{-6}$ @ -110 dBm (4800 bps)
$< 1x10^{-6}$ @ -108 dBm (9600 bps)
$< 1x10^{-6}$ @ -106 dBm (19,200 bps)

Collision Avoidance: Trio DataCom's unique supervisory channel C/DSMA collision avoidance system

09-01-2004

Multistream™: Trio DataCom unique simultaneous delivery of multiple data streams (protocols)

Data Turnaround Time: <10mS

Firmware: Field upgradeable Flash memory

General

Power Supply: 13.8 Vdc nominal (10-16 Vdc)

Transmit Current: 750 mA nom. @ 1 W 1600 mA nom. @5 W

Receive Current: <125 mA nom

Sleep Mode
Hardware: External control, < 1 mA
Software: User configurable modes

Dimensions: Rugged Diecast Enclosure
170 x 150 x 42mm
6.7 x 5.9 x 1.65 inches
With Mounting Plate
190 x 150 x 47mm
7.5 x 5.9 x 1.85 inches

Mounting: Fitted Mounting Plate

Weight: 1.27 kg (2.8lbs.)

Options

ERFD450 Full Duplex Operation with separate N (Tx) and SMA (Rx) connectors

DUPLX450BR External Duplexer, Band Reject (for single antenna operation)

EDOVM Digital Order Wire Voice Module

NEMA 4/R Stainless Steel Enclosure (IP65, NEMA 4 rated)

TVIEW+™ Configuration, Network Management and Diagnostic Windows GUI Software

DIAGS/E Network Management and Remote Diagnostics Facilities per Radio Modem

Related Products

EB450 Base Station

EH450 Hot Standby Base Station

95MSR 6 and 9 Port Stream Router Multiplexer

* With ERFD450 full duplex option plus external duplexer for single antenna operation

EB450 Specifications

Radio

Frequency Range: 330-520 MHz (various sub-frequency bands available)

Frequency Splits: Various Tx/Rx frequency splits - programmable

Channel Selection: Dual synthesizer, 6.25 kHz channel step

Channel Spacing: 12.5 or 25 kHz

Frequency Accuracy: ±1ppm (-30 to 60°C) (-22 to 140°F) ambient

Aging: <= 1ppm/annum

Operational Modes: Simplex, Full duplex, heading (Optional Internal or external duplexer available for single antenna operation)

Configuration: All configuration via Windows based software

Compliances:
ESTI   EN300 113, EN301 489, EN60950
FCC   PART 15, PART 90
IC   RS119, ICES-001
ACA   AS4295-1995

Transmitter

Tx Power: 5W (+37 dBm) ±1 dB User configurables with over-temperature and reverse power protection

Modulation: User configrable narrow band digitally filtered GMSK or 4 Level FSK

Tx Keyup Time: < 1 mS

Timeout Timer: Programmable 0-255 seconds

Tx Spurious: <= -37 dBm

PTT Control: Auto (on Data) / RTS line (Port A or B) / System Port Override

Receiver

Sensitivity: -118 dBm for 12 dB SINAD

Selectivity: Better than 60 dB

Intermodulation: Better than 70 dB

Spurious Response: Better than 70 dB

AFC Tracking: Digital receiver frequency tracking

Mute: Programmable digital mute

Diagnostics (Optional)

Network wide operation from any remote terminal.

Non intrusive protocol - runs simultaneously with the application.

Over-the-air re-configuration of user parameters.

Storage of data error and channel occupancy statistics.

In-built Error Rate testing capabilities.

Connections

User Data Ports: 2 x DB9 female ports wired as DCE (modem)

System Port: RJ45 (front and rear) for diagnostics, configuration and programming

Antenna:
2 x N female bulkhead (separate Tx and Rx ports)
1 x N female bulkhead (with optional internal duplexer)

Power: 2 pin locking, mating connector supplied

LED Display: Multimode Indicators for Pwr, Tx, Rx, Sync, TxD and RxD data LEDs (for both port A and B)

Modem

Data Serial Port A: RS232, DCE, 600-76,800 bps asynchronous

Data Serial Port B: RS232, DCE, 300-38,400 bps asynchronous

System Port: RS232, 19,200 bps asynchronous

Flow Control: Selectable hardware/software/3 wire interface

RF Channel Data Rate:
4800/9600/19,200 bps Full duplex

Data Buffer: 16 kbyte of on-board RAM

Bit Error Rate:
< $1x10^{-6}$ @ -110 dBm (4800 bps)
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Collision Avoidance: Trio DataCom's unique supervisory channel C/DSMA collision avoidance system

Multistream™: Trio DataCom's unique simultaneous delivery of multiple data streams (protocols)

Data Turnaround Time: <10mS

Firmware: Field upgradeable Flash memory

General

Power Supply: 13.8 Vdc nominal (11-16 Vdc)

Transmit Current:
1.3 A nominal @ 1 W
2.5 A nominal @ 5 W

Receive Current: < 350 mA

Dimensions: 19″ 2 RU rack mount 485 x 90 x 420 mm (Including heatsink) 19 x 3.5 x 16.5 inches

Weight: 5kg (11 lbs) (excluding optional duplexer)

Digital I/O:
2 Inputs monitered by TVIEW+ Diagnostics Software
2 Outputs user configurable by TVIEW+ Diagnostics Software

Options

DUPLX450Bx Internal / External Duplexers, Band Reject and Band Pass

EDOVM Digital Order Wire Voice Module

TVIEW+™ Configuration, Network Management and Diagnostic Windows GUI Software

DIAGS/E Network Management and Remote Diagnostics Facilities per Radio Modem

Related Products

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ER450 Remote Data Radio

95MSR 6 and 9 Port Stream Router Multiplexer

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EH450 Specifications

Radio

Frequency Range: 330-520 MHz (various sub-frequency bands available)

Frequency Splits: Various Tx/Rx frequency splits - programmable

Channel Selection: Dual synthesizer, 6.25 kHz channel step

Channel Spacing: 12.5 or 25 kHz

Frequency Accuracy: ±1ppm (-30 to 60°C) (-22 to 140°F) ambient

Aging: <= 1ppm/annum

Operational Modes: Simplex, Full duplex (optional internal or external duplexer available for single antenna operation)

Configuration: All configuration via Windows based software

Compliances:
ETSI   EN300 113, EN301 489, EN60950
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Transmitter

Tx Power: 5W (+37 dBm) ±1 dB
User configurable with over-temperature and reverse power protection

Modulation: User configurable narrow band digitally filtered GMSK or 4 Level FSK

Tx Keyup Time: < 2 mS

Timeout Timer: Programmable 0-255 seconds

Tx Spurious: <= -37 dBm

PTT Control: Auto (on Data) / RTS line (Port A or B) / System Port Override

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Spurious Response: Better than 70 dB

AFC Tracking: Digital receiver frequency tracking

Mute: Programmable digital mute

Diagnostics (Optional)

Network wide operation from any remote terminal.

Non intrusive protocol - runs simultaneously with the application.

Over-the-air re-configuration of all parameters.

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In-built Error Rate testing capabilities.

Connections

NOTE: Various duplicated configurations available.

User Data Ports: 2 x DB9 female ports wired as DCE (modem)

System Port: RJ45 (front and rear) for diagnostics, configuration and programming

Antenna:
2 x N female bulkhead (separate Tx and Rx ports)
1 x N female bulkhead (with optional internal duplexer)

Power: 2 pin locking, mating connector(s) supplied

LED Display: Multimode Indicators for Pwr, Tx, Rx, Sync, TxD and RxD data LEDs (for both port A and B)

Modem

Data Serial Port A: RS232, DCE, 600-76,800 bps asynchronous

Data Serial Port B: RS232, DCE, 300-38,400 bps asynchronous

System Port: RS232, 19,200 bps asynchronous

Flow Control: Selectable hardware/software/3 wire interface

RF Channel Data Rate: 4800/9600/19,200 bps Full duplex

Data Buffer: 16 kbyte of on-board RAM

Bit Error Rate:
$< 1x10^{-6}$ @ -110 dBm (4800 bps)
$< 1x10^{-6}$ @ -108 dBm (9600 bps)
$< 1x10^{-6}$ @ -106 dBm (19,200 bps)

Collision Avoidance: Trio DataCom's unique supervisory channel C/DSMA collision avoidance system

Multistream™: Trio DataCom's unique simultaneous delivery of multiple data streams (protocols)

Data turnaround: <10mS

Firmware: Field upgradeable Flash memory

Hot Standby Controller (HSC)
Features: Alarm indications, manual / auto changeover control, continuous monitoring of Tx power, RSSI, frequency offset, recovered data, power supply, and diagnostic commands from each base.

General

Power Supply: 13.8 Vdc nominal (11-16 Vdc)

Transmit Current:
2.0 A nominal @ 1 W
3.2 A nominal @ 5 W

Receive Current: < 1000 mA

Dimensions: 19" 5 RU rack mount
485 x 225 x 420 mm (Including heatsink)
19 x 8.9 x 16.5 inches

Weight: 12.7 kg (28lbs) (excluding optional duplexer)

Digital I/O (HSC):
TVIEW+ Diagnostics Software to;
- Monitor 2 inputs
- Set 2 outputs

Options

DUPLX450Bx Internal / External Duplexers, Band Reject and Band Pass

EDOVM Digital Order Wire Voice Module

TVIEW+™ Configuration, Network Management and Diagnostic Software

DIAGS/EH Network Management and Remote Diagnostics Facilities

09-01-2004

Part M – Support Options

Website Information

The Trio DataCom website support contains links to e-mail and telephone support, technical notes, manuals, software updates.

Please go to **www.trio.com.au/support.htm**.

E-mail Technical Support

E-mail your questions to **support@trio.com.au**.

When e-mailing questions to our support staff, make sure you tell us the exact model number (and serial number if possible) of the Trio equipment you are working with. Include as much detail as possible about the situation, and any tests that you have done which may help us to better understand the issue. If possible, please include your telephone contact information should we wish to further clarify any issues.

Telephone Technical Support

Telephone support is available at our head office telephone number Australia: (+61) 3 9775 0505 during Eastern Australian business hours (9am-5pm).

Contacting the Service Department

The Service department may be contacted by e-mail to **service@trio.com.au** , or by telephone during Eastern Australian business hours.
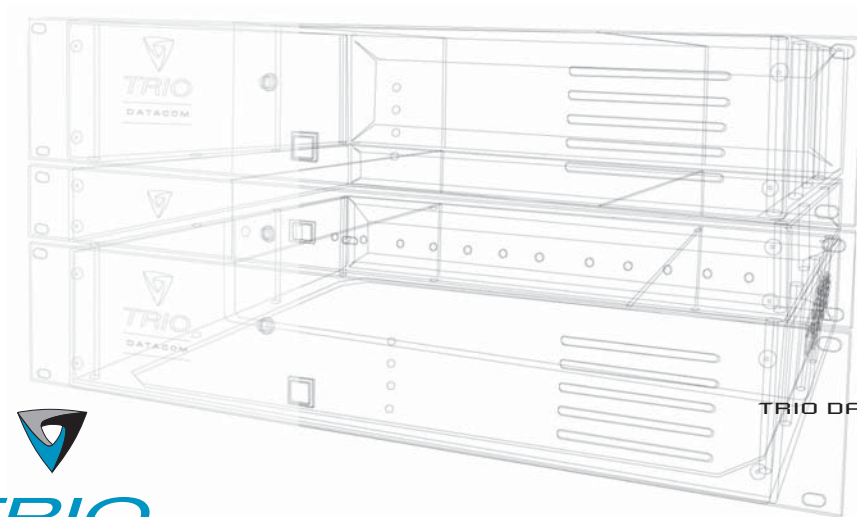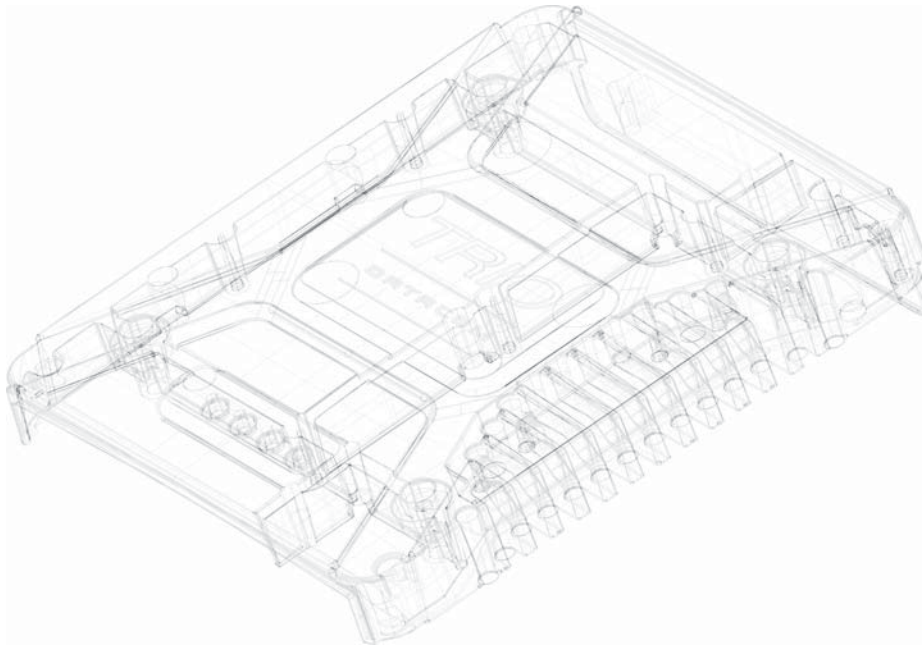
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Innovative and sophisticated
digital communications
designs products and solutions