



Frequently asked Questions

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Introduction

CES Wireless is a manufacturer of Mobile Information & Fleet Management Systems with a combination of hardware and software products, all developed, manufactured and supported in house.

Many of these products are targeted to specific vertical markets, but all can be used by any fleet. The products come with many features that were designed to satisfy specific markets, and while they can be used for generic purposes, you will find references throughout our publications to specific markets where we have found tremendous success with these features.

The CES Wireless sales department is available to assist you in configuring applications and quoting products and options. Before calling or sending an email, please read through the product information and literature to familiarize yourself with our products, since this will assist with your understanding of our response.

This questions and answers document was formulated from emails received from dealers and resellers. We will continue to add to it, and you will find a copy of the updated document, referenced by date, on the “brochure” section of our web site.

CES Wireless products are not “consumer” products and require integration and installation by a suitably qualified technician or engineer. To assist you in the interface and integration process, CES Wireless provides technical training seminars in Orlando every 8 –10 weeks. Check the CES Wireless web site for more details.

Depending on the complexities of the customers system, our engineers and training staff are available for on site visits. We also offer in factory training for individuals or groups. Please check with your CES Wireless sales representative about the costs associated with these services.

Software Breakout and Description

CES Wireless has developed two different client software packages; QUICK-trak™ and POWER-trak™.

QUICK-trak™

Software

Description

QUICK-trak™

QUICK-trak™ is a single or multiple dispatcher software supporting graphical mapping screen, status grid, free form text message dispatch, predefined text message dispatch and management reporting. The product supports single channels or multiple channels of the same network, including CDPD, GSM, Conventional, Trunking, Satellite and IP compatible.

Shipped on a CD with maps. Operates for 30 days or 150 executions without registering. Registration form is printable from the software. Fax or email to CES Wireless and receive the Registration Key within 24 hours (during normal business hours excluding weekends and holidays). Dealers and Resellers are provided with software Keys for demonstration and pilot systems without charge.

QUICK-trak™ WS™

Multiple client workstation version of QUICK-trak™ as above.

Shipped on a CD with maps. Operates for 30 days or 150 executions without registering. Registration form is printable from the software. Fax or email to CES Wireless and receive the Registration Key within 24 hours (during normal business hours excluding weekends and holidays). Dealers and Resellers are provided with Keys for demo and pilot systems without any charge.

MULTI-trak/05

MULTI-trak is required for multiple workstation applications and resides on the Network Server, providing radio and data traffic management between the client workstations, the RF or data wireless circuit and the vehicles.

Each license provides for 5 client workstations. Shipped on CD. Operates for 30 days or 150 executions without registering. Registration form is printable from the software. Fax or email to CES Wireless and receive the Registration Key within 24 hours (during normal business hours excluding weekends and holidays). Dealers and Resellers are provided with Keys for demo and pilot systems without any charge.

Sub Components

MAP-22

US Maps allows up to 10 counties. Additional counties can be loaded from CD for additional charge.

Maps for other countries and regions are available Data is accepted in MapInfo MIF or TAB format, or ESRI shape files.

MAP-22/W

Use MAP-22W for map data for the second and subsequent client's workstations.

MAP-23

For additional US County maps, add this part number

MAP-23/WS

For additional US Counties, add this part number for second and subsequent client

workstations.

MAP-32	If using International maps, use this part number	Please refer to Bulletin # 1516 for information on this program.
MAP-30	Use this part number if you wish CES Wireless to import your own map into software	Please refer to Bulletin # 1516 for information on this program.
MDC-150	Multi tasking base channel modem for trunking and conventional radio systems. One required per channel.	For cellular packet data applications use CDM-200B for CDPD, CDM-300B for GSM. QUICK-trak™ also supports fixed IP based data circuits, e.g. T1, DSL etc.
CHN-01	Additional RF Channel license	QUICK-trak™ comes licensed for one RF channel. Each additional channel requires a CHN-01 license.
MOB-20	Additional vehicle licenses	QUICK-trak™ is shipped with 50 vehicle licenses (100 when purchased through Motorola). Additional vehicles can be added in blocks of 20.
BRK-28	Serial Multiplexer for multiple analog channels when using more than one MDC-150.	When using more than one RF channel (one MDC-150), the BRK-28 combines up to 8 MDC-150 serial outputs and delivers it as one serial output to the computer. BRK-28's may be "daisy chained" for systems with more than 8 channels.
MDM-250	Repeater Data Muter with Voice Delay	Used on a Repeater will result in data transmissions repeated without CTCSS, while voice transmission will have CTCSS/DCS, preventing data being heard by the dispatcher or mobiles.
Modem 325	Long haul industrial leased line modem	For leased lines between the dispatcher and remote base station. Needs two per leased line. Also, increases traffic capacity of system.
CDM-200B CDM-300B CDM-400M	These are packet cellular data modems (used instead of the MDC-150) when using a data network such as CDPD, GSM or iDEN®.	These are designed for low traffic application, typically 50 vehicles or less. For high volume data traffic, use a dedicated fixed IP data line, such as T1, T3, DSL etc. CDM-200B for CDPD, CDM-300B for GSM, CDM-400M for iDEN.

POWER-trak™

Software

Description

POWER-trak™

Single dispatcher version of POWER-trak supporting multiple network, multiple channel, graphical mapping screen, status grid, free form text message dispatch, predefined text message dispatch and management reporting and host software interface using serial or TCP/IP interface. CDPD, GSM, Conventional, Trunking, Satellite and IP compatible. No vehicle or channel license limitations.

Shipped on a CD with maps. Operates for 30 days or 150 executions without registering. Registration form is printable from the software. Fax or email to CES Wireless and receive the Registration Key within 24 hours (during normal business hours excluding weekends and holidays). Dealers and Resellers are provided with Keys for demo and pilot systems without any charge.

POWER-trak WS™

Multiple client workstation version of POWER-trak, as above.

Shipped on a CD with maps. Operates for 30 days or 150 executions without registering. Registration form is printable from the software. Fax or email to CES Wireless and receive the Registration Key within 24 hours (during normal business hours excluding weekends and holidays). Dealers and Resellers are provided with Keys for demo and pilot systems without any charge.

MULTI-trak/05

MULTI-trak is required for multiple workstation applications and resides on the Network Server, providing radio and data traffic management between the client workstations, the RF or data wireless circuit and the vehicles.

Each license if for 5 client workstations. Shipped on CD. Operates for 30 days or 150 executions without registering. Registration form is printable from the software. Fax or email to CES Wireless and receive the Registration Key within 24 hours (during normal business hours excluding weekends and holidays). Dealers and Resellers are provided with Keys for demo and pilot systems without any charge.

Sub Components

MAP-22

US Maps allows up to 10 counties. Additional counties can be loaded from CD for additional charge.

Maps for other countries and regions are available Data is accepted in MapInfo MIF or TAB format, or ESRI shape files.

MAP-22/W

Use MAP-22W for map data for the second and subsequent client's workstations.

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For additional US County maps, add this part number

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For additional US Counties, add this part number for second and subsequent client workstations.

MAP-32

If using International maps, use this part number

Please refer to Bulletin # 1516 for information on this program.

MAP-30

Use this part number if you wish CES Wireless to import your own map into

Please refer to Bulletin # 1516 for information on this program.

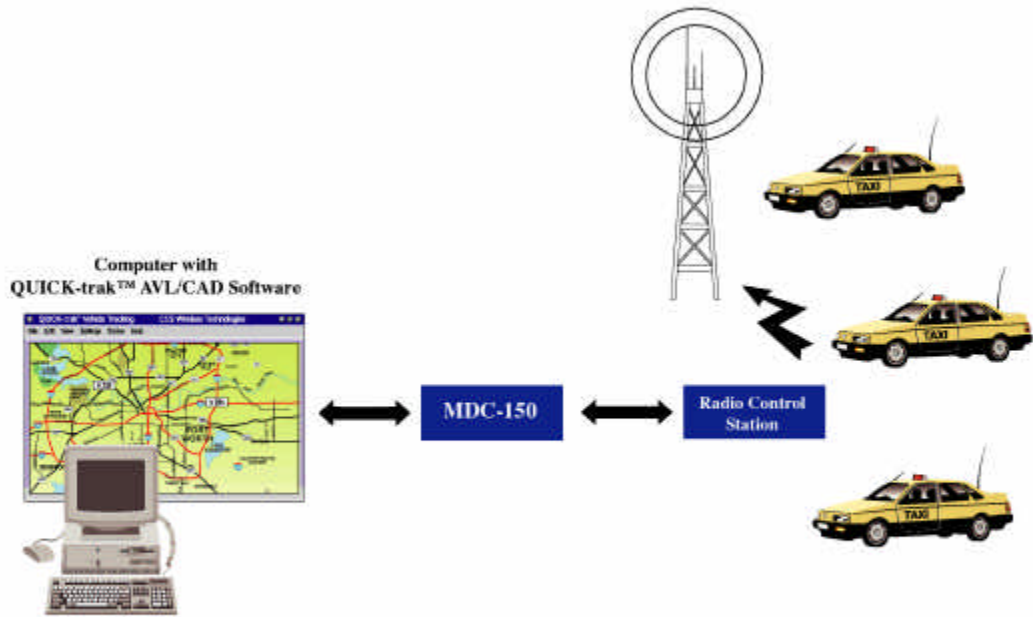
software

TRK-2000/05	This is a host interface software option for POWER-trak or MULTI-trak providing seamless serial or TCP/IP connectivity to a 'host' software system.	CES Wireless currently support a wide range of 'host' software in the Taxi, Readymix, EMS etc markets. Protocol is available to qualified developers. Ask for gateway.doc. (NDA must be signed prior to release)
MDC-150	Base Channel Modem, one per channel, for trunking and conventional radio.	For cellular applications use CDM-200B for CDPD, CDM-300B for GSM. POWER-trak™ also supports fixed IP based data circuits, e.g. T1, DSL etc.
BRK-28	Serial Multiplexer for multiple analog channels when using more than one MDC-150.	When using more than one RF channel (one MDC-150), the BRK-28 combines all of the MDC-150 serial outputs and delivers it as one serial output to the computer.
MDM-250	Repeater Data Muter with Voice Delay	Used on a Repeater will result in data transmissions repeated without CTCSS, while voice transmission will have CTCSS/DCS, preventing data being heard by the dispatcher or mobiles.
Modem 325	Long haul industrial leased line modem	For leased lines between the dispatcher and remote base station. Needs two per leased line. Also, increases traffic capacity of system.
CDM-200B CDM-300B CDM-400M	These are the base end modems (used instead of the MDC-150) when using a cellular data network such as CDPD, GSM or iDEN®.	These are designed for low traffic application. For high volume data traffic, use a dedicated fixed IP data line, such as T1, T3, DSL etc. CDM-200 for CDPD, CDM-300 for GSM, CDM-400M for iDEN®

Base Controllers

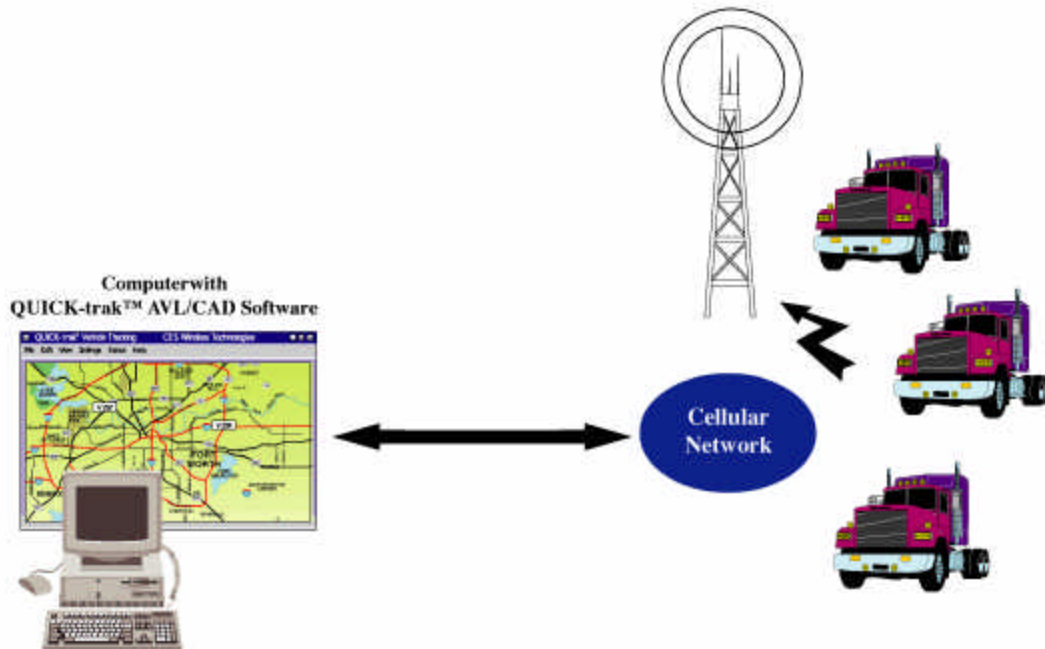
TRK-2000	This is a complete data 'server' controller, with wireless modem fitted and integrated, together with the appropriate software loaded.	Expedites the installation curve as it is shipped from CES 'ready to go'. Comes with 1 year hardware and software support, plus free on online software support. Shipped with keyboard monitor (US Only) and mouse.
TRK-2000-WS	This is a complete client workstation, with the appropriate software loaded.	Expedites the installation curve as it is shipped from CES 'ready to go'. Comes with 1 year hardware and software support, plus free on online software support. Shipped with keyboard, monitor (US Only) and mouse.

System Configuration Assistance



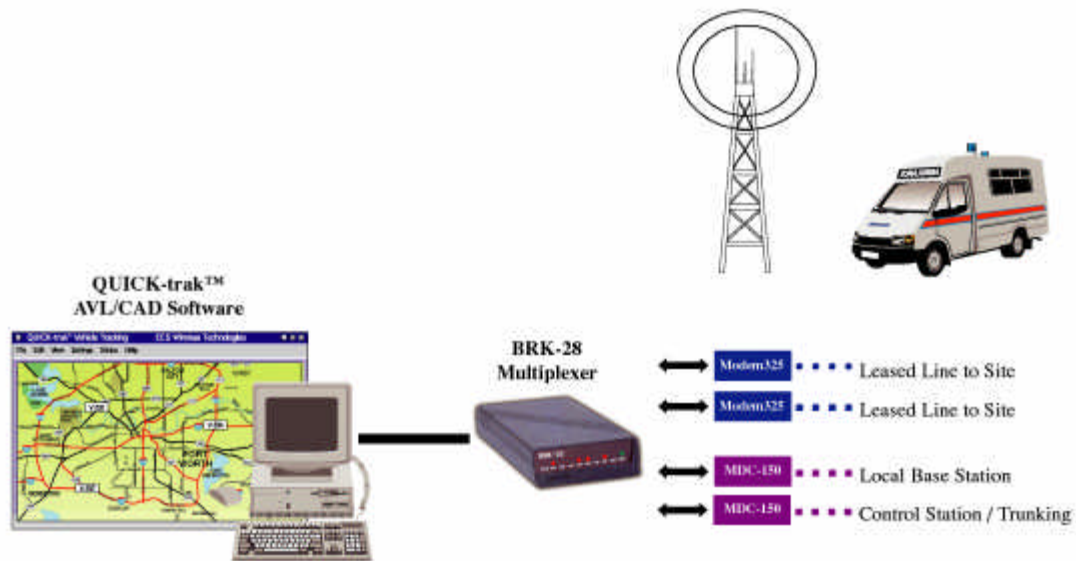
QUICK-trak, Single Channel, Single Dispatcher, Conventional or Trunking Radio

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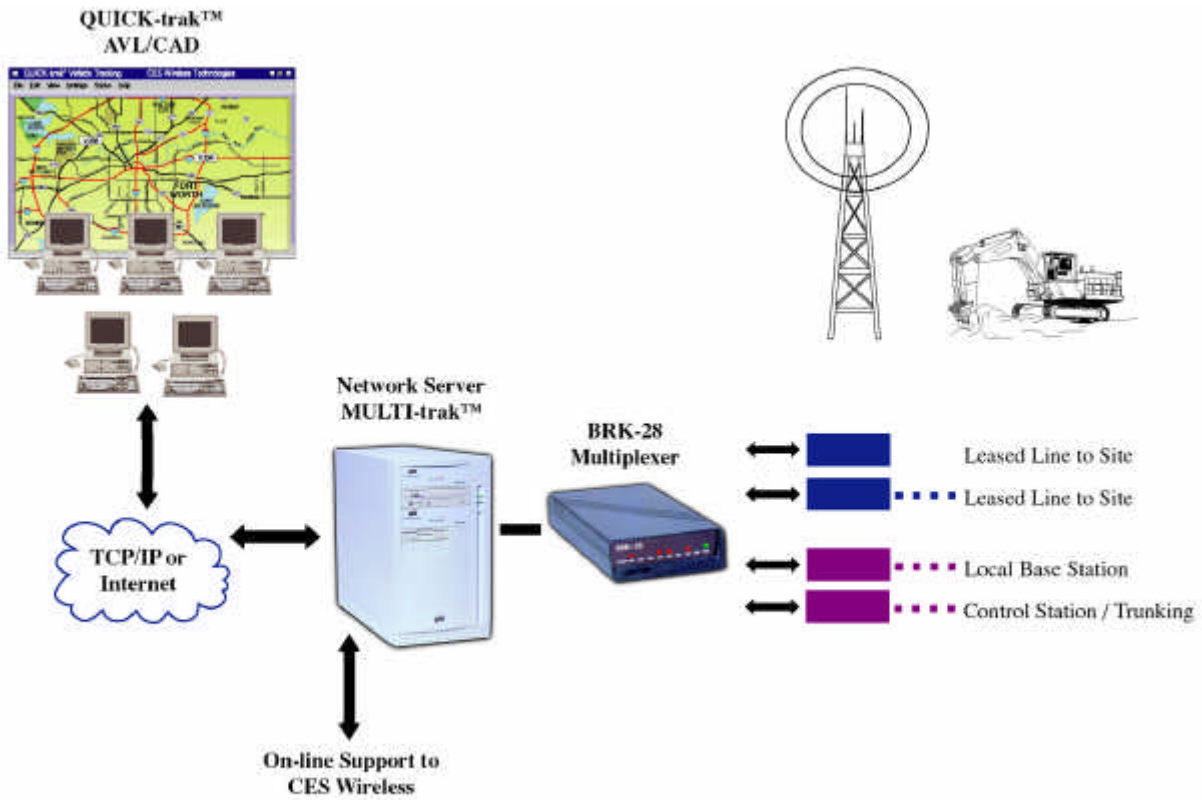
QUICK-trak, Single Channel, Single Dispatcher, CDPD/GSM/IDEN/Satellite

© 2002 CES



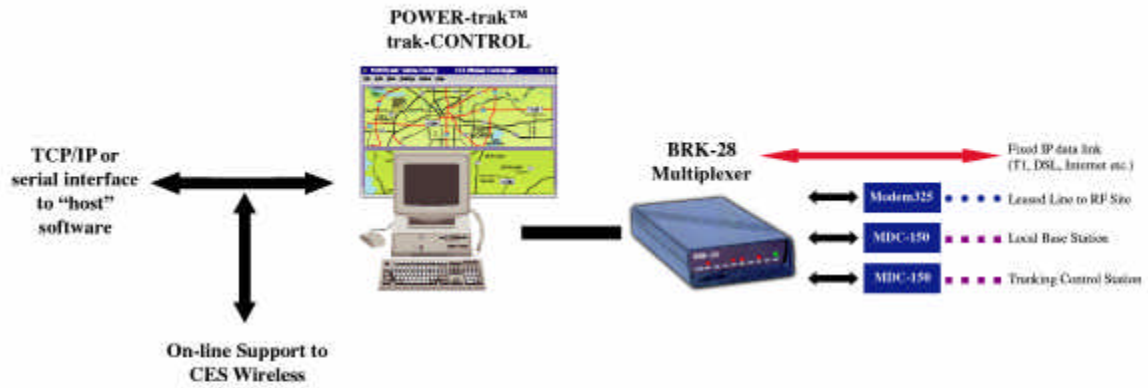
QUICK-trak, Multiple Channel, Single Dispatcher

© 2002 CES



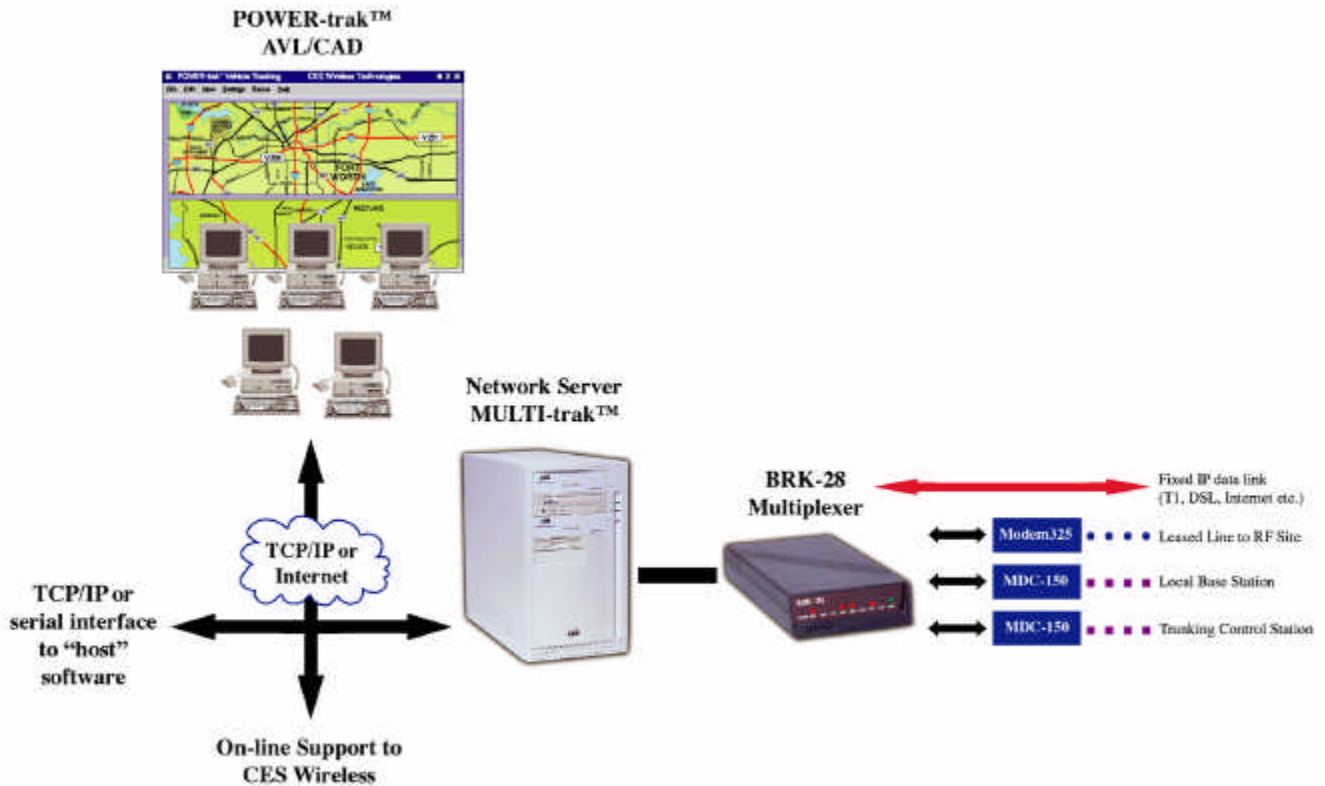
QUICK-trak, Multiple Channel, Multiple Dispatcher

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POWER-trak, Multiple Channel & Mixed Networks, with "host" software interface

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POWER-trak, Multiple Channel & Networks, Multiple Workstations with "host" software interface

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Software Questions

What is the difference between QUICK-trak™ and POWER-trak™?

QUICK-trak™ is designed as an affordable, single or multiple dispatchers, multiple channel (of the same format) software system. It can accommodate hundreds of vehicles, and is loaded with features to make fleet management easier. Included is a full status grid, graphical mapping, message dispatch and reporting modules. In the US, it ships with a regional map, with the user licensed to select any 10 counties when item MAP-22 is ordered. Additional county licenses can be purchased. See price list for part number.

POWER-trak™ is a higher level, feature rich systems software, supporting multiple channels of mixed format, multiple dispatcher platforms and a gateway to host or third party software systems. In the US, it ships with a regional map, with the user licensed to select any 10 counties when item MAP-22 is ordered. Additional county licenses can be purchased. See price list for part number.

All of the vehicle devices and base hardware operate with either software system.

What map format does CES Wireless support?

We support MIF or TAB files (MapInfo format) or shp files (ESRI). Other formats have to go through a translation process and are quoted on review of the data.

I want to use my own/customers maps. Is this possible?

Yes, the CES Wireless GIS (Geographical Information Systems) department can translate dozens of formats for you to use. Ask for Bulletin 1516 which list the process to translate maps. Among the many formats are MapInfo MIF and TAB, and ESRI SHP Shape files. We will ask for confirmation that the map data that you present to us is fully licensed, and we will need to independently verify such authorization. A charge is made for this translation service.

Will the map data be protected if I send it to CES Wireless?

Your map data is totally secured at CES Wireless, and the original disks will be returned. Please understand that we deal with maps from all over the world, and they are protected as long as we have notification of confirmation of the owner and licensing authority. We must establish the true owner before any copyright agreement will be signed.

Are there charges for map translation?

Any changes to maps or translation will entail charges, including the addition of new attributes to previously translated maps

Where can I obtain maps?

CES Wireless provides maps for the US and Canada. We also have some good maps for other countries as well. If you want to do some research yourself, you can try GDT, MapInfo, Thomas Brothers or Geoscape International. These vendors have some good map data sets that are compatible with the CES Wireless product.

How old is map data?

The availability of commercial map data is based on demand. There are many cities and regions worldwide that have not been translated into commercially available data, simply because the demand is not there to justify the cost. The CES Wireless US map product is based on 1999 tiger files. We can also offer GDT and Thomas Bros map data.

In the US, where the demand is high (e.g. New York), the data is relatively current, but some rural areas may be as much as 2-3 years old. It is a question of demand and cost.

How is the software shipped?

The application software is shipped on a CD, and the map data on either the same CD or separately.. Once you load the application software, you will be asked to insert the Map CD and load the map data into the application software. The application software comes with a very complete and indexed help file. It is very easy to operate and does not require a lot of expertise, just normal computer skills.

The software operates for 30 days or 150 executions without requiring registration to facilitate customer's evaluation and testing. The registration form is printable from the software. Fax or email it to CES Wireless and receive the Registration Key within 24 hours. Dealers and Resellers are provided with Keys for demo and pilot systems without any charge.

If you are planning to install a Windows network multiple client dispatcher system, the process is a little more complex. We suggest that an experienced Windows Network certified technician help you to configure the software. CES Wireless offers on site engineering services (at additional cost) to complete such work, together with on site training.

How many vehicles can the application software accommodate?

The software can accommodate hundreds of vehicles; the limitation is normally based on the capacity of your wireless infrastructure to deal with the traffic generated.

In a live customer installation, the QUICK-trak™ software is provided with 50 mobile licenses (100 licenses with Motorola RDN7378A). Additional vehicle licenses may be purchased from CES Wireless in blocks of 20. Contact CES Wireless and order part number MOB-20 if you need additional mobile licenses for your customer's installation. You may not buy additional mobile licenses for the demonstration version of the software.

There is no vehicle license limitation with POWER-trak™ when installed for end users.

Can I use the same CD on multiple installations?

Yes, but each must be licensed separately by CES Wireless otherwise the software will cease to operate after 30 days.

Can we install the demo software on more than one PC?

The demo version of the software may be installed on more than one PC within the dealer organization. Each PC installed will require a unique registration code so the registration process must be followed for each installation.

Why would I need a Software Development Kit?

The TRK-SDK (Software Development Kit) will only be needed if a third party software developer needs to integrate the CES Wireless solution to an existing software system. This is to expedite and assist with the development of an interface between the two software systems, allowing a seamless exchange of data using either a serial ASCII or TCP/IP exchange protocol. CES Wireless has published a protocol specification (requires signed Non Disclosure Agreement) available from our sales department.

What is the trak-CONTROL™ gateway?

trak-CONTROL™ is a CES Wireless windows software API that provides an interface to non-CES 'host' software systems. Host systems can send messages to trak-CONTROL™ for onward transmission to the vehicle fleet and receive status updates, driver inputted information and GPS automatic vehicle location information. The interface between the CES Wireless Technologies system and the "host" software system is through a TCP/IP or serial ASCII link. The protocol and description of this interface is contained in a CES Wireless proprietary document, referenced, gateway.doc and a software developers kit is available to assist with the software integration. CES Wireless has already interfaced with many third party software systems, and has built up extensive expertise in this area. The API provides all of the traffic management and radio related functions.

1: The CES Wireless base system can provide the vehicle originated and driver activated 'status' messages to the host software. These 'status' messages are numbered 0-9 on the TRK-240 front panel and are not referenced with a work order number. The host software will know the work order that the driver is currently active and assume the status messages is in reference to that work order. Sub menus can be associated with the 0-9 status messages, providing further status information, e.g. status 1 = out of service, sub menu = 1=lunch, 2=rest stop, 3=breakdown 4=end of day

2: The CES Wireless software and vehicle hardware provide for intelligent "work order" processing, where every job sent to the truck has a unique identifier. The driver selects an active job and all status messages being returned to the base has that unique identifier appended. The driver moves through the 'status' list until the job is cleared. Work Order procession is only supported when using host software systems.

3: The CES Wireless base system can provide the vehicle coordinates to the host software product for display of the location of the trucks on the host software screens. The vehicles can be pre programmed with a time window to send coordinates, can be 'polled' by the host, can be sent along with status transmission, or using the geo-STATUS™ (see Advanced Systems section) capability.

4: The CES Wireless base system will accept free form or predefined text messages originating from the host software for onward transmission to the vehicles

5: The CES Wireless base system will accept geo-coordinates from the host software for onward transmission to a vehicle for the purpose of automated status transmission, e.g. the coordinates of a customer location. When the truck gets to a location, the TRK-240 will automatically respond indicating that it is at that location, and again when it exits.

6: The CES Wireless system supports additional features such as ANI (automatic number identifier), RTT (Request to talk), Auxiliary Inputs and Outputs for sensor control and command, which may be implemented into the system at the option of the customer and host software provider.

What kind of market specific software has CES Wireless already interfaced with?

Almost 50% of the systems installed by CES Wireless are interfaced with a third party 'host' software system. These include ready mix, aggregate, taxi, emergency services, para-transit, medical transportation, public safety, air conditioning and other service industry software products.

The degree of integration is dictated by the application. Some systems simply require all of the vehicle originated status messages be transferred to the 'host'. Others require full text messaging, GPS locations and "work order" processing.

CES Wireless sales executives can assist you further to define the level of integration necessary to provide for the customers expectations.

To assist developers, CES Wireless has a Software Developers Kit available.

Mobile Devices

What is the difference between the mobile devices CES Wireless manufactures?

There are four basic models:

- 1: The TRK-200 is a status terminal with an integral radio modem and intelligent capabilities. The unit also has an optional external GPS Automatic Vehicle Location module, together with credit card reader and printer.
- 2: The TRK-240 is a status and message display terminal with an integral radio modem. The unit has an optional internal GPS Automatic Vehicle Location module, together with a credit card reader and printer. It can also be interfaced with any serial device. The unit also has an optional internal CDPD, GSM or iDEN® cellular transceiver.
- 3: The GPS-150 is a standalone GPS Automatic Vehicle Location device (with integral radio modem) for analog radio interface, e.g. two-way convention, trunking etc. It has no driver buttons/controls and is normally hidden in the vehicle. It does however have 8 auxiliary inputs and three auxiliary outputs to facilitate in vehicle sensors and controls
- 4: The GPS-210 is similar to the GPS-150 but with a built in CDPD cellular transceiver. The GPS-230 is a standalone AVL unit with built in GSM transceiver, and the GPS-240 is a standalone AVL unit with an iDEN transceiver built in. All of the units have auxiliary inputs and outputs for sensors and vehicle control points.

Can I mix and match different units within the same fleet?

Yes, one of the great advantages of the CES Wireless product is the capability to have mixed mobile products in the fleet, and the base software will only provide the dispatcher with the appropriate feature set relating to that product, so the dispatcher cannot send a text message to a vehicle fitted with a non-display device.

How are the mobile units programmed?

CES Wireless mobile units are all programmed via a flash memory update from a PC with a product specific easy to use software program. The dealer may also program most individual parameters via the front panel keypad on the units so provided and/or over the air.

Can the mobile data units monitor engine sensors or other inputs?

Yes, all CES Wireless mobile units are provided with auxiliary inputs and outputs. These are digital I/Os and may be connected to any contact closure. The mobiles may be programmed to report on a change in state from low to high, high to low or both. -Great for telemetry applications.

If I buy the TRK-240 display terminal without GPS now, can I install the GPS receiver later in the field?

Yes, it is possible for the GPS receiver option to be installed by a qualified technician. This is a bench top operation with a fair amount of labor involved. The GPS option is best installed at the factory at the time of manufacture.

How many status messages types can the data units send?

The TRK-200 and TRK-240 have a 12-button status keypad and two function keys. The programming software allows the dealer to configure each key for status only or status + numeric data. If programmed for status + numeric, the terminal can send a myriad of possible status combinations. For example:

[Key 1] + [1] may indicate In Service, Start of Day

[Key 1] + [2] may indicate Lunch

[Key 1] + [3] may indicate Return from Break. ...etc.

Giving nearly limitless status options to the user. LCD prompts can be programmed to assist the user in entry options.

Do you recommend the magnetic or fixed GPS antennas?

We do not recommend the magnetic GPS antenna for a fully installed system. The price of the fixed mount is not that much greater, and is far more reliable. We generally use the magnetic mount for demonstration, pilot or temporary installations. As you probably know, magnetic antennas result in a higher level of maintenance problems, but are excellent for temporary or short-term installations.

What faceplates are available for the TRK-240 and TRK-200?

CES Wireless has faceplates for many, many market specific industries, including taxi, readymix, EMS etc. For other applications you will need a numeric or a custom faceplate. This will have the customers own legends on the face plate, indicating to the driver as to what function each button has within the system. If interfacing with a host software system, this is done in conjunction with the host provider so the features in both the software and the mobile hardware matches - we can help you with this. There is an \$800.00 once off charge for custom labels, with a 4-week delivery. The label is two colors, (4 color additional) and the customer name and logo can be added. CES Wireless Part Number TRK-240/09.

Conventional, trunking, repeater, remote base station radio channels

Can I get cables for specific radios?

Yes. The standard generic cable has fly leads (3 feet or 15feet), while the radio specific has the appropriate radio terminator. All of the cables are the same, the different being the radio specific connector. The same cable is used for base and mobile applications.

Can I use just any cable for the radio interface?

No. The radio interface cable available from CES Wireless is specially designed for this application, with suitable double screened audio strands. Using a non specified cable will cause both encode and decode intermittency and voids product warranty.

What radios have the CES Wireless devices been used with?

Product application notes describing how to interface the CES Wireless product and the radio model of choice are available for many radio manufacturers product including Motorola, Kenwood, Tait, EF Johnson, Standard, Midland and SEA radios, from conventional, simplex, duplex, dc line, leased line, base control station, remote repeater, community repeater, LTR, Smartnet™ and Privacy Plus™ trunking

To get an application note, simply call our Support department. If we do not have an application note for your radio of choice, we can easily create one. Ask for Product Bulletin PB1508, which list the procedure for the development of an application note.

What is the recommended maximum baud rate to use?

We recommend 1200bps over conventional or trunking, where the bandwidth is limited. Because of the small packet size, 2400bps does not give you much more speed, given the rise time of the radio and transmission path. Increasing to 2400bps increases the probability of a retry *unless* the transmission path is very well configured and aligned. CES Wireless products can be programmed up to 4800 baud on analog channels. On cellular and satellite services the baud rate is determined by the carrier service.

How is data sent over the air?

Using the CES Wireless patented ‘over the air’ protocol, data is converted to MSK, and can be sent at 600-4800 baud. Typically, an RF channel will only accommodate 1200 baud since the objective is to send the message first time every time without corruption. Increase the baud rate simply increases the chance of an error, resulting in a retry and additional airtime. Since the packets are so small, increasing the baud rate does not provide any great time advantage.

At the base end, the CES Wireless multi tasking modem, the MDC-150, converts the incoming MSK data to serial ‘computer’ data for processing by the computer and software application. Computer originated messages are converted by the MDC-150 into MSK for onward transmission to the vehicles. The MDC-150 can process 50 simultaneous transactions.

How can you make sure that the messages get through?

All of the CES products have a unique patented protocol called QUADTEC™, which provides message management, including complete message acknowledgements, retries, message queues, and memory retention of vehicle activated exceptions and status activations.

Can the data be decoded by anyone else?

The data not only conforms to the CES Wireless QUADTEC™ protocol, but it is also encrypted, using the customers own programmed 16-digit encryption key. This makes it very unlikely that any third party can decode the data.

Can voice and data share the same channel?

Yes. All of the CES Wireless mobile devices incorporate a programmable busy channel lockout preventing data transmission over voice. It must be understood however that a busy voice channel will limit the opportunity for data transmissions.

If the application calls for frequent data transmissions, and the fleet is sizable and/or talkative it may be better to have separate voice and data channels. This can be accommodated by the CES Wireless devices (channel steering) subject to review of the radio type and system configuration. It is best to consult a CES support or sales representative to discuss your application.

Can voice or data have priority on the channel?

Yes. Data and voice can co-exist together on the same channel (data is in fact audio). This is a programmable feature. The system can be set up either way.

Systems with a priority on data will have the mobiles operating in "closed mode" meaning that the mobile microphone is not enabled. The driver must send a RTT (request to talk) message to dispatch. The dispatcher then sends a call message to the mobile to "open" the mobile units microphone talk path. This is the recommended mode for systems where voice and data are going to share the channel with significant data volume.

Does the system mute the data noise to prevent it from being heard by the mobile user? The mobile data device has a speaker mute output that will activate the mute input on the radio whenever data is detected on the channel. On some radios there is a small chirp of the data heard that comes prior to the mute output being activated. Motorola radios with MDC-1200 signaling will even avoid this chirp due to the D.O.S. hold-off timer (Program UNIT ID in radio disabled) Unit ID is sent by the terminal).

How many mobile units will one channel support?

There are many factors that come into play in determining this:

- √ Is the channel dedicated to data or is voice traffic shared?
- √ How much data (peak operating period) is the customer sending per mobile?
- √ How often does the customer want to send data?
- √ Is it necessary to have all mobiles sending data real-time?

Some systems are busy to capacity with 40 mobiles while others have no difficulty running more than 100 units on one channel. It depends on the voice and data traffic requirements. A full duplex control/base station will help the data processing as well. Unless you are using a dedicated "packet data" service, such as CDPD or GSM, you cannot entertain 'real time' location. And even with these services, the monthly cost is exorbitant for real time, meaning a location update every few seconds. A sensible approach at best, and in most instances, a location update with any vehicle exceptions that occur, e.g. ignition on/off, door open close, pump on, off, and then preprogrammed for 15-30 minutes is acceptable (See also DACT™ - a patent pending technology from CES Wireless explained under Advanced Systems Features).

To determine whether you have enough channel capacity, determine what the number of vehicles on the air will be at a 'peak' time. Say for example a company with 100 vehicles, that's probably 80.

To determine how often data will be sent, say the application calls only for Automatic Vehicle Updates every 30 minutes (typical if it was a delivery organization), then we know we need to be able to provide 80 vehicle updates every 30 minutes. With each update taking 3 seconds (radio rise time, repeater rise time, message and acknowledgment) that gives us a capacity of 20 updates per minute or 1200 updates per hour, assuming no voice.

If you want updates more regularly, or want text messaging or status updates (CES Model TRK-240 display terminal) then you need to add that into the formula. Also, add the capability of the dispatcher to 'poll' the vehicle to get its current position, or send text messages. CES products have smart GPS analysis, reducing transmissions when no movement or change in parameters is detected.

So, first decide what the customer is looking for. GPS AVL only, status or messaging and GPS.

Then look at what the customer does and see how this technology will be implemented. If it is a Ready mix company and they want vehicle "status", the delivery cycle will be over 2 hours with 8 status transmissions, which includes GPS AVL. (Status substantially reduces voice in this application).

You also need to take into account current voice traffic, and how the voice traffic can be reduced to provide data. Once you have this information, feel free to consult your CES Wireless sales executive who will be able to help you analyze channel capacity requirements.

At the time of publication, CES Wireless has a system in operation which consists of three remote repeater stations, connected by leased line to a dispatcher center, with 750 taxis operating on it, sharing voice and data. This is an example of what can be accommodated with an advanced data solution from CES Wireless Technologies.

Can you use the same and existing radios for voice and AVL?

You can use the same radio for voice and data. If the application calls for a lot of data per vehicle and a similar level of voice then you may need 2 separate channels, and separate radios for voice and data. Depending on the amount of data anticipated, you may have to propose a cellular network to provide the required traffic capacity.

Will the system accommodate more than one data RF channel?

Yes. The software is capable of handling multiple base modems. Each radio data channel needs its own base data modem (MDC-150 or RDN7364) and a dedicated base control station radio. All systems with more than one data channel will require a serial multiplexer (BRK-28), which provides for up to 8 channels. Multiple BRK-28 can be used in series.

The software comes with a license for one base channel. Licenses for additional base channels must be purchased from CES Wireless. The part number for additional base licenses is CHN-01. Please contact CES Wireless if you have a need for additional licenses.

Can we use any modem for leased lines to connect to a remote site?

We can only recommend the MODEM325 as the proven industrial solution. The Modem325 is an industrial device with self-synchronizing capability for remote sites. Yes, you can use any modem, but make sure that it is capable of handling the traffic throughout and the environment. Believe me, we learned the hard way! The cable is a standard RS-232 serial cable.

Is the system LTR™ compatible?

Yes, the system is in operation over LTR™. Please check radio application notes for further information.

Is the system compatible with Passport™?

Yes, the system has been tested over Passport™. Please check radio application notes for further information.

Is the system Smartnet/Privacy Plus compatible?

Yes, the system is in operation over Smartnet® and Privacy Plus®. Please check radio application notes for further information.

Is the system compatible with Smartzone?

Yes, the system is in operation over Smartzone.

What is the MDM-250 Repeater Data Mute Controller?

The MDM-250 is a device that can be used on conventional radio repeaters using CTCSS/DCS, to repeat data transmissions without the sub audible or DCS signaling. Typically when data transmissions are sent through a repeater, some if not all of the data will be heard by the drivers as well as the dispatchers (the CES Wireless data products have a muting capability, but the first 20ms may be heard). This is assuming that voice and data share the same channel and signaling code i.e. CTCSS/DCS. With the MDM-250 wired in series with the repeated audio, data transmissions will be repeated without CTCSS, while voice transmission will have CTCSS/DCS. The end result will be radios muted until decoding CTCSS will receive data without un-muting. Thus data transmissions are not heard. The MDM-250 may not work with some repeaters and tone systems other than CTCSS, etc may also work. Please check with your CES Wireless sales executive for further application materials on this device.

What is the difference between Simplex, Half Duplex and Full Duplex systems?

There are 3 types of channel assignments in radio frequencies; Simplex, Half Duplex, and Full Duplex. Simplex means that the Transmit and Receive frequencies are the same (e.g. Tx 147.00/Rx 147.00). Half Duplex means that the Tx and Rx frequencies are different, but not licensed for simultaneous transmit and receive functions (e.g. Tx 147.00/Rx 152.00). Full Duplex means that the Tx and Rx frequencies are different (e.g. Tx 147.00/Rx 152.00) but using a duplexer, the base station can transmit and receive simultaneously

How well will data work on Simplex, Half Duplex and Full Duplex?

Simplex: Since all of the mobiles are transmitting and receiving on the same frequency, there is a possibility that two mobiles can transmit at the same time. In order to compensate for this CES Wireless adjusts the setup of the Short/Long-Term Queues. A random variable is added to the Time-Interval equation of both Queues and extends the amount of retries. This compensates for any data collisions. Of course, the dispatcher or driver never recognizes that this happens in the first place, since all of this is done in the background.

In “half duplex” and “full duplex” systems, the transmitting mobile can lock out all others (busy lockout) avoiding simultaneous transmissions. A full duplex control or base station will of course increase the data throughput of the system, since the base will be transmitting while receiving.

Can data be sent over VHF Low Band (30-40MHZ)?

Yes, however there are some inherent elements to this end of the spectrum that must be compensated for.

- White Noise/Interference - Low Band frequencies are more susceptible to static and interference than higher frequency bands. In order to compensate for this, the baud rate of the transmissions can be reduced to 600baud with the objective of increasing the data throughput. The difference in baud rate is measured in ms, but the throughput is increased dramatically.
- A complete acknowledgement and retry protocol is built into the rugged, over the air protocol. This provides assurance that the signal will get through in the event it is corrupted during the first attempt. Add a short and long term queue in the mobile device, and you have sufficient memory to provide for any delay resulting from interference.
- Signal Clashing.
- VHF Low Band is usually only operated in a simplex mode in the US. Since all of the mobiles are transmitting and receiving on the same frequency, there is a possibility that two mobiles can transmit at the same time. (In a “half duplex” and “full duplex” system, the transmitting mobile can lock out all others, avoiding simultaneous transmission). In order to compensate for this CES Wireless adjusts the setup of the Short/Long-Term Queues. We add a random variable to the Time-Interval equation of both Queues and extend the amount of retries. This compensates for any data collisions. Of course, the dispatcher or driver never recognizes that this happens in the first place, since all of this is done in the background.
- To further help when operating in this configuration, the mobile units can be programmed in a Closed Voice mode. This is at your option. In the Open mode, the system allows any driver to pickup the microphone and talk. In the Closed mode, the driver must activate Request To Talk. (RTT). This can be accomplished by “double clicking” the microphone PTT or by pressing the RTT button on the TRK-240 MDT. The dispatcher is immediately advised that the driver wishes to speak, and at a click of a mouse, the dispatcher opens up the drivers radio to converse. After the conversation, the dispatcher closes down the radio.
- If you have voice and data coexisting on the same channel, one must be given priority in order to avoid voice/data collisions. Remember, one of the purposes of the data system is to reduce voice. In the “voice” priority mode, the MDT’s will hold their data packets until no voice activity is detected. Unfortunately, in a Simplex “shared voice/data” system only mobiles close enough to each other to detect the voice activity will know to hold their message. MDT’s out of range of each other will not know to hold their data packet and will transmit it over the voice. (there is no repeater inline to rebroadcast the voice signal) *Note: There is no way any system can avoid this! In the “data” priority mode, the MDT’s will be set in “Closed Voice” mode. This means the drivers will have to request to talk and voice communications is significantly reduced. Since the TRK-240 has a 4x40 character display, most conversations are more efficiently dealt with in the data format via text messaging anyway.

Satellite, iDEN, GSM, CDPD and digital data trunking and cellular services.

What packet data services are CES Wireless products compatible with?

CES Wireless products are compatible with many of the popular packet data services. These provide a dedicated data service with speeds from 19K upwards. Coverage maps change regularly, so please check the CES Web site or check with your CES Wireless sales representative for further information.

Software

Both QUICK-trak™ and POWER-trak™ are compatible with IP services, e.g. T1, DSL etc. CES Wireless also provides base transceivers for iDEN, CDPD and GSM for smaller fleets.

Mobile products

GSM: The TRK-240 is available with an internal GSM transceiver, 800/1100 or 900/1100 MHZ. Currently this uses the GSM SMS (short messaging service). CES Wireless will shortly launch a GPRS (packet data) compatible unit.

CDPD: Two products are available. The TRK-240 is available with an internal CDPD transceiver. The GPS-210 is a standalone GPS/CDPD device.

iDEN®: Two products are available. The TRK-240 display/GPS terminal is available with an internal iDEN® (Nextel/Southern Comms, Clearnet) iDEN® transceiver. The GPS-240 is a standalone GPS/iDEN® device. (Due for release April 2002).

Satellite: The TRK-240 is available with a transceiver (external) providing seamless coverage throughout Canada, US, Mexico, Caribbean and Northern Venezuela.

Training & Support

How about software support?

Firstly, if you're a CES Wireless or Motorola authorized reseller, dealer, systems integrator or software developer, you will get support from CES Wireless during normal business hours without charge. CES Wireless software is provided with 90 days end user support. Beyond that period, CES Wireless provides a software support/upgrade contract, including optional 24/7 software support. Ask for a copy of the QUICK-trak or POWER-trak Software Support/Upgrade contract for further details of the services we offer.

What are the charges for support?

All Dealer and Reseller telephone support from CES Wireless is free. A telephone and online software support/upgrade contract is available for end user's (includes free software upgrade annually).

Is 24-hour support available?

24-hour on-call support is available by contract to the end user directly from CES Wireless

How about on site project management and training services offered by CES Wireless?

CES Wireless offers a complete on site engineering and training service. You will find a complete list of our project management and training services in the CES Wireless price list.

Is training available?

Technical training sessions are held free for dealers at CES Wireless Technologies World Headquarter located in Winter Park, FL. Check the CES Wireless web site (www.ceswireless.com) for the next training date. Sessions are normally full 3 weeks prior to the date, so book early.

CES Wireless will also provide training and on site services for systems end users. Charges apply for this service. Please check the CES Wireless Dealer Price list for the charges schedule.

Demonstration Products

Can I get demonstration products?

To assist our dealer's demonstrate and evaluation product we have a Dealer Demo Program, which provides dealers with equipment at reduced cost. Any dealer who wished to become a CES Wireless Authorized Dealer must purchase a demonstration System, and attend one of our training classes.

A list of the 'demo kits' can be found in our Dealer Price List. You will find separate kits for each type of system, and support for conventional, trunking, CDPD, GSM, iDEN and satellite within this program

We get hundreds of requests for samples and demonstration product each week, so there is a cost for all of these products. Non-working samples will only be shipped if we have a credit card number on file.

Advanced System Features

What is geo-STATUS™?

This is a proprietary ‘patent pending’ technology developed by CES Wireless to allow for certain “location based” statuses to be automated (i.e. at plant, leave plant, on job, leave job). The TRK-240 message terminals are programmed with the geographical coordinates for the various fixed locations (either over the air or by PC). The TRK-240 monitors the GPS samples and looks for a match to the plant zones/job ticket zone stored. Once the TRK-240 acknowledges its presence in a particular zone the terminal automatically reports this specific and unique status to the dispatch center. Entry and exit is reported. The geo-STATUS™ coordinates can be preprogrammed in the terminal, or can be programmed over the air by the host software therefore supporting customer locations that change regularly throughout the day. The product can support 30 different geo-STATUS™ coordinates. Some clients use this feature to avoid excessive GPS vehicle updates. Rather than preprogram the terminal to send the vehicle current location every 15 minutes, they rely on the geo-STATUS™ to provide the update when needed.

What is auto-GPS™?

auto-GPS™ can be used to trigger a faster GPS sampling (from every 5 sec. up). For example, when a police vehicle activates the siren, the updates are transmitted every 5 seconds, and when the siren is off, the updates are transmitted every 15 minutes.

What is MOTION-trak™?

MOTION-trak™ is a movement based GPS technology that compares a new GPS sampling to the old one (every 20ms) and react to preprogrammed instructions. For example, this technology limits location updates to the dispatcher if the vehicle has not moved between samples. This keeps your wireless infrastructure from becoming cluttered with redundant data. (i.e. Instead of 12 samples of GPS data an hour for a sitting truck, there will only be one sample.)

What is DACT™?

This is a proprietary *Algorithm* that samples the trucks movement every few seconds, turn-by-turn, stop-by-stop, exceptions and activities. The samples are logged to memory, compressed and transmitted to the dispatch center on a “user definable time parameter “ normally every hour. This is a second layer, in addition to regular reporting. The application of this technology to the system allows you to collect extensive amounts of data for historical management reports. This data could be used to analyze routes, driver efficiency, or provide proof for claims against the company. (i.e. windshield broken by your trucks loose gravel.) This overcomes the challenge of most wireless systems and the limited amount of data that can be sent back ‘real time’ because of issues relating to spectrum, capacity or airtime. Using this feature, customers can reduce their airtime charges dramatically.

What is Work Order Processing?

The TRK-240 can be programmed to process “job tickets” from the “host” software and display them for review. Drivers can select jobs and update the job status of specific work orders to keep dispatchers abreast of current activities (most clients use the above feature to provide a paperless “job ticket” process. While a driver has a ‘job’ displayed and active, every status button activated is transmitted with the job ticket “#” appended to the message. This allows the end user to track status activity on a “per ticket” basis. This feature could be used to verify “Bill of Loading”.

What is QUADTEC™?

CES Wireless’s “over the air” protocol **QUADTEC™** is a well-proven format for sending data over the air, with a consistent and reliable result. It features a full acknowledgement and retry protocol. The base modem channel cards provide for full multi-tasking. The protocol focuses on “first-time” throughput. It gives the base channel card “full duplex like” capabilities. If one mobile is not responding it puts that message in queue and moves onto the next. This effectively removes the possibility of bottlenecking at the base where it’s most important

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