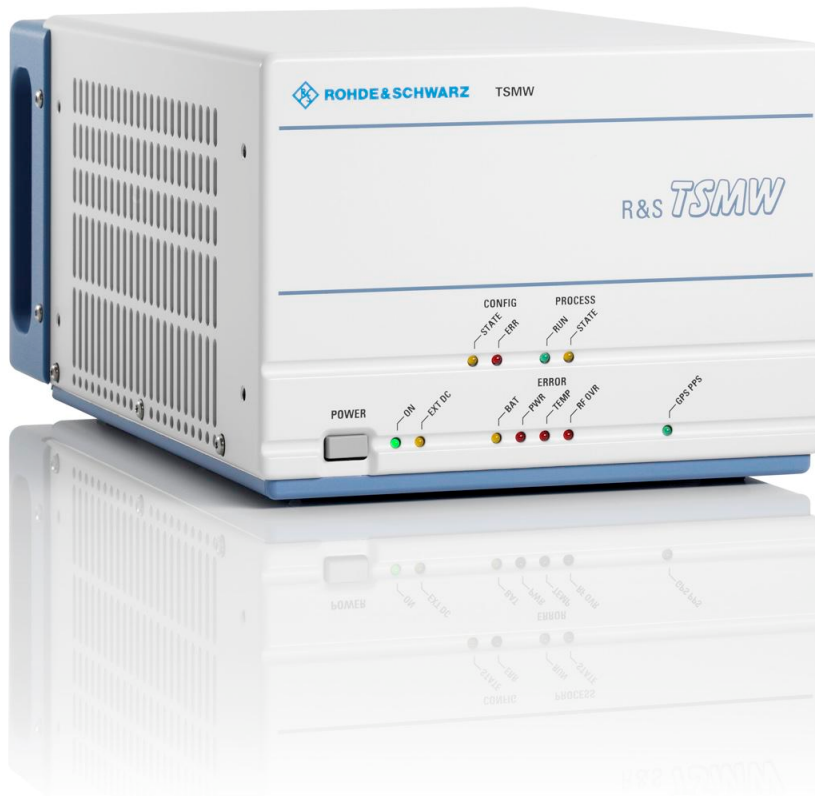


Operating Manual



Radio Network Analyzer

R&S® TSMW

1503.3001.02

Printed in Germany



Dear Customer,

Throughout this manual, TSMW is generally used as an abbreviation for the Radio Network Analyzer R&S® TSMW.

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG. Trade names are trademarks of the owners.

Grouped Safety Messages









Make sure to read through and observe the following safety instructions!







All plants and locations of the Rohde & Schwarz group of companies make every effort to keep the safety standard of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment required for them are designed and tested in accordance with the relevant safety standards. Compliance with these standards is continuously monitored by our quality assurance system. The product described here has been designed and tested in accordance with the EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards. To maintain this condition and to ensure safe operation, observe all instructions and warnings provided in this manual. If you have any questions regarding these safety instructions, the Rohde & Schwarz group of companies will be happy to answer them.

Furthermore, it is your responsibility to use the product in an appropriate manner. This product is designed for use solely in industrial and laboratory environments or, if expressly permitted, also in the field and must not be used in any way that may cause personal injury or property damage. You are responsible if the product is used for an intention other than its designated purpose or in disregard of the manufacturer's instructions. The manufacturer shall assume no responsibility for such use of the product.

The product is used for its designated purpose if it is used in accordance with its product documentation and within its performance limits (see data sheet, documentation, the following safety instructions). Using the product requires technical skills and a basic knowledge of English. It is therefore essential that only skilled and specialized staff or thoroughly trained personnel with the required skills be allowed to use the product. If personal safety gear is required for using Rohde & Schwarz products, this will be indicated at the appropriate place in the product documentation. Keep the basic safety instructions and the product documentation in a safe place and pass them on to the subsequent users.

Symbols and safety labels

| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |
| Observe product documentation | Weight indication for units >18 kg | Danger of electric shock | Warning! Hot surface | PE terminal | Ground | Ground terminal | Attention! Electrostatic sensitive devices |

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Supply voltage ON/OFF | Standby indication | Direct current (DC) | Alternating current (AC) | Direct/alternating current (DC/AC) | Device fully protected by double/reinforced insulation |

Observing the safety instructions will help prevent personal injury or damage of any kind caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before putting the product into operation. It is also absolutely essential to observe the additional safety instructions on personal safety that appear in relevant parts of the product documentation. In these safety instructions, the word "product" refers to all merchandise sold and distributed by the Rohde & Schwarz group of companies, including instruments, systems and all accessories.

Tags and their meaning

| | |
|---------|---|
| DANGER | DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. |
| WARNING | WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. |
| CAUTION | CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury. |
| NOTICE | NOTICE indicates a property damage message. In the product documentation, the word ATTENTION is used synonymously. |

These tags are in accordance with the standard definition for civil applications in the European Economic Area. Definitions that deviate from the standard definition may also exist in other economic areas or military applications. It is therefore essential to make sure that the tags described here are always used only in connection with the related product documentation and the related product. The use of tags in connection with unrelated products or documentation can result in misinterpretation and thus contribute to personal injury or material damage.

Basic safety instructions

1. The product may be operated only under the operating conditions and in the positions specified by the manufacturer. Its ventilation must not be obstructed during operation. Unless otherwise specified, the following requirements apply to Rohde & Schwarz products: prescribed operating position is always with the housing floor facing down, IP protection 2X, pollution severity 2, overvoltage category 2, use only in enclosed spaces, max. operation altitude 2000 m above sea level, max. transport altitude 4500 m above sea level.
A tolerance of $\pm 10\%$ shall apply to the nominal voltage and of $\pm 5\%$ to the nominal frequency.
2. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed. The product may be opened only by authorized, specially trained personnel. Prior to performing any work on the product or opening the product, the product must be disconnected from the supply network. Any adjustments, replacements of parts, maintenance or repair must be carried out only by technical personnel authorized by Rohde & Schwarz. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed after parts relevant to safety have been replaced (visual inspection, PE conductor test, insulation resistance measurement, leakage current measurement, functional test).

Grouped Safety Messages

3. As with all industrially manufactured goods, the use of substances that induce an allergic reaction (allergens, e.g. nickel) such as aluminum cannot be generally excluded. If you develop an allergic reaction (such as a skin rash, frequent sneezing, red eyes or respiratory difficulties), consult a physician immediately to determine the cause.
4. If products/components are mechanically and/or thermally processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled, e.g. for disposal purposes, by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed.
5. If handling the product yields hazardous substances or fuels that must be disposed of in a special way, e.g. coolants or engine oils that must be replenished regularly, the safety instructions of the manufacturer of the hazardous substances or fuels and the applicable regional waste disposal regulations must be observed. Also observe the relevant safety instructions in the product documentation.
6. Depending on the function, certain products such as RF radio equipment can produce an elevated level of electromagnetic radiation. Considering that unborn life requires increased protection, pregnant women should be protected by appropriate measures. Persons with pacemakers may also be endangered by electromagnetic radiation. The employer/operator is required to assess workplaces where there is a special risk of exposure to radiation and, if necessary, take measures to avert the danger.
7. Operating the products requires special training and intense concentration. Make certain that persons who use the products are physically, mentally and emotionally fit enough to handle operating the products; otherwise injuries or material damage may occur. It is the responsibility of the employer to select suitable personnel for operating the products.
8. Prior to switching on the product, it must be ensured that the nominal voltage setting on the product matches the nominal voltage of the AC supply network. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.
9. In the case of products of safety class I with movable power cord and connector, operation is permitted only on sockets with earthing contact and protective earth connection.
10. Intentionally breaking the protective earth connection either in the feed line or in the product itself is not permitted. Doing so can result in the danger of an electric shock from the product. If extension cords or connector strips are implemented, they must be checked on a regular basis to ensure that they are safe to use.
11. If the product has no power switch for disconnection from the AC supply, the plug of the connecting cable is regarded as the disconnecting device. In such cases, it must be ensured that the power plug is easily reachable and accessible at all times (corresponding to the length of connecting cable, approx. 2 m). Functional or electronic switches are not suitable for providing disconnection from the AC supply. If products without power switches are integrated in racks or systems, a disconnecting device must be provided at the system level.

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12. Never use the product if the power cable is damaged. Check the power cable on a regular basis to ensure that it is in proper operating condition. By taking appropriate safety measures and carefully laying the power cable, ensure that the cable cannot be damaged and that no one can be hurt by e.g. tripping over the cable or suffering an electric shock.
13. The product may be operated only from TN/TT supply networks fused with max. 16 A (higher fuse only after consulting with the Rohde & Schwarz group of companies).
14. Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket. Otherwise, this can result in sparks, fire and/or injuries.
15. Do not overload any sockets, extension cords or connector strips; doing so can cause fire or electric shocks.
16. For measurements in circuits with voltages $V_{\text{rms}} > 30 \text{ V}$, suitable measures (e.g. appropriate measuring equipment, fusing, current limiting, electrical separation, insulation) should be taken to avoid any hazards.
17. Ensure that the connections with information technology equipment comply with IEC 950/EN 60950.
18. Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, fire or damage to the product.
19. If a product is to be permanently installed, the connection between the PE terminal on site and the product's PE conductor must be made first before any other connection is made. The product may be installed and connected only by a license electrician.
20. For permanently installed equipment without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fused in such a way that suitable protection is provided for users and products.
21. Do not insert any objects into the openings in the housing that are not designed for this purpose. Never pour any liquids onto or into the housing. This can cause short circuits inside the product and/or electric shocks, fire or injuries.
22. Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a thunderstorm) can reach the product. Otherwise the operating personnel will be endangered by electric shocks.
23. Rohde & Schwarz products are not protected against penetration of liquids, unless otherwise specified (see also safety instruction 1.). If this is not taken into account, there exists the danger of electric shock for the user or damage to the product, which can also lead to personal injury.
24. Never use the product under conditions in which condensation has formed or can form in or on the product, e.g. if the product was moved from a cold to a warm environment.
25. Do not close any slots or openings on the product, since they are necessary for ventilation and prevent the product from overheating. Do not place the product on soft surfaces such as sofas or rugs or inside a closed housing, unless this is well ventilated.
26. Do not place the product on heat-generating devices such as radiators or fan heaters. The temperature of the environment must not exceed the maximum temperature specified in the data sheet.
27. Batteries and storage batteries must not be exposed to high temperatures or fire. Keep batteries and storage batteries away from children. Do not short-circuit batteries and storage batteries. If batteries or storage batteries are improperly replaced, this can cause an explosion (warning: lithium cells).

Grouped Safety Messages

Replace the battery or storage battery only with the matching Rohde & Schwarz type (see spare parts list). Batteries and storage batteries must be recycled and kept separate from residual waste. Batteries and storage batteries that contain lead, mercury or cadmium are hazardous waste. Observe the national regulations regarding waste disposal and recycling.

28. Please be aware that in the event of a fire, toxic substances (gases, liquids etc.) that may be hazardous to your health may escape from the product.
29. The product can be very heavy. Be careful when moving it to avoid back or other physical injuries.
30. Do not place the product on surfaces, vehicles, cabinets or tables that for reasons of weight or stability are unsuitable for this purpose. Always follow the manufacturer's installation instructions when installing the product and fastening it to objects or structures (e.g. walls and shelves).
31. Handles on the products are designed exclusively for personnel to hold or carry the product. It is therefore not permissible to use handles for fastening the product to or on means of transport such as cranes, fork lifts, wagons, etc. The user is responsible for securely fastening the products to or on the means of transport and for observing the safety regulations of the manufacturer of the means of transport. Noncompliance can result in personal injury or material damage.
32. If you use the product in a vehicle, it is the sole responsibility of the driver to drive the vehicle safely. Adequately secure the product in the vehicle to prevent injuries or other damage in the event of an accident. Never use the product in a moving vehicle if doing so could distract the driver of the vehicle. The driver is always responsible for the safety of the vehicle. The manufacturer assumes no responsibility for accidents or collisions.
33. If a laser product (e.g. a CD/DVD drive) is integrated in a Rohde & Schwarz product, do not use any other settings or functions than those described in the product documentation. Otherwise this may be hazardous to your health, since the laser beam can cause irreversible damage to your eyes. Never try to take such products apart, and never look into the laser beam.
34. Prior to cleaning, disconnect the product from the AC supply. Use a soft, non-linting cloth to clean the product. Never use chemical cleaning agents such as alcohol, acetone or diluent for cellulose lacquers.

Informaciones elementales de seguridad

¡Es imprescindible leer y observar las siguientes instrucciones e informaciones de seguridad!

El principio del grupo de empresas Rohde & Schwarz consiste en tener nuestros productos siempre al día con los estándares de seguridad y de ofrecer a nuestros clientes el máximo grado de seguridad. Nuestros productos y todos los equipos adicionales son siempre fabricados y examinados según las normas de seguridad vigentes. Nuestra sección de gestión de la seguridad de calidad controla constantemente que sean cumplidas estas normas. El presente producto ha sido fabricado y examinado según el comprobante de conformidad adjunto según las normas de la CE y ha salido de nuestra planta en estado impecable según los estándares técnicos de seguridad. Para poder preservar este estado y garantizar un funcionamiento libre de peligros, el usuario deberá atenerse a todas las indicaciones, informaciones de seguridad y notas de alerta. El grupo de empresas Rohde & Schwarz está siempre a su disposición en caso de que tengan preguntas referentes a estas informaciones de seguridad.







Además queda en la responsabilidad del usuario utilizar el producto en la forma debida. Este producto está destinado exclusivamente al uso en la industria y el laboratorio o, si ha sido expresamente autorizado, para aplicaciones de campo y de ninguna manera deberá ser utilizado de modo que alguna persona/cosa pueda sufrir daño. El uso del producto fuera de sus fines definidos o despreciando las informaciones de seguridad del fabricante queda en la responsabilidad del usuario. El fabricante no se hace en ninguna forma responsable de consecuencias a causa del mal uso del producto.

Se parte del uso correcto del producto para los fines definidos si el producto es utilizado dentro de las instrucciones de la correspondiente documentación de producto y dentro del margen de rendimiento definido (ver hoja de datos, documentación, informaciones de seguridad que siguen). El uso del producto hace necesarios conocimientos profundos y conocimientos básicas del idioma inglés. Por eso se debe tener en cuenta que el producto sólo pueda ser operado por personal especializado o personas minuciosamente instruidas con las capacidades correspondientes. Si fuera necesaria indumentaria de seguridad para el uso de productos de R&S, encontrará la información debida en la documentación del producto en el capítulo correspondiente. Guarde bien las informaciones de seguridad elementales, así como la documentación del producto y entréguela a usuarios posteriores.

Símbolos y definiciones de seguridad

| | | | | | | | |
|---|---|---|---|---|--|---|---|
|  |  |  |  |  |  |  |  |
| Ver documentación de producto | Informaciones para maquinaria con un peso de > 18kg | Peligro de golpe de corriente | ¡Advertencia! Superficie caliente | Conexión a conductor protector | Conexión a tierra | Conexión a masa conductora | ¡Cuidado! Elementos de construcción con peligro de carga electroestática |

Informaciones elementales de seguridad

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Potencia EN MARCHA/PARADA | Indicación Stand-by | Corriente continua DC | Corriente alterna AC | Corriente continua/alterna DC/AC | El aparato está protegido en su totalidad por un aislamiento de doble refuerzo |

Tener en cuenta las informaciones de seguridad sirve para tratar de evitar daños y peligros de toda clase. Es necesario de que se lean las siguientes informaciones de seguridad concienzudamente y se tengan en cuenta debidamente antes de la puesta en funcionamiento del producto. También deberán ser tenidas en cuenta las informaciones para la protección de personas que encontrarán en el capítulo correspondiente de la documentación de producto y que también son obligatorias de seguir. En las informaciones de seguridad actuales hemos juntado todos los objetos vendidos por el grupo de empresas Rohde & Schwarz bajo la denominación de „producto“, entre ellos también aparatos, instalaciones así como toda clase de accesorios.

Palabras de señal y su significado

| | |
|-------------|---|
| PELIGRO | Identifica un peligro directo con riesgo elevado de provocar muerte o lesiones de gravedad si no se toman las medidas oportunas. |
| ADVERTENCIA | Identifica un posible peligro con riesgo medio de provocar muerte o lesiones (de gravedad) si no se toman las medidas oportunas. |
| ATENCIÓN | Identifica un peligro con riesgo reducido de provocar lesiones de gravedad media o leve si no se toman las medidas oportunas. |
| AVISO | Indica la posibilidad de utilizar mal el producto y a consecuencia dañarlo. En la documentación del producto se emplea de forma sinónima el término CUIDADO. |

Las palabras de señal corresponden a la definición habitual para aplicaciones civiles en el área económica europea. Pueden existir definiciones diferentes a esta definición en otras áreas económicas o en aplicaciones militares. Por eso se deberá tener en cuenta que las palabras de señal aquí descritas sean utilizadas siempre solamente en combinación con la correspondiente documentación de producto y solamente en combinación con el producto correspondiente. La utilización de las palabras de señal en combinación con productos o documentaciones que no les correspondan puede llevar a malinterpretaciones y tener por consecuencia daños en personas u objetos.

Informaciones de seguridad elementales

1. El producto solamente debe ser utilizado según lo indicado por el fabricante referente a la situación y posición de funcionamiento sin que se obstruya la ventilación. Si no se convino de otra manera, es para los productos R&S válido lo que sigue:
como posición de funcionamiento se define por principio la posición con el suelo de la caja para abajo, modo de protección IP 2X, grado de suciedad 2, categoría de sobrecarga eléctrica 2, utilizar solamente en estancias interiores, utilización hasta 2000 m sobre el nivel del mar, transporte hasta 4.500 m sobre el nivel del mar.
Se aplicará una tolerancia de $\pm 10\%$ sobre el voltaje nominal y de $\pm 5\%$ sobre la frecuencia nominal.
2. En todos los trabajos deberán ser tenidas en cuenta las normas locales de seguridad de trabajo y de prevención de accidentes. El producto solamente debe de ser abierto por personal especializado autorizado. Antes de efectuar trabajos en el producto o abrirlo deberá este ser desconectado de la corriente. El ajuste, el cambio de partes, la manutención y la reparación deberán ser solamente efectuadas por electricistas autorizados por R&S. Si se reponen partes con importancia para los aspectos de seguridad (por ejemplo el enchufe, los transformadores o los fusibles), solamente podrán ser sustituidos por partes originales. Después de cada recambio de partes elementales para la seguridad deberá ser efectuado un control de seguridad (control a primera vista, control de conductor protector, medición de resistencia de aislamiento, medición de la corriente conductora, control de funcionamiento).
3. Como en todo producto de fabricación industrial no puede ser excluido en general de que se produzcan al usarlo elementos que puedan generar alergias, los llamados elementos alergénicos (por ejemplo el níquel). Si se produjeran en el trato con productos R&S reacciones alérgicas, como por ejemplo urticaria, estornudos frecuentes, irritación de la conjuntiva o dificultades al respirar, se deberá consultar inmediatamente a un médico para averiguar los motivos de estas reacciones.
4. Si productos / elementos de construcción son tratados fuera del funcionamiento definido de forma mecánica o térmica, pueden generarse elementos peligrosos (polvos de sustancia de metales pesados como por ejemplo plomo, berilio, níquel). La partición elemental del producto, como por ejemplo sucede en el tratamiento de materias residuales, debe de ser efectuada solamente por personal especializado para estos tratamientos. La partición elemental efectuada inadecuadamente puede generar daños para la salud. Se deben tener en cuenta las directivas nacionales referentes al tratamiento de materias residuales.
5. En el caso de que se produjeran agentes de peligro o combustibles en la aplicación del producto que debieran de ser transferidos a un tratamiento de materias residuales, como por ejemplo agentes refrigerantes que deben ser repuestos en periodos definidos, o aceites para motores, deberán ser tenidas en cuenta las prescripciones de seguridad del fabricante de estos agentes de peligro o combustibles y las regulaciones regionales para el tratamiento de materias residuales. Cuiden también de tener en cuenta en caso dado las prescripciones de seguridad especiales en la descripción del producto.

6. Ciertos productos, como por ejemplo las instalaciones de radiocomunicación RF, pueden a causa de su función natural, emitir una radiación electromagnética aumentada. En vista a la protección de la vida en desarrollo deberían ser protegidas personas embarazadas debidamente. También las personas con un bypass pueden correr peligro a causa de la radiación electromagnética. El empresario/usuario está comprometido a valorar y señalar áreas de trabajo en las que se corra un riesgo aumentado de exposición a radiaciones para evitar riesgos.
7. La utilización de los productos requiere instrucciones especiales y una alta concentración en el manejo. Debe de ponerse por seguro de que las personas que manejen los productos estén a la altura de los requerimientos necesarios referente a sus aptitudes físicas, psíquicas y emocionales, ya que de otra manera no se pueden excluir lesiones o daños de objetos. El empresario lleva la responsabilidad de seleccionar el personal usuario apto para el manejo de los productos.
8. Antes de la puesta en marcha del producto se deberá tener por seguro de que la tensión preseleccionada en el producto equivalga a la del la red de distribución. Si es necesario cambiar la preselección de la tensión también se deberán en caso dabo cambiar los fusibles correspondientes del producto.
9. Productos de la clase de seguridad I con alimentación móvil y enchufe individual de producto solamente deberán ser conectados para el funcionamiento a tomas de corriente de contacto de seguridad y con conductor protector conectado.
10. Queda prohibida toda clase de interrupción intencionada del conductor protector, tanto en la toma de corriente como en el mismo producto. Puede tener como consecuencia el peligro de golpe de corriente por el producto. Si se utilizaran cables o enchufes de extensión se deberá poner al seguro que es controlado su estado técnico de seguridad.
11. Si el producto no está equipado con un interruptor para desconectarlo de la red, se deberá considerar el enchufe del cable de distribución como interruptor. En estos casos deberá asegurar de que el enchufe sea de fácil acceso y nabejo (según la medida del cable de distribución, aproximadamente 2 m). Los interruptores de función o electrónicos no son aptos para el corte de la red eléctrica. Si los productos sin interruptor están integrados en bastidores o instalaciones, se deberá instalar el interruptor al nivel de la instalación.
12. No utilice nunca el producto si está dañado el cable eléctrico. Compruebe regularmente el correcto estado de los cables de conexión a red. Asegure a través de las medidas de protección y de instalación adecuadas de que el cable de eléctrico no pueda ser dañado o de que nadie pueda ser dañado por él, por ejemplo al tropezar o por un golpe de corriente.
13. Solamente está permitido el funcionamiento en redes de distribución TN/TT aseguradas con fusibles de como máximo 16 A (utilización de fusibles de mayor amperaje sólo previa consulta con el grupo de empresas Rohde & Schwarz).
14. Nunca conecte el enchufe en tomas de corriente sucias o llenas de polvo. Introduzca el enchufe por completo y fuertemente en la toma de corriente. Si no tiene en consideración estas indicaciones se arriesga a que se originen chispas, fuego y/o heridas.
15. No sobrecargue las tomas de corriente, los cables de extensión o los enchufes de extensión ya que esto pudiera causar fuego o golpes de corriente.

16. En las mediciones en circuitos de corriente con una tensión de entrada de $U_{eff} > 30 \text{ V}$ se deberá tomar las precauciones debidas para impedir cualquier peligro (por ejemplo medios de medición adecuados, seguros, limitación de tensión, corte protector, aislamiento etc.).
17. En caso de conexión con aparatos de la técnica informática se deberá tener en cuenta que estos cumplan los requisitos del estándar IEC950/EN60950.
18. A menos que esté permitido expresamente, no retire nunca la tapa ni componentes de la carcasa mientras el producto esté en servicio. Esto pone a descubierto los cables y componentes eléctricos y puede causar heridas, fuego o daños en el producto.
19. Si un producto es instalado fijamente en un lugar, se deberá primero conectar el conductor protector fijo con el conductor protector del aparato antes de hacer cualquier otra conexión. La instalación y la conexión deberán ser efectuadas por un electricista especializado.
20. En caso de que los productos que son instalados fijamente en un lugar sean sin protector implementado, autointerruptor o similares objetos de protección, el circuito de suministro de corriente deberá estar protegido de manera que usuarios y productos estén suficientemente protegidos.
21. Por favor, no introduzca ningún objeto que no esté destinado a ello en los orificios de la caja del aparato. No vierta nunca ninguna clase de líquidos sobre o en la caja. Esto puede producir cortocircuitos en el producto y/o puede causar golpes de corriente, fuego o heridas.
22. Asegúrese con la protección adecuada de que no pueda originarse en el producto una sobrecarga por ejemplo a causa de una tormenta. Si no se verá el personal que lo utilice expuesto al peligro de un golpe de corriente.
23. Los productos R&S no están protegidos contra líquidos si no es que exista otra indicación, ver también punto 1. Si no se tiene en cuenta esto se arriesga el peligro de golpe de corriente para el usuario o de daños en el producto lo cual también puede llevar al peligro de personas.
24. No utilice el producto bajo condiciones en las que pueda producirse y se hayan producido líquidos de condensación en o dentro del producto como por ejemplo cuando se desplaza el producto de un lugar frío a un lugar caliente.
25. Por favor no cierre ninguna ranura u orificio del producto, ya que estas son necesarias para la ventilación e impiden que el producto se caliente demasiado. No pongan el producto encima de materiales blandos como por ejemplo sofás o alfombras o dentro de una caja cerrada, si esta no está suficientemente ventilada.
26. No ponga el producto sobre aparatos que produzcan calor, como por ejemplo radiadores o calentadores. La temperatura ambiental no debe superar la temperatura máxima especificada en la hoja de datos.
27. Baterías y acumuladores no deben de ser expuestos a temperaturas altas o al fuego. Guardar baterías y acumuladores fuera del alcance de los niños. No cortocircuitar baterías ni acumuladores. Si las baterías o los acumuladores no son cambiados con la debida atención existirá peligro de explosión (atención células de litio). Cambiar las baterías o los acumuladores solamente por los del tipo R&S correspondiente (ver lista de piezas de recambio). Las baterías y acumuladores deben reutilizarse y no deben acceder a los vertederos. Las baterías y acumuladores que contienen plomo, mercurio o cadmio deben tratarse como residuos especiales. Respete en esta relación las normas nacionales de evacuación y reciclaje.
28. Por favor tengan en cuenta que en caso de un incendio pueden desprenderse del producto agentes venenosos (gases, líquidos etc.) que pueden generar daños a la salud.

29. El producto puede poseer un peso elevado. Muévelo con cuidado para evitar lesiones en la espalda u otras partes corporales.
30. No sitúe el producto encima de superficies, vehículos, estantes o mesas, que por sus características de peso o de estabilidad no sean aptas para él. Siga siempre las instrucciones de instalación del fabricante cuando instale y asegure el producto en objetos o estructuras (por ejemplo paredes y estantes).
31. Las asas instaladas en los productos sirven solamente de ayuda para el manejo que solamente está previsto para personas. Por eso no está permitido utilizar las asas para la sujeción en o sobre medios de transporte como por ejemplo grúas, carretillas elevadoras de horquilla, carros etc. El usuario es responsable de que los productos sean sujetados de forma segura a los medios de transporte y de que las prescripciones de seguridad del fabricante de los medios de transporte sean observadas. En caso de que no se tengan en cuenta pueden causarse daños en personas y objetos.
32. Si llega a utilizar el producto dentro de un vehículo, queda en la responsabilidad absoluta del conductor que conducir el vehículo de manera segura. Asegure el producto dentro del vehículo debidamente para evitar en caso de un accidente las lesiones u otra clase de daños. No utilice nunca el producto dentro de un vehículo en movimiento si esto pudiera distraer al conductor. Siempre queda en la responsabilidad absoluta del conductor la seguridad del vehículo. El fabricante no asumirá ninguna clase de responsabilidad por accidentes o colisiones.
33. Dado el caso de que esté integrado un producto de láser en un producto R&S (por ejemplo CD/DVD-ROM) no utilice otras instalaciones o funciones que las descritas en la documentación de producto. De otra manera pondrá en peligro su salud, ya que el rayo láser puede dañar irreversiblemente sus ojos. Nunca trate de descomponer estos productos. Nunca mire dentro del rayo láser.
34. Antes de proceder a la limpieza, desconecte el producto de la red. Realice la limpieza con un paño suave, que no se deshilache. No utilice de ninguna manera agentes limpiadores químicos como, por ejemplo, alcohol, acetona o nitrodiluyente.



ROHDE & SCHWARZ

Kundeninformation zur Batterieverordnung (BattV)

Dieses Gerät enthält eine schadstoffhaltige Batterie. Diese darf nicht mit dem Hausmüll entsorgt werden.

Nach Ende der Lebensdauer darf die Entsorgung nur über eine Rohde&Schwarz-Kundendienststelle oder eine geeignete Sammelstelle erfolgen.

Safety Regulations for Batteries (according to BattV)

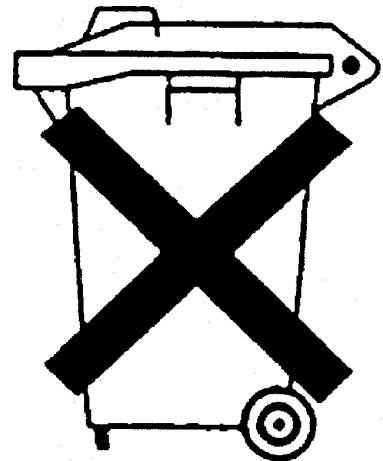
This equipment houses a battery containing harmful substances that must not be disposed of as normal household waste.

After its useful life, the battery may only be disposed of at a Rohde & Schwarz service center or at a suitable depot.

Normas de Seguridad para Baterías (Según BattV)

Este equipo lleva una batería que contiene sustancias perjudiciales, que no se debe desechar en los contenedores de basura domésticos.

Después de la vida útil, la batería sólo se podrá eliminar en un centro de servicio de Rohde & Schwarz o en un depósito apropiado.



Consignes de sécurité pour batteries (selon BattV)

Cet appareil est équipé d'une pile comprenant des substances nocives. Ne jamais la jeter dans une poubelle pour ordures ménagères.

Une pile usagée doit uniquement être éliminée par un centre de service client de Rohde & Schwarz ou peut être collectée pour être traitée spécialement comme déchets dangereux.

Certified Quality System

DIN EN ISO 9001 : 2000

DIN EN 9100 : 2003

DIN EN ISO 14001 : 2004

DQS REG. NO 001954 QM UM

QUALITÄTSZERTIFIKAT

Sehr geehrter Kunde,
Sie haben sich für den Kauf eines Rohde & Schwarz-Produktes entschieden. Hiermit erhalten Sie ein nach modernsten Fertigungsmethoden hergestelltes Produkt. Es wurde nach den Regeln unseres Managementsystems entwickelt, gefertigt und geprüft.
Das Rohde & Schwarz Managementsystem ist zertifiziert nach:

DIN EN ISO 9001:2000
DIN EN 9100:2003
DIN EN ISO 14001:2004

CERTIFICATE OF QUALITY

Dear Customer,
you have decided to buy a Rohde & Schwarz product. You are thus assured of receiving a product that is manufactured using the most modern methods available. This product was developed, manufactured and tested in compliance with our quality management system standards.
The Rohde & Schwarz quality management system is certified according to:

DIN EN ISO 9001:2000
DIN EN 9100:2003
DIN EN ISO 14001:2004

CERTIFICAT DE QUALITÉ

Cher Client,
vous avez choisi d'acheter un produit Rohde & Schwarz. Vous disposez donc d'un produit fabriqué d'après les méthodes les plus avancées. Le développement, la fabrication et les tests respectent nos normes de gestion qualité.
Le système de gestion qualité de Rohde & Schwarz a été homologué conformément aux normes:

DIN EN ISO 9001:2000
DIN EN 9100:2003
DIN EN ISO 14001:2004



ROHDE & SCHWARZ



ROHDE & SCHWARZ
EC Certificate of Conformity



Certificate No : 2008-26

This is to certify that:

| Equipment type | Stock No | Designation |
|----------------|--------------|------------------------|
| TSMW | 1503.3001.02 | Radio Network Analyzer |

complies with the provisions of the Directive of the Council of the European Union on the approximation of the laws of the Member States

- relating to electrical equipment for use within defined voltage limits (2006/95/EC)
- relating to electromagnetic compatibility (2004/108/EC)

Conformity is proven by compliance with the following standards:

EN 61010-1 : 2001
EN 61326 : 1997 + A1 : 1998 + A2 : 2001 + A3 : 2003
EN 55011 : 1998 + A1 : 1999 + A2 : 2002, Klasse B

For the assessment of electromagnetic compatibility, the limits of radio interference for Class B equipment as well as the immunity to interference for operation in industry have been used as a basis

Affixing the EC conformity mark as from 2008

ROHDE & SCHWARZ GmbH & Co. KG
Mühlhofstr. 15, D-81671 München

Munich, 2008-05-08

Central Quality Management MF-QZ / Radde

Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish.

We will take care that you will get the right information.

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Monday to Friday (except US public holidays)
8:00 AM – 8:00 PM Eastern Standard Time (EST)

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1. System Overview and Operating Concept

Introduction

The TSMW Radio Network Analyzer (TSMW) is a high-power platform for optimizing all conventional mobile radio networks. Two highly sensitive 20 MHz front ends for any input frequencies from 30 MHz to 6 GHz, a dual-channel preselector and an FPGA-based software-defined architecture offer unsurpassed performance while providing maximum flexibility and future proofness. In addition to functioning as a WiMAX scanner, the TSMW makes also an ideal digital I/Q receiver for customer-specific applications.

- ◆ User-definable input frequency range from 30 MHz to 6 GHz
- ◆ Two independent RF and signal processing paths, each with a bandwidth of 20 MHz
- ◆ Integrated preselection for high intermodulation suppression together with high dynamic range
- ◆ I/Q baseband streaming with Gigabit interface (R&S®TSMW-K1)
- ◆ Support of WiMAX IEEE802.16e measurements together with R&S® ROMES software (R&S®TSMW-K28)
- ◆ Future-proof software-defined architecture
- ◆ Integrated GPS

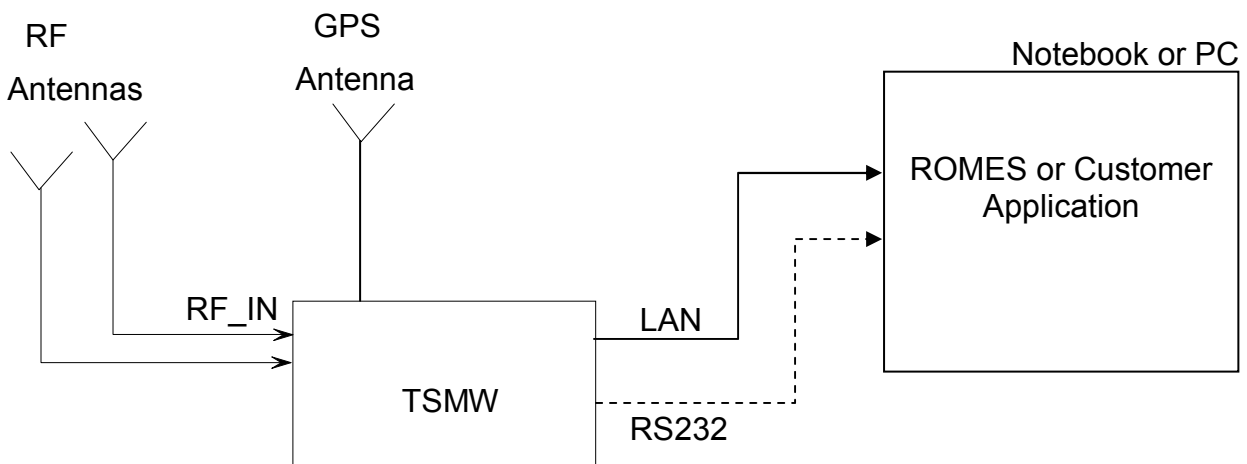


Figure 1-1: General Setup

Prerequisites

To operate the analyzer correctly, you need the following equipment:

- ◆ PC/notebook with LAN interface (see [System Requirements](#) on page 6) Not part of the package.
- ◆ Antennas 2 tri band antennas for the frequency range 2,4 / 5,2 / 5,8 GHz with SMA→N adapter is part of the package
- ◆ Connection cables Some cables are included (for details see [Connecting the TSMW to the External Devices](#) on page 19)
- ◆ DC power supply Optional part of the package: TSMW-Z1.
- ◆ World wide adaptor for earthing type plug Part of the package, necessary to use the TSMW-Z1 world wide.
- ◆ R&S® ROMES measurement software or any customer software application Not part of the package.

INFO

Please refer to the chapter [Software Options](#) on page 45 and to the Release Notes for information about the provided features for this version of the product.

System Requirements

Controlling and measuring with the TSMW requires a system controller in the form of a personal computer (PC) or notebook with LAN interface.

Operating system requirements:

- ◆ Intel Pentium 4
- ◆ 2 GB Memory
- ◆ Windows XP SP2
- ◆ Gbit LAN Adapter with Jumbo Frames 9kB and Flow Control Enabled
- ◆ Network Interface Card: PCIe

Requirements for I/Q Baseband Streaming with TSMW-K1:

- ◆ Transfer Rate Hard disk: > 40 MB/sec
- ◆ Jumbo Frames 9kB and Flow Control enabled

For diagnostic purposes and servicing the TSMW, trace and diagnostic data see output via the serial RS-232-C interface of the instrument (see [Troubleshooting via RS 232](#) on page 53).

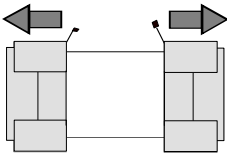
2. Setting up the Instrument

The following section describes the procedure for putting the TSMW into operation. It contains general safety instructions for operation.

CAUTION**Device damage caused by disregarding the precautions!**

Make sure instructions in the following sections are adhered in order to avoid danger to people and damage to the device. This is of particular importance when using the device for the first time. Also observe the general Safety Instructions at the beginning of this manual.

Unpacking



Remove protective covers

1. Remove the TSMW from its packaging and check the equipment for completeness using the delivery list.
2. Remove the two protective covers from the front and rear panels of the TSMW and carefully check the device for damage.
3. If the equipment is damaged, immediately contact the carrier who delivered the device. In this case, make sure that the box and packing material is not discarded.
4. Keep the box and packing material until you have verified that the contents are complete and the TSMW has been tested electrically and mechanically.
5. The original packaging is also useful for transport or shipping of the TSMW later on. Keep at least the two protective covers to prevent control elements and connectors from being damaged.

Mounting in a 19" Rack

Using the TSMW-Z3 rack adapter the instrument can be mounted in 19" racks according to the mounting instructions supplied with the rack adapter. To obtain the order number, please contact your local Rohde & Schwarz representative.

NOTICE**Danger of instrument damage!**

Allow for sufficient air supply in the rack. Make sure that there is sufficient space between the ventilation holes and the rack casing.

3. Front and Rear Panel Description

Front Panel

This section gives an overview of the control elements on the front panel of the TSMW. Each LED is briefly described.

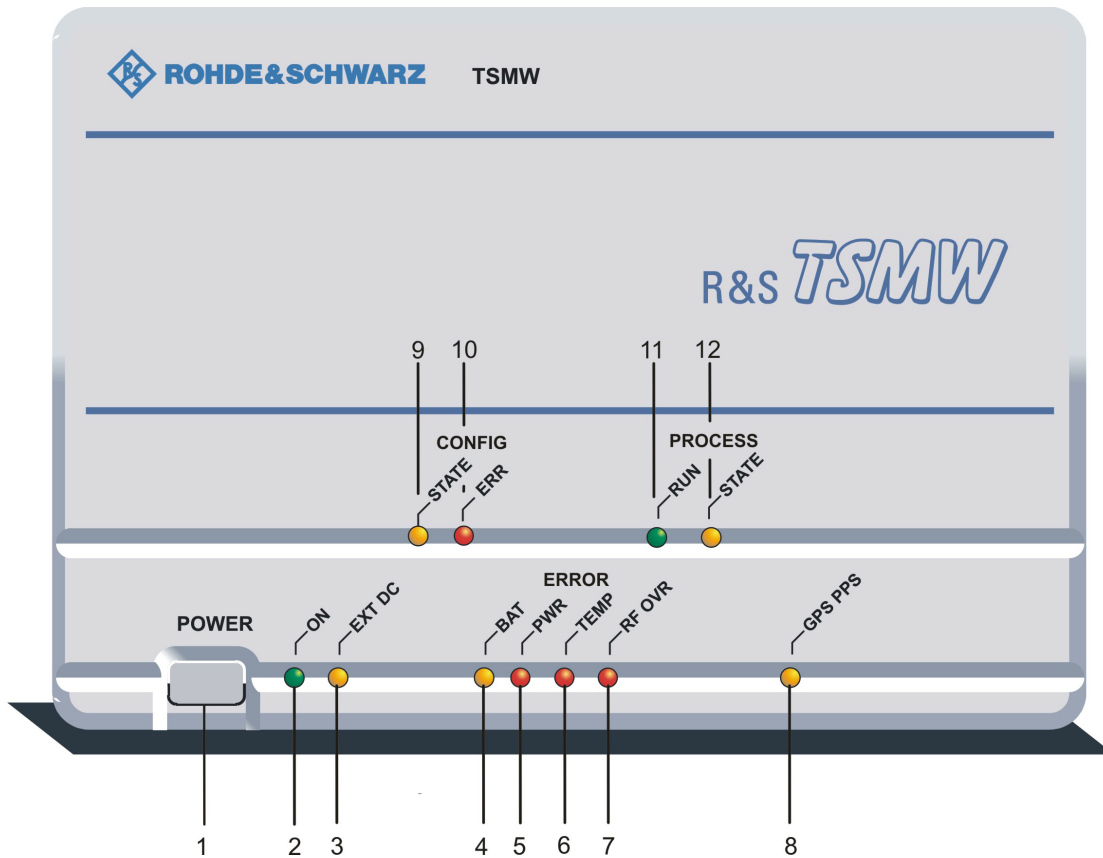
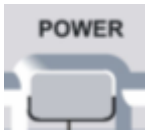


Figure 3-1: Front panel view

General

1 POWER Button

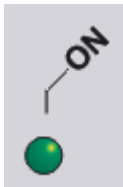


The Power Button switches the instrument on or off.

NOTICE Danger of instrument damage!

- ◆ The instrument must be set up in such a way that the operation of the power switch is not obstructed.
- ◆ It is strongly recommended to shut down the operating system before switching off the instrument.

2 On - LED



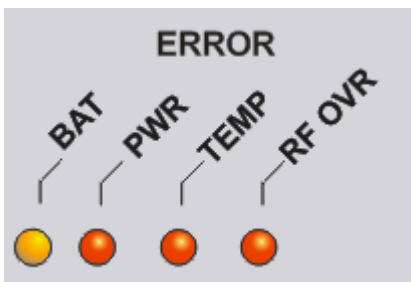
On: TSMW is operating mode.
Flashing: Sync Mode is active.

3 EXT DC - LED



On: The instrument is in Standby Mode but supplied with external power via the DC port at the rear panel.
The LED is also illuminated if the TSMW is switched off i.e. it is in Standby Mode.

ERROR LEDs



The Error LEDs indicate any failure in the system. The fault has to be diagnosed and resolved, if this is not possible stop measurements and contact R&S service.

4 LOW BAT - LED

ON: The battery level is low. Sync Mode cannot be used.
Off: No battery included or battery level is Sufficient.

5 ERR PWR - LED

On: At least one of the internal voltages is out of range.
This can damage the instrument and / or cause faulty measurements.

6 ERR TEMP - LED

On: System is overheated.
This can damage the instrument and / or cause faulty measurements.

7 ERR RF OVR - LED

On: Input of RF is too high.
Risk of fatal damage to the RF part of the instrument.

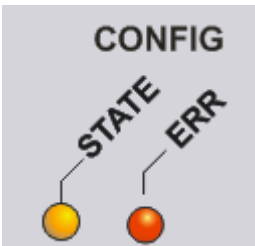
GPS

8 GPS PPS - LED



Flashing: The LED flashes once a second if the internal GPS delivers PPS (Pulse per Second) time sync signal

CONFIGURATION LEDs



Indicate the internal FPGA configuration state.

9 CONFIGURATION STATE

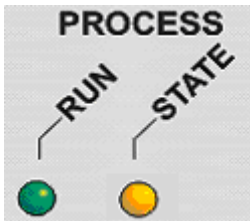
Flashing: FPGA in process.
On: FPGA configuration finished.
For the different modes refer to [Figure 7-3: TSMW Modes and Interim States](#) on page 33.

10 CONFIGURATION ERROR

Flashing: No flashcard detected.

On: FPGA configuration files could not be read from flash.

If the configuration file cannot be loaded the system will shut down.

PROCESS LEDs

Indicate the operating mode of the TSMW:

11 PROCESS RUN

On: Connected Mode, device is configured for a specific measurement.

Off: Idle, device is booted, but not connected

Flashing (slowly):

Measuring Mode, measurement is running.

Flashing (Fast):

Special application event, t.b.d

12 PROC STATE - LED

On: Booting and Self-test finished successfully.

Flashing (slowly):

System Warning, minor problem detected.

Flashing (Fast):

System Error, major problem detected.

Rear Panel

This section gives an overview of the control elements and the connectors on the rear panel of the TSMW. Each element or connector is briefly described and a reference is given to the chapters containing detailed information.

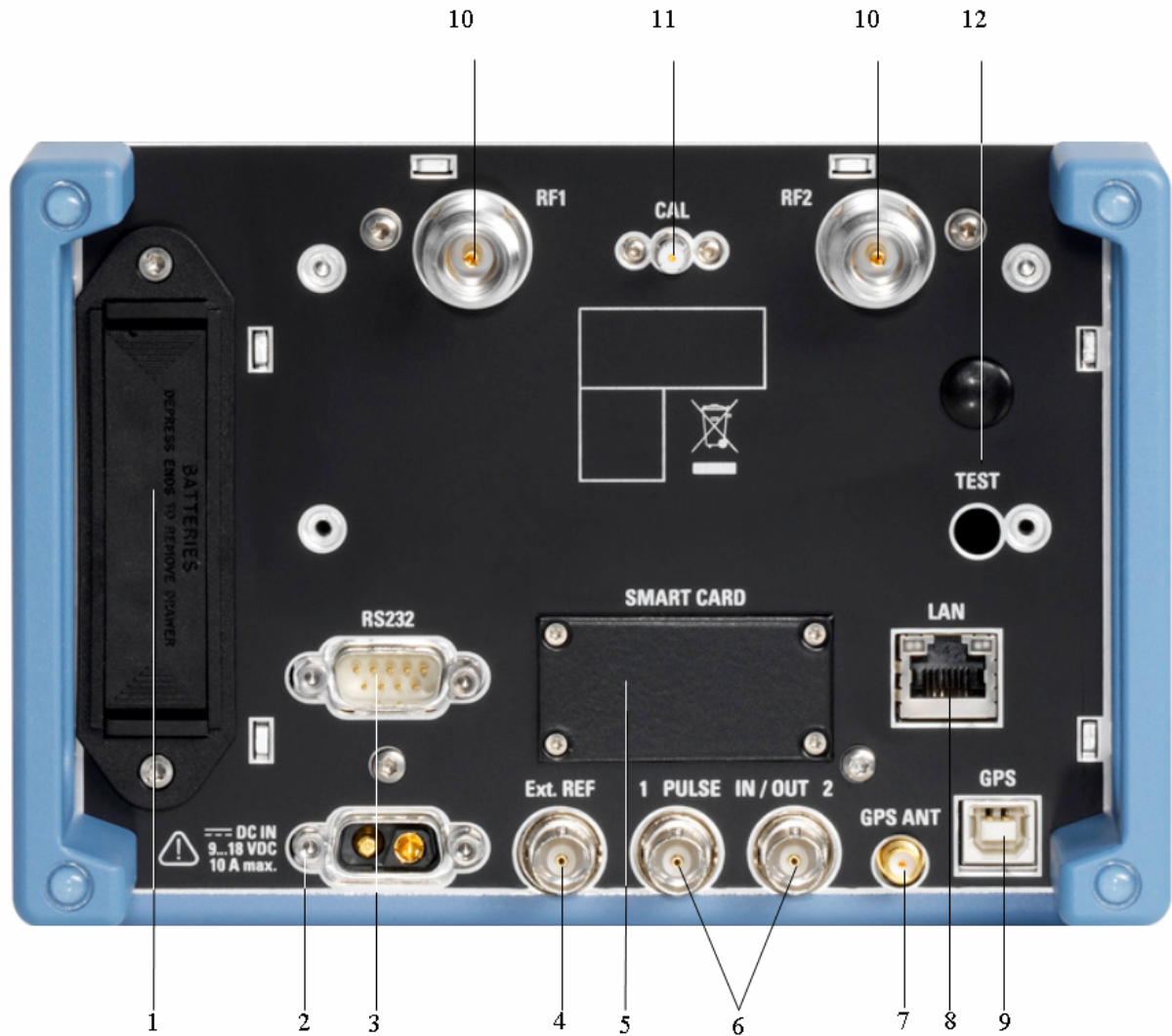


Figure 3-2: Rear panel view

1 Battery

The "usage of the" Battery Pack is optional, when used, the time synchronization with a network is preserved even if the instrument is shut down or in Standby Mode "disconnected from the DC supply". Backup Time: approx. 15 minutes.

Standby Mode: t.b.d.

NOTICE Battery Type

Use only following battery type:

- ◆ 1,5V AA MIGNON LR6
-

INFO

Battery Storage

- ◆ If the battery is not used for a longer time, it is recommended to remove it and store it separately.
 - ◆ Do not use rechargeable batteries.
-

2 DC IN



The TSMW is supplied with an external power supply and a separate power cable.

Power supply:

Snap and lock jack, "2-pin" power supply input 9 V to 18 V DC with 10A max.

3 RS232



The RS232 serial port, 9-pin D-Sub (male) connector can be connected with the RS-232-C interface on the PC or notebook via a null-modem cable (necessary only for service purposes and troubleshooting).

NOTICE Danger of instrument damage!

Before switching on the instrument for the first time, check whether the correct DC supply voltage is present.

4 Ext. REF



BNC connector for input of a dedicated 10 MHz reference signal provided by an external signal generator (optional).

5 Smart Card



Slot for Compact Flash Card.

INFO

Warranty!

Device will loose warranty if seal is broken.

6 PULSE n / Out 1 and 2



Multi-purpose Trigger I/O signals - Application specific!

7 GPS ANT



SMA Connector for the external active or passive GPS antenna.

Antenna power: 3V max. 25mA

8 LAN



High speed Gigabit Ethernet interface with RJ 45 connector using IPv4.

9 GPS



This USB port can be used to output a GPS signal to an external device. The internal TSMW-GPS is working as a standalone GPS instrument even if the TSMW is not powered. Power supply for the GPS receiver will be done via the USB connection.

10 RF 1 / RF2

Input for the RF Signal.
N female, input impedance 50 Ω ,
VSWR type. 2.0

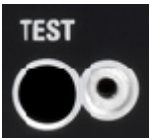
NOTICE Danger of instrument damage!

Do not inject more than the maximum rated RF input power, otherwise, the input stage can be severely damaged.

Max. input power: +5dBm/ 0V DC

11 CAL

QMA input of carrier signal used for phase calibration of the two RF front ends (optional).

12 TEST

SMP Port used for self test of the RF chain.
Cable for test purposes is included in the delivery.

Info

Connect only a cable with the SMP port for the self test of the RF chain. In all other operation modes of the TSMW keep attention that no cable is connected with this port.

4. Safety Instructions

General Precautions

CAUTION**Danger of instrument damage**

Any non-compliance with the following precautions may cause damage to the TSMW. Prior to putting the device into operation, check the following:

- ◆ Make sure that the air can escape freely through the vents at the sides on the left and the right, i.e. allow a minimum 10 cm clearance.
- ◆ When using two TSMWs in a rack side by side a metal shield is required for air fluctuation
- ◆ Make sure that the interfaces of the device are correctly connected.
- ◆ Make sure that the signal levels at the inputs and outputs do not exceed permissible limits.
- ◆ The device should only be operated in horizontal position on an even surface.
- ◆ The ambient temperature must not exceed the range specified in the data sheet.

Please also observe the instructions in the following sections and the general safety instructions at the beginning of this manual.

Protection against Electrostatics

**Risk of damaging the electronic components!**

To avoid damaging the electronic components of the EUT due to electrostatic discharge produced by contact, the use of appropriate protective measures is recommended.

Cleaning the Outside and Storing

Essentially necessary is the cleaning of the instrument.

NOTICE**Instrument damage caused by cleaning agents!**

- ◆ Cleaning agents contain substances that may damage the instrument, e.g. solvent-containing cleaning agents may damage the front panel labelling or plastic parts.
 - ◆ Never use cleaning agents such as solvents (thinners, acetone, etc.), acids, bases, or other substances.
 - ◆ The outside of the instrument is suitably cleaned using a soft, line-free dust cloth.
-

EMC Safety Precautions

To avoid electromagnetic interference (EMI) suitable, shielded signal and control cables must be used. Always operate the instrument when it is closed and with all shielding covers installed.

5. Connecting the Instrument

Connecting the TSMW to the External Devices

- ◆ Connect the PC or notebook LAN port to the LAN port of the TSMW. For detailed information see [Connecting the LAN Interface](#) on page 21
- ◆ Connect the antenna SMA-connector to the SMA↔N adapter and connect the adapter to the RF IN connector. Two tri-band antennas with adapter are part of the package.

NOTICE**Danger of instrument damage!**

Do not to inject more than the maximum rated RF input power, otherwise the input stage could be severely damaged.

- ◆ TSMW: max. +5dBm, 0V (DC).
-

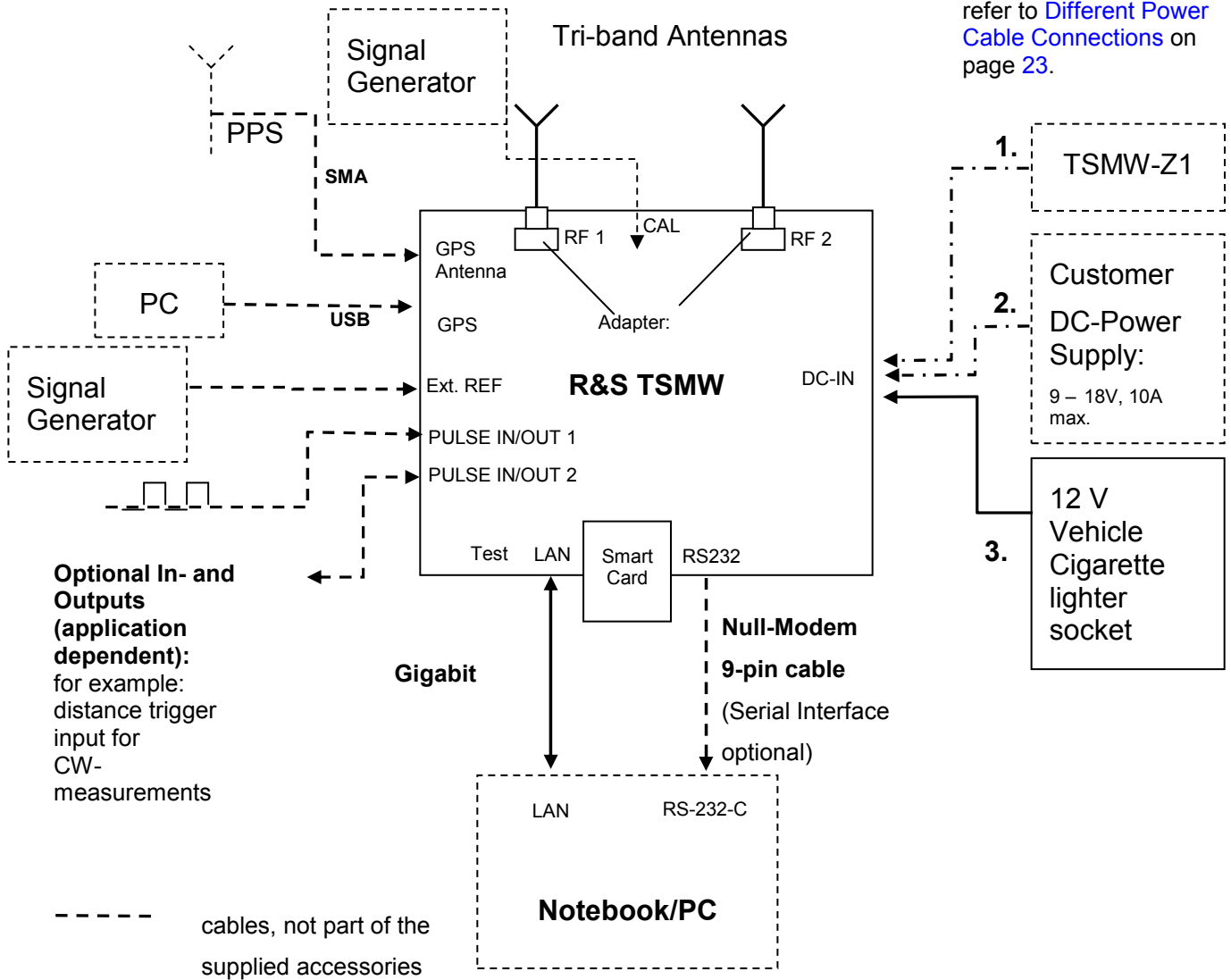
- ◆ Optional: Ext REF is only necessary if synchronization with a 10 MHz reference signal is used, required Input Level > 0dBm
- ◆ Optional: The RS232 connector should be connected with the RS-232-C interface on the PC or notebook via a null-modem cable. This is necessary only for service purposes and troubleshooting; see [Troubleshooting via RS 232](#) on page 53.
- ◆ Optional: Connect the GPS antenna to the GPS Antenna connector of the TSMW for time synchronization to a GPS signal (3V, max.100mA for active antenna).
- ◆ Optional: The GPS port is used for GPS standalone service via USB.
- ◆ Connect the TSMW to the power supply. For detailed information see [Connecting the TSMW to the DC Power Supply](#) on page 27.
- ◆ Application specific: Additional multifunctional input or output connector PULSE IN/OUT 1 and 2 can be used for the connection to external equipment for different applications, for example distance trigger input used for distance triggered RF power scan measurements.

Input type: 3-5 V TTL, max +/- 12 V DC

Input type: 5 V TTL, Ri=100R

See [Figure 5-1](#) for the complete wiring diagram.

R&S TSMW can be powered from any of these three sources, for detailed descriptions refer to [Different Power Cable Connections](#) on page 23.



PPS: Pulse per Second, falling edge with high precision!

Figure 5-1: Wiring Diagram

Connecting the LAN Interface

A LAN cable can be connected to the LAN connector on the rear panel of the analyzer. You can use a crossover or straight through LAN cable. There are two methods to establish a LAN connection to the analyzer.

- ◆ A dedicated network connection between the analyzer and a single computer via a ordinary RJ-45 network cable.
- ◆ A non-dedicated network (Ethernet) connection from the analyzer to an existing network via an ordinary RJ-45 network cable.

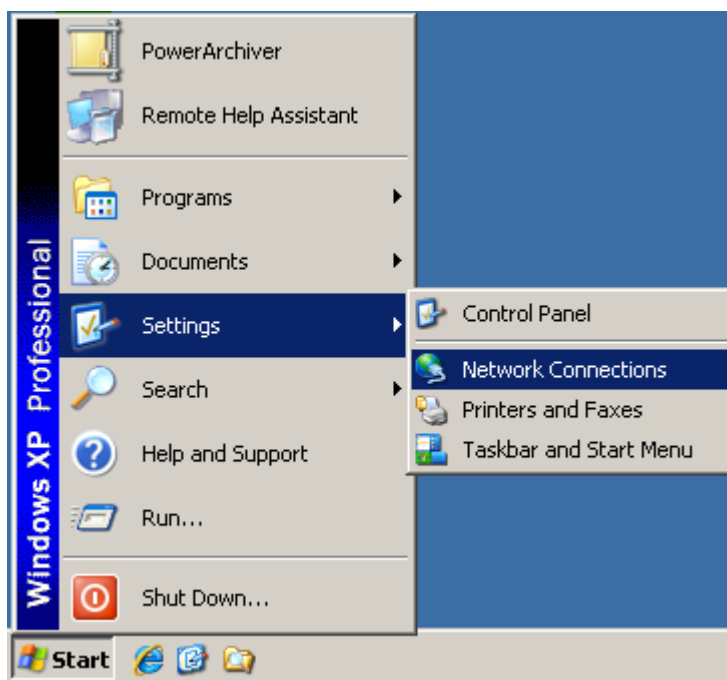
NOTICE

Generally we recommend using a separate network interface card with independent LAN connection and deactivated firewall.

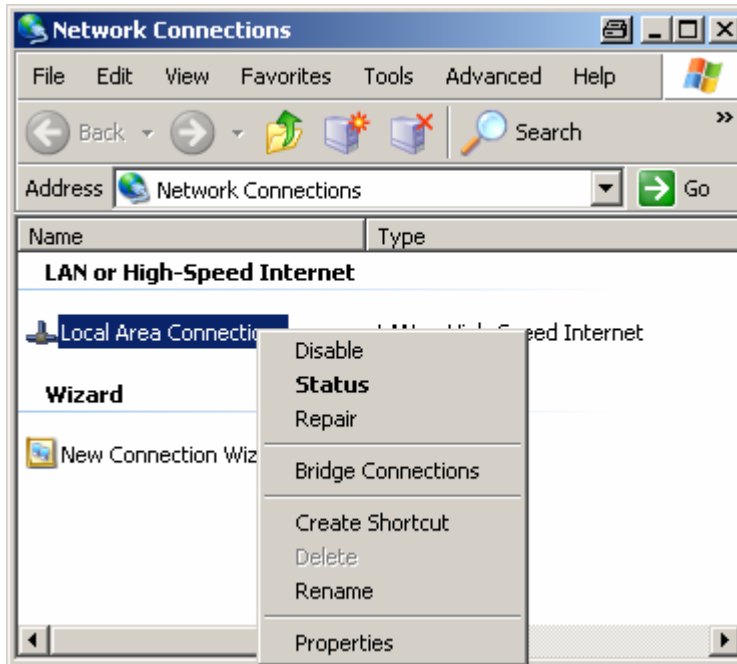
Dedicated Network Connection

To establish a LAN connection proceed as follows:

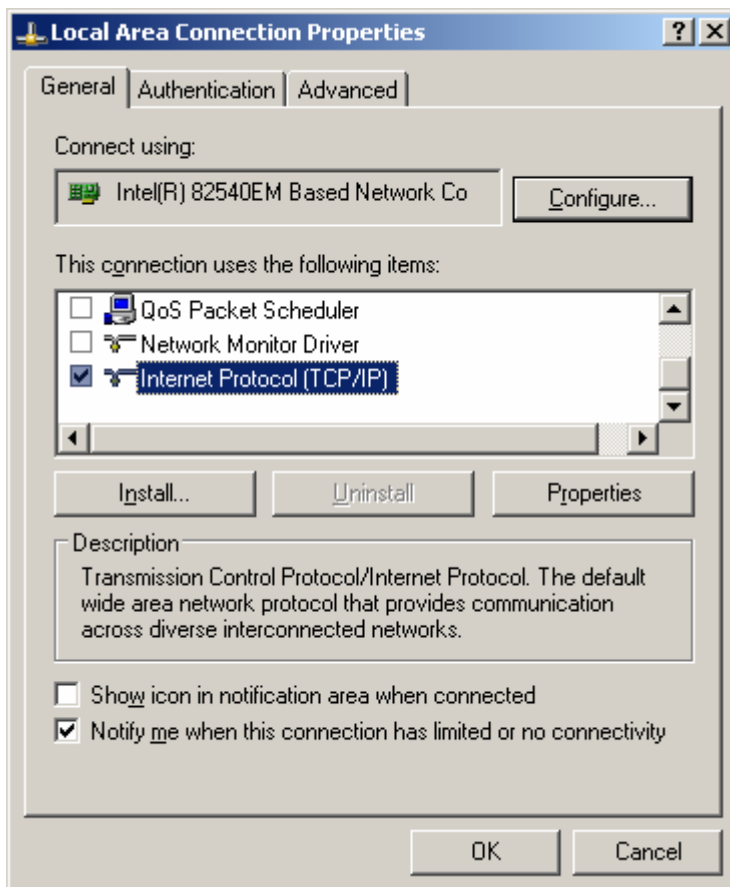
- ◆ Connect an appropriate LAN cable to the LAN port. The chip inside the TSMW recognize which type of connection is used. The system can adapt to 10, 100 and 1000 Mbit/sec and furthermore switch between cross-connected and straight LAN cable.
- ◆ Each TSMW has a unique pre-configured IP address: 192.168.0.2.
- ◆ The LAN adapter on the host PC has to be configured in the following way:
 1. Go to the Network Connection Dialog "Start"->"Settings"->"Network Connections"



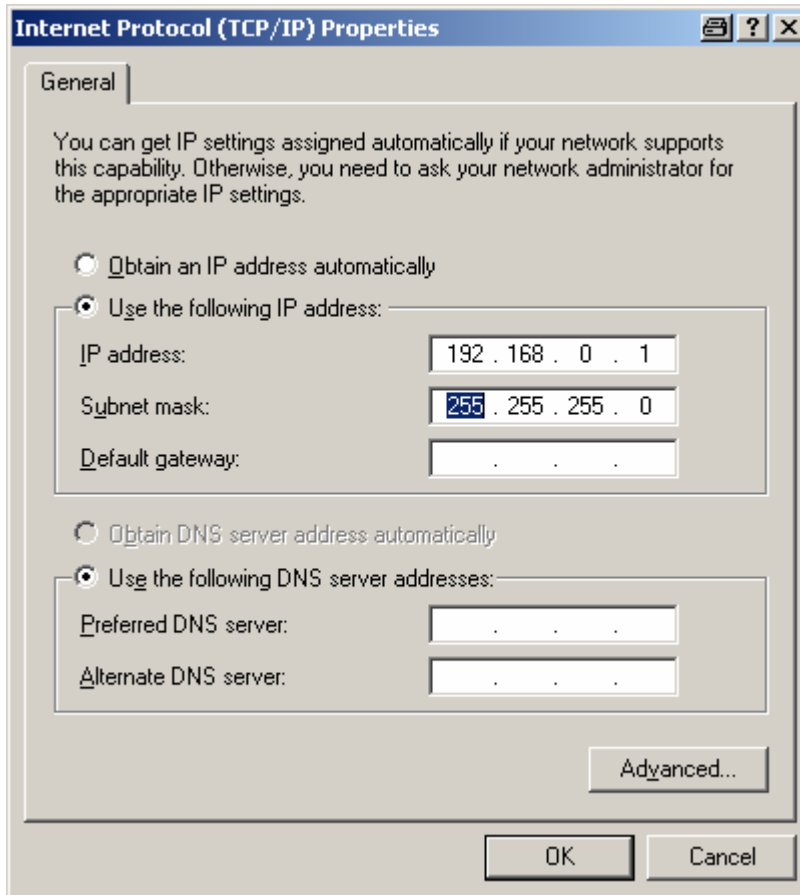
2. Select the LAN Connection which is connected to the TSMW and open the "Properties" dialog via right mouse click.



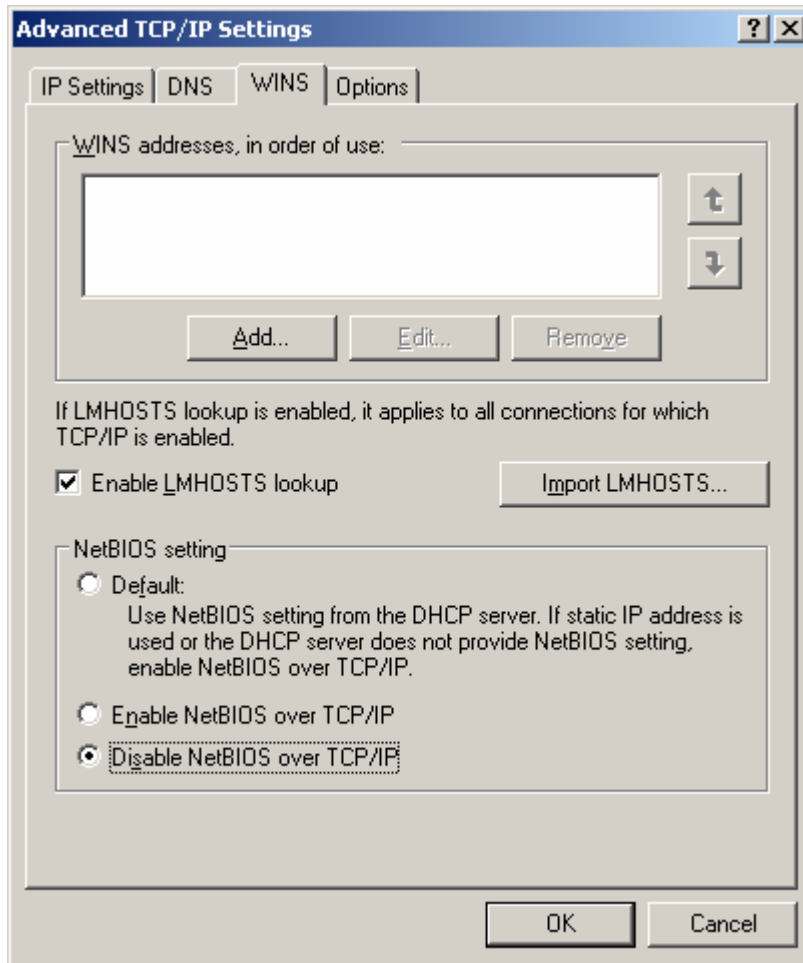
3. Select Properties for Internet Protocol (TCP/IP).



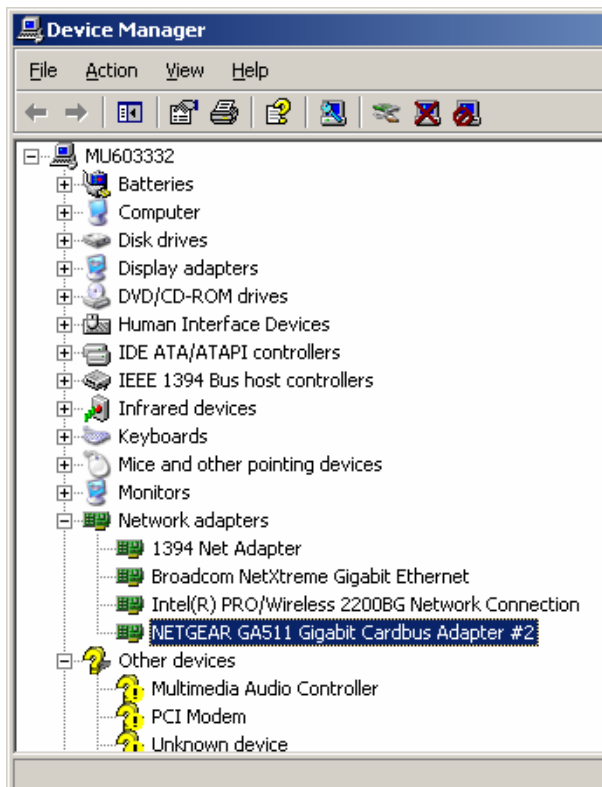
- 4. Use following TCP/IP settings:
 - IP address: 192.168.0.1
 - Subnet mask: 255.255.255.0
 - No Default Gateway



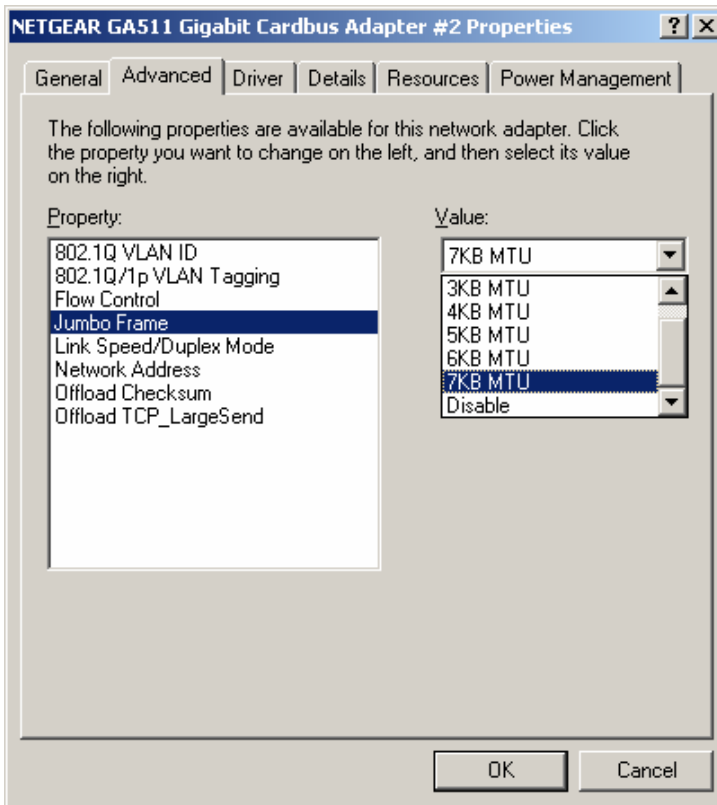
- Open "Advanced Settings" window and deactivate NetBIOS over TCP/IP in the WINS tab.



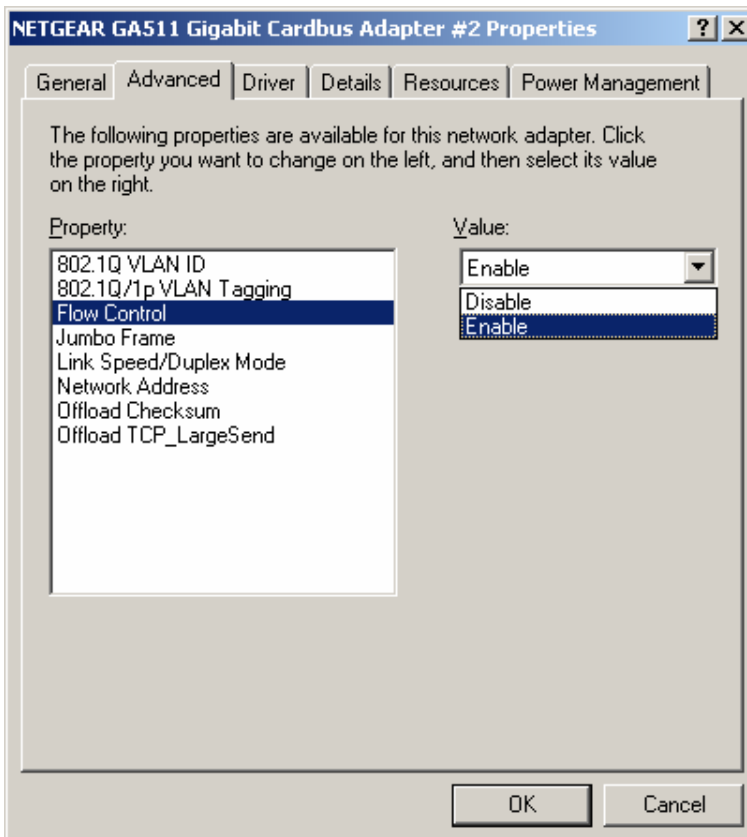
- For optimal data throughput you should open the "device manager".



- 7. Enable "Jumbo Frames" with 9k if possible .



- 8. Enable "Flow Control".



- ◆ After booting the TSMW double check via ping command if the connection is successfully established (refer to [Ping Command](#) on page 56).

Non Dedicated Network Connection

If the device operates in a network, the IP address and subnet mask of the TSMW must be set up according to the network requirements.

Set the default IP address and subnet mask via the RS232 interface according to the specifications of the network see Troubleshooting RS232 "Setting the IP address via RS232"

On the host PC the DHCP on the LAN adapter must be turned off!

Then turn off and on the device. Now the device can be addresses with the new specified IP address.

NOTICE

If your firewall is active make sure following ports are available:

Port 56026 Data transport between PC and TSMW

Port 80 HTTP Port for Browser configuration.

Connecting the TSMW to the DC Power Supply

The DC supply connector is at the rear panel of the unit. When the TSMW is connected to the DC supply, it automatically sets itself to the correct range for the applied voltage (range: see type label on the rear panel). There is no need to set the voltage manually.

DANGER**Danger of shock hazard!**

- ◆ After moisture condensation, allow the receiver to dry before switching on.
- ◆ The device is still power-supplied while it is in Standby Mode i.e. switched off with the power button but still connected with the DC Power Supply.
- ◆ After connecting the Power Supply the device is immediately under power.
- ◆ The DC-Connector is intended for disconnection.
- ◆ If another DC Supply than TSMW-Z1 is used:
 - a) Customer DC-Supply shall be in accordance with IEC / EN / UL / CSA 60950-1 or IEC / EN / UL / CSA EN EN61010-1.
 - b) 12V vehicle cigarette lighter socket must be fused.

NOTICE**Danger of instrument damage!**

- ◆ Do not cover the ventilation holes.
- ◆ Connect the receiver only with SELV (Safety Extra Low Voltage) power supplies.
- ◆ An additional external fuse must be inserted if the DC power supply offers more than 35 A!
- ◆ Use only EN 60950 approved external DC power supplies
- ◆ The receiver may be connected only to DC supplies:

DC Input range: 9V to 18 V with 10A max.

Rohde & Schwarz offers a compatible power supply, the R&S® TSMW-Z1 (order number 1503.4608.02).

Different Power Cable Connections

1. TSMW-Z1 (order number 1503.4608.02) comes with a ready-made TSMW power plug, so the device can be operated directly.
2. TSMW is provided from a proprietary DC supply with the TSMW power cable. For this purpose the cigarette lighter must be demounted and the open ends of the cable must be connected to the customer electricity supply, the polarity has to be respected (see figure [below](#)).

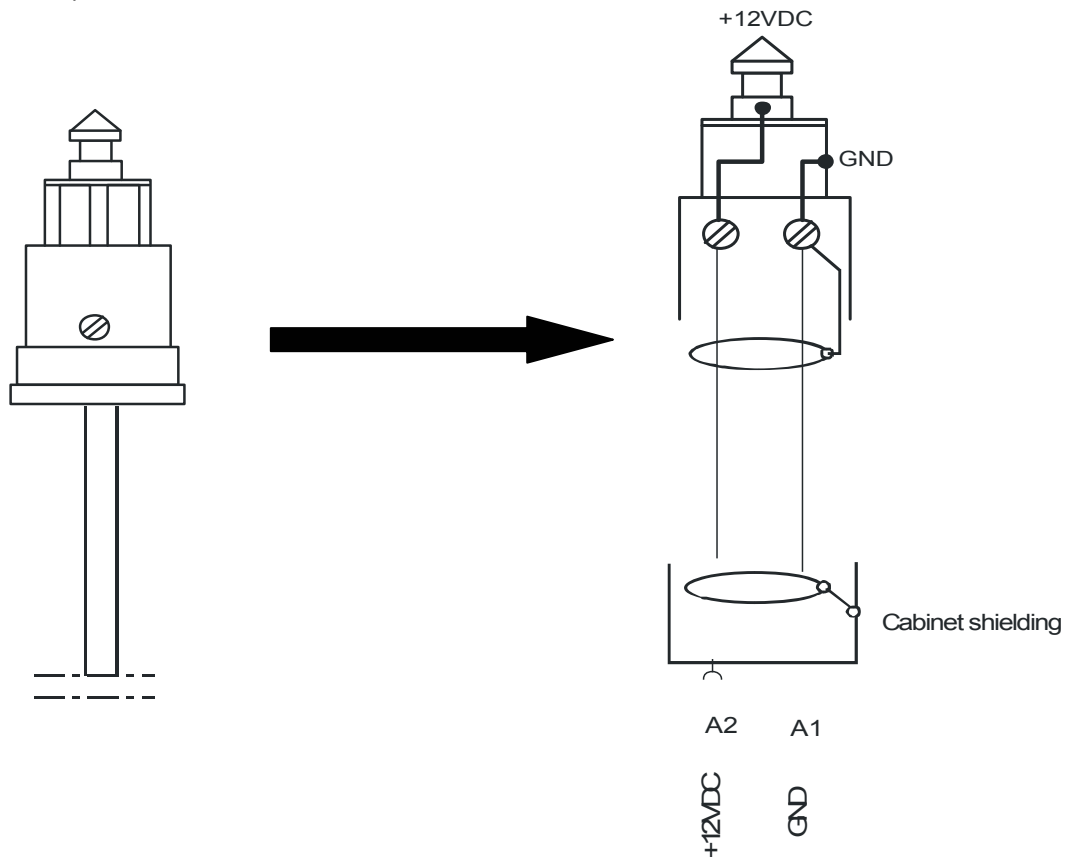


Figure 5-2: Proprietary Power Supply

3. To supply from the cigarette lighter, put the premounted power cable into the car cigar jack. An adapter might be required; it is part of the shipment.

6. Switch On or OFF

Switch On

Starting-up does not require a strict course of action, but we recommend the following sequence:

1. Establish the LAN connection to a PC running with ROMES or Customer Software application (TSMW-K1 Digital I/Q interface).
2. Establish the connection to the RF antenna.
3. Establish the connection to the GPS antenna (optional).
4. Connect external devices to the In/Out ports (application specific).
5. Use the supplied power cable to connect the power supply to TSMW.

As soon as you connect the TSMW to the power supply, the instrument switches to the Operating Mode and completes the power on sequence. A self test is done during the power on sequence. After completing the self-test successfully the PROC STATE LED turns on and will keep it on. In case of a failure during the self test the light starts flashing. After power on the LED CONFIG STATE starts blinking for a few seconds afterwards the light will be keep on.

The power on sequence can be monitored by means of the front-panel LEDs (see [Figure 3-1: Front panel view](#) on page 9 for LED location). Additional information can be seen via the RS-232-C interface (see [Troubleshooting via RS 232](#) on page 53).

| LED | Color | State | Comment |
|---------------|-------|-------|---|
| PWR | green | On | continuously after power on |
| CONFIG STATE | amber | On | about a second after PWR LED goes on continuously after completion of initialization |
| PROCESS STATE | green | Off | continuously after power on |
| PROCESS RUN | green | Off | continuously after power on |

Figure 6-1: Power on Sequence

After completing the power on sequence, TSMW switches to the Idle Mode and is ready to be connected by an application.

Switch OFF and Standby Mode

By switching off the TSMW with the Power Switch on the front panel the instrument changes to Standby Mode. The On LED is off and Ext DC LED is illuminated, see [Figure 3-1: Front panel view](#) on page 9. In the Standby Mode, the program execution on the TSMW will be stopped immediately, but the TSMW is still under Power Connection.

Pressing the POWER button in the Standby Mode initiates another power-on sequence (see [Switch On](#) on page 29).

NOTICE**Switch Off**

Do not switch off TSMW while a connection to the application software is being established, otherwise the application might not be able to close properly. As a result, the software could crash and must be shut down from the Windows Task Manager.

7. Checking the Instrument

The TSMW offers the possibility to use a browser based application to check the state and status of the instrument. Also operation and maintenance purposes can be done via the browser. The LEDs on the front panel indicate the state of the TSMW as well.

Browser Application

The web interface offers following possibilities:

- ◆ Display of System, Hardware and Firmware Configuration
- ◆ Display of Network Configuration
- ◆ Display of Software Options
- ◆ Installation of new options
- ◆ Firmware Update

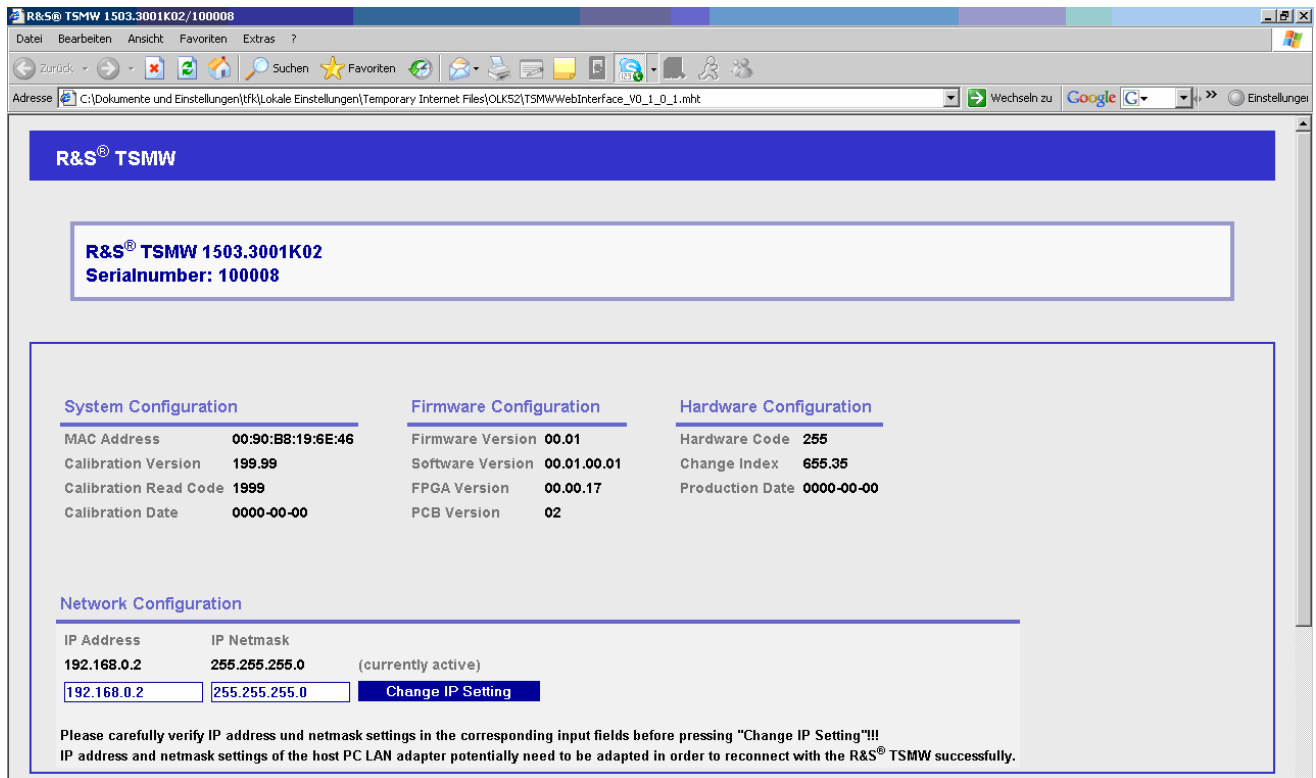


Figure 7-1: TSMW Browser

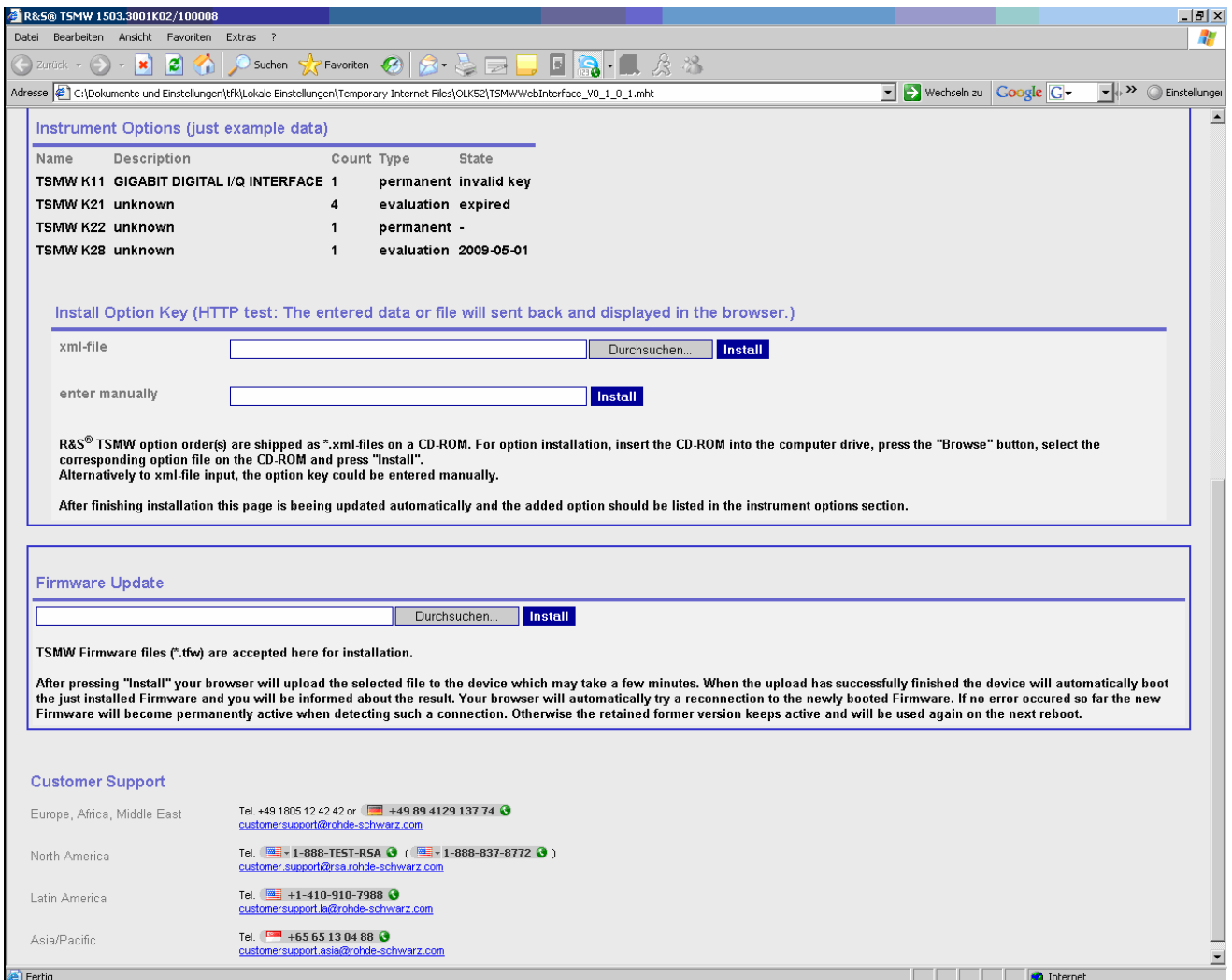


Figure 7-2: TSMW Browser

Recalling Instrument Setup

Select the TSMW home page via the browser. This page displays all the related instrument data.

- ◆ Hardware State
- ◆ Serial Numbers
- ◆ Firmware Version
- ◆ Calibration Data

Overview TSMW Modes

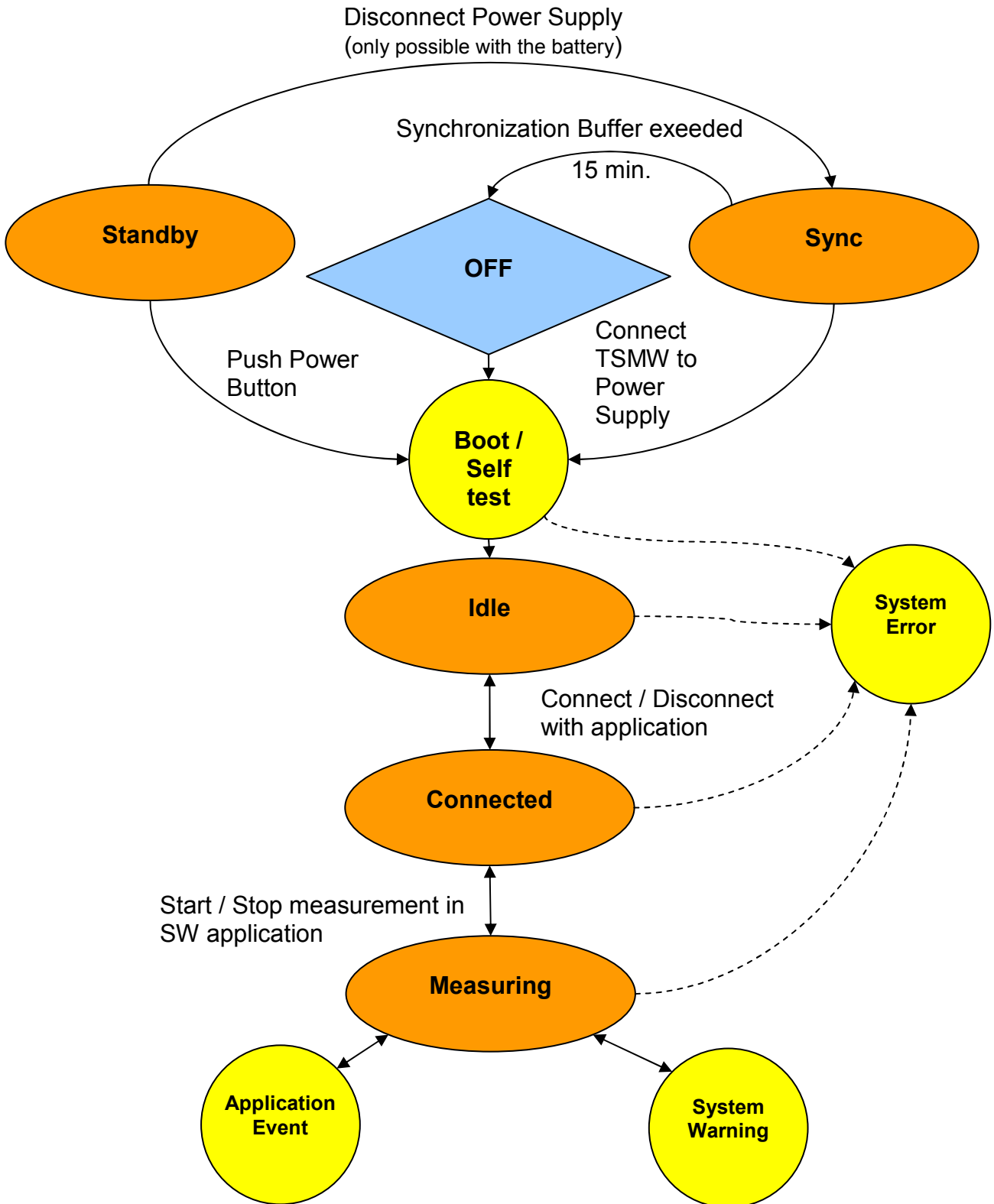


Figure 7-3: TSMW Modes and Interim States

| | PROCESS STATE | PROCESS RUN | CONFIG STATE | CONFIG ERR |
|--|--------------------------------------|-----------------|--------------|------------|
| Standby | off | off | off | off |
| Idle | on | off | on | off |
| Connected | on | on | on | off |
| Measuring | on | blinking slowly | on | off |
| Sync | PWR LED is flashing every 4 seconds. | | | |
| | | | | |
| Blinking fast: 4 pulse/sec Blinking slowly: 1 pulse/sec | | | | |

Figure 7-4: TSMW Modes

| | PROCESS STATE | PROCESS RUN | CONFIG STATE | CONFIG ERR |
|--|-------------------------------|---------------|----------------------------------|------------|
| | | | | |
| Boot / Self test | after successful self test on | off | blinking fast; after 2 second on | off |
| System Warning | blinking slowly | - | - | - |
| System Error | blinking fast | - | - | - |
| Application Event | - | blinking fast | - | - |
| | | | | |
| Blinking fast: 4 pulse/sec Blinking slowly: 1 pulse/sec | | | | |

Figure 7-5: TSMW Interim States

Standby Mode

In the Standby Mode, the program execution on the TSMW will be stopped immediately, but the TSMW is still under Power Connection. Only the Ext.DC LED is on.

Idle Mode

The device switches into Idle Mode as soon as booting and self test has been finished. The PROCESS STATE LED turns on immediately.

Connected Mode

The TSMW switch into Connected Mode as soon as the host PC (R&S® ROMES or customer application with TSMW-K1) access the device via the LAN interface and configures the measurement. In Connected Mode the PROCESS RUN LED turns on. The PROCESS STATE LED is still on.

After finishing the program download and completing some initialization routines the instrument is now ready for R&S® ROMES or Matlab® originated measurement commands.

Measuring Mode

The device switches to the Measuring Mode immediately after receiving any “Start Measurement/Recording” command from the host PC software. For information on how to carry out TSMW measurements with ROMES or any programming interface (TSMW-K1), please refer to the R&S® ROMES or TSMW Programming Interface manual.

The PROCESS STATE LED is on and the PROCESS RUN LED is blinking slowly.

Boot / Self test Mode

This state indicates a couple of processes like booting the software, self test, load main programs and FPGA Configuration . Here FPGA (Field Programmable Gate Array) will be configured i.e. FPGA configuration data and primary boot codes are loaded from the flashcard to the FPGA.

System Warning

A temporary problem in the instrument is detected, it is not affecting the measurement e.g. no PPS signal from the GPS or buffer battery low, RF overflow etc. To find out the problem use the RS232 Trace outputs (refer to [Troubleshooting via RS 232](#) on p.53).

System Error

If the device indicates “System Error” no measurements are possible. To find out the problem use the RS232 Trace outputs (refer to [Troubleshooting via RS 232](#) on p.53).

Application Event

The device indicates particular events during a measurement.

Sync Mode

The instrument enters Sync Mode if it is removed from the DC power supply but equipped with the batteries. In this mode the internal time reference is being buffered and the

instrument keeps synchronization to an previously measured radio network. The ON LED is flashing slowly. The maximum Buffer time is 15 minutes. After this the device switches automatically from Sync Mode to Power Off.

8. Basic Instrument Functions

Generally we have three possibilities to perform measurements with the TSMW:

- ◆ Gigabit Digital I/Q Interface via C ++ (refer TSMW Interface Programming Manual)
- ◆ Gigabit Digital I/Q Interface via Matlab (refer TSMW Interface Programming Manual)
- ◆ WiMAX Scanner Application for ROMES (refer to R&S® ROMES Manual)
- ◆ ROMES Software (refer to R&S® ROMES Manual)

TSMW-K1 Digital I/Q interface

A special feature of the TSMW is its Digital I/Q interface application (R&S® TSMW-K1). The application provides flexible MATLAB® interface as well as an equivalent C++ function interface for performing measurements directly on the R&S® TSMW Radio Network Analyzer and processing the results on the PC. This enables you, for example, not only to design and analyze receiver algorithms in MATLAB®, but also to port them to C++ as a real time version. Or you can even perform technology-independent channel measurements, which can be used to simulate realistic fading scenarios in the lab.

INFO

TSMW-K1 GigaBit Digital IQ interface

The TSMW-K1 is only a OEM and respectively a Matlab® option. It is not supported by R&S® ROMES. The customer needs to develop an own application.

Requirements for TSMW-K1 (Matlab®)

- ◆ Matlab Release 2007/2008B
- ◆ TSMW-K1 Installation (CD-> Applications -> TSMW-K1) on Host PC
- ◆ TSMW-K1 Option on TSMW
- ◆ Gbit LAN Interface (only for I/Q Basband Streaming, otherwise 100 Mbit LAN sufficient)

Requirements for TSMW-K1 (C++)

- ◆ TSMW-K1 Installation (CD-> Applications -> TSMW-K1) on Host PC
- ◆ TSMW-K1 Option on TSMW
- ◆ Gbit LAN Interface (only for I/Q Basband Streaming, otherwise 100 Mbit LAN sufficient)

Preparations

Please refer to the Digital I/Q interface application (R&S® TSMW-K1) in the TSMW Interface Programming Manual.

Matlab functions

If the m-files are located in the current working directory, the appropriate action will be executed by retrieving a function with the corresponding parameters:

```
[outputvalue1,outputvalue2,...]=function_name(inputvalue1,inputvalue2,...);
```

For detailed explanation please refer to the TSMW Interface Programming Manual.

TSMW-K28 WiMAX Option for R&S® ROMES

The TSMW-K28 option enable the functionality to use the TSMW as WiMAX Scanner for R&S® ROMES. The software option is available from R&S® ROMES 4.10.

Requirements for R&S® ROMES

- ◆ ROMES Installation (refer to R&S® ROMES Manual).
- ◆ ROMES Option on Dongle (refer to [Table 1: Software Options](#) on page 46).
- ◆ SW Option TSMW-K2x on device (refer to [Table 1: Software Options](#) on page 46).

Preperation

Start the R&S® ROMES software application after the power on sequence has been completed (see [Figure 6-1: Power on Sequence](#) on page 29). The TSMW application program will be downloaded from the host PC either during ROMES software start or while loading the TSMW software driver in ROMES. This depends on the availability of a ROMES option dongle. Please refer to the ROMES software manual for details.

For information on how to configure and carry out ROMES TSMW measurements, please refer to the ROMES manual either.

GPS Standalone

Prerequisite for the GPS Standalone operation is, that the TSMW is not connected to the power supply. The USB connection (port GPS) to the PC must be established and the USB antenna must be connected (GPS port ANT).

INFO**GPS Standalone**

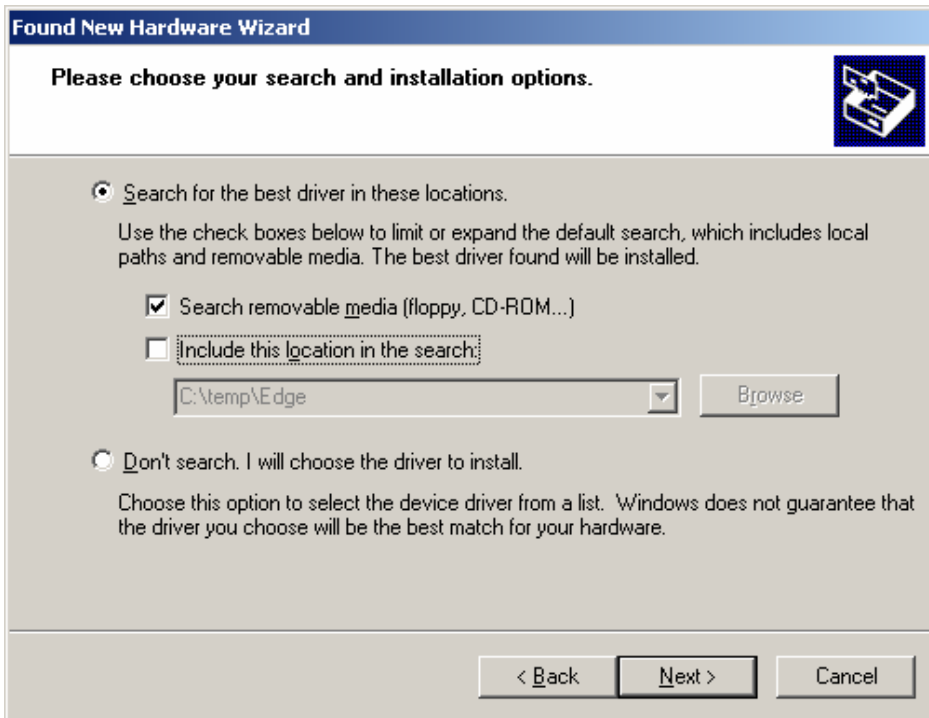
Stand-alone operation is only necessary if the TSMW is not acting with the ROMES Software.

In the ROMES software the GPS module is accessible via the LAN interface and a special GPS driver.

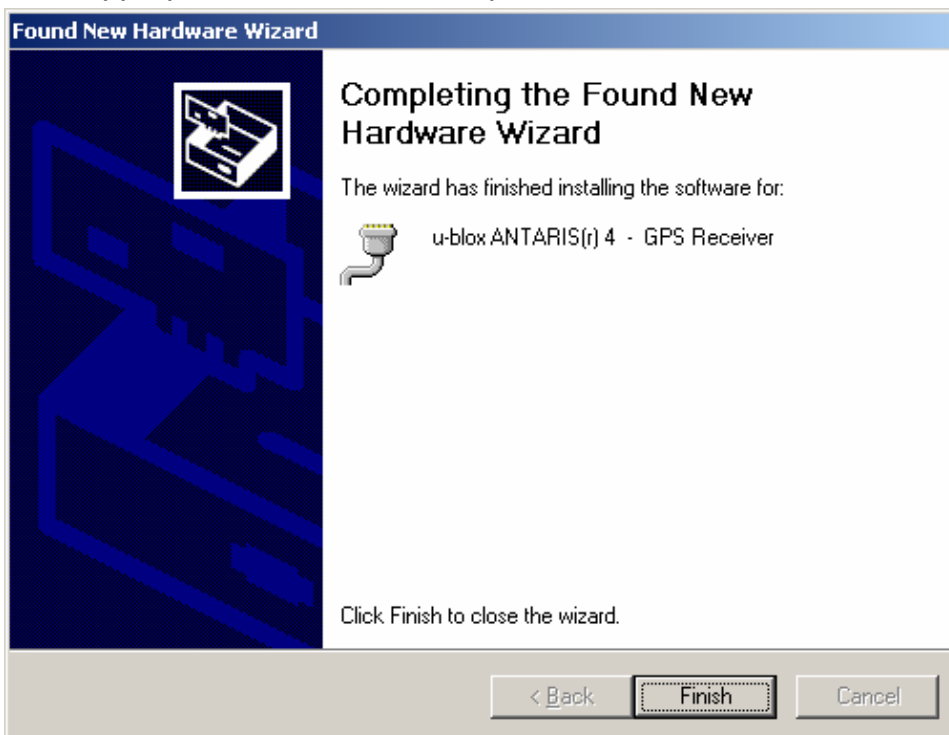
When connecting the USB port the first time Windows is looking for the applicable driver.



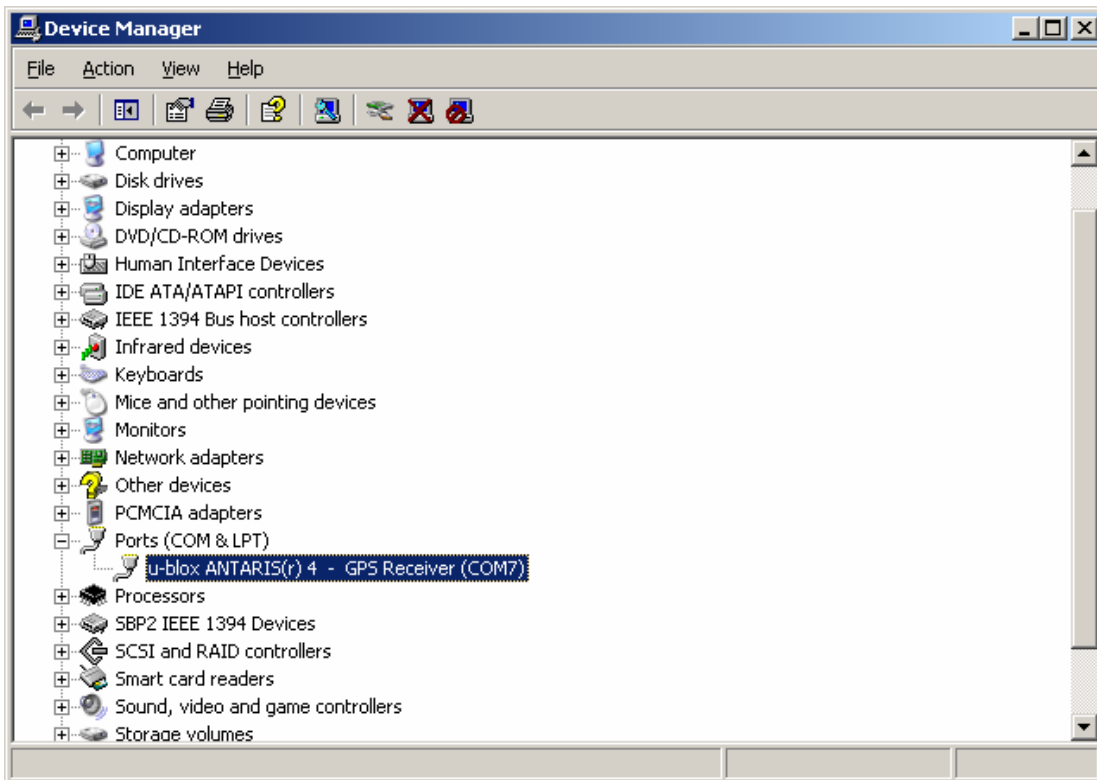
The applicable driver is delivered with the CD, insert the CD and select *Search removable media floppy*.



If the appropriate driver is chosen press *Finish*.



After successful installation you can find in the Device Manager> Control Panel following entry: ANTRARIS(r) 4 associated with the emulated COM port.

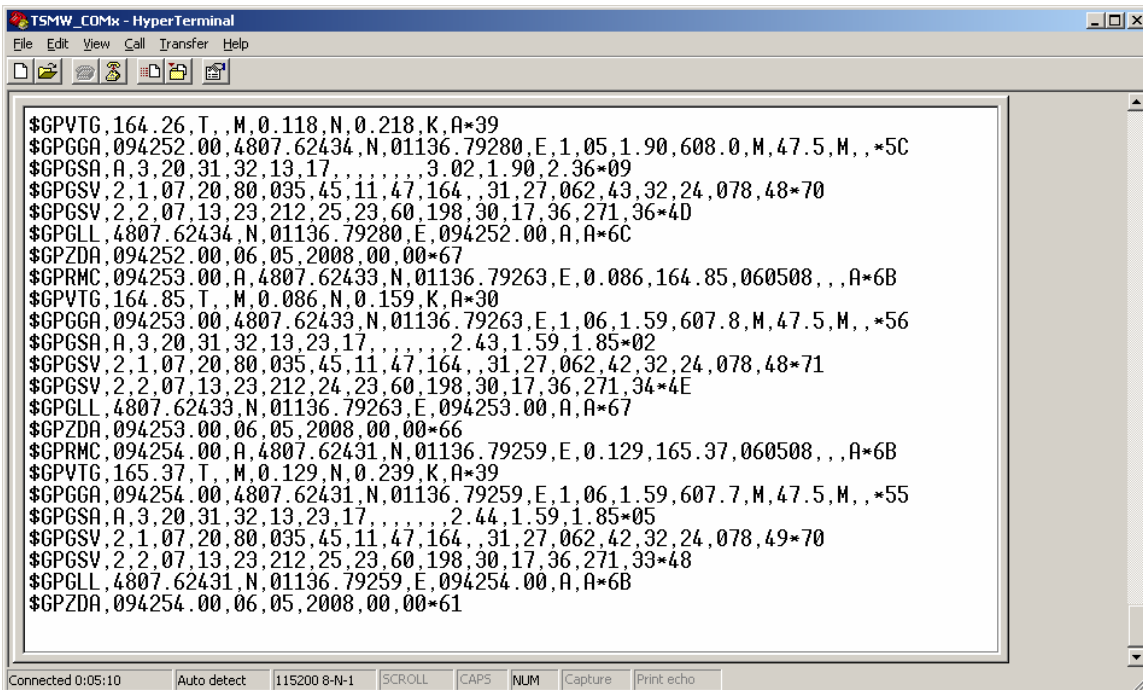
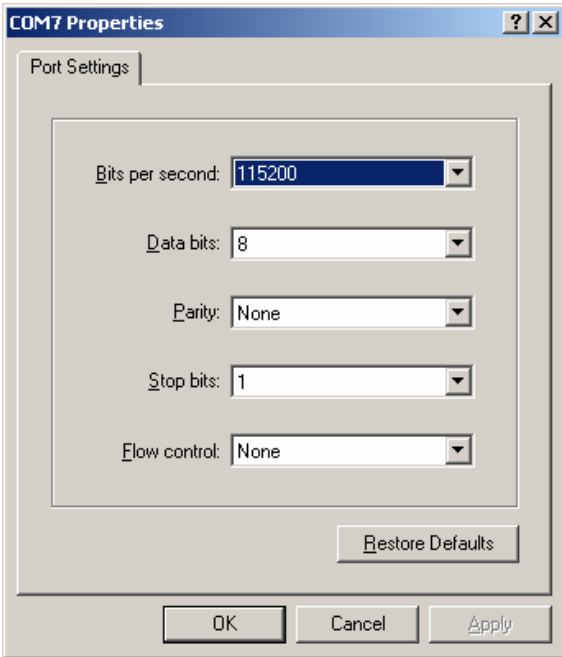


Any terminal program, which is connected with this COM interface, can access GPS data in NMEA format.

INFO**U-Blox**

The module is using the uBlox LEA-4H chipset. For further details and applications contact the manufacturer uBlox www.u-blox.de.

Example with Windows Hyper Terminal



9. Installed SW

Option Key

The web browser is used to see the system information. Furthermore you can recall the instrument setup (see page 32) and install new options.

Program Requirements to install the Option Key

- ◆ TSMW Options CD
- ◆ PC/notebook with LAN interface
- ◆ PC/notebook and TSMW connected with the accessory LAN cable
- ◆ TSMW is in Idle Mode (see [Overview TSMW Modes](#) on page 33)
- ◆ No other software application interfacing with the TSMW.

Software Options

The software option TSMW-K1 consists of one option key which activate the Digital I/Q interface.

All other software options consist of two components and therefore have two option keys. One key for the desired technology (e. g. WiMAX) and another for an adequate interface (e. g. interface to R&S® ROMES). Always both option keys of the software option have to be installed on the TSMW for proper use.

E. g: Software option TSMW-K28:

The software option TSMW-K28 – WiMAX Scanner Application for R&S® Romes consists of the following two keys:

- ◆ **TSMW-K128**
Activate the WiMAX technology on TSMW.
- ◆ **TSMW-K28**
Activate the R&S® ROMES interface on TSMW.

The two keys have to be installed on the TSMW for full functionality.

Installation of Software Options

TSMW software options for an instrument upgrade are shipped as XML files on a separate CD-ROM and need to be installed via the Browser-Install Options.

For details about the TSMW software options see the following table.

INFO Software Options

All new devices are preconfigured and software options are already installed. Only for additional reorders you have to enable the software options with the adequate option keys.

Table 1: Software Options

| Option | K Number | Ordering Number | Usage | Host PC Option | Available |
|---|----------|-----------------|--|----------------|-----------|
| GigaBit Digital I/Q Interface | TSMW-K1 | 1503.3960.02 | OEM application | - | X |
| ROMES GSM & WCDMA Scan Option | TSMW-K21 | 1503.4514.02 | ROMES GSM & WCDMA Measurements | ROMES4T1W | - |
| ROMES CDMA & EV-DO Scan Option | TSMW-K22 | 1503.4520.02 | ROMES CDMA/CDMA2K & EV-DO Measurements | ROMES4T1W | - |
| ROMES Spectrum Scan Option | TSMW-K27 | 1503.4537.02 | ROMES Spectrum Scan | ROMES4T1W | - |
| ROMES WiMAX Scan Option | TSMW-K28 | 1503.4543.02 | ROMES WiMAX Scan | ROMES4T1W | X |
| ROMES LTE Scan Option | TSMW-K29 | 1503.4550.02 | ROMES LTE Measurements | ROMES4T1W | - |

Ordering Additional Software Options

Orderings for TSMW option upgrades require that you supply the serial number of the device.

10. Maintenance

Firmware Updates

Firmware update is supported as a stand-alone tool with the name **tinstaller.exe**. It can be started via the command line. Also the Browser is used to update the instrument firmware. The GUI is interactive and guides you through the entire firmware update process.

NOTICE**Danger of instrument damage!**

Make sure that neither ROMES nor any other utility tool interfaces with the TSMW at the same time. Shut down any active utility before starting the browser!

INFO**Release Notes**

Please refer to the firmware information provided in the internet for installer utility details and new features with each version. Upload the required firmware version from the R&S homepage www.rohde-schwarz.com. Go to TSMW and then to the Download Area.

Requirements

- ◆ PC/Notebook with LAN interface
- ◆ PC/notebook and TSMW connected with the accessory LAN cable
- ◆ RS-232 interface (COM1) of PC/notebook and TSMW connected via a null-modem cable (see [RS-232-C Output](#) on page 53 for terminal settings).
- ◆ TSMW powered up and power on sequence completed successfully (see [Switch On](#) on page 29).
- ◆ No other application access the TSMW in the same time.

Instructions FW Update via Web Browser

- ◆ Download the current instrument firmware of your version of the product and store it locally on the hard drive, take care of the Release Notes **TSMW.tfw**.
- ◆ Connect your PC/notebook to the TSMW via the LAN interface.
- ◆ Make sure that neither ROMES nor any other utility tool interfaces with the TSMW at the same time.
- ◆ Open the Web browser on the Host PC and enter the IP address. The TSMW web interface will pop up.

- ◆ Go to the "Firmware Update" area and click the button "Browse".
- ◆ Select the file you stored in the beginning.
- ◆ Click the "Install" button.
- ◆ The new firmware file will be saved in the system. This will take some seconds, do not disturb this progress.
- ◆ After finishing the download progress the TSMW web interface will be updated. After successful refresh of the web interface the new firmware will be activated.
- ◆ If the refresh is not done successfully the device will activate the previous firmware version with the next reboot.

INFO

Firmware Update

The duration of the firmware download will be indicated via a status bar and the LEDs of the devices.

- ◆ Immediately after the reboot of the TSMW click the refresh button of the Web Browser. An acknowledge button appears.
- ◆ Within 5 seconds click the button to confirm the installation of the new firmware version.

INFO

Reactivate the original firmware version

If the confirm button is not pressed or not pressed within the timeframe of 5 seconds, the original firmware version will be reactivated.

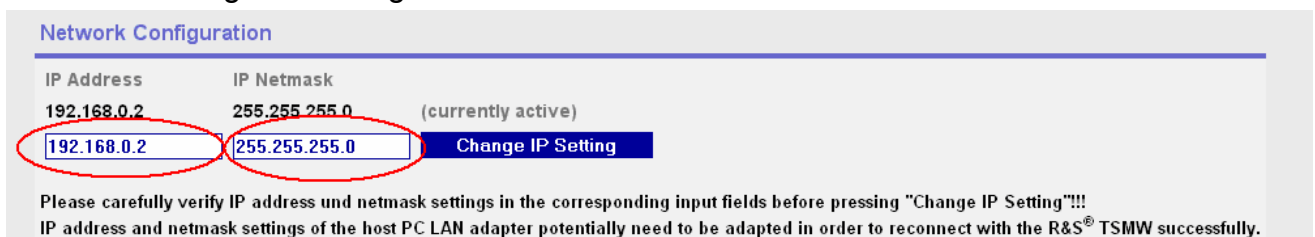
Configure IP Settings

Devices are preconfigured with the default IP address 192.168.0.2 and SubNet mask 255.255.255.0. The IP address and subnet mask can be changed with the Web interface to the required settings for the network. The configuration can also be queried and changed via the RS232 interface. To adopt the new settings the system needs a restart.

Generally we recommend using a separated network interface card, see [Connecting the LAN Interface](#) on page 21.

IP Configuration via the Web Browser

- ◆ Start the Web browser and enter the new IP address in the appropriate fields.
- ◆ Click "Change IP Settings".



The old and also the new IP address and subnet mask after rebooting will be shown.

Network Configuration

| IP Address | IP Netmask | |
|-------------|---------------|--|
| 192.168.0.2 | 255.255.255.0 | (currently active) |
| 192.168.0.4 | 255.255.255.0 | (currently configured, active after next reboot) |

192.168.0.4 255.255.255.0 **Change IP Setting**

Please carefully verify IP address und netmask settings in the corresponding input fields before pressing "Change IP Setting"!!!
IP address and netmask settings of the host PC LAN adapter potentially need to be adapted in order to reconnect with the R&S® TSMW successfully.

- ◆ Trigger a reboot and access the TSMW Web interface with the new IP address

Network Configuration

| IP Address | IP Netmask | |
|-------------|---------------|--------------------|
| 192.168.0.4 | 255.255.255.0 | (currently active) |

192.168.0.4 255.255.255.0 **Change IP Setting**

Please carefully verify IP address und netmask settings in the corresponding input fields before pressing "Change IP Setting"!!!
IP address and netmask settings of the host PC LAN adapter potentially need to be adapted in order to reconnect with the R&S® TSMW successfully.

IP Configuration via RS232

Changing the IP Setting via the RS232 is exceptionally necessary if wrong Settings are done via the Web interface and the TSMW is not accessible any more.

- ◆ Enter the command `ipconfig` to see the current IP settings.
- ◆ With `ipconfig [IPv4Address] [IPv4Netmask]` you can change the address.
IPv4Address (Format 123.456.789.012)
IPv4Netmask (Format 123.456.789.012)

Battery change

- ◆ To change the battery pack press the two clips in the direction of the arrow.
- ◆ Pull out the adapter with the 4 AA cells with the clips.
- ◆ Change the batteries; take care of the correct polarity.
- ◆ Insert the entire unit into the tray again.

The adapter can be inserted only in the right way.

11. Troubleshooting

Front Panel LEDs

The following LEDs on the front panel indicate an error (see [Figure 3-1: Front panel view](#) on page 9):

| LED | Color | Behavior | Error | Description |
|---------------------|--------|----------|-----------------------------|--|
| ERROR BAT | Yellow | On | Low Battery | Battery level is low, buffered time synchronization cannot be guaranteed |
| ERROR PWR | Red | On | Power failure | At least one internal voltage rail is out of tolerance. |
| ERROR TEMP | Red | On | Temperature Failure | Temperature inside the device is too high. |
| ERROR RF OVR | Red | On | RF Over | RF Input is too high at the antenna connectors |
| CONFIG ERR | Red | On | Configuration State failure | Data on flash card is invalid or program error |
| CONFIG ERR | Red | Flashing | Configuration State failure | No flash card inserted in flash card slot |

Table 2: Error LEDs

Troubleshooting Errors Indicated by LEDs

RF Error

If the RF input is too high for the front ends, the signal overdrives and can't be processed any more. If the RF OVR LED turns on, you should immediately turn down the RF Input. If the LED is still illuminated the unit must be switched off and the RF Input signal strength must be measured and corrected. The device is not protected against destruction by over modulation.

Low Battery

The LOW BAT LED indicates that the battery is depth discharged. The measurements are not interrupted or influenced. The battery is only used for the Sync Keeping Mode. The synchronization can't be guaranteed if the LOW BAT LED is illuminated. It is possible to change the battery at run time without any consequence for the measurement.

Temperature Error

The electronic equipment in the radio network analyzer is protected against thermal destruction. If the temperature inside the analyzer exceeds a specific limit, the unit changes to the TEMP ERROR mode and switches off the main voltages. The ventilation runs another 15 sec then also the LEDs turn off.

To switch the unit to Standby Mode again, press the POWER button.

If the temperature error occurs repeatedly within the operating temperature range, please make sure that the air can really escape freely through the vents at the sides on the left and the right. If the air circulation is guaranteed and the failure remains constant, return the device to Rohde & Schwarz service.

Config Error

The TSMW configuration data and the boot sequence are read from the internal compact flash (CF) card. If the CONFIG ERROR LED indicates "Flash Card Missing" (LED blinking fast) immediately after the analyzer has been powered on, the configuration data cannot be read from the CF card.

If the CONFIG ERR LED indicates "Flash Card Error" (LED on), the flash card may also contain erroneous or corrupt files. After five seconds indicating a Configuration Error the device will switch to Standby Mode.

The reason for the Flash Card Error during ordinary ROMES measurements is usually a program failure in the instrument itself. At this stage, the instrument will no longer respond to the ROMES application. You can check this by monitoring the RS-232-C output (see Tracing ROMES Measuring Mode) and the PROCESS LEDs on the front panel (see ROMES Measuring Mode). If an error occurs, the blinking of the LEDs stops!

In this case, shut down the ROMES application from the Windows Task Manager and reset the TSMW. Wait for the TSMW to complete the power on sequence and then set up a new ROMES measurement.

If the error persists, contact Rohde & Schwarz support.

INFO

Device Warranty!

You will lose any kind of warranty if you open the cover of the flash card on the rear panel and remove the flash card.

For information on how to perform ROMES measurements, refer to the R&S® ROMES documentation.)

Power Failure

At least one internal voltage rail is out of range. Return the device to Rohde & Schwarz service.

Troubleshooting via RS 232

Monitor the status information outputted on the serial interface to check whether the instrument is in running order.

After installing the TSMW-K1 option two new links will appear in the start menu:

- ◆ TSMW Hyper Terminal (Default COM 1)
- ◆ TSMW Web interface with default IP address (192.168.0.2)

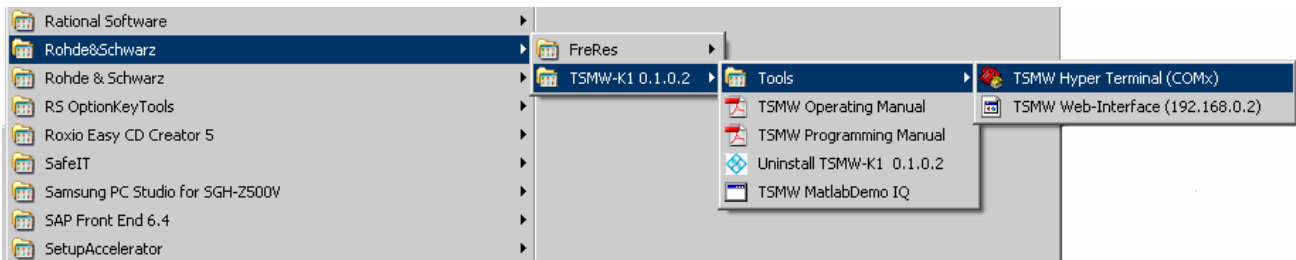


Figure 11-1: Start Menu

Self test of the HF chain

This test is used to verify the complete HF chain in the TSMW. The test can be triggered via the command line for later releases also via the TSMW Web interface.

- ◆ Connect the test output and the RF1 or RF2 with the corresponding cables.
- ◆ Establish a terminal connection via RS232.
- ◆ perform `rf_selftest [1: RF1 / 2: RF2]`
- ◆ Await the test result. The result is "passed" or "failed".
- ◆ Connect the test cable to the other RF port.
- ◆ perform again `rf_selftest [1: RF1 / 2: RF2]`
- ◆ Await the test result. The result is "passed" or "failed".

RS-232-C Output

During start up and normal operation the TSMW outputs status information via the RS-232-C connector on the rear panel parallel with standard communication via the LAN interface. Monitoring the output information on the serial interface does not decrease the analyzer's performance in any manner, but is always a valuable tool to verify the analyzer's current state.

To display the status information on the computer, the following steps are necessary:

1. Connect a serial 9-pin null modem cable between the RS-232-C socket of the analyzer and the serial interface of your PC.
2. Set up a terminal program connection on your computer's RS-232-C interface with the

following settings:

| | |
|------------------|-----------------|
| Bits per second: | 115200 |
| Data bits: | 8 |
| Parity: | no parity |
| Stop bit: | 1 |
| Flow control: | no flow control |

3. Start the terminal session

Tracing Power On Sequence

If the unit is in Standby Mode, press the power button. The following listing should appear on the "Hyper Terminal" screen (see [Listing 1: Terminal output during power on sequence](#) on page [55](#)):

NOTICE**Danger of instrument damage!**

Be sure that neither the ROMES software nor the TSMW Update program or customer application communicates with the TSMW at this test.

```

-- TSMW Boot: GB v0.1.0.1 [build Apr 28 2008 - 07:31:27]: CTRL-FPGA v0.0.15 PCB rev.2 CF v0.1 --
Performing MPMC Check                : PASS
Loading '\bin\cfg1\Gigabit.elf' ...

Request status from AL-PPC           : PASS
Communication link test GB_PPC - AL_PPC : PASS
Request status from FE-PPC           : PASS
Communication link test GB-PPC - FE-PPC : PASS
Communication link test FE-PPC - AL-PPC : PASS
Read FE ELF-file                     : PASS
Send ELF to FE-PPC (ELF size: 280884 byte) : PASS
Frontend.elf received and unpacked    : PASS
FE-PPC program start                  : PASS
Read AL ELF-file                     : PASS
Send ELF to AL-PPC (ELF size: 208768 byte) : PASS
Analyzer.elf received and unpacked    : PASS
AL-PPC program start                  : PASS

TSMW SW started - final verdict       : PASS

TSMW System Configuration:
-----

TSMW Device ID      : 24:97:1a:02:00:00
Serial number       : 100006
Material number     : 1503.3001
Variant number      : 2
KMat                : Yes
MAC Address         : 00:90:b8:18:73:bb
IPv4 address        : 192.168.0.2
IPv4 netmask        : 255.255.255.0

Preselector installed : YES
Frontend 1 installed  : YES
Frontend 2 installed  : YES

```

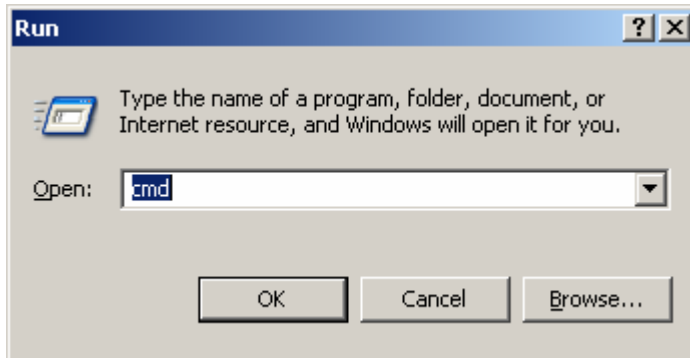
Listing 1: Terminal output during power on sequence

If the output corresponds with Listing 1 the network analyzer completed the power on sequence and is ready for the application program download via the LAN interface.

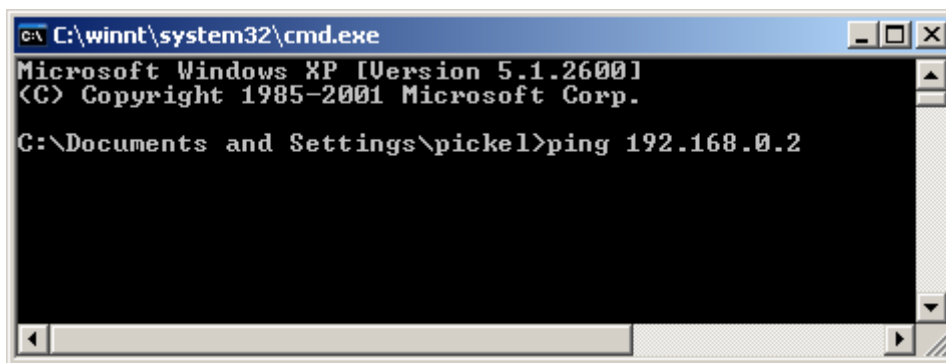
Ping Command

To check if the application i.e. Digital I/Q Interface via Matlab, ROMES or any customer application is connected successfully to the TSMW via the LAN connection it is possible to perform the ping command.

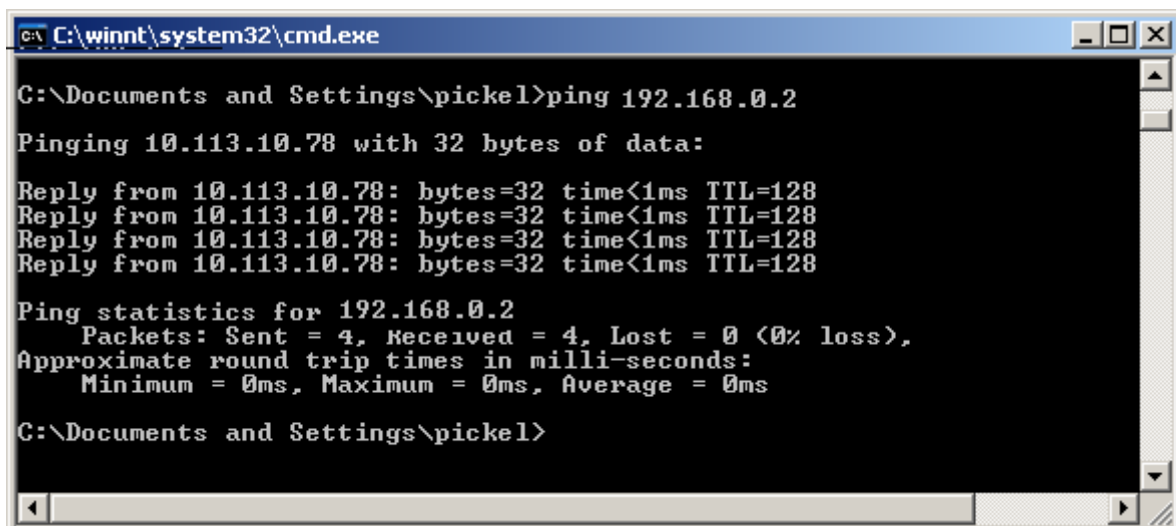
- ◆ Open the command line: Start->Run



- ◆ Type in the command `ping 192.168.0.2` and wait for the answer.



- ◆ The answer should look approximately like this one. If not refer to [Problems during LAN Connection to the TSMW](#) on page 57.



Problems during LAN Connection to the TSMW

Troubleshooting for failed *Connect* for start-up and initial operation of a dedicated LAN adapter with default IP address:

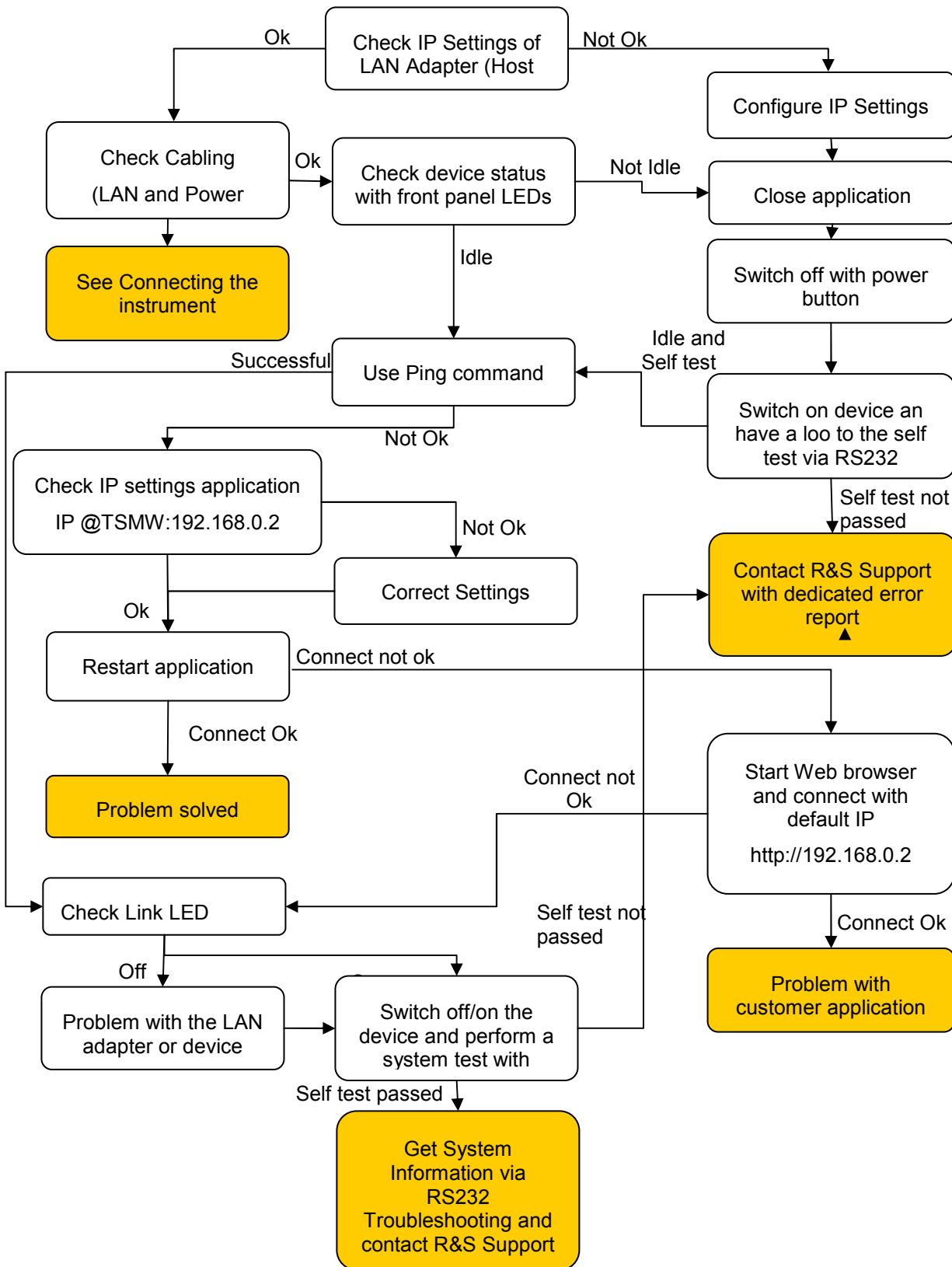


Figure 11-2: Troubleshooting: LAN Connection

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