AEROTECH

AEROTECH WORLD TRADE LTD.

USER MANUAL

AWT-100

CONNECTOR INSPECTOR

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Contact details:

Aerotech World Trade Ltd.
St.Peters Road, Maidenhead,
Berks. SL6 7QU, UK
Tel.: +44 (0) 162 863 4555 Fax: +44 (0) 162 878 1070
Email: ukhq@aerotech.uk.com

Aerotech World Trade Ltd.
31316 Via Colinas, Unit 117/118, Westlake Village,
CA 91362, USA
Tel.: (818) 991-2972 Fax: (818) 991-2974
Email: ukhq@aerotech.uk.com

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INTRODUCTION

The Aerotech Connector Inspector is designed for use as a maintenance tool by operators of sophisticated fiber optic transmission equipment, and as a final inspection tool by the equipment's manufacturers. It facilitates the inspection of front-panel/faceplate or chassis backplane mounted fiber optic connector receptacles.

Background

Fibre Optic Connectors are very reliable in operation. Whilst undisturbed, no maintenance of such a connector should be required in normal circumstances. The "contact" is optical, and does not depend on metal which may corrode leading to poor or intermittent connections.

However from time to time it is necessary to disconnect fibre optic connectors, in order to carry out maintenance of other parts of the transmission system. It may be necessary to replace a circuit board, or alter routing.

It is while the unmated fibre optic connector is exposed to the vagaries of the outside world that care must be taken. As a minimum, high standards of cleanliness and hygiene must be implemented when handling the connector with its exposed fibre end. The core diameter of the single-mode fibre used in telecommunications is less than ten microns in diameter, so very small dirt particles can cause degradation in optical performance, which can lead to degradation in system Bit Error Rate.

But while these high standards will be sufficient to avoid problems in most situations, there is always the potential for dirt to be introduced into a connector, usually without the knowledge of the operative.

If this happens, it is imperative that it is detected before the connection is remade. If it is not, then the best outcome would be a complete failure to restore the operation of the optical transmission system, as would result from a high attenuation connector. Thus would necessite immediate fault diagnosis and location, and cleaning of the offending connector. Much more pernicious would be a partial degradation of transmission performance, which might lead to unexplained errors and a drop in the quality of service provided to the system's users. Ultimately this could result in unplanned system down-time in order that the fault be isolated and rectified.

Free plugs, once removed from the connector receptacle, offer easy access to

the connector ferrule and the all-important polished end surface. So this can be inspected and cleaned without undue difficulty, using the NH-01 Connector Checker portable microscope, and CLETOP Reel type connector cleaning cassette respectively. If these are clean, then one mechanism for the introduction of dirt into the receptacle and onto the end surface of the resident connector ferrule is largely removed. However the major risk is that, at some point in time, by some means, the end surface of the resident ferrule will have become contaminated.

The Connector Inspector

The connector receptacle (adaptor/uniter/etc.), with its resident plug, is normally to be found on a circuit board faceplate or on a patch panel. It is also increasingly found, as the use of plug-in boards becomes more common, on a relatively inaccessible chassis back-plane. In either case it is highly undesirable to have to disassemble the front-panel or backplane connector so that the resident plug ferrule and receptacle guide can be separately inspected for dirt or damage. This is a time-consuming procedure, which involves its own risks of causing physical damage to the connectors and cabling where perhaps none existed prior to disassembly. It should only be done if the connector must be cleaned, and no other method of restoring cleanliness has proved to be effective.

Conventional hand-held microscopes are not effective in the inspection of a ferrule which is resident in a receptacle guide. Their design is not optimised for this task, so they are unwieldy because of the addition of an extension tube to provide the required focal length extension, and focussing is difficult as a result of the shallow depth of field.

The Aerotech Connector Inspector is optimised to enable the user to accomplish this inspection quickly, conveniently and precisely. No connector disassembly is needed, and there is no physical contact with either the receptacle guide or the resident plug ferrule. Focussing is relatively easy, and the availability of the image on a large display means that it can be viewed without eye strain, or, when conferring is necessary, by a group of people simultaneously.

The Connector Inspector consists of a rigid probe, 14 inches long, less than 20 mm. diameter, and insulated so that it can be safely inserted into the gap left when a plug-in card is removed from an equipment chassis. The diameter and length of the probe ensure that it can be inserted through a narrow gap and reach to the rear of the chassis.

The probe contains a miniature CCD camera and a special lens system so that the camera can be focussed on the polished surface of a resident plug ferrule. The probe tip locates easily on the connector receptacle, with the assistance of a local light source for sighting and a pistol-grip handle.

Interchangeable probe tips offer compatibility with FC, ST, SC or AMP SC backplane connectors. Compatibility with other connector styles will be offered in accordance with market demand.

Without the need for fine adjustment, a clear image of the ferrule surface is viewed at approximately x 200 magnification on the 4" LCD monitor supplied. The image can also be displayed on a suitable Notebook/Laptop computer via the optional 'Snappy' video image grabber, or on an external monitor.

Continuous operation for a minimum of five hours after a full charge is provided by rechargeable batteries located in the pistol grip. Mains supply operation is available via an external power adaptor.

PARTS LIST

Please check on receipt that the following items are included in the carrying case:

- AWT-100 Connector Inspector Probe including rechargeable batteries
- One fiber optic connector Adapter Tip, as ordered - FC, ST, SC front panel connector, or AMP SC backplane connector
- LCD monitor
- Cable - For connecting the AWT-100 to the Citizen 4 " LCD monitor (AWT-100: multi-pin plug; LCD monitor: separate jack plugs for video and DC power)
- Cable Adaptor - Jack plug to BNC for external monitor
- Universal AC mains power adaptor, complete with AWT-100 power connection cable and LEMO push/pull plug.
- Cable - For connecting the AWT100 AC mains power adaptor IEC socket to the AC mains supply outlet (plug as appropriate to national standard).
- Spare illumination bulbs - 5 off.

Plus options if ordered:

- Additional Adaptor Tips
- 'Snappy' parallel port video image grabber card

If any item is missing, please immediately inform your local Aerotech representative or distributor.

GETTING STARTED

The Connector Inspector is ready for use out of the box.

1. Ensure that the Adaptor Tip fitted to the probe matches the connector receptacle type which is to be inspected. Tips are marked with connector style.

   The different types of connector receptacle can usually be recognised as follows:

FC/PC	Panel mounted, circular metal body, threaded coupling with single keyslot.
ST	Panel mounted, circular metal body, bayonet coupling lugs.
SC	Panel mounted, square plastic body (often blue).
AMP	Backplane mounted, black plastic, typically 6 receptacles, SC style from rear.

   If not, change Adaptor Tip to the correct style, with reference to the instructions for changing Tips on page 11.

2. Connect Connector Inspector to the Citizen LCD monitor using the cable supplied.

   This cable supplies power to the monitor as well as the video signal. Two jack plugs are provided which plug into the appropriate sockets on the monitor. At the Connector Inspector end, the multi-pin plug plugs into the front socket on the base of the handle i.e. the socket which is nearest the probe.

3. Connect Connector Inspector to Mains Power Adaptor if operation off mains power is required.

   The LEMO connector on the cable from the Mains Power Adaptor plugs and latches into the rearmost socket on the base of the Connector Inspector handle.

   IMPORTANT NOTE: This plug uses a special push/pull latching mechanism - when removing it, pull on the metal body of the plug, NOT

on the cable.

4. Switch on Connector Inspector using the push on/push switch which is inset into the top of the Connector Inspector handle.

5. Engage the probe Adaptor Tip with the connector receptacle to be inspected.

   The probe-mounted lamp is intended to provide local illumination if the receptacle is poorly lit, e.g. on a chassis backplane.

6. **Finding image**

   Front-panel connector

   - Gently 'rock' the probe if necessary to bring the fibre area into the illuminated field of view on the monitor.

   - Manually rotate the Tip, while keeping the Connector Inspector body stationary, until the image on the monitor screen comes into focus.

     The Tip turns on the the threaded probe to provide a focussing action.

   AMP back-plane connector

   - Gently 'rock' the probe if necessary to bring the fibre area into the illuminated field of view on the monitor

   - Push lightly on the probe so that the friction between the Tip and the connector receptacle prevents it from rotating

   - Slowly rotate the Connector Inspector handle until the image on the monitor screen comes into focus.

     The intention in this case is that the Adaptor Tip remains stationary in relation to the connector receptacle while the probe turns.

7. The monitor image of the polished end-surface of the fibre can now be inspected for dirt and damage.

SPECIFICATION

Dimensions:
- Probe length: 360 mm. (14.17 inches)
- Probe diameter (excl. lamp): 16 mm. (0.63 inches)
- Overall dimensions: 403 x 175 x 50 mm. (15.87 x 6.89 x 1.97 inches)

Materials:
- Metal construction, with insulating, anti-static coating on probe

Image:
- Monochrome
- Geometric magnification x 12
- Magnification on 4" monitor x 200 approx.
- Standard SVHS video signal for external monitor or 'Snappy' card

Illumination:
- Internal image illumination
- External sighting torch to assist engagement

Display:
- Standard - 4" LCD monitor
- Optional - 'Snappy' video image grabber card enables image display on laptop computer (via Parallel Port)

Power:
- Rechargeable battery in handle, 5 hours continuous use after full charge (1 hour if LCD monitor is powered from AWT-100 battery)
- External Mains Adaptor Unit for recharging batteries during operation

External connections:
- Socket for Video lead (1.5 m.) for connection to LCD monitor (including DC supply), 'Snappy' parallel port video image grabber (optional) or external monitor (optional).
- Socket for Mains Power Adaptor LEMO Push/Pull connector

TECHNICAL INFORMATION

Changing Tips

- Unscrew the resident Tip from the probe.
- Screw on the new Tip, using all the thread.
- Unscrew 2½ turns to enter the focussing zone.

Battery

A NiMH battery is used which does not suffer from 'memory effect' as do NiCd types. It is recommended the the battery charge be topped up whenever mains supply is available.

Aerotech World Trade Ltd.
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