0964-0043
0964-0052
0964-0058
0964-0059
and
0964-0060

Dual Channel Fiber Optics Converter

Technical Manual

B90030900A
11/94

INTRODUCTION

This publication is provided solely as a guide for individuals who have received Mettler Toledo Technical Training in servicing the Mettler Toledo product.

Information regarding Mettler Toledo Technical Training may be obtained by writing to:

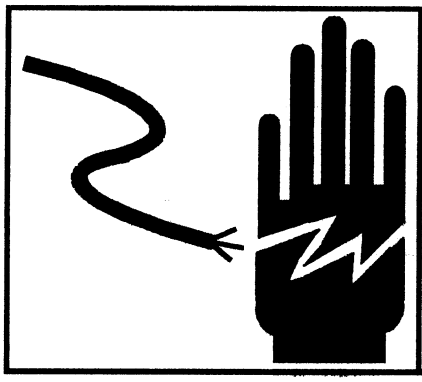
Mettler-Toledo, Inc.
Training Center
P.O. Box 1705
Columbus, Ohio 43216-6712
(614) 438-4400

IMPORTANT!

It is most important that the correct part number is used when ordering. Parts orders are machine processed, using only the part number and quantity as shown on the order. Orders are not edited to determine if the part number and description agree.

PRECAUTIONS

- READ this manual BEFORE operating or servicing this equipment.
- FOLLOW these instructions carefully.
- SAVE this manual for future reference.
- DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.
- ALWAYS DISCONNECT this equipment from the power source before cleaning, or performing maintenance.
- CALL Mettler Toledo for parts, information, and service.



WARNING

ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS, AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON.

WARNING

WHEN THIS EQUIPMENT IS INCLUDED AS A COMPONENT PART OF A SYSTEM, THE RESULTING DESIGN MUST BE REVIEWED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL COMPONENTS IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY.

WARNING

THIS MODULE AND ITS ASSOCIATED EQUIPMENT MUST BE INSTALLED, ADJUSTED, AND MAINTAINED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL COMPONENTS IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY.

WARNING

IF THIS DEVICE IS USED WITH AUTOMATIC OR MANUAL FILLING CYCLE EQUPIMENT. ALL USERS MUST PROVIDE A HARD WIRED EMERGENCY STOP CIRCUIT OUTSIDE THE DEVICE CIRCUITRY. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY INJURY.

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

FRIEMANN & WOLF Gerätebau GmbH
Von-Liebig-Str. 11 D-48342 Ostbevern
Germany

FRIWO

[redacted]

Wir, der Hersteller, erklären hiermit, daß das Produkt:
We, the manufacturer, hereby confirm, that the product:

Typ: *Type:* FW 1599

Zeichnungs-Nr.: *Part-No.:* 11.6307

weitere Merkmale:
additional information:

mit der beiliegenden Beschreibung die Anforderungen der Niederspannungsrichtlinie 73/23/EWG und der EMV-Richtlinien 89/336/EWG, 92/31/EWG erfüllt.
with the enclosed description fulfills the requirements of the Low Voltage Directive 73/23/EEC and the regulations of the EMC Directives 89/336/EEC, 92/31/EEC.

Das Gerät entspricht der:
The unit corresponds to:

a) Niederspannungsrichtlinie
Low Voltage Directive

- [x] EN 60742 11/93
- [ ] EN 60335 5/95
- [ ] EN 60950 9/94

b) EMV-Richtlinie
EMC-Directive

- [x] EN 50081-1 3/93
- [ ] EN 50081-2
- [ ] EN 50082-1 11/94
- [x] EN 50082-2

Ausstelldatum:
Date of issue: 15.11.95

Quality Manager ppa. Busche

R & D Manager ppa. Bothe

FRIEMANN & WOLF Gerätebau GmbH
Von-Liebig-Straße 11
48346 Ostbevern

Firmenstempel Company stamp

checked: R & D Electr. Man. i. V. Schulz

FRIEMANN & WOLF Gerätebau GmbH
Von-Liebig-Str. 11 D-48342 Ostbevern

FRIWO

EG-Konformitätserklärung
Declaration of Conformity

Wir erklären hiermit, daß das Produkt:
We hereby confirm, that the product:

Typ: *Type:* FW 3299

Bestell-Nr.: *Order-No.:* 11.8140

die Anforderungen der Niederspannungsrichtlinie 73/23/EWG und der EMV-Richtlinien 89/336/EWG, 92/31/EWG erfüllt.
fulfills the requirements of the Low Voltage Directive 73/23/EEC and the regulations of the EMC Directives 89/336/EEC, 92/31/EEC.

Das Gerät entspricht der:
The unit corresponds to:

a) Niederspannungsrichtlinie *Low Voltage Directive*	b) EMV-Richtlinie *EMC-Directive*
EN60742	EN50081-1
	EN50082-2

Quality Manager ppa. Busche

R & D Manager ppa. Bothe

checked: R & D Electr. Man. i. V. Schulz

FRIEMANN & WOLF Gerätebau GmbH
Von-Liebig-Straße 11
48346 Ostbevern

Firmenstempel Company stamp

Declaration of conformity
Konformitätserklärung
Déclaration de conformité
Declaración de Conformidad
Verklaring de overeenstemming
Dichiarazione di conformitá

We/Wir/Nous/WIJ/Noi: **Mettler-Toledo, Inc.**
1150 Dearborn Drive
Worthington, Ohio 43085
USA

declare under our sole responsibility that the product,
erklären, in alleiniger Verantwortung, daß dieses Produkt,
déclarons sous notre seule responsabilité que le produit,
declaramos, bajo nuestra sola responsabilidad, que el producto,
verklaren onder onze verantwoordelijkheid, dat het product,
dichiariamo sotto nostra unica responsabilitá, che il prodotto,

Models: **0964-0058, 0964-0059, 0964-0060**

Type: **Fiber Optics Communications Accessory** - when installed and used as per the manufacturers instructions listed in the Technical Manual supplied with the product.

to which this declaration relates is in conformity with the following standard(s) or other normative document(s).
auf das sich diese Erklärung bezieht, mitder/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.
Auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).
Al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
Waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
A cui si riferisce questa dichiarazione è conforme alla/e sequente/i norma/e o documento/i normativo/i.

CE Conformity / CE-Konformität / Conformité CE

73/23/EU Low Voltage / Niederspannung / basse tension	
EN61010-1	el. Safety / el. Sicherheit / sécurité el.
89/336/EU EMC Directive / EMU-Richtlinie / Directive concernant la CEM	
EN55022, B	Emissions / Funkstörungen
EN50081-1	Immunity

Other Directives and Standards / Andere Richtlinien und Normen / Autres documents
corresponding to local requirements / entsprechend lokalen Anforderungen / correspondant aux exigences locales

UL1950	el. Safety / el. Sicherheit / sécurité el. (if UL mark is applied)
C22.2 No. 950-M89	el. Safety / el. Sicherheit / sécurité el. (If CUL mark is applied)
FCC, Part 15, class A	Emissions / Funkstörungen

Darrell Flocken, Manager - Weights & Measures
Office of Weights and Measures
Worthington, Ohio USA
~~**February, 1997**~~
March, 1997 (revised to include the 0964-0060 version)

according to EN45014

A14039500A

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1.0 GENERAL DESCRIPTION

1.1 STANDARD FEATURES

The Dual Channel Fiber Optic Assembly is a small box with 2 duplex fiber optic to electrical conversion channels. Its purpose is to convert the fiber optic (light pulse) output to and from an electric equivalent signal, for Mettler Toledo instruments (Model 8141 and 8525) having fiber optic I/O.

Fiber optics communication is normally used with Mettler Toledo equipment within certain hazardous areas where an electrical spark cannot be tolerated. The light pulse output from the instrument in the hazardous area is carried through the plastic core of the fiber optic cable to the non-hazardous area where the fiber optic converter or receiving device is located. The converter then converts the fiber optic light pulses to an electrical equivalent RS232 or 20 mA loop signal.

This electrical I/O of each channel may be configured as RS232 T_x and R_x data (without handshake lines RTS, CTS, DSR, etc.) or as a 20 mA current loop where the transmit and receive circuits may be independently configured as active or passive. In addition, the connector includes a source of 5 VDC and 12 VDC for various user specified peripherals. (See Section 2.3 for loading rules.)

1.2 OPTIONS

This dual channel fiber optic converter assembly is itself an option for use with other Mettler Toledo equipment. The fiber optic portions of the other equipment are not covered here. For that information, the user is directed to the technical manual for the specific instrument. The optional fiber optic cable assemblies and related items specific to the unit are detailed below.

PART NO.	MODEL NO.	DESCRIPTION
13658400A	0900-0268	50 Ft. Cable Assembly with plug on each end
13658500A	0900-0269	100 Ft. Cable Assembly with plug on each end
13658600A	0900-0270	150 Ft. Cable Assembly with plug on each end
13658700A	0900-0271	200 Ft. Cable Assembly with plug on each end
13658800A	0900-0272	250 Ft. Cable Assembly with plug on each end
90031300A	0964-0053	Field connector KOP *
90031400A	0964-0054	500 Ft. bulk unterminated simplex cable

* This kit contains (16) connectors, (2) splices, (1) installation tool and (1) polishing kit.

1.3 FIBER OPTIC CABLE

The fiber optic cable used has a solid plastic core. Unlike the cables used for telecommunications, it has a single 1mm diameter plastic core instead of a bundle of glass fibers. The result is a low cost product at the expense of higher light attenuation. As a result, for this application, the maximum length is limited to 250 feet instead of miles common to glass fiber types.

⚠ WARNINGS

Caution must be exercised when applying this unit. Because, in most cases, it is used with equipment in hazardous areas, special attention to details and precautions must be observed. Also see specific warnings elsewhere in this manual. In general, two main topics must be considered:

1.) **<u>This</u> unit must not be installed in the hazardous area unless it is housed within a suitable enclosure that is rated for the specified area.**

2.) **The fiber optic cables traveling from the hazardous to non-hazardous areas must be enclosed in rigid metal conduit with appropriate conduit seals.**

See additional warnings elsewhere in this manual.

2.0 SPECIFICATIONS

2.1 ENVIRONMENTAL

Temperature

Operating −10°C to +45°C (+14°F to +113°F)

Storage −40°C to +70°C (−40°F to +158°F)

Humidity

Operating and Storage 0 to 95% RH non-condensing.

FCC Regulation

This unit meets or exceeds FCC Rules 47 CFR Part 15 for conducted and radiated emissions. If interference occurs in residential areas, it is the responsibility of the user at his own expense to take whatever measures required to correct the interference.

Operating Environment

Use in a non-hazardous office type environment free from liquid and dust contaminants.

2.2 POWER REQUIREMENTS

11 VDC to 16 VDC @ 250 mA. A remote "receptacle mount" power supply rated 12 VDC @ 600 mA is provided. When using other supplies, 12 VDC @ 250 mA with 1 V P-P max. ripple is minimum spec.

2.2.1 Power Supply Provided

Each unit is provided with a receptacle mounted power supply and 6 ft. of interconnect cable with a "battery charger" type of plug attached.

Plug type female battery charger plug with .1" dia. center receptacle and .216" dia. sleeve.

Plug polarity tip positive, sleeve negative.

The optional power supplies available are:

1) 120 VAC, 60 Hz Input North America Plug (13515600A)
2) 220 VAC, 50 Hz Input Europplug (90166500A)
3) 240 VAC, 50 Hz Input United Kingdom Plug (90166400A)

2.3 ELECTRICAL DATA INTERFACE

Two identical full duplex channels are provided. Each channel has a DB25 female connector protruding through box.

2.3.1 The RS232 Data (T_x and R_x) Conforms to the voltage and loading rules in the EIA RS 232C specification.

T_x (pin2) = ± 12 VDC signals

− 12 V = mark

+ 12 V = space

R_x (pin3) = ± 3 V to ± 15 V signals

(−) = mark

(+) = space

Ground (pin7) = Common for T_x and R_x.

Maximum cable length = 50 ft.

Maximum baud rate = 9600

2.3.2 The 20 mA loop data is selectable via jumper for active or passive transmit and/or active or passive receive.

Active Transmit is a non-isolated current through 1 of 2 jumper selectable voltage sources. (Loop current is determined only by series loop resistance.)

+ 12 VDC sourced through a 221 ohm resistor.

+ 5 VDC sourced through a 68 ohm resistor.

The series pass transistor characteristics are the same as for "passive transmit" below.

Passive Transmit is an optically isolated open collector NPN transistor.

V_{max} = 27 VDC (transistor OFF)

Vce_{sat} = 2.7 VDC max @ 20 mA (transistor ON)

I_{sc} = 85 mA typ. (short circuit output current)

Maximum cable length = 2000 ft.

Maximum baud rate = 9600

Active Receive is a non-isolated loop with similar characteristics to the active transmit circuit above. The opto isolator input characteristics are the same as "passive receive" below.

Passive Receive is an optically isolated input with the following characteristics.

I_{mi} = 12 mA min (minimum input current for mark)

V_{mi} = 2.75 V max @ I_{mi} = 20 mA (voltage drop across input)

I_{si} = 3 mA max (minimum input current for space)

2.4 OPTICAL DATA INTERFACE

Two full duplex identical optical channels are provided to interface the two electrical channels. Each optical channel is jumper selectable for operation with the RS232 or 20 mA electrical circuit.

2.4.1 Fiber Optic Cable

Type = 1mm solid plastic core in a 2.2 mm dia. PVC flame retardant jacket.

Max. loss = .31 dB/meter = (.0945dB/ft)

Effective optical diameter = 1mm

Min. bend radius = 35mm (1.38 in.)

Max. pull force = 50N (11.24 pounds)

Flexing = 1000 cycles max.

2.4.2 Fiber Optic Transmitter/Receiver

Type = Hewlett Packard HFBR-1523 (transmitter)

Hewlett Packard HFBR-2523 (receiver)

2.4.3 Optical Loop Characteristics

MAX. CABLE LENGTH(-10° to +45°C)		TRANSMITTER DRIVE CURRENT	JU9/JU10 POSITION
MIN.	MAX.		
0 FT.	66 FT.	3 mA	NONE
25 FT.	115 FT.	6 mA	POSITION 1-4
80 FT.	200 FT.	23 mA	POSITION 2-5
130 FT.	250 FT.	40 mA	POSITION 3-6

2.5 CONSTRUCTION

The enclosure provided is a steel sheet metal chassis/cover combination painted black enamel. It contains mounting "feet" metal tabs with holes on the chassis to facilitate panel mounting.

Overall size = 4.75" x 5.12" x 1.25" tall

Mounting tabs = 4.75" side, 3.0" mtg. centers

Mounting hole coordinates = 3.00" x 5.56" centers for #6 screws
(See mounting installation instructions in Section 3.1.2)

Weight (without power supply) = 1.0 pound

Shipping weight = 3.5 pounds

2.6 FACTORY NUMBER DETAILS

Listed below are the converter types offered. Each include appropriate power supply.

Model 0964-0043 (90030700A) 120 VAC Converter KOP

Model 0964-0052 (90030800A) 240 VAC Converter KOP

Model 0964-0058 (90165600A) 240 VAC Converter KOP (U.K.)

Model 0964-0059 (90165700A) 220 VAC Converter KOP (Europlug)

Model 0964-0060 (90165800A) Converter KOP without Power Supply

3.0 INSTALLATION

3.1 SETUP PROCEDURE

3.1.1 Unpacking

Examine the shipping carton for any signs of damage. IF DAMAGE IS FOUND, make a claim with the carrier immediately. If the container is damaged, save it. It must be presented to the carrier as evidence of damage. Open the carton and inspect the contents for missing or damaged parts. The contents are as follows:

120 VAC Version (0964-0043)

(1) 90031500A Dual Channel Converter

(1) 13515600A Transformer/Power Supply

(1) Technical Manual and Warranty Card

240 VAC version (0964-0052)

(1) 90031500A Dual Channel Converter

(1) 13379500A Transformer/Power Supply

(1) Technical Manual and Warranty Card

240 VAC U.K. Version (0964-0058)

(1) 90031500A Dual Channel Converter

(1) 90166400A Transformer/Power Supply

(1) Technical Manual and Warranty Card

220 VAC Euro Version (0964-0059)

(1) 90131500A Dual Channel Converter

(1) 90166500A Transformer/Power Supply

(1) Technical Manual and Warranty Card

Version Without Power Supply (0964-0060)

(1) 90031500A Dual Channel Converter

(1) Technical Manual and Warranty Card

⚠ WARNING

THIS CONVERTER AND POWER SUPPLY ARE NOT RATED TO ALLOW HAZARDOUS AREA INSTALLATION. DO NOT INSTALL THESE ITEMS IN A HAZARDOUS AREA WITHOUT ENCLOSING THEM IN AN APPROVED EXPLOSION PROOF ENCLOSURE. CONTACT METTLER TOLEDO FOR INSTALLATION ASSISTANCE.

3.1.2 Mounting

Mount the assembly to a flat unobstructed surface in a non-hazardous area that is not subject to dust or liquid contamination leaving enough room to service all connectors. Use the full scale mounting template shown below to aid proper placement.

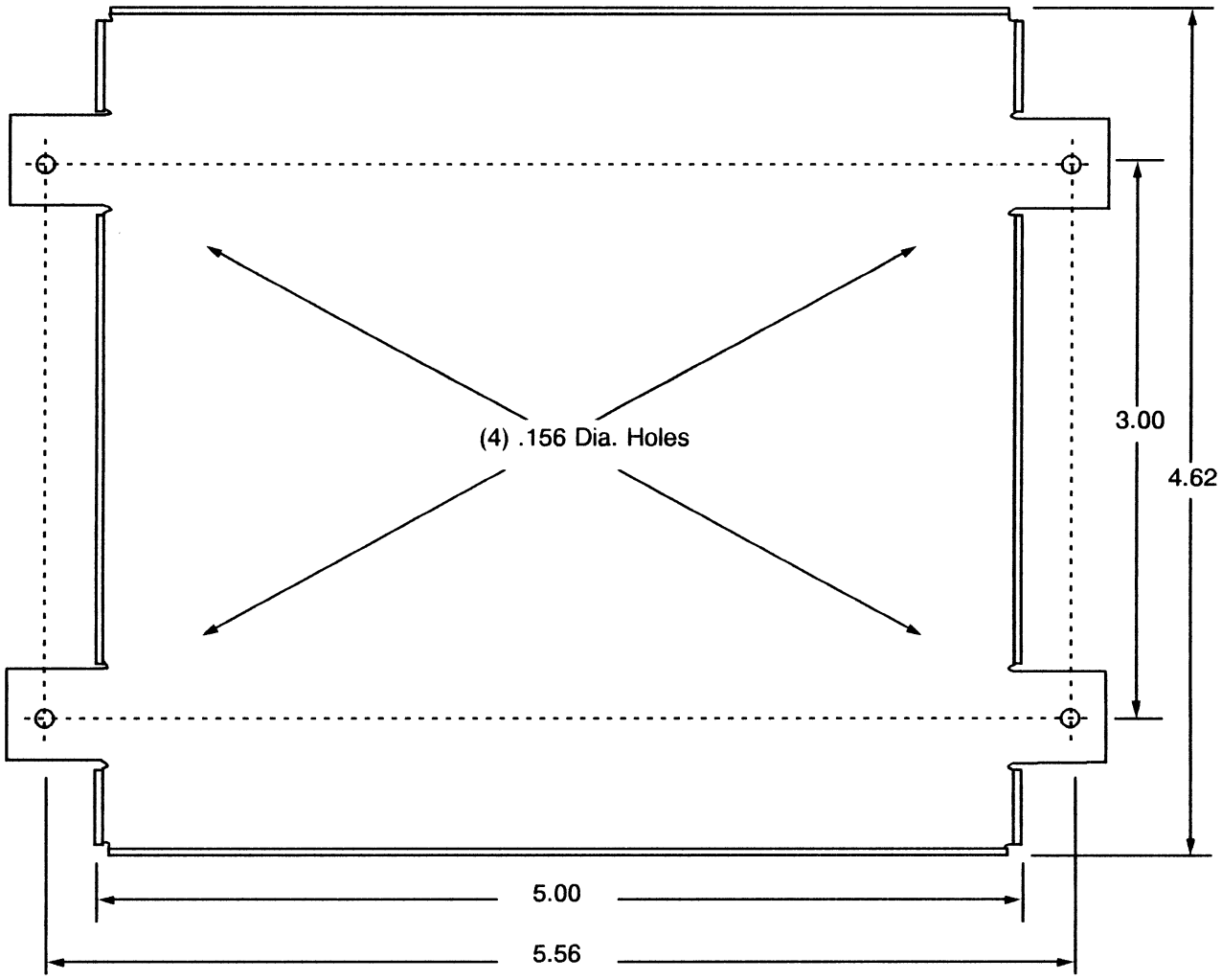


Figure 3.1 Chassis Mounting Template

3.1.3 Internal Jumper Settings

There are two identical channels on the PCB. The jumper descriptions for channels 1 and 2 are combined.

Fiber optic parameter settings for the permissible fiber optic cable length range.

JU9 (ch.1) or JU10 (ch.2)	FIBER OPTIC CABLE LENGTH
NONE	0 TO 50 FEET
1 - 4	50 TO 100 FEET
2 - 5	100 TO 200 FEET
3 - 6	200 TO 250 FEET

Fiber optic jumpers JU7 (channel 1) or JU8 (channel 2) are used to invert optical signal polarity. Insert jumpers 1-2 & 3-4 for "DATA" communications. Insert jumper 2-3 to interface contacts or pushbuttons on the electrical side. This creates light when the contact is closed and no light when it opens.

Electrical selection of 20 mA loop or RS232.

JU1 (ch.1) or JU2 (ch.2)	ELECTRICAL FUNCTION
1 - 2	RS232
2 - 3	20 mA

Electrical selection of transmitter 20 mA current loop active/passive modes. The active mode sources the voltage but does not provide isolation whereas the passive mode provides optical isolation but requires the voltage source to be remote.

JU4 (ch.1) or JU6 (ch.2)	20 mA TRANSMIT FUNCTION
4 - 5 AND 1 - 2	ACTIVE WITH +5 VDC SOURCE VOLTAGE
5 - 6 AND 1 - 2 (RECOMMENDED)	ACTIVE WITH +12 VDC SOURCE VOLTAGE
2 - 5 ONLY	PASSIVE

Electrical selection of receiver 20 mA current loop active/passive modes. Operation is the same as for the transmit circuits above.

JU3 (ch.1) or JU5 (ch.2)	20 mA RECEIVE FUNCTION
4 - 5 AND 1 - 2	ACTIVE WITH +5 VDC SOURCE VOLTAGE
5 - 6 AND 1 - 2	ACTIVE WITH +12 VDC SOURCE VOLTAGE
2 - 5 ONLY (RECOMMENDED)	PASSIVE

See the diagram below for jumper placement on the dual channel converter PCB. View shown is of the PCB only with the cover removed.

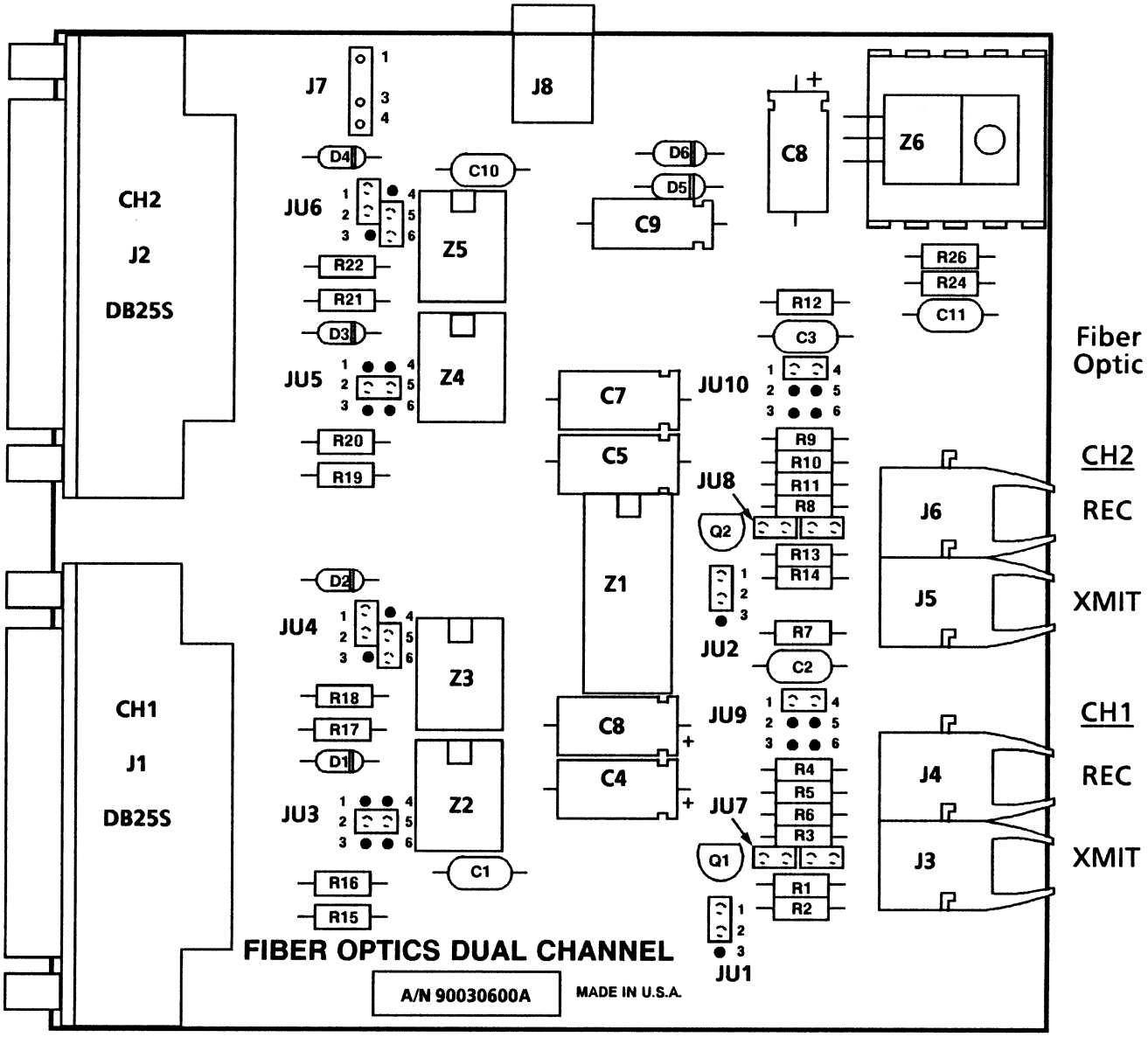


Figure 3.2 Dual Channel Converter PCB

3.2 ELECTRICAL CABLE

A twisted shielded cable of at least 24 gauge for either the RS232 or 20 mA loop data is required.

Maximum Cable Length 50 ft. (RS232) or 2000 ft. (20 mA)

IMPORTANT!

IF A MULTICONDUCTOR SHIELDED CABLE WITH MORE CONDUCTORS THAN NEEDED IS USED, **NEVER** LEAVE THE UNUSED CONDUCTOR(S) UNTERMINATED. ALWAYS CONNECT THE UNUSED CONDUCTOR(S) TO THE SHIELD AT EACH END.

Mettler Toledo recommends Belden #8759 (2) conductor with ground #20 gauge shielded cable for most applications.

3.3 OPTICAL CABLE

WARNING

ALL CABLES THAT ARE RUN WITHIN A HAZARDOUS AREA MUST BE INSTALLED IN ACCORDANCE WITH APPLICABLE CONTROL DRAWING(S) SUPPLIED WITH THAT EQUIPMENT. FAILURE TO COMPLY WITH THIS WARNING WILL RESULT IN LOSS OF ANY APPLICABLE APPROVAL(S) AND MAY ALSO RESULT IN BODILY INJURY, PROPERTY DAMAGE, OR BOTH.

3.3.1 Cable Type

All fiber optic cable supplied or used with this equipment is to be as follows:

Core – Single plastic fiber 1mm diameter.

Jacket – PVC flame retardant 2.2mm OD.

Attenuation – .31dB/meter maximum.

Manufacturer – Hewlett Packard type HFBR-QUS or equivalent.

3.3.2 Supplied Lengths

Mettler Toledo supplies the fiber optic cable, if specified, in the following pre-assembled connectored lengths: 50, 100, 150, 200 and 250 ft. These cables should not be cut in the field unless proper equipment is available to crimp the connectors in place. Excess cable is to be coiled at either end in no less than a 6 inch diameter. If special lengths are required or where bulk cable is easier to work with, a 500 ft. continuous length of unconnectored cable is available for custom lengths up to 250 ft. each. Also a connector kit consisting of 16 plugs (8 blue and 8 gray), 2 splices, and a crimp tool are available from Mettler Toledo when working with unconnectored cable in the field.

3.3.3 Connectoring In The Field

The Model 964-0053 connector kit is available to install up to 16 connectors in the field. In addition, 2 splices are included in the event a given cable is mistakenly cut short. Additional materials needed for the termination procedure are:

Industrial razor blade or wire cutters.

16 gauge latching wire strippers.

Step 1 –Cut cable to length and strip off $^1/_4$ " of outer jacket with 16 gauge wire strippers.

CAUTION

DO NOT NICK OR SCRATCH THE CABLE CORE OR LIGHT TRANSMISSION WILL BE SEVERELY IMPAIRED. ALSO THE CORE MAY FRACTURE AT THIS POINT. THE PROPER USE OF **WIRE STRIPPERS** IS STRONGLY ENCOURAGED. **DO NOT** STRIP THE JACKET WITH A KNIFE.

Step 2 –Place crimp ring and connector over end of cable. The fiber should protrude about 1/16" through the end of the connector. Carefully position ring so its rear edge is flush with the rear connector edge. Be sure the cable is firmly mated inside the connector.

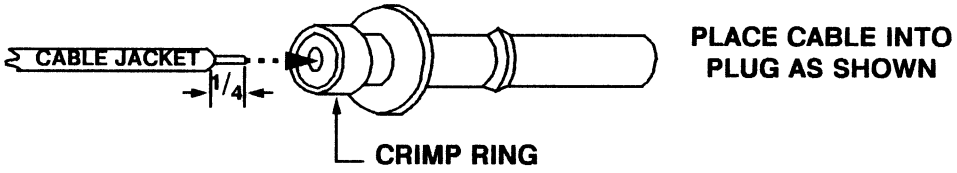


Figure 3.3 Cable Connector

NOTE: INSTALL THE GRAY PLUG ON THE TRANSMITTER END AND THE BLUE PLUG ON THE RECEIVER END OF THE CABLE TO MAINTAIN COLOR CODING. BOTH PLUGS ARE MECHANICALLY IDENTICAL.

Step 3 –Place connector and ring into the crimp tool supplied in the KOP. See diagram below. Squeeze both halves of the tool together by one of the following methods: Squeeze in a vise - or - squeeze with a "vice grip" type pliers

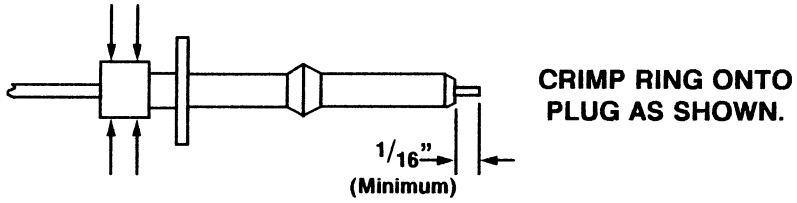


Figure 3.4 Connector Ring Crimping

CAUTION

ALWAYS USE THE TOOL PROVIDED. NEVER ATTEMPT TO CRIMP THE RING ON THE CONNECTOR WITH ONLY PLIERS. THE TOOL HAS A BUILT-IN STOP. WHEN THE TWO HALVES COME TOGETHER, THE RING IS SQUEEZED PROPERLY. IF AN ATTEMPT IS MADE TO CRIMP THE RING WITHOUT THE TOOL, IT'S EASY TO OVER-SQUEEZE THE FIBER THEREBY REDUCING THE LIGHT TRANSMISSION AND ALSO RUN THE RISK OF BREAKING THE CONNECTOR.

Step 4 –Trim OFF excess fiber protruding through connector end as shown below. Use a razor blade or other very sharp blade.

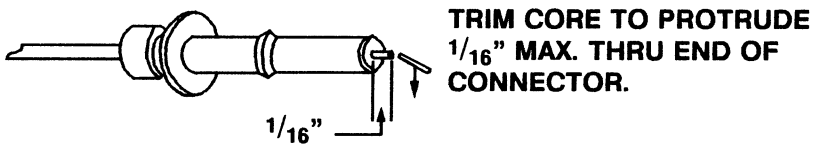


Figure 3.5 Cable Core Trim

IMPORTANT!

DO NOT CUT THE FIBER WITH SCISSORS, CUTTING PLIERS OR SIMILAR. THIS CAUSES FRACTURES BELOW THE FLUSH LEVEL OF FIBER TO CONNECTOR END. IT IS BEST TO CIRCUMSCRIBE THE FIBER WITH A RAZOR BLADE FIRST, THEN IT WILL SNAP OFF CLEAN.

Step 5 –Insert the connector into the polishing fixture provided in the connector KOP with the trimmed fiber protruding through the bottom of the fixture. Place the 600 grit abrasive paper on a flat smooth surface. Press down on the connector and polish the fiber and connector end using a figure eight pattern of strokes until it is flush with the bottom of the fixture. Wipe connector and fixture clean.

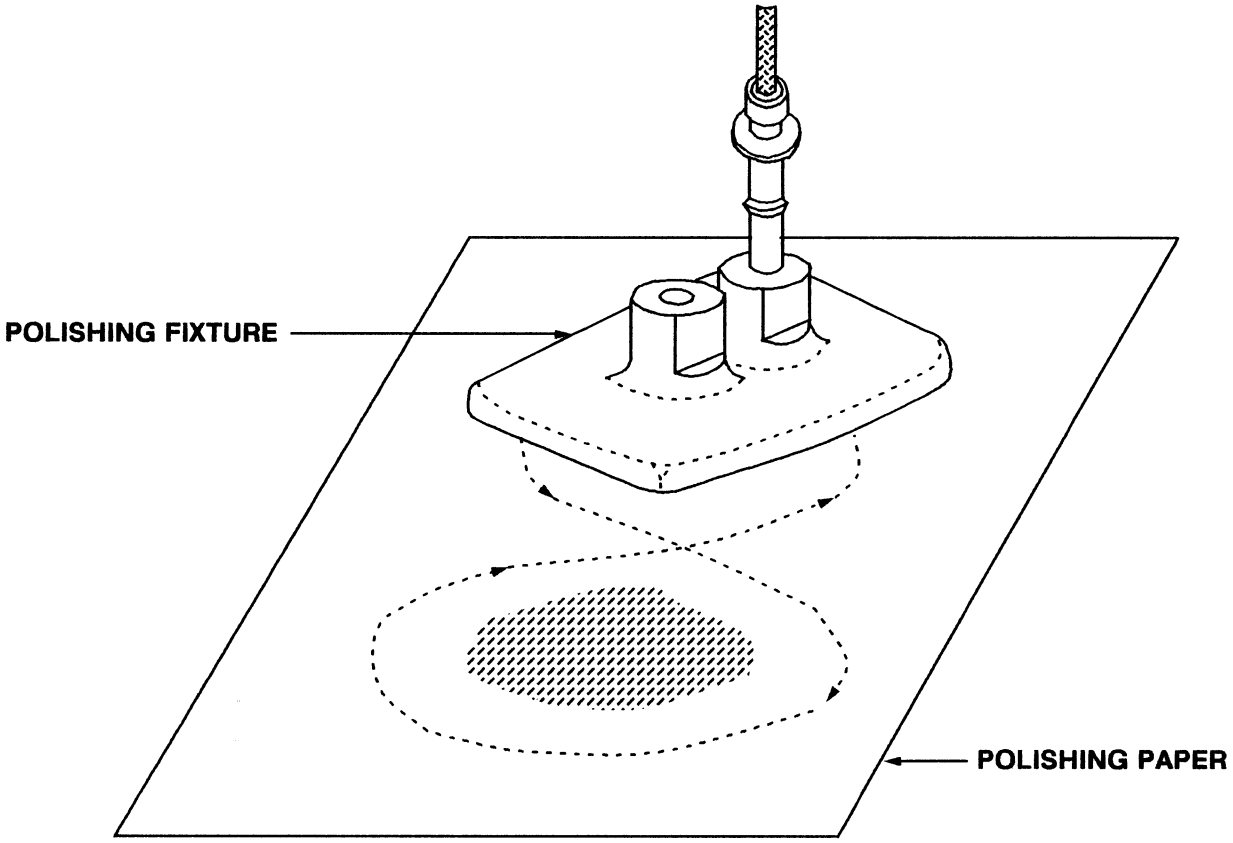


Figure 3.6 Connector Polishing

Step 6 –Place the flush connector and fixture on the dull side of the pink lapping film and continue to polish the connector for approximately 25 figure eight strokes or till flat, smooth and clean. The cable is now ready for use.

NOTE: STEP 6 MAY BE OMITTED FOR SHORT CABLE LENGTHS OF LESS THAN 100 FEET.

3.3.4 Cable Splicing

The optional connector KOP contains two splices, each for joining two pieces of fiber optic cable in the field. The procedure requires no crimping tools: simply clean each end and press into the splice. The procedure follows.

Step 1 -Prepare each end exactly as if a connector was to be applied (steps 1-6 above) except to not crimp any sleeves on the connectors.

Step 2 -Remove the cable from the connector. Each end will appear as shown below.

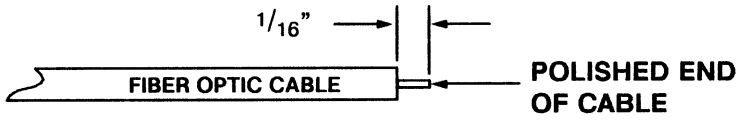
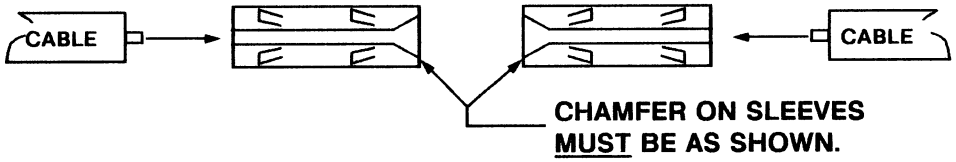


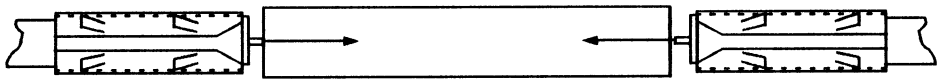
Figure 3.7 Polished Cable End

Step 3 -Slide a sleeve supplied onto <u>each</u> cable end exactly as shown in the figure below. Inspect the internal and external "barbs" on the sleeves and chamfers to determine correct orientation. Then press metal sleeves into the plastic sleeve. Splice is complete.

SLIDE THE METAL SLEEVES ONTO EACH CABLE



INSERT THE METAL SLEEVES INTO THE OUTSIDE PLASTIC SLEEVE



COMPLETED SPLICE. METAL SLEEVES COMPLETELY WITHIN THE PLASTIC SLEEVE

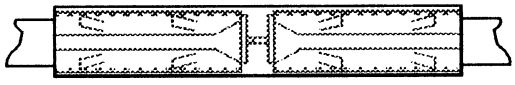


Figure 3.8 Cable Splicing Diagrams

3.4 POWER CONNECTIONS

The power supply furnished with the converter is intended to mount into a standard receptacle. (See Section 2.2 for plug types).

3.5 INTERFACING

3.5.1 Optical

The fiber optic cable is intended to interface to all Mettler Toledo products equipped with Hewlett Packard Type fiber optic capabilities. The maximum fiber optic cable length is 250 ft. Refer to the specific interfaced product for further details.

3.5.2 Electrical

Each of the two electrical channels are identical: RS232 and 20 mA capabilities on each. The electrical signals at each connector (J1 or J2) are shown on the next page. A typical full duplex 20 mA loop connection is illustrated below.

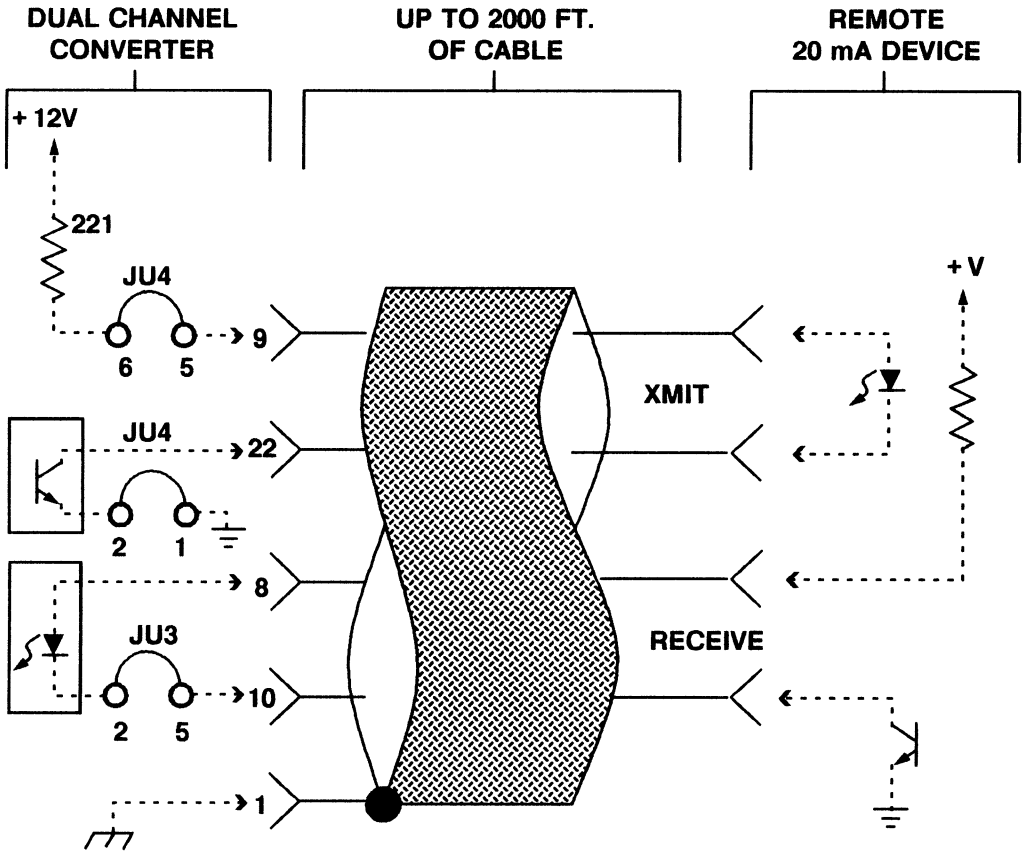


Figure 3.9 20 mA Loop Connection

J1 or J2 Pin #	Signal Description	307	8806/ 8860 Desk	8860 Washdown	8843	8855	Host Computer RS232C
1	Chassis Ground	Shield	Shield	Shield	Shield	Shield	Shield
2	TxD RS232C				3		3
3	RxD RS232C						2
4	Not Used						
5	Not Used						
6	Not Used						
7	Logic Ground				7		7
8	+ RxD 20 mA (Sink)		11				
9	+ TxD 20 mA (Source)	6	16	H		3	
10	–RxD 20 mA (Source)		22				
11	Not Used						
12	Not Used						
13	Not Used						
14	Not Used						
15	Not Used						
16	Not Used						
17	Not Used						
18	Not Used						
19	Not Used						
20	Not Used						
21	Not Used						
22	–TxD 20 mA (Sink)	7	18	K		22	
23	Logic Ground						
24	+ 5 VDC Supply (50 mA max.)						
25	+ 12 VDC Supply (100 mA max.)						
	Jumpers in connector of remote device	None	12-23	None	None	None	4-5
	Jumper plugs required on converter PCB. (channel #1 shown)	JU1 2-3 JU4 5-6 & 1-2	JU1 2-3 JU4 5-6 & 1-2 JU3 2-5	JU1 2-3 JU4 5-6 & 1-2	JU1 1-2	JU1 2-3 JU4 5-6 & 1-2	JU1 1-2

Table 3-1 Dual Channel Fiber Optic Converter Electrical Data Interface Cable Termination

4.0 MAINTENANCE

This product is a self contained digital to digital type of converter. Since no analog circuitry is involved, maintenance is minimal.

4.1 CHECKLIST

The device should be periodically inspected for signs of abuse, abnormal operating conditions and dirt accumulation. At least once a year the following item's should be reviewed as potential trouble spots.

Excessive Dirt Clean unit case and internal PCB.

Fiber Optic Connections Make sure plugs are secure and fully seated in the socket.

Electrical Connections Tighten DB25 connector shells & mounting if required.

Open Cover Inspect PCB if necessary.

4.2 TROUBLESHOOTING

⚠ WARNING

PERMIT ONLY QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS, AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON.

If the unit is non-functional, check the following items before replacing a suspected defective PCB.

Step 1 **Check Power Supply Output.** Disconnect 12 V plug and measure plug voltage. The tip is positive, sleeve negative and should be 14–19 VDC @ no load. If ok go to step 2. If not ok replace supply.

Step 2 **Measure +5v Supply.** Reconnect 12 V plug. Check for presence of +4.8 to +5.2 VDC at J1 or J2 Pin 24 with respect to Pin 7 or 23. If ok go to step 3, if not ok replace PCB.

Step 3 **Check Fiber Optic Receiver Cables.** Unplug the cable going to J4 or J6 (blue plug). Look at the plug end while data is sent from the remote device. It must flash "red" visibly. If ok go to step 4. If not, check remote fiber optic device or cable for a break.

Step 4 **Check Fiber Optic Transmitters.** Unplug the cable going to J3 or J5 (gray plug). Look into the transmitter in the converter. It must flash "red" while data is being sent. If ok, check remote fiber optic device. If not ok, check remote electrical device connected to J1 or J2. If ok, replace PCB.

4.3 PARTS REPLACEMENT

The replacement parts are as follows:

(*)90030600A	Dual Channel PCB
(*)13515600A	U.S. Power Supply (120 VAC - 60 Hz)
(*)13379500A	Power Supply (240 VAC - 50/60 Hz) (Old Style Euro plug)
(*)90166400A	U.K. Power Supply (240 VAC - 50 Hz)
(*)90166500A	Euro Power Supply (220 VAC - 50 Hz)
(*)90031300A	Connector KOP (8 blue plugs, 8 grey plugs, 2 splices, tool)
0900-0268	50 ft. Fiber Optic Cable
0900-0269	100 ft. Fiber Optic Cable
0900-0270	150 ft. Fiber Optic Cable
0900-0271	200 ft. Fiber Optic Cable
0900-0272	250 ft. Fiber Optic Cable
0964-0054	Buck 500 ft. Roll

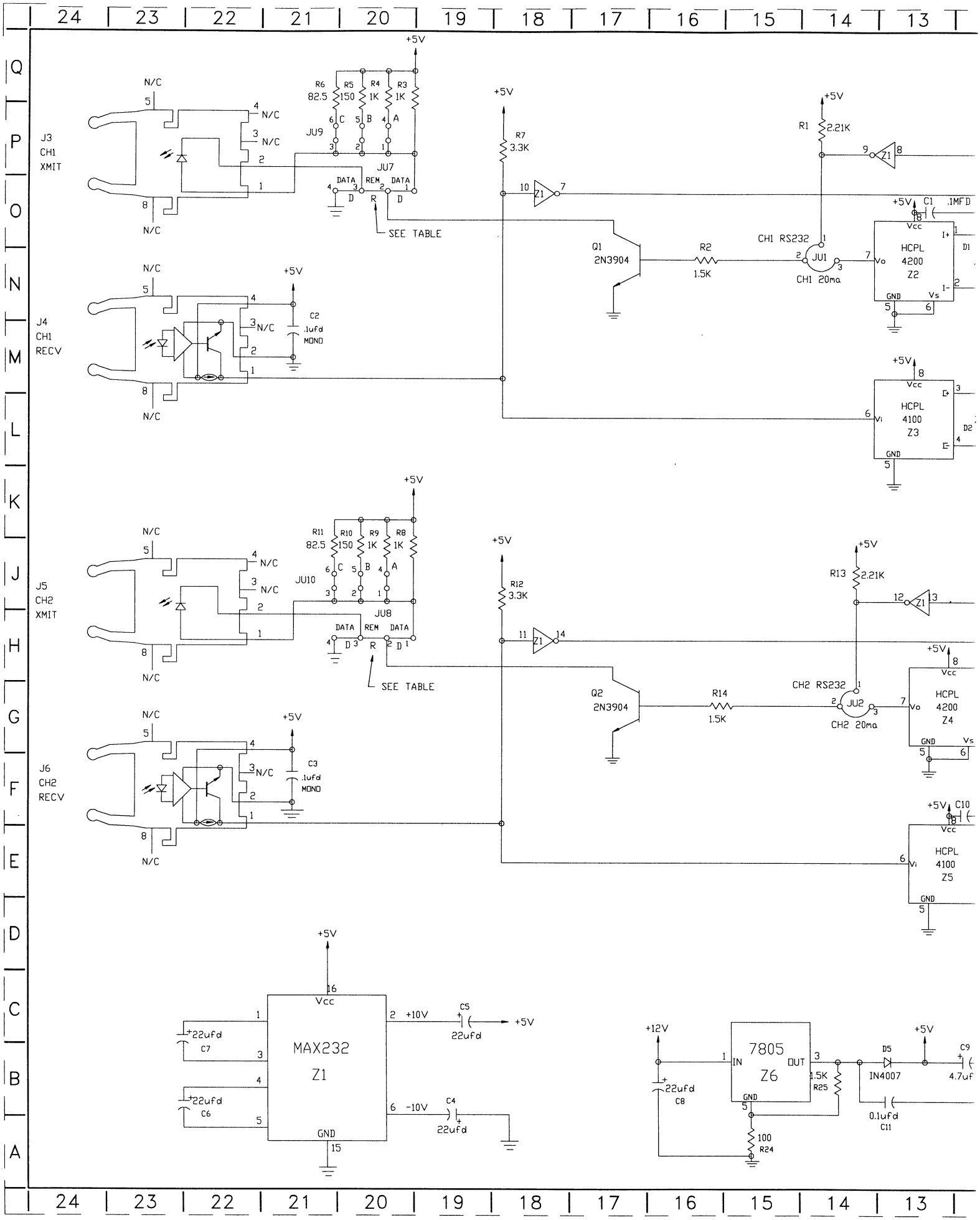
(*) indicates possible alpha revision prefix

4.4 DRAWINGS

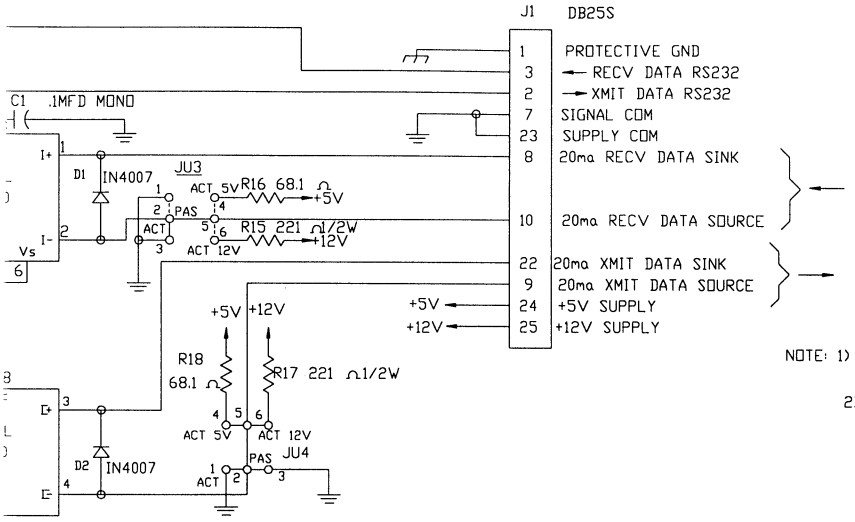
Included is drawing (*)900306 which is a schematic of the PCB. And (*)90031500A which is the box assembly.

MAINTENANCE LOG

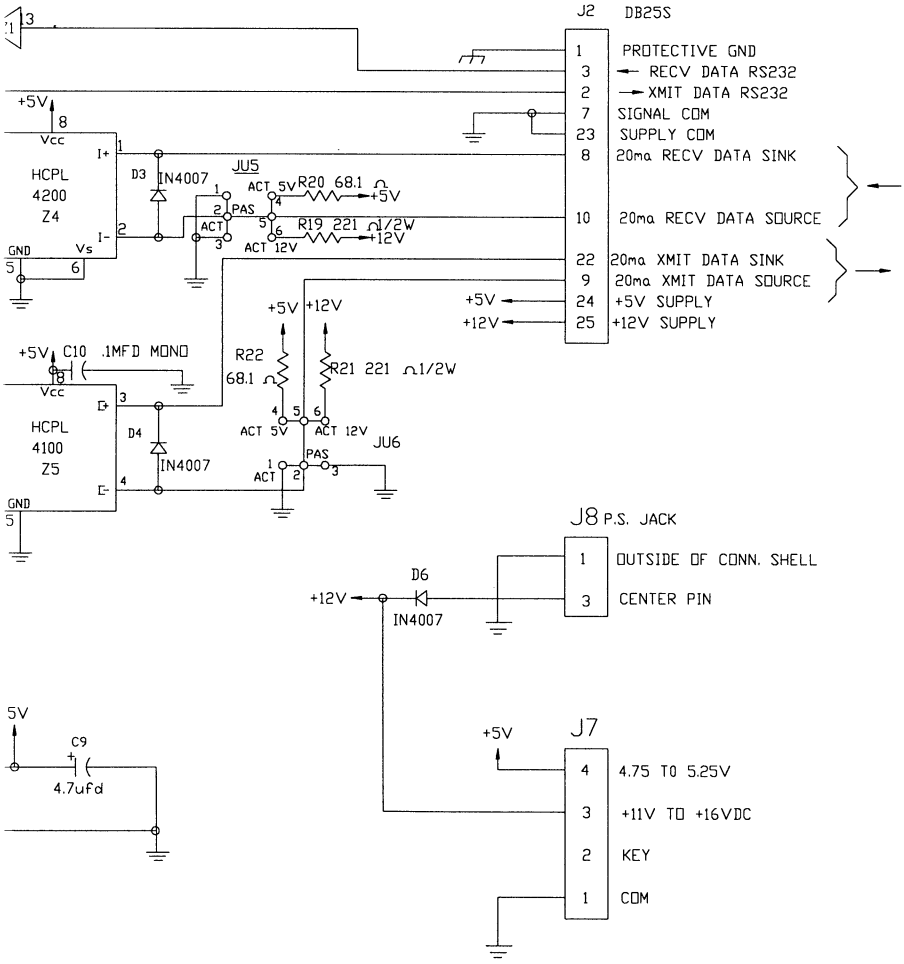
MAINTENANCE DESCRIPTION	PERFORMED BY	DATE


J3
CH1
XMIT
J4
CH1
RECV
J5
CH2
XMIT
J6
CH2
RECV
N/C
+5V
R6
82.5
R5
150
R4
1K
R3
1K
JU9
JU7
DATA
REM
DATA
SEE TABLE
R7
3.3K
R1
2.21K
Z1
C1
.1MFD
Q1
2N3904
R2
1.5K
CH1 RS232
JU1
CH1 20ma
HCPL
4200
Z2
HCPL
4100
Z3
C2
.1ufd
MONO
R11
82.5
R10
150
R9
1K
R8
1K
JU10
JU8
R12
3.3K
R13
2.21K
Q2
2N3904
R14
1.5K
CH2 RS232
JU2
CH2 20ma
HCPL
4200
Z4
C3
.1ufd
MONO
C10
HCPL
4100
Z5
MAX232
Z1
C5
22ufd
C7
22ufd
C6
22ufd
C4
22ufd
+10V
-10V
7805
Z6
C8
22ufd
1.5K
R25
100
R24
D5
IN4007
C9
4.7uf
0.1ufd
C11

FIBER OPTIC TRANSMIT CONFIGURATION TABLE		
JU7 OR JU8	→ WITH BOTH 'D' JUMPERS IN, XMITTER TURNS ON WHILE DATA IS BEING SENT. WITH 'R' JUMPER IN, XMITTER TURNS ON WHEN LOOP CURRENT FLOWS.	
JU9 OR JU10	JUMPER INSTALLED	FIBER OPTIC CABLE LENGTH
	NONE	0 TO 50 FT.
	A	51 TO 100 FT.
	B	101 TO 200 FT.
	C	201 TO 250 FT.



NOTE: 1) WHEN CONFIGURING ACTIVE USE ACT 12V POSITION.
2) ALL RESISTORS 1/4W @ 1% UNLESS NOTED.



NO.	ZONE	DESCRIPTION	BY	APPROVED	AGENCY	E.R. NO.	DATE
0		TRANSFERRED FROM MTWO.	DB 10/96	DPB		50691	10/96

RECORD OF CHANGES

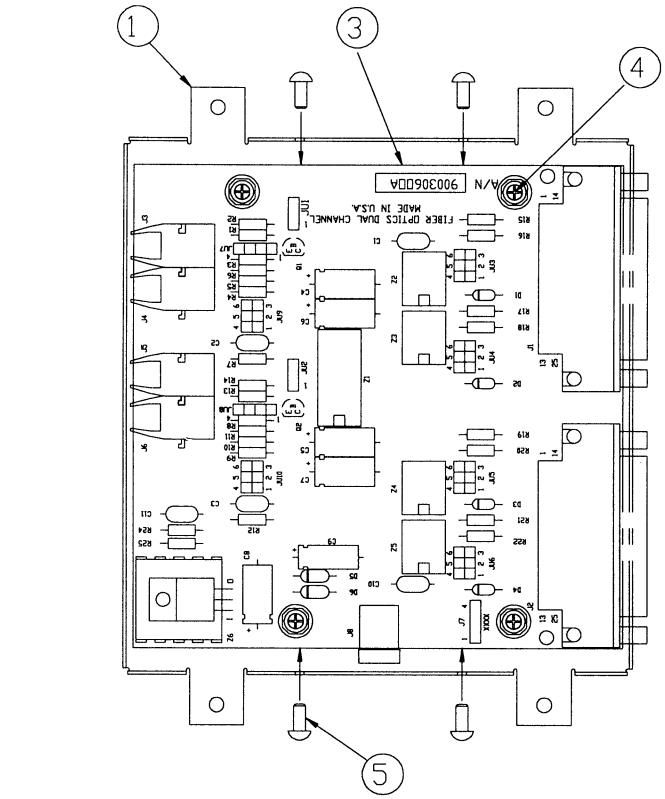
SUFFIX	DESCRIPTION	FINISH	CONSISTS OF
	SUFFIX CODE INDEX		

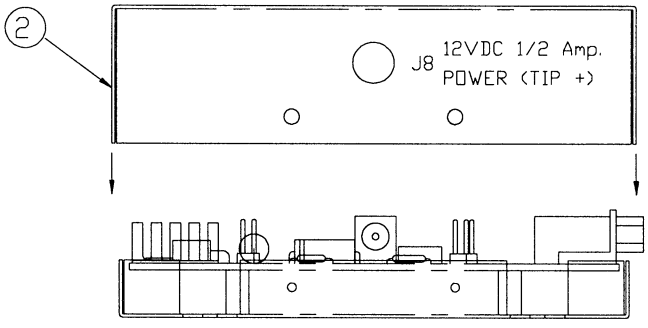
METTLER TOLEDO

MATERIAL DESCRIPTION: SCHEMATIC FILE: 150729 — MATERIAL SPEC.
SCALE: DO NOT SCALE DRAWING
UNITS: DIMENSION TOLERANCE UNLESS OTHERWISE SPECIFIED — DECIMAL — FRACTIONAL — ANGULAR
PROJ.NO./SPEC.NO.: 9712-11 — SUPERSEDES: A900306 — SUPERSEDED BY:
ENGR. RELEASE NO.: 50691 — 10/96

NAME: SCHEMATIC, DUAL CHANNEL FIBER OPTICS TO RS232/20ma LEVEL CONV.
DRN: DER 10/96 APVD: DPB 10/96
AGENCY:
150729R

BILL OF MATERIAL		
SYMBOL	REQ'D	DESCRIPTION
1	1	CHASSIS (BOTTOM PAN)
2	1	COVER
3	1	P.C. BD. ASSEMBLY
4	4	#6-32 UNC - P.H. SCR X 1/2" LG. W/WASHER
5	4	#4 X .25 P.H. SELF TAP. SCREW
6		
7		





B-FRAME (15-JUN-93)

BILL OF MATERIAL

SYMBOL	REQ'D	DESCRIPTION	PART NUMBER
1	1	CHASSIS (BOTTOM PAN)	90030300A
2	1	COVER	A90030200A
3	1	P.C. BD. ASSEMBLY	A90030600A
4	4	#6-32 UNC - P.H. SCR X 1/2" LG. W/WASHER	R0360900A
5	4	#4 X .25 P.H. SELF TAP. SCREW	R01475130
6			
7			

RECORD OF CHANGES

NO.	ZONE	DESCRIPTION	BY	CHK'D	APP'D	E.R. NO.	DATE
2		TRANSFERRED FROM MTWO.	WKB		DPB	50691	10/96
1		ITEM 2 WAS 90030200A, UPDATED BOM TO STANDARD FORMAT	RCB		ACT	K00651	30jan96

MATERIAL SPEC. SEE BILL OF MATERIALS
T.S. CODE
FINISH DESCRIPTION
FINISH CODE
DIMENSION TOLERANCE UNLESS OTHERWISE SPECIFIED
.XX=±.02
.XXX=±.005
DECIMAL
ANGULAR
SCALE 1:1
DO NOT SCALE DRWG.
PROJ. NO./SPEC. NO. 1123D
SUPERSEDES KB580445
SUPERSEDED BY
ENG. RELEASE NO. K00205
12-11-90

METTLER TOLEDO

NAME BOX ASSEMBLY
FIBER OPTIC DUAL CHANNEL CONVERTER

DRN	R.CARSE	22-mar-90	
DSGN	A. TOWSLEE	22-mar-90	
CHKD			
APPD	ART	12-11-90	

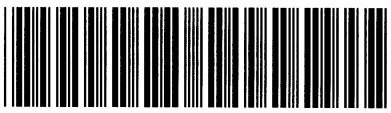
90031500A

SHEET 1 OF 1

METTLER TOLEDO

1900 Polaris Parkway
Columbus, Ohio 43240

P/N:B90030900A



B90030900A