CERN
EP-ELECTRONICS
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BRANCH RECEIVER, TYPES 178 AND 178A

TECHNICAL SPECIFICATIONS

The Branch Receiver (BR) is designed to extend the addressing capability of the basic RMH-system[1)2)]. Several of these BRs (up t 18) can be connected in a "daisy chain" configuration to the internal input bus (IIB) of a system encoder module[3)] (SE), type 158, t provide data from several RMH-branches (vertical dataway). Se Fig.1 for a multi-branch configuration. Each BR provides appropriate termination of an RMH-branch, transmits branch data (format se Fig.2) via IIB to SE, and buffers all control signals. A front panel switch provides for "first", enable and disable (type 178 only see also ref. 1).

The revised version, type 178A, uses a front panel NIM input (OP for operational) which provides for enabling or disabling of each B and the connected RMH-branch. This permits selective reading o branches within a system. Block diagram, see Fig. 3.

The RMH-branches connected to BRs are read-out similar to th single branch system (basic RMH-system), commencing with the leftmost enabled BR*. The enable input signal (EI) propagates throug all BRs enabling only one BR (and the corresponding branch) at time.

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*) Note: When using type 178 the read-out starts at the BR with it mode switch in position "first" (see also 3.1.2).

1. INPUT

Branch Input connector (BI): p.c.b. edge connector, 2x35 contacts, $^1/_{10}$" pitch: ECL signals (single ended driven, other wire of pair is statically on -1,4 V; EIF and EO are driven push-pull).

2. OUTPUT

2.2 Internal Input Bus (IIB):

2.2.1 Connections to next BR (or SE): 2 x flat cables (40 wires each) with socket connectors: ECL signals (single ended driven, other wire of pair is statically on -1,4 V; EIF and EO are driven push-pull).

Connections: see Fig. 5.

2.2.2 Connections to preceding BR (or branch receiver terminator (BRT), see Fig. 7): 2x40 contacts (2x2x20 headers): ECL signals (single ended driven, other wire of pair is statically on -1,4 V; EIF and EO are driven push-pull).

3. CONTROL

3.1 Front Panel:

3.1.1 BUSY Indicator: indicates status, "ON" when BUSY.

3.1.2 Mode Switch (type 178 only**): toggle switch, 3 positions:

- First : This BR will be read first, all preceding BRs (to the left of it) are ignored.
- Normal : BR is enabled.
- Disabled: BR will not be read.

3.2 OP Input (type 178A***): NIM signal, true for operational (enabled), must be held during whole data transfer ("static" signal), Z_i = 50Ω.

3.3 Rear Panel:

3.3.1 Threshold Adjustments: Access to potentiometers for threshold adjustments for receiver circuits of strobe signal and data signals. These potentiometers are preset and should not be touched under normal operating conditions. Exceptionally their

**) Note: At least one BR in a multi-branch configuration must have its mode switch in position "first", in general the leftmost BR, otherwise a "hang-up" condition will occur.
***) Note: All operational BRs (and branches) will be read according to their physical position in the multi-module plug-in assembly, commencing with the leftmost (enabled) BR.

setting may have to be altered during the setting-up of a system.

4. DATAWAY CONNECTOR: (rear p.c.b. connector, 2x43 contacts, $^1/_{10}$" pitch):

Only power supply and ground connections, see Fig. 6.

Unit may be inserted either in RMH-crate**** or in standard CAMAC crate.

5. MECHANICS: CAMAC mechanics, 1 unit wide.

6. POWER SUPPLY: -5,2 V/1,0 Amps or -6 V/1,0 Amps.

7. REMARKS:

Can only be used in conjunction with an SE. The IIB must be terminated inside the leftmost BR with 2 BRTs (see Fig. 7). BRs are mounted together with SE to form a compact multi-module plug-in unit.

By use of BRs in an RMH-system the BI of the SE shall not be used to input branch data; it can be used to monitor IIB signals.

****) Note: If interface (IF) connected to system unit must be inserted in CAMAC crate.

REFERENCES :

1. J.B. Lindsay, C. Millerin, J.C. Tarle, H. Verweij and H. Wendler, A fast and flexible data acquisition system for multiwire proportional chambers and other detectors, Proceedings of the Wire Chamber Conference, Vienna, Nuclear Instr. and Methods, 176 (1978).

2. J.C. Tarle and H. Wendler, Short description of the RMH-system, CERN, EP Division (1979).

3. H. Wendler, System encoder, type 158, CERN, EP Division (1979).

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LIST OF ABBREVIATIONS

BI	Branch input
BO	Branch output
BR	Branch receiver (module)
BT	Branch terminator (plug)
B0	Bit 0
B4	Bit 4
CE	Crate encoder (module)
CL.1	Clock 1 (internal)
CI	Chamber interface (module)
C0	Crate Address bit 0
DF	Device flag (handshake signal, response)
DO	Data output
ECL	Emitter coupled logic
ED	External device
EI	Enable input ("daisy" chain signal)
EIF	Enable input "first" (signal to "first" crate encoder)
ENC	Encode (handshake signal; request)
ENCSE	Encode from system encoder
ENFS	Enable fast strobe
EO	Enable output ("daisy" chain signal)
EOR	End of read-out (end of record)
ERR	Error
F	Flag bit
FF	Flip-flop (bistable)
FO	Fan out (module)
IF	Interface (module)
IIB	Internal input bus
IOB	Internal output bus
IRR	Initialise re-read
LC	Level converter (module)
LH	Lower half (of data pattern)
LSB	Least significant bit
MOR	Memory OR
MSB	Most significant bit
OP	Operational
PAR	Parallel
p.c.b.	Printed circuit board (p.c. board)
RD	Read
RMH	Receiver & memory on hybrid
RT	Reset
SE	System encoder (module)
SR	Start read system encoder (module)
S0	Station address bit 0
UH	Upper half (of data pattern)
WCI	Wire chamber interface (module)
W0	Wire number 0 (uncoded)

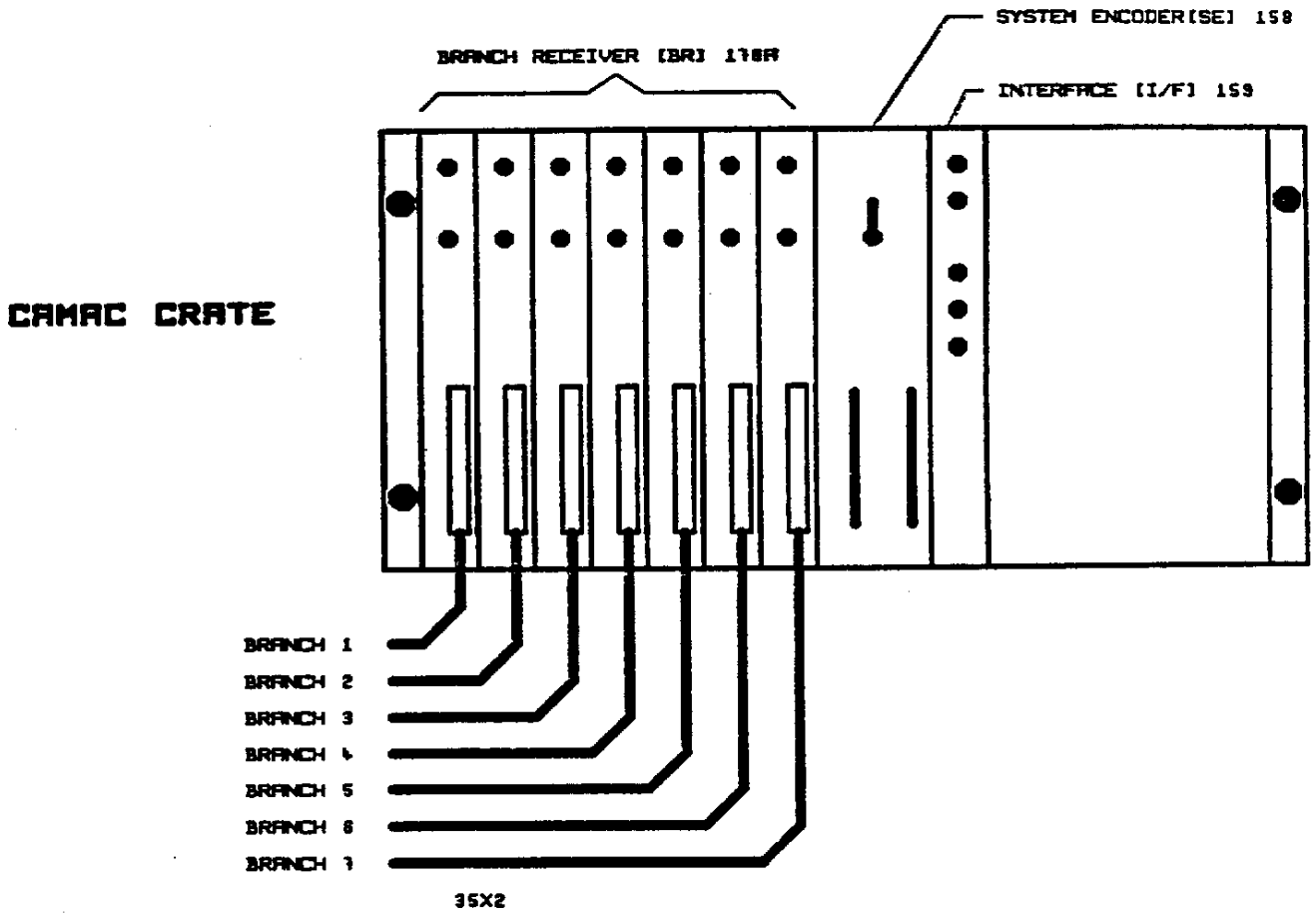

Fig. 1 Multi - Branch Configuration

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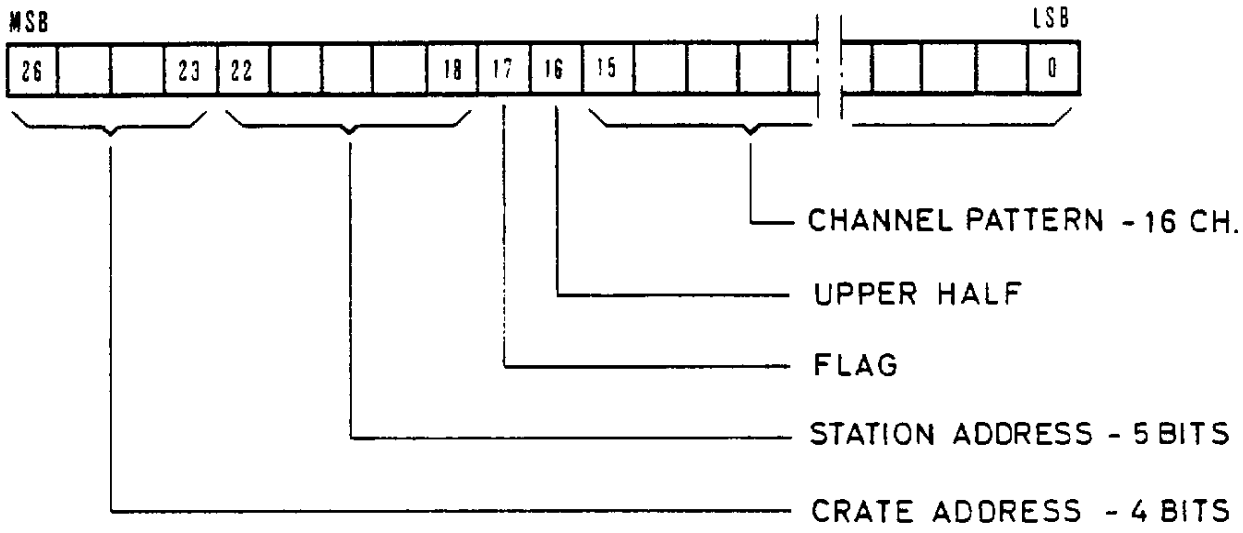

Fig. 2 BRANCH FORMAT

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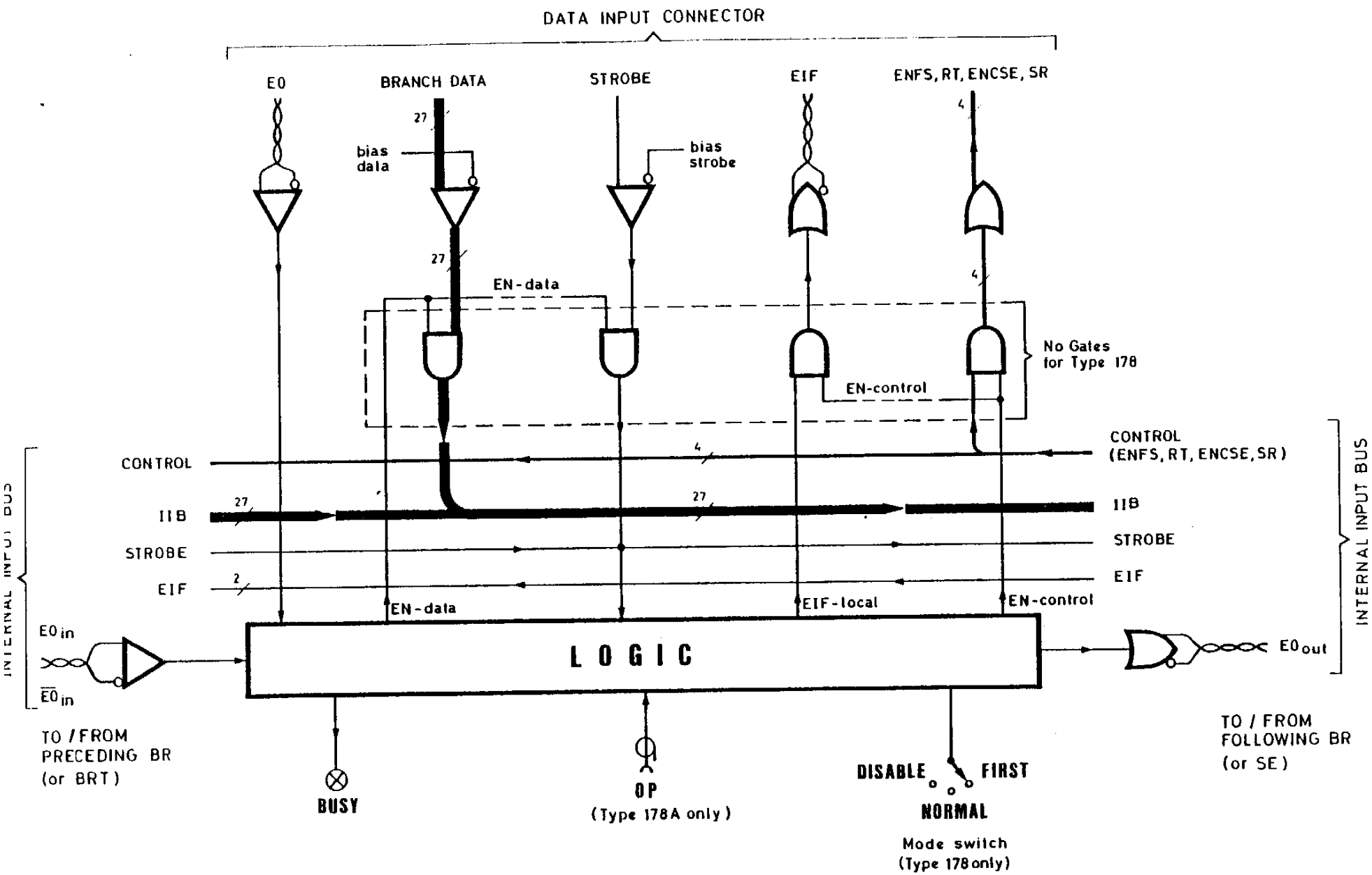

Fig. 3 BLOCK DIAGRAM

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Component side		Solder side
EO	- 1 -	$\overline{EO}$
ENFS	- 2 -	Return (-1,4 V)
C0	- 3 -	
C1	- 4 -	
C2	- 5 -	
C3	- 6 -	
S0	- 7 -	
S1	- 8 -	
S2	- 9 -	
S3	- 10 -	
S4	- 11 -	
S5	- 12 -	
ENCSE	- 13 -	
RT	- 14 -	
STROBE	- 15 -	
EIF	- 16 -	$\overline{EIF}$
F	- 17 -	Return (-1,4 V)
B4	- 18 -	
W0	- 19 -	
W1	- 20 -	
W2	- 21 -	
W3	- 22 -	
W4	- 23 -	
W5	- 24 -	
W6	- 25 -	
W7	- 26 -	
W8	- 27 -	
W9	- 28 -	
W10	- 29 -	
W11	- 30 -	
W12	- 31 -	
W13	- 32 -	
W14	- 33 -	
W15	- 34 -	
Free	- 35 -	GND

Fig. 4

Branch Input Connections (BI)
viewed from front panel

Signal		Return	
EO	1	$\overline{EO}$	Connector I1
ENFS	2	-1,4 V (from SE)	
C0	3		
C1	4		
C2	5		
C3	6		
S0	7		
S1	8		
S2	9		
S3	10		
S4	11		
SR	12		
Free	13		
Free	14		
ENCSE	15		
RT	16		
STROBE	17		
EIF	18	$\overline{EIF}$	
F	19	-1,4 V (from SE)	
B4	20		

Free	1	Free	Connector I2
Free	2	Free	
W0	3	-1,4 V (from SE)	
W1	4		
W2	5		
W3	6		
W4	7		
W5	8		
W6	9		
W7	10		
W8	11		
W9	12		
W10	13		
W11	14		
W12	15		
W13	16		
W14	17		
Free	18	Free	
W15	19	-1,4 V (from SE)	
Free	20		

Fig. 5

Internal Input Bus Connections (IIB)

viewed from component side

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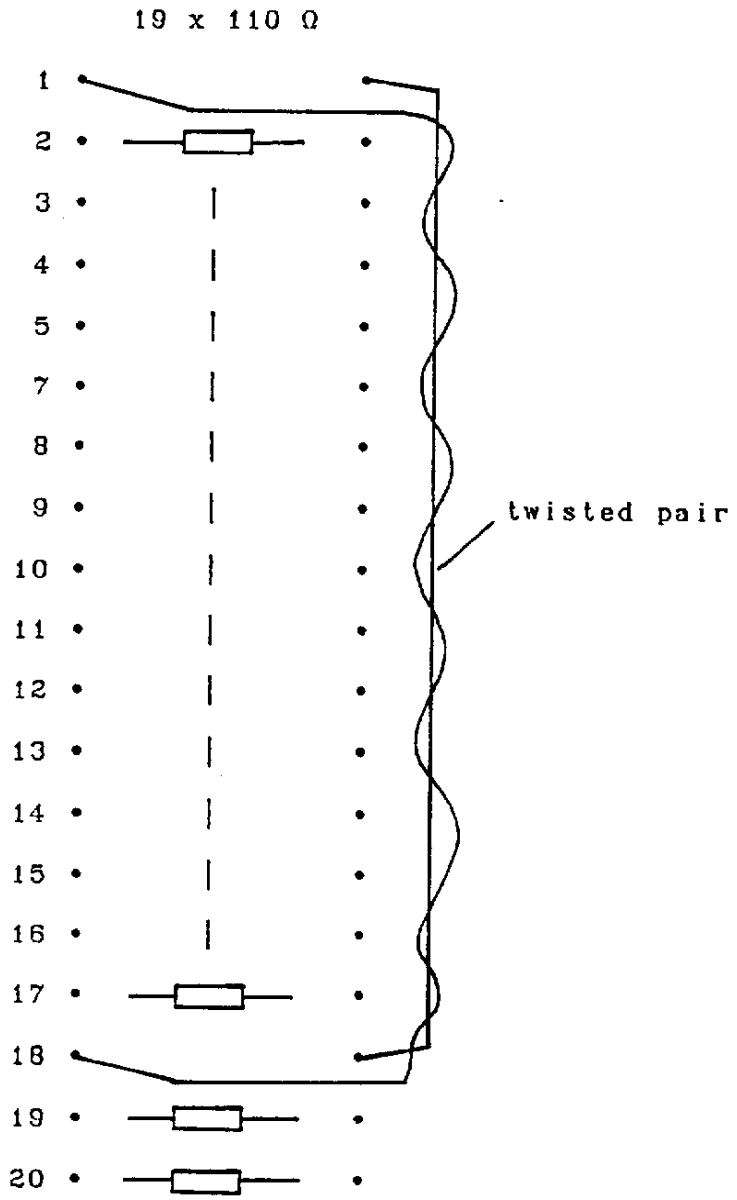
Component side		Solder side
Free	- 1 -	Free
"	- 2 -	"
"	- 3 -	"
"	- 4 -	"
"	- 5 -	"
		No contacts (connector cut-out)
Free	- 35 -	Free
"	- 36 -	"
"	- 37 -	"
"	- 38 -	-6 V
"	- 39 -	Free
-5,2 V	- 40 -	"
Free	- 41 -	"
-5,2 V	- 42 -	"
Gnd	- 43 -	Gnd

Fig. 6

Dataway Connections (CAMAC Connector)

viewed from front panel

DIAGRAM



DESCRIPTION: IIB termination; receptacle 2x20 contacts mounted on p.c.b.; to be connected to IIB headers.

Fig. 7

BRANCH RECEIVER TERMINATOR (BRT)

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