

**AQR**

**Amplitude Setting Unit Double  
Technical Manual**

**Version 001**

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**BRUKER**

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## **W**

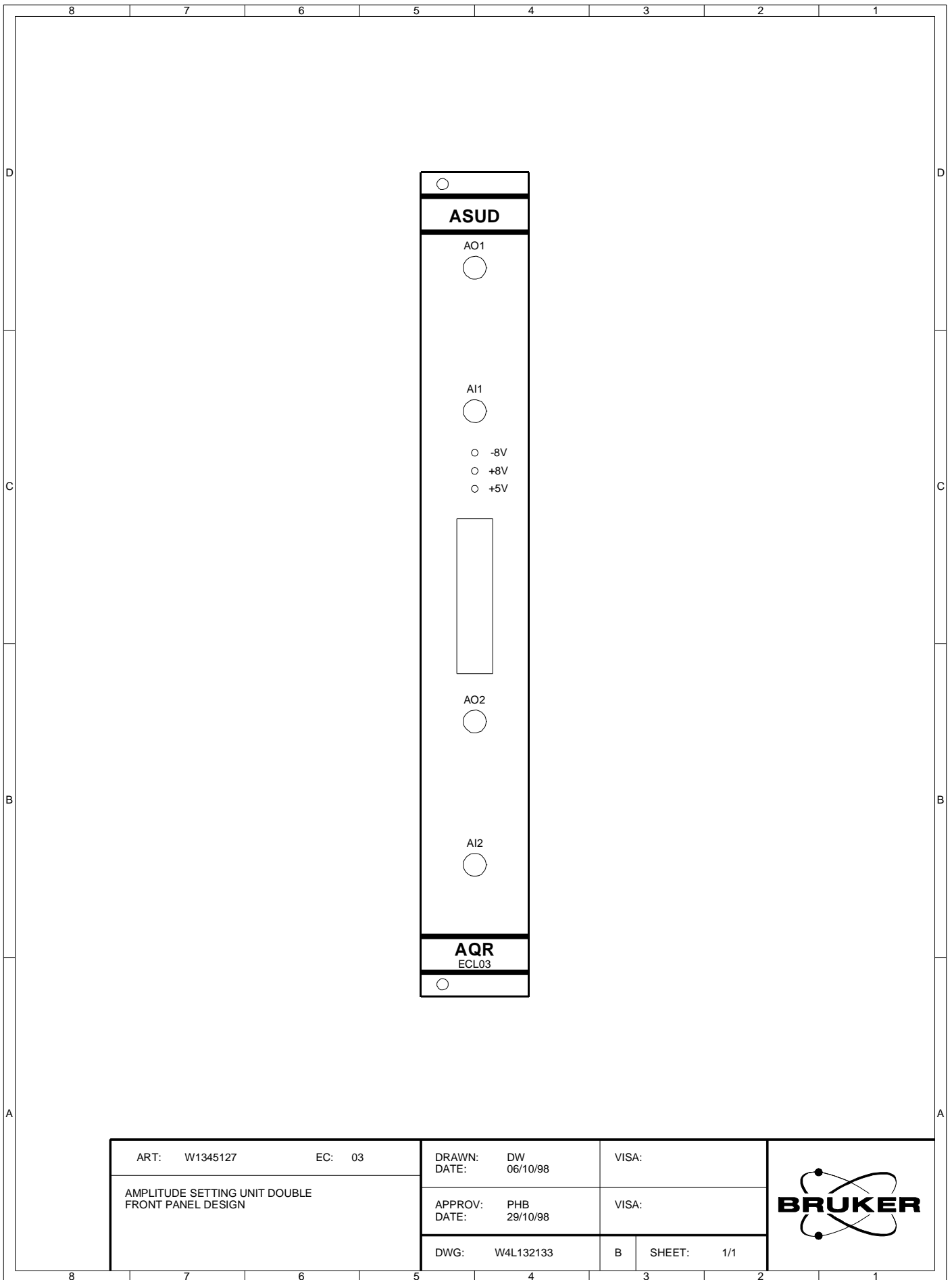
|                  |    |
|------------------|----|
| W4B132116 B..... | 9  |
| W4B132129 B..... | 20 |
| W4D132104.....   | 14 |
| W4L131102 B..... | 31 |
| W4L131509 B..... | 27 |
| W4L131510 B..... | 22 |
| W4L132133 B..... | 8  |
| W4L132197.....   | 13 |
| W4S131509 B..... | 26 |
| W4S131510 B..... | 21 |
| W4S132081.....   | 30 |
| W4S132197.....   | 12 |
| W4W132132 B..... | 10 |



# ***ASU Double Channels***

# **1**

Figure 1.1. Amplitude Setting Unit Double Channels Location

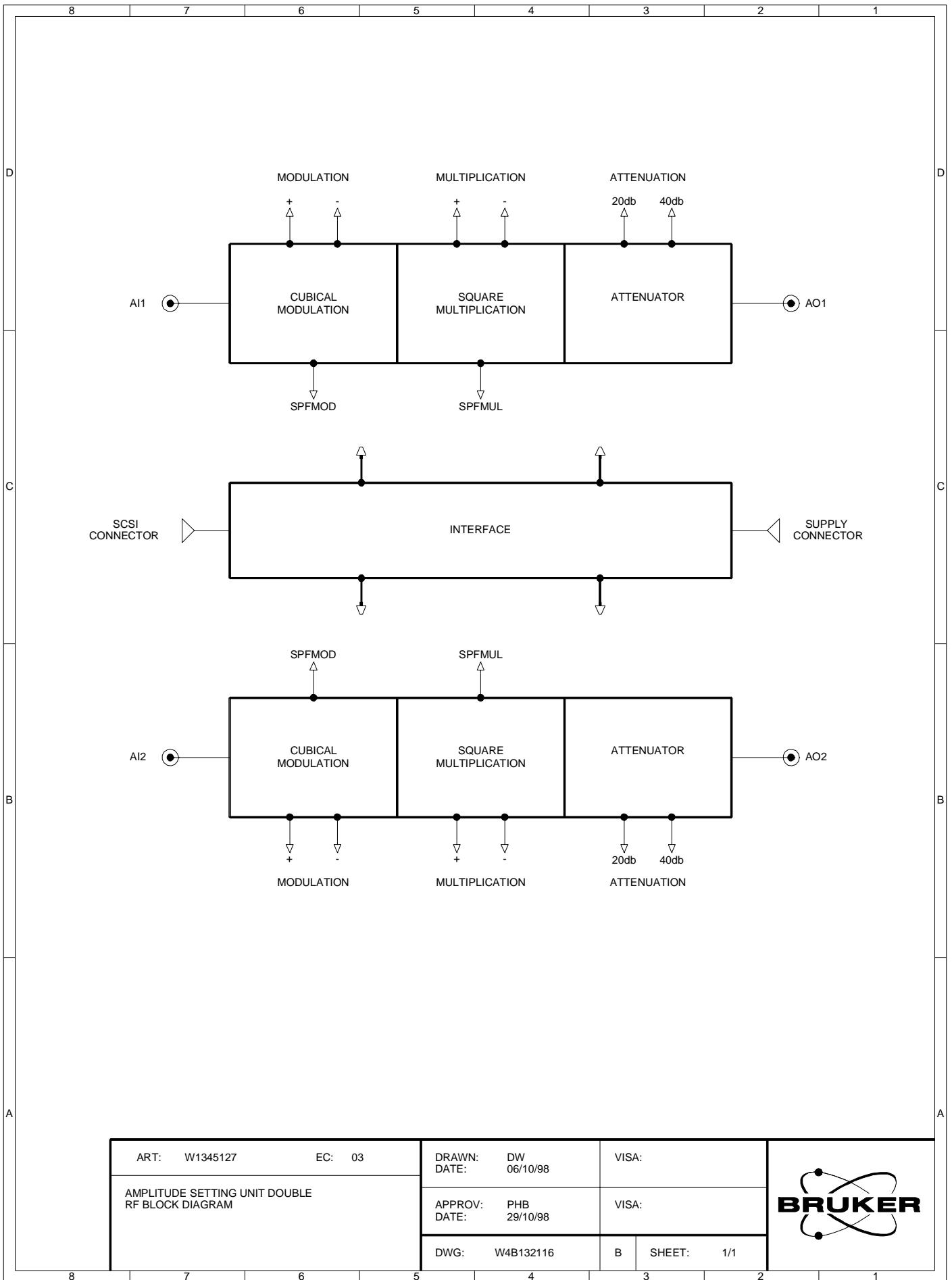


|  |        |                |                |            |
|--|--------|----------------|----------------|------------|
| ART: W1345127                                    | EC: 03 | DRAWN: DW      | DATE: 06/10/98 | VISA:      |
| AMPLITUDE SETTING UNIT DOUBLE FRONT PANEL DESIGN |        | APPROV: PHB    | DATE: 29/10/98 | VISA:      |
|  |        | DWG: W4L132133 | B              | SHEET: 1/1 |





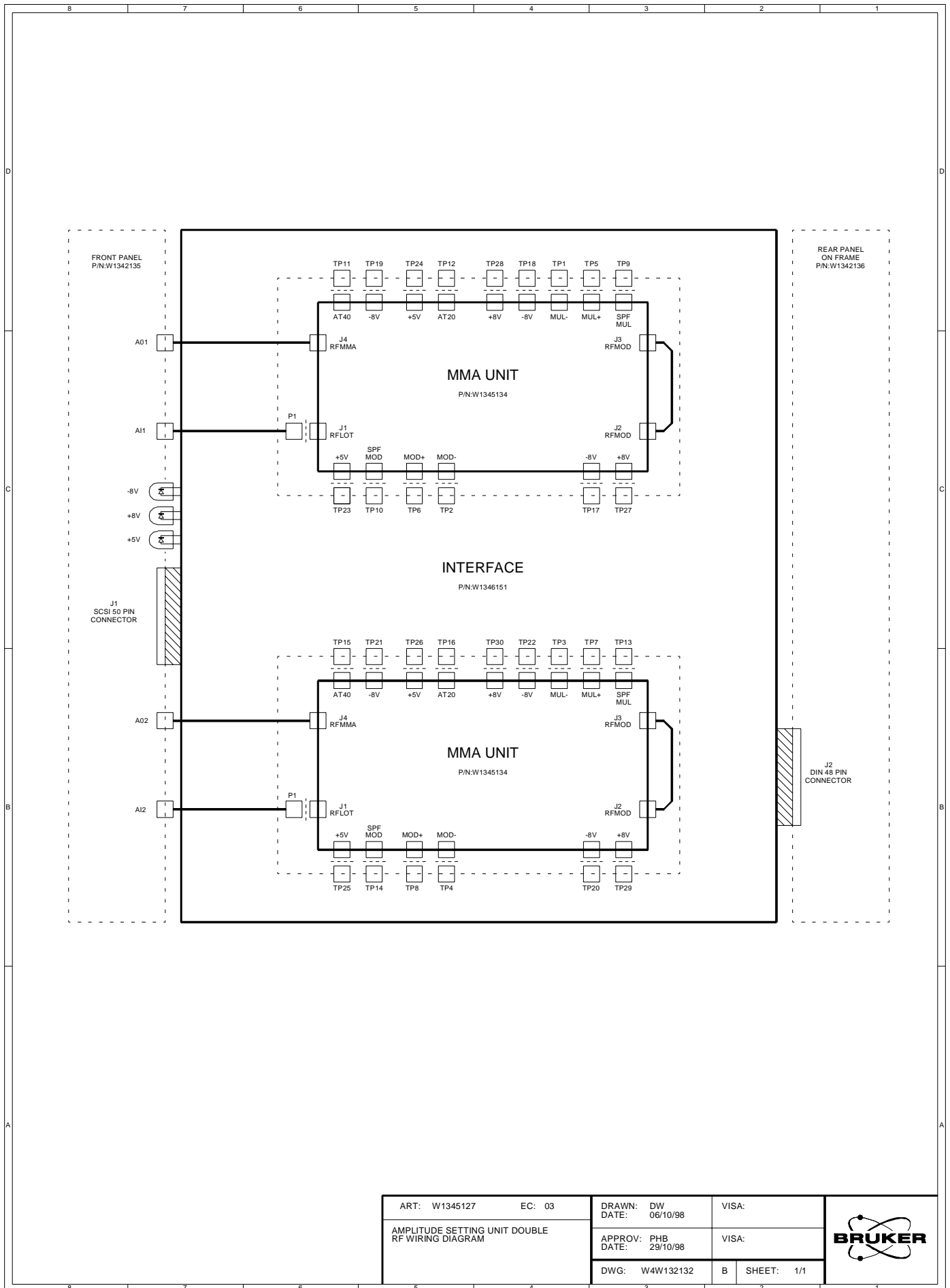
Figure 1.2. Amplitude Setting Unit Double Channels Block Diagram



|  |        |                |                |
|--|--------|----------------|----------------|
| ART: W1345127                                  | EC: 03 | DRAWN: DW      | VISA:          |
| AMPLITUDE SETTING UNIT DOUBLE RF BLOCK DIAGRAM |        | DATE: 06/10/98 | DATE: 29/10/98 |
|  |        | APPROV: PHB    | VISA:          |
| DWG: W4B132116                                 |        | B              | SHEET: 1/1     |



Figure 1.3. Amplitude Setting Unit Double Channels Wiring Diagram



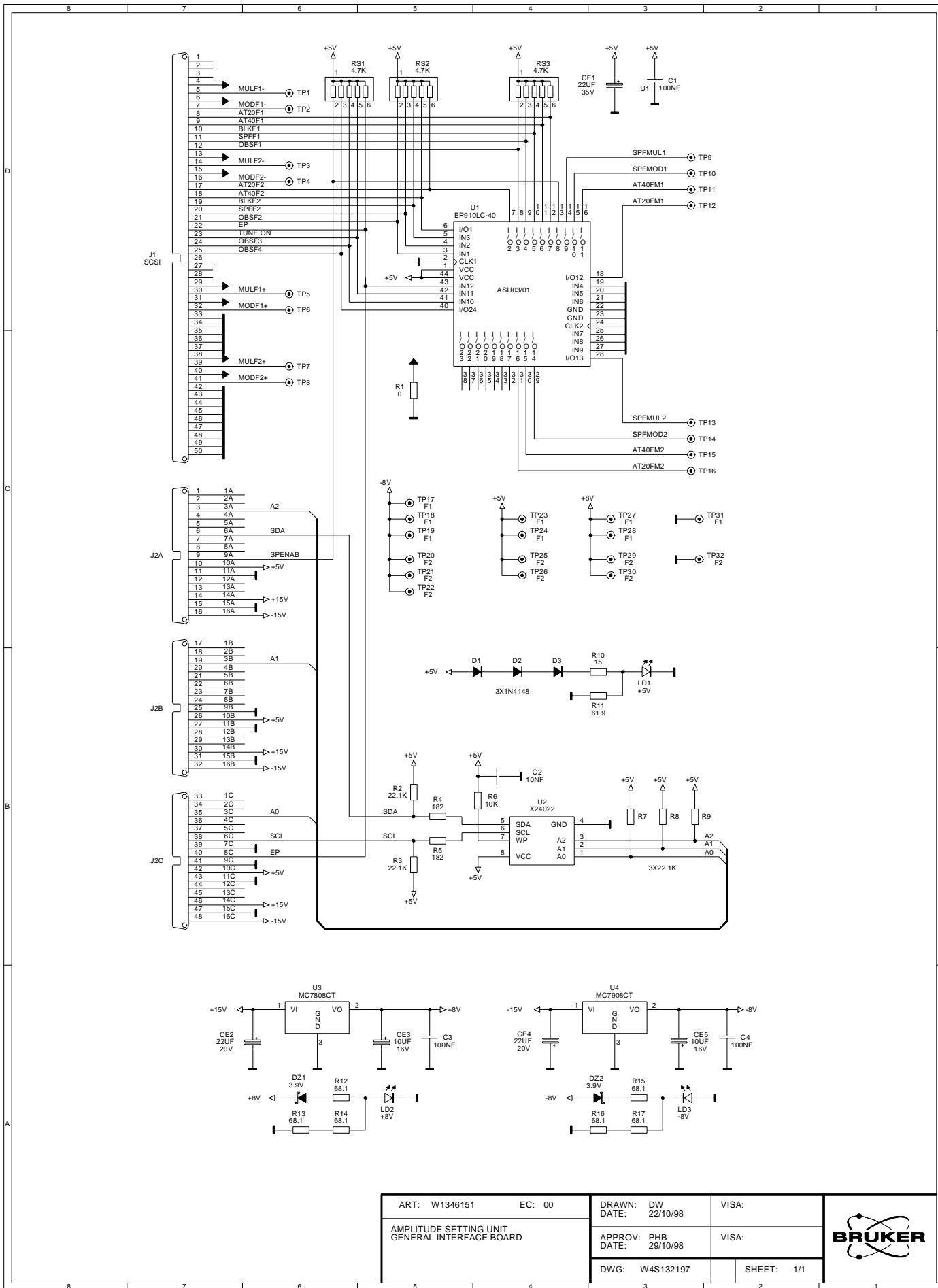
|  |        |                               |              |
|--|--------|-------------------------------|--------------|
| ART: W1345127                                      | EC: 03 | DRAWN: DW<br>DATE: 06/10/98   | VISA:        |
| AMPLITUDE SETTING UNIT DOUBLE<br>RF WIRING DIAGRAM |        | APPROV: PHB<br>DATE: 29/10/98 | VISA:        |
|  |        | DWG: W4W132132                | B SHEET: 1/1 |



# ***Interface***

# **2**

Figure 2.1. Interface Schematic



|   |        |                               |            |
|---|--------|-------------------------------|------------|
| ART: W1346151                                     | EC: 00 | DRAWN: DW<br>DATE: 22/10/98   | VISA:      |
| AMPLITUDE SETTING UNIT<br>GENERAL INTERFACE BOARD |        | APPROV: PHB<br>DATE: 29/10/98 | VISA:      |
|   |        | DWG: W4S132197                | SHEET: 1/1 |



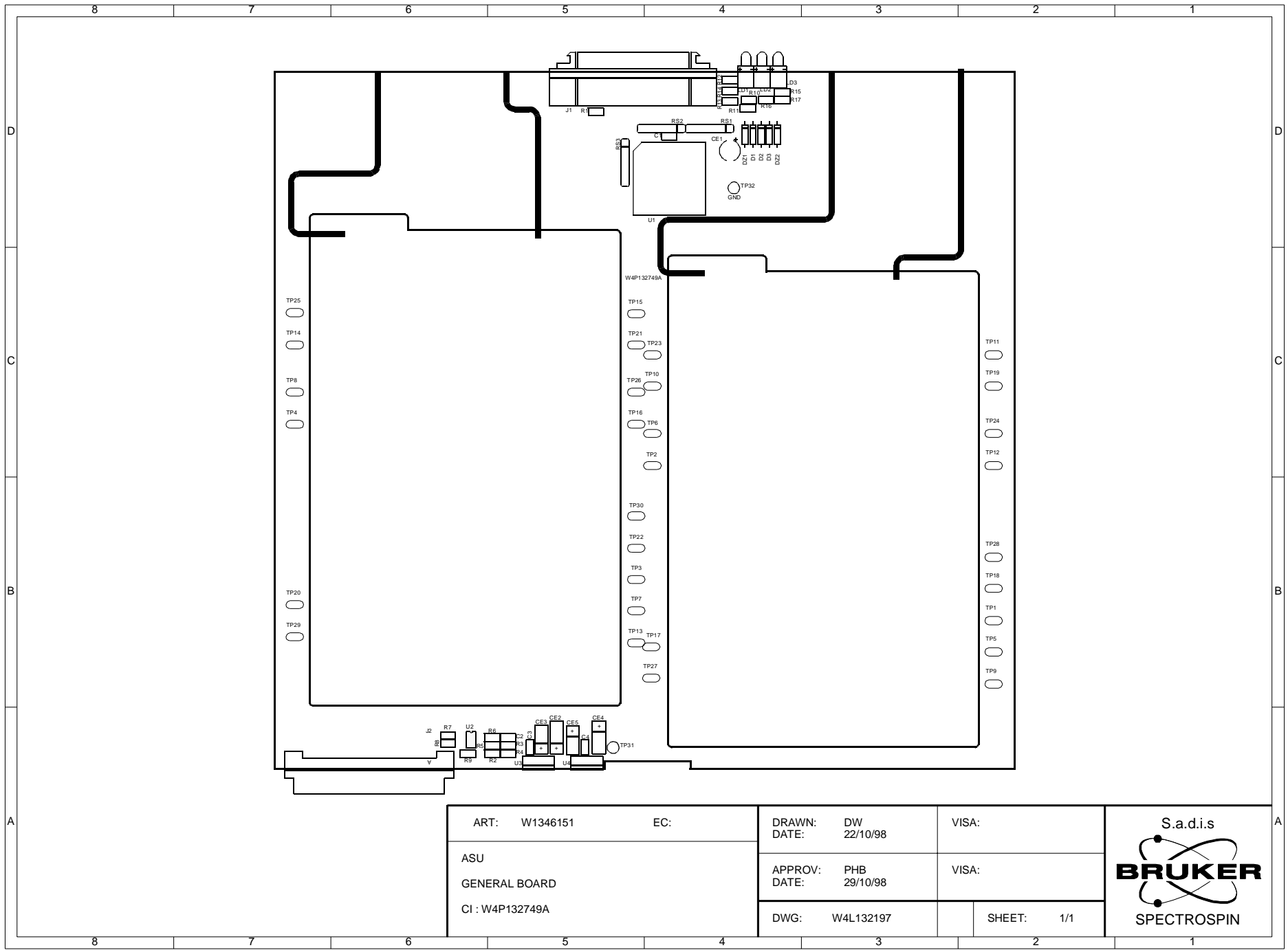


Figure 2.2. Interface Location



### Value Table

| Value Tab Head                  |           |                                |                               |
|---------------------------------|-----------|--------------------------------|-------------------------------|
| Part:W1346151 Drawing:W4S132197 |           | Copy In Part:                  |                               |
| Desc:AQR ASU CIRCUIT INTERFACE  |           | ECL:0                          | Draw: Modified:22/10/98 By:DW |
| Value Tab                       |           |                                |                               |
| Pos.                            | Component | Local Description              |                               |
| C1                              | 8493      | COND CMS 1206 100N 50V 20% X7R |                               |
| C2                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |                               |
| C3                              | 8493      | COND CMS 1206 100N 50V 20% X7R |                               |
| C4                              | 8493      | COND CMS 1206 100N 50V 20% X7R |                               |
| CE1                             | 10017     | COND CHIMI RAD 22U 35V 6.3X7   |                               |
| CE2                             | 51557     | COND CMS TANTAL 22U 20V 20%    |                               |
| CE3                             | 51559     | COND CMS TANTAL 10U 16V 20%    |                               |
| CE4                             | 51557     | COND CMS TANTAL 22U 20V 20%    |                               |
| CE5                             | 51559     | COND CMS TANTAL 10U 16V 20%    |                               |
| CI1                             | W1348018  | CI ASU2/LOT CIRCUIT INTERFACE  |                               |
| D1                              | 2967      | DIODE 1N4148                   |                               |
| D2                              | 2967      | DIODE 1N4148                   |                               |
| D3                              | 2967      | DIODE 1N4148                   |                               |
| DZ1                             | 34639     | DIODE Z BZX55C 3.9V 500MW      |                               |
| DZ2                             | 34639     | DIODE Z BZX55C 3.9V 500MW      |                               |
| ICSU1                           | 15771     | IC SUPPORT PLCC44              |                               |
| J1                              | 59837     | CN F 50 C PRT SCSI/1.27        |                               |
| J2                              | 22744     | CN M 48 C PRT DIN41612-C/2     |                               |
| LD1                             | 21866     | OPTO LED 3MM C PRT BOI VR R2.5 |                               |
| LD2                             | 21866     | OPTO LED 3MM C PRT BOI VR R2.5 |                               |
| LD3                             | 21866     | OPTO LED 3MM C PRT BOI VR R2.5 |                               |
| R1                              | 21352     | RES CMS 0 1% 0.25W 1206        |                               |
| R2                              | 21327     | RES CMS 22.1K 1% 0.25W 1206    |                               |
| R3                              | 21327     | RES CMS 22.1K 1% 0.25W 1206    |                               |
| R4                              | 20727     | RES CMS 182 1% 0.25W 1206      |                               |
| R5                              | 20727     | RES CMS 182 1% 0.25W 1206      |                               |
| R6                              | 20750     | RES CMS 10K 1% 0.25W 1206      |                               |
| R7                              | 21327     | RES CMS 22.1K 1% 0.25W 1206    |                               |
| R8                              | 21327     | RES CMS 22.1K 1% 0.25W 1206    |                               |
| R9                              | 21327     | RES CMS 22.1K 1% 0.25W 1206    |                               |
| R10                             | 20713     | RES CMS 15 1% 0.25W 1206       |                               |
| R11                             | 8853      | RES CMS 61.9 1% 0.25W 1206     |                               |
| R12                             | 20721     | RES CMS 68.1 1% 0.25W 1206     |                               |
| R13                             | 20721     | RES CMS 68.1 1% 0.25W 1206     |                               |
| R14                             | 20721     | RES CMS 68.1 1% 0.25W 1206     |                               |
| R15                             | 20721     | RES CMS 68.1 1% 0.25W 1206     |                               |
| R16                             | 20721     | RES CMS 68.1 1% 0.25W 1206     |                               |
| R17                             | 20721     | RES CMS 68.1 1% 0.25W 1206     |                               |
| RS1                             | 9818      | RES RES 4.7KX5 2% SIL6         |                               |
| RS2                             | 9818      | RES RES 4.7KX5 2% SIL6         |                               |
| RS3                             | 9818      | RES RES 4.7KX5 2% SIL6         |                               |
| TP1                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP2                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP3                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP4                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP5                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP6                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP7                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP8                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP9                             | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP10                            | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP11                            | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP12                            | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |
| TP13                            | 35779     | ACCBL LANGUETTE PL 2.8 PRT     |                               |

# Interface

```

+-- Value Tab Head -----+
| Part:W1346151 Drawing:W4S132197          Copy In Part:          Draw:          |
| Desc:AQR ASU CIRCUIT INTERFACE          ECL:0          Modified:22/10/98      By:DW      |
+-- Value Tab -----+
| Pos.          Component          Local Description          |
| TP14          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP15          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP16          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP17          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP18          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP19          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP20          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP21          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP22          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP23          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP24          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP25          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP26          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP27          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP28          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP29          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP30          35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP31          59995          ACCBL PICOT FOURCHE D1.1MM |
| TP32          59995          ACCBL PICOT FOURCHE D1.1MM |
| TP3           35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP4           35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP5           35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP6           35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP7           35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP8           35779          ACCBL LANGUETTE PL 2.8 PRT |
| TP9           35779          ACCBL LANGUETTE PL 2.8 PRT |
| U1            W1356607          IC 910/ASU CIRCUIT INTERFACE |
| U2            22952          IC 24022/E2PR X24022S8 SO8   |
| U3            4978           IC 7808/VREG MC7808CT TO220  |
| U4            12156          IC 7908/VREG MC7908CT TO220  |
+-----+

```



Table 2.1. Front Panel Connector J1

| Pins | Descriptions | Pins | Descriptions |
|------|--------------|------|--------------|
| 01   | NC           | 26   | NC           |
| 02   | NC           | 27   | NC           |
| 03   | NC           | 28   | NC           |
| 04   | AGND         | 29   | AGND         |
| 05   | MULF1-       | 30   | MULF1+       |
| 06   | AGND         | 31   | AGND         |
| 07   | MODF1-       | 32   | MODF1+       |
| 08   | AT20F1       | 33   | DGND         |
| 09   | AT40F1       | 34   | DGND         |
| 10   | BLKF1        | 35   | DGND         |
| 11   | SPFF1        | 36   | DGND         |
| 12   | OBSF1        | 37   | DGND         |
| 13   | AGND         | 38   | AGND         |
| 14   | MULF2-       | 39   | MULF2+       |
| 15   | AGND         | 40   | AGND         |
| 16   | MODF2-       | 41   | MODF2+       |
| 17   | AT20F2       | 42   | DGND         |
| 18   | AT40F2       | 43   | DGND         |
| 19   | BLKF2        | 44   | DGND         |
| 20   | SPFF2        | 45   | DGND         |
| 21   | OBSF2        | 46   | DGND         |
| 22   | NC           | 47   | DGND         |
| 23   | TUNE ON      | 48   | DGND         |
| 24   | NC           | 49   | DGND         |
| 25   | NC           | 50   | DGND         |

Table 2.2. Rear Panel Connector J2

| Pins | Descriptions | Pins | Descriptions | Pins | Descriptions |
|------|--------------|------|--------------|------|--------------|
| 1A   | NC           | 1B   | NC           | 1C   | NC           |
| 2A   | NC           | 2B   | NC           | 2C   | NC           |
| 3A   | Adresse 1    | 3B   | Adresse 2    | 3C   | Adresse 3    |
| 4A   | NC           | 4B   | NC           | 4C   | NC           |
| 5A   | NC           | 5B   | NC           | 5C   | NC           |
| 6A   | SDA          | 6B   | NC           | 6C   | SCL          |
| 7A   | NC           | 7B   | NC           | 7C   | I2CGND       |
| 8A   | NC           | 8B   | NC           | 8C   | EP           |
| 9A   | SPENAB       | 9B   | SPENABGND    | 9C   | EPGND        |
| 10A  | +5V          | 10B  | +5V          | 10C  | +5V          |
| 11A  | GND          | 11B  | GND          | 11C  | GND          |
| 12A  | NC           | 12B  | NC           | 12C  | NC           |
| 13A  | NC           | 13B  | NC           | 13C  | NC           |
| 14A  | +15V         | 14B  | +15V         | 14C  | +15V         |
| 15A  | GND          | 15B  | GND          | 15C  | GND          |
| 16A  | -15V         | 16B  | -15V         | 16C  | -15V         |

# ***MMA Unit***

# **3**

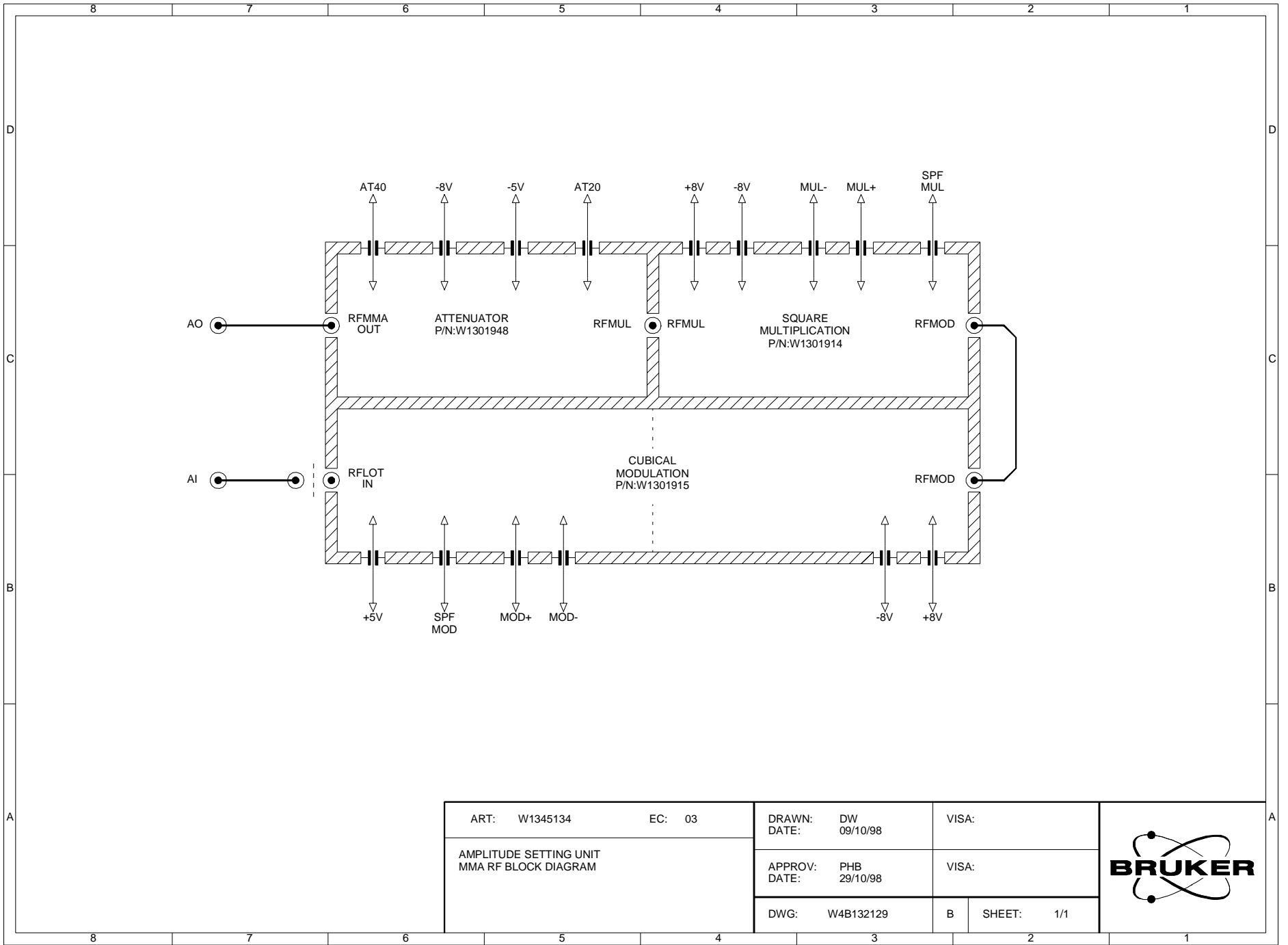


Figure 3.1. Modulation, Multiplication & Attenuator Block Diagram

|  |        |                |              |
|--|--------|----------------|--------------|
| ART: W1345134                                  | EC: 03 | DRAWN: DW      | VISA:        |
| AMPLITUDE SETTING UNIT<br>MMA RF BLOCK DIAGRAM |        | DATE: 09/10/98 |              |
|  |        | APPROV: PHB    | VISA:        |
|  |        | DATE: 29/10/98 |              |
|  |        | DWG: W4B132129 | B SHEET: 1/1 |

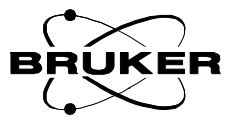
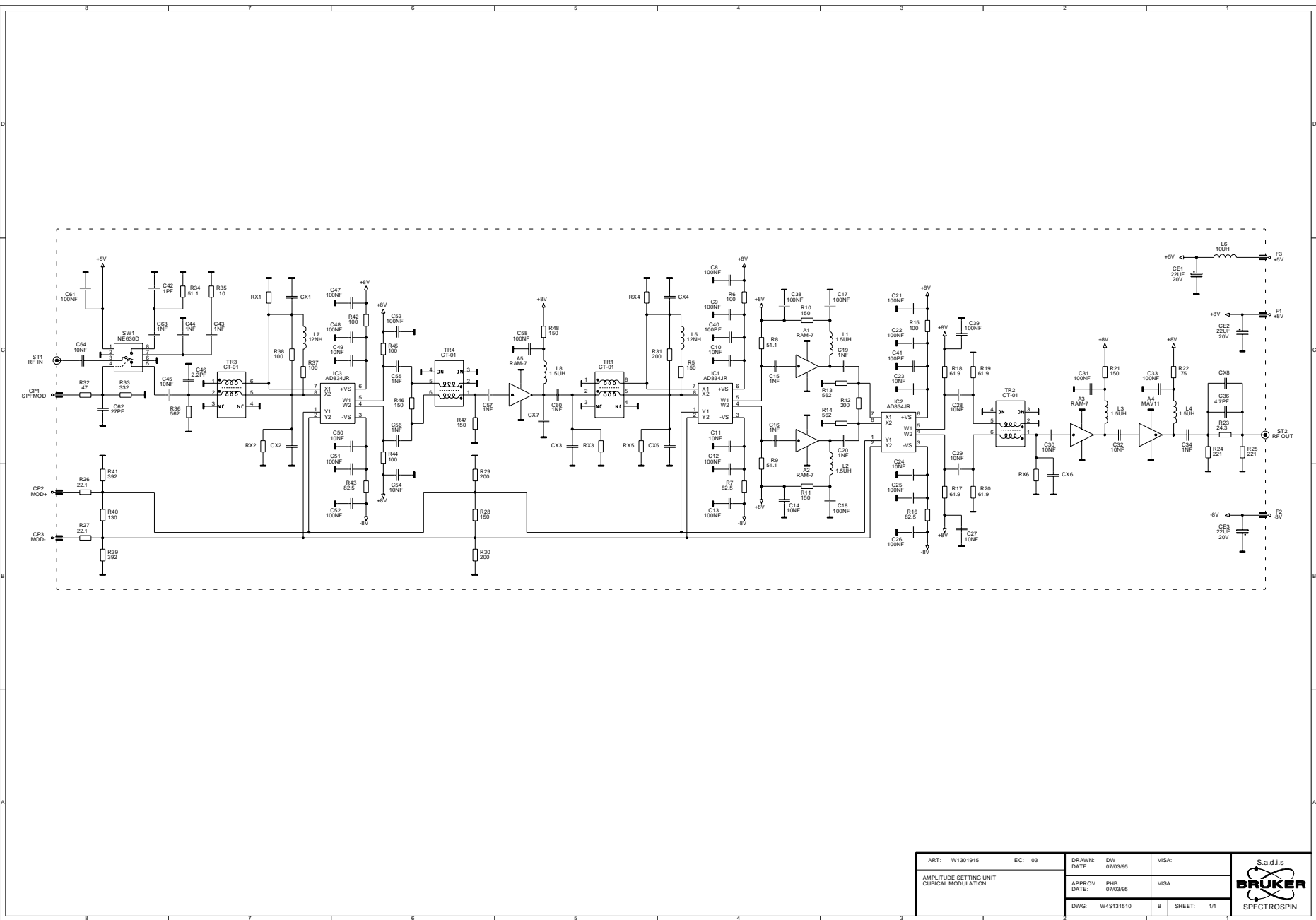


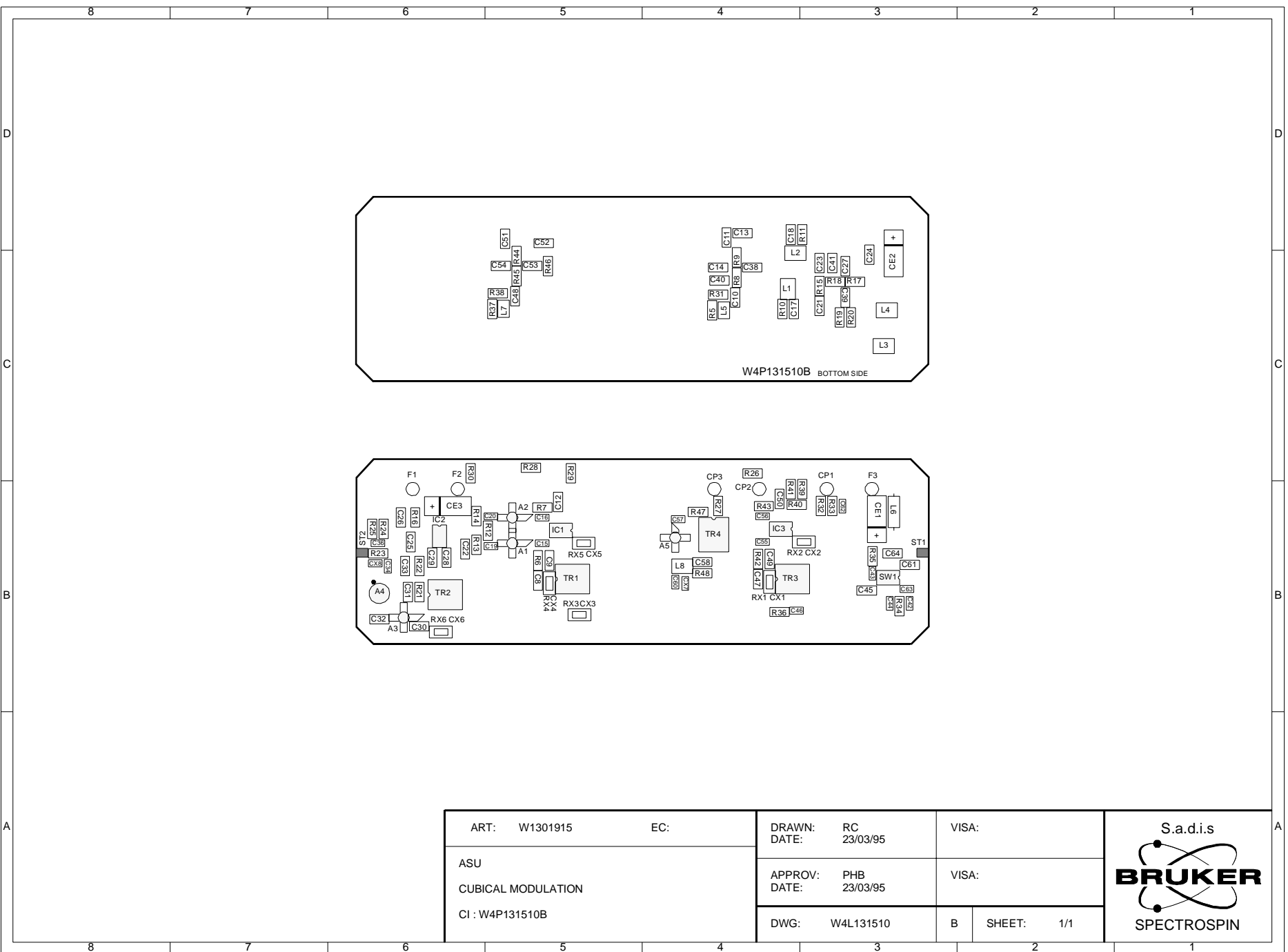
Figure 3.2. Modulation Schematic

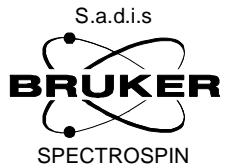


|  |        |                      |              |
|--|--------|----------------------|--------------|
| ART: W1301915                                | EC: 03 | DRAWN: DW 07503/95   | VISA:        |
| AMPLITUDE SETTING UNIT<br>CUBICAL MODULATION |        | APPROV: PHB 07503/95 | VISA:        |
|  |        | DWG: W45131510       | B SHEET: 1/1 |



Figure 3.3. Modulation Location



|                    |     |                |       |   |
|--------------------|-----|----------------|-------|---|
| ART: W1301915      | EC: | DRAWN: RC      | VISA: |  |
| ASU                |     | DATE: 23/03/95 |       |   |
| CUBICAL MODULATION |     | APPROV: PHB    | VISA: |   |
| CI : W4P131510B    |     | DATE: 23/03/95 |       |   |
|                    |     | DWG: W4L131510 | B     | SHEET: 1/1  |

### Value Table

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+-- Value Tab Head -----+
| Part:W1301915 Drawing:W4S131510B          Copy In Part:          Draw:          |
| Desc:ASU MODULATION AU CUBE                ECL:0                Modified:06/03/95      By:DEHF          |
+-- Value Tab -----+
|      Pos.      Component      Local Description      |
|-----|-----|-----|
|      A1      56535      IC 7/HF RAM-7 13DB EQU.MSA0735 |
|      A2      56535      IC 7/HF RAM-7 13DB EQU.MSA0735 |
|      A3      56535      IC 7/HF RAM-7 13DB EQU.MSA0735 |
|      A4      31201      IC 11/HF MAV-11          |
|      A5      56535      IC 7/HF RAM-7 13DB EQU.MSA0735 |
|      C8      8493      COND CMS 1206 100N 50V 20% X7R |
|      C9      8493      COND CMS 1206 100N 50V 20% X7R |
|      C10     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C11     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C12     8493      COND CMS 1206 100N 50V 20% X7R |
|      C13     8493      COND CMS 1206 100N 50V 20% X7R |
|      C14     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C15     73183     COND CMS CDR12 1N 150V 20%     |
|      C16     73183     COND CMS CDR12 1N 150V 20%     |
|      C17     8493      COND CMS 1206 100N 50V 20% X7R |
|      C18     8493      COND CMS 1206 100N 50V 20% X7R |
|      C19     73183     COND CMS CDR12 1N 150V 20%     |
|      C20     73183     COND CMS CDR12 1N 150V 20%     |
|      C21     8493      COND CMS 1206 100N 50V 20% X7R |
|      C22     8493      COND CMS 1206 100N 50V 20% X7R |
|      C23     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C24     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C25     8493      COND CMS 1206 100N 50V 20% X7R |
|      C26     8493      COND CMS 1206 100N 50V 20% X7R |
|      C27     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C28     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C29     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C30     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C31     8493      COND CMS 1206 100N 50V 20% X7R |
|      C32     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C33     8493      COND CMS 1206 100N 50V 20% X7R |
|      C34     73183     COND CMS CDR12 1N 150V 20%     |
|      C36     73180     COND CMS CDR12 4.7P 150V 0.25P |
|      C38     8493      COND CMS 1206 100N 50V 20% X7R |
|      C39     8493      COND CMS 1206 100N 50V 20% X7R |
|      C40     20990     COND CMS 1206 100P 50V 5% NPO  |
|      C41     20990     COND CMS 1206 100P 50V 5% NPO  |
|      C42     73410     COND CMS CDR12 1P 150V 0.25P   |
|      C43     73183     COND CMS CDR12 1N 150V 20%     |
|      C44     73183     COND CMS CDR12 1N 150V 20%     |
|      C45     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C46     73179     COND CMS CDR12 2.2P 150V 0.25P |
|      C47     8493      COND CMS 1206 100N 50V 20% X7R |
|      C48     8493      COND CMS 1206 100N 50V 20% X7R |
|      C49     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C50     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C51     8493      COND CMS 1206 100N 50V 20% X7R |
|      C52     8493      COND CMS 1206 100N 50V 20% X7R |
|      C53     8493      COND CMS 1206 100N 50V 20% X7R |
|      C54     21014     COND CMS 1206 10N 50V 20% X7R  |
|      C55     73183     COND CMS CDR12 1N 150V 20%     |
|      C56     73183     COND CMS CDR12 1N 150V 20%     |
|      C57     73183     COND CMS CDR12 1N 150V 20%     |
|      C58     8493      COND CMS 1206 100N 50V 20% X7R |

```





| +-- Value Tab Head -----+        |           |                              |                           |
|----------------------------------|-----------|------------------------------|---------------------------|
| Part:W1301915 Drawing:W4S131510B |           | Copy In Part:                | Draw:                     |
| Desc:ASU MODULATION AU CUBE      |           | ECL:0                        | Modified:06/03/95 By:DEHF |
| +-- Value Tab -----+             |           |                              |                           |
| Pos.                             | Component | Local Description            |                           |
| R40                              | 51682     | RES CMS 130 1% 0.25W 1206    |                           |
| R41                              | 20731     | RES CMS 392 1% 0.25W 1206    |                           |
| R42                              | 20724     | RES CMS 100 1% 0.25W 1206    |                           |
| R43                              | 20722     | RES CMS 82.5 1% 0.25W 1206   |                           |
| R44                              | 20724     | RES CMS 100 1% 0.25W 1206    |                           |
| R45                              | 20724     | RES CMS 100 1% 0.25W 1206    |                           |
| R46                              | 20726     | RES CMS 150 1% 0.25W 1206    |                           |
| R47                              | 20726     | RES CMS 150 1% 0.25W 1206    |                           |
| R48                              | 20726     | RES CMS 150 1% 0.25W 1206    |                           |
| R5                               | 20726     | RES CMS 150 1% 0.25W 1206    |                           |
| R6                               | 20724     | RES CMS 100 1% 0.25W 1206    |                           |
| R7                               | 20722     | RES CMS 82.5 1% 0.25W 1206   |                           |
| R8                               | 20765     | RES CMS 51.1 1% 0.25W 1206   |                           |
| R9                               | 20765     | RES CMS 51.1 1% 0.25W 1206   |                           |
| SW1                              | 56425     | IC 630/SA630 S08             |                           |
| TR1                              | 56414     | TRSFO 1/1 5-1000MHZ CMS DIP6 |                           |
| TR2                              | 56414     | TRSFO 1/1 5-1000MHZ CMS DIP6 |                           |
| TR3                              | 56414     | TRSFO 1/1 5-1000MHZ CMS DIP6 |                           |
| TR4                              | 56414     | TRSFO 1/1 5-1000MHZ CMS DIP6 |                           |

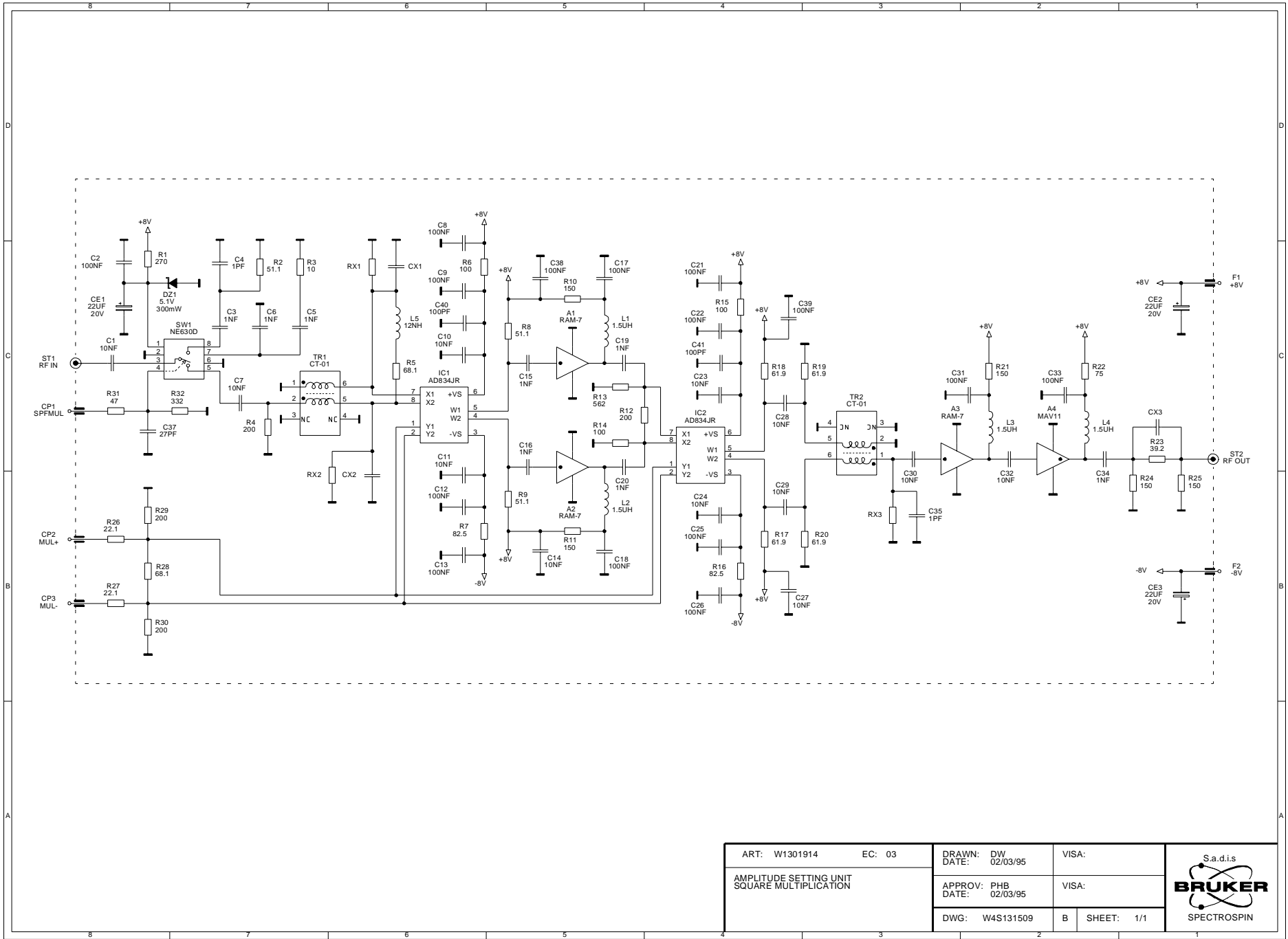


Figure 3.4. Multiplication Schematic


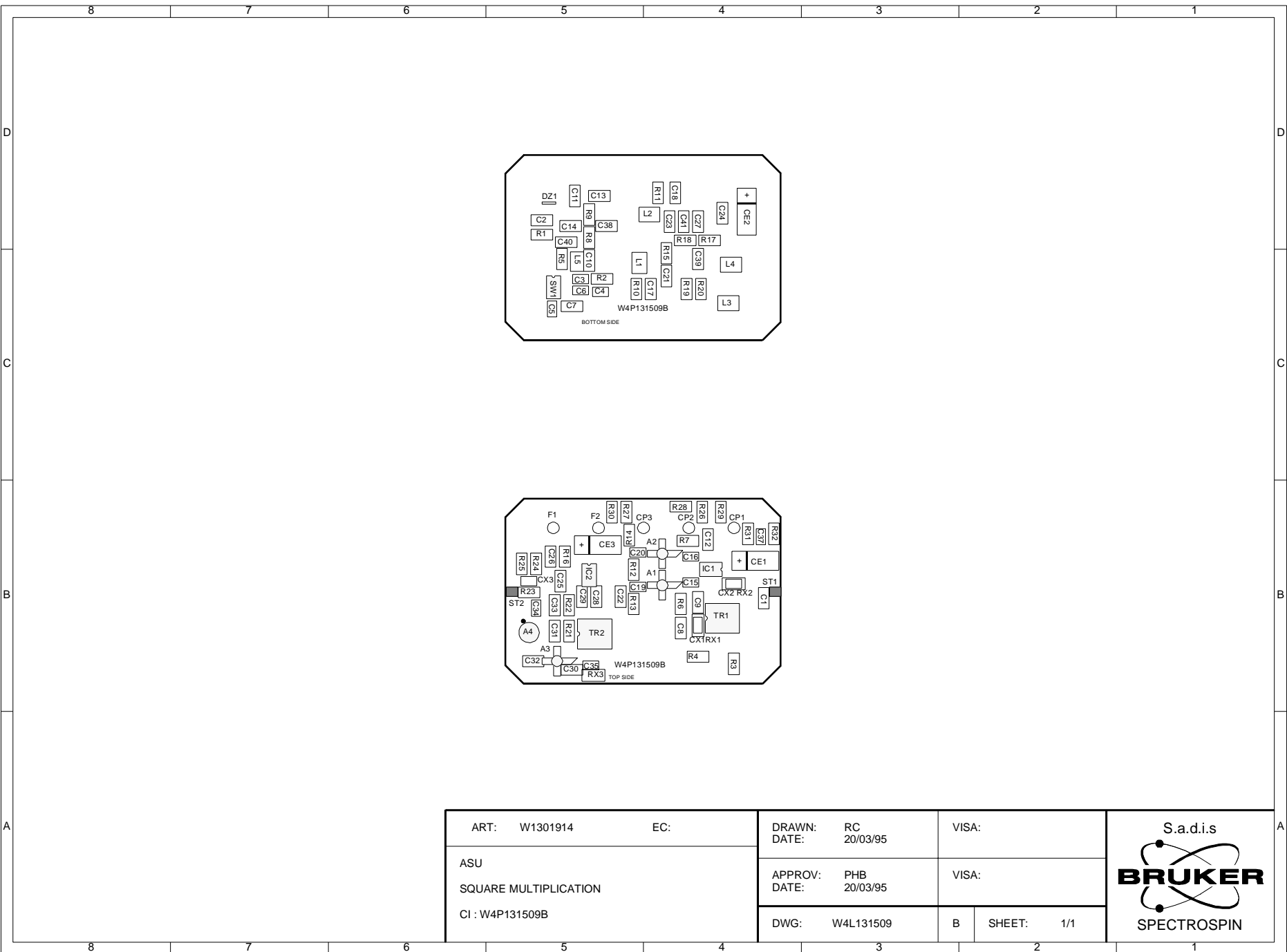
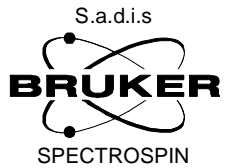
|   |        |                               |              |   |
|---|--------|-------------------------------|--------------|---|
| ART: W1301914                                   | EC: 03 | DRAWN: DW<br>DATE: 02/03/95   | VISA:        |  |
| AMPLITUDE SETTING UNIT<br>SQUARE MULTIPLICATION |        | APPROV: PHB<br>DATE: 02/03/95 | VISA:        |   |
|   |        | DWG: W4S131509                | B SHEET: 1/1 |   |

Figure 3.5. Multiplication Location



|                       |     |                |       |   |
|-----------------------|-----|----------------|-------|---|
| ART: W1301914         | EC: | DRAWN: RC      | VISA: |  |
| ASU                   |     | DATE: 20/03/95 |       |   |
| SQUARE MULTIPLICATION |     | APPROV: PHB    | VISA: |   |
| CI : W4P131509B       |     | DATE: 20/03/95 |       |   |
|                       |     | DWG: W4L131509 | B     | SHEET: 1/1  |

## Value Table

| Value Tab Head                   |           |                                |         |
|----------------------------------|-----------|--------------------------------|---------|
| Part:W1301914 Drawing:W4S131509B |           | Copy In Part:                  | Draw:   |
| Desc:ASU MULTIPLICATION AU CARRE |           | ECL:0 Modified:02/03/95        | By:DEHF |
| Value Tab                        |           |                                |         |
| Pos.                             | Component | Local Description              |         |
| A1                               | 56535     | IC 7/HF RAM-7 13DB EQU.MSA0735 |         |
| A2                               | 56535     | IC 7/HF RAM-7 13DB EQU.MSA0735 |         |
| A3                               | 56535     | IC 7/HF RAM-7 13DB EQU.MSA0735 |         |
| A4                               | 31201     | IC 11/HF MAV-11                |         |
| C1                               | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C2                               | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C3                               | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C4                               | 73410     | COND CMS CDR12 1P 150V 0.25P   |         |
| C5                               | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C6                               | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C7                               | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C8                               | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C9                               | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C10                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C11                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C12                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C13                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C14                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C15                              | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C16                              | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C17                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C18                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C19                              | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C20                              | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C21                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C22                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C23                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C24                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C25                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C26                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C27                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C28                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C29                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C30                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C31                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C32                              | 21014     | COND CMS 1206 10N 50V 20% X7R  |         |
| C33                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C34                              | 73183     | COND CMS CDR12 1N 150V 20%     |         |
| C35                              | 73410     | COND CMS CDR12 1P 150V 0.25P   |         |
| C37                              | 73182     | COND CMS CDR12 27P 150V 20%    |         |
| C38                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C39                              | 8493      | COND CMS 1206 100N 50V 20% X7R |         |
| C40                              | 20990     | COND CMS 1206 100P 50V 5% NPO  |         |
| C41                              | 20990     | COND CMS 1206 100P 50V 5% NPO  |         |
| CE1                              | 51557     | COND CMS TANTAL 22U 20V 20%    |         |
| CE2                              | 51557     | COND CMS TANTAL 22U 20V 20%    |         |
| CE3                              | 51557     | COND CMS TANTAL 22U 20V 20%    |         |
| CI1                              | W1356519  | CI MULTIPLICATION AU CARRE     |         |
| CP1                              | 59995     | ACCBL PICOT FOURCHE D1.1MM     |         |
| CP2                              | 59995     | ACCBL PICOT FOURCHE D1.1MM     |         |
| CP3                              | 59995     | ACCBL PICOT FOURCHE D1.1MM     |         |
| DZ1                              | 22577     | DIODE Z BZX84C 5V1 300MW SOT23 |         |
| F1                               | 59995     | ACCBL PICOT FOURCHE D1.1MM     |         |
| F2                               | 59995     | ACCBL PICOT FOURCHE D1.1MM     |         |

| +-- Value Tab Head -----+        |           |                                |                           |
|----------------------------------|-----------|--------------------------------|---------------------------|
| Part:W1301914 Drawing:W4S131509B |           | Copy In Part:                  | Draw:                     |
| Desc:ASU MULTIPLICATION AU CARRE |           | ECL:0                          | Modified:02/03/95 By:DEHF |
| +-- Value Tab -----+             |           |                                |                           |
| Pos.                             | Component | Local Description              |                           |
| IC1                              | 56510     | IC 834/PAD AD834MULT 0.5GHZSO8 |                           |
| IC2                              | 56510     | IC 834/PAD AD834MULT 0.5GHZSO8 |                           |
| L1                               | 22874     | SELF CMS 1008 1.5UH 10%        |                           |
| L2                               | 22874     | SELF CMS 1008 1.5UH 10%        |                           |
| L3                               | 22874     | SELF CMS 1008 1.5UH 10%        |                           |
| L4                               | 22874     | SELF CMS 1008 1.5UH 10%        |                           |
| L5                               | 42179     | SELF CMS 1008 12NH 20%         |                           |
| R1                               | 53689     | RES CMS 274 1% 0.25W 1206      |                           |
| R2                               | 20765     | RES CMS 51.1 1% 0.25W 1206     |                           |
| R3                               | 20711     | RES CMS 10 1% 0.25W 1206       |                           |
| R4                               | 8854      | RES CMS 200 1% 0.25W 1206      |                           |
| R5                               | 20721     | RES CMS 68.1 1% 0.25W 1206     |                           |
| R6                               | 20724     | RES CMS 100 1% 0.25W 1206      |                           |
| R7                               | 20722     | RES CMS 82.5 1% 0.25W 1206     |                           |
| R8                               | 20765     | RES CMS 51.1 1% 0.25W 1206     |                           |
| R9                               | 20765     | RES CMS 51.1 1% 0.25W 1206     |                           |
| R10                              | 20726     | RES CMS 150 1% 0.25W 1206      |                           |
| R11                              | 20726     | RES CMS 150 1% 0.25W 1206      |                           |
| R12                              | 8854      | RES CMS 200 1% 0.25W 1206      |                           |
| R13                              | 20733     | RES CMS 562 1% 0.25W 1206      |                           |
| R14                              | 20724     | RES CMS 100 1% 0.25W 1206      |                           |
| R15                              | 20724     | RES CMS 100 1% 0.25W 1206      |                           |
| R16                              | 20722     | RES CMS 82.5 1% 0.25W 1206     |                           |
| R17                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                           |
| R18                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                           |
| R19                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                           |
| R20                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                           |
| R21                              | 20726     | RES CMS 150 1% 0.25W 1206      |                           |
| R22                              | 51836     | RES CMS 75 1% 0.25W 1206       |                           |
| R23                              | 20718     | RES CMS 39.2 1% 0.25W 1206     |                           |
| R24                              | 20726     | RES CMS 150 1% 0.25W 1206      |                           |
| R25                              | 20726     | RES CMS 150 1% 0.25W 1206      |                           |
| R26                              | 20715     | RES CMS 22.1 1% 0.25W 1206     |                           |
| R27                              | 20715     | RES CMS 22.1 1% 0.25W 1206     |                           |
| R28                              | 20721     | RES CMS 68.1 1% 0.25W 1206     |                           |
| R29                              | 8854      | RES CMS 200 1% 0.25W 1206      |                           |
| R30                              | 8854      | RES CMS 200 1% 0.25W 1206      |                           |
| R31                              | 73283     | RES CMS 47.5 1% 0.25W 1206     |                           |
| R32                              | 20730     | RES CMS 332 1% 0.25W 1206      |                           |
| SW1                              | 56425     | IC 630/SA630 S08               |                           |
| TR1                              | 56414     | TRSFO 1/1 5-1000MHZ CMS DIP6   |                           |
| TR2                              | 56414     | TRSFO 1/1 5-1000MHZ CMS DIP6   |                           |

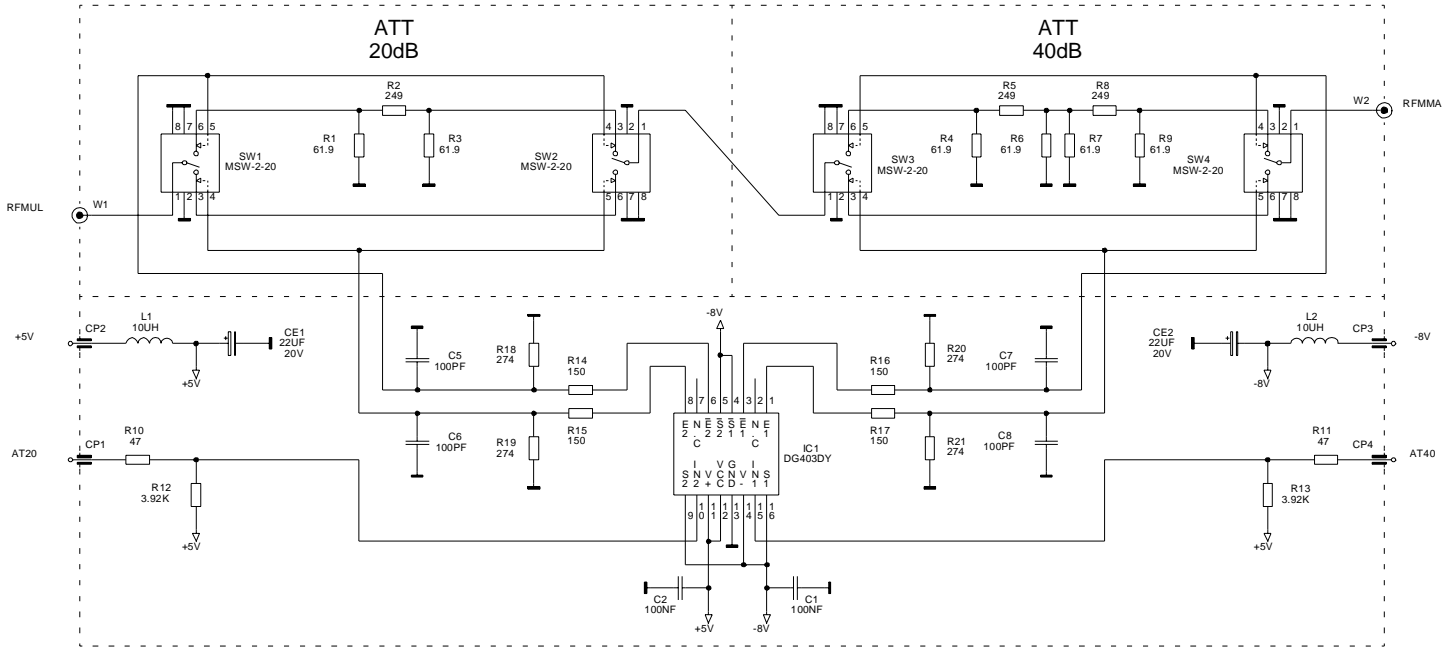
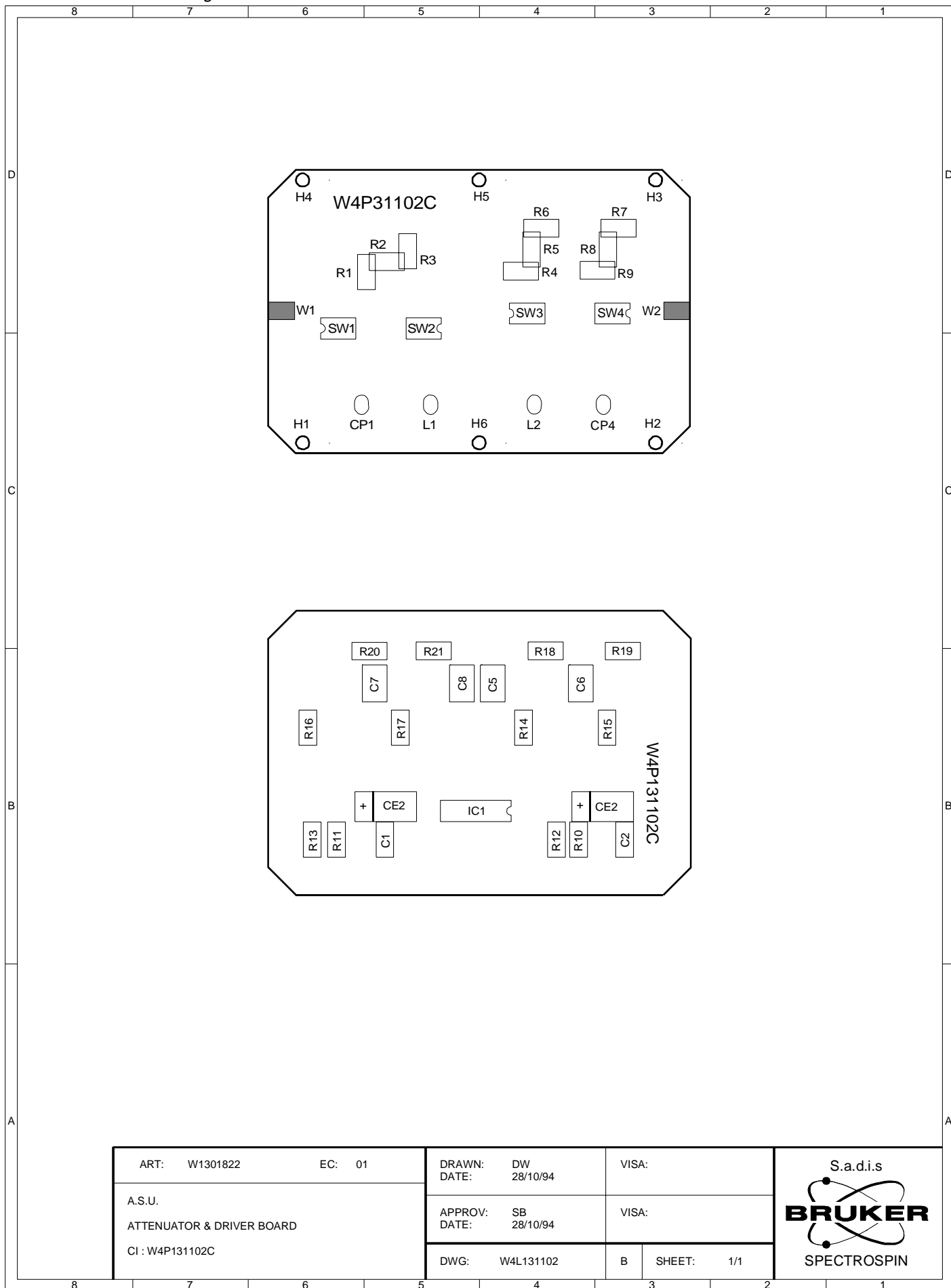


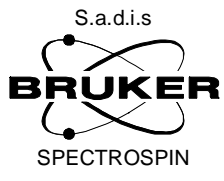
Figure 3.6. Attenuator Schematic

|   |        |                              |            |
|---|--------|------------------------------|------------|
| ART: W1301948                                       | EC: 01 | DRAWN: DW<br>DATE: 26/09/94  | VISA:      |
| AMPLITUDE SETTING UNIT<br>ATTENUATOR & DRIVER BOARD |        | APPROV: SB<br>DATE: 26/09/94 | VISA:      |
|   |        | DWG: W4S132081               | SHEET: 1/1 |

**S.a.d.i.s**  
**BRUKER**  
SPECTROSPIN

Figure 3.7. Attenuator Location



|  |        |                |       |   |
|--|--------|----------------|-------|---|
| ART: W1301822  | EC: 01 | DRAWN: DW      | VISA: |  |
| A.S.U.<br>ATTENUATOR & DRIVER BOARD<br>CI : W4P131102C |        | DATE: 28/10/94 | VISA: |   |
|  |        | APPROV: SB     | VISA: |   |
|  |        | DATE: 28/10/94 | B     | SHEET: 1/1  |
|  |        | DWG: W4L131102 |       |   |

## Value Table

| Value Tab Head                  |           |                                |                         |
|---------------------------------|-----------|--------------------------------|-------------------------|
| Part:W1301948 Drawing:W4S132081 |           | Copy In Part:                  | Draw:                   |
| Desc:ASU ATTENUATEUR & PILOTE   |           | ECL:0                          | Modified:27/10/97 By:MN |
| Value Tab                       |           |                                |                         |
| Pos.                            | Component | Local Description              |                         |
| C1                              | 8493      | COND CMS 1206 100N 50V 20% X7R |                         |
| C2                              | 8493      | COND CMS 1206 100N 50V 20% X7R |                         |
| C5                              | 30412     | COND CMS CDR14 100P 500V 20%   |                         |
| C6                              | 30412     | COND CMS CDR14 100P 500V 20%   |                         |
| C7                              | 30412     | COND CMS CDR14 100P 500V 20%   |                         |
| C8                              | 30412     | COND CMS CDR14 100P 500V 20%   |                         |
| CE1                             | 51557     | COND CMS TANTAL 22U 20V 20%    |                         |
| CE2                             | 51557     | COND CMS TANTAL 22U 20V 20%    |                         |
| CI1                             | W1356233  | CI ASU ATTENUATOR & DRIVER     |                         |
| CP1                             | 59995     | ACCBL PICOT FOURCHE D1.1MM     |                         |
| CP4                             | 59995     | ACCBL PICOT FOURCHE D1.1MM     |                         |
| IC1                             | 22554     | IC 403/SWI DG403DY SO16        |                         |
| L1                              | 30155     | SELF 10UH 0.14A                |                         |
| L2                              | 30155     | SELF 10UH 0.14A                |                         |
| R1                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                         |
| R2                              | 56314     | RES CMS 249 1% 0.25W 1206      |                         |
| R3                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                         |
| R4                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                         |
| R5                              | 56314     | RES CMS 249 1% 0.25W 1206      |                         |
| R6                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                         |
| R7                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                         |
| R8                              | 56314     | RES CMS 249 1% 0.25W 1206      |                         |
| R9                              | 8853      | RES CMS 61.9 1% 0.25W 1206     |                         |
| R10                             | 73283     | RES CMS 47.5 1% 0.25W 1206     |                         |
| R11                             | 73283     | RES CMS 47.5 1% 0.25W 1206     |                         |
| R12                             | 20744     | RES CMS 3.92K 1% 0.25W 1206    |                         |
| R13                             | 20744     | RES CMS 3.92K 1% 0.25W 1206    |                         |
| R14                             | 20726     | RES CMS 150 1% 0.25W 1206      |                         |
| R15                             | 20726     | RES CMS 150 1% 0.25W 1206      |                         |
| R16                             | 20726     | RES CMS 150 1% 0.25W 1206      |                         |
| R17                             | 20726     | RES CMS 150 1% 0.25W 1206      |                         |
| R18                             | 53689     | RES CMS 274 1% 0.25W 1206      |                         |
| R19                             | 53689     | RES CMS 274 1% 0.25W 1206      |                         |
| R20                             | 53689     | RES CMS 274 1% 0.25W 1206      |                         |
| R21                             | 53689     | RES CMS 274 1% 0.25W 1206      |                         |
| SW1                             | 56407     | SW ASGA CMS DC-1GHZ            |                         |
| SW2                             | 56407     | SW ASGA CMS DC-1GHZ            |                         |
| SW3                             | 56407     | SW ASGA CMS DC-1GHZ            |                         |
| SW4                             | 56407     | SW ASGA CMS DC-1GHZ            |                         |



# Specifications

# 4

## **Characteristics of Amplitude Setting Unit Double Channels**

**4.1**

The specifications below fit with the last upgrading of the unit. (February 1997)

### **RF specifications**

**4.1.1**

|                            |                               |
|----------------------------|-------------------------------|
| Frequency range            | 5 to 850 MHz                  |
| Gain                       | 1 dB $\pm$ 1 dB               |
| Input power                | 4 dBm $\pm$ 0,5 dB            |
| Output power               | 5 dBm $\pm$ 1 dB for 4 dBm IN |
| Input VSWR                 | 1.4                           |
| Output VSWR                | 1.5                           |
| Power out 1 dB Compression | 5 dBm                         |
| Output harmonics H2        | - 30 dBm                      |
| Output harmonics H3        | - 30 dBm                      |

### **Amplitude control**

**4.1.2**

|           |   |
|-----------|---|
|           | from 0 to +1V/-1V 100 $\Omega$ balanced load (MOD & MULT) |
|           | Cubical law for Modulation                                |
|           | Square law for Multiplication                             |
|           | Digital input for 20dB & 40dB Attenuation                 |
|           | (1 : through - 0 : active)                                |
| SPF & BLK | (0 : through - 1 : blanked)                               |

### **Safety switch**

**4.1.3**

SPENAB digital input (1 : RF Off)  
(0 : RF On)

# Specifications

## Dynamics

4.1.4

---

|                        |   |
|------------------------|---|
| Dynamic range          | 120 dB  |
| Modulation dynamic     | 50 dB (50dB @ 600 MHz)<br>-40 dB (50dB* @ 800 MHz)                          |
| Multiplication dynamic | 40 dB (50dB @ 600 MHz)<br>-30 dB (40dB* @ 800 MHz)<br>(* = ± 2dB linearity) |
| Attenuators            | 20 dB (± 1dB) + 40 dB (± 1dB) @ 800 MHz                                     |

## Phase shift

4.1.5

---

|  |  |
|--|--|
| Modulation @ 50 dB Range (25°C)          | <15° for 600 MHz<br><25° for 800 MHz   |
| Multiplication @ 30 dB                   | <10° for 600 MHz<br><15° for 800 MHz   |
| Typical thermal stability (25°C to 50°C) | $\frac{\Delta\phi}{\Delta T} = -F \times 3.10^{-3} \text{ degree.K}^{-1}$<br>(example : F = 800 MHz, T from 300 to 315k ⇒ Δφ = -36°) |

## Isolation (SPENAB CMD), (MOD & MULT at max. level)

4.1.6

---

|  |          |
|--|----------|
| Isolation input / output                     | 70 dB    |
| Isolation input / output + ATT : 60 dB       | 110 dB   |
| Isolation input 1 / output 2 channel 2 (Off) | > 140 dB |
| Isolation input 2 / output 1 channel 1 (Off) | > 140 dB |

## Output noise level

4.1.7

---

|                                 |                   |
|---------------------------------|-------------------|
| Unblanked (MOD, MULT = 0V)      | < -135 dBm (1 Hz) |
| Unblanked (MOD, MULT = 2.5V)    | < -124 dBm (1 Hz) |
| Blanked (ATT = 60 dB, SPF = 0V) | Thermal noise     |

## Switching time

4.1.8

---

|                  |        |
|------------------|--------|
| Rise Time        | 200 ns |
| DC Ringing       | 150 mV |
| Fall Time        | 100 ns |
| DC Ringing       | 10 mV  |
| Propagation Time | 40 ns  |

## Characteristics of Amplitude Setting Unit Double Channels

### *DC requirements*

**4.1.9**

---

|             |        |
|-------------|--------|
| Supply +15V | 830 mA |
| Supply -15V | 360 mA |
| Supply +5V  | 120 mA |

### *Operating temperature*

**4.1.10**

---

|                            |               |
|----------------------------|---------------|
| Ambiance temperature range | +20°C @ +40°C |
|----------------------------|---------------|



# Figures

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