Salcom™

11-78-0000
SYNTHESIZED UHF 4 WATT
NRZ DATA TRANSMITTER

PRODUCT
INFORMATION

11-78 NRZ
UHF DATA TRANSMITTER

1.0   DESCRIPTION

The 11-78 is a stand-alone 4 watt NRZ data paging transmitter. It has a special modulator design capable of transmitting frequency shift keying down to DC, using a dual point modulation synthesizer.
The unit can be configured via an RS232 serial interface adapter (SALCOM 11-46) using the Product Support Disk (PSD) programming software.

The unit supports three inputs, PTT, DATA and BUSY. An internal data delay can be selected for use in simulcast networks, and a "maximum on air timer" (MOAT) can be implemented.
An independent PTT output is available, controlled by the MOAT or BUSY functions, for enabling external power amplifiers or aerial changeover relays.

Over temperature cutout: When the unit transmits at full power in a hot environment, a protective cutout may operate. This will reduce the output power to a safe level, and will reset when the unit temperature has fallen to below 70 deg. This cutout is designed to avoid permanent damage to the transmitter.

1.1   Year 2000 compliance statement:
SALCOM has made every effort towards year 2000 compliant systems and software. However, as our products are often used as system integration tools or rely on other systems, we cannot fully determine their behaviour in every environment.

Full Y2K Compliance can be defined as follows:

(1)   No value for current date will cause any interruption in operation
(2)   Date based functionality must behave consistently for dates prior to, during and after year 2000
(3)   In all interfaces and data storage, the century in any date must be specified either explicitly or by unambiguous algorithms or rules (like a 'pivot' date)
(4)   Year 2000 must be recognized as a leap year

The 11-78-0000 has no internal time or date reference. It is

therefore inherently Year 2000 compliant.

2.0   WARRANTY

Our Products are warranted for a period of 12 months from date of purchase against faulty materials and workmanship. Should any fault occur the unit should be returned to the vendor, freight pre-paid. Please include a description of the fault to assist with prompt return. Any unauthorized alterations or repairs will invalidate the warranty.

3.0   DISCLAIMER

All information provided in this document is carefully prepared and offered in good faith as a guide in the installation, use and servicing of our products. Installers must ensure that the final installation operates satisfactorily within the relevant regulatory requirements. We accept no responsibility for incorrect installation.

We reserve the right to change products, specifications, and installation data at any time, without notice.

4.0   MECHANICAL DESCRIPTION

The 1178 is enclosed in a solid aluminium box. All electrical connections are made via the D15 socket S2 or P2, the two pin power connector.
The unit can be mounted on a wall with 4 screws. It is advisable to mount it away from sources of heat, damp or vibration.

5.0   INSTALLATION

The configuration of the unit should be completed before installation.

The power supply should be connected as illustrated, at a voltage shown in the specification. The supply input is protected against reversed connection. The aerial connection is via the BNC connector, and should present a nominal load of 50 O, with a VSWR of better than 1.8:1. It is recommended to site the aerial a few metres away from the 1178 to avoid any possibility of RF feedback causing problems with the transmitter operation. An outside aerial is preferable, as it will provide better radio coverage.

External indicators consist of a power indicator GREEN LED, normally ON with very brief flashes to indicate healthy micro-controller operation.

The RED LED will indicate when the unit is transmitting. A flashing RED LED indicates the unit cannot transmit as either the synthesiser is out of lock or the *channel busy* input is active.

6.0   OPERATION

The 1178 will power on, and will remain in the standby mode until the PTT input is activated.

7.0   INITIATING TRANSMISSIONS

The transmitter will be placed in transmit mode by the PTT (Press To Talk) input being taken low. It will then turn the carrier on at the preset power level, as defined in the configuration. The carrier frequency will follow the Data1 input, a high input giving high frequency shift. Data2 input acts as a channel busy inhibit, when taken low it will stop the transmitter coming on air.

An input can be initiated with a transition to LOW (connection to GND or connection to <+3.5v) or HIGH (input floating or connection to >+3.5v).

8.0   TROUBLE SHOOTING

If the 1178 does not perform as required, the following points may lead to solving the problem.

Fault	Check
No illumination of Green LED	Bad power supply connection
PTT input activated but no transmission, red LED flashes	Transmit inhibit /Channel busy input active.
Unit transmits but nothing received	Poor aerial. Wrong frequency, Power too low. Unit too hot. Too much vibration
No RS232 serial communication	Comport connections, baud-rate (9600) no parity, eight data bits, one stop bit
Red LED flashes rapidly. No synthesizer lock.	Frequency out of range, Channel busy active.
Unit starts, but does not complete transmission	Poor supply volts, RF interference.
Does not remain in transmit mode	"Max On Air Time" too short

9.0   TUNING AND TEST

Equipment required.
- **!** PC running PROCOMM or BGTERM**.**
- **!** 11-46 programmer between 1178 and PC comm port.
- **!** Power supply. 13.8v 2A.

**Frequency and Loop Voltage adjustment.**
- **!** Connect the transmitter to a test set with coax.
- **!** Check +5v and +12v and check green light is blinking.
- **!** Send "SALTREE" then "TD", then "C", (TX on, low speed mod) check voltage on "loop" test pad.
- **!** Tune L2 for a nominal loop voltage of 2.5v If above 2.5v, adjust L2 core inwards, if below 2.5v, adjust L2 core outwards.
- **!** Check red light is on.
- **!** Test voltages on the test point +8v.
- **!** Send command "A", (data = 1) then hold down "1" until the read back number is 040. (This sets modulator to mid point).
- **!** Adjust CV1 for transmitter centre frequency error of 0.0kHz ±200Hz.

Carrier deviation adjustment.
- **!** With conditions as per end of previous section above:
- **!** Send command "1" or "2" until transmitter frequency is +4.5kHz ±100Hz. (High DAC value), or +2.25kHz (for 12.5kHz channeling)
- **!** Send command "B" (data = 0)
- **!** Send command "3" or "4" until transmitter frequency is -4.5kHz ±100Hz. (Low DAC value) or -2.25kHz.
- **!** Send command "C" (slow modulation)
- **!** View modulation on test set scope and adjust RV2 until edges and corners of waveform are clean, with minimum overshoot.

Output Power tuning and adjustment.
- **!** Conditions as per end of previous section:
- **!** Adjust Q13 quiescent current with no RF present. With a metal screwdriver crowbar L7 to the side of the frame and rotate RV3 for an increase in total supply current of 100-150mA. Check this when hot. The quiescent current should be 150mA maximum
- **!** Send command "8" or "7" until value of 001 to 010 is obtained
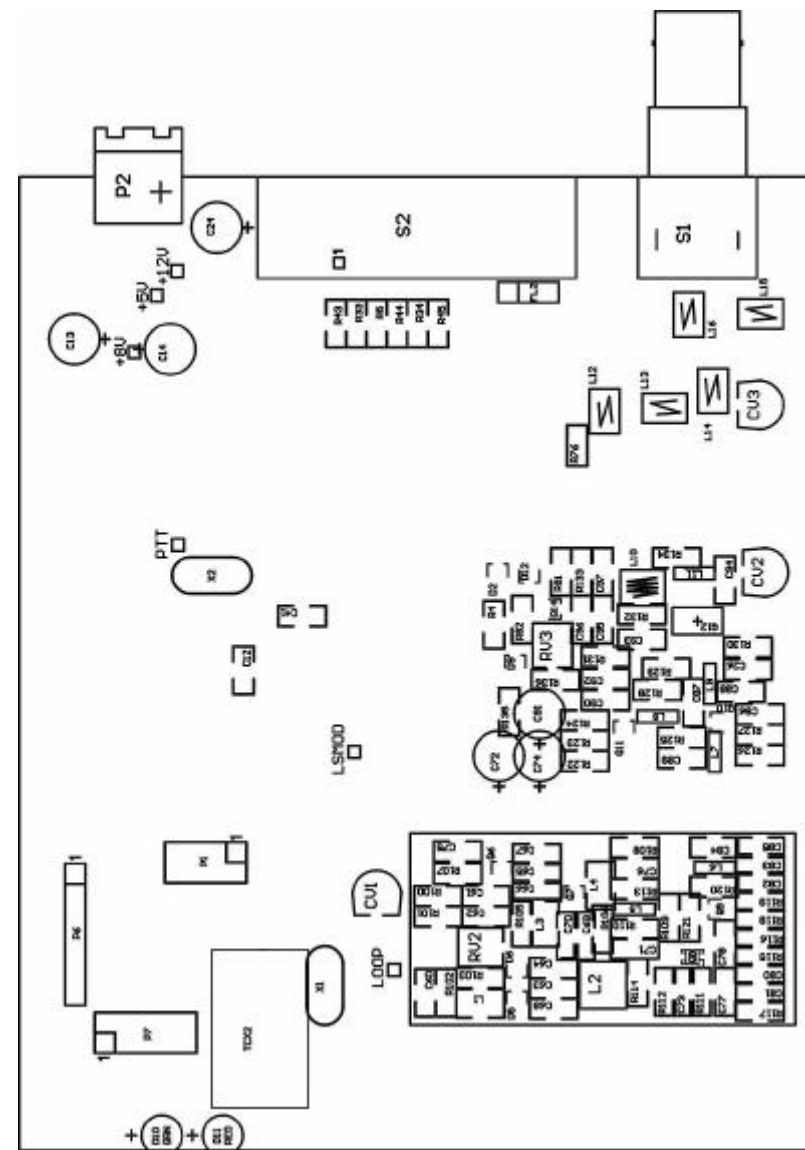
1178 Topside Components

! Adjust CV2 and CV3 for maximum output power. Power should be >4watts.
! Send "7" or "8" to adjust power to 4 watts or required output.
! Send command "E" and make sure transmitter turns off.

10   PROGRAMMING

10.1   Connecting the Programming adapter:

To change the configuration options, the unit must be connected via a SALCOM 1146 adapter to the serial port of a IBM PC compatible computer running the appropriate Product Support Disk (PSD) containing the software (S1172WE1.EXE) to program the 11-78. This software can be obtained from our WEB site, shown below.

Connect the SALCOM 1146 adapter to the 15way D type socket S2. To run the PSD, place the disk into floppy drive A. At a DOS prompt, type A: <enter> S1172WE1 <enter>.

Correct communication between the 1178 and the PC comm port is indicated by the ID and product number appearing in the bottom right hand corner of the screen. If these fail to appear, check the baud rate setting in File/Preferences.

10.2   USING THE PROGRAMMING SOFTWARE:

Once the program is running, the opening screen appears. Use the arrow keys or mouse to select various application layers and the configuration fields for each feature. At any time context sensitive help is available by pressing F1.

The PSD software allows the user to configure the following characteristics:
- C   RF carrier frequency
- C   RF carrier power
- C   Maximum ON AIR time.
- C   Low power operation in standby
- C   Simulcast delay.

The RF Carrier frequency can be selected within a F±3MHz band without adjustment of the VCO where F is frequency where the VCO loop voltage has been adjusted to 2.5 Volts. Outside that band some adjustment may be needed. Adjust L2 for 2.5V Loop Voltage.

11   SPECIFICATIONS

Power Supply	+11.5 V to 15.2 V nom 13.8 V
RF Frequency	450 - 470 MHz
Channel Spacing	12.5 KHz or 25 KHz
Output Power	4 Watts ±1dB 50 O
Power Consumption	Standby : 45 mA Low power standby - 15 mA Transmit: 1A approx
Modulation	Carrier FSK with NRZ data
Deviation	±2.25kHz or ±4.5kHz
Baud rate	512 or 1200 Baud
Modulation	NRZ FFSK
Spurious Outputs	-36dBm or less
Serial input/output	RS-232 (DCE), 9600 baud no parity, 8 data bits, 1 stop bit
Discrete inputs	Pulled up to +12v (47K), ground to activate. Threshold approx 3v
Discrete outputs	+12v on P5 pin 8&15 (200mA max). PTT on S2 pins 7. (20mA sink with diode to 12 V)
Case Dimensions	160 x 110 x 30mm
Type Approvals	New Zealand - Australia AS4295
Transmit duty cycle	Up to 50%

Connections for S2

Pin No	Function	Pin No	Function
1	Ground	9	Not used
2	Not used	10	Not used
3	Data Inp. 2 / Chan busy	11	Not used
4	Not used	12	Not used
5	PTT input	13	Data Input 1
6	Serial TD	14	Serial RD
7	PTT output	15	+13.5V output
8	+13.5V output		

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